ENVIRONMENTAL ASSESSMENT

for the

TENNESSEE LIME
LANDSCAPE MANAGEMENT PROJECT

EA # OR117-06-02

U.S. DEPARTMENT OF INTERIOR
BUREAU OF LAND MANAGEMENT
MEDFORD DISTRICT
GRANTS PASS RESOURCE AREA

July 2006

Dear Reader,

We appreciate your interest in the BLM's public land management activities. Public involvement for the Tennessee Lime Landscape Management Project began in July 2005 when approximately 500 scoping letters were sent to residents and landowners near or adjacent to BLM parcels within the planning area, to federal, state, and county agencies, and to private organizations and individuals that requested information concerning projects of this type. An open house meeting has held in September 2005 and a field trip was conducted in October 2005. The portion of the Free and Easy 2 project in the Kerby watershed is also included in the Tennessee Lime project. The original EA for Free and Easy 2 was completed in 2000. The fuels work analyzed under that EA has been completed and no timber was harvested under that project. Public input on Free and Easy 2 was also incorporated into planning for the Tennessee Lime Landscape Management Project. Responses to questionnaires, personal discussions and comment letters provided public input to BLM for consideration in the environmental assessment (EA). All public input was considered by the planning and interdisciplinary teams in developing the proposals and in preparation of this EA.

We appreciate your taking the time to review this EA. If you would like to provide us with written comments regarding this project or EA, please send them to me at 2164 NE Spalding Ave., Grants Pass, OR 97526.

If confidentiality is of concern to you, please be aware that comments, including names and addresses of respondents, will be available for public review or may be held in a file available for public inspection and review. If you wish to withhold your name and address from public review or from disclosure under the Freedom of Information Act, you must state this clearly at the beginning of your written comment. Such requests would be honored to the extent allowed by law. All submissions from organizations or officials of organizations or businesses will be made available for public inspection in their entirety.

I look forward to your continued interest in the management of our public lands.

Abbie Jossie
Field Manager
Grants Pass Resource Area

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
MEDFORD DISTRICT

EA COVER SHEET

RESOURCE AREA: *Grants Pass Resource Area* EA # OR-117-06-02

ACTION/TITLE: *Tennessee Lime Landscape Management Project*

LOCATION: T38S, R8W, Sections 26, 27, 33, 34, 35
T39S, R8W, Sections 1, 3, 5, 9, 11, 14, 15, 17, 18, 19, 29

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1.0 Purpose of and Need for Action

1.1 Introduction and Plan Conformance

The purpose of the proposed action is to implement the Medford District Resource Management Plan and to address a variety of needs in the project area. The purpose of this environmental assessment (EA) is to evaluate a range of alternatives, assessing regulatory compliance and efficacy in meeting project area needs, and to determine if preparation of an EIS is required. The EA would assist in the decision making process by assessing the environmental and human effects resulting from implementing the alternatives. This EA complies with the following decisions and plans:

(1) Final EIS/ROD for the Medford District Resource Management Plan (RMP) (1995).
(2) Final Supplemental EIS on Management of Habitat for Late-Successional and Old-Growth Forest Related Species within the Range of the Northern Spotted Owl (1994).
(3) ROD for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl and its attachment A entitled Standards and Guidelines for Management of Habitat for Late-Successional and Old-Growth Forest Related Species within the Range of the Northern Spotted Owl (NWFP)(1994).
(4) Final SEIS for Amendment to the Survey & Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines (2000), and the Record of Decision and Standards and Guidelines for Amendment to the Survey & Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines (2001)
(5) ROD Amending Resource Management Plans for Seven Bureau of Land Management Districts and Land and Resource Management Plans for Nineteen National Forests Within the Range of the Northern Spotted Owl, and its Final SEIS for the Clarification of Language in the 1994 Record of Decision for the Northwest Forest Plan amending wording about the Aquatic Conservation Strategy (2004).
(6) Medford District Noxious Weed Environmental Assessment (1998).
(7) ROD for Management of Port-Orford Cedar in Southwest Oregon (2004)

In addition to the documents cited above, project planning drew from information and recommendations from the following:

(1) Kerby Watershed Analysis (USDI 1995)
(2) Illinois River/Josephine Creek Watershed Analysis (USDA 1999)
(3) Rogue River/South Coast FY04-08 Timber Sale Projects Biological Assessment (July 2003) and USFWS Biological Opinion (#1-15-03-F-511, October 2003).
(4) 2003 Survey and Manage Annual Species Review (Forest Service Memorandum, November 20, 2001, file code 1900/2620; BLM Information Bulletin No. OR-2002-033).
(5) Visual Resource Contrast Rating BLM Manual Handbook 8431-1
(6) BLM Manual 6840 – Special Status Species Management (2001)
(7) National Fire Plan (NFP) (2000)
(8) NFP 10-year Comprehensive Strategy and Implementation Plan (2002)
(9) Josephine County Integrated Fire Plan (2004)
(10) Illinois Valley Fire Plan (2005)
(11) Healthy Forest Restoration Act (2003)
(12) Healthy Forest Initiative (2003)

1.2 Purpose of and Need for Action

The proposed action is designed to meet a variety of resource, social and economic needs:

- Management of the watershed in a manner that would provide for and promote a wide variety of non-commodity outputs and conditions including wildlife habitats, sustainable forest conditions, fuel hazard reduction, recreation opportunities, maintenance or improvement of water quality, and fisheries.
- Contribution to the Medford District's timber harvest / forest products commitment on matrix lands, thus helping meet the demand for wood products locally, regionally and nationally.

1.2.1 Fuel Hazard Reduction

Ninety-six percent of the project area lies in National Fire Plan (NFP) designated Wildland Urban Interface (WUI) and 35% is in the Community at Risk (CAR) boundary. The Kerby sub-watershed classifies into fire regime condition class (FRCC) 3. FRCC 3 is the greatest departure from the reference condition for vegetation, fuels and disturbance regimes. As a result, vegetation attributes, fuel loading, and fire behavior have been significantly altered. Condition class 3 represents a greater risk for increased fire size, intensity, and severity.

The purpose of fuel treatments is to proactively treat natural and activity fuels to reduce the time of elevated hazard and to reduce the potential for high intensity ground fire in the event of a wildfire. Treatments are designed to reduce canopy base height and surface fuels and decrease canopy bulk densities by reducing stand density.

1.2.2 Health and Structural Diversity of Forest Vegetation

With the exception of previously treated areas, tree densities are extremely high with most forests at or near full site occupancy (85-100%). The overcrowding is causing density dependent mortality, crown recession, reduced individual tree vigor, shading of large hardwoods, and exclusion of new regeneration. In mature forests many of the overstory pines and large hardwoods are dead, dying or declining in health. In young and mid-seral forests, structural development is delayed by intense competition for resources. In some riparian areas, simplified stand structure has reduced instream large wood recruitment and wildlife habitat. Many of these stands maintain high vegetation density, reducing tree and stand vigor.

The purpose of forest thinning is to increase growth rates, species diversity, and forest health. In riparian areas, thinning would increase growth rates, decreasing the time to mature stand structure for instream large wood recruitment and wildlife habitat.

<u>Commodity Production</u>

As stated in the RMP, an objective of matrix land is to produce a sustainable supply of timber and other forest commodities to provide jobs and contribute to community stability. The requirement to produce forest commodities was further emphasized in the settlement agreement between the forest industry and federal land management agencies (Douglas Timber Operators, et al. v. Secretary of Agriculture, et al., Civil No. 01-6378-AA (D. Oregon)) which identified matrix and O&C land as the primary land allocations for forest product production. The O&C Act requires the BLM to manage O&C lands for permanent forest production on a sustained yield basis while protecting watersheds, and manage in accordance with other environmental laws (RMP p. 17).

Public involvement throughout the Illinois Valley identified an increasing desire to improve local economies through stewardship contracting, biomass utilization, and special forest products. Currently, there are few opportunities in the Illinois Valley offering stewardship contracting and biomass utilization.

Closely tied to improving health and structural diversity of upland and riparian forest stands is commodity production. The purpose of commodity production is to help meet the demand for wood products and contribute to the Medford District's commitment on matrix lands to produce a sustainable supply of forest products.

Road Maintenance

Some roads in the project area route water and sediment into the channel network, reducing road safety and increasing sedimentation. Lack of road maintenance hinders fire suppression and public access. The purpose of road maintenance is to address erosion problems, increase road safety and improve access for fire suppression and the public.

Wildlife Habitat Restoration

Jeffrey pine on serpentine dominated soils is experiencing shrub encroachment above levels that would be maintained under a more regular disturbance regime (i.e. periodic fire). Brush fields are becoming senescent and in some areas impede movement of large mammals. Senescent brush provides poor browse for deer, rabbits and other herbivores. Pine and oak dominated stands are being encroached on by Douglas-fir, resulting in over-dense stands.

The purpose of wildlife habitat restoration is to reduce encroachment, rejuvenate senescent brush fields, improving browse and access for a variety of animals. Treatments would restore forests, particularly pine forests and oak woodlands to conditions closer to historic levels.

1.3 Project Location and Land Use Allocations

The project area is in the Illinois River/Josephine 5th field watershed. Project area maps are in Appendix A. Land use allocations are matrix (Southern General Forest Management Area) and riparian reserve, with inclusions of spotted owl late-successional reserves.

Matrix land allocation comprises approximately 8% of the Grants Pass Resource area. The Tennessee Lime Project area includes 6,036 acres of BLM lands of which 4,647 acres are revested Oregon & California Railroad (O&C) land grant lands and 1,389 acres are former public domain (PD) lands, all within the matrix land allocation. Approximately 1,011 acres of the Kerby watershed are in riparian reserves. As stated in the RMP (pp. 38-39) objectives for matrix land are to:

- 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 late-successional and younger forests.
- 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.

1.4 Issues and Concerns

A variety of issues and concerns were raised during project scoping by interested individuals or groups outside the BLM, and by BLM's interdisciplinary team. In this EA an issue is something unique to the project area that may need particular consideration and which may contribute to defining a particular action alternative. Pertinent issues are listed below. Many of these issues were identified through public scoping and the Kerby Watershed Analysis, and were used in the design of the proposed project and alternatives. In some cases, an issue was initially considered by the planning team and then eliminated from further analysis because it was not within the scope of the project or did not meet the purpose and need. These are summarized in Appendix D.

- Port-Orford Cedar (POC), found primarily in riparians areas in the serpentine portions of the project area, is at risk of exposure to *Phytophthora lateralis*, an exotic root disease.
- Several species of noxious weeds (*Centaurea pratensis* and *Cytisus scoparius*) are in the project area with potential for new populations of noxious weeds to become established especially along roadways.
- High stand densities throughout the project area have reduced vigor of conifers and shade intolerant species (i.e., ponderosa pine, sugar pine, black oak, Pacific madrone).
- Connectivity of low elevation late-successional forests across BLM lands is limited due to non-management related issues such as development and edaphic soil factors.
- Vegetation conditions combined with increasing rural residential development in the project area are continuing to increase the fire hazard and risk.
- Social issues include potential project effects on domestic and municipal water, visual resources, recreation, and the local economy.
- Simplified and dense forest stand conditions do not provide diverse terrestrial habitat.
- Coho salmon and critical habitat are in the planning area. Many riparian reserves are deficient in terrestrial and aquatic large woody material, have excessively dense stands and low complexity of in-stream habitat. The watershed contains streams listed on the ODEQ 2002 303(d) list as water quality limited for high summer water temperatures.

2.0 Proposed Action and Alternatives

2.1 Alternative 1: No Action

The "no-action" alternative is defined as not implementing any aspect of the action alternatives. Defined this way, the no action alternative also serves as a baseline or reference point for evaluating the environmental effects of the action alternatives. Inclusion of this alternative is done without regard to the decision made in the Medford District RMP and without regard to meeting the purpose and need for the project.

It should be pointed out that the no action alternative is not a "static" alternative. It is implied that the present environmental conditions and trends will continue. This would include trends such as vegetation succession, fire hazard, and road conditions.

2.2 Alternatives 2 and 3

Two action alternatives are proposed and analyzed. These represent treatment alternatives designed to meet the purpose and need as well as the stated objectives.

Within each alternative, proposed treatments are organized based on broad types of action (e.g., road work, riparian restoration, fisheries enhancement, vegetation treatments, etc. In designing the two action alternatives, other options or alternatives were considered. Generally, these options were incorporated into one or both of the action alternatives or were briefly described in Appendix D, Alternatives Considered but not Analyzed in Detail. Table 1 summarizes vegetation treatments for each alternative. Project design features (Chapter 2) are an integral part the action alternatives.

Table 1. Treatment Summary

Treatment	Alternative 2 acres (% 6th field watershed)	Alternative 3 acres
Commercial harvest (matrix)	396 (2%)	672
Fuel hazard reduction (matrix)	1,195 (6%)	546
Commercial harvest (riparian reserves)	193 (1%)	397
Non-commercial treatments (riparian reserves)	711 (4%)	403
Estimated volume (matrix)	2.8 mmbf	2.0 mmbf
Roads	Common to alternatives 2 and 3 (see App. C)	
Restoration thinning (not part of the commercial timber sale) (matrix and riparian reserves)	0	146
Young stand management (matrix and riparian reserves)	221 (1%)	221

2.2.1 Fuel Hazard Reduction

Objectives

Ninety-six percent of the project area is in the National Fire Plan (NFP) designated wildland urban interface (WUI). Thirty-five percent of the project area is designated as community at risk (CAR) as described in the Federal Register. The NFP and its 10-Year Comprehensive Strategy and Implementation Plan, the Josephine County Integrated Fire Plan (JCIFP) and the Illinois Valley Fire Plan place strong emphasis on reducing potential wildfire severity in these areas. The NFP also directs fuel hazard reduction in these areas to decrease the risk to residences, businesses and resources. Fuel reduction includes both activity generated fuels and natural fuel loading.

Activity fuels are surface fuels that have been created as a result of stand treatments (precommercial thinning, brushing, and older seral stage stand treatments) described in the vegetation treatment section. These activity generated surface fuels increase fuel hazard until they are treated. As the Sierra Nevada Ecosystem Project Report (1996) points out (p.4):

> Timber harvest, through its effects on forest structure, local microclimate, and fuel accumulation, has increased fire severity more than any recent human activity. If not

accompanied by adequate reduction of fuels, logging (including salvage of dead and dying trees) increases fire hazard by increasing surface dead fuels and changing the local microclimate. Fire intensity and expected fire spread rates thus increase locally and in areas adjacent to harvest. **However, logging can serve as a tool to help reduce fire hazard when slash is adequately treated and treatments are maintained** [emphasis added].

Natural fuels are those that exist as a part of the current stand / vegetation type and configuration. Fire exclusion, and vegetation growth and succession in the absence of frequent, low to moderate severity wildfire events has resulted in conditions of high fuel hazard in the project area. Surface fuel loads are high, ladder fuels are extensive, and lower, middle and upper canopies are dense. Consequently, there is a very high potential for high intensity and high severity wildfire.

The objective of proposed fuel hazard reduction is to alter fuel loadings and configuration to reduce the potential for high severity fire, reduce the time of elevated hazard, and make suppression efforts safer and more effective in the event of a wildfire, thereby protecting resource values and adjacent private property.

Proposed Actions

Two proactive fuel hazard reduction alternatives would reduce standing live fuels and surface fuels by removing small trees and flammable brush ≤8" dbh. The alternatives differ in the extent (acreage) and distribution of proposed units (Appendix A). In all instances where the "home ignition zone" of a residence or structure on private land extends onto BLM, consultation with the land owner would identify any special fuel treatment work necessary to reduce the wildland fire threat to the structure / residence.

Fuel treatments proposed in alternatives 2 and 3 (Appendix B, Unit Treatments) reflect the current best judgment regarding fuel hazard reduction. Proposed treatments may be adjusted based on interdisciplinary team post-harvest review of conditions and on considerations of site specific physical, biological, and social features at the time of review. Treatment adjustments would still fall within the range of treatments analyzed and proposed in this EA.

Fuel Hazard Reduction Techniques

Activity fuels would be treated in all units proposed for harvest in mid and older seral stage stands and in some young stands (generally within the CAR boundary). Activity and natural fuel treatments would be similar. The method of treatment is as follows:

Initial fuel reduction: Understory vegetation would be thinned using manual and mechanical techniques (slashing, pruning) to the desired tree densities and stocking levels. Slash would then be handpiled and burned (HP/B). In areas where biomass utilization has been identified as a potential treatment option, efforts will be made to identify and develop economically and ecologically viable alternatives for biomass removal. The remaining fuels not utilized would be handpiled and burned or underburned.

Maintenance Underburning: Frequent, low intensity underburns would follow initial fuel reduction to maintain desired fuel conditions. It is estimated that maintenance burning throughout the project area would be on a 7-15 year rotation, depending on vegetation responses and fuel loading. Maintenance burning that would occur more than five years following the issuance of a decision on this project would be assessed for adequacy of existing NEPA analysis

at that time. Prior to maintenance underburning, approximately 90% of madrone (and some oak) resprouts (one to three stems on each plant would be retained) would be cut.

Treatment Descriptions

A variety of tools would be used to reduce fuel/fuel hazards and to achieve ecological goals for habitat enhancement.

Slashing (SL) Understory vegetation density would be reduced by cutting and spacing of conifers <8" dbh and hardwoods <12" dbh. Retained vegetation would be spaced 14-45' apart. Within this range, wider spacing would be used for larger leave trees or for species such as pine or oak which thrive in less dense conditions. Vegetation diversity would be obtained by maintaining species occurring at low frequencies in the stand (i.e. Pacific yew, pine, vine maple). Untreated vegetation groups ranging in size from 1/10 to two acres would be retained.

Pruning (PR) – To reduce ladder fuels, live and dead branches close to ground level which allow fire to climb into the overstory would be removed to a height of 6-12' from the ground. Pruning is primarily used on road side vegetation with control problems (e.g. power lines) or near boundary perimeters. Pruned slash would be hand piled and burned. No pruning would occur in riparian reserves.

Hand piling and burning (HP) is typically used when underburning is not possible due to heavy fuel loads. Sticks 1-6" diameter and longer than two feet would be piled by hand. The piles would be covered with plastic to create a dry ignition point and would be burned in the fall or winter when the risk of fire spread (scorch or mortality) to nearby residual trees and shrubs is minimized. It is expected that hand piles would be burned in the first winter or early spring following the construction of the pile unless fuels have not cured or atmospheric conditions are not conducive for adequate smoke management.

Understory Burning (underburning) (UB) is used where the objective is to maintain ≥80% of the overstory. The objective is to reduce dead and down woody material, shrubs and small trees in the understory, and live and dead branches close to the ground. Underburning is conducted throughout the year when fuel and weather conditions permit. Typically, burning occurs between fall and spring. Summer or early fall burning is less common, but can be feasible to meet resource objectives and when risk of fire escape can be mitigated.

Underburning is conducted using hand ignition methods and drip torches as the primary ignition device. Desired fire intensity is site specific based on the desired site conditions, vegetation type and size and fuel loadings and would be controlled by number and spacing of burn strips. Most underburns require a control line around the burn area. Existing natural control lines such as major streams and rocky areas or man made barriers such as roads are used as much as possible to minimize soil disturbance. In the absence of existing control lines, hand lines would be constructed using chainsaws and hand tools. Hand lines consist of the removal of all fuels down to mineral soil for a width of 1-3 feet, depending on fuel loading. Water bars would be used on slopes exceeding 10%. Hand lines would rehabilitate naturally and would likely be used during maintenance underburn.

Broadcast Burning (BB) is prescribed in areas with little to no forest stand present. Generally, it is used in grass and shrublands for ecological and fuel reduction purposes. Broadcast burns are conducted using hand ignition or aerial ignition.

Biomass removal: Biomass is any dead or living vegetation in a fuels unit that is ≤8" in diameter for conifers and ≤12" for hardwoods. For slopes <35%, mechanized low ground pressure machinery would cut, skid, haul or chip biomass. On slopes >35%, biomass would be cable yarded.

Alternative 2
Fuel hazard reduction would be implemented on approximately 1,900 acres, focusing on areas in the CAR, along ridge tops and roadways that have strategic importance in wildfire suppression (Table B-2). In addition, 589 acres of activity fuels would be treated. Treatments would include a combination of slashing, hand pile and burning, and under burning and would depend on fuel type and loading. Fuel hazard reduction in riparian and Jeffrey pine areas would also occur. Treatments are anticipated to take place over a 3 to 6 year period.

Biomass may be removed during initial fuel hazard reduction. Approximately 1,600 acres of ground based extraction and 310 acres of cable based extraction are proposed. It is anticipated that actual acres treated would be less due to economic, safety and access limitations. Additionally, in riparian areas, biomass removal would be limited to areas accessed by existing roads and skid trails (see PDFs). Treatments would reduce hazardous fuels while utilizing the biomass to benefit the local economy. In areas where biomass extraction is not feasible, hand piling and burning would occur. Ground based methods would utilize existing skid trails whenever possible. Non-harvest units would require the designation of skids trails, spaced approximately 75' apart.

Alternative 3
Fuel hazard reduction work would be implemented on approximately 877 acres, focusing on areas in the CAR, along ridge tops and roadways that have strategic importance in wildfire suppression (Table B-2). In addition, 1,070 acres of activity fuels would be treated. Treatments would include slashing, hand pile burning or under burning and would depend on fuel type and loading.

Alternative 3 fuel hazard reduction would create a fuel break around communities for safer and more effective structure protection and provide wildland fire fighters anchor points for indirect fire fighting. Fuel hazard reduction in riparian reserves will be discussed further in the riparian reserve sections. Treatments are anticipated to take place over a 3 to 6 year period.

Proposed biomass removal is identical to Alternative 2.

2.2.2 Older Seral Stage Stand Treatments

Objectives
Objectives of alternative 2 are to reduce stand densities, increase diameter growth rates of remaining trees, perpetuate the historic mixture of tree species, promote multi-layered stand structure, reduce the risk of a stand replacing fire, and contribute to the BLM's commitment to provide forest products.

1. Reduce stand densities: Growth stagnation, resulting from abnormally high tree densities renders even the dominant trees highly susceptible to bark beetles, defoliating insects, dwarf mistletoe, and root diseases (Knutson et. al. 1986; Byler and Zimmer-Grove 1991; Cochran and Barrett 1995; Filip et al. 1999).

2. Perpetuate the historic mixture of tree species: Fire exclusion has created a shift from fire-tolerant (ponderosa pine and black oak) to less fire-tolerant species (Douglas-fir) (Atzet 1995). Pines and black oaks require openings and bare mineral soil for regeneration. Overstory trees are experiencing intense competition from abnormally high tree densities, resulting in reduced vigor and subsequent mortality.

3. Promote / retain a multi-layered stand structure: Manage for multi-layered stands by prescribing treatments that maintain existing desired structure, or by prescribing silvicultural treatments that create conditions that are favorable for the initiation of desired species and stand conditions such as the creation / retention of snags, down wood, large vigorous hardwoods, and understory vegetation diversity (Tappeneir and McDonald 1979; Berg 1996; White 2001).

4. Reduce the risk of a stand replacing fire: Vegetation density and composition, surface fuels and fuel arrangement are factors which influence fire behavior that can be directly manipulated to reduce the risk of a stand replacing fire (Agee 1993; Graham et al. 1999).

5. Contribute to the BLM's commitment to provide timber / forest resources to the local economy: Harvest would be balanced with other stated RMP objectives. In order to provide a sustainable supply of timber some proposed actions may focus more on future stand development.

The primary objective of alternative 3 is to reduce the risk of a stand replacement fire (objective #4 above). The secondary objective for older stands is to reduce densities in order to increase individual tree growth and vigor. It is recognized that the biggest threat to forest stands in the project area is fire due to high surface and ladder fuels. This alternative focuses more on removing these fuels and retaining a higher amount of canopy than in alternative 2 (see proposed action for specific differences).

Prescription Descriptions

Density management (DM) is typically prescribed for uneven-aged stands for the primary purpose of widening the spacing of residual trees in order to promote the growth and structural development of the remaining stand. Many of these stands developed in conjunction with disturbance (fire, insects, harvest, etc.) and have several layers containing multiple species. Spacing of the residual trees would use the crown radius of the healthiest dominant and co-dominant trees to achieve an average relative density of 35% with variations between 30 and 40%.

Modified group selection (Mod GS) is the removal of trees around selected pine or non-tanoak hardwood trees. This treatment removes those trees (usually Douglas-fir) that are competing with vigorous pines and non-tanoak hardwoods. It favors and retains large vigorous ponderosa and sugar pines and non-tanoak hardwoods with greater than 30% live crown ratio. The treatment seeks to increase the potential for pine or non-tanoak hardwoods to survive and regenerate.

Density Management/Understory Reduction (DM/UR) is prescribed for older seral stands which may provide multiple forest products (ie. poles, sawlogs, firewood, special products) or opportunities for restoration (i.e. prescribed burning, planting, etc.) Densities in these older seral stands are highly variable; some have a continuous overstory canopy while others are more patchy with high densities in the mid and lower tree layers. In areas with a continuous canopy,

removal would occur primarily from below (the smallest diameter trees) to achieve a target canopy closure of 60%. In more patchy areas, overstory closure is currently <60% so the prescription for these areas would retain the most vigorous large trees in patches while thinning lower and middle tree layers to accelerate development of a multi-layered structure.

Restoration thinning (RT) is prescribed for areas in which oaks and pines are more abundant than in the more mesic Douglas-fir/tanoak sites. Typically the oldest individuals are oaks and pines with a younger cohort of low vigor Douglas-fir. On these drier sites, vigorous pines and oaks would be the preferred leave species. Leave basal areas would be fairly low (60 to 80 ft2/acre) in order to restore the site to a pine/oak savannah condition. Once restored, maintenance underburning would maintain the site. No other thinning is anticipated in these stands because the low site is prohibitive to timber production.

Proposed Action
The proposed treatments described here apply to matrix lands and have been developed in order to meet the stated objectives. Riparian harvest treatments are described in detail in the following riparian reserve section of this chapter. The most appropriate prescription for each stand is selected depending on the focus of each action alternative. Specific unit treatments are shown in Appendix B. Following harvest, activity fuels would be slashed (SL), handpiled / burned (HP) and/or underburned (UB).

Alternative 2
Under this alternative 396 acres would be treated with density management/modified group selection (DM/Mod GS) to a relative density of 35%.

Alternative 3
Two prescriptions are proposed for older stands. Approximately 588 acres of Douglas-fir/tanoak stands would be treated with density management/understory reduction (DM/UR) to a variety of density targets depending on stand structure. Approximately 84 acres of pine stands would be treated with restoration thinning (RT) to promote a more open stand condition that more closely resembles pre-fire exclusion conditions.

2.2.3 Young Stand/Forest Development

Objective
Conifer plantations are experiencing intense competition from brush and hardwoods and need to be managed in order to reduce stand densities, promote species diversity, and maintain vigorous crowns. Surplus vegetation would be cut in order to accelerate growth, promote stand differentiation, and maintain the non-tanoak hardwood component for future stand diversity.

Proposed Action
The following types of treatments would be applied to meet the stated objectives:

Brushing (BR) - This treatment primarily removes brush, tanoak and excess non-tanoak hardwoods. All tanoak <12" dbh would be cut. Conifer leave trees <6" dbh would be spaced approximately 8' apart on most units; non-tanoak hardwoods <8" dbh would be spaced 25' apart.

Precommercial Thinning (PCT) / Selective Slashing (SL) - Surplus trees and brush would be cut or girdled. All tanoak <12" dbh and most brush would be cut. All sprouting hardwood stems not selected as leave trees and all surplus trees <8" dbh would be cut. Vigorous, well-formed

conifer leave trees would be spaced 14-16' apart. Non-tanoak hardwood sprout clumps would be thinned to the single largest stem and spaced 25-40' apart in the matrix. Non-tanoak hardwood sprout clumps in riparian reserves would be thinned to the single largest stem and spaced 25' apart. Retained stems in sprout clumps would be those with the largest diameter 2' above the ground, that are the straightest, have the best formed crowns, and have origins closest to the base of the stump.

Pruning (PR) - This treatment consists of selecting and pruning the largest, healthiest, best formed and least damaged conifers 3-10" dbh to an average 20' x 20' spacing. Trees would be pruned to a maximum height of 9'. All live and dead limbs, whiskers, and lateral sprouts would be removed using pruning shears or loppers to within ¼" of the main bole. Pruning would not be done in the first rows of trees along paved or rocked roads. Pruning would not occur in riparian reserves.

The locations of the proposed young stand treatments are outlined in Appendices A and B. Alternatives 2 and 3 include approximately 80 acres of pre-commercial thinning and 78 acres of brushing on matrix (see riparian reserve section for riparian acres). Following these activities, fuels (slash) would be handpiled and burned in the two young stands in the CAR. Outside the CAR, project slash would be evaluated for fuel hazard reduction based on the level of the fuel hazard, wildfire risk, and resource values. All acres may not be treated. The most common slash treatment would be hand pile and burning (HP). Other treatments options include lop and scatter (LS) or removal of slash as poles or firewood.

2.2.4 Wildlife Habitat / Jeffrey Pine Restoration

Objective
Jeffrey pine and shrub dominated serpentine soils are experiencing shrub encroachment above levels that would be maintained under a regular disturbance regime of periodic fire. The objective in these areas is to reintroduce fire, reduce brush encroachment to facilitate large mammal travel, restore the vigor of fire-adapted brush species, restore a variety of plant communities, and increase browse for large and small herbivores.

Proposed Action
Fuel hazard reduction treatments (described above) would be used to restore Jeffrey Pine savannahs by reducing the encroachment of Douglas-fir, incense cedar, and shrubs such as ceanothus and manzanita. Decadent brush and small diameter conifers would be targeted for removal; all vigorous pine and large limbed, open grown Douglas-fir would be retained. Manual treatment with chain saws may be done prior to burning to reduce potential of escape and to reduce fire severity. Small temporary fire lines may be constructed on the edge of the savannahs.

2.2.5 Riparian Reserves

Objective
High tree density in many riparian zones has reduced tree vigor and health. As a result, the time required for large tree development to function for wildlife connectivity and large wood recruitment has greatly increased. There is also a need to reduce fuel hazard. The objective of treating riparian zones would be to expedite large tree development for wildlife habitat and future instream large wood recruitment, improve wildlife habitat in oak savannah and pine stands, protect key resources from wildfire and reduce the risk of wildfire in riparian areas as well as the risk of wildfire spreading to adjacent areas and local communities.

Proposed Action

Alternative 2

Riparian reserve treatments would be based on local stand/vegetation conditions and would be designed to benefit aquatic systems and be consistent with ACS objectives (see below). Riparian reserve widths and no treatment zones are displayed in Table 2. Unstable and potentially unstable areas (areas showing active movement and indications of past movement) are considered riparian reserves (NWFP, p. C-30, C-31). Treatments would not occur in the no-treatment zone adjacent to stream.

Vegetation treatments would include precommercial thinning (PCT), brushing, slash and hand pile burning, and underburning in young stands. In older seral stands, commercial thinning and underburning would occur. Appendix B displays the riparian acres proposed for treatment and the associated treatment. There would be 711 acres of fuel hazard reduction, 193 acres of density management, and 72 acres of young stand management. Ignition of underburning would occur outside the no treatment buffers but could burn into the no treatment zone. Fuel hazard reduction work would include hand pile and burning, underburning, and slashing. Riparian treatments are also proposed to improve wildlife habitat in oak savannah and pine stands. All fuel treatments would retain conifers >8" dbh and hardwoods >12" dbh.

In thinning units outside the no treatment buffer, leave trees would be the largest in the stand. All trees showing old-growth trees characteristics would be retained. Trees leaning towards the stream would be retained over trees leaning away from the stream. The treatment can be described as density management / understory reduction with a target canopy closure of 50% in early and midseral stands and 60% for late seral stands.

Table 2. Riparian Reserve Widths and No Treatment Buffers

Stream Type	Riparian Reserve Width
Fish-bearing streams (none identified in project area)	330'
Perennial streams & springs and intermittent streams	165'
Unstable or potentially unstable areas	165'
No Treatment Widths	
Perennial streams & springs	50'
Intermittent streams	25'

Alternative 3

There would be 331 acres of fuel hazard reduction, 335 acres of density management, and 72 acres of young stand management. Riparian protection buffers and treatments are the same as alternative 2.

2.2.6 Roads

Objective

The planning objective is to minimize permanent road construction, improve road drainage, and maintain existing roads at levels consistent with planned long term road use. The proposal also seeks to reduce road densities at the watershed scale where possible and consistent with the anticipated long term resource management needs. There is also the need to provide road

systems that are safe for forest road travelers.

Proposed Actions
In order to increase driver visibility and road user safety, trees and roadside vegetation presenting a hazard would be thinned and pruned along the curves of haul routes listed in the table. Pruning in order to achieve driver visibility is to be favored over removal.

Hazard trees (dead and dying trees) that lean toward the road and are sufficiently tall to reach the roadbed would be felled and removed along BLM roads within the project boundary. Merchantable products may be removed through the small sales program. Hazard trees in the Riparian Reserve may be felled and left in place for large woody debris.

Roads that have been identified as having erosion and sediment problems would have their drainage improved in both action alternatives.

Specific proposed road work (construction, maintenance, decommissioning, etc.) for all alternatives is listed in Appendix C and displayed on Maps 3 and 4. The table lists the roads that would be used, constructed, improved, renovated, and/or decommissioned. Other proposed road work would be accomplished as future funding is available.

All action alternatives propose maintenance on 39 miles of road, renovation on 0.83 miles, and 0.65 miles of decommissioning. In addition, 1 mile of temporary road and 0.25 miles of permanent road would be constructed.

2.2.7 Special Forest Product (SFP) – Alternatives 2, 3, and 4

Objective

The objective is to provide a range of special forest products for sale/collection including but not limited to poles and firewood.

Description of Special Forest Product Activities

All special forest product (SFP) harvesting would be done in a manner that promotes attainment of the broader stand's silvicultural prescription and vegetation / fuels treatment objectives and pertinent project design features (Section 2.3 below). All timber harvest units (See Tables B-1, B-2 and B-3) would be available for SFP harvesting / collection. Materials resulting from activities associated with fuel hazard reduction, wildlife habitat restoration and enhancement and young stand treatments that could be utilized would be made available for purchase. SFP harvesting would be contingent on access availability.

2.3 Project Design Features

Project design features (PDFs) are included in the proposed action for the purpose of reducing anticipated adverse environmental impacts which might stem from project implementation. The PDFs noted below would be integral to all action alternatives unless otherwise noted.

2.3.1 Logging Systems

All Systems
All harvested trees would be limbed (≥ 3" diameter limbs) prior to yarding to reduce damage to the residual stand and minimize soil disturbance.

All natural surface landings constructed during the logging operation would be decompacted to a minimum depth of 18", seeded with native grasses, and mulched with native or weed free straw upon completion of harvest activity and before the onset of the rainy season. Landings that would be used in the future would not be decompacted.

In riparian reserves, trees would be directionally felled toward skid roads pre-approved for use. Priority for skid trail selection would be those that have not recovered from previous use. Site restoration treatments would be applied after yarding has been completed and would include such things as ripping / decompacting, water barring, seeding, tree planting and/or blocking as needed.

Unstable and potentially unstable areas are considered riparian reserves (NWFP Standards and guidelines pp. C30-C31). In unstable areas, the objective is to maintain or improve root strength. Therefore, in unstable areas (such as slip plains, step benches, recent debris flows or debris slides) vegetation would not be treated. Potentially unstable areas may be treated (selective slashing, hand piling and slash burning) where long term root strength can be maintained or increased.

Tractor Yarding
To reduce ground disturbance and soil compaction, yarding tractors would be limited to the smallest size necessary. Tractors would utilize one end log suspension during skidding and would be restricted to approved skid trails. Existing skid trails would be used when possible. Tractors would be restricted to slopes <35%. Tractors would not be used when soil moisture content at a 4-6" depth exceeds 25% by weight.

Skid roads would be water barred as needed for slope and soil type. Main tractor skid trails would be blocked where they intersect haul roads and would be decompacted or water barred shortly after yarding is completed to reduce erosion. Skid roads would be used only during the dry season. If a skid road in a riparian reserve is used for more than one season it would be winterized (water barred, covered with debris, etc.). In areas proposed for planting (Appendix B), ripped skid roads would also be planted. Other areas would be allowed to revegetate naturally.

Cable and Helicopter Yarding
In cable units, step landings would not be permitted. Cable corridors would be located away from draws and would be water barred as needed based on the slope and soil type.

All landings, including fill slopes, would be located away from headwalls, draw bottoms and adjacent draw side slopes. Existing stable roads and landings in riparian reserves would be reused to minimize new road or landing construction. All natural surface landings constructed during the logging operation would be decompacted after use, except landings on rocky ground or those planned for future use. Landings would be seeded with native grasses, mulched with

native, weed free straw, treated for effective drainage, or covered with slash following harvest and before the onset of the rainy season.

2.3.2 Seasonal Operating Restrictions

Table 3. Seasonal Operating Restrictions

Location	Restricted Activities	Restricted Dates	Reasons / Comments
Entire project area	All logging and log hauling operations	Oct. 15 to May 15*	Erosion control. Dates may vary depending on weather, road surface, drainage, and soil moisture.
Entire sale area – ¼ to ½ mile around any raptor nest	All timber harvest activities, road construction and chainsaw operation.	Variable depending on the species	Timber Sale E-4 Special Provision
1/4 mile radius around active spotted owl nest sites.	All timber harvest activities, road construction, chainsaw operation and prescribed burning	March 1 to June 30 (variable depending on nesting status)	Medford District RMP; Rogue River/South Coast FY04-08 Timber Sale Projects Biological Assessment and USFWS Biological Opinion (#1-15-03-F-511, 2003).
¼ mile no line of site and ½ mile line of site around active Bald Eagle nest sites	All timber harvest activities, road construction, chainsaw operation and prescribed burning	Variable - January 1 to August 15	Dates and restrictions depend on nest activity. Rogue River/South Coast FY04-08 Timber Sale Projects Biological Assessment and USFWS Biological Opinion (#1-15-03-F-511, 2003).
All harvest units and road construction ROWs.	Various activities depending on the species	Variable depending on the species	Restrictions only if special status species are located. (RMP; BLM 6840 Manual)
Entire project area	Fuel hazard reduction	Variable	Time fuel reduction treatments to reduce conditions that contribute to bark beetles in logging slash.

* An additional consideration would be made for continued road use and helicopter logging after rain events from October 15 to May 15 on some roads. Continued use would require roads that are well drained and have adequate surface stability (such as BST, crushed rock, grid roll rock, or pit run rock). The BLM would monitor road conditions during hauling, and road maintenance would be kept current with hauling. The affected area would be closed/blocked and weatherized if weather conditions change and hauling is suspended.

2.3.3 Special Status Plants and Noxious Weeds

For special status species, the size of the protection buffer would be determined on a case-by-case basis, depending on the species and its habitat requirements but would be a minimum of a 20' radius for sensitive species. Burns in areas containing special status plant species would follow prescriptions that would result in cool burns which would minimize potential damage to plant populations. Prescribed fire operations would be done in manner which strives to reduce or eliminate burning through identified special status plant populations depending on the adaptability of each species to fire.

Project design criteria (PDC) for T&E listed species (*Fritillaria gentneri* and *Lomatium cookii*) are provided in the FY04-08 Rogue River/South Coast Biological Opinion:

- A minimum 25' radius buffer. No mechanized activity would occur in the buffer when plants are growing. Buffers can be treated manually (burning, hand brush/tree removal,

sowing adapted native grasses etc.) during the dormancy period (September-February) for activities that benefit the species.

- Tree falling, yarding or anchor tree location would not occur in or across buffers.
- Construction of new landings would be at least 300' from known sites.
- Proposed logging road location, including temporary haul roads, would be surveyed and populations protected by a minimum 100' radius buffer. Use of existing roads within 100' of occurrence is allowed.
- Firewood collection would not occur in buffers.
- Cut material would be piled outside buffers.
- No tree planting or mechanical scalping would occur within 75'of the buffer edge (100' from occurrence).

Noxious weeds would be treated using an integrated pest management approach (RMP p. 92). Management objectives are to contain or eradicate populations of *Cytisus scoparius* (Scotch broom) and *Centurea debeauxii* (meadow knapweed). Populations of *Rubus discolor* (Himalayan blackberry) and *Cirsium vulgare* (bull thistle) would be contained using appropriate methods based on species and conditions under the guidance of the Medford District Integrated Weed Management Plan (PA-OR110-98-14). All treated noxious weed populations would be monitored for treatment effectiveness.

Seed and straw used would be native species and weed free.

Heavy equipment would be cleaned prior to moving onto BLM lands and when moving from known noxious weed areas into weed-free areas to remove seeds and mud containing seed from equipment undercarriages.

2.3.4 Wildlife

Work activities that produce loud noises above ambient levels would not occur within specified distances of any nest site or activity center of known spotted owl pairs and r-sident singles between March 1 and June 30th unless surveys determine nesting status as "non nesting" as described in the table above.

All active red tree vole nest sites will be buffered according to Management Recommendations in place at the time of the decision.

All snags ≥ 16" DBH would be reserved from cutting unless they pose a safety hazard, in which case they would be left in the unit and a replacement standing tree would be identified for retention.

Where feasible, snag patches (6 or more snags) would be buffered by one half to one site tree height to protect the snag patch from damage during logging operations.

Prior to prescribed burning pull duff away from the base of snags to reduce the chance of losing them during the burn.

Coarse woody debris (CWD) that is already on the ground would be retained and protected from disturbance to the greatest extent possible during logging, burning and other project activities.

2.3.5 Fire and Fuels Management

Prescribed burning would be consistent with the Oregon Department of Forestry's Smoke Management Plan and the Department of Environmental Quality's Air Quality and Visibility Protection Program. Additional measures to reduce smoke emissions would include rapid mop-up, burning with lower fuel moisture in smaller fuels to facilitate quick and complete combustion, burning with higher fuel moisture in the larger fuels to minimize consumption and burn out time, and covering hand piles to permit burning during the rainy season when atmospheric mixing and smoke dispersal are more likely.

All prescribed burn areas with sensitive plant species would be burned under the weather, fuel conditions or season that minimizes impacts on plant reproduction and active growth. Low intensity (winter/spring) under burning could occur after mechanical treatment to reduce fuel hazard. Fires would be allowed to back into riparian reserve no-treatment areas, but no ignition would take place within 50' of streams. Prescribed burning would also follow all PDFs for cultural resources.

Patrol and mop-up of burned areas, which may include use of a helicopter and water bucket, would help prevent reburn or fire escape.

For biomass extraction on slopes <35% slope, low impact ground based equipment such as pickup trucks, all-terrain vehicles, small tractors or rubber tire skidder may be used. Skidding or trailer forwarding by draft animals will also be acceptable. Skid roads would be ≥ 75' feet apart. In riparian areas, ground based extraction would limited to existing skid trails and roads.

Where appropriate, biomass extraction would be performed by low level aerial cable yarding systems which offers one end log suspension for at least 80% of the turns. This method of cable yarding is designed to offer maximum equipment mobility while still allowing the operator to cover a large area of ground per set-up with lateral yarding capabilities. Equipment of this type would generally be used within 200' of roads with slopes >35%.

Disposal of slash near unsurfaced roads, roads designated for decommissioning, operator spurs and landings may include mechanically chipping and spreading wood chips on the road surface and adjacent land. The material would be used to cover disturbed soils to help minimize erosion. A chip depth of 2" or less would allow seedlings to grow through the chip layer. Chip placement would not inhibit ditch and culvert drainage.

2.3.6 Roads - Construction, Improvement, Decommissioning, Closures

When roads would be used for more than one season, temporary roads or roads slated for decommissioning would be winterized and treated for erosion control (water barred, seeded, mulched, etc.). Temporary blocks would prevent wet season use prior to decommissioning.

All new road construction and improvement would be done at the minimum standard appropriate for the intended long term use of the road. New roads would have a subgrade no wider than 17', with a running surface no wider than 12'. All roads used during the wet season (October 15 through April 15) would be surfaced with at least 6" of crushed aggregate. Roads proposed for decommissioning that are needed to support the prescribed burning/fuel reductions would be scheduled after burning is complete. During the wet season, these roads would be treated for erosion control (water bars, seeding, mulching) or slash where needed, as mentioned above for

skid roads under tractor logging). Where needed, temporary blocks would be placed to eliminate wet season use.

