United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Grants Pass Resource Area
2164 N.E. Spalding
Grants Pass, Oregon 97526

IN REPLY REFER TO

1792 (ORM080)
DOI-BLM-M070-2009-010-EA

APR 0 1 2011

Dear Interested Party:

The Environmental Assessment (EA) for the Deer North Vegetation Management Project (DOI-BLM-M070-2009-010-EA) prepared by the Grants Pass Resource Area, Medford District, Bureau of Land Management, is available for public review.

This EA discloses the predicted environmental effects of No Action Alternative and two action alternatives. Alternatives 2 and 3 propose forest management activities on approximately 750 to 800 acres (varying by alternative). A combination of regeneration harvesting, commercial thinning, non-commercial thinning and group selection harvesting treatments are proposed, varying by alternative. Road work could include up to 0.5 miles of new permanent road construction, 0.8 miles of new temporary route construction, and the maintenance of up to 32 miles of existing roads (i.e., road grading, rock surfacing, and water drainage improvements).

The Deer North Vegetation Management Project Planning Area is located west of the city of Selma in Josephine County in the northwest section of the Deer Creek watershed. The legal description of the Planning Area is T37S, R7W Sections 29, 31, 33 and T38S, R7W Sections 3, 5, 6, 7, 9, 11 W.M.

The EA is available for review and comment April 1, 2011 in the Grants Pass Interagency Office, 2164 NE Spalding Avenue, 97526. Office hours are Monday through Friday, 8:00 A.M. to 4:30 P.M., closed on holidays. The document may also be accessed on the Medford District's internet site at http://www.blm.gov/or/districts/medford/plans/index.php. If you do not have internet access, or would prefer a paper copy or CD of this document, please contact Martin Lew, Environmental Planner, at (541) 471-6504.

Written comments concerning the significance, as defined in 40 CFR 1508.27, of the environmental effects predicted for this action are requested to be submitted in writing to Grants Pass Field Manager, and received on or before May 2, 2011 at the address previously stated. Comments received will be considered in making the final decision.

Individual respondents may request confidentiality. If you wish to withhold your name or street address from public review or from disclosure under the Freedom of Information Act, you must state this prominently at the beginning of your written comment. Such requests will be honored by the extent allowed by law. All submissions from organizations or businesses, and from individuals identifying themselves as representatives or officials of organizations or businesses, will be made available for public inspection on their entirety.

Thank you for your interest in public land management in the Grants Pass Resource Area.

Sincerely,

Katrina L. Symons
Field Manager
Grants Pass Resource Area

DEER NORTH
VEGETATION MANAGEMENT PROJECT
ENVIRONMENTAL ASSESSMENT

DOI-BLM-OR-M070-2009-0010-EA
April 2011

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

Responsible Official: Katrina Symons
Grants Pass Field Manager
2164 NE Spalding Avenue
Grants Pass, OR 97526

Abstract:

The Grants Pass Resource Area is proposing forest management treatments on approximately 750 to 800 acres (varying by alternative) of BLM administered lands. A combination of regeneration harvesting, commercial thinning, non-commercial thinning and group selection harvesting treatments are proposed, varying by alternative. Prescriptions are specific to the various site conditions (i.e. elevation, aspect, soil conditions, etc.) found throughout the Planning Area. Road work could include up to 0.5 miles of new permanent road construction, 0.8 miles of new temporary route construction, and the maintenance of up to 32 miles of existing roads (i.e., road grading, rock surfacing, and water drainage improvements).

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1.0 Purpose and Need for the Proposal

1.1 Introduction

The Grants Pass Resource Area, Bureau of Land Management (BLM), is proposing forest management activities analyzed under the Deer North Vegetation Management Project Environmental Assessment (EA). The EA analyzes the impacts of proposed forest management activities on the human environment in the Deer North Planning Area. The EA discloses a range of alternatives, assessing regulatory compliance and efficacy in meeting Planning Area needs and objectives, and providing the decision maker, the Grants Pass Field Manager, with current information to aid in the decision making process. It will also determine if an Environmental Impact Statement (EIS) needs to be prepared or if a Finding of No Significant Impact is appropriate. The planning, design, and analysis for the Deer North Project were initiated in December 2008.

Chapter 1 defines the Planning Area and sets the context for development of alternatives and potential environmental effects. The chapter also describes the needs, goals and objectives (purpose and need) for the Planning Area. The Planning Area is where BLM land management actions are proposed, and represents the area of consideration for assessing current and desired forest, vegetation, habitat, soils and transportation system conditions related to the goals and objectives outlined in BLM's Medford District Record of Decision and Resource Management Plan (RMP). In addition, the chapter identifies the criteria that will be used for choosing the alternative that will best meet the purpose and need for this proposal.

The Deer North Vegetation Management Project would implement the Bureau of Land Management's Medford District Record of Decision and Resource Management Plan (1995 RMP). Management direction set forth in the RMP provides direction for resource management on BLM-administered lands according to various land use allocations.

1.2 Location

The Deer North Vegetation Management Project Planning Area (PA) is located west of the city of Selma in Josephine County (Appendix A, Maps) in the northwest section of the Deer Creek watershed (Table 1).

Table 1. Legal description* of Deer North Planning Area

Township	Range	Sections
37 S	7W	20, 21, 28, 29, 30, 31, 32, 33, 34
38 S	7 W	, 3, 4, 5, 6, 7, 8, 9, 9, 10, 11, 15

*Willamette Meridian, Josephine County, Oregon

The Planning Area totals 8,848 acres, in which the BLM administers approximately 3,414 acres of these acres. Approximately 2,407 acres are in the Matrix land allocation and 1,007 acres are in Riparian Reserves. The Planning Area is located within the larger 72,573 acre Deer Creek 5th field watershed (Table 2).

Table 2. Land Category in the Deer Creek 5th Field Watershed

Land Category	Medford District, Grants Pass Resource Area	Siskiyou National Forest	Oregon Dept. of Forestry (ODF)	Private	Total
Private				33,179	**33,179**
BLM Acquired	677				**677**
O&C Land	27,251	250			**27,501**
Public Domain Land	2,274	7,642			**9,916**
ODF			1,300		**1,300**
Total	**30,202**	**7,892**	**1,300**	**33,179**	**72,573**

1.3 What the BLM is Proposing

The Grants Pass Resource Area is proposing forest management treatments on approximately 750 to 800 acres (varying by alternative) of BLM administered lands. A combination of regeneration harvesting, commercial thinning, non-commercial thinning and group selection harvesting treatments are proposed, varying by alternative. Prescriptions are specific to the various site conditions (i.e. elevation, aspect, soil conditions, etc.) found throughout the Planning Area.

Road work could include up to 0.5 miles of new permanent road construction, 0.8 miles of new temporary route construction, and the maintenance of up to 32 miles of existing roads (i.e., road grading, rock surfacing, and water drainage improvements).

1.4 Purpose and Need for the Proposal

The Deer North Vegetation Management Project is designed to meet BLM's obligation to implement the RMP and to address three primary needs identified for lands in the Planning Area. The three primary needs identified for lands in the Planning Area are: 1) the need for production of commercial and non-commercial forest products; 2) the need for improved forest health and vigor; and 3) the need to enhance socioeconomic conditions. This forest management project is designed to address each of the needs and achieve each of the associated objectives which would assist in moving the current conditions found on the Deer North Planning Area toward desired forest conditions for lands within the Matrix land allocation. Each proposed action alternative must meet all objectives of the project; however, there is a different emphasis for each alternative based on achieving different resource objectives to varying degrees.

This section describes objectives, or purposes, to be accomplished while implementing the Deer North Vegetation Management Project. The extent to which each alternative achieves the identified purposes will be considered when evaluating and selecting a course of action among the alternatives.

1. There is a need for production of commercial and non-commercial forest products

The RMP (pp. 72-75) provides clear direction that lands in the Matrix land allocation are managed for sustainable timber harvest to provide timber forest products to local and regional

economies now and into the future. The RMP set an allowable sale quantity designation for annual harvest, based on the productive capacity of the lands. The project aims to produce a sustainable supply of timber and other forest commodities on lands allocated to timber production to provide jobs and contribute to community stability.

Objectives for production of commercial and noncommercial forest products

Develop a commercially viable timber sale and other forest product opportunities

Harvest proposals under this alternative are designed to meet the following objectives for Matrix lands (RMP pp. 38-39):

- Produce a sustainable supply of timber and other forest commodities to provide jobs and contribute to community stability.
- Provide connectivity (along with other allocations such as Riparian Reserves) between late-successional reserves.
- Provide habitat for a variety of organisms associated with both late-successional and younger 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.

The RMP directs that all silvicultural systems applied to achieve forest stand objectives would be economically feasible (RMP pp. 179-180; RMP/EIS p. 2-62).

There is also a need to promote economic development through sale of timber and non-timber products. Public comments identified an increasing desire to improve local economies through stewardship contracting, biomass utilization, and special forest products. Economic development would be facilitated through commercial timber sale contracts and forest stewardship opportunities for small businesses. Units proposed for harvest, but that are not commercially viable for a large timber sale could be offered through use of "innovative contracting and other implementation strategies" (RMP p. 80). Under these strategies, timber would be available for harvest through stewardship, biomass utilization, special forest products and/or small timber sales. Timber produced through a stewardship contract contributes to county receipts if the timber is harvested, decked and sold; however, many treatments are intended to foster forest stand development and could contribute timber revenues to counties in the future.

To achieve feasibility under this project, as well as long-term access for follow-up and future harvest treatments, the objective is to successfully restore, renovate, construct and maintain roads necessary for forest management activities.

2. There is a need to improve forest stand health and vigor

There is a need to apply silvicultural treatments to forest stands to enhance the health, stability, vigor and economic value of forest stands. There is a wide distribution and diversity of species and seral stages within the Planning Area. With the exception of previously treated areas, tree densities in the Planning Area are high. They are approaching or are at a level of stand density

where competition related mortality becomes significant. The overcrowding is causing 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 declining in health. In young and mid-seral forests, structural development is delayed by intense competition for resources (Puettmann and Berger 2006). Future timber productivity of older forest stands is threatened by age related growth decline and high intensity wildfire (Oliver and Larson 1996; Poff 1996). Forest management activities are needed in the Planning Area to reverse these trends so the stands will persist and contribute to future forest commodity production and to meet other resource needs.

Objectives for improvement of forest stand health and vigor

Implement a full range of silvicultural treatments to meet a variety of forest stand objectives:

- *Reduce stand densities*: A relative density of 55% is considered the threshold for competition-induced mortality (Drew and Flewling 1979). The purpose of silvicultural activities is to reduce tree density to increase individual tree vigor, leading to increased stand resistance to insects and diseases, and to meet timber production objectives. Since trees grow fairly rapidly and to minimize soil impacts from multiple entries, the specific objective is to achieve 25 to 45% relative density in proposed thinning/density management areas. These relative densities correspond well to density recommendations for the control of insects, diseases and wildfire (Atzet 1996). In reserve land allocations and for connectivity, stand density targets would be consistent with the objectives of canopy retention for these areas.

- *Perpetuate the historic mixture of tree species*: The general strategies recommended in the literature for this objective are to retain as much of the existing historic mix while promoting a similar mixture in the understory. Silvicultural strategies for managing current and new regeneration would vary based on the plant series targets for species composition defined by the RMP (p. 193).

- *Promote / retain a multi-layered stand structure and a diversity of size classes; increase seral stage diversity across the landscape*: Utilize silvicultural prescriptions to create conditions that are favorable for the initiation, creation, and retention of snags, down wood, large vigorous hardwoods, and understory vegetation diversity in areas where these are lacking. Set stands on a trajectory to develop a range of seral stages across the landscape, which promotes landscape diversity while also providing forest products now and into the future. In dense, stagnating stands, vegetation treatments would focus on improving growth, which in turn would advance the movement of these areas from one stage to the next (i.e. small diameter stands become mid-sized because of increased growth rates accelerated by thinning). Large and mature tree structure would be retained across the landscape through reserve land allocations and stand deferrals.

3. There is a need to enhance socioeconomic conditions

Socioeconomic needs are generally comprised of human uses of BLM-managed lands such as recreation (motorized and non-motorized), road use, and special forest product utilization.

Human use issues are generally related to the increasing population of an area; the density of road systems; the ownership pattern of BLM lands interspersed with private lands; and open space associated with rural residential areas.

The Medford District RMP (p. 80, 81) states two major objectives for contributing to socioeconomics:

> Contribute to local, state, national, and international economies through sustainable use of BLM-managed lands and resources and use of innovative contracting and other implementation strategies.
>
> Provide amenities (e.g., recreation facilities, protected special areas and high quality fisheries) that enhance communities as places to live, work, and visit.

Timber sold through a traditional commercial timber sale or small timber sale would contribute directly to county funding when the sale is sold. Timber produced through a stewardship contract contributes to county receipts if the timber is harvested, decked and sold. Other stewardship products do not contribute directly as a county funding source; however, many treatments are intended to foster forest stand development and could contribute timber revenues to counties in the future.

Objectives for enhancement of socioeconomic / human use conditions

Provide timber products through one or more commercial timber sales

Provide sources for products for the public through stewardship contracting and individual permit administration.

1.5 Decision Factors

The following decision factors will be weighed, along with environmental effects of each alternative. The Field Manager will consider the extent to which each alternative would:

- Produce revenue from the sale of timber.
- Improve forest health and vigor.
- Maintain tree species diversity and structure across the landscape.
- Maintain existing northern spotted owl habitat within the provincial radius (1.3 miles) of known active northern spotted owl sites and all or substantially all of the older and more structurally complex, multilayered conifer forests.
- Enhance socioeconomic conditions through timber products and stewardship contracting.

1.6 Conformance with Land Use Plans

This EA conforms and/or tiers to the following documents:

- *Final Medford District Proposed Resource Management Plan/ EIS* (1994)

- *Medford District Record of Decision and Resource Management Plan* (ROD/RMP, 1995)
- *Medford District Integrated Weed Management Plan and Environmental Assessment* (1998) and tiered to the *Northwest Area Noxious Weed Control Program* (EIS, 1985).
- *Record of Decision and Resource Management Plan Amendment for Management of Port-Orford-Cedar in Southwest Oregon , Coos Bay, Medford, and Roseburg Districts* (ROD, 2004).
- *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)
- *ROD for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl* (NWFP,1994)
- *Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines (FEIS 2000 and ROD, 2001).*

In addition to the documents cited above, project planning drew from information and recommendations from the Deer Creek Watershed Analysis (USDI, BLM November 1997).

1.7 Decision to Be Made

The Deer North Vegetation Management Project EA will provide the information needed for the Authorized Officer, the Grants Pass Resource Area Field Manager, to render a decision regarding the selection of a course of action to be implemented for the Deer North Vegetation Management Project. The Field Manager will decide whether to implement one of the action alternatives as proposed or, whether to select the No Action Alternative; the Field Manager may also select aspects of more than one alternative. In choosing the alternative that best meets the project needs, the Field Manager will consider the extent to which each alternative responds to the purposes identified for this project.

The decision will also include a determination whether or not the impacts of the action alternatives are significant to the human environment. If the impacts are determined not to result in significant effects beyond those disclosed in the 1994 PRMP/FEIS, or otherwise determined to not be significant, a Finding of No Significant Impact (FONSI) would be issued and a decision implemented.

1.8 Issues

A variety of issues and concerns were raised by BLM's interdisciplinary team, or by interested individuals or groups outside the BLM during the scoping process which are not included in the objectives or needs for the Planning Area. In this EA an issue is something unique to the Planning Area that may need particular consideration and which may contribute to defining a particular action alternative. Pertinent issues raised during scoping were used either for developing alternatives or are addressed in the effects analysis (Chapter 3). 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 was determined to be irrelevant to making a decision on the project. These are summarized in Appendix F.

2.0 Alternative Ways of Meeting the Purpose and Need

2.1 Introduction

The IDT developed two action alternatives (Alternative 2 and Alternative 3) to meet the project's purpose and need. The alternatives differ in acreage and location of prescriptions, reflecting the alternative's emphasis or objective. Alternative 2 emphasizes the highest level of timber harvest to meet management direction under the Medford District Resource Management Plan (RMP pp. 38-40). Alternative 3 seeks to retain suitable spotted owl habitat while still providing forest products to meet the purpose and need. These alternatives were developed based on existing environmental conditions and also reflect public participation in the planning process. Through the scoping process, the public provided comments that were considered by the interdisciplinary team and incorporated into alternative development. Those alternatives and comments considered but eliminated from further analysis are found in Appendix F.

Table 3 displays treatment type and acres by alternative. Appendix B displays treatment and acres by Forest Operations Inventory (FOI) unit. Maps in Appendix A display treatment locations.

Table 3. Estimated acres and volumes for Deer North Harvest Proposals

Harvest Type	Alternative 2	Alternative 3
Regeneration Harvest	242	0
Density Management / Modified Group Selection	282	319
Density Management / Understory Reduction	275	427
Total Acres	**799**	**746**

In addition, a No Action Alternative is presented to represent current conditions and trends, and establish a baseline for analysis of proposed project effects of the action alternatives.

All action alternatives incorporate Project Design Features (Section 2.4 below), which are designed to reduce or eliminate potential environmental effects resulting from project activities.

2.2 Forest Management Treatments

Each alternative utilizes a similar set of treatments or prescriptions for vegetation management to meet project objectives. The suite of silvicultural prescriptions is designed to sustain the growth and productivity of non-reserve forest stands for current and future timber needs. Only Matrix lands (RMP pp. 38-40), specifically set aside for timber production, are included in the proposed action for each alternative.

Units considered not viable for a traditional commercial timber sale could be completed under a stewardship contract or small timber sale; treatment proposals would be the same as identified

under each alternative (i.e., a proposed commercial thin harvest that was excluded from the timber sale could be a commercial thin harvested under a stewardship contract). Biomass removed under treatments would be available for special forest products or other utilization. Biomass, for the purpose of this project, is defined as any dead or living vegetation in a treatment unit that is ≤8" in diameter for conifers and ≤12" for hardwoods.

Harvest Prescriptions / Follow-up Treatments

Density management (DM) is typically prescribed for uneven-aged (80 to 120 year old) stands for the primary purpose of widening the spacing of residual trees to promote 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 be based on the crown radius of the healthiest dominant and co-dominant trees to achieve an average relative density of 35% with some variation for site differences (range between 25 and 45% relative density).

Modified group selection (Mod GS) is the removal of trees (usually Douglas-fir) that are competing with vigorous pines and non-tanoak hardwoods with greater than 30% live crown ratio. Typically these openings would be between ¼ acre to ½ acre in size, with the occasional group up to 1 acre in size if the pines and non-tanoak hardwoods are in need of more release.

Density Management/Understory Reduction (DM/UR) is prescribed for older seral stands which may currently provide multiple forest products (e.g., poles, sawlogs, firewood, special products) or opportunities for restoration through activities such as prescribed burning or brushing. 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. Post treatment canopy closure would be greater than 40% at the stand level.

Regeneration harvest (RH) is used when the objective is to increase the growth of the existing understory trees or to regenerate a new understory with natural seeding and/or tree planting. Commercial thinning of these stands would not provide the desired growth and increase in productivity. Candidates for this prescription are older than 120 years, have poor annual stand growth, and/or have limited conifer regeneration. The residual trees could be clumped and doing so will help to enhance growth on the regenerating stand underneath.

Matrix lands in the Medford District are divided into the Northern General Forest Management Area (NGFMA) and the Southern General Forest Management Area (SGFMA). SGFMA requires retention of 16 to 25 large conifer trees per acre for RH prescribed stands. The project is in the SGFMA; however, there are "local situations in the northern GFMA that should be managed along SGFMA prescription guidelines and vice versa" (RMP p 73). Regeneration harvest units in the Planning Area are proposed to be done under NGFMA guidelines, leaving 6-8 large conifers/acre. These units have a site index comparable to NGFMA lands on the

Medford District BLM. Birch and Johnson (1992), Acker et al. (1998), and Zenner et al. (1998) report a decline in understory (seedling) growth from retaining green trees in the overstory; thus the NGFMA prescription is recommended to address this issue on these productive sites of the Planning Area.

Postharvest Follow-up Treatments

***Slashing**:* 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 (e.g., Pacific yew, pine, vine maple). Untreated vegetation groups ranging in size from 0.1 to 2 acres would be retained in each treatment unit.

***Hand piling and burning**:* 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. Hand piles would be burned in the first winter or early spring following the construction of the piles; exceptions to this timing may occur if fuels have not cured adequately, or if atmospheric conditions are not conducive to adequate smoke management.

***Understory Burning (underburning)**:* 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.

Tree Planting (PL*):* of nursery seedling stock would occur after site preparation (i.e. slashing, handpiling, underburn, etc.) has been completed on regeneration harvest areas. In some cases, the entire unit would be planted. Inter-planting of nursery stock would occur in stands that need more seedlings between existing trees to raise stocking levels to meet BLM's stocking standards; these vary based on vegetation series and stand age. Tree planting may include a delay release fertilizer packet. Seedling maintenance treatments would enhance growth and increase survival until seedlings become well established. Treatments may include removing competing grasses and forbs with hand tools, scalping an area around the seedling, or installing paper or Vispore® mulch to prevent soil moisture loss. Tree netting may also be used to prevent browsing by wildlife.

2.3 Description of the Alternatives

2.3.1 Alternative 1 (No Action) Description

The No Action Alternative is defined as not implementing any aspect of the action alternatives. The No Action Alternative is not a "static" alternative. Under the No Action Alternative, the present economic and environmental conditions and trends would continue. This would include

trends, such as vegetation succession, and consequent terrestrial and aquatic habitat changes; increases in fire hazard; continued road condition or deterioration; and continued or increasing rates of erosion; as well as current road densities and various unregulated uses (e.g., OHV use, wood theft, illegal dumping).

The No Action Alternative incorporates other present and reasonably foreseeable actions that are not dependent on any of the action alternatives, and are reasonably certain to occur regardless of the decision on this project. Defined this way, the No Action Alternative serves as a baseline or reference point for evaluating the environmental effects of the action alternatives, including cumulative effects. Inclusion of this alternative is done regardless of consistency with the Medford District RMP and without regard to meeting the purpose and need for the project.

2.3.2 Alternative 2 Description

Harvest Treatments
Alternative 2 is designed to meet the management direction provided in the 1995 Medford District Resource Management Plan. Harvest proposals under this alternative were designed around the conceptual framework of providing wildlife habitat structure (snags, coarse woody debris, and green tree retention) within harvest units, as well as relying on reserve lands to provide for habitat across the landscape.

Regeneration harvest would occur on 242 acres. Stands which would no longer respond with increased growth to commercial thinning would be a priority for this type of harvest. As stated earlier, 6 to 8 large trees per acre would be retained to meet the 1995 RMP NGFMA standards and guidelines for green tree retention in regeneration harvest units.

Combinations of density management, and/or modified group select would occur on 282 acres. The residual relative density would range between 25% on dry ridges and 45% on the lower, more productive wet sites. Density management / understory reduction would occur on 275 acres with target densities designed to maintain current suitable spotted owl habitat (see Forest Management Treatment above and Appendix B).

Post Harvest Treatments
All density management treatments (557 acres) would have selective slashing, handpiling and / or underburning to achieve desired understory density and species composition. All regeneration harvest acres (242 acres) would be planted after activity fuels are treated (slashing and hand piling) and site preparation is complete.

Roads and Transportation Management
The objectives are to minimize permanent road construction, improve road drainage, and maintain existing roads to implement the proposed actions, and at levels consistent with the planned long term use. The proposed road work is intended to improve road drainage to reduce chronic erosion and sedimentation. New permanent roads and temporary routes would be constructed to meet multiple resource management objectives and to allow access for harvesting and transporting logs.

Alternative 2 would consist of constructing 0.8 miles of temporary routes. The road subgrade would be an outsloped, 14 foot wide native surfaced road, plus curve widening and turnouts. Grades for temporary routes would not exceed 20%. Temporary routes would be fully decommissioned after use by decompacting pulling and clearing debris onto the road prism and re-establishing native vegetation. Existing primitive spurs would be water-barred, scarified, seeded, mulched and barricaded.

One-half mile of road would be constructed and blocked following use, but would not be decommissioned. Road grades for permanent roads would not exceed 15%. After all project work is completed, the new road would be water-barred, barricaded, and placed in a maintenance level 1, closed status.

Proposed road maintenance or decommissioning is outlined in Appendix C. Approximately 31.5 miles of existing road would be maintained / upgraded to reduce erosion and sediment deposits into streams, depending on funding. Road drainage would be improved, and deteriorated surfacing would be replaced with crushed aggregate. Additional drainage structures, such as culverts or drain dips, would be installed on existing roads to improve drainage.

Prior to harvest activities, selected road surfaces and ditch lines would be bladed. To reduce maintenance generated sediment from entering streams, ditches would not be bladed within 50' of flowing streams, unless necessary to protect culvert or road stability. Other maintenance activities would include cleaning catch-basins, brushing near pipe inlets and outlets, and removing vegetation along roadsides to improve site distance.

2.3.3 Alternative 3 Description

Harvest Treatments
Harvest proposals under Alternative 3 are also designed to meet the objectives for Matrix lands (1995 RMP pp. 38-39). The alternative retains as much suitable spotted owl habitat as possible while still providing forest products to meet the purpose and need of this project. No regeneration harvest would occur under Alternative 3. Thinning and density management is proposed to retain key spotted owl habitat structural elements (large trees, snags, coarse woody debris, hardwoods, etc.) and to protect overly dense stands from stand replacing fire.

Density management and/or modified group select would occur on 319 acres; and density management / understory reduction would occur on 427 acres. Target densities for all of these prescriptions have been designed to maintain current suitable spotted owl habitat.

Post Harvest Treatments
All density management treatments (746 acres) would have selective slashing, handpiling and / or underburning to achieve desired understory density and species composition.

Roads and Transportation Management
The objectives are to minimize permanent road construction, improve road drainage, and maintain existing roads to implement the proposed actions, and at levels consistent with the planned long term use. The proposed road work is intended to improve road drainage to reduce chronic erosion and sedimentation. Alternative 3 proposes 0.8 miles of temporary route

construction and full decommissioning similar to Alternative 2. Proposed road maintenance or decommissioning is outlined in Appendix C. Approximately 31.5 miles of existing road would be maintained / upgraded to reduce erosion and sediment deposits into streams depending on funding. Road drainage would be improved, and deteriorated surfacing would be replaced with crushed aggregate. Additional drainage structures, such as culverts or drain dips, would be installed on existing roads to improve drainage.

Prior to harvest activities, selected road surfaces and ditch lines would be bladed. To reduce maintenance generated sediment from entering streams, ditches would not be bladed within 50' of flowing streams, unless necessary to protect culvert or road stability. Other maintenance activities would include cleaning catch-basins, brushing near pipe inlets and outlets, and removing vegetation along roadsides to improve site distance.

2.4 Best Management Practices and Project Design Features

Project Design Features (PDFs) are specific measures included in the site specific design of the Action Alternatives to eliminate or minimize adverse impacts on the human environment. Best Management Practices (BMPs) are required by the Federal Clean Water Act to reduce nonpoint source pollution to the maximum extent practicable. The BMPs are methods, measures, or practices selected from Appendix D of the 1995 ROD/ RMP to ensure that water quality would be maintained at its highest practicable level.

Logging Systems

- Limbing, (>3" diameter limbs) of harvested trees would not be required if total soil disturbance for all actions can be restricted to less than 15% of the harvested area. For any activities that would exceed the 15% threshold, all harvested trees would be limbed (≥ 3" diameter limbs) prior to yarding to reduce damage to the residual stand and minimize soil disturbance.
- Whole tree yarding or with tops attached to the last log would be permitted as long as contractor can operate without causing unacceptable damage from bark slippage, girdling, broken tops, or damage to live crowns. If it is determined by the Authorized Officer that unacceptable amounts of damage is occurring, trees would be required to be bucked and limbed as directed by the Authorized Officer. Delivered log length not to exceed 44 feet.
- All logging and hauling would generally be restricted between Oct. 15th and May 15th for erosion control. Dates may vary depending on weather, road surface, and soil moisture.
- There would be no cable yarding landings within Riparian Reserves. 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 unstable areas, only fuel reduction activities would occur.

Tractor Yarding

- To reduce ground disturbance and soil compaction, yarding tractors would be limited to the smallest size necessary. Tractors would be equipped to obtain one end log suspension during skidding and would be restricted to approved skid trails spaced 150' apart where topography allows. Existing skid trails would be used when possible. Tractors would be restricted to slopes <35%.
- Tractor logging would not occur when soil moisture at a depth of 4-6 inches is wet enough to maintain form when compressed, or when soil moisture at the surface would readily displace, causing ribbons and ruts along equipment tracks. These conditions are generally found when soil moisture, at a depth of 4-10 inches, and is between 15-25% depending on soil type..
- Skid roads would be water barred as appropriate for slope and soil type. Main tractor skid trails would be blocked where they intersect haul roads. All compacted skid roads would be decompacted and would be water barred
- Harvest equipment used off of designated skidtrails would operate on ground less than 35% slope, have an arm capable of reaching at least 20 feet and minimize turning. When practical, the harvest equipment must walk on a mat of existing or created slash. To prevent operations from exceeding the maximum 5% soil productivity loss **or 12% compaction levels across the harvest unit**, equipment use may be restricted depending on soil type, soil moisture, ground pressure of the equipment, and presence of slash to operate on.

Cable Yarding

- 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 to avoid potentially unstable areas.

Special Status Botanical Species

- Bureau Sensitive and Survey and Manage botanical species would be protected by establishing variable radius no disturbance buffers or implementing seasonal restrictions. The minimum buffer size would be 20' radius, actual size would be determined on a case by case basis based on differing habitat requirements and existing habitat conditions.
- Trees would be directionally felled away from all no disturbance buffers.
- Prescribed burns would occur during cool, moist weather conditions in units that contain Special Status Species.

Noxious Weeds

- All heavy equipment, including brushing machinery, would be pressure washed to remove all dirt and debris prior to entering BLM lands and when moving from infested to non-infested areas within the Planning Area. This includes a thorough cleaning of the undercarriage in a designated cleaning area or equipment yard after loading. Cleaning areas would be subsequently monitored for infestation and weeds would be treated.
- Roadside noxious weed populations would be treated prior to timber sale activity with subsequent treatments as necessary and as funding is available. Treatments could be accomplished through ongoing Medford District noxious weed program.
- Haul truck turn-arounds would not be constructed in known noxious weed populations (BLM map to be provided).

- Equipment and material would not be stored in known weed populations (BLM map to be provided).
- When possible, temporary roads off of permanent roads would not be constructed through known weed sites.
- Roadsides disturbed by project implementation (e.g. culvert, shoulder work, landings) would be re-vegetated after implementation.
- Seed and straw used for restoration, replanting of bare soil, and post treatment throughout the Planning Area would be native species and weed free to prevent the further spread of noxious weeds. All seeding would be contingent on seed availability.

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 the 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.
- Drip torches would not be filled within 150 ft. of streams.
- *Patrol and mop-up* of burned areas would help prevent re-burning or fire escape. A helicopter with water bucket may be used during mop-up to aid in extinguishing larger burning fuels and internal re-burning in islands of unburned fuels.

Cultural Resources

- All archaeological sites located during cultural resource surveys would be protected using a 25 ft. no entry buffer area. There are eight recorded cultural sites in the Planning Area which would be buffered prior to project implementation. Flagging would be placed 25 feet from the site boundary. No treatments would occur within this buffer. No fire line construction, prescribed burning, or hand piling/burning would occur within the flagged boundaries of the recorded cultural resources.
- Any archaeological or historical artifacts or remains discovered during operations would be left intact and undisturbed; all work in the area would stop immediately and the area archaeologist would be notified immediately.

Wildlife

- Work activities that cause disturbance above ambient noise levels would not occur from March 1 to June 30 within specified distances of known spotted owl sites (within ¼ mile of chainsaw activities, quarry operations other than blasting, and helicopter operations; within 1 mile for unmuffled blasting). These seasonal restrictions may be waived if non-nesting is determined through BLM surveys. If any new owls are discovered during harvest, activities would stop until mitigation options can be determined.
- Meadows and natural openings would be buffered with a 100' no commercial harvest buffer (pre-commercial thinning, hand piling, and burning would be allowed).
- Maintain all snags $\geq$ 16" DBH, except those that need to be felled for safety reasons. Those snags felled for safety reasons would be left on-site.

- 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.
- Maintain existing large (>16" DBH), coarse woody debris (CWD) to the greatest extent possible from disturbance during treatments.
- Known Del Norte salamander sites would receive a one site-potential tree or 100' horizontal distance (whichever is greater) buffer. Within the site and its surrounding buffer, a minimum 40% canopy closure would be maintained and any activities that would directly disrupt the surface talus layer would be avoided. Partial harvest within a buffer may be possible if a minimum 40% canopy closure can be maintained; in such cases, tree harvest must be conducted using helicopters or cable systems to avoid compaction or other disturbance of talus. Prescribed burning in buffers would occur only when temperatures are at or below freezing to avoid direct mortality to salamanders. Trees would be directionally felled away from these buffers.

Recreation

- To reduce the unauthorized OHV trails, fireline construction would not be done within 100 feet of roadways until project is implemented. Vegetation removal would be minimal for the first 100 feet, routing the fireline around existing vegetation where possible. Upon completion, vegetation would be pulled back over the first 100 feet of fireline.
- Vegetation would be pulled back over the first 50 feet of spur/skidroad in Unit 29-2 where it intersects on either side with BLM haul roads.

Roads - Construction, Improvement, Decommissioning, and Closures

- All temporary spur roads would be constructed and decommissioned in the dry season. 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 road closure barriers would be placed to discourage wet season use prior to decommissioning.
- All roads can be used during the wet season, October 15 through May 15, if adequately surfaced or if weather is unseasonably dry as determined by the Authorized Officer.
- Thinning of vegetation would be favored over removal along roads.
- Dust created from log hauling would be abated as necessary to reduce driving hazards and protect the fine materials that bind the road surface rock, thus increasing road longevity. Dust abatement may include the application of water, lignin, or reduced vehicle speed.
- Road side hazard trees that need to be felled in Riparian Reserves or owl cores would be left on site.
- Blading of ditch lines would not occur within 50 feet of streams unless the lack of blading would compromise the integrity of the road prism. If blading within 50 feet of streams is required, Best Management Practices of placement of baffles or straw bales in the ditch would be required.

Riparian Reserves

- There would be no treatment, other than road work within Riparian Reserves under any alternative. Riparian Reserve widths are defined in the Table 4 below:

Table 4. Riparian Reserve Widths -No Treatment

Stream Type	Riparian Reserve Width
Fish-bearing streams	380’
Perennial streams & springs and intermittent streams (all without fish)	190’
Unstable or potentially unstable areas (not in above categories)	190’

3.0 Affected Environment and Environmental Consequences

3.1 Introduction

In accordance with law, regulation, executive order, policy and direction an interdisciplinary team reviewed the elements of the human environment to determine if they would be affected by the alternatives described in Chapter 2.0. The Affected Environment portion of this chapter describes the current conditions in the Deer North Thin Planning Area and the relevant resources that could be potentially affected. The Environmental Consequences provides the analytical basis for the comparisons of the alternatives (40 CFR § 1502.16) and the reasonably foreseeable environmental consequences to the human environment that each alternative would potentially have on the relevant resources. Impacts can be beneficial, neutral or detrimental. This analysis considers the direct impacts (effects caused by the action and occurring at the same place and time), indirect impacts (effects caused by the action but occurring later in time and farther removed in distance but are reasonably foreseeable) and cumulative impacts (effects caused by the action when added to other past, present and reasonably foreseeable future actions on all land ownerships). The temporal and spatial scales used in this analysis may vary depending on the resource being affected.

Cumulative Effects
As the Council on Environmental Quality (CEQ), in guidance issued on June 24, 2005, points out, the "environmental analysis required under NEPA is forward-looking," and review of past actions is required only "to the extent that this review informs agency decision-making regarding the proposed action." 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.)

When encountering a gap in information, the question implicit in the Council on Environmental Quality regulations on incomplete and unavailable information was posed: is this information "essential to a reasoned choice among the alternatives?" (40 CFR §1502.22[a]). While additional information would often add precision to estimates or better specify a relationship, the basic data and central relationships are sufficiently well established that any new information would not likely change relationships or conclusions. Although new information would be welcome, the team did not identify any missing information as essential for the Decision Maker to make a reasoned choice among the alternatives.

The IDT weighed the scientific evidence offered through public comments, as well as that gathered by each resource specialist. Scoping for this project did not identify any need to exhaustively list individual past actions or analyze, compare, or describe the environmental

effects of individual past actions in order to complete an analysis which would be useful for illuminating or predicting the effects of the proposed action.

The Deer Creek Watershed Analysis (1997) describes the events that contributed to the current condition such as early hunting/gathering by aboriginal inhabitants, mining, road building, agriculture and water diversions, wildfire, and timber harvest.

Rural development across the watershed has modified the landscape and ecological processes through construction of new homes and roads, and water diversions and well drilling which has disrupted hydrologic processes and further fragmented the landscape. The No Action Alternative serves as a baseline or reference point for evaluating the environmental effects of the action alternatives, including cumulative effects.

3.2 Soil and Water

3.2.1 Introduction

Methodology
The Resource Area Soil Scientist used a "change detection" geographic information system (GIS) for analyzing the existing conditions of the Deer Creek 5th field watershed to assess the effects of timber harvest on the watershed's hydrology and peak flows. Change detection analysis measures acres of openings caused by management actions and natural events such as stand-replacing harvests or wildfires using satellite imagery data from the past 30 years. Change detection is a "first-cut" method, used as a screen, to determine if logged or burned openings in the forests are sufficiently extensive to further analyze for possible peak flow effects. Change detection uses satellite imagery selected in periodic increments over 30 years. The most recent set of images was from 2002. The satellite images were interpreted to determine openings created by logging or fire. This method is not extremely accurate in terms of actual boundaries of created forest openings but it results in percentages that reflect the area of forest openings. For initial analysis all acres of openings counted through 30 years are summed and converted to percentages of 7th field drainage areas. Acres for the August 2005 Deer Creek Fire were also included.

BLM Riparian Reserve surveys determined functioning condition of streams on BLM lands in 1997 and 2007. The 1997 surveys were conducted for the Deer Mom project using roughly the same parameters as more recent surveys. Ten percent of the older surveyed stream reaches were resurveyed in 2008 to check for current relevance. The older surveys were found to be valuable for analysis.

The scale for this analysis is the 5th and 6th field watershed level of Deer Creek and its tributaries for cumulative effects analysis. The 5th field watershed scale is appropriate because the proposed project lies within this boundary, and we do not expect any effects to the soils or water from the project to occur outside the 5th field watershed. In addition, peak flow analysis was performed at the 7th field scale.

The Medford District Resource Management Plan (RMP) and FEIS (USDI 1994) analyzed watershed effects of projects at the 5th field watershed scale. The Medford BLM Record of

Decision and Resource Management Plan relies on Best Management Practices (BMPs) to comply with the Federal Clean Water Act. BMPs are considered the primary mechanisms to achieve Oregon water quality standards (USDI 1995 p.149)

Assumptions

For purposes of this analysis, we assume that private timberlands would remain in an early to mid-seral condition with high densities of roads and skid trails. We also assume that logging on nonfederal lands would occur on a 60 year rotation or an average of about 2 percent cut of nonfederal lands per year (47% of the 5th field watershed consists of nonfederal land, USDI 1997). Based on 2006 aerial photo analysis, 10 to 20% of stands on private lands in and near the Planning Area show patterns of intense logging. The analyses included only parameters that this project may affect. These are:

1. Hydrologic Process
   - Peak flows – Research shows that new openings created in forested stands can increase peak flows.
   - Stream channel – Past land management practices on agricultural and forested land have affected stream channel stability in the Deer Creek watershed.

2. Water Quality
   - Temperature – Deer Creek is listed under the Clean Water Act as water quality limited due to warm seasonal temperatures. Logging can affect stream temperatures.
   - Sediment – Deer Creek and its tributaries have had a history of accumulation of fine sediment in the stream beds. Logging and road building can increase sediment in streams.

3. Soil Productivity
   - Logging practices can diminish soil productivity by compacting soil and/or causing detrimental soil disturbance.

3.2.2 Affected Environment Soil and Water

The approximately 72,700 acre Deer Creek 5th field watershed is within the Illinois River sub-basin. Within the Deer Creek 5th field watershed are four 6th field watersheds. The Deer North Planning Area is within two 6th field watersheds, Middle and Lower Deer Creek. Middle Deer Creek subwatershed has 11- 7th field drainage areas and Lower Deer Creek subwatershed has 19 - 7th field drainage areas. The land within the planning area drains into the lower portion of the Deer Creek where it flows down to its confluence with the Illinois River. The Deer Creek Watershed Analysis (USDI 1997) provides general water resources background information for the project planning area.

Numerous disturbances have occurred in the Deer Creek 5th field watershed in the past 55 years. Based on the change detection analysis, combined with data from the 2005 Deer Creek fire, between 1972 and the present, 1,073 acres (1.5% of watershed area) have burned sufficiently intense to create openings across all ownerships. Between 1972 and 2002, analysis shows that 5,646 acres (7.8% of watershed area) have been logged, also creating openings. The majority of harvest occurred from the late 1970s to the early 1990s.

The existing watershed condition is the result of past actions and natural events that have occurred in the Deer Creek 5th field watershed. Past and current actions have resulted in existing hydrologic conditions, such as elevated stream temperatures, slight additions of fine sediment above background levels, reduced summer flow, and simplified stream channels. Past logging practices, road building, and agricultural development are the dominant actions that have resulted in these conditions. This includes harvest close to streams that removed riparian vegetation (including stream cleaning), and roads built alongside streams that created drainage ditches, which route sediment runoff into the streams. Other contributors include urban/rural development and some mining.

Hydrologic Process

Peak Flows: The Deer Creek watershed has a Mediterranean climate with cool, wet winters and warm dry summers. Annual precipitation in the 5th field watershed is variable, ranging from approximately 56 to 100 inches. The Deer Creek watershed is predominately rain-dominated. However, at elevations greater than 3,000 feet on the east end of the watershed, rain-on-snow can generate high peak flows, and melting snow pack may result in extended stream flows in the late spring / early summer. The Deer North Planning Area is located at lower rain-dominated elevations. From 1942 to 1956, the estimated mean peak flow of Deer Creek (at Dryden) during the wet season (November–March) was approximately 2,300 cubic feet of water per second (ref.: http://nwis.waterdata.usgs.gov/nwis/peak/?site_no=14377500&).

One of the main hydrological limiting characteristics of the Deer Creek watershed is the minimum stream flow amounts that occur during the summer months. Most of the tributary streams in the lower watershed have very low flows or small pools with little surface flow.

While there have been numerous studies in the Pacific Northwest examining the effects of timber harvest on peak flows, the results vary widely depending on a number of factors including the type of event (rain; rain-on-snow; snow melt), the watersheds' characteristics, and the location of roads and clearcuts (Church et al. 2001). Increases in streamflow have been shown to be proportional to the amount of cover removed with clearcutting, yielding larger increases than partial cutting (Rothacher 1971). However, cutting trees reduces, but does not stop transpiration, as residual plant root systems grow and respond to increased available soil moisture; therefore, evapotranspiration increases with time.