All temporary spur roads would be constructed and obliterated in the dry season. Temporary roads would be winterized by installing water bars or water dips, seeding, mulching and surfacing the road. Roads would be replanted after obliteration.

Along streams and at stream crossings, removal of vegetation would be avoided except as necessary for safety.

During thinning and pruning of vegetation for driver visibility, pruning would be favored over thinning and disturbance of roots would be avoided.

Dust from log hauling would be abated as necessary to promote safety and road longevity. Dust abatement may include the application of water or lignin, or reduced vehicle speed.

2.3.7 Cultural Resources and Recreation

Cultural sites located during the cultural resource survey would be buffered with flagging prior to project implementation. No treatment would occur in the buffered areas.

Timber would be felled away from cultural resource site buffers.

If any cultural sites not located during the cultural resource survey are found during project implementation, activities around the site would halt until a BLM archaeologist reviewed the site and determined appropriate protection measures.

2.3.8 Visual Resource Management

The project area consists of VRM Class III and Class IV lands.

Class III objectives are to manage lands for moderate levels of change to the characteristic landscape. Management activities may attract attention but should not dominate the view of the casual observer. Class IV objectives are to manage lands for high levels of change. Management activities may dominate the view and be the major focus of viewer attention (Visual Resource Contrast Rating BLM Manual Handbook 8431-1). The following design features would be followed for all VRM III units:

In timber harvest units:

- Use irregular clearing shapes
- Mimic size and shape of existing openings or meadows in the characteristic landscape.
- Feather/thin the edges of cleared areas to reduce strong lines of contrast and appear more natural. Retain a mix of tree/shrub sizes and species along edges.
- Retain most large crowned trees and a variety of tree sizes and shapes to ensure that the resulting visual canopy does not distract from the surrounding landscape.
- Feather and scallop edges of openings around legacy trees.
- Avoid fan shaped yarding corridors

In fuels reduction units:

- Avoid straight edges when building fire lines.
- Rehabilitate fire lines by pulling in berms, covering with vegetation or water barring when necessary.
- Where possible, tie fire line into existing natural fire breaks.

For road construction:

- When multi-layered canopies occur adjacent to the road, leave dominant trees in each canopy layer to aid visual screening.
- Seed and mulch cut banks to blend with the surrounding area
- Plant shrubs and/or conifers that belong to the Douglas-fir and pine plant series.

2.3.9 Off-Highway Vehicle Management

The project area has open, limited and closed categories for off-highway vehicle (OHV) use (RMP p.109). If resource damage from OHV use is documented, steps will be taken to control the use through signing, barriers, monitoring and increased law enforcement activity.

3.0 Environmental Consequences

Current conditions in the project area result from a multitude of natural events and human actions that have taken place over many decades. Cumulative effects are defined as the, "impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions" (40 CFR § 1508.7).

In response to public interests and comments regarding multiple BLM projects in the Illinois River Valley, the following presents an overview of proposed BLM projects. The Illinois River Valley is a 633,517 acre subbasin to the Rogue River. Within this subbasin, BLM has 6 proposed or ongoing projects (Deer Creek Salvage, Althouse Sucker, West Fork Illinois River, East Fork Illinois River, South Deer, Tennessee Lime, Anderson West). Collectively the BLM projects propose 3,786 acres of commercial thinning/special forest products/density reduction, representing 0.5% of the Illinois River subbasin. Acres for the Althouse Sucker project have not yet been estimated. There are no clear-cuts proposed. Forty-one acres of structural retention are proposed, representing 0.006% of the Illinois River subbasin. Fuel reduction and wildlife habitat restoration is proposed on approximately 6,645 and 2,725 acres, respectively. Additionally, a net of 0.3 miles (0.9 acres) of new road construction would be added to the transportation road system, increasing road surfaces by 0.0001%. These figures are based on the alternatives with the greatest level of acres treated. As decisions have not been made on several projects, the figures represent the greatest level of potential treatment.

Potential treatments in the Illinois River Valley subbasin

	Acres	**Percent**
East Fork Project	1,909	0.3
Watershed CT / SFP / DR*	3,786	0.5
Watershed structural retention	41	0.006
Fuel hazard reduction	6,645	1
Wildlife habitat restoration	2,725	0.4
Road construction	0.9	0.0001

*CT = Commercial Thin; SFP = special forest products; DR = density reduction

Scoping for this project did not identify a need to exhaustively list individual past actions or analyze their environmental effects in order to fully analyze the effects, including cumulative, of this project's action alternatives. A description of current conditions inherently includes the effects of past actions and serves as a more accurate and useful starting point for a cumulative effects analysis than by "adding up" the effects of individual past actions. "Generally, agencies can conduct an adequate cumulative effects analysis by focusing on the current aggregate effects of past actions without delving into the historical details of individual past actions." (CEQ Memorandum 'Guidance on the Consideration of Past Actions in Cumulative Effects Analysis' June 24, 2005.) Cataloging past projects and their individual effects would not be useful in discerning the contribution of the incremental impact of the project's action alternatives. However, cataloging and analyzing other present and reasonably foreseeable actions relevant to the effects of the proposed action *is* necessary and is described below. By comparing the "no action" alternative (current condition) to the action alternatives, we can discern the "cumulative impact" resulting from adding the "incremental impact" of the proposed action to the current environmental conditions and trends.

Only substantive site specific environmental changes that would result from the proposed alternatives are discussed here. If an ecological component is not discussed, it should be assumed that resource specialists have determined that there would be no effects to that component. The following were found to be unaffected by the proposed action or alternatives: areas of critical environmental concern, Native American religious sites, prime or unique farmlands, wild and scenic rivers and wilderness.

Watershed Overview/History

The following overview provides a context in which to analyze the effects of the Tennessee Lime project. This summary of the watershed and the future foreseeable actions provides a 'big picture' look at the watershed, puts the project into perspective, and allows for comparison of the action alternative with the no action alternative (existing conditions).

The Kerby sub-watershed (18,279 acres) is central to the communities of Selma and Cave Junction and drains into the larger Illinois River/Josephine Creek 5th field watershed (81,743 acres) (USDA 1999; USDI 1995). The Illinois River/Josephine Creek watershed contains predominately Forest Service lands followed by private, BLM, county and state ownerships. Approximately 31% of the watershed is allocated to late-successional reserves, and other uses which provide for wildlife habitat (USDA 1999). Only 3% of the Illinois River/Josephine Creek watershed is allocated to timber production (matrix land).

Of the 18,279 acres contained in the Kerby sub-watershed, 6,036 acres are managed by the BLM. This acreage comprises 33 percent of the sub-watershed. Of the BLM managed lands, 4,647 acres are revested Oregon & California Railroad (O&C) land grant lands and 1,389 acres are former public domain (PD) lands. Approximately 3,171 acres of the BLM managed lands are classified as unsuitable for commercial forest production and have been withdrawn from the commercial forest land base; 2,865 acres have been classified as suitable as commercial forest lands. Approximately 1,011 acres of BLM land within the Kerby sub-watershed are in riparian reserves.

Of the remaining land base in the Kerby sub-watershed, 2,094 acres are managed by the U.S. Forest Service, approximately 1,124 acres by Josephine County, 14 acres are Oregon state lands, and the remaining 9,011 acres are privately owned lands. There are no BLM lands in the three

other sub-watersheds (Six Mile, Josephine Creek and Oak Flats) that make up the Illinois River/Josephine Creek 5th field watershed.

The Biscuit fire burned 59,000 acres in the Illinois River-Josephine Creek watershed. The perimeter of the fire is on the west side ridge that divides the Kerby sub-watershed from the Josephine Creek and Six Mile sub-watersheds. There were no burned acres in the Kerby sub-watershed. Approximately 25,910 acres (32% of the 5th field watershed) burned with high severity; 15,916 acres burned with mixed severity. The high severity areas were mostly on the northwest side of the Illinois River/Josephine Creek watershed with some patchy areas of high severity in the interior portion.

Harvest on BLM lands began in the mid 1950s, peaked in the 1970s and declined to approximately 383 acres in the 1990s. Of the total harvest of 2,616 acres, approximately 1,378 acres were even-age harvest (clearcut, shelterwood, seed tree, etc.). On Forest Service lands approximately 2,800 acres of even-age harvest has occurred (USDA 1999). When combined, past federal harvest represents 7% of the Illinois River/Josephine Creek watershed.

The two most recent BLM harvests in the Kerby sub-watershed include Moosehorn and 3+3. On Forest Service lands in the Illinois River/Josephine Creek watershed, approximately 836 acres of the Biscuit fire was salvage logged in the Fiddler, McGuire and Briggs-Cedar projects (13.5 mmbf removed). Two roadside salvage sales, Baby Onion and River Six, also occurred along Forest Service roads in the watershed (1.5 mmbf removed). Acres and road miles were unavailable for these two sales.

Foreseeable activities include a salvage sale planned on Forest Service land, which would remove 10 mmbf on 400 acres in the Mike's Gulch project. There are no additional foreseeable activities on BLM lands, county or state lands in the sub-watershed. Private industrial lands are expected to continue with rotational harvest.

3.1 Soil and Water

3.1.1 Affected Environment

The Kerby sub-watershed is one of four in the Illinois River-Josephine Creek 5th field watershed (81,743 acres). At 18,279 acres, the Kerby sub-watershed is centrally located in the Illinois River Basin. The mainstem of the Illinois River flows through the western third of the watershed. Other major drainages include Reeves, Montgomery, Free and Easy, George, and Holton creeks.

There are two primary soils in the Kerby sub-watershed. One group formed from serpentine and unltramafic rock and the other from sedimentary and igneous rock. The Dubakella and Pearsoll soils, derived from serpentine and ultramafic rock, are moderately deep and well drained. They have low productivity due to high levels of magnesium and low calcium. Soils formed from serpentine parent material usually have a high clay and rock content. The high clay content reduces infiltration, creating a potential for rapid runoff and erosion. The soils are found on the western portion of the watershed where vegetation is sparse consisting of Jeffrey pine with an understory of brush (major brush species are wedge leaf ceanothus, sticky manzanita and huckleberry oak). Riparian areas in these soils are narrow and dominated by Port-Orford-cedar in the overstory and azalea in the understory. The unique plants found in the area led to the designation of Eight Dollar Mountain ACEC. The Josephine County Soil Survey (USDA 1983) recommends designating skid trails and operating in dry season to minimize compaction and

erosion. The soils are also susceptible to slumping when roads are constructed on steep slopes. Derived from sedimentary and igneous rock, the Josephine and Speaker soils found on the eastern portion of the sub-watershed, are deep and well drained, well suited for mixed conifer forests and are productive.

Peak flows vary by year and are dependent on annual rainfall which ranges from 45 to 60 inches across the watershed. Large peak flows of record such as 1955, 1964, 1974, 1997 result from rain on snow events. Summer low flows are much lower than average winter flows largely due to precipitation patterns in the Pacific Northwest. Most of the precipitation occurs between November and March.

The State of Oregon's Watermaster's Office recorded over one hundred points of diversion from tributary streams and the Illinois River in the Kerby subwatershed. All streams are over-appropriated from water rights (USDI 1995). Two major irrigation ditch systems, one on each side of the valley, supply water for crops. While not quantified, hundreds of private wells pull groundwater for domestic and irrigation uses; groundwater extraction exacerbates low flow conditions. The watershed also supplies water for communities and domestic beneficial uses. With the very heavy private demands on water, summer flow conditions have greatly decreased.

Roads have been identified as mechanisms altering surface flow routing. Specifically, roads route subsurface and surface flow to the stream via road ditches and culverts (Wemple et al. 1996; Harr et al. 1975). Overall 2% of the watershed is roaded. At these road levels, elevated peak flows in the East Fork Illinois and tributaries are very unlikely. For comparison, (Jones and Grant 1996, Jones 2000) found no statistically significant increases in peak flows attributed to roads when roads occupied 6% of the basin. Similarly, Wright et al. (1990) and Ziemer (1981), found no changes to the hydrograph when roads occupied 5% of the basin. Road effects on peak flows were detectable when 12% of the watershed was roaded (Harr et al. 1975).

Field reconnaissance identified road segments in sections 24, 34, and 35 routing water and eroding the road bed. The survey found that a small percentage of roads are responsible for the majority of surface flow interception and sedimentation. Luce and Black (1999), similarly, found that a few roads generated the majority of sediment.

Compacted soils on roads have the potential to route surface water and deliver to a stream segment. Additional compaction created through management history is highly variable in recovery due to time since implementation, local equipment techniques, slopes, and soils. Compacted surfaces are also often isolated by grasses, brush, trees and down logs, greatly reducing surface flow routing.

Soil compaction reduces plant growth and productivity; therefore, loss of productivity can indicate detrimental compaction. Based on silvicultural and fuel vegetative descriptions, there has been little to no effect on unit productivity as evidenced by high stand densities and fuel loadings across the watershed. Further, on federally managed lands only 7% of the watershed has been harvested indicating low levels of compaction.

Timber harvest and associated reduction in evapotranspiration (plant uptake of water) has also been linked to increased flow volume. Reduced evapotranspiration leads to higher soil moisture, resulting in a greater percentage of precipitation available for surface runoff. In the Kerby sub-watershed, a combination of past federal land harvest activities, rotational harvest on private timber lands, and fire suppression are primarily responsible for changes in forest vegetation.

While research (Beschta et al. 2000; Harr et al. 1979; Harr et al. 1975; Jones 2000, Thomas and Megahan 2000, Ziemer 1981) found stream flow responses to timber harvest variable; consistent detectable changes to stream flow occurred when greater than 25% of the watershed was in clear-cut condition. The 5% early seral in the Kerby sub-watershed is not in clear-cut condition but rather has approximately15 years of vegetation regrowth. Harr et al. (1979) found hydrologic recovery of vegetation occurs in 25-30 years. Jones and Grant (1996), documented significant hydrologic recovery 6 years following clear cutting. Additionally, most of the grass/shrub acres contributing to the early seral vegetation composition are considered natural conditions due to serpentine soil conditions.

Since 1980, BLM has harvested 492 acres in the Kerby sub-watershed, representing 8% of BLM lands and 2% of the watershed area. Including past harvest on Forest Service managed lands, 7% of federal lands have been harvested in the Illinois River-Josephine Creek watershed scale since 1940.

The transient snow zone occupies approximately 8% of the sub-watershed. Within the transient snow zone less than 2% is in early seral vegetative conditions. Therefore, past disturbances in the transient snow zone have not led to increased peak flows.

Clearing vegetation from Illinois Valley bottom lands began with early settlement in the mid 1850s. Stream riparian areas were cleared either for farmland or by miners seeking gold (USDI 1995). Roads have been constructed in valley bottoms in and adjacent to riparian zones. Consequently, low gradient reaches of tributaries (Holton, Reeves, Free and Easy) and the Illinois River have greatly reduced floodplain connectivity, resulting in accelerated bank erosion. Associated with loss of floodplains is the loss of sinuosity and channel structure necessary to create pool and spawning bed habitats.

In the mid- to higher gradient reaches on BLM managed lands, surveys found 19% of the stream reaches lacking sufficient large wood debris to slow water velocities. These structures play a key role in shaping aquatic habitat conditions.

Fine sediment embeddedness was recorded in 17% of stream reaches on BLM managed lands in the Illinois-Kerby subwatershed. While historic distribution of fine sediment is not known, current conditions likely represent an increase due to past harvest practices, mining and road building. Importantly, given the reduction of upslope and riparian harvest, larger culverts, road closures and decommissioning, and vegetation recovery on skid roads, fine sediment loading is decreasing.

The Oregon Department of Environmental Quality (ODEQ) listed the Illinois River and Free and Easy Creek as water quality limited for water temperature. Much of the riparian vegetation along streams in the floodplains has been cleared for agriculture, mining and development. This lack of shade, predominately on lower tributary streams and the mainstem, combined with reduced base flow, are the mechanisms for increased water temperature.

3.1.2 Environmental Consequences

Alternative 1 – No Action

There would be a continued risk for high severity wildfire. The vast majority of the project area is in fire condition class 3 with heavy fuels loads and reduced natural fire frequencies.

Associated with the altered fire regime is a high risk of losing key ecosystem components. If a fire event were to occur, water and soil runoff can be expected to increase. The amount would depend on the intensity and extent of the fire. High intensity fires in the riparian zone would greatly decrease stream shade and large wood recruitment potential. This condition would gradually improve over the ensuing 60 years.

Alternative 2

Alternative 2 proposes a combination of forest thinning, fuel hazard reduction, and young stand management. The pertinent watershed issues include potential alterations to flows, soil compaction and productivity, erosion, channel condition and riparian function. Table 1 displays the activity, acres, and percent of the sub-watershed proposed for treatment. At the Josephine-Illinois River 5th field watershed scale, all treatment acres represent 3% of the watershed.

Hydrology

As displayed in Table 1, a fraction of the watershed would be treated. All silvicultural harvest, fuel reduction, and young stand management activities maintain an overstory and a mosaic of understory vegetation. Harvest units would maintain 40-60% canopy cover; there would be no clear-cuts creating large canopy openings. Therefore, vegetation transpiration processes at the stand level would not be reduced to levels leading to increased runoff potential.

No openings would be created in the transient snow zone. Peak flow enhancement from rain and snow events would not occur.

There would be 1.0 mile of temporary spur development, generating 1.3 acres of compaction. Developed roads would be short spur extensions from existing roads. All but 0.25 miles of temporary spurs would be decommissioned following use. The 0.25 miles of road remaining would be located away from channels and would not create a water routing mechanism. Five temporary spur road stream crossings would be constructed. Two would be temporary pipes with rock fill. Since use and development would occur during the dry season, the crossing would neither interrupt stream flow nor route water to the stream. Following use, roads would be water-barred and mulched, eliminating water routing during wet season or runoff periods. Project activities would not alter peak flows, base flow, or annual yield.

Soils

Compaction and Productivity: Fuel treatments would follow forest thinning. In addition, 1,900 acres of natural fuels would be treated. Thinning of fuels would remove vegetation ≤8" dbh. Prescribed fire would be a low intensity burn, protecting soil productivity. Underburning and handpile burning would leave bare soil areas on less than 7% of the treated area. Bare soils conditions would not occur within the "no treatment" riparian zone and be fragmented by unburned ground, preventing concentration of runoff. No compaction would occur as no machinery would be used. It is expected that one year after treatment grasses and forbs would return. Tree thinning, handpile burning, and subsequent low intensity under burning would retain a mix of hardwoods and conifers, organic duff layer, leaf litter, and coarse woody debris. Collectively these forest components provide nutrients, bacteria and fungi decomposers, and mycorrhizae to maintain long term site productivity. Powers et al. (2004) found that removing all surface organics had little effect on carbon/nitrogen levels or vegetation reproduction.

Maintenance fuels treatments would occur on a 7-15 year cycle, depending on fuels loading and understory stand density. If response of vegetation is slow, indicating low productivity, maintenance fuel treatments would not occur. Maintenance fuel treatments would be designed to retain vegetation and soil components necessary for soil productivity. Based on findings in Powers et al. (2004) and maintenance of plant species diversity and age classes, no reduction in site productivity would occur.

Two half acre landings would be constructed along existing roads. All landings would be located away from streams and riparian areas. Skid roads for commercial tractor use would be designated on the 330 acres proposed for harvest. Based on skid road spacing of 150', approximately 20 acres of skid road would be developed during operations. Skyline cable logging systems typically cause less compaction than ground-based systems, but yarding logs can still create compaction and soil disturbance. Klock (1975) found that 3% of the unit had soil disturbance associated with cable systems. Amaranthus and McNabb (1983) found that cable yarding systems created bare soil conditions between 8 and 14%. However, approximately 50% of the units monitored did not have statistically different levels of bare soil conditions compared to pre-harvest conditions. Additionally, the treatments included removal of all logs (merchantable and unmerchantable) >8". Based on PDFs, soil disturbance would be less than 8%. Using a conservative estimate of 5%, less than 5 acres on the 80 acres proposed for cable logging would be disturbed. Implementation of PDFs (water-barring and mulching) would greatly reduce erosion potential from cable corridors. The likelihood of eroded sediment reaching stream channels would be low due to riparian reserve buffers and forest vegetation between yarding corridors and stream channels.

No ground-based harvest would occur on sensitive serpentine soils.

The project identified 1,600 acres of ground based and 313 acres of cable based biomass removal. These activities are not additive to the 1,900 acres of fuel reduction. Rather, biomass removal would be used instead of slashing as proposed under fuel reduction activities. Unlike slashing, ground based equipment would be necessary and would create soil disturbance. Due to smaller machinery typically used for biomass removal, skid roads would be designated approximately 75' apart. Out of the 1,600 acres, there would be no additional soil disturbance on 500 acres located on low productivity serpentine soils or in riparian reserves; existing skid roads would be utilized. On the remaining 1,100 acres, with a skid road spacing of 75', 121 acres of soil would be disturbed. Twenty of these acres were accounted for in tractor harvest units. Biomass activity would use skid roads developed for harvest activities. Therefore, biomass activity would create 101 acres of additional soil disturbance. This figure represents the maximum level of soil disturbance as existing skid roads would be utilized wherever possible.

With smaller ground-based equipment, Amaranthus and Steinfeld (1997) found an increase in bulk density (measure of compaction) of 5-7%. Region 6 of the Forest Service identified detrimental compaction when bulk density increased 15%. Displacement of surface organics and top soil is expected on at most 100 acres. However, detrimental compaction, based on the findings of Amaranthus and Steinfeld (1997) and observations of past similar projects, is estimated to be 10% of the disturbed ground. Allowing for unforeseen circumstances and equipment usage, 25% or 25 acres is assumed compacted. In addition to the 100 acres of ground based soil disturbance, cable extraction would add approximately 12 acres of displacement.

Amaranthus et al. (1996) found ground-based harvest reduced soil productivity through compaction and loss of organic matter. Soil productivity can be expected to decrease on the 27

acres (2 acres in spurs and landings, 20 acres in skid roads and 5 acres for skid roads) of compaction associated with commercial activities and up to 25 acres of biomass removal for a total of 52 acres. However, Powers et al. (2004) found no evidence that 10-year productivity was universally impacted by soil compaction. The 52 acres represents the theoretical maximum of compaction and would occur on 0.4 percent of the Kerby 6th field watershed. Loss of productivity on displaced soils is not expected due to maintenance of physical properties of pore space allowing plant root penetration and water and nutrient infiltration, and the findings of Powers et al. (2004).

Erosion: Other than temporary stream crossings, the potential delivery of water and any sediment from compacted surfaces to the stream network is extremely low. The compacted surfaces may pond and route water during heavy rainstorm events. Associated with water routing would be potential surface erosion. With PDFs of slope limitation, approved trail location and water barring, erosion would be minimized. Importantly, with riparian protection buffers, slope limitations and no routing mechanism to the creek, compacted surfaces would not create off-site impacts. There would be no additional loss of productivity due to erosion as erosion would occur on compacted surfaces already identified as areas with reduced productivity.

The temporary spur road and three designated skid trail stream crossings represent potential sediment routing mechanisms to the creek. Sources of fine sediment include temporary road fill, road dust, sediment falling off trucks, and bank disturbances. However, construction and use would occur during the dry season when creeks are dry; there are no perennial stream crossings. Therefore, sediment resulting from road fill erosion is not expected. Road dust from truck hauling would be greatly reduced through the PDF requiring dust abatement. Log hauling during the dry season would greatly reduce mud and sediment on the truck. Bank disturbances would be water-barred, seeded and mulched following use. These latter PDFs reduce bank sediment inputs and routing mechanisms to the channel during runoff periods.

While PDFs reduce short term inputs, each source would add very localized, low volume sediment to the channel network. As described in the Medford RMP (p. 4-18) roads are expected to increase stream sediment. This sediment would be fines accumulated from dust and disturbance from construction/decommissioning of crossings. Sediment would be short term, as the fines (sand, silt, clay) would be transported during the first runoff season. Should the first few storms be of low magnitude, flows with low volume and little sediment, there may be a detectable increase in turbidity at the location of channel crossings. However, during typical winter peak flows which initiate suspended and bedload sediment transport, the activity generated sediment would be undetectable.

The project also proposes 31 miles of road maintenance. Associated with road maintenance is approximately 2 miles of road side ditch clearing. Luce and Black (1999) found no significant increase in erosion when only the road tread was treated; however statistically significant increases in erosion occurred when road ditches were bladed.

Sediment delivery to streams from road-ditch renovation would primarily occur at road-stream crossings in years one and two following activity. Luce and Black (2001) observed an 87% decrease in erosion and sediment transport in year one and two following road maintenance activities. While activity generated sediment would increase, road conditions would improve due to drainage improvements, leading to an overall immediate reduction in erosion.

Ditch maintenance would occur where improperly functioning ditches are currently routing water onto the road, resulting in erosion. Ditch clearing would not occur within 50-100' of stream crossings, and in most situations would not occur between the last relief culvert and stream crossing. Maintaining distance between clearings and the crossing reduces potential delivery of sediment to the channel system. Additionally, wet season haul, known to produce rutting and subsequent erosion, would not occur. The short term inputs may create isolated pockets of fine sediment deposition 5-100' below culverts. During high flows, the introduced sediment will become an immeasurable fraction of the system sediment load and would not be detectable downstream. A long term reduction in sediment and altered flow routing are likely following road drainage improvement and decommissioning.

Collectively, the temporary spur roads, skid trail crossings and road maintenance would each incrementally add fine sediment to the channel network. However, during typical winter peak flows which initiate suspended and bedload sediment transport, the activity generated sediment would be inconsequential. While turbidity may increase under certain conditions in year one following activity, there would be no alterations to channel form (width to depth ratios, pool reduction, embeddedness) or to channel processes (floodplain connectivity, stream flow velocity, pool and bar formations). Longer term sedimentation is not expected due to site rehabilitation and ceasing of truck traffic. The channels would maintain themselves regardless of activity. There would be no alteration to sedimentation processes which would create chronic adverse water quality or channel conditions.

Riparian

Alternative 2 proposes thinning and fuel reduction activities in the riparian zone. Riparian zones identified for treatment have high tree densities and reduced growth rates. In these conditions, the Sufficiency Analysis for Stream Temperatures (USDA, USDI 2003), and the Northwest Forest Plan (USDI, USDA 1994a, b) recommend thinning and fuel activities to increase vigor and resiliency.

Stands identified for thinning currently have high (>80%) canopy closure. Thinning in the riparian zone outside 50' would reduce canopy closure to 50-60%, with the expectation that within 10 years canopy closure would increase to 60-70%. The Sufficiency Analysis for Stream Temperatures (USDA, USDI 2003) recommends not reducing canopy cover below 50% to protect riparian site conditions. In all cases, the 50' no treatment zone would maintain primary shade along perennial streams. This complies with the temperature anti-degradation policy for the Illinois River and Free and Easy Creek.

Wildlife enhancement units maintain a lower canopy cover due to soil and vegetation characteristics. Wildlife treatments would return riparian areas to pre fire-suppression conditions by removing decadent brush and small trees and increasing species diversity and wildlife habitat.

Fuel reduction treatments focus on removal of understory brush and small diameter trees which afford no shade to the stream. The prescribed fire would be low intensity, designed to create a mosaic vegetation pattern. All fuel reduction activities would preserve riparian shade and large wood recruitment functions. Underburning and handpile burning would leave bare soil areas on less than 7% of the treated area. Bare soils conditions would not occur in the no treatment riparian zone, thus providing a vegetated barrier between bare ground and the stream, preventing concentration of runoff. No compaction would occur as no machinery would be used. It is expected that one year after treatment grasses and forbs would return.

Commercial harvest on 30 acres and an additional 150 acres of small diameter stewardship activities could potentially add 11 acres of compaction in the riparian zone. As discussed above, due to smaller machinery and removal of smaller diameter trees, detrimental compaction leading to a loss of soil productivity is not expected. Additionally, existing skid trails would be utilized, decreasing the creation of new compaction; at the most, 11 acres would be disturbed and would be distributed across the project area, providing large undisturbed riparian areas between project sites. As noted above, offsite impacts are not expected due to PDFs of untreated riparian buffers, designating routes, slope limitations and water barring. *NOTE:* These 11 acres are not additive to the compaction estimates above, but rather a subset.

Project implementation would not reduce streamside shade in any stream reach. Nor would the project reduce large wood recruitment potential. Rather, tree growth rates would increase in response to density reduction. Thus, time required to achieve stand structure with potential to deliver large instream wood would decrease. Therefore, the project is in full compliance with the Aquatic Conservation Strategy (ACS) (USDA-USDI 1994a, b).

Cumulative Effects

There are no direct or indirect adverse impacts to current watershed conditions associated with project activities. Therefore, there would be no cumulative impacts at either the project, Josephine-Kerby 6th field sub-watershed, or the Illinois River scale.

Hydrology

All harvest, forest thinning and fuel reduction activities in the project would retain an overstory and a mosaic of understory vegetation, preserving transpiration processes. Temporary spur roads constructed over intermittent channels would be used in the dry season and pulled prior to the wet season. Due to the remaining vegetation pattern and no permanent road crossings, there would be no increase in water availability and no increase in routing mechanisms accelerating water delivery to streams. Therefore, there would be no increase to peak flows.

In total, alternative 2 would add approximately 52 acres of compaction due to ground based harvest. However, biomass removal accounts for approximately 50% of the compacted acres, conducted with smaller machinery. Assuming all acres represent a decrease in infiltration, the acres represent 0.2% of the sub-watershed. Importantly, these areas of decreased infiltration are isolated from the stream channel and surrounded by vegetation. Therefore, water routing to the creek, leading to increased runoff would not occur. The current alterations to stream flow, water yield, and distribution is due to high demand for water use, irrigation, and ditches. The project would not add to these disturbances.

Soil

The 52 acres of compaction would be distributed across the landscape avoiding a concentrated loss of site productivity. All forest and fuel reduction activities retain a mix of conifer, hardwoods, shrubs, and forbs necessary to support soil biota, as well as organics for future nutrients. Hence, the soil's potential to support a mix of plant species and growth rates is retained. Importantly, thinning and fuel activities are designed to improve tree vigor through reduced competition for soil, water, nutrients, and sunlight. Vegetation growth and development are expected to increase as a result. Further, based on current high stand density and fuel loading, there are no indications of forest stand productivity losses.

The sedimentation from road maintenance activities and temporary stream crossings would be minimal and short term. Pockets of fine sediment may be observed prior to the first runoff season at which point the inputs would be incorporated in the systems sediment load and become immeasurable. These sediment inputs would not degrade channel structure or water quality and would become immeasurable in downstream stream reaches. The sources are of insufficient duration or magnitude to alter channel conditions. Further, current poor channel conditions are linked to stream straightening by heavy equipment, loss of floodplain function, water withdrawals and lack of large wood. The project activities would not add to these disturbances. Long term reduction in sediment delivery to streams is expected from road drainage improvement.

Riparian
Project activities maintain streamside shade and large wood recruitment potential. Water quality conditions and future supply of large wood would be maintained. Therefore, there would be no adverse effects to riparian functions.

Alternative 3

Project activities are very similar to those proposed in Alternative 2. Site specific effects are also similar. The difference in Alternative 3 is in the amount of acres of each activity. Rational and logic presented under alternative 2 are not repeated in alternative 3. Rather, this discussion references assessments in alternative 2. Therefore, the analysis of effects of alternative 3 focuses on the changes in treatment acres and resulting consequences.

Hydrology
Under alternative 3, 923 acres would be treated with density management prescriptions. All acres are identified as special forest products and stewardship contracting. Similar to the discussion under alternative 2, all acres maintain overstory and understory vegetation. Therefore, losses in transpiration rates leading to increased water availability would not occur. The level and type of temporary spur construction and skid trail/stream crossings are similar to alternative 2. As stated in alternative 2, there would be no alteration to stream flow timing or volume.

No openings would be created in the transient snow zone. Peak flow enhancement from rain and snow events would not occur.

Soil
Compaction and Productivity: There are fewer acres of fuel reduction treatments compared to alternative 2. For the reasons and justification presented in alternative 2, fuel treatments in alternative 3 would not reduce soil productivity. No compaction would be generated.

Forest harvest, based on a skid road spacing of 150', could generate 47 acres of compaction from the 785 acres of ground based harvest. Actual acres of compaction are expected to be less due to smaller machinery typically used in stewardship contracts. Landings, cable harvest and temporary spur roads would add five additional acres of compaction.

The 1,600 acres of biomass removal, based on methodologies discussed under alternative 2, would add 121 acres of soil disturbance. However, 47 acres of compaction are accounted for under commercial harvest. It is assumed that biomass activities would utilize skid roads designated for commercial harvest resulting in 74 additional acres of soil disturbance.

With smaller ground-based equipment, Amaranthus and Steinfeld (1997) found an increase in bulk density (measure of compaction) of five to seven percent. Region 6 of the Forest Service identified detrimental compaction when bulk density increased 15 percent. Displacement of surface organics and top soil is expected on, at most, 74 acres. However, detrimental compaction, based on the findings of Amarathus and Steinfeld (1997) and observations of past similar projects, is estimated to be 10% of the disturbed ground. Allowing for unforeseen circumstances and equipment usage, 25% or 18 acres, is assumed compacted. In addition to the 89 acres of ground based soil disturbance, cable extraction would add approximately 12 acres of displacement.

Soil productivity can be expected to decrease on the 47 acres of compaction associated with commercial activities and up to 18 acres of biomass removal for a total of 65 acres. However, Powers et al. (2004) found no evidence that 10-year productivity was universally impacted by soil compaction. The 70 acres represents the theoretical maximum of compaction and represents only 0.4 percent of the Kerby 6th field watershed. Loss of productivity on displaced soils is not expected due to maintenance of physical properties of pore space allowing plant root penetration as well as water and nutrient infiltration. Additionally, Powers et al. (2004) found that removing all surface organics had neither an appreciable affect on carbon or nitrogen levels, nor an impact on vegetation reproduction.

Erosion

The mechanisms identified as creating potential erosion are the same as alternative 2. Namely, the temporary spur road crossings, skid trail crossings and road maintenance would each add sediment to the stream network. As described under alternative 2, sediment inputs would be localized, low volume and short duration. Therefore, there would be no alterations to channel form or processes.

Road maintenance activities are the same as described in alternative 2. Effects on potential erosion and sedimentation are also similar.

Within riparian areas, 330 acres of ground-based harvest could potentially add 19 acres of compaction. Soil disturbance in riparian areas represents potential sedimentation to creeks due to proximity. As discussed above (Amaranthus and Steinfeld 1997; Powers 2004) due to smaller machinery and removal of smaller diameter trees, detrimental compaction leading to a loss of soil productivity is not expected. Additionally, existing skid trails would be utilized, decreasing the creation of new compaction; at most, 19 acres would be disturbed and would be well-distributed across the project area, resulting in isolated instances of erosion potential. Erosion potential and sedimentation is greater under alternative 3 due to the increase in ground-based extraction in riparian areas. Potential erosion would be minimized because there would be no routing mechanisms to the creek. Untreated riparian buffers and waterbarring skid trails would quickly divert runoff from skid trails. Also, in year two following disturbance, grasses, forbs and brush are expected to revegetate disturbed soil, further reducing long term erosion potential. Offsite impacts are not expected due limited disturbance and efforts to reduce/eliminate sediment routing. *NOTE:* These 19 acres are not additive to the compaction estimated in the soil section above, but rather a subset.

Therefore, there is a slight increase in erosion potential and delivery to streams as 8 more acres of riparian compaction would occur. However, consequences to the channel environment are similar to alternative 2.

Riparian

Alternative 3 proposes approximately 200 more acres of thinning in riparian areas compared to alternative 2. Sixty-two acres would be wildlife enhancement treatments. Prescription designs and protection measures are similar to alternative 2.

As with alternative 2, project implementation would not reduce streamside shade within any stream reach. Nor would the project activities reduce large wood recruitment potential. Rather, tree growth rates would increase in response to density reduction. Thus, time required to achieve stand structure with potential to deliver large instream wood would decrease. Potential erosion from riparian disturbances would be minimized as described above, short term, and would not result in stream channel modification. There would be no increase in water temperature, complying with the state of Oregon's anti-degradation policy for listed water bodies. Therefore, the project is in full compliance with the ACS.

Cumulative Effects

Alternative 3 has similar activities and design features as alternative 2. Foreseeable future projects are similar to alternative 2. There are differences in acres treated. Specifically, there would be 18 more acres of potential compaction, 9 of which would occur in the riparian zone. The objective of the riparian treatments are consistent with those stated in the RMP (USDI 1995, p. 29 and appendix E) including thinning to increase stand resiliency and vigor, and wildlife habitat. Applying PDFs and removal of smaller diameter trees with smaller equipment reduces erosion potential created by ground-based extraction. Untreated vegetation between soil disturbance and the stream channel further reduces the potential for sediment to enter the creek. Additionally, the spatial disturbance of compaction (0.3% of the Kerby subwatershed) and duration of bare soils are all limited. As a result, there would be no alterations to current channel form or conditions.

For the reasons and logic detailed in cumulative effects under alternative 2, alternative 3, likewise, would not generate cumulative effects to water quality or aquatic conditions.

3.2 Vegetation

3.2.1 Affected Environment

The present day landscape pattern of vegetation in the Tennessee Lime Project Area is a result of topography, soils, natural disturbances, timber harvest, mining and agricultural/residential development. Ownership patterns and subsequent use is the primary driver for current and future vegetative trends. These include but are not limited to: residential/agricultural use in the lowlands, rotational harvest on private timber lands, BLM checkerboard ownership supporting multiple uses, and a high percentage of Forest Service land allocated primarily to non-timber objectives. Approximately 13% (2,380 acres) of the Kerby sub-watershed is developed (agricultural and residential).

Data in Tables 4 and 5 is for BLM and non-BLM lands in the Kerby sub-watershed and the larger Illinois River/Josephine Creek watershed. Plant series and vegetation condition class is a data layer that was produced in 1994 by specialists in the Grants Pass Resource Area. The data for the Illinois River/Josephine Creek watershed was taken from the 1999 Middle Illinois River Watershed Analysis (USDA 1999). No updates have been completed on the Forest Service

vegetation condition class layer since the Biscuit fire of 2002. Plant series are assumed to be the same regardless of burn severity.

Plant Series

The Illinois River/Josephine Creek watershed contains a high percentage of Jeffrey Pine and White Oak (50%). In these communities recruitment of new trees is continuous, canopy closure is low and large trees are rare. In the Kerby sub-watershed, where fire exclusion continues to be a factor, threats to ecosystem integrity include shrub decadence, reduced native grass and forb abundance/diversity (caused by invasive exotic species), and low individual tree vigor from increased tree/shrub densities.

The Tanoak series dominates the western portion of the River/Josephine Creek due to higher precipitation and coastal influences (USDA 1999). Douglas-fir is the dominant series comprising 50% of the sub-watershed. The tanoak and Douglas-fir areas are highly productive sites supporting a relatively high amount of aboveground biomass.

Table 4. Plant Series

Plant Series	Tennessee Lime Project Area (Kerby sub-watershed)						Percent Illinois River/ Josephine Ck Watershed
	Acres BLM	Percent BLM	Acres Non-BLM	Percent Non-BLM	Total Acres (Kerby sub-watershed)	Percent Total (Kerby sub-watershed)	
Non-forest	30	<1%	92	<1%	122	**<1%**	**1%**
Water	16	<1%	173	1%	189	**1%**	**2%**
Developed/non-vegetated	3	<1%	200	2%	203	**1%**	**2%**
Developed/vegetated	54	<1%	2,123	17%	2,177	**12%**	**18%**
White oak	31	<1%	169	1%	200	**1%**	**2%**
Jeffrey pine	2,826	47%	1,290	11%	4,116	**23%**	**48%**
Riparian/hardwoods	16	<1%	104	1%	120	**<1%**	**0**
Douglas-fir	2,840	47%	5,664	46%	8,504	**47%**	**13%**
Douglas-fir/Tanoak	220	4%	368	3%	588	**3%**	**1%**
Tanoak	0	0	0	0	0	**0**	**4%**
Tanoak/Douglas-fir	0	0	0	0	0	**0**	**23%**
White fir	0	0	0	0	0	**0**	**6%**
No Data[1]	0	0	2060	17%	2060	**11%**	**2%**
Total	**6,036**		**12,243**		**18,279**		

[1]no data for Forest Service lands on Eight Dollar Mtn. which is predominately Jeffery pine

Disturbance History

Natural and human caused fire played an important role in vegetative community structure and composition prior to the adoption of effective fire suppression techniques. On Jeffery pine and white oak areas within the project area, the fire regime has been characterized as high frequency (0-35 years), low severity. On these sites, frequent surface fires maintained an open pine/oak savannah condition. In this fire regime, stand densities were low due to frequent fire disturbance. Frequent fire also created un-even aged stands with multiple canopy layers. On Douglas-fir and tanoak forests the fire regime has been characterized as moderately frequent (35-100+ years), mixed severity. On these sites fire was more variable, creating a diversity of stand ages, size classes and densities (Agee 1993).

Other natural disturbances include insects, floods and wind. These disturbances create landscape variability in natural systems ranging from single tree and small gap mortality to larger stand replacement disturbance events. Bark beetles, the primary insect agent in Southwest Oregon, typically feed on weakened and stressed trees that are large enough in diameter to produce adequate nutrients for insects to feed on. The relation of growth to sapwood produces a vigor index for individual trees which can be used to predict the likelihood of attack by bark beetles. As sunlight becomes a limiting factor due to increase tree competition vigor typically declines. Vigor index was calculated on core samples taken from 28 Douglas-fir and three ponderosa pine site trees within the project area. All of these trees had a vigor index below 80 which is considered the threshold for insect attack (Mitchell et al. 1983). Insect activity from 2001-2004 was mapped on 165 acres within and adjacent to the project area during the annual aerial insect inventory. In a non-drought cycles, such as the current cycle, this level of mortality represents endemic (low population) levels (as opposed to epidemic levels).

The impacts of timber harvesting have varied both spatially and temporally across ownerships. In managed stands, which have been clearcut and replanted, the vegetative community lacks vertical and horizontal structure. Resprouting of hardwoods within these stands has occurred, creating species diversity with a hardwood component. Pre-commercial thinning in the last 5-10 years retained a mix of species to promote long-term stand development into a vertically diverse structure. Individual tree selection harvest (selective cutting, commercial thinning, density management and mortality salvage) has had less impact on the vertical and horizontal structure.

Vegetation Condition Class/Stand Dynamics

Vegetation condition classes (VCC) provides the relative distribution of seral/structural stage across the watershed. On BLM lands in the Kerby sub-watershed, the mid and mature classes dominate (81%) with the remaining area in the non-vegetated, grass/forb, shrub, hardwood, seedling/sapling and pole classes (Table 5). These VCCs are also found on non-BLM lands in the sub-watershed with the major difference in the amount of developed vegetated and non-vegetated classes (~0% on BLM versus 24% on non-BLM), and the mature class (12% on BLM versus 2% on private).

Non-vegetated areas include water and rock landscape features, while the grass/forb, shrub and hardwood vegetation classes represent non-forest or woodland classifications. Across ownerships in the Kerby sub-watershed these non-forest and woodland classes represent only 5% (840 acres) of the area (Table 5).

The seedling/sapling and early condition classes most often represent plantation stands. Within the Kerby sub-watershed, these condition classes comprise 390 acres, or 2% of the sub-watershed. The percentage increases to12% at the Illinois River-Josephine Creek 5th field watershed scale. This percent, found in the watershed analysis, combined grass/forb, shrub, hardwood, seedling/sapling, and early VCCs to represent early seral vegetation. The lack of post-Biscuit data updates and the crosswalk between BLM and Forest Service vegetation classes makes interpretation of exact watershed percentages difficult. The analysis indicates that early seral vegetation is more prevalent on Forest Service land outside the Kerby sub-watershed.