Research (Beschta et al. 2000; Harr et al. 1979; Harr et al. 1976; Jones 2000, Thomas and Megahan 1998, Ziemer 1981) has found that consistent detectable changes to stream flow from timber harvest occurred only when greater than 25 to 30% of the watershed was in clear-cut condition. Most of these studies included watersheds with substantial transient snow-zone (TSZ) openings. Compared to clearcutting, partial cutting would be expected to have a much reduced influence on the stream flow regime. Rapid expansion of root systems and crowns of trees left after partial cutting or thinning would be expected to quickly reduce any changes in streamflow that would result from this type of logging (Rothacher 1971).

Moore et al. (2005) concluded that the magnitude of peak flow increases declined with increasing event magnitude in most cases, with the greatest increases typically associated with autumn rain events on relatively dry catchments. These events resulted in small peak flows with little hydraulic consequence (Moore et al. 2005). Others found peak flow increases for flow

events with a return interval of 5 years or greater were either small or there was no increase (Beschta et al. 2000). In the steep gradient cascade and step-pool type streams, peak flow increases would have no affect on stream channels, as the flows critical for initiating morphological change are far beyond five year events (Grant et al. 1990). However, this does not address meandering alluvial streams (Rosgen Type C). Post-treatment recovery rates varied among studies. It is generally accepted that watersheds exhibit almost complete hydrologic recovery twenty-five years after harvest activities have concluded. Thus, we are most concerned with the amount of openings in a watershed that were created less than twenty-five years ago.

The graph below (Grant et al. 2008) is a compilation of results from several field studies. This graph is relevant because the Planning Area is "rain-dominated" without any TSZ. Note the results are scattered and the patterns that emerge are not exact. The gray shading shows the limit of detection. This graph shows that 29% openings ("percentage harvested") is a very conservative beginning level for rain dominated systems to show any increase in peak flows. The first measured data point is actually at greater than 40% openings and the mean change for all data (dashed line) becomes detectable at 45% openings. Note, there are seven points at or near zero peak-flow-change at all different levels of percentage harvest.

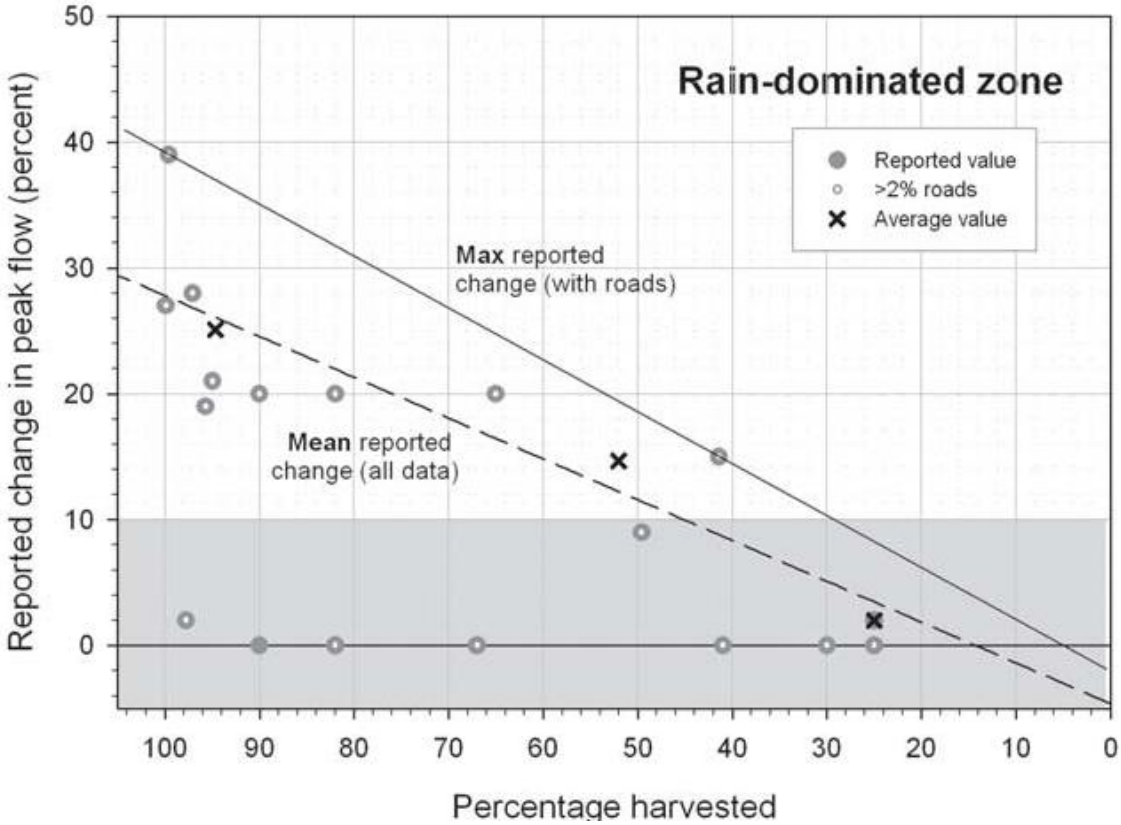


Figure 1. Peak Flow increases in heavily harvested rain-dominate Forests

Table 5, below, displays the percentages based on Change Detection analysis of accumulated openings for the nine drainages that may be affected by the Deer North Project.

Table 5. Percent 7th Field Drainage Areas that are in logged and wildfire openings

6th Field Subwatershed	7th Field Drainage Areas	Opening%
Middle Deer Creek	0212, Deer Creek below White/Harmon Creeks, above Section 15 Bridge	11.5
	0215, Deer Creek (Illinois) below Section 15 Bridge, above Crooks Creek	10.0
	0227,Unnamed Crooks Creek Tributary	10.3
	0230,Crooks Creek below Unnamed Tributary, above Deer Creek confluence	13.5*
	0233,Deer Creek below Crooks Creek, above McMullin Creek	**33.4***
Lower Deer Creek	0406,Draper Creek above Indian Creek	16.6
	0409, Indian Creek to Draper Creek	13.4
	0412, Draper Cr below Indian Creek, above Davis Creek	12.5
	0415, Davis Creek	8.6*

*****Includes openings created by Deer Creek Fire

In order to pass through the screen to be further analyzed, the cumulative opening threshold is conservatively set at 25% or more for rain dominated precipitation. The only 7th field drainage area that passes through the screen is 0233, Deer Creek below Crooks Creek, above McMullin Creek. Of the 33.4%, 27% was caused by the Deer Creek Fire. Though the drainage area lies within part of this Planning Area, there is no proposal under any of the action alternatives that would add openings that would affect any change in peak flows. Therefore further analysis is not needed. There is also no activity proposed in drainage areas 0409 and 0415.

Stream Channels: Roads, past logging practices, agriculture and development have appreciably altered the mainstem of Deer Creek and its tributaries. Compared with pre-European settlement, the stream channels are less stable. Loss of floodplains, large wood in streams, and riparian vegetation in combination with large flood events (1964, 1974, and 1997) led to accelerated erosion. To a lesser degree, roads in the watershed, particularly those with poor drainage, have increased sediment loading. The naturally low summer stream flow has been reduced by irrigation withdrawals (USDA 1997).

Based on stream survey data on BLM lands, 59% of sites were trending upwards or were functioning properly in relation to Proper Functioning Condition and 29% were functioning at risk but with unknown trend. Approximately 31% of the streams were large wood deficient. This data indicates that stream channels are generally becoming more stable.

Field observation indicates that Draper Creek and some tributary streams were cleared in the mid to late 1900s. This was done to “clean the stream,” ridding it of obstacles to flow (vegetation and woody debris) so that flooding was less likely to occur. Currently the channel is substantially down cut below the historical channel by 15 to 20 feet. A newer channel has formed within the down cut banks, meandering from one side to the other. A floodplain margin has formed

between the down cut banks and the newer stream banks. This is an example of a channel that is improving in stability.

Roads Work- Peak Flows and Sediment

Peak Flows

The three primary effects of roads on hydrologic processes (peak flows) are: 1) they intercept rainfall directly on the road surface and cutbanks, and affect subsurface water moving down the hillslope; 2) they concentrate flow either on the surface or in an adjacent ditch or channel; and 3) they divert or reroute water from paths it otherwise would take were the road not present (Gucinski et al. 2001). Roads connected to stream channels through ditch lines effectively extend the stream channel network, changing runoff timing and ultimately increasing the magnitude of peak flows (Wemple et al. 1996). The effect of roads on peak streamflows depends strongly on the size of the watershed and the percentage of the watershed in roaded condition. For example, capture and rerouting of water can remove water from one small stream while causing major channel adjustments in another stream receiving the additional water (Gucinski et al. 2001). Roads have relatively insignificant effects on peak flow in large watersheds where they constitute a small proportion of the land surface; they do not seem to change annual water yields, and no studies have evaluated their effect on low flows (Gucinski et al. 2001).

Roads on steeply-sloped ground intercept surface and subsurface water, routing it to a draw or other natural drainage way within the stream system. This routing of water may cause drainage water to reach streams more quickly than the natural rate, increasing the magnitude of flows and alter the timing of runoff. Increasing road surface coverage in a watershed to a total of over 5% may show measurable increases in peak stream flow over an unroaded condition. Jones (2000) found no statistically significant increases in peak flows attributed to roads when roads occupied 6% of the basin. Similarly, Wright (1990) and Ziemer (1981), found no changes to the hydrograph when roads occupied 5% of the acreage of the watershed.

In the Deer Creek watershed, road area is generally greatest on non-BLM land, greater than 3%; and less on BLM land, less than 2 %. Within the Planning Area, the combined average BLM and non-BLM, roads cover 2.0% of the land area. The portion of road surface in the Middle Deer subwatershed within the Planning Area is 3.0%, and for the Lower Deer subwatershed within the project road coverage constitutes 1.3% of the area.

Because of these low to moderate roaded percentages in the Planning Area, substantial effects from roads on flow, peaks and lows, are very unlikely. Note: roads are included in the Change Detection graph above (Figure 1).

In addition to roads, within the Planning Area, there are OHV trails that are actively used. Half of the OHV trails (2.3 miles of 4.6 total miles in the Planning Area or approximately 2.8 acres) are located in the Draper Creek drainage area. Within the Planning Area OHV trails constitute less than 0.1% of any of the drainage areas, including Draper Creek. The OHV trails are part of an informal, well established system that starts in the Elliot Creek drainage area.

Sediment
Some natural surface roads and OHV trails near streams are probable sources of fine sediment to streams during runoff periods; however, stream surveys indicated only one road-related problem, which was on Crooks Creek.

Land adjacent to Draper Creek and its major tributaries is very gently sloping, allowing for sediment deposition before reaching streams. There is an OHV trail in 37-7W section 29 that runs up a broad bottom swale and intercepts BLM road 37-7-29.2. OHVs drive up the trail and turn onto the BLM road. The BLM road is deeply rutted. The ruts produce sediment during surface runoff periods. However, there is no indication of sediment reaching the stream system. This is likely due to gentle lower slopes combined with heavy vegetation that slows the water, allowing for settling of sediment and infiltration of water before it reaches streams.

Water Quality
The BLM, in cooperation with the Forest Service, Oregon Department of Environmental Quality, and the Environmental Protection Agency, is implementing the *Forest Service and Bureau of Land Management Protocol for Addressing Clean Water Act Section 303(d) Listed Waters* (USDA and USDI 1999). Under the Protocol, the BLM would protect and maintain water quality where standards are met or surpassed, and restore water quality limited waterbodies within their jurisdiction to conditions that meet or surpass standards for designated beneficial uses. The BLM would also adhere to the State Antidegradation Policy (OAR 2005; 340-041-0004) under any proposed actions.

Temperature - The Oregon Department of Environmental Quality (ODEQ), 2004/2006, listed Deer Creek as water quality limited list from Section 303(d) of the Clean Water Act (Table 6) for elevated stream temperatures. Stream temperatures were elevated due to:

- reduction in stream shade through the removal of riparian vegetation from logging, mining, settlement, and road building;
- water withdrawal for irrigation and domestic use during the summer low flow period;
- simplified channels with high width:depth ratios from the removal of large wood from streams;
- large areas of stream scoured to bedrock due to the removal of large wood;
- past mining in stream channels.

These human disturbances, along with natural causes such as poor soils for growing conifer forest stands (like serpentine soils) have resulted in stream temperatures above the ODEQ summer standard maximums.

Deer Creek is the only stream in the watershed that is 303(d) listed. Deer Creek is listed only for high temperatures. Following Northwest Forest Plan (NWFP) Riparian Reserve standards would maintain or reduce water temperatures of perennial streams (USDI 1994). Maintaining and increasing shade to the stream surface is the primary means of maintaining and reducing stream temperature. Generally, shade models with typical tree heights (in mature stands) and canopy closure show that there is a primary shade zone of 50 to 60 feet on each side of streams that blocks solar exposure when solar energy is greatest (10 a.m. to 2 p.m.).

Table 6. Water Quality Assessment 2004/2006 (ODEQ)

Name	Stream Mile	Parameter	Season	Criteria	Status	Assessment Year: Action
Deer Creek	0-17	Temperature	Year Around (Non-spawning)	Salmon and trout rearing and migration: 18.0 degrees Celsius 7-day-average maximum	303(d)	2004 Added to database
	0-17	Temperature	October 15 - May 15	Salmon and steelhead spawning: 13.0 degrees Celsius 7-day-average maximum	303(d)	2004 Added to database

Tributary streams to Deer Creek, though not 303(d) listed, are required to meet the same riparian vegetation standards as is Deer Creek. This is because any change in temperature in a tributary stream would affect Deer Creek.

The Illinois River sub-basin (except Sucker Creek watershed) is included in the Rogue River Basin TMDL (ODEQ 2008). Both stream temperature standards 303(d) listed for Deer Creek are covered in the TMDL. Exceeding of temperature standards is caused by non-point sources of pollution, meaning the cause cannot be identified as a point, such as a pipe outlet. Actions required to counter elevated temperatures (or other non-point sources of pollution) are land management measures generally referred to as Best Management Practices, which are incorporated into PDFs for this project (section 2.4).

Sediment in streams within the Planning Area varies. The 2008 stream survey information for streams on BLM in the Planning Area, indicate that only 23 reaches of tributaries to Deer Creek and Crooks Creek have high levels of fine sediment (>30% of streambed covered with fine sediment as defined in BLM stream survey criteria) while 28 reaches of tributaries to Deer, Crooks, and Draper Creeks have lower levels of fine sediment.

Soil Productivity

Soils in the Planning Area are generally moderately to highly productive (Based on Douglas Fir Site Index). Some soils have high erosion hazard under bare mineral soil conditions where slopes are steep and very steep (greater than 35% slope). Most soils in the Planning Area, however, are not located on steep and very steep sites. Table 7 displays soils within the Planning Area (SCS Soil Survey (USDA.1983)).

Table 7. Soils in the Planning Area

Soil Name (Map Symbol(s))	Texture (Top/Subsoil)	% Slope, No.or So. (N/S)	Key Feature(s) and notes ***Productivity Ratings Douglas-fir Site Index (SI)*** ***Low < 70-85*** ***Moderate 86-120*** ***High 121-130+***
Abegg (1B)	gravelly loam/very gravelly loam	2-7	60+ inches deep, moderate productivity, susceptible to compaction
Beekman-Colestine Complex (6F/7F)	very gravelly loam/ very gravelly loam	50-80 N/S	20-40 inches deep, high erosion hazard (bare soil), verygravelly surface, moderate productivity
Cornutt-Dubakella complex (19D/19E)	cobbly clay loam/ cobbly clay loam	7-35	40-60 inches deep/20-40 inches, cobbly/verycobbly surface, moderate productivity/v.low on Dubakella, susceptible to compaction, serpentine influenced
Josephine (47E)	gravelly loam/ clay loam	20-35	40-60 inches deep, high erosion hazard (bare soil), thin gravelly surface, high productivity, susceptible to compaction
Josephine (48F)	gravelly loam/ clay loam	35-55 N	40-60 inches deep, high erosion hazard (bare soil), thin gravelly surface, high productivity
Jumpoff (49D/49E)	clay loam/clay	7-35	40-60 inches deep, slow permeability, moderate productivity, susceptible to compaction
Pollard (61B/61D)	loam/clay loam to clay	2-20	60+inches deep, high productivity, susceptible to compaction
Pollard (62F)	gravelly loam/clay loam	35-50	60+inches deep, high erosion hazard (bare soil), high productivity
Speaker-Josephine complex (72F)	gravelly loam/ gravelly clay loam	35-55 S	20-40 inches deep, high erosion hazard (bare soil), moderate productivity
Takilma (73)	cobbly loam/very cobbly loam	0-3	60+inches deep, low productivity, susceptible to compaction

The above information indicates that soil erosion processes in the Planning Area are dominated by concentrated runoff (19D, 19E, 47E, 48F, 49D, 49E, 62F, 72F) with some surface ravelling (6F/7F). These forms of erosion have contributed to past soil loss. The chief factor creating high erosion hazard is steep slopes in bare soil conditions. Soil erosion greater than natural process reduces soil productivity by reducing the amount of higher organic/microbe content in the upper soil that contributes nutrients for plant growth.

Forest productivity also depends on soil biotic activity, specifically assimilation of nutrients in plant-available forms as well as making water available to plants that plant roots alone cannot take up. Microbial populations, particularly ectomychorrhizal fungi (EMF) (Amaranthus 1998), provide basic soil nutrients and water to forest vegetation. Observation of planted stands indicates that soil microbial populations establish themselves within ten years of planting. This is based on personal observations of mychorrhizal hyphae in older plantations.

The immediate effects of heavy equipment on soil are to increase soil resistance to root growth and penetration; reduced conductivity of soil to water through a reduction in size, continuity, and total volume of pores, especially large pores; and reduced number, size, and/or strength of structural aggregates. The depth of these effects (typically 4 to 10 inches) is a function of the

ground pressure and total load, soil characteristics (e.g., texture, structure), and moisture conditions at the time of operation. Ground pressure is greatest at the soil surface and decreases with depth. Soil compaction increases soil resistance to root growth and penetration and therefore, reduces plant growth rates. Tractor and cable yarding are two tree harvest methods proposed for use in this project. Of the two, generally, tractor yarding causes the most compaction, followed by cable. Typically, using modern methods, tractor yarding causes 7% to 25% compaction of logged areas, while cable yarding causes less than 5% to 10% compaction of logged areas.

Tractor yarding typically removes vegetation and duff, thereby exposing soils to rainfall and subsequent erosion. Tractor yarding also physically displaces soils, resulting in potential erosion and subsequent off-site sedimentation. "The assessment of surface erosion and sediment routing during the first two years following harvest indicates that a 10 meter (32.8 feet) setback for ground disturbance can be expected to prevent sediment delivery to streams from about 95 percent of harvest-related erosion features" (Rashin, et al .2006).

Based on aerial photo interpretation, field observation, and past stand management history, an estimated 808 acres in the Planning Area show detrimental compaction, that is 12 to 30+% covered by skid trails. These acres are in skid trails within past tractor-logged units at various stages of recovery, assuming a 60 year recovery period (Froehlich, H.A., D.H McNabb 1983). Given that ground-based equipment in the 1960s and 1970s was not generally confined to designated skid trails, typical compaction occurred over 25 to 30% of each tractor logged stand. For post 1970s tractor logging, skid trail routes on BLM land were designated to limit the area of compaction to 12% or less. For non-BLM lands, it is assumed that compaction level continues to be 25 to 30% (average based on Froehlich and McNabb.1983, p. 183). Total existing compacted area due to logging is an estimated 4% of the Middle Deer Creek subwatershed and 2% of the Lower Deer Creek subwatershed portions of the Planning Area. As stated under Hydrology, above, roads (assumed to be permanently compacted) occupy about 2% of the Planning Area. The current total level of compaction (includes tractor and cable logged areas, roads, OHV trails) in the Planning Area is roughly 8% in the Middle Deer Creek 6th field part of the Planning Area, and 5% in the Lower Deer Creek 6th field part of the Planning Area.

Activities on Non-Federal Lands

The ability of BLM to improve hydrologic function and resultant effects on fisheries in this watershed is limited because the predominant factors contributing to the detrimental conditions in the streams are not subject to BLM's control or influence.

Non-federal entities (Oregon, Josephine County, private timber companies, and private citizens) own 47% of the land in the Deer Creek watershed (USDI.1997). Roughly 16% of the Deer Creek watershed is under forest industry ownership while 26% is under other private ownership (Deer Creek Watershed Analysis (USDI. 1997)). Land management constraints for private lands are required to manage their stands within the guidelines of Oregon's State Forest Practices Act. Moreover, most of the valley bottom lands, where a major portion of the fishery streams exist, are controlled by private individuals. Agricultural development and road construction in the valley bottoms have caused streams to be less sinuous and have reduced the amount of shade, reducing habitat complexity. Even though the management of these lands has a major impact on

the stream and aquatic health, there are no coordinated management objectives established for private lands (USDI. 1997).

Current Trends
For thermal protection of cold water beneficial uses, the Oregon Department of Environmental Quality generally considers full recovery of shade at 80% (USFS, USDI 2004).

BLM stream surveys in the Planning Area, performed in the summer of 2008, indicate that riparian shade is generally adequate (only one of 58 stream reaches lacked a riparian buffer, a very narrow intermittent stream in T38-R7W-Section 5 that has no effect on summer high stream temperatures).

Fire suppression in combination with past riparian harvest activities has led to high density, slow growing stand conditions in moderate to high gradient reaches of streams. High-density stands have been identified adjacent to riparian areas of Draper Creek. About a third of the Deer Creek watershed is classified as high fire hazard (USDI.1997). About a third of the Deer Creek watershed is classified as high fire risk (See Fire and Fuels section in Chapter 3). It is likely that both of these categories have increased in the past 12 years. Associated with the altered fire regime, there is a strong possibility of losing key existing soil and water characteristics to a large wildfire in the next 20 years.

3.3.2 Environmental Consequences Soil and Water

3.3.2.1 Alternative 1 (No Action) Effects to Soil and Water

Urbanization, rural development, and commercial logging are expected to continue throughout the watershed. Road building to support the urbanization would also continue, creating more impervious surfaces that would not experience hydrologic recovery because most of these roads would likely be continually used.

Under the No Action Alternative, no forest harvest projects proposed in this EA would occur and current conditions and trends would continue. Under this alternative, there would be no direct effects from ground disturbance on water quality or quantity in the Planning Area based on BLM actions. It is understood that the private and non-BLM government agencies would perform actions that would change the landscape with continuing trends and resultant effects as outlined above. It is assumed that these activities would occur at roughly the same rate that they have in the past. As an example; Indian Hill has proposed a quarter mile of road construction in the upper part of the McMullin Creek 6th field subwatershed. These requests are a normal part of BLM business and occur regularly, but on an unpredictable schedule.

It is assumed that one additional BLM project would occur in the Deer Creek 5th field watershed within the next five years, the South Deer Landscape Management Project. The South Deer Planning Area is location predominately in the McMullin Creek 6th field subwatershed. For this project, there were no anticipated added effects to surface water from project activities. The only effect to soilwould be soil compaction resulting in some soil productivity loss, but overall compaction would remain within RMP acceptable levels.

BLM fuel treatments would continue, though resulting reduction in acres of heavy fuel load conditions would be small under the Programmatic Fuel Hazard Reduction EA (EA # DOI-BLM-OR-M070-2009-0009-EA). Emphasis would be on areas near rural development. Also understory thinning would continue in riparian zones under the Aquatic Restoration EA (EA# DOI-BLM-OR-M010-2009-0004-EA) where needed to improve riparian habitat as well as to reduce fire hazard.

If a high-severity fire were to occur, it could damage soils by removing the entire duff layer. Intense burning could alter key soil physical, chemical, and biological characteristics resulting in diminished soil productivity (Scott and Van Wyk, 1990; Neary et al. 1999). High severity fires in the riparian zone would greatly decrease stream shade and large wood recruitment potential. After an intense, high-severity fire this condition would persist but gradually improve over the ensuing 60+ years. Although there is a strong probability that a high intensity fire would occur in the Deer Creek 5th field watershed within the high fire risk area (31% of the watershed, see Fire and Fuels section below), it cannot be determined when or where it may occur. Therefore this event cannot be foreseen for any particular subwatershed and is not taken into account below for each Soil and Water effect category.

Hydrologic Process

***Peak Flows*:** As land treatments on non-BLM land would likely continue to be at roughly the same rate as currently, recovery from past clear cut logging would roughly equal new clear cut openings that would be forming. This would leave net logged openings at approximately the same as currently. Therefore peak flows would remain at about the same as they are currently. Few roads would be constructed on non-BLM lands. It is not anticipated the roaded areas in 6th field subwatershed in Deer North Planning Area would experience any dramatic increases. It would stay within ranges of 2% to 2.3% in the Planning Area part of Lower Deer 6th field subwatershed and 3% to 3.3% in the Planning Area part of Middle Deer 6th field subwatershed. Even with occasional future additions of access roads, this would likely remain far less than where any measurable increase in peak flow would occur (5 to 6% threshold).

***Stream Channel*:** If there is no action on BLM land within the Planning Area, stream channel stability is likely to remain at the same trend, which is improving. This is assuming that there would be no accelerated activity in logging, development on slopes, or road construction.

Water Quality

***Temperature*:** Assuming the same rate of land treatments is implemented as planned on other than BLM lands, temperatures of Deer Creek should diminish with time as the ODEQ TMDL for the Rogue Basin is implemented. It is not known the length of time it would take and the amount of reduction, but the goals to reach are 7-day maximum temperature standards for cold water fish—less than 18 degrees C in the summer and less than 13 degrees C during spawning season.

Sediment: No road decommissioning or road maintenance would occur under the No Action Alternative. Roads would remain in current condition and have some localized drainage problems that may result in fine sediment reaching streams. We assume some road construction would occur on non-BLM lands. Additionally, OHV activity may expand with an increase in the existing network of user-created trails in the Planning Area, including more creek crossings. It is

anticipated therefore, that fine sediment in streams would increase slightly in the long term from current, varied levels, particularly in Draper Creek.

Soil Productivity
Soils would remain at approximately the same productivity range as currently. The existing Planning Area shows compaction levels, including roads, of roughly 8% of the Middle Deer Creek part of the Planning Area, and 5% of the Lower Deer Creek part (see **Soil Productivity** under **Existing Environment** section, above). Compaction may increase if the rate of logging on private lands increases and OHV activity expands. However, in the next 20 years compaction levels should remain moderate (<12% of compacted area).

3.2.2.2 Alternatives 2 and 3 Effects to Soil and Water

Hydrologic Process
***Peak Flows*:** Research shows a relationship between logged or fire caused openings and increased peak flows (see Affected Environment for discussion). Peak flow increases cannot be detected at less than 29% openings. Change detection analysis was completed for all affected 7th field drainage areas. For all drainage areas that would be affected by Deer North, existing openings were far less than the 25% threshold established. For purpose of analysis, new openings would be created by regeneration harvest, 6 to 8 trees (Alt. 2). It was also assumed that proposed DM/Mod.GS/ would create 10% of the unit acres in openings, though Group Selections are likely to cover less than 10% of unit acres. All proposed openings, including the area of temporary route construction for each 7th field drainage, were added to the existing openings (as determined by change detection).

Using Change Detection estimates of existing openings, Table 8, below, also shows the proposed regeneration cut openings and openings that would be caused by proposed modified group selections that would occur under Alternative 2.

Table 8. Change Detection (existing openings) and proposed openings, percent of affected 7th Field Drainage Areas

6th Field Subwatershed	7th Field Drainage Areas	Alt. 1 (Existing) (%)	Alt. 2 (%)	Total (Existing +Alt. 2 (%)
Middle Deer Creek	0212, Deer Cr below White/Harmon Creeks, above Section 15 Bridge	11.5	1.7	**13.2**
	0215, Deer Cr (Illinois) below Section 15 Bridge, above Crooks Cr	10.0	0.7	**10.7**
	0227,Unnamed Crooks Cr Trib	10.3	0.6	**10.9**
	0230,Crooks Cr below Unnamed Trib, above Deer Cr confluence	13.5*	3.6	**17.1**
Lower Deer Creek	0406,Draper Cr above Indian Cr	16.6	4.3	**20.9**
	0412,Draper Cr below Indian Cr, above Davis Cr	12.5	1.5	**14.0**

*****Includes openings created by Deer Creek Fire

There are no regeneration cuts or group selections proposed in Alternative 3, but two acres of temporary roads are proposed; one acre for each 6th field subwatershed are assumed to be new openings. However, one acre would be less than 0.1 percent proposed new openings for any the 7th field drainage areas, a trace amount with no effect on peak flow increase.

As increases in peak flows cannot be detected in small watersheds with logged or wildfire openings totaling less than 29% of the area, there would be no detectable increases in peak flows for any of the proposed action alternatives.

Under Alternative 2, 0.5 miles of road would be constructed on a ridge top in T37S-7W Section 31 within the Lower Deer Creek 6th field subwatershed. This would add about 1.2 acres of road to the system in the 6th field subwatershed. That amounts to only 0.03% roaded area within the Planning Area part of the Lower Deer Creek 6th field subwatershed. With this road added to the system, the roaded area would stay below the threshold for peak flow increase (5-6%).

Stream Channel: There is no action proposed under any action alternative that would destabilize any stream channel. That is, 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). Since there would be no measurable change in peak flows and riparian vegetation would remain, bank stability would remain the same. The only direct contact with stream channels, under all action alternatives, would be a few tractor crossings approved by a BLM fish and/or hydrology specialist. Crossing sites would be picked for minimal disturbance to vegetation, and the channel stability would be maintained.

Water Quality

Activities proposed would meet the Clean Water Act by applying BMP's listed in Appendix D of the ROD/RMP (USDI 1995, p.149 to 170) and relevant PDFs listed in Chapter 2 (Section 2.4) of this EA.

***Temperature*:** Implementation of any alternative would not reduce streamside shade within any stream reach and the project would not reduce large wood recruitment potential because there would be no harvest within Riparian Reserves for any of the alternatives. Riparian Reserves are of sufficient width, a minimum of one site tree height (190 feet). Since no harvest would occur within these distances, all stream shade would be retained. Additionally, since there would be no loss of stream shade for all alternatives, there would no change in shaded stream surface. Therefore, no change in stream temperature is anticipated in the short term and summer/fall temperatures should slowly diminish in the long term as vegetation grows.

Sediment: Under alternative 2, 0.5 miles of road would be constructed on a ridge top in T37S-R7W., Section 31, within the Lower Deer Creek 6th field subwatershed. Given the ridge-top location and the outsloped, no-maintenance design of this road, no sediment is anticipated to reach the stream system from the new road.

Approximately 0.8 miles of temporary routes would be fully decommissioned after use by decompacting and pulling clearing debris onto the road prism, and re-establishing native vegetation. Existing primitive spurs would be water-barred, scarified, seeded, mulched and barricaded. By reestablishing near-natural contours on temporary routes and waterbarring old existing spurs, surface flow would be dispersed before it would have a chance to build erosive

energy. Infiltration of rain would be maximized by these actions and scarification of old existing spurs. Further protection of bare surfaces, by pulling back clearing debris, or mulching and seeding, would limit any rain drop splash or sheet erosion. No sediment is anticipated to reach the stream system from temporary routes or old primitive spurs.

Approximately 31.5 miles of roads are proposed for maintenance/upgrading and used for hauling under all action alternatives to reduce erosion and sediment deposits into streams. A short-term input of sediment to stream channels from the proposed maintenance is anticipated. Sediment production from newly maintained and upgraded forest roads declines substantially with time. A study of 74 road segments with road surfaces graded in western Oregon found 70 percent recovery by the second year and 90 percent recovery by the third year (Luce and Black 2001). Road maintenance would reduce sedimentation in the long term, benefiting water quality and reversing increases in overall sedimentation from past activities.

Ditch maintenance would occur as part of road maintenance where improperly functioning ditches are currently routing water onto the road. Ditch clearing would not usually occur within 50 feet of stream crossings. The site-specific distance would depend on road slope and the ability of the road to shed water before it reaches the stream; slope of the road fill; and type of vegetation. Maintaining distance between ditch clearings and stream crossings reduces potential delivery of sediment to the channel system because the armoring layer is not broken and vegetation in the ditch acts as a filter. The recovery from ditch blading occurs rapidly during the first three years in an exponential pattern (Luce and Black 2001).

The short term inputs from maintenance and hauling may create isolated pockets of fine sediment deposition immediately below culverts (5-100 feet). During high flows, sediment introduced to streams would become an immeasurable fraction of the system sediment load; it would not be detectable at downstream locations. A long-term slight reduction in sedimentation and improved flow routing would be expected following road drainage improvement.

OHV trails would remain where currently located, inadvertent creation of new OHV trails is not anticipated. The PDFs for this project (section 2.4) are designed to discourage expansion of any new OHV trails. One existing OHV trail would be used as a main skid trail and decommissioned following use. It is located in an ephemeral drainage swale and intersects road 37-7-29, and runs up the hill in the swale to intersect with road 37-7-29.2. Due to OHV activity, sediment is running off the upper road and onto the OHV trail in the swale. The decommissioning of the skid/OHV trail coupled with maintenance/upgrading of the 29.2 road would stop the erosion. Though not anticipated, there would be some risk that new OHV trails would be developed in the Draper Creek portions of the Planning Area particularly under Alternative 2 because new openings in regeneration harvest units. There would be fewer opportunities for development of OHV trails under Alternative 3; however, it could occur on tractor skid roads.

As stated above, there would be no treatment in Riparian Reserves. Rashin et al. (2006) found, “The assessment of surface erosion and sediment routing during the first two years following harvest indicates that a 10 meter (32.8 feet) setback for ground disturbance can be expected to prevent sediment delivery to streams from about 95 percent of harvest-related erosion features” (Page 1325). Riparian Reserves under all action alternatives would have effective no-treatment buffers of at least190 feet for all perennial and intermittent streams. Therefore, sediment from

regeneration harvested units should not reach streams through these buffers due to a lack of routing mechanisms and resulting infiltration.

Soil Productivity

With the implementation of the action alternatives, soils would remain within the same productivity range. The existing Planning Area shows compaction levels (including roads) of roughly 8% of Middle Deer Creek part of the Planning Area Area and 5% of Lower Deer Creek part (see Soil Productivity part of Affected Environment section above). Compaction would increase by slightly less than 1% for all action alternatives in the Middle Deer Creek part of the Planning Area. Compaction would increase by less than 0.5% for all action alternatives in the Lower Deer Creek part of the Planning Area. However, in the next 20 years compaction levels should remain moderate (<12% of compacted area). This is based on estimates from average rotations on federal and non-federal lands and average compaction for logging on federal and non-federal lands on the Deer Creek 5th field watershed.

Regeneration harvest units under Alternative 2 would be decompacted. For all Density Management units compaction would remain until final entry. Therefore, because all units to be harvested under Alternative 3 are under a Density Management prescription, there would be slightly more (0.2% and 0.1% more for Middle Deer and Lower Deer respectively) compaction created under that alternative than for Alternative 2.

Regeneration harvest, leaving 6 to 8 trees per acre and subsequent fuels treatment, would reduce organic duff by roughly 40 to 90% per unit as well as remove microbial host trees. Beneficial microbial populations would be substantially diminished. Some continuous bare soil conditions are likely to occur with subsequent short term erosion. Regeneration harvest followed by burning would diminish beneficial microbial populations and assimilation of nitrogen and other nutrients, but personal observation of tree plantations suggest that beneficial microbial populations recover within 10 years of planting.

Density Management and subsequent low intensity underburning would retain a mix of hardwoods and conifers, organic duff layer, leaf litter, and course woody debris. Collectively, these forest components provide nutrients, bacteria and fungi decomposers, and mycorrhizae to maintain long-term site productivity. If any bare soil conditions do occur, they would be fragmented and surrounded by unburned ground preventing any concentration of runoff. Based on experience on similar projects, we expected that grasses and forbs would return one year after treatment. Additionally, recent literature reveals that charcoal produced during low-intensity fire is beneficial to nutrient mineralization (MacKenzie et al. 2009).

Table 9 summarizes the effects of all alternatives. It serves to represent cumulative effects for all action alternatives:

Table 9. Comparison of Effects from All Alternatives

6th Field Subwatershed	Action Alternatives	Parameter	Existing, No Action, Level of Cumulative Effect	Cumulative Effect Level After Action	Rationale for Cumulative Effects Determination
Middle Deer Creek (All 7th field drainage areas in Planning Area)	2	Peak Flow	None Measurable (Existing openings below threshhold) Few added openings may occur outside BLM due to logging/development.	No increase in peaks. Proposals would result in unchanged peak flows for all affected 7th field drainage areas	Percent openings is below measurable threshold; hydrologic recovery is sufficient; new road runoff routing mechanisms to streams are limited, there would be none added.
		Stream Temperature	Deer Creek is 303(d) listed. Temperature should decrease slightly as DEQ TMDL is enacted	Same as no action. No activity proposed within RMA's or RR's,	Primary, secondary shade zones would not be touched; improving trend would continue long term, following TMDL.
		Sediment	Low, small localized deposits from roads and OHV trails, would likely remain in current condition	Low, slight improvement in 3 years (short term addition of few fines from roads, maintained, haul)	Channel morphology unaffected and for the long term sediment in streams on BLM should decrease
		Soil Productivity	Moderate at 6th Field level (Compaction - 8%)	Moderate, with a very slight decrease in productivity (Compaction< 9%)	A small increase (<1%) in compaction would minimally decrease productivity at the site level. Also, for the short term, beneficial microbial populations would diminish in regen'd units
	3	Peak Flow	None Measurable (Existing openings) Few added openings may occur outside BLM due to logging/development.	No peak increase. No added openings under this proposal	Percent openings remains the same as existing.
		Stream Temperature	Deer Creek is 303(d) listed. Temperature should decrease slightly as DEQ TMDL is enacted	Same as no action No activity proposed within RR's, Same as no action	Primary, secondary shade zones would not be touched; improving trend would continue long term, following TMDL
		Sediment	Low, small localized deposits from roads and OHV trails, would likely remain in current condition	Low, no change (except short term addition of few fines from roads,	Channel morphology unaffected and; long term, static trend in streams on BLM.

				maintained, haul)	
		Soil Productivity	Moderate at 6th Field level (Compaction -8%)	Moderate with a very slight decrease in productivity (Compaction< 9%)	A slight increase (<1%) in compaction would minimally decrease productivity at the site level.
Lower Deer Creek	2	Peak Flow	None Measurable (Existing openings & roaded area below threshold) Few added openings may occur outside BLM due to logging/development. .	No increase in peaks. Proposals would result in unchanged peak flows for all affected 7th field drainage areas	Percent openings is below measurable threshold; hydrologic recovery is sufficient, new road runoff routing mechanisms to streams are limited.
		Stream Temperature	Deer Creek is 303(d) listed. Temperature should decrease slightly as DEQ TMDL is enacted	Same as no action. No activity proposed within RMA's or RR's,	Primary, secondary shade zones would not be touched; improving trend would continue.long term, following TMDL.
		Sediment	Low, small localized deposits from roads and OHV trails, would likely remain in current condition	Low, slight improvement in 3 years (short term addition of few fines from roads maintained, haul) Indirect: If OHV trails increased due to logged openings, stream sediment may increase.	Channel morphology unaffected and for the long term sediment in streams on BLM should decrease. New OHV trails may route sediment to stream crossings particularly in Draper Creek system
		Soil Productivity	Moderate at 6th Field level (Compaction - 5%)	Moderate, with a very slight decrease in productivity (Compaction< 6%)	A very small increase (<0.5%) in compaction would minimally decrease productivity at the site level. Also, for the short term, beneficial microbial populations would diminish in regen'd units
	3	Peak Flow	None Measurable (Existing openings & roaded area below threshold) Few added openings may occur outside BLM due to logging/development.	No peak increase. No added openings under this proposal	% Openings remains the same as existing.
		Stream	Deer Creek is 303(d)	Same as no	Primary shade zone

		Temperature	listed. Temperature should decrease slightly as DEQ TMDL is enacted	action, No activity proposed within RMA's or RR's,	would be protected; improving trend would continue long term, following TMDL.
		Sediment	Low, small localized deposits from roads and OHV trails, would likely remain in current condition	Low, slight improvement in 3 years (short term addition of few fines from roads maintained, haul) Indirect: Few OHV trails may increase due to new tractor trails, resulting in slight sediment increase	Channel morphology unaffected and for the long term sediment in streams on BLM should decrease Few New OHV trails may route sediment to stream crossings particularly in Draper Creek system
		Soil Productivity	Moderate at 6th field level (Compaction - 5%)	Moderate, with a very slight decrease in productivity (Compaction< 6%)	A very small increase (<0.5%) in compaction would minimally decrease productivity at the site level.

Summary and Conclusions for Soil and Water

Alternative 2 proposes a combination of regeneration harvest and DM/UR and DM/Mod GS treatments. Alternative 3 proposes only DM/UR and DM/Mod GS with little in added openings. Mod GS would create openings no larger than 1 acre. Table 9, above, displays the effects of the proposals. The following are discussions by each category:

1. ***Peak Flow*** is related to openings created in the forest by logging or fire. See discussion above under Affected Environment. Openings that would be created for each alternative in each 7th field drainage were calculated. The highest level reached for any 7th field drainage area was 20.9% for Alternative 2. The 7th field drainage area would be Draper Creek above Indian Creek (0406). All other levels were less than 20%. As 29 % openings is the threshold for detection of peak flow increases, there would be no detectable increase in peak flows at these levels. Since cumulative effects for peak flow are less when scale is broadened, there would be no effect at the Deer Creek Watershed 5th field level.
2. ***Stream Temperature*** would follow the current trend that is premised on Deer Creek being under a TMDL for high temperatures (high temperature is a non-point source pollutant). Solar radiation is the dominant cause of high temperature. Under the TMDL for all lands, as riparian vegetation grows and creates more primary and secondary shade, stream temperature should diminish. All action alternatives under this project would not inhibit this process since all harvest entries would be outside the primary and secondary shade zones.
3. ***Sediment*** inputs into streams can be tracked from specific features on forest lands in the Grants Pass Resource Area, such as roads that are outside the stream channel (personal observation). All action alternatives are anticipated to have short term input of very small amounts of sediment to stream channels from the proposed maintenance and timber

hauling. However, a long term decrease in sediment delivered to streams from current levels is anticipated in both affected 6th field subwatersheds for all action alternatives. This is due to road maintenance and upgrading designed to reduce long-term erosion and sedimentation.

There is some risk that new OHV trails would be developed in the Draper Creek portions of the Planning Area. A potential indirect effect is that new OHV trails would add to fine stream sediment by routing runoff to streams. Most terrain adjacent to Draper Creek is near level to gently sloping and there would be no treatment in Riparian Reserves. This limits routes for sediment to get to the stream system. It is not possible to predict where new OHV trail would be developed but new OHV stream crossings would be sites most susceptible to additions of fine sediment to streams for as long as OHV activity continues.

4. ***Soil Productivity*** for all action alternatives would be slightly reduced as treated areas within the two subwatersheds would increase compacted area. Areas of compaction would remain well within the moderate range that would have an upper threshold of 12% after implementation of any of the action alternatives. Net estimated cumulative effects would be a very slight decrease in soil productivity for Alternative 2 over Alternative 3 for both subwatersheds. This is due to loss of litter/duff and beneficial soil microbes in Regeneration Harvest units. However, this would be for less than 10 years; after 10 years, no difference is expected because of anticipated soil recovery.