Table 5. Vegetation Condition							
Vegetation Condition Class	Tennessee Lime Project Area (Kerby sub-watershed)						Percent Illinois River/ Josephine Ck Watershed[2]
	Acres BLM	Percent BLM	Acres Non-BLM	Percent Non-BLM	Total Acres (Kerby sub-watershed)	Percent Total (Kerby sub-watershed)	
Grass/forb	9	<1%	0	0	9	0	12%
Shrub	151	3%	133	1%	284	2%	
Hardwood	231	4%	72	1%	303	2%	
Early (0-5" dbh)	52	1%	0	0	52	<1%	
Seedling/Sapling	338	6%	0	0	338	2%	
Poles (5-11" dbh)	302	5%	1,671	14%	1,973	11%	
Mid (11-21" dbh)	4,171	69%	4,888	40%	9,059	50%	30%
Mature (>21" dbh)	739	12%	292	2%	1,031	6%	10%
Non-vegetated	43	1%	201	2%	244	1%	1%
Developed/vegetated	0	0	2,933	24%	2,933	16%	4%
Developed/non-vegetated	0	0	0	0	0	0	0
No Data/Steady State[1]	0	0	2,060	17%	2,060	11%	43%
Total	**6,036**		**12,250**		**18,286**		

[1]no data for Forest Service lands on Eight Dollar Mt. which is predominately Jeffery pine; steady state is a Forest Service class for describing Jeffrey pine/serpentine areas

[2]Early data includes grass/forb, shrub, hardwood, early, seedling/sapling and pole condition classes; this represents conditions prior to Biscuit fire

Stand Density

Forest inventory data (stand exams) were collected for the Free & Easy project on 20 representative forested stands in Sections 3, 5, 11, 14, 17 and 35. Relative densities range from 68-100%. Stands can remain between 55-100% relative density until mortality is caused by suppression, disease, insects or drought. Mortality typically begins at a relative density of 55% or above in the smallest suppressed size classes. Basal areas ranged from 161 to 339 ft2/acre and total trees per acre ranged from 309 to 1,717. Only two of the 20 stands had average live crown ratios above 40%, below which is considered the threshold for concern. Low live crown ratios compromise the trees ability to withstand drought, insects and diseases.

3.2.2 Environmental Consequences

Alternative 1- No Action

Within the project area fire exclusion has created conditions favorable to increased Douglas-fir/tanoak establishment, resulting in abnormally high stocking densities. Once established, these trees develop into the stem exclusion phase. During the stem exclusion phase, understory vegetation is shaded out, crowns recede, height growth is enhanced, and suppression-induced mortality begins in the smaller tree classes. Crown recession is especially important because once the lower limbs die there is no opportunity to develop large diameter lower limbs critical to some wildlife species (Poage and Tappeiner 2002). Stands at high densities reach the stem exclusion phase faster than low density stands. Stands remain in the stem exclusion phase until mortality to the overstory creates canopy openings and structural complexity begins to develop (understory reinitiation phase). Therefore, stand level complexity will eventually be attained through insect and disease attack, windthrow, and tree decadence but only if major stand replacement events do not occur.

Lack of disturbance in fire-adapted systems, such as those found in the project area, has resulted in higher stocking densities than the site is capable of maintaining. With no-action, stands will continue to have low individual tree vigor, reduced understory vegetation, and increased fuel loadings from suppression-induced mortality and litter fall. Higher levels of insect and disease infestation/infection are expected. These conditions are considered outside the range of natural variability for the Douglas-fir and Tanoak plant series. Once outside the range of natural variability, ecosystem stability, biological diversity, resilience and ecosystem health is reduced (Atzet and Martin 1991).

In the no-action alternative, abundance of shade intolerant species such as pine and black oak would be reduced due to lack of regeneration opportunities and large tree mortality. Regeneration of these ecosystem components would continue to be limited by lack of canopy gaps (light to the forest floor) and high duff/litter layers. The longevity of large pre-fire exclusion pines and black oaks would be shortened by competition from post-fire exclusion vegetation. The major impact of no-action to this community is continued shrub decadence, reduction of native grass and forb abundance/diversity, and reduction of overstory tree vigor from higher stocking levels. Thus, stand diversity in terms of species abundance and vertical structure would continue to be reduced.

Cumulative Effects

Annual insect surveys of Southwest Oregon indicate an increase in insect activity corresponding to the drought of 2001. In the event of another drought period, low vigor trees in the project area would likely succumb to beetle attack. (Sartwell and Stevens 1975, Cole and Cahill 1976, Mitchell et al. 1983, Amman and Logan 1998, Kolb et al. 1998, McDowell et al. 2003). If insect populations are allowed to build-up on BLM lands within the project area, the potential for these to spread to adjacent land increases. In endemic periods, trees of low vigor are typically attacked, but once epidemic population levels are reached even healthy trees are subject to attack.

The high fuel loadings and ladder fuels created by the successful exclusion of fire and past management has created prime conditions for a wildfire start on BLM to spread to adjacent private/public lands. The no action would continue this trend. Stand replacement fire within the watershed will reduce structural complexity, create early-seral conditions, and increase brush abundance.

Wood demand and the need for products to supply this demand are not influenced by the quantity or quality of products taken from public lands. Consumers are responsible for this demand and if wood demand is not met through sustainable forest practices, it will be met in regions not subject to these sustainable practices. Mitigation measures taken on public lands far exceed those taken on other lands; therefore, negative cumulative effects from deferral of harvest on public land are increased by meeting this demand on other lands (Bowyer 1992).

Alternative 2

<u>Short Term/Stand Level Effects</u>

Young stand prescriptions would release residual conifers and hardwoods and retain the most vigorous trees. Brushing and pre-commercial thinning would reduce canopy bulk density and ladder fuels (brush). Surface fuels may increase in units where the slash goes untreated. The young stand in the CAR would be hand piled and burned, leaving the stand in a more fire resistant condition. The young stand outside the CAR would be evaluated after initial treatment

for fire risk and hazard. If slash treatment was unnecessary due to the low amount of material (woody biomass), treatments surrounding this stand would function to mitigate fire spread from the young stands to other areas.

Non-harvest treatments (fuel hazard reduction) in Douglas-fir pole and mid size classes would expedite development into the next vegetation condition class. Thinning from below would raise canopy base height and reduce canopy bulk density making the stands more resistant to stand replacement fire. Under burning would reduce litter depths and down dead material, which would reduce flame lengths in the advent of a fire start. Some crown scorch and mortality (less than 15%) is expected to occur from the under burning. Previous prescribed burn mortality has been evaluated in other areas and typically results in 8-15% tree mortality per acre (generally in the smallest diameter classes).

In the Jeffrey pine and white oak series, proposed treatments under fuel hazard reduction include prescribed burning, hand cutting of excess brush and small diameter trees. Individual tree vigor will be improved, mortality from insects and disease will be lessened and higher growth rates will raise the average stand diameter. Prescribed burning is expected to reduce shrub dominance and allow forb and grass cover to increase. Within 5 years plant diversity and vigor will be higher than would exist under the no action alternative.

In areas proposed for density management/mod GS (DM/Mod GS) removal of trees would occur primarily from the smaller size classes, retaining a canopy cover of 40% and creating an occasional canopy gap around large pines and hardwoods. The resulting stand structure would be vertically and horizontal diverse. The target canopy closure in these stands would result in a fairly open structure with light reaching the forest floor. Pine and oak regeneration is expected to increase and understory plant diversity/abundance will be greater. Release of residual trees would accelerate diameter growth, retain high crown ratios and increase individual tree vigor.

In all harvest units, activity fuels would be piled and burned. Understory trees would be slashed to spacing specifications, leaving the most vigorous conifers and hardwoods; slash would be piled and burned. With just a few exceptions, a follow-up underburn would occur after piles are burned. Mortality and crown scorch are expected to be within the levels discussed in the fuels reduction section. The short-term effects of these activities are reduced surface and ladder fuels, mortality to understory vegetation in a mosaic pattern, and exposure of bare mineral soil, also in a mosaic pattern. Landsberg (1994) found potential short-term effects including growth decline of overstory trees; however, tree cores from overstory trees in nearby project areas show no growth decline after prescribed fire. Within 2 to 5 years of these treatments, understory vegetation would have resprouted with higher species diversity expected. Providing canopy separation by removing some of the larger overstory trees would reduce the likelihood of large stand-replacement fire events.

Long-term/Landscape Level Effects

Alternative 2 would perpetuate a diversity of structures, species, and landscape habitat components (snags, down-wood, large hardwoods and conifers). Since this alternative proposes the highest level of treatment, the landscape would be in a fairly open condition initially. This would benefit early seral species such as pines and oaks, which are currently in decline. As growth and regeneration advance, the effects of treatments would be less apparent. As evidenced by the plant community response to the large fire of 1868 a third age group would emerge, creating another layer of vegetation.

Effects to Productivity

Alternative 2 would retain a mix of hardwoods, grasses, forbs, shrubs and conifers on the landscape, providing future organics and soil nutrients. Fuel treatment would reduce duff layers in a mosaic pattern. Retaining a mix of species across the landscape and residual duff or organic layers provides for current and future productivity. Since the key components of ecosystem productivity are retained there are no expected decreases in productivity.

Additionally, long-term studies have reported no decline in site productivity with substantive soil compaction and massive removals of surface organic matter (Powers et al. 2004). Another study found that land-use conversion from forest to residential or agricultural development has the greatest impact on forest productivity and habitat (Rochelle 1998; Perry et al. 1989). Given that alternative 2 results in minimal soil compaction and organic matter removal and does not propose land-use conversion, long-term effects on vegetation productivity are not expected.

Cumulative Effects

Young stand management and fuel hazard reduction treatments are proposed on 2,137 acres (11.7% of the Kerby sub-watershed) under this alternative. These treatments will provide for future stand development, and restore key ecosystem structures and processes. This project would not add to the Biscuit Fire effects since no stands would be converted to early seral condition and the fire burned outside the project area sub-watershed.

The combination of commercial harvest and fuel treatments reduce the likelihood for a fire start on BLM land to spread to adjacent lands. Additionally, all thinning activities would increase individual tree vigor, reducing the potential for epidemic beetle populations to build up and spread.

The propose action includes 589 acres of various levels of commercial harvest, representing 3% of the Kerby sub-watershed. An additional 400 acres of salvage harvest is planned on Forest Service land in the Illinois River-Josephine Creek watershed. Cumulatively the 989 acres of harvest represents 1.2% of the watershed. Through recovery of past harvest units and management activities emphasizing thinning to increase growth rates, there is and would continue to be an increase in mature stand structure at both the watershed and project scale.

Alternative 3

The proposed action for young stands is the same as alternative 2, therefore the effects are similar. Stand effects of fuel hazard reduction will also be the same as those described in alternative 2. Areas not treated under alternative 3 would have the same effects as the no-action alternative.

Density management/understory (DM/UR) in areas with a continuous canopy, trees in the smaller size classes would primarily be selected for removal, retaining a canopy cover of at least 60%. The prescription would create a relatively evenly spaced residual stand since no gaps are proposed. The opportunity to release large pines and oaks will be missed by retaining higher canopy closures; regeneration of these species would be minimal. Individual tree release would be accomplished but the duration of release will be shorter as crowns expand. Understory thinning followed by underburning would reduce ladder and surface fuels, reducing the likelihood of early seral conditions through stand replacement fire.

In stands with a more patchy large tree component, the density management/understory (DM/UR) prescription would retain the most vigorous large trees and remove trees in the mid and lower layers to promote development of multiple layers. Even with the patchy distribution, competition for resources from dense understory vegetation is reducing vigor in the largest trees. Removal of these competing trees will help to insure the longevity of the larger trees while also promoting the growth of mid and lower tree layers. Expediting growth of younger, less developed trees would help insure future large tree components.

Within the areas proposed for restoration thinning the effects will vary depending upon site characteristics. Restoration thinning includes a structure based and a process based treatment strategy. The level of removal will be guided by species, individual tree vigor and site indicators of soil moisture/nutrients. In the structure based approach, trees showing signs of stress, competing with vigorous pine, oak and cedars, or determined to be in excess of density targets would be removed. Since density targets are highly variable (60 ft^2/acre for dry sites and 100 ft^2/acre for wetter sites) the resultant structure and species mix will be highly variable. In order to maintain this structure, prescribed fires every 7 to 15 years which mimic the natural fire return interval would be applied in the future. The effects of prescribed fire are similar to those disclosed for the harvest prescriptions.

Underburning would create patches of bare mineral soil for regeneration of conifers dependent upon bare mineral soil for germination. Overstory shade to these species would progressively reduce growth rates as overstory crowns expand and seedling/saplings increase in size. As the sunlight becomes more limiting, crown vigor on the new trees would decline. This layer is not expected to be as vigorous as expected in alternative 2. Retaining higher canopy closures would similarly reduce vigor of large hardwoods. Native grasses and forbs are expected to increase, enhancing understory diversity.

In areas of dense large trees, where higher canopy retention (>60%) is prescribed, individual tree vigor will not increase as much as in alternative 2. Pine and oak regeneration will be limited, and opportunity to provide commodities/services will not be as high as in alternative 2.. In no treatment stands, effects are similar to the no action alternative.

Cumulative Effects

While acres proposed for harvest are higher in alternative 3 (1,069 vs. 589), less volume would be removed. As with alternative 2, alternative 3 would not convert stands to early seral conditions and would not add to the Biscuit Fire effects.

The proposed action includes 1,069 acres of various levels of commercial harvest, representing 6% of the Kerby sub-watershed. An additional 400 acres of salvage harvest is planned on Forest Service land in the Illinois River-Josephine Creek watershed. Cumulatively the 1,469 acres of harvest represents 1.7% of the watershed. Through recovery of past harvest units and management activities emphasizing thinning to increase growth rates, there is and would continue to be an increase in mature stand structure at both the watershed and project scale.

The combination of commercial harvest and fuel treatments reduces the likelihood that fire on BLM would spread to adjacent lands. Additionally, all thinning activities would increase individual tree vigor, reducing the potential for epidemic beetle populations to build up and spread to adjacent lands.

3.3 Botanical Resources

3.3.1 Affected Environment

The Tennessee Lime project area was surveyed for the presence of Survey and Manage (S&M), Threatened and Endangered (T&E), State Threatened (STO), Bureau Sensitive, Bureau Assessment, or Bureau Tracking plant species, and noxious weeds during the 1989 - 2005 field seasons. Surveys documented 158 populations for 30 species of listed plants within the project area (Table 6). Over 7 populations for 2 species of noxious weeds were documented from surveys (Table 7). The project area is within the range for the federally listed species *Fritillaria gentneri* and *Lomatium cookii*; however, *Fritillaria gentneri* was not found within the project area. All Survey and Manage species with ranges within the Medford District BLM are documented under the Record of Decision and Standards and Guidelines for Amendments to the Survey and Mange Protection Buffer, and other Mitigation Measures Standards and Guidelines, as not requiring pre-disturbance surveys. Known sites will be managed in accordance with the standards and guidelines (USDI, USDA 2001, Standards and Guidelines, pp. 7-14).

Fungi

No pre-project surveys were conducted for fungi because no fungi are in categories for which pre-disturbance surveys are required. There is one previously known site of *Phaeocollybia pseudofestiva*, a S&M category B and Bureau Tracking (BT) species, located in the project area, but it is not located within any proposed units for this project. Surveys for the project located one site of the S&M category D fungi *Phaeocollybia kaufmanii*. If additional S&M or BS fungi sites are discovered on BLM-administered land before project implementation, these sites would be protected according to *Management Recommendations for Survey and Manage Fungi* (Castellano and O'Dell 1997).

Only S&M Category B, D, and F, and BS, fungi are included on the Medford BLM Special Status Plant list. These are species expected to be found within the District. Management policy for Category B fungi gives direction to "manage all known sites and reduce the inadvertent loss of undiscovered sites" (USDA and USDI 2001, S&G-9). Reducing the inadvertent loss of undiscovered Category B fungi sites is accomplished through Strategic Surveys, which are currently being conducted at a regional level. Management directions for Category D fungi are to manage known sites to provide for a reasonable assurance of species persistence (USDA and USDI 2001, S&G-11). Managing known sites is not required for Category F fungi because they are uncommon, not rare (USDA and USDI 2001, S&G- 13). The inadvertent loss of Category D and F fungi are not considered likely to change the level of rarity of these species (USDA and USDI 2001, S&G-9-14).

Pre-disturbance surveys are not required for S&M, BS, or BT fungi. Above-ground fruiting structures (sporocarps) are short-lived, seasonal, and annually variable making surveys difficult (USDA, USDI 2004). According to BLM Information Bulletin #OR-2004-145, it is expected that field units will not conduct field surveys for these species due to survey impracticality. Bureau Tracking species are not considered Special Status species for management purposes and no further analysis is required. The effects of management actions on S&M fungi were analyzed under the *FSEIS For Amendment to the Survey & Manage, and other Mitigation Measures, Standards and Guidelines* (USDA and USDI 2001) and strategic surveys are being conducted that satisfy the requirements of avoiding the inadvertent loss of undiscovered Category B fungi.

Table 6. Botanical Survey Findings				
Species	**Habitat**	**Protection Status**	**Populations in Project Area**	**Populations on the District**
VASCULAR PLANTS				
Lomatium cookii (Cook's lomatium)	Vernal pool/patterned ground areas on mounds and moist sites in meadows.	Federally Endangered	7	29
Calochortus howellii (Howell's mariposa lily)	Dry, open slopes. Rocky, serpentine soils, in Jeffrey pine forests.	State Threatend	6	122
Hastingsia bracteosa var. *bracteosa* (Large-flowered rush lily)	Wet meadows on serpentine soil.	State Threatend	8	42
Microseris howellii (Howell's microseris)	Dry, rocky areas on serpentine soil.	State Threatend	12	204
*Cypripedium fasciculatum (*Clustered ladyslipper)	Moist microsites in mixed evergreen forests.	Survey and Manage Category C	6	1,242
Cypripedium montanum (Mountain ladyslipper)	Moist microsites in mixed evergreen forests.	Survey and Manage Category C	5	567
Epilobium oreganum (Oregon willow herb)	Wet boggy sites often serpentine at lower elevations.	Bureau Sensitive	6	17
Gentiana setigera (Waldo gentian)	Wet meadows and bogs on serpentine soils at lower elevations.	Bureau Sensitive	6	35
Hastingsia bracteosa var. *atropurpurea* (Purple-flowered rush lily)	Wet meadows on serpentine soil.	Bureau Sensitive	3	3
Limnanthes gracilis var. *gracilis* (Slender meadow foam)	Wet ground, on serpentine soils.	Bureau Sensitive	19	89
Plagiobotherys figuratus ssp. *corallicarpa* (Coral seeded allocarya)	Rocky, open grassland meadows assoc. with vernal pools (wet in spring/dry in summer).	Bureau Sensitive	1	13
Senecio hesperius (Western senecio)	Serpentine soils at lower elevations on gentle to steep slopes.	Bureau Sensitive	12	170
Streptanthus howellii (Howell's streptanthus)	Serpentine soils dry open woods or brushy areas.	Bureau Sensitive	3	6
Fritillaria glauca (Siskiyou fritillary)	Dry rocky slopes, often serpentine.	Bureau Assessment	6	85
Monardella purpurea (Siskiyou monardella)	Dry open places, rocky slopes.	Bureau Assessment	2	23
Salix delnortensis (Del Norte willow)	Riparian serpentine areas.	Bureau Assessment	3	4

Table 6. Botanical Survey Findings				
Species	**Habitat**	**Protection Status**	**Populations in Project Area**	**Populations on the District**
Allium bolanderi var. *bolanderi* (Bolander's onion)	Heavy clay soils in openings among brushy woods. Serpentine soils on stony slopes/ gravelly flats.	Bureau Tracking	22	1
Carex serpenticola (Serpentine sedge)		Bureau Tracking	1	14
Cypripedium californicum (California lady's slipper)	Moist microsites in mixed evergreen forests.	Bureau Tracking	1	23
Darlingtonia californica (California pitcher plant)	Serpentine soils. Boggy places with running water.	Bureau Tracking	1	23
Dicentra formosa ssp. *oregana* (Oregon bleeding heart)	Serpentine dry open gravelly slopes.	Bureau Tracking	1	6
Epilobium rigidum (Rigid willow herb)	Serpentine dry slopes along creekbeds.	Bureau Tracking	2	8
Lewisia oppositifolia (Opposite-leaved lewisia)	Open moist serpentine rock or soil.	Bureau Tracking	1	19
Mimulus douglasii (Douglas monkey flower)	Serpentine open gravelly moist places in springs.	Bureau Tracking	8	91
Mimulus kelloggii (Kellogg's monkey flower)	Openings in coniferous forests. Dampish disturbed places in clay soil.	Bureau Tracking	7	25
Poa piperi (Piper's bluegrass)	Dry, rocky serpentine slopes in open pine woods and meadows.	Bureau Tracking	5	48
Sedum laxum ssp. *heckneri* (Heckner's stonecrop)	Dry rocky places on serpentine.	Bureau Tracking	1	11
Thlaspi montanum var. *siskiyouense* (Siskiyou mountains pennycress)	Moist rocky serpentine soils.	Bureau Tracking	1	9
NON-VASCULAR PLANTS				
Crumia latifolia (Three-lined moss)	Wet rocks, cliffs, flowing streams.	Bureau Assessment	1	138
FUNGI				
Phaeocollybia kaufmanii (Giant phaeocollybia)	Solitary or grouped under conifers.	Survey and Manage Category D	1	

Table 7. Noxious Weeds Survey Findings				
Species	**Common Name**	**Species Code**	**Designation**	**Section**
Centaurea debeauxii	Meadow Knapweed	CEDE5	B	38S-07W-31, 39S-08W-06
Cytisus scoparius	Scotch Broom	CYSC4	B	39S-08W-1, 3, 11, 14, 21

3.3.2 Environmental Consequences

The only plant species that will be discussed will be those species depicted in the tables above. Survey and Manage (S&M), Threatened and Endangered (T&E), State Threatened (STO), and Bureau Sensitive plants are required to be protected and managed. Bureau Assessment species are ones currently not eligible for federal listing, but are of a conservation concern and may need protection or mitigation from BLM activities. It is Oregon State Office's policy that the Bureau of Land Management would protect, manage, and conserve those sensitive species and their habitats such that any Bureau action would not contribute to the need to list any of these species (IM OR-91-57). Bureau Tracking species are not considered Special Status species for management purposes, but are documented to help determine future status and management. Protection for these species is discretionary, and based on species and treatment prescribed.

Alternative 1 – No Action

The no action alternative would not result in direct effects to S&M, STO, T&E or special status species. Plant species would have both a negative and positive indirect effect based on the species and habitat requirements as described below.

Fuels treatment and timber harvest

Without treatment, a build-up of fuels would continue to occur within the plant populations. This build-up would create favorable conditions for higher intensity wildfires, which could result in extensive damage to plant species habitat. Fire has played an extremely important role in influencing the plant communities of southwestern Oregon. The mixed evergreen forests and shrublands typically found in the Illinois Valley and in this project area have been created and perpetuated in the past by fire. This regime has been disrupted by fire control activities (Franklin and Dyrness 1988).

Certain plant species, such as *Cypripedium fasciculatum, C. californicum, C. montanum,* and *Phaeocollybia kaufmanii,* require a sufficient amount of down logs, snags, duff layer, and canopy cover to maintain soil moisture and mycorrhizal associates. Species that prefer canopies with dense conditions would continue to persist under the no action alternative. Habitat conditions for species requiring canopy openings, and more open habitat conditions such as *Alium bolanderi* var. *bolanderi, Calochortus howellii, Carex serpenticola, Crumia latifolia, Darlingtonia californica, Dicentra Formosa* ssp. *oregano, Epilobium oreganum, Epilobium rigidum, Fritillaria glauca, Gentiana setigera, Hastingsia bracteosa* var. *bracteosa, Hastingsia bracteosa* var. *atropurpurea, Lewisia oppositifolia, Limnanthes gracilis var. gracilis, Lomatium cookii, Microseris howellii, Mimulus douglasii, Mimulus kelloggii, Monardella purpurea, Poa piperi, Salix delnortensis, Sedum laxum* ssp. *heckneri, Senecio hesperius, Streptanthus howellii,* and *Thlaspi montanum* var. *siskiyouense* would decline due to shrub/conifer encroachment and crowded conditions

Road work and noxious weeds

Noxious Weeds can out-compete native plants, reduce habitat for native insects and animals, and threaten biological diversity. They can alter soil fertility, dry up water supplies, poison animals, decrease agriculture production, infest rivers, and reduce the recreational value. Noxious weeds find disturbed sites favorable for habitat. Vehicles are a primary method for transporting noxious weeds and creating new populations of noxious weeds. No action would create no additional disturbance or access that may result in new weed populations. However, existing populations would not receive priority for treatment compared to alternatives 2, and 3. Action alternatives would include vehicle and equipment use which are known vectors of seed dispersal.

Therefore, the risk of weed infestations would be higher even though disturbance is proposed in other alternatives.

Alternative 2

Short and Long Term Effects
Due to project design features (PDFs) there should be no direct or indirect effects to existing listed botanical species. For some species that require higher canopy closures, buffers are expanded beyond the actual population in order to protect habitat for future population expansion. Buffers surrounding all listed plant sites would provide protection from project activities. Buffer sizes would be based on species, habitat, and treatment. A 20' minimum buffer would encompass State Threatened and Special Status species. While protection of Bureau Assessment species is discretionary, protection would occur for these species, dependent on habitat needs and activity. Therefore, implementation would not contribute to the listing of vascular plants, non-vascular plants or fungi.

Fuels treatment and timber harvest
Treatments that reduce canopy cover beyond 40% may degrade unoccupied habitat for species (*Cypripedium californicum, C. fasciculatum, C. montanum,* and *Phaeocollybia kaufmanii)* if opening of the canopy reduces or dries moist microsites. However, this short term degradation would only occur on approximately 600 acres and would begin to recover within two years at which time canopy cover increases. These treatments would not lead to the listing of these species, given the small scale of treatment (<2% of the Kerby sub-watershed), short duration of effects, protection buffers, and presence and habitat for these species adjacent to the project area, in the watershed, throughout the district and the Pacific Northwest.

Canopy thinning should improve habitat for those plant species requiring openings by reducing competing vegetation and opening the canopy (*Alium bolanderi* var. *bolanderi, Calochortus howellii, Carex serpenticola, Crumia latifolia, Darlingtonia californica, Dicentra Formosa* ssp. *oregano, Epilobium oreganum, Epilobium rigidum, Fritillaria glauca, Gentiana setigera, Hastingsia bracteosa* var. *bracteosa, Hastingsia bracteosa* var. *atropurpurea, Lewisia oppositifolia, Limnanthes gracilis var. gracilis, Lomatium cookii, Microseris howellii, Mimulus douglasii, Mimulus kelloggii, Monardella purpurea, Poa piperi, Salix delnortensis, Sedum laxum* ssp. *heckneri, Senecio hesperius, Streptanthus howellii,* and *Thlaspi montanum* var. *siskiyouense*).

Fuels treatments would maintain habitat while protecting against catastrophic wildfires. Underburning, burning slash and chipped material are treatments that replicate natural, low intensity burns on the landscape. However, a thick layer of slash (>6") creates potential for smoldering under the event of a wildland fire which could damage the soil and seedbed to a point where many species in the herbaceous layer would have difficulty re-establishing. This potential for high intensity smoldering and impediment of germination would not occur in the project area due to a targeted slash layer of 0 – 1" left on the ground. The slash left on the ground would decrease over time as slash settles and decomposes. PDF requirements for leaving untreated areas, follow up under-burns, and avoiding placing material in buffered areas, would minimize slash buildup across the landscape and in buffers.

Hand piles would be distributed across the landscape covering a maximum of 1,233 acres. Igniting hand piles produces a high intensity burn exposing mineral soil. For the project, an average of 70 hand piles per acre would be burned. Based on a 7'x 7' hand pile spacing and 70

hand piles per acres, only 0.2% of the acreage would be directly affected by the hand piles. At the Kerby watershed scale, hand piles would occur on less than 0.1% of the area. Piles burned are not fully consumed, reducing predicted disturbed acreage. Observation and research from previously treated areas has found that vegetation, within unoccupied habitat, recovers within the piles over the next couple of years.

Thinning or fuel reduction would reduce competition from encroachment from other plant species and improve the habitat conditions. Since this treatment is performed in the fall, or dormancy period, there wouldn't be any direct effects. Reducing the understory mimics historical conditions (open stands) simulating a more natural fire regime. This, in turn, would reduce the risk of high intensity fire, protecting plant species by reducing fuel loads and reducing risk.

Biomass Utilization

Approximately 1,915 acres were identified as potential biomass removal in the project area. Treatments would reduce hazardous fuels while utilizing the biomass to benefit the local economy. Smaller machinery will most likely be used to remove biomass. Existing skid roads and skid roads developed for commercial prescriptions will be used in riparian areas. Additional skid roads may be identified in matrix lands. To eliminate any effects to plant species or the spread of noxious weeds, PDF's will be followed. Effects are similar to fuel reduction activities described above.

Road Work and Noxious Weeds

If left un-checked, noxious weeds would occupy habitat for botanical and native species. Adverse effects to botanical species from the encroachment of noxious weeds could impact populations due to competition for light, water, and nutrients. These effects may reduce populations and potential habitat over time. Road maintenance and temporary construction, tractor harvest, trails and landing construction represent opportunities for seed dispersal of noxious weeds from outside the project area as well as the spread of existing seed present in the project area. However, due to PDFs designed to reduce the risk of weed spread (equipment washing to remove dirt containing weed seeds or plants, seeding/mulching with native species to help native plants become established more quickly than and thus outcompete noxious weed species, and control or eradication of identified noxious weed sites), the spread of noxious weeds would be greatly minimized and would not be distinguishable above current levels and mechanisms of weed spread (vehicles, wind, animals, etc.). PDFs for reducing or eliminating noxious weed impacts are "widely accepted and utilized as best management practices in noxious weed control across the nation" (Cottonsnake Timber Sale EA Supplement, Glendale Resource Area, Medford BLM 2006).

Known sites would be treated, in accordance to the Medford District Noxious Weed EA, reducing known populations which would not occur under the no action alternative. Given the unpredictability of weed spread through these existing vectors, it is not possible to quantify with any degree of certainty the rate of weed spread in the future or even the degree by which that potential would be affected (increased or decreased) by the proposed action. The potential for the introduction of new infestations is similar for all alternatives. Populations would continue to establish and spread due to seed transport by existing vectors such as vehicles, wildlife, wind, and water.

Alternative 3

Short and Long Term Effects
Species needing open canopies will benefit from alternative 3 where 40% canopy cover would be proposed. Habitat for species requiring openings would decrease over time with shrub/conifer encroachment and crowded conditions unless maintained by activities such as maintenance underburning.

Biomass Utilization
Effects are similar to alternative 2.

Road Work and Noxious Weeds
Effects are similar to alternative 2.

Cumulative Effects
Land ownership within the project area includes a checkerboard of government and privately owned land. As human populations increase in this region, available habitat for plant species would decrease on non-federal lands. Management and treatment activities would continue to occur on private and BLM lands. Special status plant species/habitat on federal lands would continue to be protected. Populations on non-federal lands would most likely remain undetected and unprotected because no laws governing rare plants on non-federal lands exist. Because habitat and populations for the plant species found in the project area are abundant on the resource area, district, and southern Oregon on federal land, impacts associated with this project would not lead to the listing of any plant species, when considered in conjunction with habitat or plant impacting activities on non-federal land.

Noxious weeds have started to impact plant communities, especially in drainages and along roadsides in the project area. Foreseeable activities in the project area are expected to be similar to past and current activities: motor vehicle traffic, recreations use, timber harvest, and road construction. These types of activities could result in new disturbed sites available for colonization by existing noxious weed populations, and they offer the possibility of introduction of new noxious weed species to under any alternative, including no action. Known populations of noxious weeds on BLM lands are typically treated which is not necessarily the case on non-federal lands. Therefore, populations are expected to increase on private land, but decrease on public land where known populations occur.

3.4 Fisheries / Aquatic

3.4.1 Affected Environment

The project area is in the Josephine-Kerby 6th field sub-watershed in the Illinois River-Josephine Creek 5th field watershed. The major fish bearing streams that could be affected by the proposed actions are the Illinois River, Reeves Creek, George Creek, Jimmy Creek and Free and Easy Creek. Fish species that inhabit these streams include fall chinook salmon, coho salmon, winter steelhead, cutthroat trout, Pacific lamprey, western brook lamprey, and sculpins. Southern Oregon/Northern California (SONC) coho salmon are federally listed as threatened. Pacific lamprey is a Bureau tracking species in Oregon. Kerby is not in a tier 1 key watershed and it is not identified in the Governor's salmon recovery plan as a core habitat area of critical importance to the maintenance of coho salmon populations.

Streams and riparian areas in the sub-watershed is described in the Kerby Watershed Analysis (USDI 1995) as degraded due to the effects of historic and current land use. The Oregon Department of Fish and Wildlife (ODFW) has identified fish habitat benchmarks used to determine if a component of fish habitat is a limiting factor in trout or salmon production or survival. In the streams of the project area, large woody debris (LWD), pool depth and frequency, water flow and temperature have been identified as limiting for salmon and trout production and survival. The ODFW benchmark for pool habitat is that pools comprise >35% of total stream area, adequate riparian canopy is identified as coverage >75%, and >20 pieces of large wood per 100 meters of stream. Summer water temperatures are higher than optimal levels for salmonids in the Illinois River and Free and Easy Creek. Instream water availability is below historic ranges.

3.7.2 Environmental Consequences

The following analysis considers the likelihood that the no action and proposed two action alternatives would affect fisheries and aquatic resources, and then assesses the potential magnitude, duration, and nature of effects. The proposed actions are evaluated on how they would change fish habitat, and for this reason, the fisheries analysis is linked closely to the soil and water effects analysis (Soil and Water section 3.1). The effects on habitat are in turn used to evaluate the potential of the proposed actions to affect fish populations through production and survival.

Alternative 1 – No Action

Current conditions and trends of channel processes and water quality, and therefore fish habitat, would continue. Currently, streams have poor quality rearing habitat which limits salmonid growth and survival. Across BLM lands, sedimentation in spawning gravels do not appear to be a limiting factor for production and survival. Although programmatic road maintenance would continue, improvements proposed in other alternatives alleviating chronic sediment sources would not occur.

Alternative 1 would have no direct effect on summer stream temperatures. However, the increased risk of a high severity wildfire in the riparian zone could indirectly affect stream temperatures by substantially reducing stream shade. Fish growth and survival are limited by elevated stream temperatures in the Illinois River mainstem and in the lower reaches of tributary streams.

The loss of future LWD recruitment potential from a high severity wildfire in the riparian would decrease pool frequency and depth, stream complexity, and salmonid growth and survival through reduced rearing habitat quality. Stream reaches with inadequate instream wood would continue to have low pool frequency, depth, and stream complexity, and high stream velocities, and bank erosion.

Alternative 2

<u>Road Work</u>
Road maintenance and renovation would maintain downstream salmonid survival and production. Road work would reduce chronic sources of sediment through improved road drainage. Road work could deliver fine sediments to stream immediately downstream of culverts. However, this sediment would be minimal due to PDFs (wet season restrictions, dust

abatement, etc.) and, therefore, would not likely alter fish habitat. The amount of sediment delivery would be so small as to not cause an increase in streambed embeddedness or alterations in pool formation or quality.

The temporary spur road stream crossings and three designated skid trails across intermittent streams could route sediment to stream channels. However, all but one of the crossings are on intermittent streams where there are no fish present and sediment inputs would be small enough to not be detectable in fish habitat downstream. The crossing on Reeves Creek would be constructed at an existing low water ford when the channel is completely dry due to the irrigation diversion immediately upstream. Road work related sediment would be transported only after irrigation season during the first runoff season and would be undetectable during typical winter flows. Low magnitude storms occurring early in the runoff season could create detectable turbidity at this crossing for a short time until typical winter flows were present. At this time of the season, fish are not present and would not be affected by the turbidity.

Through PDFs and practices which minimize potential sediment routing to streams, activity generated sediment in fish habitat would be undetectable. Salmonid survival and production would be maintained because, as stated in the Soil and Water section (3.1), there would be no alterations to channel form (width to depth ratios, pool reduction, embeddedness) or channel processes (floodplain connectivity, stream flow velocity, pool and bar formations). There would be no alteration to sedimentation processes which would create chronic adverse water quality or channel conditions. Salmonid life stages (spawning, incubation, rearing) which depend on these channel conditions would not be affected.

Riparian Vegetation Treatments

Harvest - In this alternative, 188 acres in perennial and intermittent stream riparian reserves are proposed for harvest, approximately 105 acres of which would be accomplished by tractor. Vegetation prescriptions in the riparian reserve were developed to meet objectives for ecosystem function that tier to the Aquatic Conservation Strategy of the NWFP. Density management thinning in the riparian reserves would accelerate the development of late-successional forest conditions. There would be no reduction in streamside shade or large instream wood recruitment because there would be a no treatment buffer on perennial streams and retention of canopy in the riparian reserves.

Over time, late-successional forest conditions in riparian reserves would have increased structural diversity, canopy, and large woody debris recruitment, with improved stream complexity and water quality. Salmonid production would likely increase through increased adult holding areas and gravel retention. Increased stream complexity would result in improved juvenile rearing habitat.

PDFs such as no treatment buffers, canopy closure, skid road rehabilitation, and slope restrictions minimize sediment potential. Tractors would operate in riparian areas that have slopes <35%, and logs would be lined to existing or designated skid trails, which would be decompacted following use. Silvicultural treatments in riparian reserves would not reduce the canopy coverage below 50%, with the overall long term target of 60-70%. Vegetation in the primary shade zone of perennial streams would be retained because a 50' no treatment area would be implemented next to the channel, thereby protecting water quality.

Fuels – Activity and natural fuels would be treated in the riparian reserves of perennial and intermittent streams. Fuel treatments include handpiling/burning, slashing, and underburning.

Mechanical treatments and prescribed burning in riparian reserves would occur outside of no treatment zones.

Small woody material would be consumed during prescribed burning, but LWD would remain largely intact. The low intensity prescribed fires have a very low risk of mortality to large overstory trees or the consumption of snags. Therefore, future recruitment of LWD and streamside shade would not be reduced due to prescribed fire in the riparian reserve. Hand piles would not be burned within 50' of stream channels. Although these piles burn down to mineral soil, sediment would not migrate beyond the unburned litter around the pile. Following under burning, potential for sediment and ash transport to fish habitat is low because of the unburned strip of vegetation and organics along streams and the mosaic pattern of unburned vegetation outside the no treatment zone; therefore, no sediment routing mechanisms would be created. The potential for sediment transport resulting from these burns would coincide with intense rainfall and high winter flows and would not be distinguishable from baseline sediment loads. There would be no changes to the channel environment that would adversely affect fish or fish habitat.

In Alternative 2, approximately 500 acres in riparian reserves would be treated for fuel reduction through biomass utilization. Effects from biomass treatments and subsequent under burning and hand pile burning would be the same as for the fuel treatments described above for activity generated fuels and natural fuels. The use of designated skid trails from harvest treatments would prevent any additional soil disturbance from the biomass treatments in riparian reserves.

Cumulative Effects

The potential effects described above are minimal or negligible in this alternative because of the efforts to eliminate sediment delivery mechanisms and disturbance through PDFs. Riparian functions of stream shade and large wood recruitment would be maintained. There would be no increase in peak flows or stream temperature. Therefore, there would be no measurable or detectable changes to aquatic habitat and no changes to the channel environment that would affect fish or fish habitat.

There are no reasonably foreseeable actions on BLM land in the sub-watershed. On National Forest lands, a timber salvage project consisting of 400 acres is being planned outside of the project area and the Kerby sub-watershed. Private lands are assumed to continue to be harvested on a rotation schedule in accordance with ODF guidelines. No cumulative effects were identified in the analysis of impacts to soil and water (See Section 3.1). Therefore, no cumulative effects to fish and aquatic habitats would be expected to result from the proposed action in this project area, 6th, or 5th field watershed scales.

Alternative 3

Road Work

Road maintenance and renovation would be the same as Alternative 2. Construction of temporary spur roads and landings would facilitate commercial harvest as in Alternative 2 and would not increase in area or in the number of temporary stream crossings. The impacts to fish and fish habitat from road work would be the same as those described above for Alternative 2.

Riparian Vegetation Treatments

Harvest – 200 more acres of density management thinning would occur in Alternative 3 than in Alternative 2, for a total of approximately 399 acres. Tractor harvest would increase to approximately 330 acres in riparian reserves. As analyzed in the Soil and Water section (3.1),

erosion potential and sedimentation is greater under Alternative 3 due to the increase in ground-based extraction. However, potential erosion would be minimized because routing mechanisms to channels would not be created, riparian buffers would remain untreated, and skid trails would be waterbarred to divert runoff onto the forest floor. The number of skid trail crossings on intermittent streams would not increase beyond that analyzed in Alternative 2. The use of smaller ground-based equipment typical in stewardship treatments would be expected to produce impacts on a level similar to tractor harvest analyzed in Alternative 2 (see Soil and Water Section 3.1). Off-site impacts are not expected due to limited disturbance and efforts to reduce/eliminate sediment routing. Consequences to the channel environment are similar to Alternative 2. There would be no reduction in streamside shade and no increase in water temperature. The potential for large instream wood recruitment would not be reduced. Salmonid production and survival would be maintained as stream complexity would provide adult holding opportunities and juvenile rearing habitat.

Fuels – Natural and activity generated fuels in matrix and riparian reserve would be treated and have similar effects to those described in Alternative 2. The biomass utilization treatments of fuels would take place in riparian reserves using the same ground-based methods analyzed for impacts in Alternative 2. Effects from biomass treatments and subsequent under burning and hand pile burning would be the same as for the fuel treatments described above for Alternative 2 because of the use of existing skid trails in the riparian reserve, small equipment, no-treatment buffers and other PDFs designed to minimize sediment routing (also, see Soil and Water Section 3.1).

Cumulative Effects

The potential effects described above are minimal or negligible in this alternative because of the efforts to eliminate sediment delivery mechanisms and disturbance through PDFs. Riparian functions of stream shade and large wood recruitment would be maintained. There would be no increase in peak flows or stream temperature. Therefore, there would be no measurable changes to aquatic habitat and no changes to the channel environment that would affect fish or fish habitat.

In Alternative 3, as in the previous alternative, no cumulative effects were identified in the analysis of impacts to soil and water (See Section 3.1). Therefore, no cumulative effects to fish and aquatic habitats would be expected at the project, 6th or 5th field watershed scales.

3.5 Wildlife

3.5.1 Affected Environment

BLM manages approximately 6,036 acres (33%) of the 18,279 acres in the Lower Kerby 6th field watershed and Tennessee Lime project area. The US Forest Service manages approximately 2,094 acres (11%) of the watershed with the remainder (10,149 acres (56%)) in county, state and private ownership.

Southwest Oregon Mixed Conifer-Hardwood Forest is the predominant vegetation type in the project area (Chappell and Kagan 2001). This vegetation type is composed of mixed conifers (primarily Douglas-fir (*Pseudotsuga menzeseii*), sugar pine (*Pinus lambertiana*), ponderosa pine (*P. ponderosa*) and incense cedar (*Calocedrus decurrans*)) and evergreen hardwoods (primarily madrone (*Arbutus menzeseii*) as well as deciduous hardwoods). Stands in the project area are in various stages of stand development though there are some noticeable trends such as

encroachment of Douglas-fir into pine stands and brush encroachment into otherwise open plant communities associated with serpentine or ultramafic soils such as Jeffrey pine (*P. jeffreyi*) savannahs. Other habitat types in the project area are Westside Oak and Dry Douglas-fir Forest and Woodlands, Ceanothus-Manzanita Shrublands and Westside Riparian-Wetlands (Chappell and Kagan 2001).

Since completion of the Kerby Watershed Analysis in 1995, the Bureau Special Status Species list has been updated, and there have been several changes in management direction specifically as they relate to the NWFP Survey and Manage Mitigation Measures. This has resulted in some differences between the discussions found in the watershed analysis (USDI BLM 1995) and those in this section concerning species and habitats.

The red tree vole and Great Gray Owl are Survey and Manage species. Great Gray Owl and red tree vole surveys were completed in the project area per S&M policy and protocols (USDA & USDI 2000; 2001a; 2001b; 2002, 2002a; 2002b; 2003a, 2004). (See specific sections for details.) Additionally, extensive protocol surveys were conducted to locate and color band spotted owls across the Grants Pass Resource Area and in the project area during the early 1990s.