Cumulative Effects Analysis for Soil and Water

For Alternatives 2 and 3, within the Deer Creek 5th field watershed (as well as affected 6th field subwatersheds), actions proposed in this document would not contribute to the cumulative watershed effects of:

A. Increased stream peak flows, as any increases at the more focused 7th field drainage level are not measurable
B. Increased stream temperatures because there would be no treatment of vegetation within Riparian Reserves. Project activities maintain streamside shade as well as large wood recruitment potential. Water quality conditions and a future supply of large wood would be maintained.

For Alternatives 2 and 3, within the Deer Creek 5th field watershed (as well as affected 6th field subwatersheds), actions proposed in this alternative would contribute to the cumulative watershed effects of:

A. Sediment to streams in small localized deposits for short term, 3 years; however, in the long term, sedimentation in stream would be less than the current condition. Added OHV trail development could cause additions of fine sediment to Draper Creek.
B. Soil productivity would be slightly reduced but would be maintained in a moderate range of compaction at 5th and 6th field levels. Alternative 2 would also have a loss of litter / duff and beneficial soil microbes in Regeneration Harvest units.

The cumulative effects are within the scope of anticipated effects to water and soil determined in the 1995 RMP/EIS (pp. 4-14 to 4-24).

3.3 Vegetation

3.3.1 Affected Environment Vegetation

The current landscape pattern of vegetation in the Deer North Planning Area is a result of topography, soils, natural disturbances, fire suppression, timber harvest, mining and agricultural / residential development. The 1,548 acre Deer Creek Fire of 2005 is the most pronounced recent disturbance within the Planning Area (Figure 2). Ownership patterns and subsequent use are the primary drivers for current and future vegetative trends. These include but are not limited to residential/agricultural use in the lowlands, even-aged harvest on private timber lands, BLM checkerboard ownership with timber and reserve lands, and Forest Service block ownership supporting multiple uses in the northwest portion of the Deer Creek 5th field watershed (the 5th field watershed is hereafter referred to as the Deer Creek watershed).

Figure 2. The Deer Creek Fire (2005): 1,548 acres. Of the 256 acres occurring on BLM land, 185 acres of these, or 66%, was in the form of a high to moderately-high severity wildfire (127 acres, or 50%, was complete stand replacement).

Plant Series

Approximately 98% of the BLM lands in the Planning Area are in the Douglas-fir and Douglas-fir / tanoak plant series (Table 10). These are highly productive sites supporting a high amount of above ground biomass. During walk-thru assessments, the project forester found an understory component of tanoak on BLM forested stands that show no recorded harvest. The

trend of increasing tanoak presence within the Planning Area coincides with increased tanoak abundance in other portions of Southwest Oregon (C. Martin, personal communication).

Table 10. Plant Association Groups (Atzet et. al. 1996)

PSME-QUKE/RHDI6 (Douglas-fir-California Black Oak/Poison Oak)
PSME-PIPO/RHDI6 (Douglas-fir-Ponderosa Pine /Poison Oak)
PSME-DRY SHRUB
PSME-QUCH2-LIDE3 (Douglas-fir-Canyon Live Oak-Tanoak)
PSME-QUCH2-RHDI 6 (Douglas-fir-Canyon Live Oak-Poison Oak)

Vegetation Condition / Age Class

Tree size classes have been used to describe the relative distribution of seral stages[1] across the watershed; however, this can be misleading in certain respects as described below. Characterization of seral stages on BLM lands in the Planning Area is limited by the best available data set, which is a layer developed in 2001 to inventory BLM and Forest Service Lands in Oregon (Table 11). The biggest concern with the Interagency Vegetation Mapping Project (IVMP) satellite data was the high percentage (25%) of BLM land in the <70% and <30% vegetation cover class since many of the BLM plantations were mapped into this category.

On BLM land in the Planning Area the combined mid and mature classes dominate (56%) followed by the pole class (10%) (Table 11). A visual comparison of the IVMP map with actual known mid and mature stands shows more confidence with these classes than with the pole and early size classes. The early class most often represents plantation stands. According to the IVMP data approximately 7% of BLM land in the Planning Area is in the early class (Table 11). Micro*storms[2] (Table 12) data is provided to illustrate the relative amounts of young stands in the Deer North Planning Area as it provides a more accurate representation of young stands than the IMVP satellite data.

Table 11. IVMP Satellite Data Deer North Planning Area (2001)

Vegetation Condition Class	BLM Acres	Percent	Non-BLM Acres	Percent
Early (conifers 0 to 4.9" DBH)	233	7%	537	10%
Pole (conifers 5-11" DBH)	331	10%	872	16%
Mid (conifers 11-21" DBH)	523	15%	1126	21%
Mature (conifers >21" DBH)	1397	41%	1336	25%
Water	0	0%	0	0%
Barren	0	0%	1	0%
Agricultural, wetlands, etc	18	1%	349	6%
Urban	23	1%	33	1%
Other (snow, noise, etc.)	0	0%	0	0%
<30% vegetation	185	5%	908	17%
<70% vegetation	692	20%	254	5%
TOTAL	**3402**		**5416**	
DBH: Diameter at Breast Height				

1 Seral stages: the series of relatively transitory plant communities that develop during ecological succession from bare ground to the climax stage (RMP p. 112)

2 Micro*Storms: a micro-computer database system providing background information and recommended treatment for each operations inventory unit (stand) (RMP p.107)

Since the adoption of the 1995 Medford District Resource Management Plan (RMP), the 2005 Deer Creek Fire is the only disturbance that has created early seral vegetation on BLM lands in the Deer Creek watershed. This unreliable disturbance mechanism however, in the form of an uncontrolled wildfire event, resulted in the stand replacement of 50% of the affected BLM land (127 of the 256 acres of affected BLM land). Approximately 66% (185 acres) of the BLM land within the fire perimeter experienced high to moderately-high severity wildfire (USDI 2005).

Stand replacement fire detrimentally affects the landscape in the following ways:
removes or degrades valuable wildlife habitat
decreases biological diversity

- creates homogenous stand structure
- removes legacy structural unique stand components from the landscape (legacy oaks, ponderosa pine, sugar pine, and old growth trees)
- increases runoff and soil erosion
- degrades timber value,
- substantially adds federal costs to fund post fire recovery efforts.

The age distribution data from Micro*storms estimated approximately 21% of the Planning Area in less than 30 year old age classes, with 5% directly associated with planted Deer Creek Fire stands (Table 12).

Table 12. Micro*storms age classes on BLM lands Deer North Planning Area

Age Class	BLM Acres	Percent
5-10*	160	5%
20	523	15%
30	35	1%
40-90	707	21%
100 -150	1081	32%
160+	906	26%
Total	**3,412**	
*Includes young stands planted after the Deer Creek Fire		

The impacts of past timber harvesting have varied both spatially and temporally across BLM lands in the Planning Area. Stands that were previously clearcut and replanted now lack the vertical and horizontal structure that once characterized many historical sites in the watershed (USDI 1997). 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 more 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 (i.e. large, mid-sized and small trees are still present).

Commercial harvest has occurred on approximately 17,970 acres of the BLM lands in the Deer Creek watershed since 1900 (Micro*storms). Of these acres only 5,300 were even-age harvest, which as described above, has more impact on forest structure than thinning, salvage, and selective cutting.

Current Ecological Condition
Early-Mid Seral Species Decline

The vegetation pattern in the Deer Creek watershed has shifted from historical conditions. Forests were historically more diverse, contained a mix of seral stages and size classes, and exhibited open growing conditions (USDI 1997). Ponderosa pine and sugar pine developed in more open conditions than the dense structure they are surrounded in today. A favorable

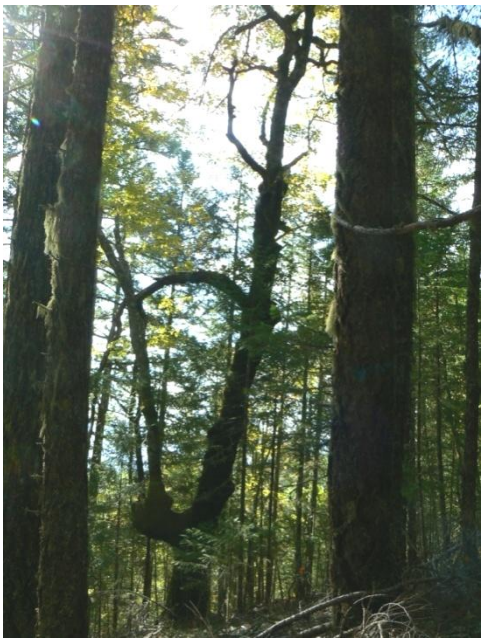


Figure 3. Deer North Unit #33-001. This live legacy black oak is significantly older than the surrounding Douglas-fir. Douglas-fir sample trees in the unit were aged at 100 years old. This age coincides with the onset of fire suppression and settlement that essentially put a halt to disturbances that would have otherwise resulted in lower densities around unique structures such as this one.

growing environment for pine species in the past, resulting from frequent fire and minimal vegetation encroachment, allowed for sun-loving ponderosa pine and sugar pine to form the largest trees in the watershed and often become the most prevalent and dominant forest component (USDI 1997). Some of these trees are evident today, but many have succumbed to competition mortality, drought, and bark beetle infestations that have resulted from lack of disturbance mechanisms on the landscape and subsequent shade tolerant Douglas-fir encroachment. In addition, the number of ponderosa pine seedlings replacing a dying legacy ponderosa pine component is decreasing as crown canopies continue to close in and suppress, overtop, and shade out the early seral, shade intolerant or sun-loving ponderosa pine germinates.A dominant ponderosa pine responds significantly when enough growing space becomes newly available from the removal of adjacent subordinate trees (Barrett 1963, Cochran 1992).

A study of ponderosa pine response to competition in a mixed conifer site in the Sierra Nevada revealed that “even beneath a light overstory stand casting 47 percent shade, ponderosa pine saplings grew only about half as rapidly as their associates (Douglas-fir, sugar pine, white fir,

and incense-cedar) and about half of that expected for fully sunlit pines" (Burns and Honkala 1990). Burns and Honkala also point out that ponderosa pine loses vigor in dense stands. York et al. (2007) found in their Sierran Mixed Conifer study in California that experimental canopy gaps exhibited better survival among shade intolerant species versus their shade tolerant counterparts.Black oak and white oak species are also declining. This is due in large part to the absence of frequent low severity fire on the landscape. The absence of fire can be attributed to both fire suppression in the beginning of the 20th century and the halt of Indians' burning following immigrant settlement prior to the collective western campaign to suppress all wildfires. According to Harrington and Devine (2010), less-frequent fire resulted in oak dominated woodlands encroached upon by Douglas-fir overtopping and shading the oaks, which eventually killed them. They add that, "today the Oregon white oak ecosystem has been reduced to a few remnants" (Harrington and Devine 2010, and Figure 3).

The loss of the ecologically significant species of ponderosa pine and oak species also has implications beyond the loss in species diversity. Oak communities represent unique habitat for wildlife (Harrington and Devine 2010). According to the Deer Creek Watershed Analysis (1997):

> Of particular concern is the remaining oak woodlands and ponderosa pine sites. The loss of these habitat types will continue to contribute to the decline of associated species of wildlife… Large ponderosa pine snags are being lost in the watershed at a rate greater than they are being replaced. The loss of these habitat types will continue to contribute to the decline of associated species of wildlife.

Currently, vegetation condition across the landscape of the Deer Creek watershed is highly variable. This is due mostly to aspect. Conditions on north aspects are cooler and moister than those found on south and southeast aspects. As a result, north aspects exhibit species conducive to cool and moist microenvironments such as Douglas-fir and true firs. Conditions on the southern aspects receive more drying and warming and exhibit drought tolerant species such as shrub species, manzanita, white oak, and ponderosa pine.

Stand Development

As individual trees respond to their environment, they grow and eventually die. The constant change around individual trees influences the development patterns of entire forest stands. Dynamic interactions in stand development can be develop into patterns and divided into stages (Oliver and Larson 1996). All environments with finite resources can only support a finite amount of living biomass (Oliver and Uzoh 1997). Because growing capacity is limited, the in-growth of trees reaches a density level where competition induced mortality begins and the stand relies solely on a disturbance to renew growth. Following disturbance, a stand will see new plants emerge for several years; this is described as the stand initiation stage. As growing space becomes occupied and growth factors become less available to individual trees, new plants no longer emerge and some of the original plants begin to die. Trees with a competitive advantage for the site begin to establish dominance. This stage is then followed by the understory reinitiation stage where openings created by the death of existing trees during the previous stage become occupied by new plants and continue to survive. The stand develops much later into the old growth stage. Here overstory trees die and some lower class trees grow into the overstory.

Douglas-fir Encroachment

Tree growth requires the necessary factors of sunlight, water, nutrients, temperature, oxygen, and carbon dioxide until the absence of one or more of these limit its growth (Oliver and Larson 1996, Smith 1986). This resource may be absent because the growth factor is being utilized by another tree, is no longer available, or its presence is so poor that it is essentially absent. Generally, available growing space is set by the most limiting of these factors. The efficiency of shade tolerant species, such as Douglas-fir, to utilize the limiting factor of sunlight at low levels gives it a competitive advantage over shade intolerant species, such as ponderosa pine and white oak that lack this capability.

As in-growth of Douglas-fir continues to establish itself in an environment with increasing shade, many second growth trees and trees with old-growth characteristics are dying as a result of high stocking levels. To further exacerbate the problem, drought conditions are lowering the natural defenses of established trees. This is predisposing stands to bark beetle infestations and competition mortality. The landscape is seeing an unprecedented amount of Douglas-fir, so much that Douglas-fir is now dominating the species composition. Douglas-fir represents the climax species and, behaving as a drought tolerant pioneer, is replacing early-mid seral ponderosa pine, sugar pine, California black oak, and incense cedar due to its greater shade-tolerance. Harrington and Devine (2010) agree with Agee (1993) in pointing out that Douglas-fir encroachment produces a dense understory replacing the formerly open oak understory. Over time, Douglas-fir would overtop Oregon white oak and the shade-intolerant mature oaks will die (Agee 1993). Douglas-fir, is encroaching upon the edges of pine sites and hardwood/woodlands, making further inroads deeper into these stands. Mortality of Douglas-fir along these edges has been noticeable in the last several years.

Relative Density and Tree Vigor

Preliminary survey data performed between the years 2007-2008 indicate that stocking levels of forestland throughout the Planning Area are high. No disturbances have occurred since this time to reduce stocking to lower densities. Extensive forestry research has been developed to quantify the relationship between stand density and tree growth. The value of these indices is that they are independent of site quality and tree age, allowing them to be applied in a wide variety of conditions. Relative density index is the ratio of actual stand density to the maximum stand density attainable in a stand with the same mean tree volume. The correlative relative density index (RDI) rating between 0.55 and 1.00 for any given stand marks the zone of imminent mortality and suppression; crown closure occurs at a RDI of 0.15 (Drew and Flewelling 1979, Hayes et al. 1997). A relative density of 1.00 means that trees on the site occupy the full growing space with mortality levels equaling stand growth. Briegleb (1952) stated that the optimum densities for most combinations of factors will lie between 0.34 and 0.55 relative densities.

Canopy Leaf Area

Waring and Schlesinger (1985) state that a reduction in canopy leaf area following a disturbance such as a silvicultural system, fire, insect, or disease induced mortality increases the penetration of radiation and precipitation to the forest floor. This, in turn, increases soil temperature and available water supply. Additional light penetration would stimulate photosynthetic rates in the lower canopy; disturbances further provide additional access to water and essential minerals

which increases the rate of wood production per unit of leaf area (Waring and Schlesinger 1985). As long as there is available growing space in a forest stand, individual trees will continue to grow and expand their crowns. When a forest reaches maximum leaf area, further growth requires a corresponding reduction in the number of surviving individuals (Waring and Schlesinger 1985; Mohler et al. 1978). This stage of a stand, referred to as the stem exclusion stage, exhibits a closed canopy layer, poor crown to height ratio, and a forest floor generally lacking in vegetation. Individual tree vigor declines and intense competition ensues predisposing trees to competition mortality and bark beetle infestations. Some existing stems die and are thus excluded from the stand.

The overall rate of decomposition in a forest ecosystem is largely determined by temperature and moisture, with temperature of primary importance. Reducing shade increases soil temperatures and microbial activity, which in turn increases decomposition and nutrient availability (Waring and Schlesinger 1985; Edwards 1975; Oliver and Larson 1996). As forests respond to the reduction of canopy leaf area, increases per unit of leaf area are evident in nutrient and water uptake and the rate of wood production (Waring and Schlesinger 1985).

Tree Vigor

Waring and others (1980) developed a vigor rating using a physiological index of growth efficiency. The vigor index is a measure of health defined as the ratio of annual growth of stemwood to the area of leaves present to capture sunlight (Waring, et al. 1980). Vigorous trees have higher levels of productivity and increased incremental growth. Waring and Pitman (1980) concluded that trees attacked and killed by bark beetles had such low carbohydrate reserves that they lacked the ability to produce sufficient oleoresins which protect the tree against beetles.

Table 13 displays the thresholds of the vigor ratings and can be accurately applied to individual trees and are comparable among conifers (Larsson, et al. 1983, Christiansen et al. 1987).

Table 13. Tree Vigor Rating Index Thresholds (adapted from Waring and Pitman 1985, Mitchell et al. 1983, Christiansen et al. 1987, and Larsson et al. 1983).

Grams of stem growth per meter squared per year ($g/m^2/yr$)	Effect of Bark Beetle Attack on Trees
< 30	Would succumb to attack of relatively low intensity
30-70	Can withstand progressively higher attacks but are still in danger of mortality
70-100	Can generally survive one or more years of relatively heavy attacks
> 100	Can emit sufficient oleoresins to repel invading beetles and survive even relatively heavy insect attacks
> 150	Can open the stand to sucking insects, such as aphids, who take advantage of free sugars and low tannin or other defensive compounds

Each tree species has a specific leaf area/sapwood relationship that reflects its environmental growth potential, which can be estimated using measurements from a core sample (Kimmins 1987). Tree cores were extracted and measured from 53 Douglas-fir sample trees in the Planning Area using an increment borer. The results showed an average current annual vigor rating index of 36.84 of wood production in $g/m^2/yr$. This indicates that Douglas-fir, the majority represented conifer species in the Planning Area, can barely withstand a bark beetle attack (Table 13). It further indicates that Douglas-fir are in danger of mortality from an attack of medium intensity.

Ponderosa pine species are experiencing a sharp decline in the Planning Area. This is the result of a lack of disturbance involving a species that depends heavily on disturbance to maintain productivity and regenerate the site. Disturbances provide the sunlight ponderosa pine requires to maintain productivity, withstand inter-tree competition, and most importantly, to regenerate ponderosa pine for the future. Sample cores collected in the Planning Area during field surveys in 2008 reveal that ponderosa pine is exhibiting a very low vigor rating of 14.69 $g/m^2/yr$. In a study performed by Sartwell (1971), he found that practically all sampled trees grew an annual increment of < 0.09 inches prior to attack. Ponderosa pine in the Planning Area grew an average annual (1-year) increment of 0.10 inches in its most current year's growth.

Bark Beetles

Most conifers have an associated bark beetle that is capable of killing the tree under the right conditions (SWOFIDSC). Bark beetles can alter the stand structure by creating large and small gaps in the stand. However bark beetles often kill large diameter trees and this effect is at its greatest during drought periods. A mortality pocket of ponderosa pine killed by western pine beetle *(Dendroctonus brevicomis)* was detected in 2008 on BLM land within the Deer Creek Fire perimeter. Flatheaded wood borers *(Phaenops drummondi)* are killing Douglas-fir inside the Planning Area while mountain pine beetles *(Dendroctonus ponderosae)* are infesting sugar pine, within 0.5 miles of the Planning Area as indicated by the 2008 and 2009 Aerial Insect and Disease Survey (Oregon Department of Forestry, 2008 & 2009).

Western pine beetles are specific to ponderosa pine preferring large diameter trees. Outbreaks are associated with old growth, mature, or overcrowded second growth stands (USDA 2006). In southwestern Oregon, flatheaded fir borers aggressively attack and kill Douglas-fir, often preferring larger trees (USDA 2006). Therefore, the presence of western pine beetles and flatheaded fir borers on BLM land in the Planning Area poses serious concern in an area already seeing a sharp reduction in large ponderosa pine and Douglas-fir. Consequently, these insects can drastically alter the character of the watershed and the landscape.

Drought and Stand Density

Dense stands heighten tree to tree competition. Growing conditions become so stagnant (at or above stand density index of 0.55) that intense competition follows and the stand begins excluding the weakest trees. During competition, trees commit their energy sources for survival above their competing neighbors. This exhaustive effort predisposes a tree to damage or mortality by incoming insects and diseases. In severe cases entire stands are completely decimated by insects and/or fire. Droughty areas and/or a period of drought exacerbate the problem. Future silvicultural options diminish when severe stand mortality results. Bark beetles may disperse to adjacent non-thinned watersheds and kill additional conifers.

Water availability is considered a tree's most important determinant in its ability to grow and survive (Young and Giese 1992). Drought conditions and high tree stocking levels act as physiological stress agents, enabling beetles to invade and kill trees. A tree under stress has a reduced capability of responding to the invasion because of insufficient oleoresin production to pitch out invading beetles, whereas a vigorous tree is able to eject invading beetles with its pitch. Larsson et al. (1983) point out that ponderosa pine vigor decreases as stand density increases. Sartwell and Stevens (1975) note that in drier sites in the Pacific Northwest, trees in pole-size

stands become susceptible to bark beetle infestations when their stand densities exceed 150 ft^2 BA/AC.

According to DeMars and Roettgering (1982), western pine beetles "breed in and kill scattered, overmature, slow-growing, decadent, or diseased trees and trees weakened by stand stagnation, lightning, fire, or mechanical injury" as occurred within the Deer Creek Fire in subsequent years. Group mortality and individual large diameter tree mortality can occur in dense overstocked stands or in dense pockets within a stand. Extensive mortality in large groups adversely affects distribution of trees and stocking levels, depletes timber supplies, and increases fuel loading which can lead to catastrophic fires. Mortality of large diameter trees, especially ponderosa pine, represents the loss of a significant ecological component of forest stands.

Dolph (1985) found that bark beetle attack occurred in unmanaged stands when trees grew ≤ 1 inch diameter growth per decade. As a general rule, stands with growth rates ≥1.50 inches of diameter growth per decade are less prone to bark beetle attack (USDA 1998, Cochran 1992, Chadwick and Eglitis 2007, USDA 2001). From a sample size of 54 core trees in the Planning Area, the average diameter growth in the last decade was 0.97 inches. This indicates that trees in the Deer North Planning Area are prone to mortality by bark beetle infestations.

In Douglas-fir forests, Fetig et al. (2007) reported that factors contributing to infestation levels consistently include poor growth and stand density. Stands on south and east aspects below 3,500 foot elevations are particularly vulnerable to bark beetles when their densities are high (USDA 2001, USDA 1998). Stand elevations in the Deer North Planning Area range from 1,500 to 2,500 feet in elevation.

The susceptibility of trees to damage by bark beetles can be mitigated by stocking control which is tied closely together with tree vigor (Larsson, et al. 1983). DeMars and Roettgering (1982) recommend that "reducing stand stocking to 55 to 70 percent of the basal area needed for full site utilization will relieve the competitive stress among the remaining trees, improve their vigor, and make them less prone to successful bark beetle attack." Altogether, site disturbance such as fire and thinning improves tree vigor. Larsson, et al. (1983), Waring and Pitman (1980), and Berryman (1981) suggest that comparatively few beetles are needed to kill low vigor trees. Negron (1998) found that poor growth and stand density contributed to increased infestation levels in Douglas-fir forests.

Fire

The August, 2005 Deer Creek Fire, occurring between 1,400 to 2,500 feet in elevation, further weakened surviving trees in the Planning Area which predisposed the surviving trees to insect attack. Fettig et al. (2007) disclosed that:

> "Douglas-fir beetles are attracted to trees with only moderate amounts of crown scorch (Furniss, 1965; Flanagan, 1996; Parker et al., 2006). A high percentage of large diameter Douglas-fir that are initially classified as surviving a mixed severity wildfire may ultimately die due to beetle attack (Weatherby et al., 1994) . . . Crown scorch occurring during the growing season may have more severe effects and consequently results in greater risk of insect attack than during the dormant season (Fischer, 1980).

> ". . . Bark beetles are often considered the most important mortality agent following fires in coniferous forests (Miller and Patterson, 1927; Fischer, 1980; Ryan and Reinhardt, 1988; McCullough et al., 1998; Bradley and Tueller, 2001; Fowler and Sieg, 2004; Parker et al., 2006; among others). Sublethal heating of critical plant tissue can stress trees, which then are more susceptibility to bark beetle attack (Elkin and Reid, 2004)."

Stand Inventory / Growth and Yield

Several representative stands were randomly sampled and analyzed using projections from the ORGANON (Oregon Growth Analysis and Projection System) modeling tool. Inventories are taken at one point in time to provide current conditions and to forecast stand dynamics. Modeling tools are useful to estimate stand characteristics at certain points in time. The intent was to assess the stand condition to determine density, species composition, diameter distribution, site potential, and vigor. Stand density is important in forested stands because, within limits, the more growing space made available to a tree, the less competition it will face and the faster it will grow. The results were entered in the ORGANON growth and yield model and are summarized in Table 14.

Table 14. Species Composition and Stand Condition Summary

Unit (Twnship, range, section, OI#)	Trees Per Acre				Basal Area (ft^2/acre)	Relative Density (%)	Average Diameter (inches)
	Douglas-fir	Pine	Incense Cedar	Hardwood			
37S-7W-33-011	294	91	0	315	222	86	7.6
37S-7W-31-008	340	1	0	290	154	62	6.7
38S-7W-11-002	255	29	0	106	225	77	10.3
38S-7W-11-005	437	66	0	105	244	90	8.6
37S-7W-33-001	540	11	19	211	197	79	6.8
38S-7W-07-003	171	32	0	65	235	74	10.7
37S-7W-33-008	274	0	0	185	246	85	9.9
37S-7W-31-001	900	28	0	254	203	88	5.6
38S-7W-15-001	248	0	0	127	245	82	11.0
Average (percentage)	**384 (64%)**	**29 (5%)**	**2 (>1%)**	**184 (31%)**	**219**	**80**	**9**

Overall, Douglas-fir is the dominant conifer species (65%), followed by ponderosa / sugar pine (5%) with only one stand having an incense cedar component (37S-7W-33-001). Hardwoods make up 31% of the trees/acre in survey areas, but most of these are small diameter trees in the understory. Total trees per acre ranged from 375 to 1,185 in these stands, which translates into a tree every 8 feet based on average tree spacing (range 6 to 11 feet). Average diameters are low in these stands (5.6 inches to 11.0 inches DBH) because of the high number of trees per acre in the smaller size classes. Basal areas ranged from 154 to 246 ft^2/acre and relative density ranged from 0.62 to over 0.90. The average relative density for the area is 0.80 and indicates that

physiologically the trees have exceeded the 0.55 threshold of competition induced suppression and mortality. This is primarily due to the lack of disturbance and fire suppression.

Figure 4 displays the average growth per decade of 54 sample trees in the Planning Area measured from tree cores extracted with an increment borer. The result points to the same outcome as Waring's Vigor Rating Indices. A low Douglas-fir average vigor rating of 36.84 g/m²/yr coincides with this decade's average diameter growth of Douglas-fir at 0.96 inches of growth per current decade – far below the 1.50 inch threshold expected from healthy conifers. The last time Douglas-fir in the Planning Area saw a minimum average growth of 1.50 inches per decade was in the decade ending in 1928, approximately 23 years after fire suppression began as a major campaign throughout the western United States. In addition, a low ponderosa pine average vigor rating of 14.69 g/m²/yr coincides with the species' current average diameter growth of 0.90 inches per decade – both figures are far below their respective thresholds for a ponderosa pine to survive bark beetle attacks.

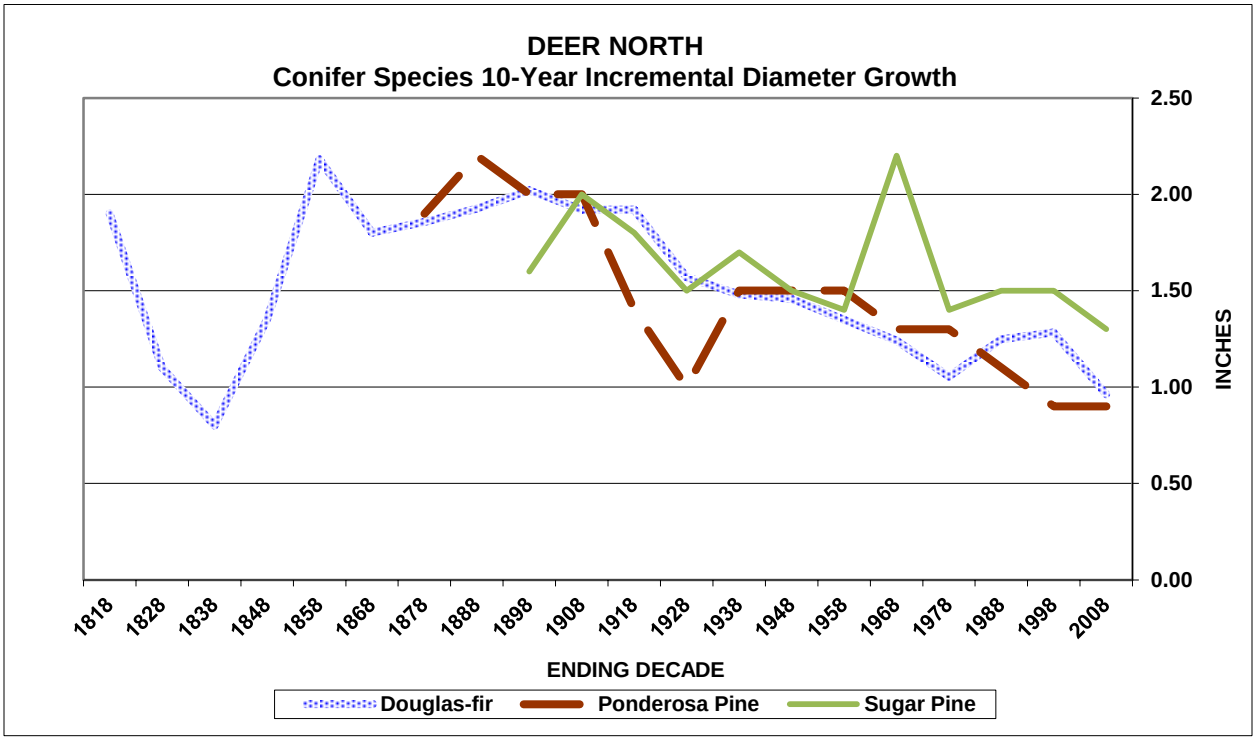


Figure 4. Deer North Planning Area: Diameter Growth Per Decade of the Three Primary Conifer Species.

3.3.2 Environmental Consequences Vegetation

3.3.2.1 Alternative 1 (No Action) Effects to Vegetation

The No Action Alternative would allow forest stands to increase from the overall average of 0.80 relative density. Physiologically, the trees, overall in the Planning Area, have exceeded the relative density threshold of suppression and mortality. Stand densities would continue on their current trajectory and remain overpopulated, whereas, a No Action Alternative would allow

forest stands to remain overstocked and individual tree vigor and growth would remain poor. Stands with relative densities over 0.55 RDI would persist in the stem exclusion stage of development. Tree mortality represents an increase in fuels, elevating the fire hazard, reducing stand volume production, and resulting in low tree vigor.

Without action, forest structure and species composition could not be enhanced. Where ponderosa pine is a component in stands, Douglas-fir would continue to exploit continued shaded conditions and, with their competitive edge, prevail over ponderosa pine, both in current structure and in reestablishment. Without management intervention, together with long term fire exclusion, individual old-growth ponderosa pine, incense cedar, sugar pine, and Douglas-fir trees, with seedlings through poles within their dripline, would continue to die from resource competition. As crowns continue to close, shade tolerant Douglas-fir would take the competitive advantage over pine and oak species. Pine and oak species would continue to decline in number from competition with Douglas-fir because of their shade intolerance. As individual trees continue to crowd the site and compete for space, older preexisting trees of all species would suffer the effects of resource depletion and continue to drop out of the stand as the stand enters the stem exclusion stage.

Large tree mortality would result in forest stand structure gradually shifting to the understory reinitiation stage— a transition phase when trees in the main canopy layer start to die, either singly or in small groups, from lightning, wind-throw, or insects and disease. This is ecologically significant in that resources previously used by the dead tree are reallocated to the surviving vegetation. Small diameter trees, instead of dying out, would continue developing into a dense forest structure prone to disease, catastrophic fire, and eventual dieback from intense competition.

Without density reduction, continued slow tree growth and poor vigor would result in individual tree and perhaps stand mortality. A decrease in stand vigor is expected to continue with continued overstocking and increasing stand age. The current average relative density for the Planning Area is 0.80 and indicates that physiologically the trees are within the zone of suppression and mortality. As measured by stand density, diameter growth, and vigor the forest is unhealthy.

Where dense forest stands persist over time, canopy closure would remain at 80 to 100 percent. When tree mortality is singular or in small patches, canopy closure may approach 50 to 80 percent. In pockets of mortality, canopy closure would range from 0 to 40 percent. Without controlling the number of trees per acre, some forest stands would naturally fall below 60 percent canopy closure as a result of competition mortality, beetle kill, drought, and wildfire.

Figure 5. Left: Stand replacement impact of the 2005 Deer Creek Fire on BLM 38-7W-5. Stand densities were allowed to accumulate over the last 100 years, setting up the landscape for this large-scale event. Right: Adjacent BLM lands treated under Deer Mom Timber Sale exhibited better spacing and were left unburned or burned at a lower intensity. (Source: John Craig)

Data from representative stands inventoried throughout the Planning Area exhibit an average RDI of 0.80. This result indicates that individual trees are spending their energy to compete against adjacent trees. This causes stress in the tree leaving them susceptible to mortality from insect and disease agents, such as bark beetles and dwarf mistletoe. Disease agents in a stressed stand can kill the host tree. Decadent stands intensify the fire behavior which can result in a stand replacement fire (DecAID, SWOFIDSC).

Untreated stands could cause epidemic levels of insects and diseases that could affect adjacent forest stands including private land. Leaving these acres untreated would also decrease the effectiveness of fuels hazard reduction in adjacent treated stands. Lightning is the major cause of fires on BLM lands and the majority of these become large fire events. Untreated stands remain dense and predisposed to large conflagrations that can convert a densely forested site into bare rock and shrubs. Fire hazard would continue to increase with the abundance of dead vegetation and ladder fuels, and left untreated, would remain at or reach maximum levels. This in turn would contribute to the fuel hazard and complicate or exceed fire control efforts. Crown scorching and cambial damage are examples of the effects of direct heat on individual trees. Where trees are not killed outright by wildland fire, surviving trees are nevertheless damaged and remain in a weakened condition. This condition predisposes survivors to insect infestations, drought mortality, and competition induced mortality. Intense fires can also cause erosion where the protective litter layer has been erased exposing bare soil. Forest nutrient losses, most notably nitrogen, also occur following intense fires. The detrimental effects of intense fires can be minimized by reducing stand densities.

Pine and oak species would continue to decrease in number if significant growing space is not created for these shade intolerant species. The more shade tolerant Douglas-fir would continue to outcompete pine and oak species and continue to dominate the landscape. Species diversity would further decline.

Christiansen, et al. (1987) stated that less carbon is available for a tree's defense following droughty periods and that any environmental factor, including competition, "that restricts the size of the canopy or its photosynthetic efficiency can weaken a tree's resistance." No Action would perpetuate the cycle of stand stagnation with increasing stand densities. Competition for the limited growth factors of sunlight, water, and nutrients would increase until the limiting factor becomes available (Oliver and Larson 1996). Such availability would not occur without some kind of disturbance to free up the growth factors required for tree growth and improved tree vigor. A No Action Alternative would continue to limit these resources resulting in poor tree vigor, higher densities, and increased stress on trees which, in turn, predisposes trees to the damaging agents of insects and the detrimental effects of mortality from inter-tree competition.

As described in the affected environment, the No Action Alternative allows stands to continue on their current trajectory of stand development. The Applegate Adaptive Management Area (AMA) borders the northern boundary of the Deer North Planning Area (USDA/USDI 1998). The Applegate AMA Ecosystem Health Assessment (1994) recommends most stand types in the Applegate AMA maintain 60 to 120 ft^2 BA/AC as a desired density level. This level coincides with a relative density range of 0.35-0.49 projected in ORGANON. Stand level complexity may eventually be attained through insect and disease attack, windthrow, and tree decadence, but only if major stand replacement events do not occur. The recent trends in southwest Oregon illustrate that fire has been converting mature forest structure at a higher rate than harvest, making the retention of these types of forests problematic in dry forest ecosystems (Spies et al. 2006; Courtney et al. 2004).

Lack of disturbance from low-intensity fire in fire-adapted systems, such as those found in the Planning Area, has resulted in higher stocking densities than the site is capable of maintaining in the long-term. With No-Action, stands would continue to have low individual tree vigor, reduced understory vegetation, and increased fuel loadings from suppression-induced mortality and litter fall. Lack of sunlight to tree crowns would limit the development of large diameter lower limbs for tree structure objectives. The No-Action Alternative would allow stands to remain outside the natural range of variability until such time as major mortality from insects, disease, wind or fire occurs. These large scale disturbances threaten the ability of BLM land to produce an even flow of timber products from lands allocated to timber production.

In the No Action Alternative, the decline of shade intolerant species (e.g., pine and oak) would continue due to shading and subsequent tree mortality (Russell and Honkala 1990). 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 (North et al. 2004). The longevity of large, pre fire-exclusion pines and oaks would be shortened by competition from post fire-exclusion vegetation. Thus, stand diversity in terms of species abundance and vertical structure would continue to be reduced.

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. Stand replacement fire within the watershed would reduce structural complexity, create early-seral conditions and increase brush abundance. Commercial stands in reserve areas would remain in poor vigor and tree mortality can be expected in the future. Conifer canopy closure would decrease with time thus degrading some types of habitat. This

also decreases the effectiveness of fuels hazard reduction. Without management, the stand structure and vegetation condition would continue on its current trajectory of decline in species diversity, low vigor, and increasing densities. A break in this pattern would occur by management or by the unpredictable forces of wildfire which have become increasingly more intense and destructive, more costly to control, and more unreliable as a tool for natural thinning.

Without the careful management of our forests, stands would unnecessarily remain exposed to stand replacement wildfire and prone to bark beetle infestations. Johnson and Franklin (2010) made the following observation:

> The dry forests managed by BLM in southwest Oregon and the resources that they contain are at significant risk in their current condition. Most of these forest landscapes have densities greatly in excess of their historic condition and natural carrying capacity. Such dense contiguous forests are not a sustainable condition in these Dry Forest landscapes and area potentially subject to large high-severity fire events and outbreaks of defoliating insects and bark beetles, the latter resulting from drought and competition induced stress in trees. Climate change intensifies these threats.

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 would be met from areas not subject to these sustainable practices (Powers 2002). Protection measures for natural resource management on public lands far exceed those on private lands; therefore, negative effects are increased indirectly from deferral of harvest on public land as a result of forcing this demand to be met from other lands. Consequently, the impact is greatest to the landscape environment when federal lands are not managed for sustained forest yield.

Likewise, effects for other ownerships are the same as reported for the No Action Alternative. None of the actions proposed under this Alternative would affect the long-term productivity of BLM lands in the Planning Area.

Alternative 1 Summary and Conclusions for Vegetation

The No Action Alternative would result in BLM lands remaining in its current condition. The current condition exhibits a historical shift from growing conditions that once exhibited a variety of seral stages and size classes, and displayed a greater diversity in species composition (USDI 1997). The ecologically significant species of ponderosa pine, sugar pine, California black oak, and Oregon white oak would continue declining along its current trajectory. The decline in early seral species would continue as shade tolerant Douglas-fir continues encroaching undisturbed on sites formerly occupied by more pine and oak species.

A compounding buildup of fuels and in-growth of shade tolerant species would continue to predispose forested stands to bark beetle infestations and stand replacement fire events. Field data reveals that, on average, stands have exceeded their competition mortality threshold and vigor ratings and diameter growth measurements show that trees in the Planning Area are predisposed to successful bark beetle attacks. These current trends in forested stands are expected to rise undisturbed if stands remain untreated

3.3.2.2 Alternative 2 Effects to Vegetation

Short Term/Stand level effects
Silvicultural thinning can be described as a process of controlled reductions to stand density that enables the remaining trees to accelerate their occupancy of growing space and increase their diameter growth (Smith 1986). Thinning treatments decrease densities, thereby improving the tree vigor of remaining trees and subsequent protection against insect outbreaks. Alternative 2 treatments would improve the vigor of ponderosa pine where they can better withstand insect attacks in order to ensure the survival and perpetuity of this declining seral species.

Density Management / Modified Group Selection
The Medford District RMP (1995) - Southern General Forest Management Area (SGFMA p.192) provides direction to managed stands to maintain a minimum of 40% canopy cover except for units of the pine series or where stand condition or site characteristics require lower levels. Because prevention is the best method of control against bark beetles, thinning a stand to either relative densities of 0.25 and 0.35 would provide the growing space required by trees to maintain vigorous growth. Vigorous growing conditions are required for trees to avoid being harmed by bark beetles. A thinned stand would improve the vigor of the remaining trees.

Density Management
Removal of trees would target shade tolerant species and follow the following species-retention preference order: ponderosa pine, sugar pine, incense cedar, Douglas-fir, white fir. Removal of trees would occur primarily from the smaller size classes while retaining an average canopy cover of 40% and creating an occasional canopy gap around large pines and hardwoods. Bailey and Tappeiner (1998) found that thinning in 40 to 100 year old stands of Douglas-fir in western Oregon resulted in recruitment of understory species such as conifers, hardwoods, and shrubs. This study and others support the expectation that post-harvest stand structure would be vertically and horizontally diverse in the density management units (Thysell and Carey 2001). The target canopy closure in these stands would result in a fairly open structure with light reaching the forest floor, thus advancing stand development into the understory reinitiation phase. With increased sunlight and fewer Douglas-firs overtopping the stand, pine and oak regeneration is expected to increase and understory plant diversity / abundance would improve. Residual trees would accelerate diameter growth, retain high crown ratios, and increase individual tree vigor. On site data, modeled in ORGANON, reveal a general increase in DBH immediately after harvest along with a relative density index within an acceptable range (Table 15).