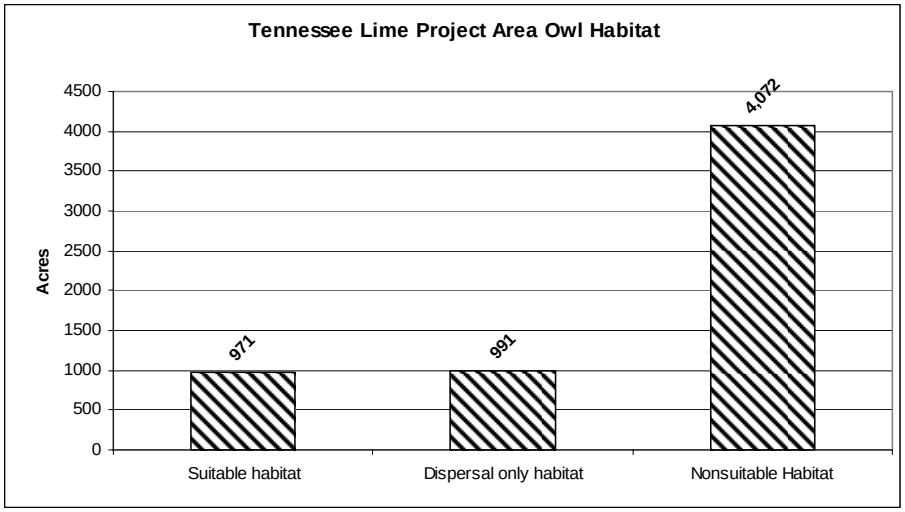
Since the late 1800s, timber harvest and fire suppression have replaced natural disturbance as the primary forces shaping forest landscapes. Perhaps the most important consequence of timber harvest has been the significant reduction in amounts of old growth forest on private land and its high degree of fragmentation on federal land. A significant proportion of low elevation forest land in western Oregon has been converted to other uses, primarily agriculture and suburban development, resulting in both fragmentation and loss of forest habitat (Rochelle 1998). Fire suppression has resulted in over-dense stands, for some species, and encroachment of shrubs and trees into open, edaphic-influenced plant communities, in turn, influencing the wildlife species composition of those communities.

Habitats in the project area will be discussed as they relate to the Special Status Species (SSS) policy for species known or suspected to occur in the project area as well as those under the Survey and Manage (S&M) program of the Northwest Forest Plan (USDA, USDI 1994, 1994a). There is one federally threatened species (Northern Spotted Owl), three Bureau Sensitive species (Pacific fisher, Northern Goshawk and Townsend's big-eared bat) and two Bureau Assessment species (fringed myotis and Pacific pallid bat) that are known or suspected to occur in the project area.

Habitat within the project area for BLM lands was typed utilizing the McKelvey rating system (see Appendix G for description). This habitat typing system was designed specifically for spotted owls, but can be used to assess habitat availability for other species because the habitat typing accounts for habitat condition and structure important to other species. The Tennessee Lime project area is synonymous with BLM lands in the watershed and therefore habitat for the watershed and the project area is identical. Because of agricultural and rural development, not all lands in the watershed are capable of becoming suitable nesting, roosting, foraging (NRF) habitat. The valley bottom contains 150 acres of developed lands, hardwood forest, riparian hardwood and mixed conifer /hardwood stands that are not capable of sustaining NRF habitat. Additionally, there are 2,826 acres of serpentine influenced brush or Jeffrey pine habitat that is incapable of becoming NRF habitat. On BLM lands, the project area and the Lower Kerby sub-watershed currently contain approximately 971 acres of suitable spotted owl habitat, or approximately 16% of the 6,036 acres of BLM lands in the watershed. There are approximately

991 acres (16% of BLM lands) of dispersal only habitat (suitable habitat is also dispersal habitat) and 4,072 acres (67%) of non-suitable habitat (Figure 1).

Figure 1. Spotted Owl Habitat - Current



Over the past 10 years the Northwest Forest Plan (NWFP) has been implemented across Federal lands, resulting in considerable change in forestry practices during this implementation period. The overall trend towards the recovery of the Northern Spotted Owl and old growth and late-successional forest related species has improved (USFWS 2004). While past forest management practices have fragmented habitat, there is no evidence that current forest practices immediately threaten any terrestrial vertebrate species in Oregon; current conservation measures appear adequate for species known to be vulnerable to forest practices (e.g., Northern Spotted Owl).

Habitats in the project area will be discussed as they relate to the Special Status Species (SSS) policy for species known or suspected to occur in the project area as well as those under the Survey and Manage (S&M) program of the Northwest Forest Plan.

Consultation with the USFWS regarding any T&E listed species potentially impacted by the project has been completed as required by Endangered Species Act (USFWS 2003, log #1-15-03-F-511). Subsequent or additional consultation would be conducted if: (1) new information reveals that the effects of the proposed action may affect listed species or critical habitat in a manner or to an extent which was not considered in the biological opinion; (2) the proposed action is subsequently modified in such a way as to cause an effect to a listed species or critical habitat in a manner or to an extent not considered in the biological opinion; or (3) a new species is listed or critical habitat is designated that may be affected by this action.

3.5.2 Environmental Consequences

If no habitat is present in the project area or the area is outside the range of a species, then no further analysis is needed. If habitat is present, but no activities are planned for that habitat, then no further analysis is needed. If a threatened, special status sensitive or assessment, or S&M species is known or suspected to be present and habitat is proposed to be disturbed, then affects on the species would be analyzed (see Appendix G for the list of Special Status Species considered).

Species Associated with Late-Successional Habitat

There are a number of species or groups of species that are strongly linked to features found in late-successional forests, commonly referred to as late-successional / old growth associated species. Rochelle (1998) observed that small amounts of habitat structure maintain many species assumed to be late-successional associates at levels statistically inseparable from levels in old growth stands. This is important as it suggests that at least some late-successional species can be maintained in managed stands by retaining suitable levels of required habitat elements, though likely at lower levels than intact forests. Other species, such as spotted owls, require more intact, closed canopy forests for successful reproduction and some species require closed canopy forests for dispersal.

This project is in conformance with the 2001 S&M ROD as outlined in the Northwest Forest Plan (NWFP), and subsequent Annual Species Reviews.

Northern Spotted Owl

Affected Environment

Spotted owls are closely associated with old forests for nesting, foraging, and roosting throughout most of their range (Forsman, et al. 1984, Carey et al. 1990, Solis and Gutierrez 1990). The Northern Spotted Owl (*Strix occidentalis caurina*) was federally listed as a threatened species in 1990. There is no spotted owl critical habitat in the project area. The East IV/Williams Late-successional Reserve (LSR) is approximately four miles east of the project area.

Standards and Guidelines of the NWFP established 100 acre late-successional reserves (cores) protecting the best quality habitat near nest sites and activity centers known to exist as of January 1, 1994. There are two historic spotted owl sites in the project area and both have designated core areas. These sites were surveyed to protocol in 2006 and no owls were located. Seasonal restrictions will be in effect for these sites (Table 3). An owl pair may use several different nest trees over the years, but the pair usually continues to spend the majority of their nesting and roosting time in a 125 acre activity center (personal communication Jim Harper, 2005).

The Northern Spotted Owl Five-year Status Review was completed by the U.S. Fish and Wildlife Service (USFWS) in 2004. There are four reports including the Status Review which are important to this effort: 1) *Scientific Evaluation of the Status of the Northern Spotted Owl* (Sustainable Ecosystems Institute, Courtney *et al.* 2004); 2) *Status and Trends in Demography of Northern Spotted Owls, 1985-2003* (Anthony *et al.* 2004) 3) *Northern Spotted Owl Five Year Review: Summary and Evaluation* (USFWS, November 2004); and 4) *Northwest Forest Plan – The First Ten Years (1994-2003): Status and trend of northern spotted owl populations and habitat, PNW Station Edit Draft* (Lint, Technical Coordinator, 2005). To summarize these reports, although the agencies anticipated a decline of NSO populations under land and resource management plans during the past decade, the reports identified greater than expected NSO population declines in Washington and northern portions of Oregon, and more stationary than expected populations in southern Oregon and northern California. The reports did not find a direct correlation between habitat conditions and changes in NSO populations, and they were inconclusive as to the cause of the declines. Lag effects from prior harvest of suitable habitat, competition with Barred Owls, and habitat loss due to wildfire were identified as current threats; West Nile Virus and Sudden Oak Death were identified as potential new threats. It was surmised that complex interactions are likely among the various factors affecting spotted owls throughout

their range. This information was evaluated in regard to the NWFP and the RMP, and has not been found to be in conflict with the NWFP or the RMP (Medford District BLM 2005).

In the Klamath Province of California, Franklin et al. (2000) found a positive relationship between habitat heterogeneity and Northern Spotted Owl reproductive output. This research found that annual survival of spotted owls was positively associated with both amounts of interior old growth forest and length of edge between those forests and other vegetation types. Treatments which retain interior forest conditions and increase edge could provide an increased chance of survival, but could negatively affect reproductive output (Franklin et al. 2000). Interior forest conditions likely decreased exposure to predators, but reduced availability of prey species which, at least in southern Oregon prefer edge habitat (see prey species discussion below for more detail).

This project and the expected effects to spotted owls comply with the formal Endangered Species Act (ESA) consultation with U.S. Fish and Wildlife Service (USFWS) issued in the Biological Opinion (#1-7-01-F032). Although this BO is the subject of a lawsuit, the only portion of the BO found deficient addressed spotted owl designated critical habitat. The Tennessee Lime project does not contain spotted owl designated critical habitat, therefore, this BO is valid for this project.

No Action Alternative

Current habitat conditions within the two spotted owl home ranges in the project area and in the watershed would continue to develop along their current successional pathways. Stand conditions within the project area are susceptible to wildfire, disease, insects and competition from shade tolerant species. Current stand conditions reflect past fire suppression, and fuel loading and ladder fuel conditions make spotted owl habitat susceptible to higher fire severity potential. Wildfire would remain the most immediate hazard to spotted owl habitat (Courtney et. al., 2004), increasing the risk of loss of large diameter remnant conifers important to spotted owl nesting success. Wildfire could remove or downgrade habitat randomly across the landscape, setting back succession and development, and likely reduce large tree structure critical to spotted owl nesting success. Additionally, fire severity may be higher than historical due to current stand conditions, prolonging the recovery of mycorrhizae, macroinvertebrates and small mammalian prey food webs important to provide suitable foraging for spotted owls.

The current successional development trend of stands toward late-successional habitat under Alternative 1 is uncertain. In southwest Oregon, the reduction in fire frequency has reduced the role of fire as an ecological factor influencing stand development, and altering historic forest structures, processes and functions. As a result, young stands are on a developmental pathway different than old growth stands. Therefore, the currently abundant young forest stands would likely develop stand structure and species compositions very different than that of old growth. Further, both the young and old forest stands are increasing in density, placing them at an increasing risk of accelerated density related mortality and increased fire severity (Sensenig 2002). Additionally, they could develop into stands with less complex structures and species compositions than that of old growth stands (Sensenig 2002). Alternative 1 may fail to maintain or develop large diameter conifers within the project area, and over time these habitat structures would be lost, potentially with negligible future recruitment.

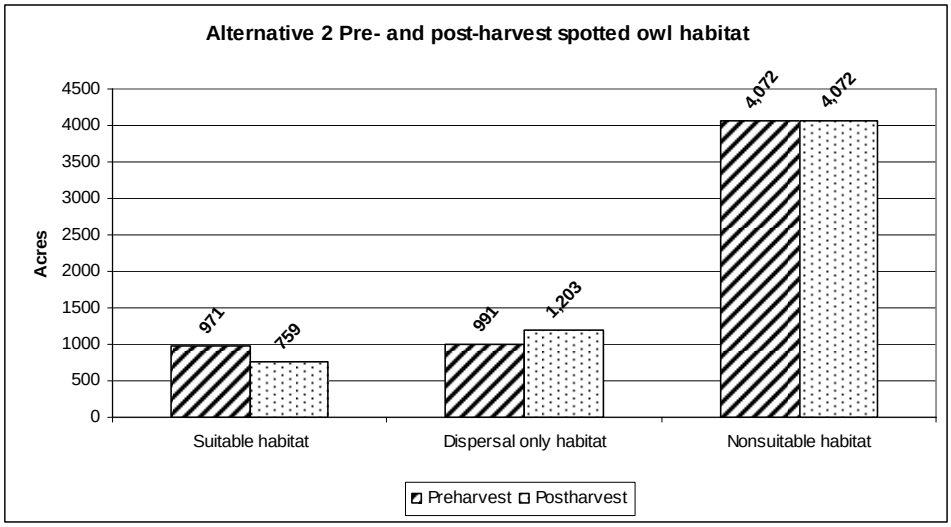
Alternatives 2 & 3

Under Alternatives 2 and 3, actions are proposed throughout known spotted owl home ranges. In alternative 2, timber harvest is proposed in 212 acres of suitable habitat, and in alternative 3, no harvest is proposed in suitable NRF habitat (Figures 2 and 3; Table 8). In the following discussion, suitable habitat degraded means that habitat remains, but is of lower quality. Fuels hazard reduction treatment in proposed in 637 acres and 653 acres in alternatives 2 and 3, respectively. NRF downgraded means that the nesting, roosting or foraging habitat has been downgraded to dispersal habitat. Dispersal degraded means that dispersal habitat remains, but may be of lower quality because of loss of understory diversity through fuels treatments. Dispersal removed means that canopy closure is reduced to < 40% resulting in habitat which does not meet any needs for spotted owls. Dispersal habitat is "dispersal only" and does not include suitable habitat which also meets owls' needs for dispersal.

Alternative 2 would downgrade 212 acres (22%) of suitable habitat to dispersal habitat and degrade approximately 637 acres (66%) of suitable habitat through fuel hazard reduction treatments. Dispersal habitat would increase by 212 acres and nonsuitable habitat would not change (Figure 2). This downgrading of habitat is permitted under the Biological Opinion (log #1-15-03-F-511) which this project is in compliance with.

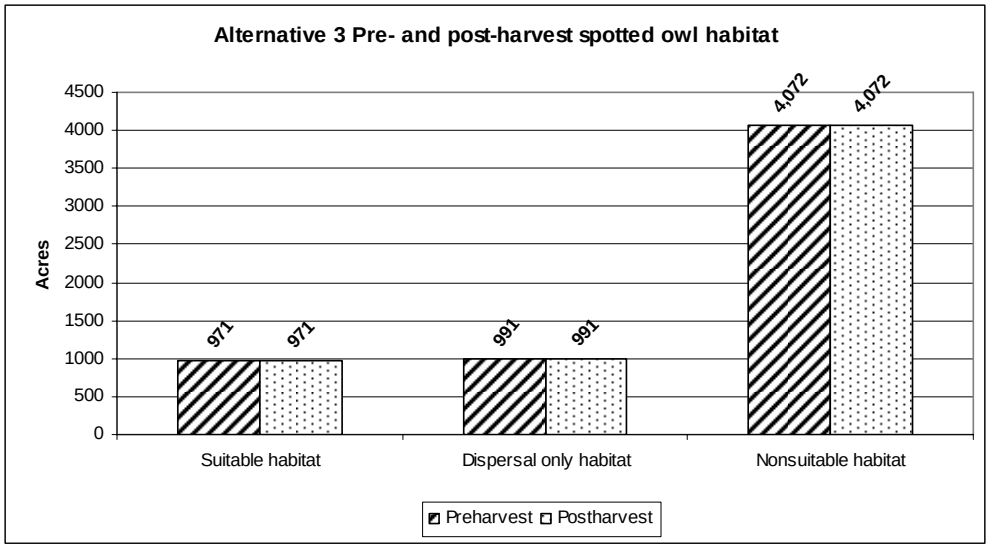
With alternative 3, no NRF would be downgraded and 653 acres (67%) would be degraded from Density Management / Understory Reduction and fuel hazard reduction treatments. However, this habitat would continue to be suitable habitat as minimal overstory canopy reduction would occur, and a minimum overall 60% canopy and habitat characteristics (large snags, coarse wood) known to be important to spotted owls would be retained. Nonsuitable habitat would not change (Figure 3) as treatments would not decrease canopy closure below 40%.

Figure 2. Spotted Owl Habitat - Alternative 2



Note: Dispersal habitat is dispersal only and does not include NRF which also functions as dispersal habitat.

Figure 3. Spotted Owl Habitat - Alternative 3



Note: Dispersal habitat is dispersal only and does not include NRF which also functions as dispersal habitat.

Table 8. Summary of Effects by Alternative

Alternative	Habitat	Preharvest	Postharvest*
2	Suitable	971	759
	Dispersal only	991	1,203
	Nonsuitable	4,072	4,072
3	Suitable	971	971
	Dispersal only	991	991
	Nonsuitable	4,072	4,072

Habitat modification through commercial harvest described for Alternatives 2 and 3 could result in a short term change in behavior patterns that would require owls to expend more energy by maintaining a larger home range and traveling greater distances to forage. Alternative 2, with reduction in canopy closure, could result in reduced survival, productivity, and occupancy of known sites (Meiman et al. 2003). Alternative 3 would retain suitable habitat where it currently exists, but may cause some shift in behavior patterns because of degrading of habitat. However, habitat would remain suitable, effects are expected to be short term and no reduction in survival, productivity or occupancy of sites is expected (Franklin et al. 2000).

In addition to timber harvest units, a small portion of roadside hazard trees (per OSHA requirements) would also be felled. The impact on habitat of hazard tree removal would be negligible as minimal canopy reduction would occur through felling of these trees which are generally snags.

Restoration projects such as prescribed burning and wildlife habitat restoration would have minimal effects on owls and their habitat. Road projects would have no impact when seasonal restrictions are implemented for owl activity centers and new spur roads are blocked following use as proposed. With the proposed road renovation, access could increase, potentially leading to increased human disturbance. Fuel hazard reduction and thinning under all action alternatives may impact foraging by changing habitat conditions for prey, but would not downgrade suitable habitat.

Seasonal restrictions would be in effect for all proposed activities occurring in units within ¼ mile of historic spotted owl nest sites (RMP 55). This protection would prohibit disturbance

during the breeding season and would avoid any negative effects to reproduction from disturbance.

Effects to spotted owl prey species

Effects to Northern Spotted Owl prey species would logically have an associated effect on spotted owls. Taken in whole, project activities would lead to an increase in "edge" or ecotonal habitats. While this would degrade or downgrade suitable habitat, this may increase prey species populations and allow spotted owls to adjust habitat use to adapt to the changes in habitat quality for nesting, roosting and foraging by reducing energetic costs of foraging.

Woodrats, the primary prey of spotted owls in southwest Oregon (Forsman et al. 2004, Zabel et al. 1995), are more vulnerable to predation at habitat edge openings. Dusky-footed woodrats, the primary woodrat prey species for spotted owls in southwest Oregon, are found in high densities in early seral or ecotonal habitats (Sakai and Noon 1993, 1997). Sakai and Noon (1993) stated that dusky-footed wood rats may benefit from some thinning or harvest which would increase shrub and pole stands. Bushy-tailed woodrat presence is more dependent upon cover and food availability than on seral stage, and they often use areas previously disturbed by fire (Carey 1991). Flying squirrels would likely respond negatively to habitat fragmentation, resulting in lower abundance of this species. Project activities, especially under alternative 3, may decrease the energetic costs of foraging for owls because of increased foraging opportunities along edges, and may in turn, lead to increased productivity of owls. Effects to red tree voles are addressed below in the context of the Survey and Manage program.

In all units, a legacy component of large, green conifer trees would be retained to provide for the unique structure and functions associated with these large old trees (RMP 47). The retention of legacies can accelerate the pace of ecosystem recovery such that the rate of change in a new, self-organizing community would be rapid and prey species would be affected differentially (Franklin et al. 1997); a reduction in abundance of some species and an increase in abundance of other species. Retaining legacies also provides perching structure for spotted owls that could allow owls to forage opportunistically in the uncharacteristic (for foraging) environment of degraded habitats because prey populations could be high. This could decrease energetic demands of foraging, but with a cost of increased exposure to predators. Spotted owl foraging would return to pretreatment levels after canopy closures recovers to 60% (10-20 years) and forest floor rodent (prey) populations increase (Meiman et al. 2003, Wilson and Carey 2000).

The CT/MGS treatments (40% canopy closure maintained) would likely reduce flying squirrel populations through reduced truffle production and fragmentation of arboreal travel ways (Colgan et al. 1999, Carey 2000). There may be short term impacts on truffle production, flying squirrel abundance, and owl foraging, but habitat and prey populations recover more quickly with these prescriptions when compared to more aggressive treatments (clear cutting, regeneration harvest). Stands with 40% canopy closure would likely be utilized more for dispersal than foraging. Thinned stands with 60% canopy closure would degrade flying squirrel habitat and truffle production but would likely maintain arboreal travel ways. CT/MGS may accelerate the development of spotted owl habitat and dense prey populations especially when decadence (snags, cavity trees and down logs) is provided for, as in the Tennessee Lime project. The CT/MGS prescription increases tree growth, crown differentiation, understory development, and understory plants' flowering and fruiting (Buermeyer and Harrington 2002, Wender et al. 2004, EA), which provide ancillary foods to spotted owl prey. Fuel hazard reduction and thinning under all action alternatives may impact foraging by changing prey habitat conditions; treatments could be perceived as creating "edge" and degrading suitable owl habitat; however,

recent research indicates that owl productivity is enhanced by having an edge component in the home range (Franklin, et al. 2000, Zabel et al. 1995, Olsen et al. 2004).

In any case, in southwestern Oregon, brushy-tailed woodrats, dusky-footed woodrats, flying squirrels, and red tree voles can be abundant in the same stand. The mosaic of different seral stages and species composition found within the project area can provide diverse patches of habitat with an abundance of one or more of these prey species (Zabel et al. 1995). Spotted owls could exploit untreated areas without increasing their home range by shifting their foraging use patterns within the same approximate area. This situation is unique within the range of the spotted owl and the abundance of prey would likely minimize the need to expand their home range in response to commercial treatments, though they may have to adjust foraging patterns to account for changes in habitat; this could increase risk of predation.

In summary, for effects to spotted owls and their prey, in alternative 2, approximately 212 acres of suitable spotted owl habitat would be downgraded to dispersal habitat and 637 acres would be degraded, but continue to function as suitable NRF habitat. In alternative 3, approximately 653 acres of suitable habitat would be degraded, but would retain suitable habitat characteristics and remain suitable for spotted owl nesting, roosting and foraging. Alternative 3 would result in short term impacts to prey availability and a potential shift in owl use of that habitat. Alternative 2 would have greater effects on prey species and could additionally lead to decreased survival and productivity of spotted owls in the project area.

In the long term, habitat conditions should improve because of increased stand vigor and health. The effect of alternatives 2 and 3 to the spotted owl and its habitat would be to downgrade and degrade spotted owl habitat that would result in short term impacts to prey availability. All alternatives may result in a shift of habitat use by owls. Alternative 3 is unlikely to negatively affect reproductive success because of minimal degrading of suitable habitat. Alternative 2 may lead to an increase in vulnerability to predation; however predation is not considered a major influence on population dynamics or behavior (USFWS 2004). The Northern Spotted Owl Five-year Review: Summary and Evaluation (USFWS 2004) states, "At this point, a strong effect of predation is best regarded as an untested hypothesis which, while possible, lacks any empirical support, and is not favored by circumstantial evidence (Courtney et al. 2004)." At the NWFP scale, alternatives 2 and 3 would have no effect to spotted owl population demographics (USDI, USFWS 2003; USDI, USFWS 2004). This project and the expected effects to spotted owls are compliant with formal consultation with the U.S. Fish and Wildlife Service (USFWS) issued in the Biological Opinion (#1-15-03-F-511, October, 2003).

Northern Goshawk

Affected Environment

The Northern Goshawk (*Accipiter gentiles*), a Bureau Sensitive species, is found in a variety of mature, deciduous and coniferous forest types. Nesting habitat consists of mature forest with high canopy closure and an open understory. Goshawks may occur in the watershed, although in low numbers. Suitable habitat is in the project area but no nests have been found and there are no historic records of nesting in the watershed. Goshawks are rarely found in the Grants Pass Resource Area. The only known historic goshawk nest in the Grants Pass Resource Area is near Galice, approximately 25 air miles north of the Tennessee Lime project area. Their absence may be due to the brush and small diameter tree component found in the understory of many stands. Fire exclusion may have reduced the suitability of some stands for goshawk by allowing the understory to develop.

A petition to list the Northern Goshawk in the western United States as a threatened species was considered by the U. S. Fish and Wildlife Service (USFWS) in 1998 and the final conclusion was published that year (Federal Register, Vol. 63, No. 124, June 29, 1998, 35183-35184). USFWS found no evidence to support the contention that the goshawk was in danger of extinction or that the species was likely to become endangered in the foreseeable future.

Spotted owl habitat, as defined by the McKelvey rating system, incorporates habitat structure and canopy closures important to Northern Goshawks. Therefore, the McKelvey rating system is used for assessing the impacts of the alternatives to the Northern Goshawk.

No Action Alternative

Effects of the no action alternative were described above for the spotted owl and are relevant in their entirety for the Northern Goshawk, because the impacts to goshawk habitat structure and conditions would be the same (Reynolds et al. 1992). In summary, habitat would continue in its current successional pathway and may restrict goshawk nesting because of high stand densities.

Alternatives 2 & 3

Effects of Alternatives 2 and 3 for the spotted owl were described above and are relevant to the Northern Goshawk, because habitat and prey species use are similar (Reynolds et al. 1992). However, use of habitat is different and goshawks would likely respond to the action alternatives by foraging more in thinned stands than would owls. Goshawks are habitat generalists and thinned stands would provide more suitable foraging habitat, with unimpeded flight paths. The ecotonal edge (between two habitat types) created by treatments would likely benefit goshawk foraging for prey species.

Though there are no known nests in the project area, noise disturbance from timber sale operations could impact goshawks during the breeding season. If an active nest is found, seasonal restrictions (Table 3) would be imposed on units near active goshawk nest sites which would minimize that disturbance and likely prevent nest abandonment. Goshawks are highly mobile habitat generalists and could further avoid disturbance by utilizing more distant habitat in the project area and watershed.

Great Gray Owl

The Great Gray Owl is a Survey and Manage and a Bureau tracking species. There is potential Great Gray Owl (*Strix nebulosa*) reproductive habitat in the project area. The Great Gray Owl forages in open areas such as meadows or clear cuts, conifer forests, and oak woodlands (USDA and USDI 2002c). Great grey owls have been located nesting in a variety of stand types, but appear to prefer mature park like stands with a closed canopy (>60%) and an open understory with room for flight. Nests are in tree cavities, large broken-top snags, or abandoned raptor, corvid (jays, crows, ravens, etc.), or squirrel nests. Historic numbers of Great Gray Owls across its range are unknown. The Great Gray Owl's diet consists mostly of small mammals, particularly voles and pocket gophers. The young leave the nest before they can fly and need leaning trees to enable them to climb up off the ground.

Studies show logging can create "temporary meadows" capable of supporting rodent populations used by breeding Great Gray Owls. Unlike naturally occurring mountain meadows, forest

clearings created by logging undergo rapid forest reestablishment. Therefore, successional development makes the usefulness of such openings short lived.

In this project, surveys were conducted to protocol along meadows, clear cuts and lower elevations in the project area (USDA and USDI, 1995 with subsequent modifications (BLM-Information Bulletin No. OR-97-311)); surveys were completed in 2003. One Great Gray Owl was detected during one survey, but not confirmed in follow up visits. No nesting Great Gray Owls were detected. Since the late 1990s, eleven landscape management project areas evenly distributed across the Grants Pass Resource Area have been surveyed for Great Gray Owls using the two year survey protocol. Only one project area on the Grants Pass Resource Area (east of Williams, approximately 19 miles distance) has documented nesting Great Gray Owls. These are the closest known sites to the project area. Additionally, no nesting territories have been detected west of Williams on either Forest Service or BLM lands (ISMS database).

Alternative 1 – No Action

Forested stands would continue to develop along their current pathways. Successional stand development would continue to be influenced by fire suppression, high stem densities and ladder fuels. The risk of stand replacement fire events would remain at current levels or increase. Foraging areas would continue to be encroached upon by fire intolerant plant species, thereby reducing potential foraging opportunities.

Alternatives 2 & 3

Alternatives 2 and 3 propose treatment in potential Great Gray Owl habitat. Because no owls were located during protocol surveys in suitable habitat, it is unlikely that treatments would have a negative effect on this species. However, treatments in alternative 2 would modify potential nesting habitat to a non-nesting condition. Short term effects for alternative 2 includes reducing canopy closures and structural complexity within stands, and providing opportunities for predators, such as the Great Horned Owl to become established. However, these habitat changes would also open stands to allow for unobstructed flight, though potentially increasing the risk of predation. Long term benefits of this alternative include the accelerated development of late-successional forest habitat conditions in areas not currently supporting suitable habitat, and enhancement of foraging areas due to thinning and burning.

Alternative 3 proposes treating similar acreages to alternative 2. However, alternative 3 would not degrade nesting and roosting habitat for owls and may not accelerate forest stand development because of continued high stand densities; however, removal of understory suppressed and intermediate trees (DM/UR prescription), and fuels treatments would provide for a more open understory on approximately 653 acres in suitable nesting habitat and on 619 acres of fuels treatments which would improve foraging opportunities.

Pacific Fisher

Affected Environment

The Pacific fisher (*Martes pennanti*) was petitioned for listing as endangered or threatened under the Endangered Species Act on three occasions. In 2004, the USFWS determined that listing fishers as threatened was warranted but was precluded by higher priority listing actions (Federal Register Vol. 69, No. 68, April 8, 2004, 18769-18792). The species remains a USFWS candidate species (USDI, USFWS 2004).

In the western United States, fishers are associated with extensive mature conifer forests and elements such as old live trees, snags and large logs are required (Buck et al. 1994, Harris et al. 1982, Rosenberg and Raphael 1986, Weir and Harestad 2003, Zielinski et al. (in press), Zielinski et al. 2004). Fishers are associated with low to mid-elevation forests with a coniferous component, large snags or decadent live trees and logs for denning and resting, and complex physical structure near the forest floor to support adequate prey populations (Aubry and Lewis 2002). Fishers in southern Oregon have been documented using a variety of habitats such as early seral open habitats, oak woodlands and previously harvested areas (pers. comm. Jeff VonKienast 2004). Fishers are restricted to two small, disjunct and genetically isolated populations in southwestern Oregon: an introduced population in the southern Cascades and an extant, historic population in the Siskiyou Mountains (Wisely et al. 2004, Aubry et al. 2004). The Siskiyou Mountain population is likely connected to a coastal population in northern California, because there are no human or habitat barriers to their genetic interchange (pers. comm. K. Aubry 2004). These personal communication references constitute the best available and most recent scientific information from leading experts conducting fisher studies concerning fisher presence in southern Oregon, where the Tennessee Lime project is located. Forest fragmentation remains a concern for fishers, as stated by Powell and Zielinski (1994):

> Presumably, fishers experience habitat loss when timber harvest removes overstory canopy from areas larger and more extensive than natural wind throw and fire would. Small patch cuts interspersed with large, connected, uncut areas should not seriously affect fisher populations. In fact, these small scale disturbances may increase the abundance and availability of some fisher prey.

Private timberlands may provide foraging and dispersal for fishers, but would not provide the large live trees, snags and logs necessary for natal and maternal den sites, and resting sites. Fisher would travel across private lands within their home range, because of the checkerboard ownership of BLM and private lands within the project area and watershed.

Although they generally avoid recent clearcuts, telemetry research indicates fisher use recovering clearcuts and mid-seral stands on both private and federal lands in Southern Oregon (Aubrey and Raley 2002).

In the Kerby watershed, past harvest practices, and land ownership patterns are the main cause of fragmentation. BLM checkerboard ownership may be one of the primary factors limiting the ability of BLM lands to provide optimal habitat for fishers (USDA and USDI 1994b).

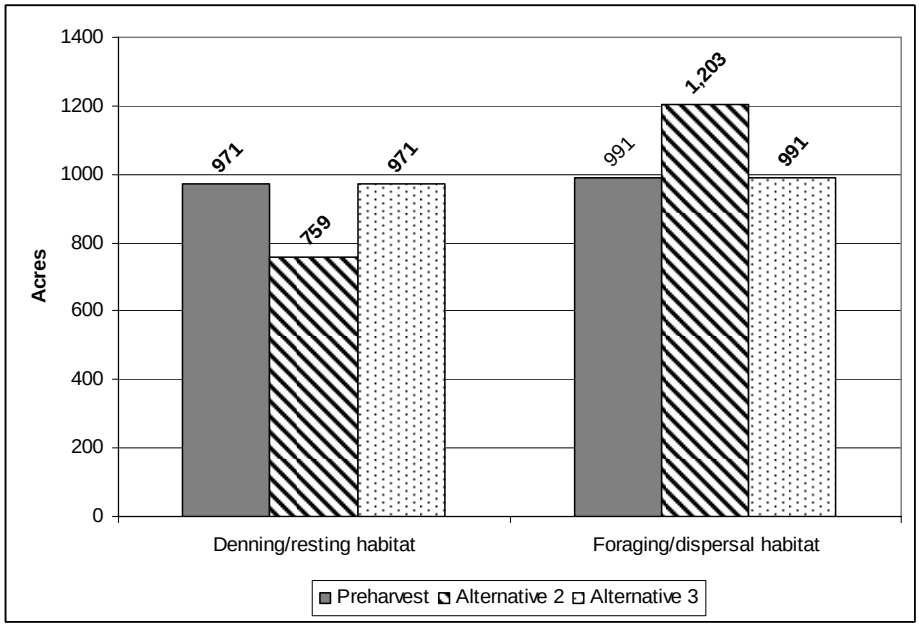
Forest carnivore surveys using bait stations with motion and infrared detection cameras have been conducted throughout the resource area and have detected fishers in the vicinity of Williams and near the top of the Deer Creek drainage. Additionally, BLM has documented observations near Galice Creek. Fishers may occur in the upper reaches of the Kerby watershed, but it is unlikely that they traverse the valley bottom because of the natural fragmentation of the forest and because of urban development. BLM checkerboard ownership may be one of the primary factors limiting the ability of BLM lands to provide optimal habitat for fishers (USDA and USDI 1994b).

Fishers are naturally rare and have a disjunct distribution in the Pacific Northwest. Appendix J-2 of the NWFP determined that their range included 34% non-federal land and that although federal lands may provide suitable well-distributed habitat, fisher populations may never become well distributed due partly to limited federal land ownership at lower elevations and the species'

naturally low abundance. The NWFP concluded that "habitat is of sufficient quality, distribution, and abundance to allow the species population to stabilize. However, significant gaps in the historic species distribution on federal lands may cause some range-wide limitation in interactions, and thus loss of genetic exchange among populations (USDA and USDI 1994b). The Pacific fisher has been extirpated from extensive regions of its historical range in the Pacific states (Powell and Zielinski 1994). Buskirk and Powell (1994) concluded that fishers are one of the most habitat specialized mammal species in North America. However, views differ about the fisher's need for extensive tracts of mature, largely coniferous, forest stands. Fishers in southern Oregon have been documented using a variety of habitats such as young successional open habitats, oak woodlands and previously harvested areas (personal communication, Jeff VonKienast). Fishers are wide-ranging animals (Zielinski et al. 2004) with movements recorded from radio-tracked animals of up to 26 km for females and 55 km for males (Aubry and Raley 2002). Males have been documented to have a larger home range (~147 km^2) during the breeding season compared to ~63 km^2 during the non-breeding season (Aubry and Raley 2002). Given that fishers are capable of moving long distances, the entire project area and watershed can be considered fisher habitat; however, inferences can be made on suitability of habitat for natal dens, resting and foraging.

The McKelvey rating system describes habitat structures and canopy closures important to fishers for natal dens and is used for assessing impacts. There are approximately 971 acres of denning and resting habitat, and 991 acres of foraging habitat for fishers in the project area (Figure 4**.**

Figure 4. Fisher Habitat Effects



No Action Alternative – Alternative 1

Effects for the no action alternative were described above for the spotted owl and are relevant in their entirety for effects to the fisher due to similar habitat conditions and requirements (Powell & Zielinski 1994, Aubry & Raley 2002, Buskirk & Powell 1994). Ultimately, the greatest risk of no action is the wildfire related loss of large remnant conifers and hardwoods important to fisher natal and maternal denning sites.

Alternatives 2 & 3

Fisher Habitat

Effects for alternatives 2 and 3 for the spotted owl were described above and are relevant in their entirety for effects to the fisher, because habitat structure and condition, as well as prey species use are similar (Powell & Zielinski, 1994; Aubry & Raley, 2002; Buskirk & Powell, 1994). However, they may use impacted habitats for foraging if coarse woody debris is available for prey species and some cover is retained.

Alternative 2 proposes to decrease denning/resting habitat, through commercial thinning, by 212 acres (22%) and increase foraging habitat by 212 acres (21%). Alternative 3 would not change the level of denning/resting habitat or foraging/dispersal habitat, although the structure of this habitat may be simplified by fuels treatments (Figure 5). However, fishers have been found to use recovering regeneration units for foraging on the Rogue River National Forest (Aubry and Raley 2002; Aubry and Lewis 2003) and therefore, fishers would likely continue to use thinned areas under alternative 2 for foraging and dispersal.

A study in northern California found fishers to be associated with residual forest structures where large hardwoods and live trees were left in patches and riparian reserves in managed landscapes (pers. comm. L. Diller 2004). Retaining legacies would provide habitat structure for natal and maternal denning sites, resting sites and structure important to fisher prey species as these stands develop through their successional pathways.

Variable density thinning in stands in which 40% canopy closure would be maintained (approximately 212 acres for alternative 2) would likely result in lower squirrel abundance, because of reduced truffle production and arboreal travel ways (Colgan et al. 1999, Carey 2000b). Additionally, these treatments would result in lower abundance of other small mammals such as snowshoe hare, brush rabbit, white-footed mice, deer mice, red-backed voles, and meadow voles, because of the reduction of habitat from the removal of understory and overstory vegetation. However, other potential prey species' populations such as woodrats may increase due to the more open canopy (see spotted owl prey species discussion above). Fishers were found to avoid forested stands with less than 40% canopy cover (Aubry and Lewis 2003), likely due to the reduced abundance of prey species. However, as described previously, fishers have been known to forage in these types of forested stands in southwest Oregon. Effects to prey species are relatively short term, as these stands revegetate in the understory within 5 years, and 10-15 years for the overstory canopy to close to 60%. Variable density thinning (Density Management/Understory Reduction) with a treatment prescription of maintaining overstory canopy closures (alternative 3) would minimally affect fisher prey species and their habitat. The effects of uneven-aged timber management practices, such as are proposed for this project, have not been studied but are likely to have less effect on fisher habitat than even-aged management (Powell and Zielinski 1994), as higher vegetation density is correlated with higher animal species diversity.

Additionally, late-successional habitat would be provided in the project area and 5th field watershed because of no treatment areas, riparian reserves, RTV buffers, and 15% late-successional forest retention (RMP pp. 38-40).

Impacts associated with timber sale operation noise disturbance are unknown due to a lack of scientific literature. There is evidence that fishers avoid roaded areas (Harris and Ogan 1997), and the fisher has been characterized as a species that avoids humans (Douglas and Strickland 1987; Powell 1993). Many roads within the project area are already closed year round or seasonally. Alternatives 2 and 3 would construct one mile of temporary road, 0.25 miles of permanent road, and would decommission 0.65 miles of road. Disturbance from timber sale operations would be temporally and geographically limited and would occupy a geographic area smaller than the average fisher home range. Fishers have large home ranges and would be able to move away from the action area while the disturbance was occurring. Additionally, seasonal restrictions would preclude activities during natal season and juvenile rearing, thereby minimizing disturbance during this time.

In summary, all action alternatives would degrade fisher habitat through mechanical thinning, and noise disturbance from vegetation treatments that would result in reducing prey species and use of these habitats by fisher in the short term. Alternative 3 would have the least impact followed by alternative 2 would have the greatest effect through downgrading of habitat from denning / resting to foraging / dispersal.

However, the action alternatives would not contribute to the need to federally list the fisher. While some habitat would be degraded, it would still remain suitable for fisher dispersal and foraging, fishers are wide-ranging species and thus are able to move to minimize disturbance, seasonal restrictions for soils would restrict activities until young are approximately eight to ten weeks of age, and habitat features such as large snags and coarse downed wood would be maintained across the project area.

Red Tree Vole

Affected Environment

The red tree vole is the most arboreal mammal in the Pacific Northwest (Carey 1996). Habitat is mesic Douglas-fir forest. They have small home ranges, low dispersal capability, low reproductive potential and are sensitive to stand level disturbances (USDA, USDI 2002). Although the red tree vole may occur in younger stands, old growth forests seem to provide optimum habitat. Nests are built on suitable foundations such as large tree limbs, whorls, and the nests of birds or squirrels. They feed mostly on fir needles, bark, and lichens (Verts and Carraway 1998). Red tree voles are an important prey species for the spotted owl in parts of their range. Red tree vole surveys were complete in September 2001. Active nest sites were buffered as per management recommendations (USDA, USDI 2000) with a minimum 10 acre buffer per active site. Population numbers are unknown. Buffers will be implemented on all active nest sites as per management recommendations (USDA, USDI, 2000) prior to any project activities.

No Action Alternative

Effects from the no action alternative as described above for the spotted owl are relevant in their entirety for the red tree vole because their habitat structure and conditions are similar. Successional development of stands would continue to be influenced by fire suppression, high stem densities and ladder fuels. The risk of a stand replacement fire event would continue to be a threat. Development of late-successional habitats in the project area would be delayed by no action because stand development patterns have changed due to fire suppression efforts. In summary, forested stands in the project area would continue to develop towards older forest

conditions through natural succession, although at a lower rate than if low/moderate severity fire had continued to be a part of natural conditions.

Alternatives 2 & 3
Effects for alternatives 2 and 3 for the spotted owl were described above and are relevant in their entirety as they relate to spotted owl prey species, such as the RTV (Carey 1996; Carey 2004; Courtney et al. 2004; Forsman et al. 2004).

Red tree vole (RTV) nest trees have been reserved from cutting, and minimum 10 acre buffers will be incorporated into the project area for all active nest sites. This should provide protection for RTVs throughout the project area, provide for dispersal and migration, and allow the species to persist throughout the project area.

In the long term, effects for all action alternatives include an increase in mature and late-successional habitats in the project area, with high canopy closures that may facilitate more successful dispersal of the species. Additionally, the proposed pre-commercial thinning and brushing throughout the project area would accelerate the development of potential red tree vole habitat in the future. Alternative 2 would reduce canopy in more suitable habitat than alternative 3, thus potentially having a greater impact on nests that were not located during surveys. However, as buffers are large, encompass the dispersal distance of the species (USDA, USDI, 2000), and the majority of suitable habitat (Survey protocol, Version 2.1, USDA, USDI 202), it is expected that red tree voles would continue to maintain viable populations in the project area and watershed.

Connectivity

Affected Environment

McKelvey ratings were used to assess connectivity across late-successional habitat in the project area. Units with McKelvey ratings 1 or 2 (spotted owl nesting, roosting and foraging habitat) were identified as providing habitat structure that could facilitate connectivity. The low elevation late-successional forests in the project area provide habitat for migration and dispersal for wildlife, as well as for foraging, resting, nesting and protection from weather extremes and predation. Loss of connectivity could result in reduced survival and reproductive success, and reduced genetic exchange among subpopulations, particularly for species with short dispersal distances. Effects to connectivity would be similar to effects to spotted owl habitat because habitat structure and condition required for dispersal and migration are similar. Connectivity would be negatively affected if canopy closure is reduced to less than 60%. Prescriptions under alternatives 2 and 3 are designed to provide canopy closure as well as coarse wood and other habitat characteristics necessary to provide for dispersal and migration of late-successional dependent species. Using McKelvey ratings 1 and 2, the project area and watershed currently provide approximately 971 acres of connectivity habitat.

No Action Alternative

Successional development of stands would continue to be influenced by fire suppression, high stem densities and ladder fuels. The risk of a stand replacement fire event would continue to be a threat. Development of late-successional habitats in the project area would be delayed by no action because stand development patterns have changed due to fire suppression efforts. Encroachment of conifers and increased density of shrublands would continue, reducing

structural heterogeneity of serpentine influenced habitats. This would negatively impact mammal and bird species which depend on structural diversity including shrub thickets for nesting and roosting, and open spaces or edge habitat for foraging. Dispersal may also be negatively affected by conifer or shrub encroachment. In summary, forested stands in the project area would continue to develop towards older forest conditions through natural succession, although at a lower rate than if fire had continued to be a part of natural conditions. Additionally, open serpentine influenced vegetation communities on the west side of the watershed would continue to diminish because of encroachment.

Alternatives 2 & 3

Timber harvest would have the greatest effect on connectivity. Alternative 2 would reduce habitat for connectivity by 212 acres (22%), and alternative 3 would have minimal short-term effects on connectivity because of the canopy retention requirements. Alternative 3 would have the least effect on connectivity because it retains a 60% canopy closure where it currently exists, and minimally modifies overstory structure to meet certain objectives where a closed canopy does not currently exist.

Units proposed for fuel hazard reduction treatments in all alternatives contribute minimally to connectivity because of low canopy closure in these area; therefore these activities would not negatively affect connectivity. Alternative 3 would not modify the overstory structure and canopy closure of closed canopy stands, and thus would not impact the function of these stands to provide for connectivity. Density management units in which the target canopy closure is 60% would not impact the function of the stand to provide habitat structure important for connectivity. This is because the higher canopy would be maintained, thus maintaining arboreal travel ways. Density management under alternative 2, in units with a target canopy closure of 40% would reduce the function of the stand and no longer provide habitat structure for connectivity in the short term (10-20 years), by disrupting arboreal travel ways. However, this type of treatment would accelerate the development of the stand and in the long term, and would again function and provide habitat important to connectivity. Additionally, late-successional habitat would be provided within the 5th field watershed and in the project area because of no treatment areas, and by riparian reserves, RTV buffers, and 15% late-successional forest retention (RMP 38-40).

Within the project area, there may be some short effects on connectivity for species that disperse for short distances (red tree voles, molluscs and salamanders) because some treatments may inhibit dispersal between closed canopy forests. However, as vegetation between closed canopy forests was historically more open because of frequent fires and edaphic factors (lowland oak woodlands, serpentine soils, rocky areas), post-harvest conditions would exhibit an environment closer to the historic range of habitat connectivity. There would be vegetation composition more suited to local factors in open, pine dominated areas and in serpentine influenced areas. Connectivity would continue to function for red tree voles and other species with similar dispersal capabilities because of site buffers and riparian areas adequate to provide for genetic exchange and dispersal between populations. On the larger scale, an analysis of dispersal habitat and connectivity for the entire Rogue River Basin was conducted for the spotted owl by USFWS. Even with other Federal and private timber harvest, and wildfires, there remains ample dispersal habitat across the landscape to enable owl genetic interchange between LSRs (USDI 2003 (Biological Opinion log #1-15-03-F-511). This would also serve other long ranging species dispersal, migration and genetic exchange.

Road construction could inhibit connectivity, and subsequently, dispersal and migration for some species such as salamanders which may view roads as barriers to movement (Rittenhouse and Semlitsch 2006).

In summary, although there may be some degradation of connectivity habitat, it would not affect reproductive success, dispersal, migration or genetic exchange among species populations though roads may cause some localized reductions in connectivity habitat for some species. Riparian reserves, red tree vole buffers and no treatment areas would continue to provide for connectivity across the landscape except where development or edaphic factors influence vegetation composition. Additionally, these buffer areas would minimize the effects on both short range and long range dispersers. Alternative 2 would have the greatest effect because of canopy reduction, and alternative 3 would have minimal effects on canopy closure.

Dead Wood Dependent Species

Affected Environment

A review of DecAid's snag association tables identified 47 wildlife species associated with down wood (down logs, branches, and root wads), 64 species associated with snags, and 29 species associated with tree cavities (Marcot et al. 2003). Some species, such as Pileated Woodpeckers, were included in all three categories.

Primary excavators create cavities used by other species (secondary cavity users). Primary excavators also transmit heartrot and other decay fungi, by probing and excavating, into trees; heartrot is important to other primary excavators not able to excavate sound wood (Aubry and Raley, 2002). The following Special Status species are either primary cavity excavators or secondary cavity nesters, suspected to occur in the project area and the Kerby watershed: Lewis's Woodpecker (*Melanerpes lewis*), Flammulated Owl (*Otus flammeolus*), Pacific fisher (*Martes pennanti pacifica*), fringed myotis (*Myotis thysanodes*), Pacific pallid bat (*Antrozous pallidus pacificus*) and the Townsend's big-eared bat (*Corynorhinus townsendii*). The Townsend's big-eared bat is generally considered a cave user, but is known to use trees for roosting.

Fishers use live tree and snag cavities (many of which are excavated by Pileated Woodpeckers) as well as down logs in southern Oregon (Aubry and Raley 2002b, pers. comm. Keith Aubry 2004). Bats use live tree and snag cavities as well as rock crevices, mines, caves, stumps, loose bark, bridges, buildings, and other protected sites (Verts and Carraway 1998). Four bat species (the silver-haired bat (*Lasionycteris noctivagans*), long-eared myotis (*Myotis evotis*), long-legged myotis (*Myotis volans*), and pallid bat are listed in the NWFP as protection buffer species (USDA and USDI 1994a, b). These bats are crevice dwellers and may use crevices under loose bark and in decaying stumps, or wedge into spaces in tree bark. Some species may roost in cavities created by rot or excavated by woodpeckers. The status of these protection buffer species was not removed or modified in the 2004 Survey and Manage ROD (USDA and USDI 2004b). Pallid bats roost in rock crevices, tree hollows, mines, caves and a variety of anthropogenic structures, including vacant and occupied buildings (Sherwin 1998). Townsend's big-eared bats hibernate in caves and mines during winter (Sherwin 1998). The fringed myotis is a crevice dweller found in crevices of mines, caves, rocks, and large conifers (Bradley et al. 1998). No bat roosting sites are known within the project area; however Townsend's big-eared bats, pallid bats and the fringed myotis are suspected to occur in the Kerby watershed; all are known to occur in the Grants Pass Resource Area. Additionally, Townsend's big-eared bats have been documented in the watershed in the past and are likely to still occur. The greatest

concern for bat habitat is the retention of undisturbed roosting sites in snags, caves, mines, bridges, abandoned buildings or other potential roost sites during critical seasons for bats.

There is one known cave complex, but no known abandoned mines, wooden bridges or buildings in the project area that would warrant management as an occupied bat site. Older forest stands receive greater use by bats due to the availability of roosts, a complex vertical structure and less clutter, providing room for flight and foraging. Studies show that older stands and thinned stands received more use by bats than unthinned stands, clearcuts and shelterwood cuts. Riparian habitats received the greatest use of all habitats (personal communication Holly Ober 2006).

Some mammals that are important prey species for the spotted owl use down wood. Dusky-footed woodrats build stick nests, sometimes incorporating logs as part of the structure. They also may fortify hollow logs with sticks to use for dens. Other prey species, such as the western red-backed vole use sound logs for travel lanes and rotting logs for foraging, nesting, or internal travel routes. Moisture in and under rotting logs provides fungi habitat, the main food for northern flying squirrel and the western red-backed vole.

No Action Alternative
Effects of the no action alternative were described above for the fisher and are relevant in their entirety for effects to bats and other cavity users due to similar habitats (Weller and Zabel 2001). Additional effects to bats include restrictions on access to snags in dense stands due to cluttered flight paths (clutter results in echolocation interference) (pers. comm. John Hayes 2003).

Alternatives 2 & 3
The greatest concern for dead wood dependent species is retention of adequate roosting and foraging, and large snags with cavities for nesting. The greatest concern for bat habitat is the retention of undisturbed roosting sites in snags, caves, mines, bridges, abandoned buildings or other potential roost sites during critical seasons for bats (maternity and hibernation). Project design features (PDFs) would ensure adequate snag retention and down wood recruitment by retaining all snags >16" dbh (RMP p. 44) unless designated as a hazard tree (Snags that provide potential roost sites may be felled to meet OSHA safety standards.); as per PDFs, these trees would be left on site for down wood. Down wood would be retained where it is currently available to meet or exceed minimum requirements of the RMP (p. 45) of 120 lineal feet per acre (>16" dbh and 16 feet long). Where snags are currently available, alternatives 2 and 3 would meet or exceed these snag levels. Proposed thinning would reduce understory clutter and thus improve flyways. Marking guidelines mitigate these potential negative effects by: 1) retaining all snags >16" dbh, 2) no trees with old growth characteristics are marked for harvest, and 3) the largest deformed or diseased trees are the preferred wildlife leave trees retained to meet dead wood targets.

The NWFP identified snag and green tree retention guidelines that would reduce the risk of local extinctions and improve the likelihood that well-distributed populations of snag dependent species would be maintained (USDI and USDA 1994b). The CT/MGS prescription would maintain habitat structure and foraging substrates associated with snags and large conifers. Retained snags and large conifer trees can be susceptible to wind throw, which may reduce snag density. However, under alternatives 2 and 3, it is expected that snag levels would be maintained, and treatments would not affect caves, mines or anthropogenic structures, and therefore, dead wood dependent species would be minimally affected by project activities.

Other Species of Concern
The following species are not late-successional, cavity, or dead wood dependent. However, they may use components of late-successional habitat, such as large diameter trees.

Bald Eagle

Affected Environment
The Bald Eagle is listed as a Threatened species under the Endangered Species Act. In southwest Oregon, the majority of Bald Eagle (*Haliaeetus leucocephalus*) nests are in large trees near lakes, rivers, and ponds. Bald eagles likely feed on fish along the Illinois River, and forage in the open meadows in the lowlands along creeks in the watershed. Eagles build their nests in large dominant overstory trees, often at the edge of a stand or on a ridge. Nest trees have broken or deformed tops and/or large branches to support the nest. There are no Bald Eagle nest sites in the project area or known in the watershed. If nest sites are located, they will be protected as per RMP guidelines (RMP p. 57).

USFWS proposed to remove the bald eagle from the list of endangered and threatened wildlife in 1999 (Federal Register July 6, 1999. Vol. 64(128) 36453-36464). No final determination has been made and the bald eagle remains a threatened species.

Alternative 1
Effects for the no action alternative were described above for the spotted owl and are relevant in their entirety for the Bald Eagle, because the consequences of no action to Bald Eagle nesting habitat structure and condition are similar (Isaacs et al. 2003; Anthony et al. 1989; Anthony et al. 1982). Ultimately, the greatest risk is in the loss of large diameter remnant conifers important to Bald Eagle nesting, roosting and perching. Alternative 1 could potentially increase risk to Bald Eagle roost trees because of continued increased fire hazard.

Alternatives 2 & 3
As there are no Bald Eagles in the project area there are no anticipated effects to the species from project activities. Variable density thinning under all alternatives could potentially increase the rate of development of large nest or roost trees and increase habitat suitability in the long term.

Alternative 3 proposes commercial harvest and fuel hazard reduction treatments. Alternative 3 would not modify the overstory structure of the stands. Effects would be similar to those under the No Action alternative.

In alternative 2, commercial treatments would modify the overstory structure, but would maintain a 40% canopy closure from the largest green conifer trees. Commercial and fuel hazard reduction treatments would open the understory through the removal of brush and small trees and may increase the rate of development of large trees suitable for eagle nesting and roosting because of reduced competition.

In summary, the effect of alternatives 2 and 3 to the Bald Eagle and its habitat as proposed would result in no change to existing roosting, nesting or perching trees and to foraging areas. However, alternative 2 may increase the rate of development of roosting and nesting structure.

Peregrine Falcon

The peregrine falcon had been a federally listed Threatened species, but was removed from the list in August 1999 (Federal Register August 25, 1999 Vol.64 (164) 46542-46558). At that time, the falcon was added to the BLM SSSP as a sensitive species.

Habitat for peregrine falcon (*Falco peregrinus*) is primarily tall cliffs (Henny and Pagel 2003). There are no suitable cliffs for nesting within the project area. One confirmed active site is approximately 7 miles east of the project area. Forested lands provide habitat for prey species for falcons. Peregrines prey almost entirely on birds. As there is no suitable habitat for this species in the project area, there is no anticipated effect to this species from project activities. Activities would not affect prey species availability for falcons.

Land Birds (Neotropical migrants and year round residents)

Land birds use a wide variety of habitats, including late-successional forests, riparian areas, brush in recovering clearcuts, and small trees in developing stands. Some birds, such as the Olive-sided Flycatcher, perch on residual canopy trees and forage over clear cuts. Many land birds are associated with deciduous shrubs and trees in early successional habitats (i.e. Orange-crowned Warblers and Rufous Hummingbirds). Any action that changes or removes vegetation used by one species may benefit another. For example, thinning in the understory may negatively affect a species which uses dense understory, such as the Winter Wren, but would benefit other species, such as Hammond's Flycatcher, which forages in open mid-stories.

Neotropical migrants migrate to Central or South America each year. Neotropical birds, as a group, are not special status species. They are addressed here due to widespread concern regarding downward population trends, habitat declines, and the BLM's efforts to comply with Executive Order 13186, the Migratory Bird Treaty Act (per a MOU between the BLM, U.S. Forest Service and the U.S. Fish and Wildlife Service). None of the neotropical migrants documented as occurring on the Medford District BLM are listed as endangered or threatened. In February 2003, USFWS identified migratory non-game birds that were species of conservation concern (Federal Register July 10, 2003 Vol. 68, No. 25, 6179). Six of the birds on this list (Table 9) are known to occur on the Medford District BLM (USDI USFWS 2002). .

Table 9. Birds of Conservation Concern for Medford BLM

Species	Presence in Kerby Watershed
Peregrine Falcon	Present
Flammulated Owl	Unknown
Olive-sided flycatcher	Present
Rufous Hummingbird	Present
Lewis' woodpecker	Unknown
White-headed woodpecker	Unknown

Resident birds remain in the same general area (e.g., the Pileated Woodpecker) or migrate to lower elevations in the winter (e.g., the Dark-eyed Junco). Populations of late-successional dependent migratory or resident birds for the Kerby watershed are unknown. Breeding bird surveys indicate increasing evidence that regionally, songbirds are declining (Sauer et al. 2004, J. Alexander personal communication 2005). However, the cause of these declines is still unclear, but is suspected to be on their winter grounds.

Alternative 1

Effects for the no action alternative were described above for the spotted owl and are relevant in their entirety as they relate to late-successional structure and conditions for landbirds. Meadows, shrub habitats and oak woodlands would continue to be encroached upon by small trees and shrubs. Development and maintenance of forest and non-forest habitats have stagnated because of lack of fire or other disturbance; this trend would continue. Some bird species have benefited from the lack of fire while others have declined due to habitat changes outside the historic range of variability. Ultimately, the greatest risk is the loss of large diameter remnant conifers and hardwoods important to land birds. Alternative 1 would not enhance the development of large diameter conifers. Over time, these habitat structures would be lost without future recruitment (Sensenig 2002, Mazurek and Zielinski 2004).

Alternatives 2 & 3

Alternatives 2 and 3 would treat a variety of songbird habitats, causing a shift in habitat use, decrease available habitat for some species and increase habitat for others. Birds, such as Brown Creepers, that use mature and old growth trees would have reduced amounts of late-successional forest available because of habitat removal and reduced canopy closure in alternative 2. Alternative 3 would retain 60% canopy closure, minimizing the effect on these species. However, species such as the Rufous Hummingbird which use nectar producing plants would benefit from the increase in forbs and flowering shrubs which would occur post treatment. This increase would continue until the tree canopy recovers and shades out these plants. Short term effects to meadows, shrub habitats and oak woodlands and would include reduced stem densities, shrub abundance and structure, but potentially enhance habitat for forbs and flowering shrubs. These changes could reduce the occurrence of species that have benefited from fire suppression such as the Nashville Warbler (J. Alexander, personal communication) or increase the availability of foraging habitat for species such as the Rufous Hummingbird. Long term effects would include increased native grass abundance and the maintenance and enhancement of meadows, oak woodlands and Jeffrey pine savannahs. Species that would benefit long term from these treatments include the Flammulated Owl, Western Bluebird, and prey species such as small mammals and a host of insects associated with these habitats. Alternative 2 proposes to treat more acres of Jeffrey pine savannah than alternative 3. Therefore, over time, alternative 2 would benefit more species associated with this unique plant community than alternative 3.

Short term effects to forested stands for both action alternatives include reduced stem densities, ladder fuels and canopy closure. Treatments would retain large structure and large diameter snags and down wood. Species that have benefited from lack of fire and dense understories could be adversely affected by these treatments. Songbird composition and abundance in treated stands could be reduced in the short term (Janes, 2003; Hagar et al., 2001; Siegel et al., 2003; USGS, 2003). However, it is likely that by moving stands toward their historic range of variability, some species that have been adversely affected by fire suppression would benefit. Long term effects include accelerated development of large tree structure for interior forest species. Alternatives 2 and 3 propose activities that would contribute to moving stands in the project area towards their historic range of variability benefiting those species historically present. Alternative 2 proposes activities that could arguably benefit these species more than alternative 3, and therefore would move a greater percentage of the project area toward this historic range of variability.

Under all alternatives, extensive areas of vegetation would remain untreated and would provide adequate nesting, roosting, foraging and dispersal habitat for all species of songbirds throughout the project area. However, disturbance and direct impacts of activities on and near nests could

reduce reproductive success of nesting birds if activities occur during the nesting season. This would only occur during the season of activity and would not extend beyond activity areas.

In summary, each action alternative would modify habitat to varying degrees shifting habitat suitability among land birds. Since effects would be temporally and spatially small in extent,, and adequate habitat for these species occurs within the project area and Kerby watershed, the alternatives would not result or contribute to the need for federal listing.

Big Game

Affected Environment

Deer, elk, bear and cougar are not late-successional dependent species. They depend upon early seral vegetation for forage and need dense vegetation for hiding cover for fawning and calving and to escape predators. The project area provides year round habitat for these species. The Medford District RMP designated big game winter range (USDI BLM 1995, MAP 7); however there is no designation within the project area or the Kerby watershed. Deer winter range has been identified by ODFW within the watershed (USDI BLM 1997).

Since the late 1970s, the belief that thermal cover constitutes a key component of ungulate habitat has resulted in its widespread application, to the extent that virtually all elk habitat evaluation procedures currently use this variable as a measure of abundance in the Pacific Northwest (e.g., Wisdom et al. 1986; Thomas et al. 1988) and many other regions in the western United States. These habitat evaluation procedures were used extensively in the development of national forest plans (Edge et al. 1990) and in the Medford BLM RMP (USDI BLM 1995, p. 48; USDI BLM 1994, Vol. I, p.3-39). Nonetheless, the concept of thermal cover remained a poorly tested hypothesis until Cook et al. (1998) concluded that thermal cover effects (summer and winter) on animal condition, had little relevance to herd productivity and demographics (Cook et al. 1998, p.52; Duncan 2000, p. 2).

In contrast, the effects of nutrition on population demography of free-ranging ungulates has been reasonably well established (e.g., Clutton-Brock et al. 1982; Coughenour and Singer 1996). In fact, there is a long recognized inverse relationship between forage production and forest canopy closure (Pase 1958; Young et al. 1967; McConnell and Smith 1970), such that emphasis on thermal cover over food production can reduce forage production and, in turn, carrying capacity. The quality and quantity of forage directly relates to physical condition of deer, elk, bear and cougar, and plays an important role in their management.

Alternative 1

Effects of the no action alternative to big game would be two fold. First, there would not be any creation of early successional habitat or rejuvenation of decadent foraging habitat through mechanical or prescribed fire which these species require for browse. Historic fire regimes prior to fire suppression provided for these open habitats and succulent browse important to the nutritional needs of does and cows. Secondly, alternative 1 would sustain the current fuel hazard condition of the project area, in which the loss of habitat if a wildfire occurs would reduce the available cover for security and fawning and calving habitat.

Alternatives 2 & 3

Commercial harvest in alternative 2 would reduce canopy closures and increase available forage for deer and elk, and potentially for bear through increase in forbs and shrubs. Harvest and fuel hazard reduction treatments would open the understory, providing for easier access and increased

forage availability, but would reduce security cover. ODFW recommends road density reduction and habitat improvement projects, such as prescribed burns on south slope aspects, to maintain or improve big game habitat. Alternatives 2 and 3 would both reduce road density in the long term through a net decommissioning of 0.4 miles of road. Alternatives 2 and 3 would likely benefit deer, elk and bear primarily through the increase in available forage.

Invertebrates

Affected Environment

There are two Bureau Sensitive/S&M snail species: the Oregon shoulderband (*Helminthoglypta hertleini*) and the travelling sideband (*Monadenia fidelis celeuthia*). This group generally requires closed canopy, cool, moist environments with the exception of the Oregon shoulderband which may utilize rocky talus in open exposed slopes. Oregon shoulderbands were found in rocky areas associated with damp grassy areas, oak woodlands, and shrub lands, or in conifer forests closely associated with these habitat types. Shoulderband survey data analysis determined that they were not late-successional or old growth habitat dependent (USDA & USDI 2003a).

Part of the project area was surveyed for S&M molluscs. None were located. Surveys are no longer required and no additional surveys will be completed. If S&M molluscs are located during project activities the approved management recommendations would be implemented.

Since the late 1990s, more than 15 landscape management project areas throughout the Grants Pass Resource Area have been surveyed for these two species using the terrestrial mollusk survey protocol (USDA and USDI 1997, USDA and USDI 2002b, USDA and USDI 2003a,b), and unknown mollusc species were collected and submitted to taxa experts for identification. None of the mollusc species submitted were identified as the travelling sideband. Surveys on the Grants Pass Resource Area have revealed no detections for the sideband and only three detections for the shoulderband east and north of the project area. Surveys have been conducted on other areas in the Medford District BLM area using the same protocol for terrestrial mollusks. The traveling sideband is known to occur in the Ashland Resource Area and the Oregon shoulderband occurs more commonly to the north in the Glendale and Butte Falls Resource Areas. Neither of these species was located during protocol surveys in the project area. Oregon shoulderbands were found in rocky areas associated with damp grassy areas, oak woodlands, and shrub lands, or in conifer forests closely associated with these habitat types.
Shoulderband survey data analysis determined that they were not late-successional or old growth habitat dependent (USDA & USDI 2003a).

Alternative 1

The forest would continue to go through developmental stages towards older forest conditions, which would be favorable to late-successional forest associated molluscs. Foraging opportunities for species associated with shade intolerant hardwoods would diminish. The potential for a fire in the project area would remain high.

Alternative 2 and 3

Habitat could experience short term effects, including warmer, drier conditions which could reduce mollusc use of those areas; however, with the implementation of the management recommendations there are no anticipated effects to these species. This effect could extend into adjacent mollusc habitat because of the edge effect, but would be minimized because of the retention of approximately 40% or greater canopy cover in treated units. These effects could be

expected to mimic what would have occurred under normal disturbance regimes prior to the fire suppression era. Long term effects would be a reduced risk of stand replacing fire, which would likely maintain high canopy closures and mollusc populations. Alternative 2 proposes to treat more areas of habitat than alternative 3, which would provide a greater long term benefit to the species through the reduced risk of severe fire. Both temporary and permanent road construction would be expected to decrease habitat from edge effects (Trombulak and Frissell 2000) and preclude dispersal of these short dispersal distance species through habitat fragmentation in these areas.

Amphibians

Affected Environment

Habitat (rock, talus and coarse wood) for amphibians, including the Del Norte salamander (*Plethodon elongatus*), is sporadically distributed throughout the project area, occurring primarily near rock outcrops, ridge tops, and along riparian areas. Protocol surveys have been partially completed for amphibians and no Del Norte salamander sites were located. Surveys are no longer required for this species, and are not planned. The Del Norte salamander is currently a Bureau Tracking species and is not considered a management species under the SSSP. Additionally, under the Survey and Manage program, pre-disturbance surveys are no longer required (S&M ROD 2001). A variety of amphibians are suspected to occur in the project area including riparian associated species as well as those that use upland habitats.

Alternative 1

The amount of amphibian habitat would remain at its current level. Forested vegetation on talus would remain at risk from wildfire. Talus slopes are not highly productive sites and would not be expected to provide late-successional habitat. However, suitable talus habitat can exist in late-successional forest stands, and high canopy closures can be attained from overstory trees to maintain a cool, moist microclimate important to salamanders. Fuel loading and ladder fuel conditions make amphibian habitat susceptible to risk of high severity fire which would reduce canopy closure over talus habitat randomly across the landscape, retarding succession and development of shade tolerant trees.

Alternatives 2 & 3

All action alternatives propose treatments in talus and other amphibian habitat such as where down logs occur. Canopy closures in most units would be retained at or above 40% in alternative 2 and 60% or higher in alternative 3. A minimum 40% canopy closure is recommended for Del Norte habitat (RMP p. 47) and would likely provide at least marginal microclimatic conditions for amphibians. Riparian reserves and other untreated areas would provide refugia for amphibian species. Short term effects would include warmer, drier conditions in some habitat areas which could reduce salamander use of those areas. Coarse down wood would be retained and continue to provide the microclimate that these structures afford. However, these effects are expected to mimic what would have occurred under normal disturbance regimes prior to the fire suppression era. Long term effects would be a reduced risk of stand replacing fire, which would likely maintain high canopy closures and amphibian populations. Alternative 2 proposes to treat more areas than alternative 3, which would provide a greater long term benefit to the species through the reduced risk of severe fire.

Effects of Roads

For all alternatives, road construction could cause warmer, drier conditions in adjacent interior forest habitats because of reduction of the canopy closure and increase solar and wind exposure (Trombulak and Frissell 2000). This could result in reduced reproduction and survival of species with low dispersal capabilities such as mollusks and possibly amphibians (Marsh and Beckman 2004). However, road construction will occur in a small portion of the project area and in relatively dry sites which are not prime habitat for these species. Species with greater dispersal capabilities could likely move to areas with more favorable microclimate conditions if suitable habitat was nearby. If suitable habitat was not within dispersal distance, these species could also experience similar effects on reproduction and survival. Both temporary and permanent road construction would be expected to decrease habitat from edge effects (Trombulak and Frissell 2000) and preclude dispersal of these short dispersal distance species through habitat fragmentation. On a project scale, effects to these species would be minimal because of the small amount of road construction, and project activities would not be expected to substantially affect these species.

Cumulative Effects

Cumulative effects in the project area result from the incremental impact of the alternatives, added to other past, present and reasonably foreseeable future actions regardless of who undertakes the action. Fire suppression, mining, road building, grazing, land development, agriculture and timber harvest throughout the watershed have altered historic conditions. Species associated with younger forested conditions have benefited from these changes. Species associated with late-successional forests, such as the spotted owl, have declined historically, but have been relatively stable for the last 10 years (USFWS 2004). However, as habitats in the Kerby watershed are naturally fragmented because of oak and other hardwood stands and edaphic conditions, the impact on these species is likely less than in more contiguous late-successional habitats. Land development and agriculture have reduced low elevation habitats, creating barriers and prohibiting dispersal of some species. Overall, these past activities have resulted in a loss of habitat. The majority of remaining older forest occurs on public lands managed by the BLM and the Forest Service.

These past activities have changed the distribution and abundance of habitats and many wildlife species. For example, riparian habitats have been altered by road construction, development and mining, changing the hydrology and vegetation potential from historic conditions, which has affected the quality of connective habitat these areas provide. Mature and old growth forests have decreased in the watershed, mostly from logging of private lands (USDI, BLM 1995).

Timber harvest has occurred and would continue to occur on private lands in the Kerby watershed. Late-successional habitat would likely rely on federal lands for its persistence. Rotational harvest of privately owned timberland in the watershed is expected to continue at current levels at an estimated 60 year rotation; none are assumed to attain late-successional conditions. Late-successional habitat would likely rely on federal lands for its persistence.

As a result of the NWFP, there has been a shift in management on federal lands in the Rogue Basin. Prior to the plan, harvest treatments were dominated by regeneration harvest. In the Kerby watershed, harvest treatments shifted to density management as a result of the NWFP. This has resulted in the treatment of many more acres compared to regeneration harvest of equivalent timber volume. Density management has fewer adverse effects on wildlife than regeneration harvest. Additionally, due to the National Fire Plan (NFP), management activities

have been designed to move vegetation towards its historic range of variability by reducing fuel levels. The NWFP and NFP have resulted in treatments more in line with historic disturbance regimes.

Range-wide, Northern Spotted Owl populations declined 3.7% annually from 1985-2003 (USFWS 2004). In the Tyee, Klamath, and South Cascades study areas in southwestern Oregon, spotted owl populations appeared stable from 1985-2003 (USFWS 2004). Habitat loss due to timber harvest was identified as the paramount threat in 1990 (USFWS 2004). The NWFP and RMP anticipated a loss of habitat due to timber harvest (USDA/USDI 1994 Vol. 1; RMP).

However, this loss has been less than anticipated and the rate of suitable habitat loss due to timber harvest on private, state, and federal forest lands declined in the late 1980s and early 1990s (USFWS 2004). The harvest rates in suitable habitat on BLM lands in Oregon was 3% per year (22,000 acres) in 1990 and dropped to 0.52% per year (4,911 acres) by 2003 (USFWS 2004). During this period of declining rates of habitat loss, spotted owl populations in southwestern Oregon appeared stable. The future rate of habitat loss due to timber harvest on federal lands is expected to be less than 4% per decade (USDA, USDI, 2004 p.111). Since harvest rates on federal lands in Oregon are expected to remain low for the foreseeable future, it is reasonable to expect that the northern spotted owl population would remain stable in southwestern Oregon. The harvest of up to 285 acres of suitable habitat for this project is included in the projected BLM timber harvest program for southwestern Oregon. In addition, it is estimated that in the NWFP area, late-successional forest habitat development through in-growth (tree growth) is occurring at approximately 8% (600,000 acres) per decade over the baseline condition established in the NWFP (USFWS, 2004). This development is 2.5 times the rate of loss through stand replacement fire and harvest, and would result in a 2.7 million acre net increase in late-successional forest over 3-4 decades (USDA, USDI, 2004). While much of this is only 80 to 100 years old, if this trend continues, an improving trend in late-successional habitat conditions can be expected. Private forest lands and federal, non-reserved matrix lands are not expected to develop into suitable spotted owl habitat. Managed, mid-seral stands on federal, non-reserved matrix and on private lands produce spotted owl dispersal habitat that may be used to connect blocks of late seral habitat in the federal reserves.

At the province level, this project would not add cumulatively to effects on late-successional habitat. In 2002, the Biscuit Fire burned almost 500,000 acres, primarily on the Siskiyou National Forest. Although approximately 95,500 acres (45,000 acres in four LSRs) of spotted owl NRF habitat was lost, there are still approximately 69,168 acres of suitable habitat remaining in these LSRs (Biological Opinion, log #1-15-03-F-511). It is unknown to what extent burned sites would continue to be used by spotted owls. However, it has been determined that impacts from the Biscuit Fire would not be likely to preclude movement of spotted owls between the Coast and Cascades Provinces (BO, log #15-03-F-511, 2003).

The emergence of Barred Owls as invasive competitors, West Nile virus, and sudden oak death as new threats to spotted owls suggests an increase in risk to the species since 1990. These newly identified threats are poorly understood, are likely to be pervasive, and would be difficult to alleviate. However, this risk was not sufficient to change the status of the spotted owl (USFWS, 2004).

While past forest management practices have fragmented habitat, there is no evidence that current forest practices immediately threaten any terrestrial vertebrate species in Oregon; current

conservation measures appear adequate for species known to be vulnerable to forest practices (e.g., Northern Spotted Owl).

In summary, the rate of habitat loss is substantially reduced from historic trends, there is substantial in-growth and recovery of habitat, and newly identified threats are unconnected to the proposed action. Therefore, even with the additional downgrading of up to 212 acres (alternative 2) of suitable nesting, roosting, foraging habitat, this project is unlikely to negatively affect the stability of the Northern Spotted Owl population in southwestern Oregon and is unlikely to substantially effect the demographics of the spotted owl (USFWS 2003 log #1-15-03-F-511). Additionally, the Tennessee Lime project would have relatively minor effects to persistence of other species in the watershed. Cumulatively, while this project would further degrade late-successional habitat, preclude dispersal of some short distance dispersers and cause some limited (temporally and spatially) effects to particular species, project design features, retention of snags, downed wood and legacy components of forests, enhancement of riparian areas and retention of untreated areas would minimize impacts of project activities. This project, combined with other actions in the watershed would not contribute to the need to federally list any Bureau sensitive or assessment wildlife species.

3.3 Fire and Fuels

3.3.1 Affected Environment

Fire regime, fire condition class, fuel models and estimates of fuel hazard are indices of current fuel loads, fire hazard, and difficulty for suppression. They provide a comparison of alternative effects and an assessment of community and resource protection in the project area.

Wildfire History / Fire Regimes

The project area is within the Klamath Province Region in southwestern Oregon where fire is recognized as a key natural disturbance (Atzet and Wheeler 1982). Fire has played an important role in influencing successional processes and creating diverse forest conditions.

Prior to the 20th century, low severity fires burned regularly in most dry forest ecosystems, with ignitions caused by both lightning and humans. Low severity fire influenced regeneration of fire-intolerant species, promoted fire tolerant species such as ponderosa pine and Douglas-fir, maintained an open forest structure, reduced forest biomass, decreased the impacts of insects and diseases, and maintained wildlife habitats for many species that utilize open stand structures (Graham et al. 2004). Native Americans influenced vegetation patterns for over a thousand years by igniting fires to enhance values that were important to their culture (Pullen 1995). Early settlers used fire to improve grazing and farming and to expose rock and soil for mining. Large, low to moderate severity fires were a common occurrence in the area based on fire scars and vegetative patterns.

Fire regime refers to the frequency, severity and extent of fires occurring in an area (Agee 1991). There are five national fire regimes (Schmidt et al. in press):

Fire Regime 1:	0-35 years, low severity
Fire Regime 2:	0-35 years, high severity
Fire Regime 3:	35-100+ years, mixed severity
Fire Regime 4:	35-100+ years, high severity
Fire Regime 5:	200+ years, high severity

These fire regimes provide a historical perspective of fire regimes prior to the era of fire exclusion. They also provide an indicator of natural processes that contributed to current forest vegetation and structure. They are thus useful in characterizing conditions across a project area and landscape. Agee (1993) has described the fire regime in southwest Oregon as moderate or mixed severity which includes a mixture of stand replacement and low severity fires with fire return intervals ranging from 0-115 years.

The Kerby sub-watershed has been shaped over the millennium with frequent surface fires and mixed fire severity with a mean fire return interval of approximately 15 years.

Fire Regime 1: 0-35 years, Low Severity. Typical climax plant communities include ponderosa pine, Jeffery Pine, pine-oak woodlands, dry Douglas-fir sites and low elevation grasslands usually located within the valley bottoms. Large stand-replacing fire can occur under certain weather conditions, but are rare events (i.e. every 200 years). Valley bottoms, drier south and west aspects and the Jeffery Pine/ Oak savannah plant series within the project area fall within this regime (76 % of project area).

Fire Regime 3: <50 years, mixed severity. Typical plant communities include mixed conifer and eastside Douglas-fir. Most fires are lower severity. This regime usually results in heterogeneous landscapes. Large, stand-replacing fires may occur but are usually rare events. Wetter and cooler north and east aspects, riparian zones and the higher elevations within the project area fall within this fire regime (24 % of project area).

In the early 1900s, suppression of all fires became a goal of land management agencies. This altered the historic fire regime. Based on calculations using fire return intervals, two to five fire cycles have been eliminated in the southwest Oregon mixed conifer forests that occur at low elevations (Thomas and Agee 1986). As a result, fuel loading has increased and plant succession shifted to fire-prone vegetative conditions. Species, such as ponderosa pine and oaks, have decreased. Many stands, which were once open, are now heavily stocked with conifers and small oaks which have changed the horizontal and vertical stand structure. Surface and ladder fuels have increased, increasing the potential for large scale crown fires which were once historically rare.

In the Douglas-fir series there has been an increase in stand densities with a shift to more shade tolerant species (Atzet 1996). High stand densities result in trees becoming weakened and are highly susceptible to insect epidemics and tree pathogens. High density forests burn with increased intensity because of the high fuel levels. High intensity fires can damage soils and often completely destroy riparian vegetation. Historically, low intensity fires often spared riparian areas, which reduced soil erosion and provided wildlife habitats following the event.

The past 20 years in Southwest Oregon indicate that there has been a trend toward more large fires which burn at higher intensities in vegetation types associated with low to mixed severity fire regimes.

Fire Regime Condition Class (FRCC)

Fire regime condition classes offer another approach to evaluating potential fire conditions and is most useful at the watershed and larger scales. Treatment effects are reflected in changes in the acreage in each FRCC. FRCCs are a function of the degree of departure from historical vegetation and disturbance regimes. These departures result in forest component alterations such

as species composition, structural stage, stand age, and canopy closure. There are three fire condition classes:

FRCC 1 - Fire regimes are within or near an historic range. The risk of losing key ecosystem components is low. Vegetation species composition and structure are intact and functioning within an historical range.

FRCC 2 - Fire regimes have been moderately altered from their historical range (more than one return interval). This change results in moderate changes to one or more of the following: fire size, frequency, intensity, severity, or landscape patterns.

FRCC 3 - Fire regimes have been significantly altered from their historical range. The risk of losing key ecosystem components is high. This change results in dramatic changes to fire size, frequency, severity, or landscape patterns.

To evaluate FRCC in the project area, current conditions were compared to historic reference condition classes identified using the Landfire Rapid Assessment Reference Condition Models to determine the degree of frequency severity departure and vegetation fuel departure. These models were devised by interagency ecologist through the Landfire process and peer reviewed. Each model includes comprehensive documentation that describes the vegetation, geography, biophysical characteristics, succession stages and disturbance regimes of each natural vegetation group and the reference characteristics of dominate vegetation and their disturbance regimes. Four reference condition class models were evaluated, Oregon White Oak, Jeffery Pine/Sepentine, Mixed conifer-Southwest Oregon and Northern California mixed evergreen. While there are isolated areas on private and public lands that have had recent disturbance and are within their range of natural variability (FRCC 1 and 2) the watershed as a whole classifies as FRCC 3. The greatest departure in the four reference condition classes was in severity due to an over abundance of the mid-closed and late-closed successional vegetation conditions.

Fire Behavior Fuel Models

Shrub Group

Fire Behavior Fuel Model 4 - High intensity and fast spreading fires through foliage and live and dead fine woody material in the crowns of secondary overstory. Stands of mature shrubs, six feet tall or more are typical candidates. Besides flammable foliage, dead woody material in the stands contributes significantly to the fire intensity. A deep litter layer may also hamper suppression efforts.

Fire Behavior Fuel Model 5 - Fire is generally carried by surface fuels made up of litter cast by shrubs and grasses or forbs in the understory. Fires typically have low intensities because the fuels are light and shrubs are young with little dead material. Young green stands with little dead wood are typical.

Fire Behavior Fuel Model 6 - Fires carry through the shrub layer where the foliage is more flammable than fuel model 5, but requires moderate winds, greater than eight miles per hour.

Fire Behavior Fuel Model 7 - Fires burn through the surface and shrub strata equally and can occur at higher dead fuel moistures because of the flammability of live foliage and other live material.

Timber Group
Fire Behavior Fuel Model 8 - Slow burning ground fuels with low flame lengths are generally the case, although the fire may encounter small jackpots of heavier concentrations of fuels that can create a flare up. Only under severe weather conditions do the fuels pose a threat. Closed canopy stands of short-needled conifers or hardwoods that have leafed create the compact litter layer. This layer is mostly twigs, needles, and leaves.

Fire Behavior Fuel Model 9 - Fires run through the surface faster than in fuel model 8 and have a longer flame length. Both long-needle pine and hardwood stands are typical. Concentrations of dead, down woody material will cause possible torching, spotting, and crowning of trees.

Fire Behavior Fuel Model 10 - Fires burn in the surface and ground fuels with greater intensity than the other timber litter types. A result of overmaturing and natural events creates a large load of heavy down, dead material on the forest floor. Crowning out, spotting, and torching of individual trees is more likely to occur, leading to potential fire control difficulties.

Fire risk, fire hazard, and values at risk
Fire Risk: Fire risk reflects the probability of ignition in a given area. Lightning and humans have caused fires in the project area. Increased development of homes in the WUI, trail systems, dispersed camp sites, recreation, and major travel corridors all serve to increase the risk of human caused fires. Wildfires in the project area occur predominately from July through September.

Table 10 displays fire occurrences in the project area (all ownerships) over a 31 year period. Lightning accounted for 23% of the total fires; humans caused 77% of the total fires.

Table 10. Fire History (1970 – 2000)

Number of Fires	Size Class
139	A (<.25ac)
33	B (.26-10ac)
2	C (10.1-100ac)
0	D (100.1-300ac)
0	F (> 300 ac)

Source: Oregon Department of Forestry historical records (Jim Wolfe)

Fire Hazard: Fire hazard is useful in the prioritizing fuel treatment needs in a project area. It also provides an index to compare alternatives. Fire hazard provides an index of resistance to control a wildfire and is based on vegetation, fuel arrangement and volume, condition and location. All are determinants of the potential for spread of a fire and difficulty of suppression.

Based on the fire hazard rating, the canopy base height, and canopy bulk density, the potential for a large fire to occur is high to extremely high for the project area. The extensive high hazard condition (Table 11) reflects the history of fire exclusion and the build up of surface and ladder fuels.

Table 11. Fire Hazard Ratings for the Tennessee Lime Project Area			
Fire Hazard Rating	**BLM Lands (acres)**	**Non-BLM Land (acres)**	**Percentage**
Low hazard	3	891	5%
Moderate hazard	1,630	3,085	26%
High hazard	4,403	8,267	69%

Source: Josephine County Integrated Fire Plan, Fire and Hazard Risk Rating

Values at risk provide an index of resource and human values. A majority of the project area is in the high and moderate values at risk category due to the residential, wildlife, recreational, and other forest resource values. Approximately 35% of the project area is in the Illinois Valley designated Community at Risk (CAR); 96% lies in the Wildland Urban Interface(WUI) (Table 12).

Table 12. Wildland Urban Interface and Communities at Risk						
Designation	Acres	Percent of Project Area	BLM		Private	
			Acres	% of Acres	Acres	% of Acres
WUI	11,142	61%	4,828	26%	6,314	35%
CAR	6,323	35%	1,208	7%	5,115	28%

Derived from GIS, Medford District BLM

Fire Behavior

Fuel models characterize fuel profiles and potential fire behavior. Surface fire behavior models address ground and understory fuels and their potential contribution to fire intensity and behavior. Crown fire behavior models address the upper canopy and vegetation layers in a stand. Fire behavior modeling was used to analyze the effects of the alternatives.

Surface Fire Behavior Models. Fire Behavior Fuel Models (FBFM) (Anderson 1982) are used to estimate potential surface fire behavior under various environmental conditions. Surface fire behavior has a direct effect on fire severity, mortality, suppression tactics and the initiation of crown fire. Reduction in fireline intensities and flame lengths are a key component in reducing fire size and severity. Surface fuel treatments greatly reduce heat per unit area, fire line intensity and flame lengths. Flame lengths less than 4' are considered safe for direct attack. Flame lengths greater than 4' require indirect attack. High hazard areas in the project area are best represented as a fuel model 10. Desired fuel models after treatment are FBFM 8 or 9. Table 13 displays fire behavior characteristics for FBFM 8,9 and 10.

Table 13. Fuel Model / Fire Behavior Modeling			
Model Inputs	**Fuel Model 10**	**Fuel Model 9**	**Fuel Model 8**
1-hr Moisture	5	5	4
10-hr Moisture	8	8	7
100-hr Moisture	10	10	9
Live Woody Moisture	100	N/A	N/A
Mid flame Wind Speed	5	5	6
Slope Steepness	40	40	40
Model Outputs	**Fuel Model 10**	**Fuel Model 9**	**Fuel Model 8**
Rate of Spread (max)	11.2	11.9	3.7
Heat per Unit Area	1,315	390	209

Fire line Intensity	270	85	14
Flame Length	7.2	3.5	1.5

Crown Fire Behavior Modeling. Crown fire behavior modeling provides a method for comparing the effects of the vegetation and fuel treatments in each of the alternatives. It provides estimates of the potential for crown fire initiation and sustainability. This is important as it greatly influences fire intensity, fire severity, resistance to control, rates of spread and thus potential resource damage.

Canopy Base Height and Canopy Bulk Density. Canopy base height (CBH) and canopy bulk density (CBD) are parameters not included in the above hazard ratings but are important components of overall fire hazard. These vegetation/fuel parameters can changed following vegetation/fuel treatments in the middle and upper canopies. Currently, stands identified for treatment have high CBD. CBH is typically very low due to the high density understory in the project area. (See vegetation section 3.2)

Air Quality

The population centers of Grants Pass and Medford/Ashland are the closest non-attainment areas. The non-attainment status is not attributable to particulates (PM-10, PM-2.5) from prescribed burning. Major sources of particulate matter within the Grants Pass and Medford/Ashland non-attainment areas are smoke from woodstoves, dust and industrial sources. Over the past eight years the population centers of Grants Pass and Medford/Ashland have been in compliance for the national ambient air quality standards for PM 10 and PM-2.5.