Table 15. Projected Change in Stand Structure following Harvest (DM/Mod GS, unless otherwise noted)

O.I.#	CURRENT BA/AC (ft^2)	CURRENT RELATIVE DENSITY	AVERAGE DBH	PROJECTED BA/AC (ft^2)†	PROJECTED RELATIVE DENSITY	PROJECTED DBH
MID						
112805	197	0.787	7.0	80	0.383	9.1
113359	246	0.855	9.9	69	0.364	11.0
117019*	248	1.068	5.7	86	0.398	9.1
112533	235	0.740	12.7	107	0.392	14.2
MATURE						
111607	246	0.812	11.2	100	0.348	11.1
117024	154	0.617	6.8	88	0.357	8.8
115214	204	0.867	5.9	91	0.445	10.0
111598	264	0.971	8.6	118	0.486	10.4
111595*	225	0.759	10.7	115	0.431	9.9
114987**	157	0.690	5.5	82	0.307	8.2

* Regeneration Harvest (16-25 TPA ≥20" DBH)
** Regeneration Harvest (6-8 TPA ≥20" DBH)
† Conifer BA/AC

Modified Group Select Treatments

Canopy gaps can be defined by Watt (1947) as "discrete openings in forest canopies caused by small scale disturbances." In the Deer North project landscape design, Modified Group Selection areas are selectively chosen areas ranging from 0.25 to 0.5 acre, occasionally reaching 1 acre in size, that remove a number of trees in a group to create a canopy gap around legacy or legacy candidate ponderosa pine. This treatment mimics small scale natural disturbances to promote forest complexity, structural heterogeneity, and biological diversity. Treatments would be selectively designed around these components to meet the following short and long term objectives:

- release ecologically significant structural components from competition
- protect and promote their unique presence on the landscape
- stimulate early seral species seed production
- provide the growing space appropriate to regenerate new early seral growth
- develop a multistoried canopy
- provide structural heterogeneity
- improve vigor of selected trees
- introduce a new stand cohort
- stratify the fuels component to improve fire resiliency on the landscape

Figure 6. Left: Deer North Unit #33-001 (112805). Competing trees surrounding the pine are occupying growing space and consuming water and nutrients that, if densities were lower, would otherwise be available for the pine to ensure its survival for the next several decades. Right: Natural regeneration within a treated ponderosa pine Group Selection Opening (Medford District BLM).

Primarily, old-growth ponderosa pine as well as young ponderosa pine ≥ 18 inches DBH would be centered in the group selection openings. These openings are needed to provide suitable growing conditions for ponderosa pine seedling regeneration. This approach would remove trees surrounding the ponderosa pine in a group while leaving other important legacy structural stand components where appropriate, such as the large Douglas-fir pictured to the side of the pine, significant oaks, and other ecologically unique stand features (Figure 6).

Stand 112805 (Deer North #33-001), a 100 year old dry Douglas-fir site (PSME-QUKE/RHDI6), has a prescription of Density Management/Modified Group Selection. Atzet et al. (1996) describe this plant association group as the warmest of the dry Douglas-fir sites and one of the lowest in elevation. They add that ponderosa pine in this plant association group generally occupies 9% cover in the overstory. On site data shows that ponderosa pine occupies only 5% of the overstory (≥ 12 inches DBH) and its presence represents less than 1% of the entire stand. Figure 6 can pictorially explain why sun-loving ponderosa pine is underrepresented in the stand (left). The ponderosa pine pictured is surrounded by, and competing heavily with, shade tolerant Douglas-fir. Figure V-6 (right) depicts an example of how ponderosa pine legacy trees can be released and how natural regeneration can be initiated through management action (right). Manual regeneration (i.e. tree planting and its subsequent maintenance) would greatly accelerate this effect.

Table 16 displays the ORGANON-projected 50-year growth of a mid-size (11 to 21 inches DBH) conifer stand in the Planning Area with a Density Management prescription. Table 16 displays the difference between no action and a treatment that maintains on average 40-60% crown closure. The modeled stand immediately after harvest would result in a relative density of 0.38 and coinciding with a basal area of approximately100 ft^2/ac. The sub merchantable understory would be treated to space hardwoods 45x45 feet and conifers 15x15 feet. The left half of Table 16 shows the modeled growth of the untreated stand. The loss of trees per acre by competition induced mortality each decade in the untreated stand is significantly greater each

decade of growth versus the treated stand. The treated stand also yields a larger quadratic mean diameter each decade than the untreated stand. A No Action Alternative exhibits tree loss through competition mortality versus trees removed and utilized through timber harvesting under a science-based silvicultural prescription. The No Action Alternative projection suggests that over-competition among trees results in greater losses in trees per acre than a sustainable level of competition among residual trees in the managed stands.

Table 16. Deer North Unit #33-001 (112805) with and without silvicultural treatment

Existing Stand: 112805 (Mid Stand)						
Stand Age	**Trees Per Acre**	**Basal Area**	**Relative Density Index**	**Crown Closure**	**Quadratic Mean Diameter**	**Scribner Volume***
101	742	197	0.797	99	7.0	26,395

Growth of Stand if Not Treated							**Growth of Stand if Thinned to 40-60% Crown Closure**					
Stand Age	**TPA**	**BA**	**RDI**	**Crown Closure**	**QMD**	**Scribner Volume***	**TPA**	**BA**	**RDI**	**Crown Closure**	**QMD**	**Scribner Volume***
111	413	183	0.659	100	9.0	26,981	152	98	.329	57	10.9	16,628
121	289	177	0.597	100	10.6	27,599	120	98	.313	68	12.2	17,231
131	228	175	0.565	100	11.8	28,442	103	100	.308	72	13.3	17,958
141	191	175	0.546	100	12.9	29,315	93	103	.310	74	14.3	18,713
151	167	177	0.535	100	13.9	30,347	86	107	.315	76	15.2	19,764

* Scribner Volume of Conifers and Hardwoods Including ≤ 8 inches DBH

Prevention Strategies

Besides the benefit of thinning to avoid catastrophic fire, thinning forested stands to reduce density also contributes to promoting vigorous growing conditions among trees which helps to prevent damage from bark beetle infestations. Thinning to reduce inter-tree competition and increase tree growth to prevent beetle infestations may be critical (Sartwell 1971). On pine sites, ridges, droughty areas, and in stands in the understory reinitiation stage where variable relative density indices are required, stand densities should be lower in order to maintain maximum health and stand resiliency. On these sites the relative density index should be reduced below 0.35 because there is evidence that heavy thinning to a relative density index3 of 0.25 promotes understory development and vertical diversity (Hayes et al., 1997).

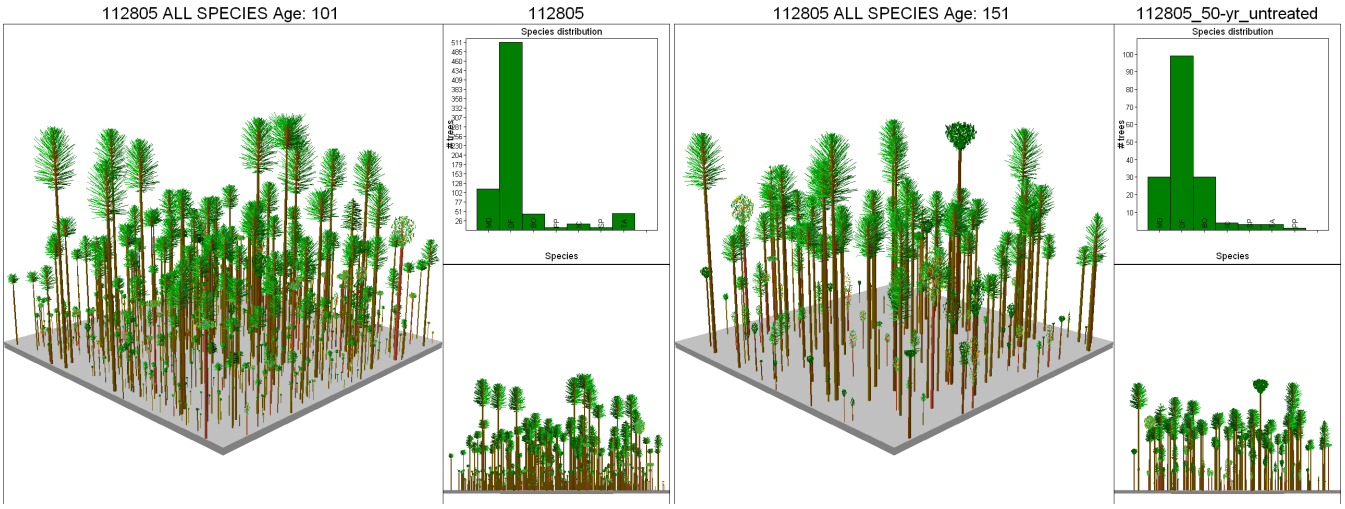
Larsson and others (1983) found in their ponderosa pine study that a basal area of 112 ft^2/acre provided the retention level at which most trees could survive moderate beetle attack while observing that ponderosa pine vigor decreases with increasing stand density. They add that retaining still lower stocking levels provides a greater margin of safety.

DeMars and Roettgering (1982) describe tree resistance to insects and diseases as one of the biotic conditions affecting outbreaks and beetle caused mortality. Prevention is the best method of control against insects and disease by maintaining thrifty, vigorous trees (DeMars and Roettgering 1982; Flowers and Kanaskie 2007). DeMars and Roettgering suggest that "by

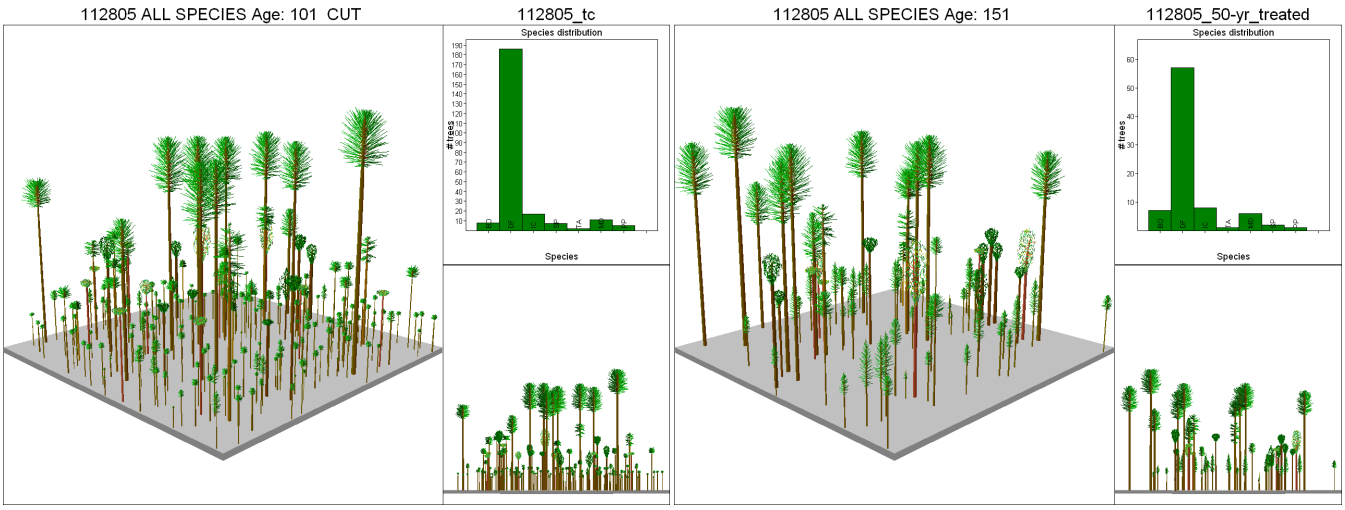
maintaining thrifty, vigorous trees or stands that do not afford a suitable food supply for the beetle" land managers can prevent susceptibility of hosts to insect damage. To reiterate, vigorous trees successfully repel invading beetles, but nonvigorous trees can easily succumb to attack (Table 13).

The Stand Visualization System (SVS) is a computer simulation model that generates graphics depicting forest stand conditions to illustrate individual stand vegetation components and changes under different forest management treatments (McGaughey 1997). SVS is used to portray what existing forest stands look like today and after application of the proposed prescriptions (U.S.D.A. and University of Washington 1995). ORGANON plot data was input into the SVS program for the simulations.

The following images represent the current and projected post harvest condition of Unit #33-001 (112805) (Figure 7 (a) and (c), respectively). Figure 7 (b) and (d) displays the 50-year conditions of the untreated and treated stand, respectively. Figure 7 (c) illustrates a relative density reduction from 0.79 to 0.38. This scenario removes approximately 10 MBF/acre (ORGANON projection) and reduces understory densities to maintain total hardwoods at 22 TPA and submerchantable conifers (< 8 inches DBH) at 194 TPA to reach a 0.38 relative density index. The healthiest, fullest crowned hardwoods and conifers would be selected as leave trees. The poorest competitors would be slashed to accelerate the natural process of competition mortality and its subsequent density reduction. A managed reduction in understory densities better promotes species diversity by favoring as leave trees those underrepresented species such as ponderosa pine, sugar pine, incense cedar, and black oak. A managed stand better improves the vigor of remaining trees by selectively targeting the removal of competitors and favoring trees based on vigor, form, crown class, dominancy, and ecological benefits to the stand. A managed reduction in stand density frees additional growing space making available the growth factors of light, water, and nutrients to selected reserve trees. Lowering understory densities reduces fire-receptive flashy fuels that carry fire into the crowns of live residual overstory trees. Additional SVS images of management scenarios before and after treatment can be found in Appendix E.



(a) **(b)**



(c) **(d)**

Figure 7. Deer North Unit #112805. (a): Existing Condition. (b): 50-Year Untreated Stand Condition. (c): Post Harvest Stand Condition. (d): 50-Year Post Harvest Stand Condition**.**

Negative effects of density management treatments, such as windthrow, logging damage, sunscald and thinning shock have been widely reported in forestry literature (Worthington 1961; Maguire et al. 2006; Aho et al. 1983; Moore et al. 2003). Walk-thrus of recent harvest activity (Round Bull and Elliot Creek timber sales) near the Planning Area have not detected these negative effects to the point where tree health or forest structure has been compromised (i.e., post-treatment densities meet the silvicultural objectives outlined in the original prescription). Additionally, units are not located along exposed high profile, high elevation areas susceptible to patterns of large scale wind events; thus, the exposure of residual trees to wind damage is minimal.

Regeneration Harvest

To stimulate a thrifty regeneration of young vigorous seedlings in a stand, the treatment of regeneration harvest would provide the adequate growing space for a fresh, young, emergent forest stand. Regeneration harvest treatments are prescribed on highly productive sites and will apply the Medford District RMP (1995) Northern General Forest Management Area (NGFMA p.186) retention guidelines of leaving 6-8 green conifer TPA ≥20 inches DBH. These regeneration harvest treatments would come closer to (or below) 0.25 relative density index.

As directed by the Medford District RMP (p. 39), regeneration harvest as proposed under this project would leave at least 6 to 8 large (≥20 inches DBH) green conifer trees per acre. Additional retention requirements are 2 snags/acre and 2 large hardwoods per acre if present (RMP p. 193). If the unit doesn't have 2 snags/acre the prescription would leave an additional 2 large green conifers per acre. If snags are not present these design features retain 8 to 10 large green trees per acre, or a large tree every 66 to 75 feet on average. The residual trees could be clumped and doing so would help to enhance growth on the regenerating stand underneath.

Table V-9 shows a modeled comparison of changes in a treated (regeneration harvest) and untreated mature size (> 21 inches DBH) conifer stand in the Planning Area in a 50-year time span. Unit #29-002 (114987) has reached the stand age of 132 years. The crowns have closed in to an 89% crown closure with a relative density index of 0.69 (0.55 to 1.00 bounds the zone of

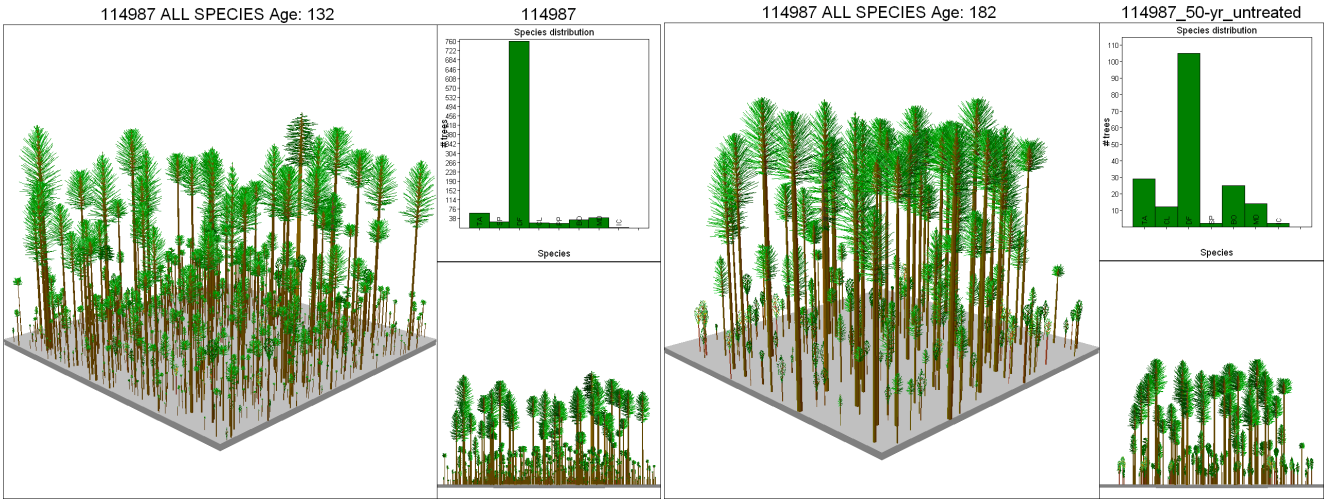
imminent competition mortality and suppression). The unit is assigned a prescription that retains 6-8 trees per acre ≥ 20 inches DBH. Table 17 shows a projected reduction in trees per acre each decade resulting from competition induced mortality. No action compounds the competition each decade as a result of undisturbed densities. In comparison, the fewer numbers of trees lost per acre per decade occurs in the treated stand. After 50 years, the untreated stand retains 189 TPA at a stand RDI of 0.54. The 50 year treated stand however, holds 116 trees per acre at a stand RDI of 0.39.

Table 17. Deer North Unit No. 29-002 (114987) with and without regeneration harvest

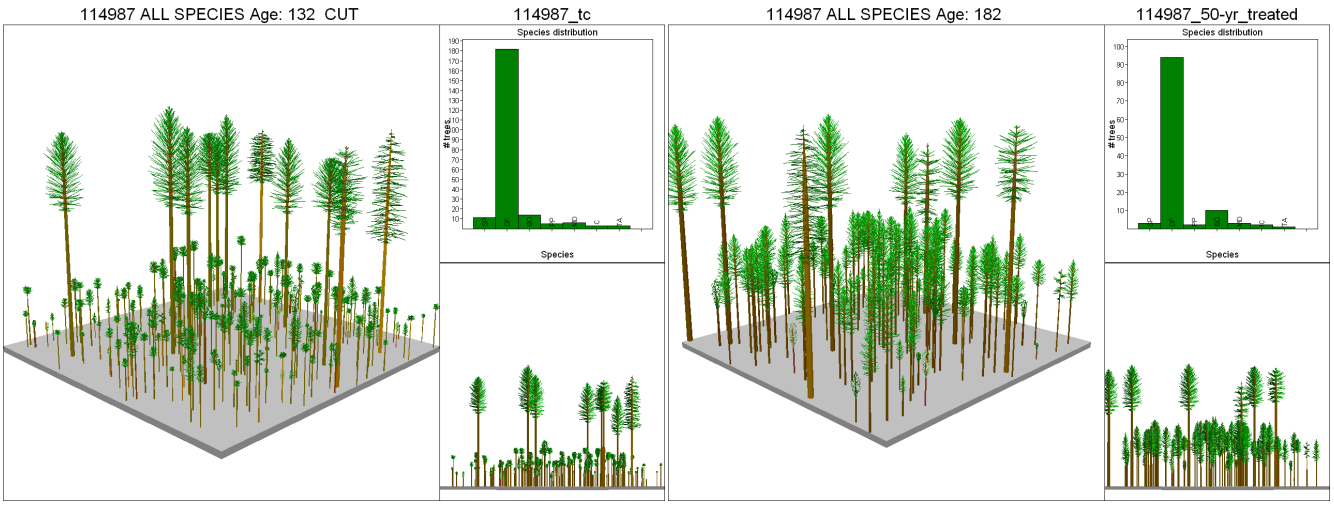
Existing Stand: 114987 (Mature Stand)						
Stand Age	**Trees Per Acre**	**Basal Area**	**Relative Density Index**	**Crown Closure**	**Quadratic Mean Diameter**	**Scribner Volume***
132	959	157	0.690	89	5.5	25,325

Growth of Stand if Not Treated (compare the decline in trees/acre from natural mortality in untreated vs. treated)							**Growth of Stand if Cut to Leave 9 TPA ≥20 inches DBH (.307 RDI and 43% Crown Closure)**					
Stand Age	**TPA**	**BA**	**RDI**	**Crown Closure**	**QMD**	**Scribner Volume***	**TPA**	**BA**	**RDI**	**Crown Closure**	**QMD**	**Scribner Volume***
142	477	151	0.582	100	7.6	28,063	158	82	0.286	61	9.8	14,887
152	328	153	0.546	100	9.2	31,307	139	91	0.304	80	11.0	17,632
162	260	158	0.536	100	10.6	34,493	129	104	0.332	88	12.1	20,431
172	218	165	0.536	100	11.8	37,570	122	117	0.363	96	13.3	23,391
182	189	173	0.539	100	13.0	40,658	116	131	0.393	100	14.4	26,571
* Scribner Volume of Conifers and Hardwoods Including ≤ 8 inches DBH												

Figure 8 (a) and (c) illustrates the pre and post-harvest stand conditions of a mature Dry Douglas-fir stand in the PSME-PIPO/RHDI6 plant association group (Unit #29-002, T37S-R7W-Sec.29). Currently the stand has 959 TPA; a tree diameter range from 0.1 to 44.0 inches DBH; and a species composition of Douglas-fir, ponderosa pine, sugar pine, tanoak, black oak, canyon live oak, incense cedar, and madrone (Figure 8 (a)).



(a) **(b)**



(c) **(d)**

Figure 8. Deer North Unit 29-002. (a): Existing Condition. (b): 50-Year Untreated Stand Condition. (c): Post Harvest Stand Condition. (d): 50-Year Post Harvest Stand Condition.