In general, air quality in the Illinois Valley is good with limited local emission sources including occasional construction and logging equipment, light industrial, vehicles, road dust, residential wood and debris burning, campfire burning, and smoke from prescribed fire. Emissions impacting air quality are greatest during times of heavy wildfire activity, usually in the late summer. Temperature inversions develop in the Illinois Valley in the winter months and occasionally during the late summer. These trap smoke and reduce smoke dispersal. Burning is highly restricted during these times. The Oregon Smoke Management Program is managed by the Oregon State Forester. Prescribed burning is regulated by the State of Oregon to ensure that burning complies with air quality standards.

3.3.2 Environmental Consequences

The effects of the alternatives are compared using Fire Regime Condition Class (FRCC) and Fire Management Analyst + (FMA+) modeling. Modeling was done for each of the six representative forest stand types recommended for fuel treatments to predict fire behavior for surface fires and thresholds for passive and active crown fire. It compares the number of days of surface fire potential and the number of days that an active crown fire would be sustained under average weather conditions (past 20 years of weather data used) for the area. Comparing current fire conditions with post treatment conditions yields relative effectiveness of the alternatives. Changes in fuel model, fire risk and fire hazard allow comparison of effects on fire potential, ease of wildfire suppression, and the potential for high severity fire.

Alternative 1 - No Action

Stand Level

No action would continue conditions that have a high potential for large, high intensity fires. Fuel hazard would increase as vegetation continues to develop on current successional trajectories. Surface fuels would increase due to tree mortality in dense stands as higher levels of insect and disease mortality are expected. CBH would decrease due to understory density increases, increasing the potential for crown fire initiation. CBD would increase, as would the potential for active crown fire events. The shift to more shade tolerant species would continue in dense overstocked stands.

With these conditions, wildland fire fighters and the local public would be at greater risk of loss of life and property. Direct attack capabilities would diminish as fuel hazard increases. Initial attack success would decline over time resulting in larger fire sizes. Aerial attack effectiveness would decrease with extreme fire behavior and, as upper and mid level canopies close, penetration of aerial applications of water or retardant would reduce. As a result, in the event of a wildfire, many stands would experience stand replacing wildfires.

As an example, the Deer Creek fire covered private, county, and BLM lands, six residences and a total of 1,548 acres. Direct attack strategies were ineffective due to the high intensities and fast moving crown fire activity. Evacuations and structure protection dominated most of the responding resources' time. The following days' weather (heavy inversion) played a major part in fire containment by moderating fire behavior which allowed resources to establish control lines around the perimeter. After the Deer Creek fire, LandSat analysis and field verification were used to classify burn severity (Table 14). Most notable are the moderate, high and extreme severity classes in which more than 70% of the trees were killed. Approximately 217 BLM acres and 974 non BLM acres experienced moderate to extreme fire severity.

Table 14. Deer Creek Fire Severity

Fire Severity (% mortality)	BLM Acres (%)	Non-BLM Acres (%)	Total Acres (%)
*Unburned (0%)	14 (5%)	112 (9%)	126 (8%)
Low (1-69%)	39 (14%)	191 (15%)	230 (15%)
Moderate (70-94%)	78 (29%)	363 (28%)	441 (29%)
**High (95-99%)	35 (13%)	112 (9%)	147 (10%)
**Extreme (100%)	104 (39%)	499 (39%)	603 (39%)
Total	***270******	***1,277***	***1,547***

*Imagery indicates no significant tree mortality. Field verification found mosaic ground fire in these areas
**High severity includes areas with foliage retained but dead; extreme severity includes no foliage retained
***Difference in acres is attributed to the pixilation of the LandSat data

On BLM lands, the Deer Creek fire converted hardwood, early, pole, mid, and mature forests to an early seral condition class in the moderate and extreme fire severity classes. Plantations (45 acres) and one of the mature stands (30 acres) experienced stand replacement (extreme severity). The remaining pole, mid, and mature classes had various levels of burn severity. The Deer Creek fire shifted 217 acres of BLM and 974 acres of private land into the seedling/sapling condition class.

Table 15 provides a baseline (current condition) by describing modeled (FMA+) fire behavior in each of the 6 typical stand types identified for fuel treatments.

Table 15. Current conditions fire behavior predictions using FMA+						
Treatment	**Plot**	**Stand Type**	**Environmental Conditions**	**20' (midflame) Wind speed**	**Fire Behavior**	**Percent Days**
No Action Current Conditions	1	Single Story Late- closed 11-21"DBH Moderate dead and down FBPS FM 10	Dry	0(0)	Surface	13
				0-13(4)	Passive Crown	67
				14-20(6)	Active Crowning	11
			Wet	n/a	n/a	9
No Action Current Conditions	2	Multi-Story Late open 11-21"DBH Heavy dead and down FBPS FM 10	Dry	0(0-2)	Surface	13
				0-20(2-8)	Passive Crown	78
				33(10+)	Active Crowning	0
			Wet	n/a	n/a	9
No Action Current Conditions	3	Poles Mid-closed 5-11'DBH Moderate dead and down FBPS FM 10	Dry	0(0)	Surface	13
				0-4(0-2)	Passive Crown	1
				5-20(2+)	Active Crowning	77
			Wet	n/a	n/a	9
No Action Current Conditions	4	Multi-Story Mid closed 11-21"DBH Moderate dead and down FBPS FM 10	Dry	0-20(0-6)	Surface	91
				25(7+)	Passive Crown	0
				n/a	Active Crowning	0
			Wet	n/a	n/a	9
No Action Current Conditions	5	Poles Mid-closed 5-11'DBH Moderate dead and down FBPS FM 10	Dry	0-2.9(0-1)	Surface	13
				n/a	Passive Crown	0
				ALL	Active Crowning	78
			Wet	n/a	n/a	9
No Action Current Conditions	6	Multi-Story Late- closed >21"DBH Moderate dead and down FBPS FM 10	Dry	0-2.9(0-.9)	Surface	14
				3-30.9(0-8.9)	Passive Crown	77
				31+(9+)	Active Crowning	0
			Wet	n/a	n/a	9

Source: C. Martin, Fire Ecologist, Medford BLM. Based on approximately 100 days a year July 15th through October 20th

Table 15 figures are based on an average 100 day fire season. For protection of forests and for safety, the biggest issue is the number of days vulnerable to crown fire which represents the largest deviation from historic conditions. In these areas, frequent fire intervals have a low probability of crown fire.

Project Level

With the no action alternative, fire regimes 1 and 3 would continue on present trajectories of unnaturally heavy fuel loads, over stocked stands, and increased shade tolerant/fire intolerant vegetation. Lands currently in condition class 3 would remain unchanged until disturbance occurs. Acres in condition class 1 and 2 would move towards condition class 3. Fire risk would increase with population, residential development and recreation. Fire condition class 3 would continue to increase. Table 16 estimates the increases in high fuel hazard levels in the project area over the next 10-20 years.

Table 16. Projected Hazard Classification

Time period	Total Acres	High Hazard		Moderate Hazard		Low Hazard	
		Acres	% of Total	Acres	% of Total	Acres	% of Total
BLM – Current *	6,036	4,403	73%	1,630	26%	3	<1%
5-10 Years	6,036	5,284	88%	749	12%	0	0%
10-20 Years	6,036	6,036	100%	0	0%	0	0%

Projections are based on the assumption of 20% acreage increase in the high hazard for the first 5-10 years and an additional 40% for the next 10 – 20 years.

As the acreage of high fuel hazard increase, the potential for high severity wildland fire increases. Strategies and tactics for fire suppression would shift to indirect attack utilizing topographic features such as ridgetops and existing road ways resulting in larger fire sizes. Initial attack suppression goals (94% of new fire starts to 10 acres or less) would become increasingly difficult to attain due to increased fire line heat and flame length. Therefore, the potential for a fire start to develop into a large fire would continue to increase.

In the event of wildfires, air quality would deteriorate due to smoke emissions. The potential for large quantities of smoke over long periods of time and at uncontrollable times is high as observed during the Biscuit fire. During the fire season (June-September) weather patterns are often stable creating inversions in the valley bottoms trapping smoke.

Alternatives 2 and 3

Table 17 displays fuel treatment acres by alternative. In conjunction with fuels reduction, forest thinning would also reduce fire hazard. Stands would be thinned to varying degrees of tree canopies openings, reducing crown bulk densities and increasing crown base height. An increase in solar radiation on the forest floor may increase surface temperatures, decrease fine fuel moisture, decrease relative humidity, and may increase surface wind speeds compared to un-thinned stands, increasing fire hazard if surface fuels are untreated. Therefore, surface fuels would be reduced to minimize the potential for high severity, high intensity fire. The acres displayed in table 15 includes both natural fuels reduction and post harvest fuel reduction.

Table 17. Fuel Treatment Comparison by Alternative

Alternative	CAR	WUI	Total Acres	No Treatment
2	889	1,233	2,112	3,924
3	791	1,040	1,831	4,205

Total acres do not represent the sum of individual treatments as many acres would receive a combination of treatments

Stand Level

Stand level effects are similar for the two action alternatives as fuel treatments for the identified units (Appendix B) in each alternative would have similar influence on the structure,

composition and fuel loading. In treated forest stands (see Table B-2), surface fuels and ladder fuels would be reduced resulting in low to moderate intensity surface fire. Surface fuel models would be reduced from a FM 10 (>6' flame lengths) to a FM 8 or 9 (<4' flame lengths). At these reduced flame lengths, direct attack suppression tactics are generally successful which are safer and more effective. Stands may experience some over story (<15%) mortality due to single tree or group torching. Stands labeled for no-treatment would have essentially the same effects as discussed in the no-action alternative.

Table 18 displays desired condition (post treatment) fire behavior in % days given historical weather inputs. Sixty-four percent of potential days that would exhibit passive crown fire behavior have been reduced to surface fire days; 100% of active crown fire days would be eliminated in treatment areas.

Table 18. Post treatment conditions fire behavior predictions using FMA+

Treatment Type	Plot	Stand Type	Env. Conditions	20' (midflame) wind speed	Fire Behavior	Percent Days
No Action Current Conditions	1	Single Story Late- closed 11-21"DBH Light dead and down FBPS FM 10	Dry	0-49.9(0-14.9)	Surface	87
				50+(15+)	Passive Crown	4
				n/a	Active Crowning	0
			Wet	n/a	n/a	9
No Action Current Conditions	2	Multi-Story Late open 11-21"DBH Light dead and down FBPS FM 10	Dry	0-20(0)	Surface	91
				n/a	Passive Crown	0
				n/a	Active Crowning	0
			Wet	n/a	n/a	9
No Action Current Conditions	3	Poles Mid-closed 5-11'DBH Moderate dead and down FBPS FM 10	Dry	0-20(0)	Surface	91
				n/a	Passive Crown	0
				n/a	Active Crowning	0
			Wet	n/a	n/a	9
No Action Current Conditions	4	Multi-Story Mid closed 11-21"DBH Light dead and down FBPS FM 10	Dry	0-24.9(0-6..9)	Surface	91
				25+(7+)	Passive Crown	0
				n/a	Active Crowning	0
			Wet	n/a	n/a	9
No Action Current Conditions	5	Poles Mid-closed 5-11'DBH Light dead and down FBPS FM 10	Dry	0-2.9(0-.9)	Surface	14
				0-20(1-11.9)	Passive Crown	77
				42+(12+)	Active Crowning	0
			Wet	n/a	n/a	9

No Action Current Conditions	6	Multi-Story Late- closed >21"DBH Moderate dead and down FBPS FM 10	Dry	0-20(0-14..9)	Surface	91
				50+(15+)	Passive Crown	0
				27+(8+)	Active Crowning	0
			Wet	n/a	n/a	9

Source: C. Martin, Fire Ecologist, Medford BLM/ Based on approximately 100 days a year July 15th through October 20th

Handpiling and burning, and underburning would produce smoke. However, burning would conform to Oregon smoke management program. All burning activities would comply with the national ambient air quality standards for particulates (PM 10 and PM 2.5)

Initial Fuel Reduction: Slashing. Forest thinning greatly reduces the potential for surface fires transitioning to crown fires. Reducing canopy fuels and eliminating ladder fuels will decrease the probability that a crown fire will initiate and spread (Cron 1969; Omi and Martinson 2002; Scott and Rhinehardt 2001; Stephens 1998).

Initial Fuel Reduction: Hand PileBurning. Hand pile burning is conducted in the late fall thru early winter when surface and ground fuels are wet greatly reducing the spread of surface fire. As a result of these wet burning conditions, it can be expected that ≤10% of each individual pile would not be consumed leaving pile "rings" and that ≤5% of the piles on the site would not burn resulting in scattered pockets of surface fuels remaining on site. These residual fuels would be reduced with subsequent underburning treatments. Hand piles are generally burned the following fall or winter after they are constructed. However, piles would not be burned if piles did not have enough time to cure or if air quality objectives could not be met. In these situations, the piles would remain on site for one full burning season. Although ladder fuels have been reduced, a wildfire in a unit with hand piles present would exhibit flame lengths and fire line intensities that would make direct attack tactics difficult and would result in a high level of mortality to the overstory vegetation.

Initial Fuel Reduction: Under burning. A typical underburn prescription would reduce 70% of the fine dead 1-100 hour time lag fuels (¼" – 3 inch diameter) and 50% of the 1,000 hour time lag fuels (3" – 9 inch diameter). In most units 10,000 hour time lag fuels (9+ inches) are retained but it can be expected that up to 10% would be consumed, mostly in the smoldering phase. A high percentage of the loss of the large woody material is through outer layer charring, often reducing the overall diameter but not consuming the entire log. During fall burning conditions when fuel moistures are lower an increase up to 25% consumption can be expected. Erosion potential from containment lines would be minimized/eliminated through water-barring. Hand lines would be allowed to be rehabilitated naturally as it is expected they would be utilized during the maintenance underburn.

Plots from the Long Term Ecosystem Productivity (LTEP) study site located on the Chetco Ranger District were burned by the 2002 Bisquit Fire. (Raymond and Peterson 2006:In press) "Thinned and then underburned plots had the least crown scorch volume and cambium death in the overstory trees…", "Mortality was least severe in thinned and then underburned stands with <5% mortality….".

Maintenance Underburning: It is estimated that maintenance burning throughout the project area would be on a 7-15 year rotation in areas classified as fire regime 1 and on a 10-30 year rotation for areas within fire regime 3. Smoke emissions will be localized and below health

hazard standards due to low fuel loadings. Mortality to the residual stand will be minimal (<5%) as fireline intensities would be low.

Project Level

Due to urban growth, population increases and recreation and tourism in the Illinois Valley, fire risk is expected to increase. The priority for both action alternatives is to treat activity fuels and stands in and adjacent to the CAR. Table 19 compares acres treated and effects by alternative.

Table 19. Fuel Treatment Effects Comparison

Effect	Alternative 2	Alternatives 3 and 4
Surface fuels reduction	Fuels would be reduced at the highest level of treatment (potential treatment of 2,112 acres)	Fuels would be reduced on fewer acres than alt.2 (potential treatment of 1,831 acres)
Increase canopy base height (CBH)	Highest CBH increase in understory ladder fuels treated.	CBH increased but less than alt. 2. Fewer acres treated in WUI understory.
Reduce canopy bulk density (CBD)	Less reduction in mid and upper canopy compared to alt. 3. Greatest reduction of crown fire behavior as canopies would be reduces to 40%.	The greatest reduction in pole, mid and late-seral veg classes due to harvest. Harvest plus fuel treatments would have the greatest reduction of CBD overall.
Riparian Reserve fuel hazard reduction	The greatest fuels reduction (904 acres) and best chance to retain key ecosystem components in the event of wildfire.	Less fuels reduction than alt. 2 Potential treatment acres 666. Higher probability of losing key ecosystem components.
Fire Condition Class	The greatest fuels reduction in FCC 3 and lowest risk of losing key ecosystem components.	Less treatment in FCC 3 than alt. 2. The risk of losing key ecosystem components is greater than alt. 2
Fire Hazard	68% treated.	61% treated.
CAR	74% treated.	65% treated.

Alternative 2 would have the greatest number of treated stands at all elevations (valley bottoms, mid-slope, ridgetops) throughout the project area, minimizing potential fire spread from untreated stands. Alternative 3 treats fewer acres in the WUI; instead it focues on treating the CAR and strategic areas. Untreated stands would have the same wildfire behavior and intensity as those described in the no-action alternative. Forest thinning would complement fuels reduction as crown bulk densities and fuel loads would decrease. Alternative 3 would have a greater effect on reducing fire behavior as more acres are proposed for density management.

Both action alternatives will increase initial attack effectiveness and public and fire fighter safety at varying levels. Treated stands would be more resistant to crown fire due to the reduction in the crown base height and crown bulk density, reducing mortality to over story vegetation. All alternatives would result in a reduction of the potential for large scale, high intensity fire as fire suppression would be more successful across the project area.

Cumulative Effects

Air Quality

There are 5 known fuels reduction projects that would impact air quality in the Illinois Valley: the Page Creek (USFS, 1200 acres), Longwood (USFS, 740 acres), Anderson West (BLM, 780 acres) West Fork Illinois (BLM, 2,618 acres) and the East Fork Illinois (1,807). It is anticipated these projects and Tennessee Lime Project would be implemented over a five year period. All prescribed burning activities will be regulated by the State of Oregon to ensure that burning

complies with air quality standards. Therefore, the action alternatives are not expected to contribute cumulatively to any air quality impacts beyond the short term impacts previously stated.

Fuel Reduction and Fire Behavior

Since 1990, 111 acres of UT/HP/B and 535 acres of mechanical treatment have been completed on BLM land in the Kerby sub-watershed under the 3+3 and Free and Easy projects. Combined with the proposed action which treats up to 2,112 acres, 2,758 acres representing 15% of the Kerby sub-watershed would be treated; 35% of the Tennessee Lime project area would be treated.

The proposed fire hazard reduction treatments in the two action alternatives would return a large portion of the project area to near historical ranges of fuel loadings, CBH and CBD. This would result in a substantial reduction to fire hazard, and loss to values at risk in the project area. It would compliment several other fuel reduction projects (including Free and Easy, Deer Mom, 3 + 3, West Fork Illinois, Nor East, East Illinois and NFP grant projects) underway or planned in the Illinois Valley. Wildland firefighter and public safety would greatly increase in treated areas and direct strategies and tactics could be used to control fire, resulting in fewer acres burned and less threat to private property.

While the potential for high severity is expected to decrease by creating fire-resilient forests, predicting fire behavior in all instances is very difficult. Studies by Pollet and Omi (2002), Moore et al (1955), Van Wagner (1968), Omi and Martinson (2002) provide strong evidence of fuel treatment efficacy. However, even with past and anticipated treatments, the potential for a high severity fire remains high across the watershed due to the level of untreated acres and unpredictability of human caused fires. It can be expected that extreme fire behavior would be moderated in treated stands and overstory mortality can be reduced by as much as 60% as compared to untreated stands. Based on FMA+ modeling, untreated stands would initiate passive crown fire and under high wind conditions sustain active crown fire behavior. In these instances, fires starting on BLM land would adversely affect adjacent private lands as crown fires would likely carry from the BLM site to the private lands. Conversely, fires originating from private lands would adversely affect BLM managed lands as crown fire would carry onto BLM lands.

3.4 Recreation, Cultural, and VRM

3.4.1 Affected Environment

Recreation

Recreation opportunities in the Tennessee Lime project area are limited. Most lands with the highest recreation potential are along the Illinois River which is predominantly privately owned. Designated recreation opportunities in the project area include Eight Dollar Mountain Botanical Wayside and the Illinois Valley State Park. A portion of the state park is on BLM land and is under lease with the state. A portion of the designated Wild and Scenic Illinois River administered by the Forest Service is in the Illinois-Josephine watershed. A commercially permitted paintball area in section 3 (T39S, R8W) has not been active since November 2004.

Two competitive activities under a special recreation permit occur in the project area. Limestone Challenge Equestrian Endurance Ride has taken place since 1995 on approximately 2.1 miles of

roads and trails in the project area. The Adventure Race has taken place since 2002 on approximately 2 miles of roads and trails in the project area. The Lime Rock Cave is located within the project boundary. Highway 199, the main highway from southern Oregon to the Oregon/California coast and Redwoods, travels through the project area.

The project area has open, limited or closed categories for off-highway vehicle (OHV) use (RMP p.109). **Limited areas include:** Eight Dollar Mountain Area of Critical Environmental Concern; Riparian Reserves; Illinois Valley Botanical Emphasis Area . **Closed areas include:** Wetlands, Meadows, Lime Rock Cave, Springs. Open areas encompass anything that is not on the above lists.

In open areas, all types of OHVs are permitted at all times in any location subject to operating regulations and vehicle standards. Limited areas are restricted by time and location. OHV use is prohibited in closed areas (43 CFR, subparts 8341 and 8342).

OHV use is scattered throughout the project area, generally heavier east of Kerby, along powerline right of ways and on BLM land in the rural interface.

Cultural

Prior to white settlement in the 1850s, the indigenous Takelma and Athapascan groups inhabited the project area. The Takelma Indians inhabited much of the Rogue Valley, and the Athapascan Indians occupied lands from the coast to the Applegate River and Galice Creek. The subsistence of both the Takelma and Athapascan Indians consisted of acorns, camas bulbs, manzanita berries, fish, and deer.

The mineral resources of the Illinois Valley Mining played an important role in the settlement of the Illinois Valley. Gold was first discovered in 1851, which launched several decades of intensive gold mining in southwestern Oregon. By 1853, miners were at work along the Applegate River, Galice Creek, the Illinois River, and several smaller water courses in the Siskiyou Mountains. By the mid to late 1850s mining was common southwestern Oregon (Kramer 1999).

To serve the social, economic, and governmental needs of the region, Kerbyville, later known as Kerby, developed near the junction of Holton Creek and the Illinois River. Kerby became the county seat in 1857, and served in this capacity until 1885 when the county seat moved to Grants Pass.

After the First World War, very little mining was carried out in the area but the effects of mining on the landscape are still evident today. These features include tailing piles, hydraulic cut banks, mill sites, and the remains of habitation areas.

Logging in the project area was not a large part of the local economy until World War II. Prior to this, logging was comprised mostly of small family owned logging operations producing wood products for the local use and mining operations. With the end of World War II a building boom occurred. This boom coupled with improved logging technology created the impetus for the logging industry to expand (Draper 1998). Evidence of past logging activity is still found in the project area.

Previous archaeological research in the project area includes several small BLM management related survey projects and two larger landscape surveys. The total acreage previously surveyed under these other projects total 283 acres. No sites were recorded during previous surveys in the project area. In 2006, the Tennessee Lime cultural resource survey found four new sites, including two isolates.

Visual Resource Management

VRM classes in the project area are VRM III and VRM IV. Class III objectives are to manage lands for moderate levels of change to the characteristic landscape. Management activities may attract attention but should not dominate the view of the casual observer. Class IV objectives are to manage lands for high levels of change. Management activities may dominate the view and be the major focus of viewer attention. Currently, the characteristic landscape can be described as modified by human alterations including the city of Cave Junction, dispersed roads and residences in the area, and private industry land.

3.4.2 Environmental Consequences

Alternative 1 - No Action

Recreation
In the no action alternative, recreation opportunities would remain unchanged. As recreation and population increases in the project area, fire risk from human ignition sources is expected to increase.

Cultural
All environmental conditions and trends will continue. Fuels build-up would increase and could result in a catastrophic fire which could threaten or destroy cultural resources. Vegetation would continue to encroach on cultural resources resulting in potential damage and/or destruction.

VRM
Visually, the area would remain the same. There would be no changes to the existing landscape except in the case of severe fire.

Alternatives 2 and 3

Recreation
No recreation actions are proposed. Fuels and harvest work on BLM would reduce understory vegetation, thus improving access for increased OHV use (i.e. increased OHV use off of designated roads and trails)

Developed skid roads also create opportunities for OHV use. Blocking skid roads at intersections with main roads in OHV "limited" areas would reduce OHV use potential. If OHV use increases as a result of this project and resource damage appears probable, area closures and increased law enforcement patrols would be implemented. Effects of OHV use in open or designated areas are expected to be within the range anticipated in the RMP.

Cultural
Proposed treatments would occur near flagged cultural resources but not within the buffers. Therefore, no direct effects to cultural resources are expected. Indirect effects from the reduction

of vegetation through harvest and fuel treatments would provide increased visibility, potentially leading to vandalism and looting of cultural sites. The sites recorded in the Tennessee Lime project area are typical of other numerous sites located within Southern Oregon. The sites have not been formally evaluated for the National Register of Historic Places, but recorded cultural sites on Bureau of Land Management, Medford District lands are protected as if they are eligible for inclusion on the National Register. Also, recorded sites are monitored after the project is implemented to assure there are no impacts to the sites. If vandalism is occurring law enforcement would be notified.

Benefits of fuels and vegetation treatments would be the reduced risk of losing wooden features and artifacts due to catastrophic fire.

VRM

There would be a short term increase in browns and light greens as the understory is opened up. The texture of the vegetation would become slightly rougher when openings are created. Vertical lines would be slightly more pronounced in the foreground views and along ridges, as individual trees may stand out more. Observers may see background views of the project area, but the treatments would not be apparent to casual observers, who are normally traveling Highway 199 through the area at speeds of 45-55 mph or more. PDFs such as feathering, irregular shapes, avoiding straight lines and screening would help treatments blend with the characteristic landscape. The project would not be apparent to the casual observer from Highway 199. Changes to the characteristic landscape as viewed from Westside Road and Laurel Road would not dominate the view of the casual observer due existing varied nature of the landscape, prescriptions, and project design features. Therefore, treatments proposed on all BLM land in the project area would meet VRM III and IV objectives.

Cumulative Effects

Recreation: Reducing vegetative cover in the low elevations increases the opportunity for legal (in open OHV areas) and illegal (in "limited" OHV areas) OHV uses. Areas which are closed to OHVs in the project area are not proposed for any treatment, therefore, there would be no potential for increased use in these areas.

Cultural: There are no direct effects identified for cultural resources. Indirect effects include increased visibility of sites possibly leading to vandalism and looting. The sites recorded in the Tennessee Lime project area are typical of other numerous sites located within Southern Oregon. The sites have not been formally evaluated for the National Register, but recorded sites on Bureau of Land Management, Medford District lands are protected as if they are eligible for inclusion on the National Register. Also, recorded sites are monitored after the project is implemented to assure there are no impacts to the sites. If vandalism is occurring law enforcement would be notified.

VRM: Cumulative effects of this and future projects in the Kerby watershed on visual resources would be negligible, due to the current prescriptions used in the projects that avoid noticeable lines, do not remove all the overstory, etc. Previous BLM projects (in the 1960s, 1970s and 1980s), as well as projects on private land, have altered forest stands leading to negative visual images. However, today's prescriptions include project design features such as feathering and screening, so that the unit repeats the characteristic landscape and are not noticed by the casual observer. This project, as stated above, would not be apparent to the casual observer traveling along Highway 199 and would meet VRM III and IV objectives. Therefore, due to the

prescriptions, project design features, and location, the proposed actions would not add negative visual impacts in the watershed.

4.0 Agencies and Persons Consulted

4.1 Public Involvement

Public scoping for the Tennessee Lime Landscape Management Project was initiated in July 2005, when BLM mailed out more than 450 scoping letters to landowners and others who have asked to be kept informed about upcoming BLM projects. Approximately 40 letters were received. Comments received on the Free & Easy 2 project (EA #OR110-00-15) were also incorporated into project development. Most of the comments referenced the Illinois Valley in general; very few referred specifically to BLM lands in the Tennessee Lime Landscape Management Project area.

An open house held on September 27, 2005 introduced the local communities to the BLM planning team, resource specialists and the scope of the project. A field trip on October 19, 2005 facilitated informal discussions between BLM resource specialists and the public. Responses to questionnaires, personal discussions and comment letters provided public input for BLM consideration. Letters, phone calls, meetings, and field visits solicited the following issues or concerns, which were considered and addressed throughout the EA:

- Maintain the quality of life for local residents by protecting forest resources
- Maintain or improve native ecosystems
- Create local jobs from forest activities
- Protect water quality
- Do not increase road densities
- Reduce fuel loading/fire hazard
- Promote recreation and tourism

4.2 Agencies and Persons Consulted

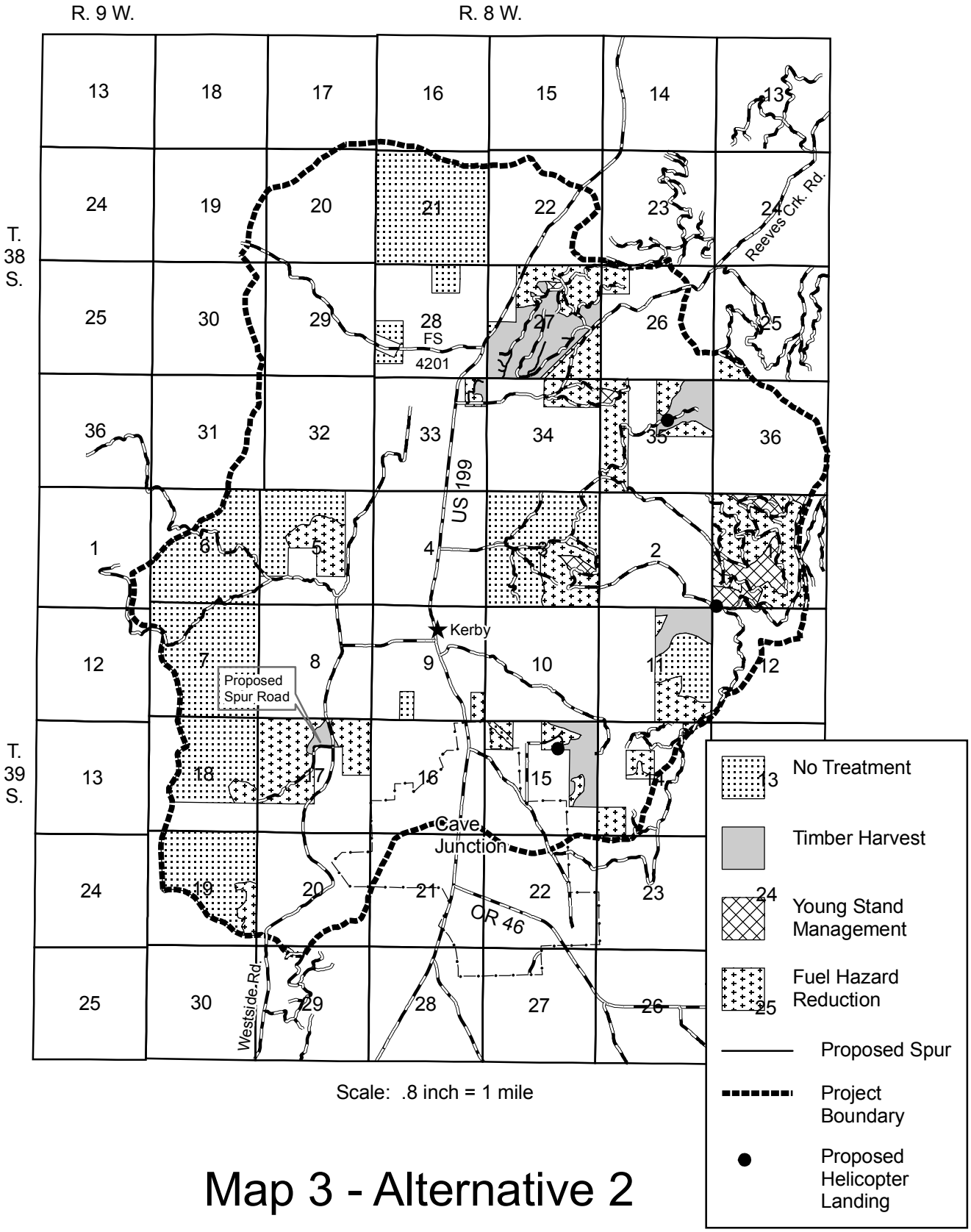
The following agencies were consulted during the planning process: Josephine County, the City of Grants Pass, USDA Forest Service, US Fish and Wildlife Service, National Marine Fisheries Service, and Oregon Department of Fish and Wildlife.

4.3 Availability of Document and Comment Procedures

Copies of the EA will be available for public review in the Grants Pass Interagency Office, 2164 NE Spalding Avenue, Grants Pass, OR 97526. A formal 30-day public comment period will be initiated by a notice in the Grants Pass Daily Courier. If you would like a copy of the EA, please stop by the office or contact Lisa Brennan, project lead, at (541) 471-6635. Written comments should be addressed to Abbie Jossie, Field Manager, Grants Pass Resource Area, at 2164 NE Spalding Avenue, Grants Pass, OR 97526. E-mailed comments may be sent to: *or110mb@or.blm.gov*.

Appendix A. Maps

Tennessee Lime Landscape Management Project



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Map 3 - Alternative 2

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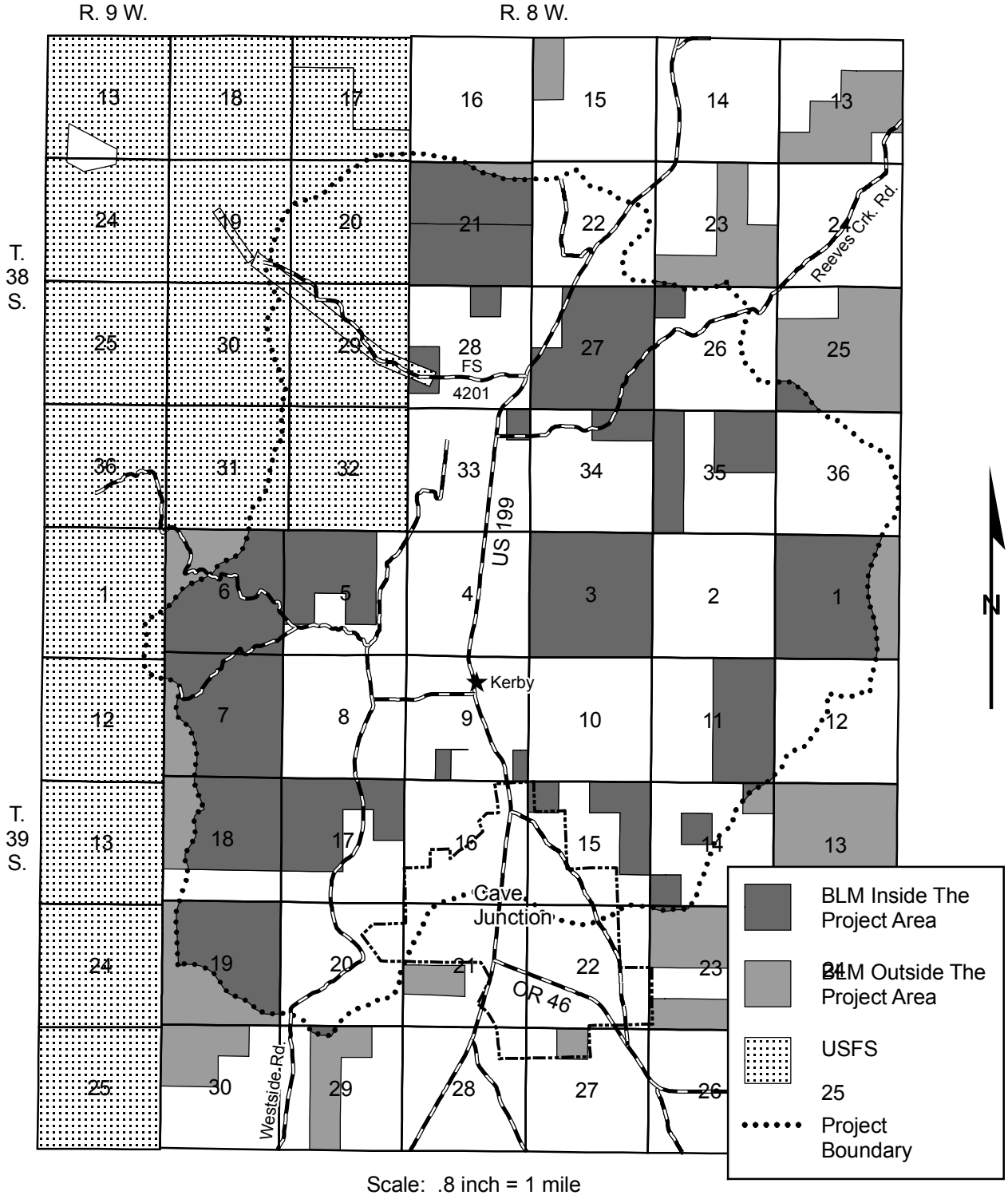
Tennessee Lime Landscape Management Project



Map 2 - Project Location

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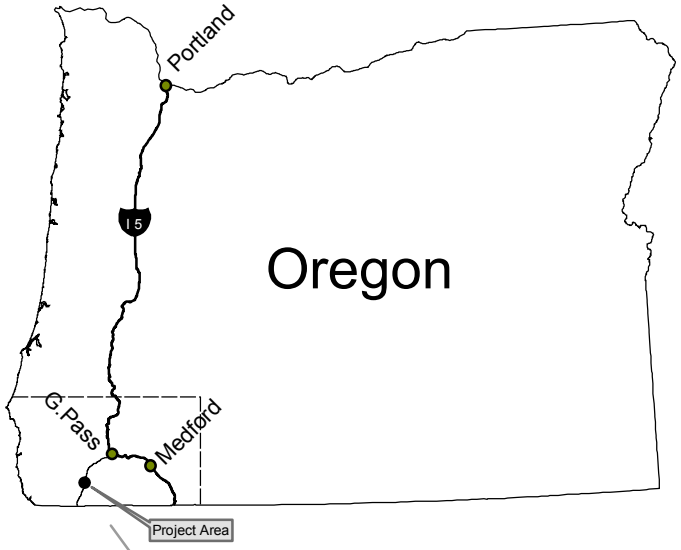
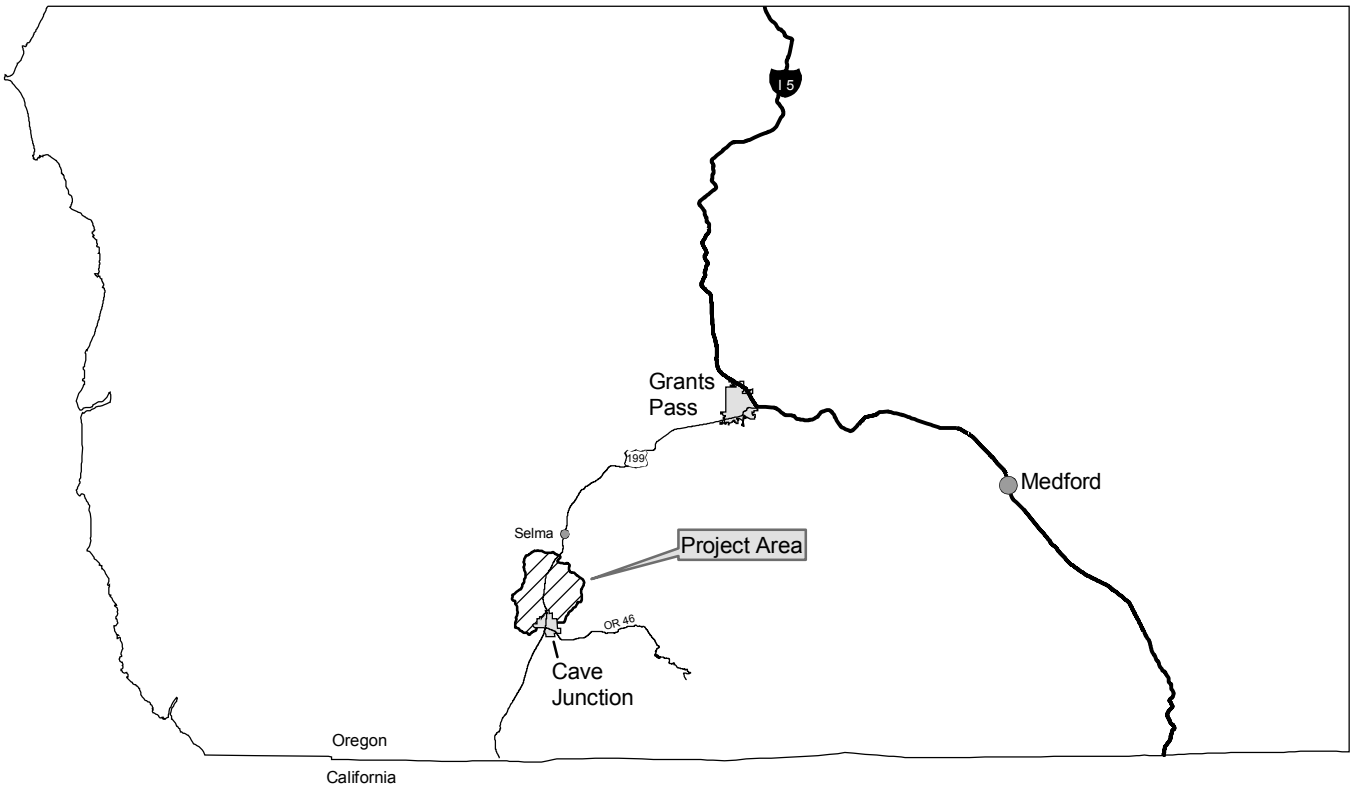
Tennessee Lime
Landscape Management Project

Map 1 - General Location





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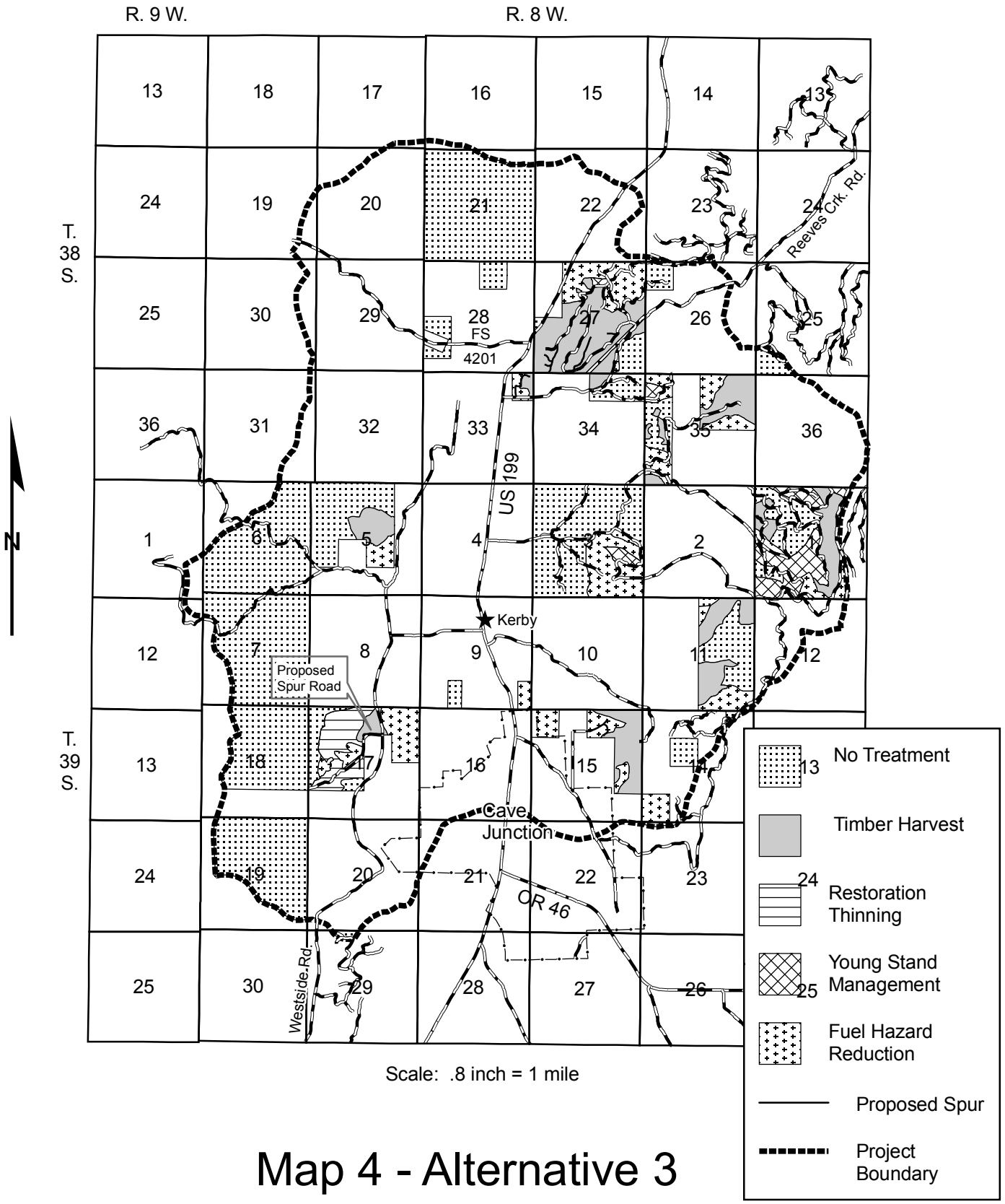
Tennessee Lime Landscape Management Project



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Map 4 - Alternative 3

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Appendix B. Unit Treatments

Table B-1 Alternative 2 T-Lime

Table B-1 Alternative 2 T-Lime

T-R-S-OI#	*Land Use Allocation*	*Acres*	*Seral Stage Current*	*Plant Series*	*Vegetation Treatment*	*Understory/ Fuel Treatments*	*Logging _System*	*Total Unit Volume (mbf/ac)*	*Matrix Harvest Acres*	*Matrix Harvest Volume (mbf/ac)*	*Riparian Harvest Acres*	*Riparian Harvest Volume (mbf/ac)*	*Total Harvest Volume (mbf/ac)*	*Non Harvest Treatment Acres Matrix*	*Non Harvest Treatment Acres Riparian*
39S-08W-9-003	Matrix/ Riparian	7	Hardwood	NW	No Treatment										
39S-08W-9-002	Matrix	20	Mid-Late	DF	Fuel Hazard Reduction	SL/HP/UB/BU								20	0
39S-08W-9-001B	Matrix/ Riparian	7	Hardwood	DV	No Treatment										
39S-08W-9-001A	Matrix/ Riparian	6	Hardwood	RIP/NW	No Treatment										
39S-08W-7-001	Matrix/ Riparian	528	Mature	JP	No Treatment										
39S-08W-6-002	Matrix/ Riparian	32	Mature	JP	No Treatment										
39S-08W-6-001	Matrix/ Riparian	432	Mature	JP	No Treatment										
39S-08W-5-004	Matrix/ Riparian	63	Mature	DF	Fuel Hazard Reduction	SL/HP/UB/BU								46	17
39S-08W-5-003	Matrix/ Riparian	38	Mature-Late	JP	Fuel Hazard Reduction	SL/HP/UB/BU								24	14
39S-08W-5-002	Matrix/ Riparian	13	Mature	JP	Fuel Hazard Reduction	SL/HP/UB								9	5

Table B-1 Alternative 2 T-Lime

T-R-S-OI#	Land Use Allocation	Acres	Seral Stage Current	Plant Series	Vegetation Treatment	Understory/ Fuel Treatments	Logging _System	Total Unit Volume (mbf/ac)	Matrix Harvest Acres	Matrix Harvest Volume (mbf/ac)	Riparian Harvest Acres	Riparian Harvest Volume (mbf/ac)	Total Harvest Volume (mbf/ac)	Non Harvest Treatment Acres Matrix	Non Harvest Treatment Acres Riparian
39S-08W-5-001	Matrix/ Riparian	214	Mature	JP	No Treatment										
39S-08W-3-994	Matrix/ Riparian	22	Non-vegetated	DF	No Treatment										
39S-08W-3-017	Matrix/ Riparian	13	Mature-Late	DF	No Treatment										
39S-08W-3-016	Matrix/ Riparian	14	Mid-Late	DF	No Treatment										
39S-08W-3-015	Matrix	11	Mature-Late	DF	No Treatment										
39S-08W-3-014	Matrix/ Riparian	8	Mature-Late	DF	No Treatment										
39S-08W-3-013	Matrix	18	Early	DF	Young-Stand Management	PCT/PR								17	1
39S-08W-3-012	Matrix/ Riparian	20	Mature-Late	DF	Fuel Hazard Reduction	SL/HP/UB								9	11
39S-08W-3-011	Matrix/ Riparian	40	Mid-Late	DF	Fuel Hazard Reduction	SL/HP/UB								25	15
39S-08W-3-010	Matrix	15	Mature-Late	DF	No Treatment										
39S-08W-3-009	Matrix/ Riparian	12	Hardwood	DF	No Treatment										
39S-08W-3-008	Matrix/ Riparian	111	Mature-Late	DF	No Treatment										

Table B-1 Alternative 2 T-Lime

T-R-S-OI#	Land Use Allocation	Acres	Seral Stage Current	Plant Series	Vegetation Treatment	Understory/ Fuel Treatments	Logging _System	Total Unit Volume (mbf/ac)	Matrix Harvest Acres	Matrix Harvest Volume (mbf/ac)	Riparian Harvest Acres	Riparian Harvest Volume (mbf/ac)	Total Harvest Volume (mbf/ac)	Non Harvest Treatment Acres Matrix	Non Harvest Treatment Acres Riparian
39S-08W-3-007	Matrix/ Riparian	66	Mature-Late	DF	Fuel Hazard Reduction	SL/HP/UB								44	22
39S-08W-3-006	Matrix	14	Mature	DF	Fuel Hazard Reduction	SL/HP/UB								14	0
39S-08W-3-005	Matrix/ Riparian	13	Mature-Late	DF	Fuel Hazard Reduction	SL/HP/UB/BU								10	2
39S-08W-3-004	Matrix/ Riparian	42	Mid-Late	DF	No Treatment										
39S-08W-3-003	Matrix/ Riparian	37	Mature-Late	DF	No Treatment										
39S-08W-3-002	Matrix/ Riparian	97	Mature-Late	DF	No Treatment										
39S-08W-3-001	Matrix/ Riparian	100	Poles	DF	No Treatment										
39S-08W-29-002	Matrix	9	Mid-Late	DF	Fuel Hazard Reduction	SL/HP/UB								8	1
39S-08W-23-004	Matrix	6	Mature	DF	No Treatment										
39S-08W-19-001B	Matrix/ Riparian	40	Mature	DF	Fuel Hazard Reduction	SL/HP/UB								17	23
39S-08W-19-001A	Matrix/ Riparian	346	Mature-Late	JP	No Treatment										
39S-08W-18-001B	Matrix/ Riparian	27	Mature	JP	Fuel Hazard Reduction	SL/HP/UB								19	8

Table B-1 Alternative 2 T-Lime

T-R-S-OI#	Land Use Allocation	Acres	Seral Stage Current	Plant Series	Vegetation Treatment	Understory/ Fuel Treatments	Logging _System	Total Unit Volume (mbf/ac)	Matrix Harvest Acres	Matrix Harvest Volume (mbf/ac)	Riparian Harvest Acres	Riparian Harvest Volume (mbf/ac)	Total Harvest Volume (mbf/ac)	Non Harvest Treatment Acres Matrix	Non Harvest Treatment Acres Riparian
39S-08W-18-001A	Matrix/ Riparian	318	Mature	JP	No Treatment										
39S-08W-17-012	Matrix/ Riparian	11	Shrubs	RIP/HW	Fuel Hazard Reduction	SL/HP/UB								0	11
39S-08W-17-011	Matrix/ Riparian	27	Mature-Late	JP	Fuel Hazard Reduction	SL/HP/UB								8	19
39S-08W-17-010	Matrix/ Riparian	55	Mature-Late	JP	Fuel Hazard Reduction	SL/HP/UB								45	10
39S-08W-17-009	Matrix/ Riparian	11	Shrubs	JP	Fuel Hazard Reduction	SL/HP/UB/BU								8	3
39S-08W-17-008	Matrix	6	Mature-Late	JP	Fuel Hazard Reduction	SL/HP/UB								6	0
39S-08W-17-007	Matrix	3	Mature	JP	Fuel Hazard Reduction	SL/HP/UB								3	0
39S-08W-17-006	Matrix/ Riparian	7	Mature	JP	Fuel Hazard Reduction	SL/HP/UB/BU								2	5
39S-08W-17-005	Matrix/ Riparian	14	Mature	DF	Fuel Hazard Reduction	SL/HP/UB/BU								0	14
39S-08W-17-004	Matrix/ Riparian	23	Mid-Late	JP	Fuel Hazard Reduction	SL/HP/UB								18	5
39S-08W-17-003B	Matrix/ Riparian	41	Mature-Late	JP	Fuel Hazard Reduction	SL/HP/UB								13	28
39S-08W-17-003A	Matrix/ Riparian	55	Mature-Late	JP	Fuel Hazard Reduction	SL/HP/UB								38	17

Table B-1 Alternative 2 T-Lime

T-R-S-OI#	Land Use Allocation	Acres	Seral Stage Current	Plant Series	Vegetation Treatment	Understory/ Fuel Treatments	Logging _System	Total Unit Volume (mbf/ac)	Matrix Harvest Acres	Matrix Harvest Volume (mbf/ac)	Riparian Harvest Acres	Riparian Harvest Volume (mbf/ac)	Total Harvest Volume (mbf/ac)	Non Harvest Treatment Acres Matrix	Non Harvest Treatment Acres Riparian
39S-08W-17-002	Matrix/ Riparian	28	Mature	DF	Free and Easy II	HP/UB	Tractor		23						
39S-08W-17-001	Matrix/ Riparian	81	Shrubs	DF	Fuel Hazard Reduction	SL/HP/UB/BU								50	31
39S-08W-15-994	Matrix/ Riparian	9	Non-vegetated	DV	No Treatment										
39S-08W-15-005	Matrix	13	Hardwood	WO	Fuel Hazard Reduction	SL/HP/UB								13	0
39S-08W-15-004B	Matrix/ Riparian	87	Mature-Late	DF	Free and Easy II	HP/UB	Tractor/Heli		60						
39S-08W-15-004A	Matrix/ Riparian	34	Mid-Late	DF	Fuel Hazard Reduction	SL/HP/UB								17	17
39S-08W-15-003	Matrix/ Riparian	28	Mature-Late	DF	Free and Easy II	HP/UB	Tractor/Heli		22						
39S-08W-15-002	Matrix/ Riparian	23	Mid-Late	DF	Fuel Hazard Reduction	SL/HP/UB/BU								21	2
39S-08W-15-001	Matrix/ Riparian	9	Mid-Late	WO	Fuel Hazard Reduction	SL/HP/UB/BU								3	6
39S-08W-14-008	Matrix	9	Mature	DF	DM/ModGS	SL/HP/UB	Heli		8						
39S-08W-14-007	Matrix/ Riparian	10	Hardwood	DF	No Treatment										
39S-08W-14-004B	Matrix/ Riparian	16	Mature	DF	Fuel Hazard Reduction	SL/HP/UB								11	5

Table B-1 Alternative 2 T-Lime

T-R-S-OI#	Land Use Allocation	Acres	Seral Stage Current	Plant Series	Vegetation Treatment	Understory/ Fuel Treatments	Logging _System	Total Unit Volume (mbf/ac)	Matrix Harvest Acres	Matrix Harvest Volume (mbf/ac)	Riparian Harvest Acres	Riparian Harvest Volume (mbf/ac)	Total Harvest Volume (mbf/ac)	Non Harvest Treatment Acres Matrix	Non Harvest Treatment Acres Riparian
39S-08W-14-004A	Matrix/ Riparian	25	Mature	DF	Free and Easy II	SL/HP/UB	Heli		12						
39S-08W-14-003	Matrix	14	Mature	DF	Fuel Hazard Reduction	SL/HP/UB								14	0
39S-08W-14-002	Matrix/ Riparian	8	Mature	DF	DM/ModGS	SL/HP/UB	Heli		6						
39S-08W-14-001	Matrix	7	Mature	DF	Fuel Hazard Reduction	SL/HP/UB								7	0
39S-08W-11-013	Matrix/ Riparian	33	Mid-Late	DF	Fuel Hazard Reduction	SL/HP/UB								25	7
39S-08W-11-012	Matrix	7	Mature	DF	Fuel Hazard Reduction	SL/HP/UB								6	1
39S-08W-11-011	Matrix/ Riparian	18	Mature	DF	Fuel Hazard Reduction	SL/HP/UB								15	3
39S-08W-11-010	Matrix/ Riparian	25	Mature-Late	DF	Fuel Hazard Reduction	SL/HP/UB								12	13
39S-08W-11-009	Matrix/ Riparian	14	Mature-Late	DF	Fuel Hazard Reduction	SL/HP/UB								5	10
39S-08W-11-008	Matrix/ Riparian	36	Mature-Late	DF	No Treatment										
39S-08W-11-007	Matrix/ Riparian	22	Mature	DF	No Treatment										
39S-08W-11-006	Matrix/ Riparian	71	Mature	DF	No Treatment										

Table B-1 Alternative 2 T-Lime

T-R-S-OI#	Land Use Allocation	Acres	Seral Stage Current	Plant Series	Vegetation Treatment	Understory/ Fuel Treatments	Logging _System	Total Unit Volume (mbf/ac)	Matrix Harvest Acres	Matrix Harvest Volume (mbf/ac)	Riparian Harvest Acres	Riparian Harvest Volume (mbf/ac)	Total Harvest Volume (mbf/ac)	Non Harvest Treatment Acres Matrix	Non Harvest Treatment Acres Riparian
39S-08W-11-005	Matrix/ Riparian	17	Mature	DF	DM/ModGS	SL/HP/UB	Heli		7						
39S-08W-11-004	Matrix	7	Mature	DF	DM/ModGS	SL/HP/UB	Heli		6						
39S-08W-11-003	Matrix/ Riparian	19	Mature	DF	DM/ModGS	SL/HP/UB	Heli		12						
39S-08W-11-002	Matrix/ Riparian	12	Mid-Late	DF	No Treatment										
39S-08W-11-001	Matrix/ Riparian	46	Mature	DF	DM/ModGS	SL/HP/UB	Heli		34						
39S-08W-1-024	Matrix	7	Mature-Late	DF	Fuel Hazard Reduction	SL/HP/UB/BU								7	1
39S-08W-1-023	Matrix/ Riparian	27	Mid-Late	DF	Fuel Hazard Reduction	SL/HP/UB/BU								19	8
39S-08W-1-022	Matrix/ Riparian	7	Mature-Late	DF	Fuel Hazard Reduction	SL/HP/UB/BU								4	3
39S-08W-1-021	Matrix	17	Mature	DF	Fuel Hazard Reduction	SL/HP/UB/BU								17	0
39S-08W-1-020	Matrix/ Riparian	36	Mature-Late	DF/TO	Fuel Hazard Reduction	SL/HP/UB/BU								22	14
39S-08W-1-019	Matrix/ Riparian	9	Early	DF	Young-Stand Management	BR								5	4
39S-08W-1-017	Matrix	4	Mature-Late	DF	Fuel Hazard Reduction	SL/HP/UB								3	1

Table B-1 Alternative 2 T-Lime

T-R-S-OI#	Land Use Allocation	Acres	Seral Stage Current	Plant Series	Vegetation Treatment	Understory/ Fuel Treatments	Logging _System	Total Unit Volume (mbf/ac)	Matrix Harvest Acres	Matrix Harvest Volume (mbf/ac)	Riparian Harvest Acres	Riparian Harvest Volume (mbf/ac)	Total Harvest Volume (mbf/ac)	Non Harvest Treatment Acres Matrix	Non Harvest Treatment Acres Riparian
39S-08W-1-016	Matrix/ Riparian	18	Mature	DF	Fuel Hazard Reduction	SL/HP/UB								14	4
39S-08W-1-015	Matrix/ Riparian	24	Mature-Late	DF	Fuel Hazard Reduction	SL/HP/UB/BU								14	10
39S-08W-1-014	Matrix/ Riparian	30	Mature-Late	DF/TO	Fuel Hazard Reduction	SL/HP/UB/BU								16	14
39S-08W-1-013	Matrix	6	Mature	DF	Young-Stand Management	BR/PL								6	0
39S-08W-1-012	Matrix/ Riparian	51	Mature	DF/TO	Young-Stand Management	BR/PL								28	23
39S-08W-1-011	Matrix/ Riparian	31	Early	DF	Young-Stand Management	BR								21	10
39S-08W-1-009	Matrix/ Riparian	34	Early	DF	Young-Stand Management	PCT								28	6
39S-08W-1-006B	Matrix/ Riparian	17	Early-Mid	DF	Fuel Hazard Reduction	SL/HP								7	10
39S-08W-1-006A	Matrix/ Riparian	10	Early-Mid	DF	Young-Stand Management	PCT/BR								6	4
39S-08W-1-005	Matrix/ Riparian	20	Early-Mid	DF	Young-Stand Management	PCT								17	3
39S-08W-1-004B	Matrix/ Riparian	13	Early	DF/TO	Fuel Hazard Reduction	SL/HP/UB/BU/PR								0	13
39S-08W-1-004A	Matrix/ Riparian	24	Early	DF	Young-Stand Management	PCT/PR								9	14

Table B-1 Alternative 2 T-Lime

T-R-S-OI#	Land Use Allocation	Acres	Seral Stage Current	Plant Series	Vegetation Treatment	Understory/ Fuel Treatments	Logging _System	Total Unit Volume (mbf/ac)	Matrix Harvest Acres	Matrix Harvest Volume (mbf/ac)	Riparian Harvest Acres	Riparian Harvest Volume (mbf/ac)	Total Harvest Volume (mbf/ac)	Non Harvest Treatment Acres Matrix	Non Harvest Treatment Acres Riparian
39S-08W-1-003	Matrix	23	Mature-Late	DF	Fuel Hazard Reduction	SL/HP/UB/BU								23	1
39S-08W-1-002	Matrix/ Riparian	109	Mature-Late	DF	Fuel Hazard Reduction	SL/HP/UB/BU								91	18
39S-08W-1-001	Matrix	2	Early	DF	Fuel Hazard Reduction	SL/HP/UB								2	0
38S-08W-35-013	Matrix/ Riparian	9	Mature-Late	DF	Fuel Hazard Reduction	SL/HP								7	2
38S-08W-35-012	Matrix/ Riparian	26	Mature-Late	DF	Fuel Hazard Reduction	SL/HP/UB								21	5
38S-08W-35-011	Matrix/ Riparian	33	Mature-Late	DF	Fuel Hazard Reduction	SL/HP/UB/BU								12	21
38S-08W-35-010	Matrix/ Riparian	13	Early	DF	Young-Stand Management	BR								9	4
38S-08W-35-009	Matrix/ Riparian	9	Mature-Late	DF	Fuel Hazard Reduction	SL/HP/UB/BU								6	3
38S-08W-35-008	Matrix/ Riparian	7	Mature	DF	Fuel Hazard Reduction	SL/HP/UB/BU								6	2
38S-08W-35-007	Matrix/ Riparian	8	Hardwood	DF	Fuel Hazard Reduction	SL/HP/UB/BU								0	8
38S-08W-35-006	Matrix/ Riparian	19	Hardwood	DF	Fuel Hazard Reduction	SL/HP/UB								9	10
38S-08W-35-005	Matrix/ Riparian	9	Hardwood	DF	Fuel Hazard Reduction	SL/HP/UB								6	3

Table B-1 Alternative 2 T-Lime

T-R-S-OI#	Land Use Allocation	Acres	Seral Stage Current	Plant Series	Vegetation Treatment	Understory/ Fuel Treatments	Logging _System	Total Unit Volume (mbf/ac)	Matrix Harvest Acres	Matrix Harvest Volume (mbf/ac)	Riparian Harvest Acres	Riparian Harvest Volume (mbf/ac)	Total Harvest Volume (mbf/ac)	Non Harvest Treatment Acres Matrix	Non Harvest Treatment Acres Riparian
38S-08W-35-004C	Matrix	3	Mature-Late	DF	Fuel Hazard Reduction	SL/HP/UB								2	1
38S-08W-35-004B	Matrix/ Riparian	22	Mature-Late	DF	Fuel Hazard Reduction	SL/HP/UB								11	11
38S-08W-35-004A	Matrix	4	Mature-Late	DF	Fuel Hazard Reduction	SL/HP/UB/SB								3	1
38S-08W-35-003	Matrix/ Riparian	29	Mid-Late	DF	Fuel Hazard Reduction	SL/HP/UB								19	10
38S-08W-35-002	Matrix/ Riparian	32	Hardwood	DF/TO	Fuel Hazard Reduction	SL/HP/UB/BU								15	17
38S-08W-35-001C	Matrix/ Riparian	27	Mature	DF	DM/ModGS	SL/HP/UB/BU	Tractor/Heli		13		14				
38S-08W-35-001B	Matrix/ Riparian	62	Mature	DF/TO	DM/ModGS	HP/UB	Tractor/Heli		28		34				
38S-08W-35-001A	Matrix/ Riparian	12	Mature-Late	DF/TO	DM/ModGS	SL/HP/UB	Tractor		10		2				
38S-08W-34-006	Matrix/ Riparian	6	Mid-Late	DF	Fuel Hazard Reduction	SL/HP/UB								4	2
38S-08W-34-004	Matrix/ Riparian	6	Shrubs	DF	Fuel Hazard Reduction	SL/HP/UB/BU								2	4
38S-08W-34-003	Matrix/ Riparian	39	Mature	DF	Fuel Hazard Reduction	SL/HP/UB/BU								20	19
38S-08W-34-002	Matrix/ Riparian	12	Mature-Late	DF	Fuel Hazard Reduction	SL/HP/UB/BU								1	12

Table B-1 Alternative 2 T-Lime

T-R-S-OI#	Land Use Allocation	Acres	Seral Stage Current	Plant Series	Vegetation Treatment	Understory/ Fuel Treatments	Logging _System	Total Unit Volume (mbf/ac)	Matrix Harvest Acres	Matrix Harvest Volume (mbf/ac)	Riparian Harvest Acres	Riparian Harvest Volume (mbf/ac)	Total Harvest Volume (mbf/ac)	Non Harvest Treatment Acres Matrix	Non Harvest Treatment Acres Riparian
38S-08W-34-001	Matrix/ Riparian	17	Mature	DF	Fuel Hazard Reduction	SL/HP/UB/BU								1	16
38S-08W-33-002	Matrix/ Riparian	18	Hardwood	DV	Fuel Hazard Reduction	SL/HP/UB/BU								4	15
38S-08W-33-001	Matrix/ Riparian	13	Mature-Late	DF	Free and Easy II	SL/HP/UB	Tractor		4						
38S-08W-28-880B	Matrix/ Riparian	43	Shrubs	NF	No Treatment										
38S-08W-28-880A	Matrix/ Riparian	40	Hardwood	JP	No Treatment										
38S-08W-27-994	Matrix/ Riparian	11	Non-vegetated	DF	No Treatment										
38S-08W-27-017	Matrix/ Riparian	49	Mature	DF	Fuel Hazard Reduction	SL/HP/UB/BU								38	11
38S-08W-27-016	Matrix	2	Early	DF	Fuel Hazard Reduction	SL/HP/UB								1	1
38S-08W-27-015	Matrix/ Riparian	32	Mature	DF	Fuel Hazard Reduction	SL/HP/UB								22	10
38S-08W-27-014	Matrix/ Riparian	25	Mid-Late	DF	Fuel Hazard Reduction	SB/UB								17	8
38S-08W-27-013	Matrix/ Riparian	16	Mature	DF	Fuel Hazard Reduction	SL/HP/UB/SB								10	6
38S-08W-27-012B	Matrix/ Riparian	37	Mature-Late	DF	DM/ModGS	SL/HP/UB			28		9			28	9

Table B-1 Alternative 2 T-Lime

T-R-S-OI#	Land Use Allocation	Acres	Seral Stage Current	Plant Series	Vegetation Treatment	Understory/ Fuel Treatments	Logging _System	Total Unit Volume (mbf/ac)	Matrix Harvest Acres	Matrix Harvest Volume (mbf/ac)	Riparian Harvest Acres	Riparian Harvest Volume (mbf/ac)	Total Harvest Volume (mbf/ac)	Non Harvest Treatment Acres Matrix	Non Harvest Treatment Acres Riparian
38S-08W-27-012A	Matrix/ Riparian	24	Mature-Late	DF	DM/ModGS	SL/HP/UB			17		7			17	7
38S-08W-27-011	Matrix/ Riparian	35	Mature-Late	DF	Fuel Hazard Reduction	SL/HP/UB								14	21
38S-08W-27-010	Matrix/ Riparian	6	Early	DF	Young-Stand Management	PCT/PR								3	3
38S-08W-27-009	Matrix/ Riparian	5	Early	DF	Fuel Hazard Reduction	SL/HP/UB/BU								2	3
38S-08W-27-008	Matrix/ Riparian	10	Mature	DF	Fuel Hazard Reduction	SL/HP/UB/BU								5	5
38S-08W-27-007	Matrix/ Riparian	17	Mature-Late	DF	Fuel Hazard Reduction	SL/HP/UB								8	9
38S-08W-27-006	Matrix/ Riparian	8	Hardwood	DF	Fuel Hazard Reduction	SL/HP/UB/BU								0	8
38S-08W-27-005B	Matrix/ Riparian	7	Mature-Late	DF	Fuel Hazard Reduction	HP/UB								2	5
38S-08W-27-005A	Matrix/ Riparian	12	Mid-Late	DF	Fuel Hazard Reduction	SL/HP/UB/BU								6	6
38S-08W-27-004	Matrix/ Riparian	133	Mature-Late	DF	DM/ModGS	SL/HP/UB/SB	Tractor		57		76				
38S-08W-27-003	Matrix/ Riparian	5	Grassland	DV	No Treatment										
38S-08W-27-002B	Matrix/ Riparian	12	Hardwood	DF	Fuel Hazard Reduction	SL/HP/UB/BU								9	3

Table B-1 Alternative 2 T-Lime

T-R-S-OI#	Land Use Allocation	Acres	Seral Stage Current	Plant Series	Vegetation Treatment	Understory/ Fuel Treatments	Logging _System	Total Unit Volume (mbf/ac)	Matrix Harvest Acres	Matrix Harvest Volume (mbf/ac)	Riparian Harvest Acres	Riparian Harvest Volume (mbf/ac)	Total Harvest Volume (mbf/ac)	Non Harvest Treatment Acres Matrix	Non Harvest Treatment Acres Riparian
38S-08W-27-002A	Matrix/ Riparian	7	Hardwood	DF	No Treatment										
38S-08W-27-001	Matrix/ Riparian	113	Mature-Late	DF	DM/ModGS	SL/HP/UB/BU	Tractor/Cable		75		38				
38S-08W-26-002	Matrix/ Riparian	6	Mature	DF	Fuel Hazard Reduction	SL/HP/UB/BU								1	5
38S-08W-26-001	Matrix/ Riparian	34	Mature	DF	Fuel Hazard Reduction	SL/HP/UB/BU								24	10
38S-08W-25-013	Matrix/ Riparian	40	Mature-Late	DF	Fuel Hazard Reduction	SL/HP/UB								36	4
38S-08W-23-010	Matrix	3	Early	DF	Fuel Hazard Reduction	SL/HP/UB/BU								3	0
38S-08W-23-007	Matrix	2	Mature-Late	DF	No Treatment										
38S-08W-21-880	Matrix/ Riparian	609	Mature	JP	No Treatment										
									422		180			1365	787

Table B-1 Alternative 3 T-Lime

Table B-1 Alternative 3 T-Lime

T-R-S-OI#	Land Use Allocation	Acres	Seral Stage Current	Plant Series	Vegetation Treatment	Understory/ Fuel Treatments	Logging _System	Total Unit Volume (mbf/ac)	Matrix Harvest Acres	Matrix Harvest Volume (mbf/ac)	Riparian Harvest Acres	Riparian Harvest Volume (mbf/ac)	Total Harvest Volume (mbf/ac)	Non Harvest Treatment Acres Matrix	Non Harvest Treatment Acres Riparian
39S-08W-9-003	Matrix/ Riparian	7	Hardwood	NW	No Treatment										
39S-08W-9-002	Matrix	20	Mid-Late	DF	Fuel Hazard Reduction	SL/HP/UB/BU								20	0
39S-08W-9-001B	Matrix/ Riparian	7	Hardwood	DV	No Treatment										
39S-08W-9-001A	Matrix/ Riparian	6	Hardwood	RIP/NW	No Treatment										
39S-08W-7-001	Matrix/ Riparian	528	Mature	JP	No Treatment										
39S-08W-6-002	Matrix/ Riparian	32	Mature	JP	No Treatment										
39S-08W-6-001	Matrix/ Riparian	432	Mature	JP	No Treatment										
39S-08W-5-004	Matrix/ Riparian	63	Mature	DF	DM/UR	SL/HP/UB/BU	Tractor		46						
39S-08W-5-003	Matrix/ Riparian	38	Mature-Late	JP	Fuel Hazard Reduction	SL/HP/UB/BU								24	14
39S-08W-5-002	Matrix/ Riparian	13	Mature	JP	No Treatment										
39S-08W-5-001	Matrix/ Riparian	214	Mature	JP	No Treatment										

Table B-1 Alternative 3 T-Lime

T-R-S-OI#	Land Use Allocation	Acres	Seral Stage Current	Plant Series	Vegetation Treatment	Understory/ Fuel Treatments	Logging _System	Total Unit Volume (mbf/ac)	Matrix Harvest Acres	Matrix Harvest Volume (mbf/ac)	Riparian Harvest Acres	Riparian Harvest Volume (mbf/ac)	Total Harvest Volume (mbf/ac)	Non Harvest Treatment Acres Matrix	Non Harvest Treatment Acres Riparian
39S-08W-3-994	Matrix/ Riparian	22	Non-vegetated	DF	No Treatment										
39S-08W-3-017	Matrix/ Riparian	13	Mature-Late	DF	No Treatment										
39S-08W-3-016	Matrix/ Riparian	14	Mid-Late	DF	No Treatment										
39S-08W-3-015	Matrix	11	Mature-Late	DF	No Treatment										
39S-08W-3-014	Matrix/ Riparian	8	Mature-Late	DF	No Treatment										
39S-08W-3-013	Matrix	18	Early	DF	Young-Stand Management	HP								17	1
39S-08W-3-012	Matrix/ Riparian	20	Mature-Late	DF	Fuel Hazard Reduction	SL/HP/UB/BU								9	11
39S-08W-3-011	Matrix/ Riparian	40	Mid-Late	DF	Fuel Hazard Reduction	SL/HP/UB/BU								25	15
39S-08W-3-010	Matrix	15	Mature-Late	DF	No Treatment										
39S-08W-3-009	Matrix/ Riparian	12	Hardwood	DF	No Treatment										
39S-08W-3-008	Matrix/ Riparian	111	Mature-Late	DF	No Treatment										
39S-08W-3-007	Matrix/ Riparian	66	Mature-Late	DF	Fuel Hazard Reduction	SL/HP/UB/BU								44	22

Table B-1 Alternative 3 T-Lime

T-R-S-OI#	Land Use Allocation	Acres	Seral Stage Current	Plant Series	Vegetation Treatment	Understory/ Fuel Treatments	Logging _System	Total Unit Volume (mbf/ac)	Matrix Harvest Acres	Matrix Harvest Volume (mbf/ac)	Riparian Harvest Acres	Riparian Harvest Volume (mbf/ac)	Total Harvest Volume (mbf/ac)	Non Harvest Treatment Acres Matrix	Non Harvest Treatment Acres Riparian
39S-08W-3-006	Matrix	14	Mature	DF	Fuel Hazard Reduction	SL/HP/UB/BU								14	0
39S-08W-3-005	Matrix/ Riparian	13	Mature-Late	DF	Fuel Hazard Reduction	SL/HP/UB/BU								10	2
39S-08W-3-004	Matrix/ Riparian	42	Mid-Late	DF	No Treatment										
39S-08W-3-003	Matrix/ Riparian	37	Mature-Late	DF	No Treatment										
39S-08W-3-002	Matrix/ Riparian	97	Mature-Late	DF	No Treatment										
39S-08W-3-001	Matrix/ Riparian	100	Poles	DF	No Treatment										
39S-08W-29-002	Matrix	9	Mid-Late	DF	No Treatment										
39S-08W-23-004	Matrix	6	Mature	DF	No Treatment										
39S-08W-19-001B	Matrix/ Riparian	40	Mature	DF	No Treatment										
39S-08W-19-001A	Matrix/ Riparian	346	Mature-Late	JP	No Treatment										
39S-08W-18-001B	Matrix/ Riparian	27	Mature	JP	No Treatment										
39S-08W-18-001A	Matrix/ Riparian	318	Mature	JP	No Treatment										

Table B-1 Alternative 3 T-Lime

T-R-S-OI#	Land Use Allocation	Acres	Seral Stage Current	Plant Series	Vegetation Treatment	Understory/ Fuel Treatments	Logging _System	Total Unit Volume (mbf/ac)	Matrix Harvest Acres	Matrix Harvest Volume (mbf/ac)	Riparian Harvest Acres	Riparian Harvest Volume (mbf/ac)	Total Harvest Volume (mbf/ac)	Non Harvest Treatment Acres Matrix	Non Harvest Treatment Acres Riparian
39S-08W-17-012	Matrix/ Riparian	11	Shrubs	RIP/HW	Fuel Hazard Reduction	SL/HP/UB/BU								0	11
39S-08W-17-011	Matrix/ Riparian	27	Mature-Late	JP	Restoration Thinning	SL/HP/UB	Tractor		8		19				
39S-08W-17-010	Matrix/ Riparian	55	Mature-Late	JP	Restoration Thinning	SL/HP/UB	Tractor		45		10				
39S-08W-17-009	Matrix/ Riparian	11	Shrubs	JP	Fuel Hazard Reduction	SL/HP/UB/BU								8	3
39S-08W-17-008	Matrix	6	Mature-Late	JP	Fuel Hazard Reduction	SL/HP/UB/BU								6	0
39S-08W-17-007	Matrix	3	Mature	JP	Fuel Hazard Reduction	SL/HP/UB/BU								3	0
39S-08W-17-006	Matrix/ Riparian	7	Mature	JP	Fuel Hazard Reduction	SL/HP/UB/BU								2	5
39S-08W-17-005	Matrix/ Riparian	14	Mature	DF	No Treatment										
39S-08W-17-004	Matrix/ Riparian	23	Mid-Late	JP	Restoration Thinning	SL/HP/UB	Tractor		18		5				
39S-08W-17-003B	Matrix/ Riparian	41	Mature-Late	JP	Restoration Thinning	SL/HP/UB	Tractor		13		28				
39S-08W-17-003A	Matrix/ Riparian	55	Mature-Late	JP	No Treatment										
39S-08W-17-002	Matrix/ Riparian	28	Mature	DF	DM/UR	SL/HP/UB	Tractor		23		5				

Table B-1 Alternative 3 T-Lime

T-R-S-OI#	Land Use Allocation	Acres	Seral Stage Current	Plant Series	Vegetation Treatment	Understory/ Fuel Treatments	Logging _System	Total Unit Volume (mbf/ac)	Matrix Harvest Acres	Matrix Harvest Volume (mbf/ac)	Riparian Harvest Acres	Riparian Harvest Volume (mbf/ac)	Total Harvest Volume (mbf/ac)	Non Harvest Treatment Acres Matrix	Non Harvest Treatment Acres Riparian
39S-08W-17-001	Matrix/ Riparian	81	Shrubs	DF	Fuel Hazard Reduction	SL/HP/UB/BU								50	31
39S-08W-15-994	Matrix/ Riparian	9	Non-vegetated	DV	Fuel Hazard Reduction	SL/HP/UB/BU								6	3
39S-08W-15-005	Matrix	13	Hardwood	WO	Fuel Hazard Reduction	SL/HP/UB/BU								13	0
39S-08W-15-004B	Matrix/ Riparian	87	Mature-Late	DF	DM/UR	SL/HP/UB/BU	Tractor		60		27				
39S-08W-15-004A	Matrix/ Riparian	34	Mid-Late	DF	Fuel Hazard Reduction	SL/HP/UB/BU								17	17
39S-08W-15-003	Matrix/ Riparian	28	Mature-Late	DF	DM/UR	SL/HP/UB/BU	Tractor		22		5				
39S-08W-15-002	Matrix/ Riparian	23	Mid-Late	DF	Fuel Hazard Reduction	SL/HP/UB/BU								21	2
39S-08W-15-001	Matrix/ Riparian	9	Mid-Late	WO	Fuel Hazard Reduction	SL/HP/UB/BU								3	6
39S-08W-14-008	Matrix	9	Mature	DF	DM/UR	SL/HP/UB	Heli		8		1				
39S-08W-14-007	Matrix/ Riparian	10	Hardwood	DF	No Treatment										
39S-08W-14-004B	Matrix/ Riparian	16	Mature	DF	Fuel Hazard Reduction	SL/HP/UB								11	5
39S-08W-14-004A	Matrix/ Riparian	25	Mature	DF	DM/UR	SL/HP/UB	Heli		12		13				

Table B-1 Alternative 3 T-Lime

T-R-S-OI#	Land Use Allocation	Acres	Seral Stage Current	Plant Series	Vegetation Treatment	Understory/ Fuel Treatments	Logging _System	Total Unit Volume (mbf/ac)	Matrix Harvest Acres	Matrix Harvest Volume (mbf/ac)	Riparian Harvest Acres	Riparian Harvest Volume (mbf/ac)	Total Harvest Volume (mbf/ac)	Non Harvest Treatment Acres Matrix	Non Harvest Treatment Acres Riparian
39S-08W-14-003	Matrix	14	Mature	DF	No Treatment										
39S-08W-14-002	Matrix/ Riparian	8	Mature	DF	DM/UR	SL/HP/UB	Heli		6		2				
39S-08W-14-001	Matrix	7	Mature	DF	No Treatment										
39S-08W-11-013	Matrix/ Riparian	33	Mid-Late	DF	Fuel Hazard Reduction	SL/HP/UB								25	7
39S-08W-11-012	Matrix	7	Mature	DF	Fuel Hazard Reduction	SL/HP/UB								6	1
39S-08W-11-011	Matrix/ Riparian	18	Mature	DF	Fuel Hazard Reduction	SL/HP/UB								15	3
39S-08W-11-010	Matrix/ Riparian	25	Mature-Late	DF	Fuel Hazard Reduction	SL/HP/UB								12	13
39S-08W-11-009	Matrix/ Riparian	14	Mature-Late	DF	Fuel Hazard Reduction	SL/HP/UB								5	10
39S-08W-11-008	Matrix/ Riparian	36	Mature-Late	DF	No Treatment										
39S-08W-11-007	Matrix/ Riparian	22	Mature	DF	No Treatment										
39S-08W-11-006	Matrix/ Riparian	71	Mature	DF	No Treatment										
39S-08W-11-005	Matrix/ Riparian	17	Mature	DF	No Treatment										

Table B-1 Alternative 3 T-Lime

T-R-S-OI#	Land Use Allocation	Acres	Seral Stage Current	Plant Series	Vegetation Treatment	Understory/ Fuel Treatments	Logging _System	Total Unit Volume (mbf/ac)	Matrix Harvest Acres	Matrix Harvest Volume (mbf/ac)	Riparian Harvest Acres	Riparian Harvest Volume (mbf/ac)	Total Harvest Volume (mbf/ac)	Non Harvest Treatment Acres Matrix	Non Harvest Treatment Acres Riparian
39S-08W-11-004	Matrix	7	Mature	DF	No Treatment										
39S-08W-11-003	Matrix/ Riparian	19	Mature	DF	DM/UR	SL/HP/UB/BU	Heli		12		7				
39S-08W-11-002	Matrix/ Riparian	12	Mid-Late	DF	Fuel Hazard Reduction	SL/HP/UB								6	6
39S-08W-11-001	Matrix/ Riparian	46	Mature	DF	DM/UR	SL/HP/UB/BU	Heli		34		11				
39S-08W-1-024	Matrix	7	Mature-Late	DF	No Treatment										
39S-08W-1-023	Matrix/ Riparian	27	Mid-Late	DF	No Treatment										
39S-08W-1-022	Matrix/ Riparian	7	Mature-Late	DF	No Treatment										
39S-08W-1-021	Matrix	17	Mature	DF	Fuel Hazard Reduction	SL/HP/UB/BU								17	0
39S-08W-1-020	Matrix/ Riparian	36	Mature-Late	DF/TO	No Treatment										
39S-08W-1-019	Matrix/ Riparian	9	Early	DF	Young-Stand Management	HP								5	4
39S-08W-1-017	Matrix	4	Mature-Late	DF	No Treatment										
39S-08W-1-016	Matrix/ Riparian	18	Mature	DF	No Treatment										

Table B-1 Alternative 3 T-Lime

T-R-S-OI#	Land Use Allocation	Acres	Seral Stage Current	Plant Series	Vegetation Treatment	Understory/ Fuel Treatments	Logging _System	Total Unit Volume (mbf/ac)	Matrix Harvest Acres	Matrix Harvest Volume (mbf/ac)	Riparian Harvest Acres	Riparian Harvest Volume (mbf/ac)	Total Harvest Volume (mbf/ac)	Non Harvest Treatment Acres Matrix	Non Harvest Treatment Acres Riparian
39S-08W-1-015	Matrix/ Riparian	24	Mature-Late	DF	No Treatment										
39S-08W-1-014	Matrix/ Riparian	30	Mature-Late	DF/TO	DM/UR	SL/HP/UB/BU	Tractor/Cable		16		14				
39S-08W-1-013	Matrix	6	Mature	DF	Young-Stand Management	HP								6	0
39S-08W-1-012	Matrix/ Riparian	51	Mature	DF/TO	Young-Stand Management	HP								28	23
39S-08W-1-011	Matrix/ Riparian	31	Early	DF	Young-Stand Management	HP								21	10
39S-08W-1-009	Matrix/ Riparian	34	Early	DF	Young-Stand Management	HP								28	6
39S-08W-1-006B	Matrix/ Riparian	17	Early-Mid	DF	Fuel Hazard Reduction	SL/HP/UB/BU								7	10
39S-08W-1-006A	Matrix/ Riparian	10	Early-Mid	DF	Young-Stand Management	HP								6	4
39S-08W-1-005	Matrix/ Riparian	20	Early-Mid	DF	Young-Stand Management	HP								17	3
39S-08W-1-004B	Matrix/ Riparian	13	Early	DF/TO	Fuel Hazard Reduction	SL/HP/UB/BU								0	13
39S-08W-1-004A	Matrix/ Riparian	24	Early	DF	Young-Stand Management	HP								9	14
39S-08W-1-003	Matrix	23	Mature-Late	DF	No Treatment										

Table B-1 Alternative 3 T-Lime

T-R-S-OI#	Land Use Allocation	Acres	Seral Stage Current	Plant Series	Vegetation Treatment	Understory/ Fuel Treatments	Logging _System	Total Unit Volume (mbf/ac)	Matrix Harvest Acres	Matrix Harvest Volume (mbf/ac)	Riparian Harvest Acres	Riparian Harvest Volume (mbf/ac)	Total Harvest Volume (mbf/ac)	Non Harvest Treatment Acres Matrix	Non Harvest Treatment Acres Riparian
39S-08W-1-002	Matrix/ Riparian	109	Mature-Late	DF	DM/UR	SL/HP/UB/BU	Cable		91		18				
39S-08W-1-001	Matrix	2	Early	DF	Fuel Hazard Reduction	SL/HP/UB/BU								2	0
38S-08W-35-013	Matrix/ Riparian	9	Mature-Late	DF	DM/UR	SL/HP/UB/BU	Tractor		7		2				
38S-08W-35-012	Matrix/ Riparian	26	Mature-Late	DF	Fuel Hazard Reduction	SL/HP/UB/BU								21	5
38S-08W-35-011	Matrix/ Riparian	33	Mature-Late	DF	Fuel Hazard Reduction	SL/HP/UB/BU								12	21
38S-08W-35-010	Matrix/ Riparian	13	Early	DF	Young-Stand Management	HP								9	4
38S-08W-35-009	Matrix/ Riparian	9	Mature-Late	DF	DM/UR	SL/HP/UB/BU	Tractor		6		3				
38S-08W-35-008	Matrix/ Riparian	7	Mature	DF	Fuel Hazard Reduction	SL/HP/UB/BU								6	2
38S-08W-35-007	Matrix/ Riparian	8	Hardwood	DF	No Treatment										
38S-08W-35-006	Matrix/ Riparian	19	Hardwood	DF	No Treatment										
38S-08W-35-005	Matrix/ Riparian	9	Hardwood	DF	No Treatment										
38S-08W-35-004C	Matrix	3	Mature-Late	DF	DM/UR	SL/HP/UB/BU	Tractor		2		1				

Table B-1 Alternative 3 T-Lime

T-R-S-OI#	Land Use Allocation	Acres	Seral Stage Current	Plant Series	Vegetation Treatment	Understory/ Fuel Treatments	Logging _System	Total Unit Volume (mbf/ac)	Matrix Harvest Acres	Matrix Harvest Volume (mbf/ac)	Riparian Harvest Acres	Riparian Harvest Volume (mbf/ac)	Total Harvest Volume (mbf/ac)	Non Harvest Treatment Acres Matrix	Non Harvest Treatment Acres Riparian
38S-08W-35-004B	Matrix/ Riparian	22	Mature-Late	DF	No Treatment										
38S-08W-35-004A	Matrix	4	Mature-Late	DF	DM/UR	SL/HP/UB/BU	Tractor		3		1				
38S-08W-35-003	Matrix/ Riparian	29	Mid-Late	DF	Fuel Hazard Reduction	SL/HP/UB/BU								19	10
38S-08W-35-002	Matrix/ Riparian	32	Hardwood	DF/TO	Fuel Hazard Reduction	SL/HP/UB/BU								15	17
38S-08W-35-001C	Matrix/ Riparian	27	Mature	DF	DM/UR	SL/HP/UB/BU	Tractor		13		14				
38S-08W-35-001B	Matrix/ Riparian	62	Mature	DF/TO	DM/UR	SL/HP/UB/BU	Tractor		28		34				
38S-08W-35-001A	Matrix/ Riparian	12	Mature-Late	DF/TO	DM/UR	SL/HP/UB/BU	Tractor		10		2				
38S-08W-34-006	Matrix/ Riparian	6	Mid-Late	DF	No Treatment										
38S-08W-34-004	Matrix/ Riparian	6	Shrubs	DF	No Treatment										
38S-08W-34-003	Matrix/ Riparian	39	Mature	DF	No Treatment										
38S-08W-34-002	Matrix/ Riparian	12	Mature-Late	DF	DM/UR	SL/HP/UB/BU	Tractor		1		12				
38S-08W-34-001	Matrix/ Riparian	17	Mature	DF	No Treatment										

Table B-1 Alternative 3 T-Lime

T-R-S-OI#	Land Use Allocation	Acres	Seral Stage Current	Plant Series	Vegetation Treatment	Understory/ Fuel Treatments	Logging _System	Total Unit Volume (mbf/ac)	Matrix Harvest Acres	Matrix Harvest Volume (mbf/ac)	Riparian Harvest Acres	Riparian Harvest Volume (mbf/ac)	Total Harvest Volume (mbf/ac)	Non Harvest Treatment Acres Matrix	Non Harvest Treatment Acres Riparian
38S-08W-33-002	Matrix/ Riparian	18	Hardwood	DV	Fuel Hazard Reduction	SL/HP/UB/BU								4	15
38S-08W-33-001	Matrix/ Riparian	13	Mature-Late	DF	DM/UR	SL/HP/UB/BU	Tractor		4		8				
38S-08W-28-880B	Matrix/ Riparian	43	Shrubs	NF	No Treatment										
38S-08W-28-880A	Matrix/ Riparian	40	Hardwood	JP	No Treatment										
38S-08W-27-994	Matrix/ Riparian	11	Non-vegetated	DF	Fuel Hazard Reduction	SL/HP/UB/BU					7			4	7
38S-08W-27-017	Matrix/ Riparian	49	Mature	DF	Fuel Hazard Reduction	SL/HP/UB/BU								38	11
38S-08W-27-016	Matrix	2	Early	DF	No Treatment										
38S-08W-27-015	Matrix/ Riparian	32	Mature	DF	Fuel Hazard Reduction	SL/HP/UB/BU								22	10
38S-08W-27-014	Matrix/ Riparian	25	Mid-Late	DF	No Treatment										
38S-08W-27-013	Matrix/ Riparian	16	Mature	DF	Fuel Hazard Reduction	SL/HP/UB/BU								10	6
38S-08W-27-012B	Matrix/ Riparian	37	Mature-Late	DF	DM/UR	SL/HP/UB/BU	Tractor		28		9			28	9
38S-08W-27-012A	Matrix/ Riparian	24	Mature-Late	DF	DM/UR	SL/HP/UB/BU	Tractor		17		7				

Table B-1 Alternative 3 T-Lime

T-R-S-OI#	Land Use Allocation	Acres	Seral Stage Current	Plant Series	Vegetation Treatment	Understory/ Fuel Treatments	Logging _System	Total Unit Volume (mbf/ac)	Matrix Harvest Acres	Matrix Harvest Volume (mbf/ac)	Riparian Harvest Acres	Riparian Harvest Volume (mbf/ac)	Total Harvest Volume (mbf/ac)	Non Harvest Treatment Acres Matrix	Non Harvest Treatment Acres Riparian
38S-08W-27-011	Matrix/ Riparian	35	Mature-Late	DF	Fuel Hazard Reduction	SL/HP/UB/BU								14	21
38S-08W-27-010	Matrix/ Riparian	6	Early	DF	Young-Stand Management	SL/HP								3	3
38S-08W-27-009	Matrix/ Riparian	5	Early	DF	Fuel Hazard Reduction	SL/HP/UB/BU								2	3
38S-08W-27-008	Matrix/ Riparian	10	Mature	DF	No Treatment										
38S-08W-27-007	Matrix/ Riparian	17	Mature-Late	DF	DM/UR	SL/HP/UB/BU	Tractor		8		9				
38S-08W-27-006	Matrix/ Riparian	8	Hardwood	DF	Fuel Hazard Reduction	SL/HP/UB/BU								0	8
38S-08W-27-005B	Matrix/ Riparian	7	Mature-Late	DF	DM/UR	SL/HP/UB/BU	Tractor		2		5				
38S-08W-27-005A	Matrix/ Riparian	12	Mid-Late	DF	No Treatment										
38S-08W-27-004	Matrix/ Riparian	133	Mature-Late	DF	DM/UR	SL/HP/UB/BU	Tractor		57		76				
38S-08W-27-003	Matrix/ Riparian	5	Grassland	DV	No Treatment						5				
38S-08W-27-002B	Matrix/ Riparian	12	Hardwood	DF	Fuel Hazard Reduction	SL/HP/UB/BU								9	3
38S-08W-27-002A	Matrix/ Riparian	7	Hardwood	DF	No Treatment										

Table B-1 Alternative 3 T-Lime

T-R-S-OI#	Land Use Allocation	Acres	Seral Stage Current	Plant Series	Vegetation Treatment	Understory/ Fuel Treatments	Logging _System	Total Unit Volume (mbf/ac)	Matrix Harvest Acres	Matrix Harvest Volume (mbf/ac)	Riparian Harvest Acres	Riparian Harvest Volume (mbf/ac)	Total Harvest Volume (mbf/ac)	Non Harvest Treatment Acres Matrix	Non Harvest Treatment Acres Riparian
38S-08W-27-001	Matrix/ Riparian	113	Mature-Late	DF	DM/UR	SL/HP/UB/BU	Tractor/Cable		75		38				
38S-08W-26-002	Matrix/ Riparian	6	Mature	DF	No Treatment										
38S-08W-26-001	Matrix/ Riparian	34	Mature	DF	No Treatment										
38S-08W-25-013	Matrix/ Riparian	40	Mature-Late	DF	No Treatment										
38S-08W-23-010	Matrix	3	Early	DF	No Treatment										
38S-08W-23-007	Matrix	2	Mature-Late	DF	No Treatment										
38S-08W-21-880	Matrix/ Riparian	609	Mature	JP	No Treatment										
									675		398			734	430

Appendix C. Roads

Road Number	Road Name	Road Mile	Who Controls	Surface Type	Maint. Level	Approx. Miles of Proposed Treatment				Road Closure Type	POC	PL	Agreement Number	Comment
						Maint.	Const.	Renov.	Decom.					
38 S 08 W 25.06	W Ridge Sp	1.38	BLM	GRR	2	1.38							M1166	Roadside brushing, blading, pull ditches, and clean culverts.
38 S 08 W 27.00	Siss Gap Sp	3.52	BLM	PRR	3	3.52							M1166	Roadside brushing, blading, pull ditches, and clean culverts.
38 S 08 W 27.01	Siss Gap Sp	1.44	BLM	PRR	2	1.44								Roadside brushing, blading, pull ditches, and clean culverts.
38 S 08 W 27.02A	Siss Gap Sp	0.57	BLM	GRR	2	0.57								Roadside brushing, blading, pull ditches, and clean culverts.
38 S 08 W 27.02B	Siss Gap Sp	0.14	BLM	NAT	2	0.14								Roadside brushing, blading, pull ditches, and clean culverts.
38 S 08 W 27.03	Siss Gap Sp	0.24	BLM	NAT	2	0.24								Roadside brushing, blading, pull ditches, and clean culverts.
38 S 08 W 27.04	Siss Gap Sp	1.14	BLM	GRR	2	1.14								Roadside brushing, blading, pull ditches, and clean culverts.
38 S 08 W 27.05	Siss Gap Sp	0.18	BLM	NAT	2	0.18								Roadside brushing, blading, pull ditches, and clean culverts.
38 S 08 W 27.06	Siss Gap Sp	0.2	BLM	NAT	2	0.2								Roadside brushing, blading, pull ditches, and clean culverts.
38 S 08 W 27.07	Siss Gap Sp	0.07	BLM	NAT	2	0.07								Roadside brushing, blading, pull ditches, and clean culverts.
38 S 08 W 27.08	Deer Selmac B Sp	0.15	BLM	NAT	2	0.15								Roadside brushing, blading, pull ditches, and clean culverts.
38 S 08 W 34.00A	Siss Gap Sp	1.01	BLM	PRR	3	1.01							M1166	Roadside brushing, blading, pull ditches, and clean culverts.
38 S 08 W 34.01	Siss Gap Sp	0.36	BLM	NAT	2	0.36							M1166	Roadside brushing, blading, pull ditches, and clean culverts.
38 S 08 W 35.00	Reeves Creek H	1.59	BLM	PRR	3	1.59							M1166	Roadside brushing, blading, pull ditches, and clean culverts.

39 S 08 W 01.00	Reeves Ck Ridge Sp	0.48	BLM	GRR	2	0.48								Roadside brushing, blading, pull ditches, and clean culverts.
39 S 08 W 01.02	Remullin Sp	0.28	BLM	GRR	2	0.28								Roadside brushing, blading, pull ditches, and clean culverts.
39 S 08 W 01.03	Reeves Ck Ridge Sp	0.6	BLM	GRR	2	0.6							M1166	Roadside brushing, blading, pull ditches, and clean culverts.
39 S 08 W 01.04	Reeves Ck Sp	0.8	BLM	ABC	2	0.8								Roadside brushing, blading, pull ditches, and clean culverts.
39 S 08 W 01.05	Reeves Ck Sp	0.36	BLM	ABC	2	0.36								Roadside brushing, blading, pull ditches, and clean culverts.
39 S 08 W 01.06	Reeves Ck Sp	0.51	BLM	NAT	2	0.51							M1166	Roadside brushing, blading, pull ditches, and clean culverts.
39 S 08 W 01.07	Reeves Ck Sp	0.84	BLM	ABC	3	0.84								Roadside brushing, blading, pull ditches, and clean culverts.
39 S 08 W 01.08	Reeves Ck Sp	0.53	BLM	ABC	2	0.53								Roadside brushing, blading, pull ditches, and clean culverts.
39 S 08 W 01.09	Reeves Ck Sp	0.14	BLM	NAT	2	0.14								Roadside brushing, blading, pull ditches, and clean culverts.
39 S 08 W 03.00A	Reeves Creek Rdg	1.35	BLM	PRR	3	1.35							M1166 / M656B	Roadside brushing, blading, pull ditches, and clean culverts.
39 S 08 W 03.00B	Reeves Creek Rdg	1.51	BLM	PRR	3	1.51							M1166 / M656B	Roadside brushing, blading, pull ditches, and clean culverts.
39 S 08 W 03.00C1	Reeves Creek Rdg	0.95	BLM	GRR	3	0.95							M1166 / M656B	Roadside brushing, blading, pull ditches, and clean culverts.
39 S 08 W 03.00C2	Reeves Creek Rdg	0.43	BLM	GRR	3	0.43							M1166 / M656B	Roadside brushing, blading, pull ditches, and clean culverts.
39 S 08 W 03.00D	Reeves Creek Rdg	0.98	BLM	GRR	3	0.98							M1166 / M656B	Roadside brushing, blading, pull ditches, and clean culverts.
39 S 08 W 03.01	Kerby Demo Sp A	0.63	BLM	NAT	2	0.63								Roadside brushing, blading, pull ditches, and clean culverts.
39 S 08 W 03.02	Kerby Demo	0.59	BLM	NAT	2	0.59								Roadside brushing, blading, pull ditches, and clean culverts.

39 S 08 W 03.03	Kerby Demo	0.54	BLM	NAT	2	0.54								Roadside brushing, blading, pull ditches, and clean culverts.
39 S 08 W 04.00A	Kerby Mainline	1.33	BLM	BST	5	1.33							M1166 / M656B	Roadside brushing, blading, pull ditches, and clean culverts.
39 S 08 W 04.00B1	Kerby Mainline	0.36	BLM	BST	4	0.36							M1166	Roadside brushing, blading, pull ditches, and clean culverts.
39 S 08 W 04.00B2	Kerby Mainline	0.19	BLM	BST	4	0.19							M1166	Roadside brushing, blading, pull ditches, and clean culverts.
39 S 08 W 04.00C	Kerby Mainline	1.23	BLM	ABC	3	1.23							M1166	Roadside brushing, blading, pull ditches, and clean culverts.
39 S 08 W 04.00D	Kerby Mainline	1.97	BLM	ABC	3	1.97							M1166	Roadside brushing, blading, pull ditches, and clean culverts.
39 S 08 W 10.01A	Holton Crk	0.85	PVT	NAT	2	0.85								Roadside brushing, blading, pull ditches, and clean culverts.
39 S 08 W 10.01B	Holton Crk	0.34	BLM	NAT	2	0.34								Roadside brushing, blading, pull ditches, and clean culverts.
39 S 08 W 17.00	Pomroy Lookout	1	BLM	NAT	2	1	0.25							Roadside brushing, blading, pull ditches, and clean culverts. Construct new section of road at beginning. Install gate.
39 S 08 W 29.00	Combo Mainline	1.49	BLM	NAT	2	1.49								Roadside brushing, blading, pull ditches, and clean culverts.
39 S 08 W 29.05	Combo F Sp	0.06	BLM	NAT	2	0.06								Roadside brushing, blading, pull ditches, and clean culverts.
38 S 08 W 27.09		0.36	BLM	NAT	2	0.36		0.36						Renovate road.
Spur A 27		0.19	BLM	NAT	2		0.19		0.19					Temporary spur to be constructed and decomissioned after treatment unit has been treated.
Spur B 27		0.06	BLM	NAT	2		0.06		0.06					Temporary spur to be constructed and decomissioned after treatment unit has been treated.
Spur C 27		0.13	BLM	NAT	2		0.13		0.13					Temporary spur to be constructed and decomissioned after treatment unit has been treated.

38 S 08 W 33.00		0.35	BLM	NAT	2	0.35								Install temporary culvert across Reeves Creek. Remove culvert after unit has been treated.
39 S 08 W 15.00		0.27	BLM	NAT	2		0.27		0.27					New construction to Helicopter landing. Barricade with earth and log.
39 S 08 W 15.01		0.14	BLM	NAT	2		0.14		0.14					New construction to Helicopter landing.
38 S 08 W 25.00A	Reeves Creek	0.9	BLM	ABC	3	0.9							M1166 / M656B	Roadside brushing, blading, pull ditches, and clean culverts.

Approximate Miles of Treatment

Total Maintenance	Total Construction	Total Renovation	Total Decommissioning
39.83	1.04	0.83	0.79

Footnotes: BST=Bituminous Surface Treatment ASC= Aggregate Surface Coarse GRR= Grid Rolled Rock PRR= Pit Run Rock NAT= Natural Surface
H = Construct Helicopter landing (approx. 100' x 200')

Maintenance may include surface grading, roadside brushing, for safety, spot rocking and maintaining existing drainage structures. Maintenance of natural surface roads may also include correcting drainage and erosion problems (e.g., improving or installing drainage dips, installing other drainage structures where needed, eliminating outside road edge berms or other features that are obstructing drainage where they exist).

Full Decommissioning consists of subsoil ripping of the roadbed to promote the establishment of vegetation and promote drainage consistent with the surrounding undisturbed areas. Existing culverts may be removed. Grass seeding of the road prism, fill slope and cutbank, and mulching of the Road prism may be included to minimize initial erosion potential prior to natural revegetation. An earth berm/tank trap barricade may be constructed at the beginning of each road to prevent use of the road prism following decommissioning.

Road Renovation consists of reconditioning and preparing the subgrade for heavy truck use, cleaning and shaping drainage ditches and structures, and trimming or removing vegetation from cut and fill slopes.

Appendix D. Alternatives Considered but not Analyzed in Detail

Healthy Forest Restoration Act – The interdisciplinary team considered planning this project under the HFRA but decided not to because it would not meet the non-fuels related objectives.

A few scoping comments recommended the following alternatives:

Thin plantations – Plantations will be thinned in this project (EA pp. 13-14)

Do not treat late seral stands – This proposal would not meet the purpose and need for fuel hazard reduction, timber, or stand vigor.

Retain the growth forests – BLM is not treating old growth stands. However, BLM is treating mature stands which the public sometimes perceives as old growth (RMP p.113). Not treating mature stands would not meet the purpose and need of improving stand vigor and providing forest products.

Do not build roads – This proposal will not meet purpose and need because it will not allow BLM access to stands in need of treatments for forest health, fuel hazard reduction and timber harvest commitments.

Upgrade existing roads – Several roads will be maintained and receive improved drainage treatments (Appendix C)

Decommission roads – Roads slated for decommissioning are listed in Appendix C.

Do not degrade spotted owl habitat from NRF habitat to dispersal habitat – This proposal would not meet the resource objectives for stand vigor and forest products. Sufficient NRF habitat will remain in the project area to meet wildlife needs (Chapter 3, Wildlife Effects).

Do not burn cut material from fuels or density management activity. Material should be chipped or shredded and reused as compost – Burning would be in compliance with the Oregon Department of Forestry's Smoke Management Plan and the Department of Environmental Quality's Air Quality and Visibility Protection Program. Not all fuels will be burned. Much of it will be available through special forest products and biomass utilization, thus contributing to economic opportunities in the local area as suggested in this comment.

An EIS should be prepared – The purpose of this EA is to determine whether an EIS needs to be prepared. That decision is based on whether or not significant adverse effects are expected; that decision has not yet been made.

Tractor yarding should not occur – Tractor yarding was determined an appropriate tool for the project area. Effects due to tractor yarding have been minimized though project design features.

Connectivity between lower and higher elevation forests should be maintained – The project will maintain and promote connectivity as much as possible. However, given the watershed's level of agriculture and land development, natural fragmentation because of serpentine soils, and checkerboard ownership, BLM's ability to foster forest connectivity between low and high elevation forest is limited.

Appendix E – Fire and Fuels

Fire Regime

"Fire Regime" refers to the frequency, severity and extent of fires occurring in an area (Agee 1991). There are five national fire regimes (Schmidt et al. In press):

Fire Regime 1:	0-35 years, low severity
Fire Regime 2:	0-35 years, high severity
Fire Regime 3:	35-100+ years, mixed severity
Fire Regime 4:	35-100+ years, high severity
Fire Regime 5:	200+ years, high severity

Fire Condition Class

FRCC 1 - Fire regimes are within or near an historic range. The risk of losing key ecosystem components is low. Vegetation species composition and structure are intact and functioning within an historical range.

FRCC 2 - Fire regimes have been moderately altered from their historical range (more than one return interval). This change results in moderate changes to one or more of the following: fire size, frequency, intensity, severity, or landscape patterns.

FRCC 3 - Fire regimes have been significantly altered from their historical range. The risk of losing key ecosystem components is high. This change results in dramatic changes to fire size, frequency, severity, or landscape patterns.

Fire Behavior Fuel Models

Shrub Group

Fire Behavior Fuel Model 4 - High intensity and fast spreading fires involve the foliage and live and dead fine woody material in the crowns of a nearly continuous secondary overstory. Stands of mature shrubs, six feet tall or more are typical candidates. Besides flammable foliage, dead woody material in the stands contributes significantly to the fire intensity. A deep litter layer may also hamper suppression efforts.

Fire Behavior Fuel Model 5 - Fire is generally carried by surface fuels that are made up of litter cast by the shrubs and grasses or forbs in the understory. Fires typically have low intensities because the fuels are light and shrubs are young with little dead material. Young green stands with little dead wood would qualify.

Fire Behavior Fuel Model 6 - Fires carry through the shrub layer where the foliage is more flammable than fuel model 5, but requires moderate winds, greater than eight miles per hour.

Fire Behavior Fuel Model 7 - Fires burn through the surface and shrub strata equally and can occur at higher dead fuel moistures because of the flammability of live foliage and other live material.

Timber Group

Fire Behavior Fuel Model 8 - Slow burning ground fuels with low flame lengths are generally the case, although the fire may encounter small "jackpots" of heavier concentrations of fuels that can create a flare

up. Only under severe weather conditions do the fuels pose a threat. Closed canopy stands of short-needled conifers or hardwoods that have leafed out support fire in the compact litter layer. This layer is mostly twigs, needles, and leaves.

Fire Behavior Fuel Model 9 - Fires run through the surface faster than in fuel model 8 and have a longer flame length. Both long-needle pine and hardwood stands are typical. Concentrations of dead, down woody material will cause possible torching, spotting, and crowning of trees.

Fire Behavior Fuel Model 10 - Fires burn in the surface and ground fuels with greater intensity than the other timber litter types. A result of overmaturing and natural events creates a large load of heavy down, dead material on the forest floor. Crowning out, spotting, and torching of individual trees is more likely to occur, leading to potential fire control difficulties.

Appendix E. Species and Habitats

Spotted Owl Habitat McKelvey Rating System

Operations Inventory polygons were given an owl habitat suitability rating (sometimes referred to as a McKelvey Rating) from 1 to 6.

The McKelvey Classification System is described below:

Class 1 - Meets all life requirements (optimal). Nesting, foraging, roosting and dispersal. Canopy closure greater than 60 percent. Canopy structure usually multi-layered and diverse and includes snags, mixed species and large wolf trees.

Class 2 - Meets foraging, dispersal, and roosting. Canopy closure greater than 60 percent. Open enough below canopy to permit flight. Canopies can be single layered.

Class 1 & 2 together are considered suitable owl habitat nesting, roosting and foraging (NRF).

Class 3 - Meets no known requirements for spotted owls. Does not provide nesting, foraging, roosting, or dispersal. Canopy closure 40 percent or less. Does not meet requirements due to some kind of disturbance but has the biological potential to develop into class 1 or 2. This class includes clearcuts, plantations, thinned timber that could grow into suitable habitat given enough time.

Class 4 - Meets no known requirements for spotted owls. Does not provide nesting, foraging, roosting or dispersal. Canopy closure 40 percent or less. Does not meet requirements due to site limitations and would not likely have the potential to develop into class 1 or 2. Examples could include oak woodlands, serpentine areas, etc.. Other examples include roads, rockpits, brush fields, non forest, or very low stocking. To enable quantification and display of dispersal habitat, Class 5 was created as a subset of Class 3, and Class 6 was created as a subset of Class 4. These stands feature scattered clumps of cover that could offer short-term roosting cover to owls as they disperse across the landscape.

Class 5 - Provides for spotted owl dispersal habitat only. Canopy closure between 40 and 60 percent. Needs to be open enough below canopy to allow for flight and avoidance of predators. Has the biological potential to develop into nesting, foraging or roosting habitat.

Class 6 - Provides for spotted owl dispersal habitat only. Canopy closure between 40 and 60 percent. Needs to be open enough below canopy to allow for flight and avoidance of predators. Not currently meeting nesting, roosting or foraging requirements due to site limitations and would not likely have the potential to develop into class 1 or 2. Examples could include low site lands, woodlands, serpentine areas, etc.

PROJECT NAME: Tennessee Lime Landscape Management Project
MIGRATORY BIRD SPECIES ASSESSMENT
Prepared by: Anthony Kerwin **Date: June 28, 2006**

The following contains a list of Northern Pacific Forest Bird Conservation Region migratory birds that occur within the Grants Pass Resource Area (USFWS, 2002). Each of these species was considered and evaluated for this project. The following documents the basic conclusions of this assessment by species, and complies with the Migratory Bird Treaty Act and Executive Order 13186 to protect migratory birds. Two key principles of these are 1) focus on bird populations and their habitats rather than on species, and 2) focus conservation efforts on USFWS Birds of Conservation Concern.

SPECIES[1]	PRESENCE[2]	BASIC CONCLUSION[3]
Lewis's woodpecker	S	All snags >16" dbh will be reserved (EA pdfs, Section 2.4.4) adequate potential habitat exists within and adjacent to the project area. Proposed activities impacts are inconsequential to species and/or habitat at the watershed scale.
Olive-sided flycatcher	S	All snags >16" dbh would be reserved (EA pdfs, Section 2.4.4) adequate potential habitat exists within and adjacent to the project area. Proposed activities impacts are inconsequential to species and/or habitat at the watershed scale.
Rufous hummingbird	S	In fuels treatments, patches of untreated areas would be retained (Proposed Action section 2.2.1) as well as riparian areas and other buffers (i.e. botanical and wildlife buffers, cultural site buffers) would be left untreated (EA pdfs, Section 2.4). Ground disturbance from treatment activities and prescribed fire will stimulate growth of shrubs and herbaceous plants. Adequate potential habitat exists within and adjacent to the project area. Proposed activities impacts are inconsequential to species and/or habitat at the watershed scale.
Peregrine falcon	A	No habitat within the project area.
Flammulated owl	S	All snags >16" dbh will be reserved (EA pdfs, Section 2.4.4) adequate potential habitat exists within and adjacent to the project area. Proposed activities impacts are inconsequential to species and/or habitat at the watershed scale.
White-headed woodpecker	S	All snags >16" dbh would be reserved (EA pdfs, Section 2.4.4) adequate potential habitat exists within and adjacent to the project area. Proposed activities impacts are inconsequential to species and/or habitat at the watershed scale.

[1] USFWS Birds of Conservation Concern 2002 that breed within the Grants Pass Resource Area.
[2] Indicates 'P' if the species is known to occur in the project area, 'S' suspected to occur based on known sites adjacent to the project area, or suitable breeding habitat exists, 'U' uncertain that the species occurs within the project area based on insufficient data, 'A' absent from the project area based on no known sites and no suitable breeding habitat within the project area, and 'T' possibly transitory species utilizing habitats within the project area during migration.
[3] Describes the facts, context and intensity to provide the rationale for the conclusion of the proposed action(s) on the species and its habitat.

Summary of Habitat Relationships and Biological Objectives

Focal Species[1]	Conservation Focus[3]	Key Habitat Relationships			
		Vegetative Composition	Vegetation Structure	Landscape/ Patch Size	Special Considerations
Lewis's woodpecker[2]	large snags large conifer trees	Cottonwood Herbaceous, shrubs, ponderosa pine	>0.8 snags/acre >16 in dbh; >0.8 trees/acre >21 dbh; canopy cover 10-40%; shrub cover 30-80% trees >20 dbh; 2.5 snags/ha >12 dbh; tree canopy cover 10-40%		dependent on insect food supply; competition from starlings detrimental pine-oak sites may be most suitable
Olive-sided[2] Flycatcher	Early seral, mature and old growth forest edges with snags	Mt. & Western Hemlock; Noble & Silver fir	Retain >3 2.5 acre areas with 4-12 trees/acre >40 ft. tall; rest avg. 1-2 trees/acre >40 ft. tall		Harvest units >50 acres; retain understory hemlocks & true firs, & large snags
Rufous Hummingbird[2]	Early seral habitats; Nectar producing plants	Salmonberry, currant, penstemon, paintbrush	Diverse vegetative structure		Open space for aerial courtship display
Peregrine Falcon	Cliffs		Diverse vegetative structure		
Flammulated Owl	Large snags	Ponderosa pine and Jeffery pine; mixed conifer	Large diameter snags (min 12 dbh); mature forests; open canopy		Dependent on large primary cavity excavators (Pileated's, flicker's & sapsuckers)
White-headed woodpecker	Mix of mature cone producing pine species	Ponderosa Pine mix	50-70% canopy closure, >21" dbh snags & stumps for nesting cavities; >10 trees/acre >21" dbh		

[1] USFWS. 2002. Birds of Conservation Concern 2002. Division of Migratory Bird Management, Arlington, VA. 99pp. Only those that breed within the Grants Pass RA.
[2] Habitat specifications from Partner's in Flight Conservation Plans for Western Coniferous Forests, Westside Lowlands and Valleys and the Columbia Plateau.
[3] Habitat requirements of focal species highly associated with important attributes or conditions within each habitat type (PIF Westside Lowlands and Valleys and the Columbia Plateau, p. 3).

PROJECT NAME: Tennessee Lime Landscape Management Project
SPECIAL STATUS SPECIES ASSESSMENT
Prepared by: Anthony Kerwin Date: June 28, 2006

The following contains the USDI Bureau of Land Management OR/WA Special Status Species List (March 14, 2005). Each of these species was considered and evaluated for this project. The method(s) used to assess and review the potential effects to these species followed the techniques described in the OR/WA Special Status Species Policy (IM OR-2003-054). The following documents the basic conclusions of this assessment by species.

A description of the table's headings and letter codes are located at the bottom of the table. Additionally, general habitat descriptions for each species are included at the end of this table.

SPECIAL STATUS SPECIES IN GRANTS PASS RA

SPECIES	STATUS	RANGE (Y/N)	Presence	COMMENTS/ BASIC CONCLUSIONS
Birds – BS & BA				
American peregrine falcon	BS, SE, 2	Y	A	No habitat within the project area.
Arctic peregrine falcon	BS, SE,	T	N/A	N/A
Bald eagle	FT, ST, 4	Y	S	Bald Eagle habitat will be protected in the project area (EA pdf). All management will conform to the Biological Assessment/Opinion (log #1-15-03-F-511).
Black-backed woodpecker	BS, CR, 4	Y	A	All snags >16" dbh would be reserved (EA pdf, Section 2.3.4) adequate potential habitat exists within and adjacent to the project area. Proposed activities impacts are inconsequential to species and/or habitat at the watershed scale.
Ferruginous hawk	BS, CR, 4	N	N/A	N/A
Flammulated owl	BS, CR, 4	Y	A	All snags >16" dbh will be reserved (EA pdf, Section 2.3.4) adequate potential habitat exists within and adjacent to the project area. Proposed activities impacts are inconsequential to species and/or habitat at the watershed scale.
Lewis' woodpecker	BS, CR, 2	Y	A	All snags >16" dbh will be reserved (EA pdf, Section 2.3.4) adequate potential habitat exists within and adjacent to the project area. Proposed activities impacts are inconsequential to species and/or habitat at the watershed scale.
Northern goshawk	BS, CR, 4	Y	A	Temporary human disturbance, both temporally and spatially would be inconsequential. All snags >16" dbh and coarse woody debris would be retained (EA pdf, Section 2.3.4) adequate potential habitat exists within and adjacent to the project area. Proposed activities impacts are inconsequential to species and/or habitat at the watershed scale..
Northern spotted owl	FT, ST, 1	Y	S	Temporary human disturbance would be inconsequential for all actions, both temporally and spatially. There is no designated critical habitat within the project area. Proposed actions will not preclude species from moving between LSRs and physiographic provinces. Proposed activities impacts are inconsequential to species and/or habitat at the province scale.

SPECIES	STATUS	RANGE (Y/N)	Presence	COMMENTS/ BASIC CONCLUSIONS
Marbled murrelet	FT, ST, 2	Y	S	N/A Project is outside the known range of the species.
Purple martin	BS, CR, 2	Y	U	N/A Species is not suspected to occur in the project area.
Three-toed woodpecker	BS, CR, 4	N	N/A	N/A
White-headed woodpecker	BS, CR, 2	Y	A	N/A Species is not suspected to occur in the project area.
White-tailed kite	BA, 2	Y	U	N/A Species is not suspected to occur in the project area.
Amphibian – BS & BA				
Black salamander	BA, P, 2	Y	U	Coarse woody debris would be retained (EA pdf, Section 2.3.4) adequate potential habitat exists within and adjacent to the project area. Proposed activities impacts are inconsequential to species and/or habitat at the watershed scale. Not located during surveys and habitat evaluations. Not suspected to occur in the project area.
Foothill yellow-legged Frog	BA, V, 2	Y	S	Not documented during riparian surveys. Not expected to occur in the project area
Oregon Spotted frog	FC, CR, 1	N	N/A	N/A
Siskiyou Mt. salamander	BS, V, 2	Y	A	Not located during surveys and habitat evaluations. Not suspected to occur in the project area.
Reptiles – BS & BA				
Northwestern pond turtle	BS, CR, 2	Y	S	Not documented during riparian surveys. Not expected to occur in the project area
Mammals – BS & BA				
Fisher	FC, CR, 2	Y	S	Temporary human disturbance, both temporally and spatially would be inconsequential. All snags >16" dbh and coarse woody debris would be retained (EA pdf, Section 2.3.4) adequate potential habitat exists within and adjacent to the project area. Proposed activities impacts are inconsequential to species and/or habitat at the watershed scale.
Fringed myotis	BA, V, 2	Y	S	All snags >16" dbh will be reserved (EA pdf, Section 2.3.4) adequate potential habitat exists within and adjacent to the project area. Proposed activities impacts are inconsequential to species and/or habitat at the watershed scale.
Pacific pallid bat	BA, V, 2	Y	P	All snags >16" dbh will be reserved (EA pdf, Section 2.3.4) adequate potential habitat exists within and adjacent to the project area. Proposed activities impacts are inconsequential to species and/or habitat at the watershed scale.
Townsend's big-eared bat	BS, CR, 2	Y	P	Roosting or hibernaculum habitat located near the project area. If any caves are located they would be protected by 250' no treatment buffers.
Invertebrates – BS & BA				
Chase sideband snail	BS, 1	N	N/A	N/A
Evening fieldslug	BS, 1	N	N/A	N/A

SPECIES	STATUS	RANGE (Y/N)	Presence	COMMENTS/ BASIC CONCLUSIONS
Mardon skipper butterfly	FC, 2	N	N/A	N/A
Oregon shoulderband snail	BS, 1	Y	U	Known sites would be buffered and coarse woody debris would be retained (EA pdf, Section 2.3.4); adequate potential habitat exists within and adjacent to the project area. Proposed activities impacts are inconsequential to species and/or habitat at the watershed scale.
Scale lanx snail	BS, 1	N	N/A	N/A
Siskiyou hesperian snail	BS, 1	N	N/A	N/A
Siskiyou short-horned grasshopper	BS, 1	Y	U	Not expected to occur in the project area.
Travelling sideband snail	BS, 1	Y	U	Coarse woody debris would be retained (EA pdf, Section 2.3.4), adequate potential habitat exists within and adjacent to the project area. Proposed activities impacts are inconsequential to species and/or habitat at the watershed scale.
Vernal pool fairy shrimp	BS, 1	N	N/A	N/A
SPECIES	**STATUS**	**RANGE (Y/N)**	**Presence**	**COMMENTS/ BASIC CONCLUSIONS**
Birds – BS & BA				
American peregrine falcon	BS, SE, 2	Y	A	No habitat within the project area.
Arctic peregrine falcon	BS, SE,	T	N/A	N/A
Bald eagle	FT, ST, 4	Y	S	Bald Eagle habitat will be protected in the project area (EA pdf). All management will conform to the Biological Assessment/Opinion (log #1-15-03-F-511).
Black-backed woodpecker	BS, CR, 4	Y	A	All snags >16" dbh would be reserved (EA pdf, Section 2.4.4) adequate potential habitat exists within and adjacent to the project area. Proposed activities impacts are inconsequential to species and/or habitat at the watershed scale.
Ferruginous hawk	BS, CR, 4	N	N/A	N/A
Flammulated owl	BS, CR, 4	Y	A	All snags >16" dbh will be reserved (EA pdf, Section 2.4.4) adequate potential habitat exists within and adjacent to the project area. Proposed activities impacts are inconsequential to species and/or habitat at the watershed scale.
Lewis' woodpecker	BS, CR, 2	Y	A	All snags >16" dbh will be reserved (EA pdf, Section 2.4.4) adequate potential habitat exists within and adjacent to the project area. Proposed activities impacts are inconsequential to species and/or habitat at the watershed scale.
Northern goshawk	BS, CR, 4	Y	A	Temporary human disturbance, both temporally and spatially would be inconsequential. All snags >16" dbh and coarse woody debris would be retained (EA pdf, Section 2.4.4) adequate potential habitat exists within and adjacent to the project area. Proposed activities impacts are inconsequential to species and/or habitat at the watershed scale..
Northern spotted owl	FT, ST, 1	Y	S	Temporary human disturbance would be inconsequential for all actions, both temporally and spatially. There is no designated critical habitat within the project area. Proposed actions will not preclude species from moving between LSRs and physiographic provinces. Adequate potential habitat exists within and adjacent to the project area. Proposed activities impacts are inconsequential to species and/or habitat at

SPECIES	STATUS	RANGE (Y/N)	Presence	COMMENTS/ BASIC CONCLUSIONS
				the province scale.
Marbled murrelet	FT, ST, 2	Y	S	N/A Project is outside the known range of the species.
Purple martin	BS, CR, 2	Y	U	N/A Species is not suspected to occur in the project area.
Three-toed woodpecker	BS, CR, 4	N	N/A	N/A
White-headed woodpecker	BS, CR, 2	Y	A	N/A Species is not suspected to occur in the project area.
White-tailed kite	BA, 2	Y	U	N/A Species is not suspected to occur in the project area.
Amphibian – BS & BA				
Black salamander	BA, P, 2	Y	U	Coarse woody debris would be retained (EA pdf, Section 2.4.4) adequate potential habitat exists within and adjacent to the project area. Proposed activities impacts are inconsequential to species and/or habitat at the watershed scale. Not located during surveys and habitat evaluations. Not suspected to occur in the project area.
Foothill yellow-legged Frog	BA, V, 2	Y	S	Not documented during riparian surveys. Not expected to occur in the project area
Oregon Spotted frog	FC, CR, 1	N	N/A	N/A
Siskiyou Mt. salamander	BS, V, 2	Y	A	Not located during surveys and habitat evaluations. Not suspected to occur in the project area.
Reptiles – BS & BA				
Northwestern pond turtle	BS, CR, 2	Y	S	Not documented during riparian surveys. Not expected to occur in the project area
Mammals – BS & BA				
Fisher	FC, CR, 2	Y	S	Temporary human disturbance, both temporally and spatially would be inconsequential. All snags >16" dbh and coarse woody debris would be retained (EA pdf, Section 2.4.4) adequate potential habitat exists within and adjacent to the project area. Proposed activities impacts are inconsequential to species and/or habitat at the watershed scale.
Fringed myotis	BA, V, 2	Y	S	All snags >16" dbh will be reserved (EA pdf, Section 2.4.4) adequate potential habitat exists within and adjacent to the project area. Proposed activities impacts are inconsequential to species and/or habitat at the watershed scale.
Pacific pallid bat	BA, V, 2	Y	P	All snags >16" dbh will be reserved (EA pdf, Section 2.4.4) adequate potential habitat exists within and adjacent to the project area. Proposed activities impacts are inconsequential to species and/or habitat at the watershed scale.
Townsend's big-eared bat	BS, CR, 2	Y	P	Roosting or hibernaculum habitat located near the project area. If any caves are located they would be protected by 250' no treatment buffers.
Invertebrates – BS & BA				
Chase sideband snail	BS, 1	N	N/A	N/A

SPECIES	STATUS	RANGE (Y/N)	Presence	COMMENTS/ BASIC CONCLUSIONS
Evening fieldslug	BS, 1	N	N/A	N/A
Mardon skipper butterfly	FC, 2	N	N/A	N/A
Oregon shoulderband snail	BS, 1	Y	U	Known sites would be buffered and coarse woody debris would be retained (EA pdf, Section 2.4.4), adequate potential habitat exists within and adjacent to the project area. Proposed activities impacts are inconsequential to species and/or habitat at the watershed scale.
Scale lanx snail	BS, 1	N	N/A	N/A
Siskiyou hesperian snail	BS, 1	N	N/A	N/A
Siskiyou short-horned grasshopper	BS, 1	Y	U	Not expected to occur in the project area.
Travelling sideband snail	BS, 1	Y	U	Coarse woody debris would be retained (EA pdf, Section 2.4.4), adequate potential habitat exists within and adjacent to the project area. Proposed activities impacts are inconsequential to species and/or habitat at the watershed scale.
Vernal pool fairy shrimp	BS, 1	N	N/A	N/A

Table Headings and Letter Code Definitions

Species: are listed by taxon. Bureau Sensitive and Bureau Assessment are combined, and then Bureau Tracking are listed.
Status: lists the Oregon BLM, Oregon state and then Oregon Natural Heritage Program codes in that order.

Oregon BLM Codes:

FE - USFW Endangered - in danger of extinction throughout a significant portion of its range
FT - USFW Threatened - likely to become endangered species within the foreseeable future
FC - USFW Candidate - proposed and being reviewed for listing as threatened or endangered
SM - Survey & Manage - Forest plan ROD directs protection of known sites and/or survey for new sites
BS - Bureau Sensitive (BLM) - eligible for addition to Federal Notice of Review, and known in advance of official publication. Generally these species are restricted in range and have natural or human caused threats to their survival.
BA - Bureau Assessment Species (BLM) - not presently eligible for official federal or state status, but of concern which may at a minimum need protection or mitigation in BLM activities.
BT - Bureau tracking (BLM) - not considered as a special status species for management purposes. Tracking will enable early warning for species which may become of concern in the future. Districts are encouraged to collect occurrence data on species for which more information is needed to determine status.

Oregon State Codes:

SE - State Endangered - in danger of extinction in the state of Oregon
ST - State Threatened - listed as likely to become endangered by the state of Oregon
CR - State Critical - listing is pending, or appropriate, if immediate conservation action not taken
V - State Vulnerable - listing not imminent, and can be avoided through continued or expanded use of adequate protective measures and monitoring
P - State Peripheral or naturally rare - populations at the edge of their geographic range, or historically low numbers due to limiting factors
U - State Unknown - status unclear, insufficient information to document decline or vulnerability

ONHP Codes:

1 - Oregon Natural Heritage Rank, threatened with extinction throughout its range
2 - Oregon Natural Heritage Rank, threatened with extinction in the state of Oregon
3 - Oregon Natural Heritage Rank, more information is needed before status can be determined, but may be threatened or endangered in Oregon or throughout range
4 - Oregon Natural Heritage Rank, of conservation concern. May be rare, but are currently secure. May be declining in numbers or habitat but still too common to be considered as threatened or endangered. May need monitoring.

Range: indicates yes or no, if the breeding range overlaps with the Grants Pass Resource Area. If not within the range, both presence and basic conclusion on not applicable (N/A). For invertebrates in which there is inadequate data to determine ranges, 'U' is used for unknown.

Presence: indicates 'P' if a species is known to occur in the project area, 'S' suspected to occur based on known sites adjacent to the project area, or suitable breeding habitat exists, 'U' uncertain that the species occurs within the project area based on insufficient data, 'A' absent from the project area based on no known sites and/or no suitable breeding habitat within the project area, and 'T' possibly transitory species utilizing habitats within the project area during migration.

Basic Conclusion: describes the facts, context and intensity to provide the rationale for the conclusion of the proposed action(s) on the species and its habitat.

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• Courtney et al. 2004:
http://www.sei.org/owl/finalreport/finalreport.htm
• Anthony et al. 2004:
http://www.reo.gov/monitoring/trends/Compiled%20Report%20091404.pdf
• USFWS, November 2004:
http://www.fws.gov/pacific/ecoservices/endangered/recovery/5yearcomplete.html
• Lint, Technical Coordinator, 2005:
http://www.reo.gov/monitoring/10yr-report/northern-spottedowl/documents/owl_text%20and%20tables.pdf

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