Unit #29-002 immediately after harvest produces an outcome that lowers the RDI to 0.31 (Figure 8 (b)). Immediately following harvest the stand exhibits a projected 225 TPA with a basal area of 82 ft² per acre. The leave tree preference would favor species in the following order: ponderosa pine, black oak, sugar pine, incense cedar, Douglas-fir, madrone. The initial treatment result would yield an increase in pine from to 4% to 7% of the stand component. The post harvest open stand condition would allow sun-loving ponderosa pine, black oak, sugar pine, and incense cedar to regenerate, persist on the site for the next several decades, and over time, reestablish its long term prevalence on the landscape. Appendix E displays additional images of Alternative 2 regeneration harvest prescriptions.

Regeneration harvest would simplify stand structure, creating an overstory of large residual trees, and a regeneration of both natural and planted seedlings and saplings. Until these seedlings / saplings grow large enough to withstand surface fire, the potential for intense fire behavior will remain. Initially, the overstory would not be threatened by this because canopy bulk density will be low and crown base heights will be high. Since these stands will be fairly open, the potential for windthrow will increase. This potential will be greater in areas along prominent ridges. Blowdown in southwest Oregon on a large scale generally occurs during hurricane force winds, such as those that caused the recent blowdown in the Butte Falls Resource Area. Given the infrequent nature of these events, the likelihood for blowdown on a large scale is minimal.

Activity Fuels

In all harvest units, activity fuels would be piled and burned. Understory trees in density management units would be slashed to spacing specifications, leaving the most vigorous conifers and hardwoods. Except in stands with healthy conifer regeneration, 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 following prescribed burning, including growth decline of overstory trees; however,

tree cores measured from overstory trees in the nearby McMullin Planning Area show no growth decline after prescribed fire. Additionally, another study (York and Heald 2007) found that Douglas-fir, sugar pine and ponderosa pine seedlings grew better in rings where piles were burned than anywhere else in the study area. Within 2 to 5 years of these treatments, understory vegetation would resprout with higher species diversity expected. Providing canopy separation by removing some of the larger overstory trees in the density management prescriptions, along with treatment of activity fuels, would reduce the likelihood of large stand-replacement fire events.

Long-term/landscape level effects

The treatments proposed under Alternative 2 would result in a diversity of structures, species composition, and landscape habitat components (e.g., snags, down-wood, large hardwoods and conifers). Immediately after density management treatments, average stand diameters of the stands would increase by approximately two inches due to the fact that residual trees are typically larger in diameter than the ones being harvested (Table 15). Based on field measurements in similar treatment areas and growth measurements reported in the literature (Latham and Tappeiner 2002) an additional 1.4 inches in diameter growth are expected in the density management treatments within the first two decades of treatment.

Thinning and group selection, combined with regeneration harvest of select stands, would produce a diverse distribution of size/seral classes on BLM land in the Planning Area. Commercial harvest proposed under Alternative 2, would create the early size class on 14 acres or 12% of the harvest acres; this constitutes only 0.4% of the BLM land in the Planning Area moving into the early size class as a result of the proposed action for this Alternative. The pole and mid size classes would shift into the next size classes (mid and mature) since these increase average stand diameter in the short and long-term. Because the proposal aims to treat more acreage in thinning prescriptions rather than regeneration harvest prescriptions, the mature size class immediately after harvest would remain the dominant size class in the Planning Area.

Since Alternative 2 proposes the highest level of treatment, it would result in the highest level of individual tree release. Any additional sunlight would benefit early-successional species such as pine and oak, which are currently in decline. As growth and regeneration advance, the effects of treatments would be less apparent.

Spur road construction would take a very small amount of forestland out of production, but would also provide long-term access for future management. In addition to the benefits of commercial harvest to current and future forest product supply, roads would provide access for fire suppression, public use, and BLM personnel to inventory and maintain desired conditions in the future.

Effects to productivity

In order to manage for future forest product options, the landscape should provide for a diversity of size classes, which would become available for commercial harvest at different intervals. Regeneration harvest is the most viable option for sustainable growth and yield. Thinning would ensure the viability of future regeneration harvest options as well as provide for wildlife and forest structure in the interim.

Land-use conversion from forest to residential or agricultural development has the greatest impact on forest productivity4 and habitat (Rochelle 1998; Perry et al. 1989). In Alternative 2, no site conversion is proposed. Further, a mix of hardwoods, grasses, forbs, shrubs and conifers would remain 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 these key components of ecosystem productivity are retained, there are no expected decreases in forest productivity.

Alternative 2 Summary and Conclusions for Vegetation

Alternative 2 includes 799 acres of various levels of commercial harvest (including regeneration harvest), representing 3% of the BLM lands in the Planning Area (0.2% of the watershed The 14 acres of regeneration harvest proposed in Alternative 2 represents 2.7% of the BLM land in the Planning Area which would be converted from mature to early seral condition. The regeneration of conifers would provide a sustained yield of forest products into the future.

1. Early-Mid Seral Species would be favored as leave trees and their regeneration of seedlings is expected to increase under all forest treatments within this alternative. In particular, the Regeneration Harvest prescription and subsequent tree planting would provide the mix in seral stages and size classes to the landscape that would otherwise not occur. The only other disturbance mechanism that would provide such early seral regeneration are wildfires. However, a century of fire suppression has created conditions where wildfires quickly grow into large uncontrolled disturbance events that denude entire stands and landscapes including the removal of rare ecologically significant legacy trees such as large old ponderosa pine, California black oak, and sugar pine in addition to other ecologically significant features. The commercial thinning under the prescription of Density Management / Modified Group Selection (DM/Mod GS) would reduce stands to density levels that more closely represent historical conditions. Group Selection openings around legacy or legacy candidate ponderosa pine would protect these components from the devastating effects from wildfire while stimulating seed production and natural regeneration of pine seedlings in the understory. This would, in turn provide a new smaller cohort of early seral species and a mix of size classes across the landscape that once characterized historical conditions.

2. Douglas-fir Encroachment would be reduced by creating opened stand conditions more conducive to the initiation and longevity of early seral species such as pines and oaks. The treatments prescribed under this alternative (DM/Mod GS and Regeneration Harvest) would provide favorable growing conditions for sun loving species and be less conducive to shade tolerant species such as Douglas-fir. This would reduce the likelihood of Douglas-fir encroachment upon drier sites that historically sustained fire and drought tolerant pines and oaks.

3. Relative Density and Vigor would be brought to more acceptable levels. Average relative densities would be reduced below the zone of competition mortality. Tree vigor would improve

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4 Forest productivity- the total amount of plant material produced by a forest per unit area per year

with additional growing efficiency by removing competing trees. With the removal of adjacent competitor trees, growth factors such as sunlight, water, and nutrients become newly available to the remaining trees. Remaining trees would in turn, respond with elongating their crowns, increasing diameter growth, producing new root growth, and increasing photosynthesis. These renewed processes indicate a vigorous tree.

4. Bark Beetles may have greater difficulty in finding weakened host trees to attack and breed in when the vigor of remaining trees has improved. Bark beetle attacks are closely tied together with low vigor trees which are often the result of high stand densities, drought, fire, and other physical agents. Thinning a stand reduces the surrounding densities which then provide the remaining trees with the additional resources that were being utilized by competing trees.

3.3.2.3 Alternative 3 Effects to Vegetation

The major difference between Alternatives 2 and 3 is that Alternative 3 does not propose any regeneration harvest, and proposes no permanent road construction. The use of temporary spurs would allow for recovery of vegetation over time, but would also limit future options for access for both commercial and non-commercial activities.

Short Term/Stand level effects
In the absence of regeneration harvest, density management is the next most viable option for providing a sustainable growth and yield of forest products. According to Buermeyer and Harrington (2002), and Bailey and Tappeiner (1998), density management is expected to result in healthy conifer regeneration. Relying on natural regeneration may be problematic in some areas because tanoak and madrone have greater height growth than Douglas-fir in areas of high canopy closure (>50%). Future forest product availability may be compromised if overstory canopy closure (>40%) impedes the growth and yield of conifer seedlings similar to the long-term effects disclosed for regeneration harvest in alternative 2. The short and long term effects of Alternative 3 are the same as for Alternative 2 except for the effects of regeneration harvest. Regeneration harvest is absent in Alternative 3.

Long-term/landscape level effects
Stand maintenance objectives to treated stands that require follow up maintenance would remain difficult with only temporary road access and no permanent road access. Fire suppression efforts would also remain difficult by providing only temporary road access.

Group Selection Areas are designed to create gaps in the forest structure and would meet a threefold objective:

1. create a structural forest composition found in natural disturbances that provide horizontal structural variability, vertical variability, edge trees, and regeneration of seedlings;
2. release legacy pine candidates or old growth incense cedar and Douglas-fir trees to ensure their longevity; and
3. break up the fuel continuity of the landscape.

These openings would provide suitable growing conditions for the regeneration of ponderosa pine and incense cedar. A dominant ponderosa pine responds significantly when enough

growing space becomes newly available from the removal of adjacent subordinate trees (Barrett 1963, Cochran 1992). A study of ponderosa pine reaction to competition in a mixed conifer site in the Sierra Nevadas revealed:

> even beneath a light overstory stand casting 47 percent shade, ponderosa pine saplings grew only about half as rapidly as their associates (Douglas-fir, sugar pine, white fir, and incense-cedar) and about half of that expected for fully sunlit pines (Burns and Honkala 1990).

Effects to productivity

Birch and Johnson (1992), Acker et al. (1998), and Zenner et al. (1998) report a decline in understory (seedling) growth from retaining green trees in the overstory. Future forest product availability may be compromised if overstory canopy closure (>40%) impedes the growth and yield of conifer seedlings similar to the long-term effects disclosed for regeneration harvest and group selection openings proposed in Alternative 2. As crowns continue to expand, the overstory would capture the growth factor of sunlight required for seedlings to germinate and survive on the site. By limiting this growth factor, fewer seedlings would emerge and over time stands would exclude the entire understory growth as they enter the stem exclusion stage of forest development. 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). In Alternative 2, no site conversion is proposed. Further, a mix of hardwoods, grasses, forbs, shrubs, and conifers would remain 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 these key components of ecosystem productivity are retained, there are no expected decreases in forest productivity.

Alternative 3 Summary and Conclusions for Vegetation

Alternative 3 includes 746 acres of commercial harvest representing 3% of the BLM lands in the Planning Area (0.1% of the watershed). Through recovery of past harvest units and density management which emphasizes thinning to increase growth rates, there would be more mature size class retention than what is prescribed in Alternative 2. None of the actions proposed under Alternative 3 would affect the long-term productivity of BLM lands in the Planning Area.

1. Early-Mid Seral Species would be favored as leave trees and their regeneration of seedlings is expected under all forest treatments within this alternative. The commercial thinning to retain 40% or 60% crown closures would reduce stands to density levels closer, but perfectly, to historical conditions. Small gaps around legacy or legacy candidate ponderosa pine would protect these ecologically significant structures from the devastating effects from wildfire while stimulating seed production and natural regeneration of pine seedlings in the understory. This would, in turn provide a new smaller cohort of early seral species and a mix of size classes across the landscape that once characterized historical conditions.

2. Douglas-fir Encroachment may continue in shaded stands retaining 60% crown closure. Although stands retaining 40% crown closure would see more open stand conditions conducive to the initiation and longevity of early seral species such as pines and oaks.

3. Relative Density and Vigor would be brought to more acceptable levels, although in stands thinned to a 60% crown closure would still remain near or within the zone of competition mortality. Average relative densities in stands thinned to retain 40% crown closure would be reduced below the zone of competition mortality and tree vigor would improve with additional growing efficiency by the removal of competing trees. With the removal of adjacent competitors, growth factors such as sunlight, water, and nutrients become newly available to the remaining trees, although to a lesser degree when thinned to 60% crown closure. Nevertheless, remaining trees would respond to thinning with elongated crowns, new root growth, and increased photosynthesis.

4. Bark Beetles may have greater difficulty in finding weakened host trees to attack and breed in when the vigor of remaining trees has improved to 40% crown closure. Bark beetle attacks are closely tied together with low vigor trees which are often the result of high stand densities, drought, fire, and other physical agents. Thinning a stand reduces the surrounding densities which then provide the remaining trees with the additional resources that were being utilized by competing trees. This effect is also produced, although to a lesser extent and for a shorter period of time, when stands are thinned to a 60% crown closure.

3.4 Fire and Fuels

3.4.1 Affected Environment Fire and Fuels

Introduction
Fire regime, fire condition class, fire history, fire hazard, fire risk and fuel models are indices of current fuel loads and difficulty of fire suppression and management. Along with weather information they provide the components needed to assess predicted fire behavior for a given area. Current conditions will be described using the above indices and effects of the alternatives will be compared using Fire Management Analyst Plus (FMA+) modeling comparing days of crown fire potential before and after treatment.

Fire Regime
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 that range from 0-115 years. Historic fire-return intervals in the Deer Creek watershed range from 0-100 plus years, with 85% of the area having intervals of less than 35 years (Atzet et al. 2004). Fire regimes provide a historical perspective of fire regimes prior to the era of fire exclusion, and also provide an indicator of natural processes that contributed to current forest vegetation and structure. Thus they are useful in characterizing conditions across a Planning Area and landscape.

The vegetation in the Deer Creek watershed has been shaped over the millennium with frequent surface fires and mixed fire severity. Ninety-nine percent of the Planning Area is represented by the following two fire regimes.

Fire Regime 1: 0-35 years, Low Severity (85% of watershed). 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).

Fire Regime 3: 35-100 years, Mixed Severity (14% of watershed). This regime usually results in heterogeneous landscapes. Large, stand-replacing fires may occur but are usually rare events. Such stand-replacing fires may "reset" large areas (10,000-100,000 acres) but subsequent mixed intensity fires are important for creating the landscape heterogeneity. Within these landscapes a mix of stand ages and size classes are important characteristics; generally the landscape is not dominated by one or two age classes.

Fire Regime Condition Class (FRCC*)*

Fire regime condition classes offer another approach to evaluating potential fire conditions and are 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 (i.e., missed 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 Deer Creek watershed, current conditions were compared to historic reference condition classes identified using the Landfire Rapid Assessment Reference Condition Models to determine the degree of fire frequency and severity, and changes in historic vegetation. These models were devised by interagency ecologists 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 dominant vegetation and their disturbance regimes. Three reference condition class models were evaluated, Oregon White Oak, Mixed conifer-Southwest Oregon and Northern California mixed evergreen. While there are areas on private and public lands that have had recent disturbance and are within their range of natural variability (FRCC 1), a majority of the watershed (71%) classifies as FRCC 2 and FRCC 3, (Reilly et al. 2008).

Table 18 below displays the Deer Creek watershed fire regime, condition class (FRCC), acres, and percent of the watershed in each.

Table 18. Fire Regime FRCC for the Deer Creek Watershed

Fire Regime	Condition Class	Acres	Percent of watershed
1	3	18,559	26%
1	2	26,228	36%
1	1	15,325	21%
3	3	4,232	6%
3	2	1,873	3%
3	1	2,810	4%
Not Mapped	N/A	3,085	4%
Totals	**N/A**	**72,627**	**100%**

Data from, Reilly Martin et al. via LANDFIRE 2008. Not mapped areas include water, roads, green pastures, and urban areas such as Selma, OR.

Fire History

The Deer Creek watershed has experienced three large wildfires (100 acres or more) over the last sixty years, (Oregon Department of Forestry 2008). As a result, vegetation is uncharacteristically dense due in part to one or more missed fire intervals. Crown fire, particularly in mixed conifer forests has been of paramount concern in southwest Oregon due to the threat to life, property, and wildlife habitat from large-scale unpredictable wildfires. Hardwood and brush species, along with a litter of ground fuels, have provided a ladder for wildfires to consume the conifer overstory.

Fire Hazard

Fire hazard is described as conditions that may contribute to wildfire such as fuels, slope, aspect, elevation, and weather (Josephine County Integrated Fire Plan 2004). Fire hazard ratings help prioritize fuel treatments. These ratings are based on vegetation type, fuel arrangement and volume, and condition of fuels and location. They are all are determinants of the potential for spread of a fire and the difficulty of fire control. Missed fire intervals, caused in part by decades of successful fire suppression, have created areas of dense vegetation, increasing the fire hazard.

The lowest portion of a tree crown and its relationship to the surface fuels are known as crown base height. When considered at the stand level, the lowest portion of the canopy and its relationship to the surface fuels is known as canopy base height (CBH) and is critical in the initiation phase or “torching” of crown fire events; the lower the CBH the higher the potential for initiating crown fire due to ladder fuels. The fuel volume in the upper strata of the vertical fuel layer is canopy bulk density (CBD). The higher the bulk density the higher the risk for sustaining a high intensity crown fire. Crown fires exhibit violent behaviors while advancing through canopy stands usually killing the trees and brush in their wake (Keyes 2002).

Based on canopy base height and canopy bulk density the fire hazard rating and the potential for a large fire to occur is moderate to high across most of the area. (Table 19) displays hazard condition in the watershed.

Table 19 : Fire Hazard Ratings for the Deer Creek Watershed

Fire Hazard Rating	All Ownership Lands (acres)	Percentage of Acres in each Category
Low	14,757	20%
Moderate	33,292	46%
High	24,587	34%

Data from Deer Creek watershed analyses, (1997)

Fire Risk

Fire risk reflects the probability of ignition in the Planning Area due to lightning or humans. Wildfires in the watershed have occurred predominately from mid-July through much of October, due to low relative humidity, low precipitation, and high ambient temperatures.

Since 1967, 353 widfires have burned approximately 5,000 acres in the watershed. There is a history of fires 40 acres and larger in the watershed. Two recent fires include a small portion of the 2002 Biscuit Fire which burned 499,965 acres and the Deer Creek fire which burned 1,547 acres in 2005 (Oregon Department of Forestry 2008). The Deer Creek Fire originated less than three miles from Selma, Oregon and destroyed or damaged seven homes, destroyed 17 outbuildings, and ruined 20 vehicles (Illinois Valley Fire Department 2005). Both fires required evacuations of residents and visitors. The above statistics indicates that there is the potential for large fires in the vicinity due to similar vegetation types and fuel loadings throughout the Deer Creek watershed.

Table 20 displays the fire risk rating of the BLM and other lands in the Deer North Planning Area.

Table 20. Fire Risk Ratings for the Deer Creek Watershed

Fire Risk Rating	All Ownership Lands (acres)	Percentage of Acres in each Category
Low	14,525	20%
Moderate	35,696	49%
High	22,414	31%

Data from Deer Creek watershed analyses, (1997)

The entire Deer Creek watershed lies within the Wildland Urban Interface (WUI), defined as the area where structures and other human development meet or intermingle with undeveloped wildland (USDA, USDI 2001). Humans are responsible for starting approximately 80% of all wildfires in the area (Oregon Department of Forestry 2009)

Fire Behavior

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, and suppression tactics.

The current condition of acres included in the Deer North project consists of approximately 64% resembling fuel model 10, 35% resembling fuel model 9, and 1% resembling fuel model 8 (Gonzales personal observation 2008).

Timber Group Fire Behavior Models

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 of high severity wildfire. Closed canopy stands of short-needled conifers or hardwoods that have dropped leaves 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 would 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 over-maturing 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.

Logging Slash Group Fire Behavior Models

Fire Behavior Fuel Model 11 – Fires are fairly active in the slash and herbaceous material intermixed with the slash. The spacing of the rather light fuel load, shading from overstory, or the aging of the fine fuels can contribute to limiting the fire potential. Light partial cuts or thinning operations in mixed conifer stands, hardwood stands, and southern pine harvests are considered.

Fire Behavior Fuel Model 12 – Rapidly spreading fires with high intensities capable of generating firebrands can occur. When fire starts, it is generally sustained until a fuel break or change in fuels is encountered. The visual impression is dominated by slash and much of it is less than 3 inches in diameter. The fuels total less than 35 tons per acre and seem well distributed. Heavily thinned conifer stands, clearcuts, and medium or heavy partial cuts are represented.

Table 21 displays fire behavior outputs using 8 percent dead fuel moisture content and a 5 mph mid-flame wind speed, (Anderson 1982).

Table 21: Fire behavior rates of spread and flame lengths

Fire Behavior Fuel Model	Rate of Spread in Chains per Hour	Flame Length in Feet
8	1.6	1
9	7.5	2.6
10	7.9	4.8
11	6	3.5
12	13	8

Aids to Determining Fuel Models for Estimating Fire Behavior, (Hal E. Anderson, 1982).

Direct attack is ineffective and unsafe for handcrews when flame lengths are four feet or more (Fireline Handbook 1998).

Air Quality
The population centers of Grants Pass and Medford/Ashland are smoke sensitive receptor areas (SSRA) as defined in the Oregon Smoke Management Plan Revision, December 2007. Major sources of particulate matter within the Grants Pass and Medford/Ashland SSRA's 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 Deer Creek watershed 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.

3.4.2 Environmental Consequences Fire and Fuels

The effects of the alternatives are compared using Fire Regime Condition Class (FRCC) and Fire Management Analyst Plus (FMA+) modeling. Modeling was done for the representative forest stand types recommended for vegetation 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 a crown fire would be sustained under average weather conditions. Weather data was compiled from the Illinois Valley Remote Automated Weather System (RAWS) near Cave Junction, Oregon. Comparing current fire conditions with post-treatment conditions yields relative effectiveness of the alternatives. Changes in fuel models alter fire behavior and fire hazard allowing a comparison of effects on fire potential, ease of wildfire suppression, and the potential for high severity fire caused by crown fires.

3.4.2.1 Alternative 1 (No Action) Effects to Fire and Fuels
The No Action Alternative would not alter the current fire conditions or fuel hazards in the short run. Over time, natural fuels would continue to build as branches and leaf litter accumulated on the forest floor and understory vegetation would become denser and taller; canopy base height, would decrease and canopy bulk density would increase. The scenario of current policy, which is to suppress wildfires rapidly upon detection, would allow litter to become unnaturally deep and cause severe surface fire effects which could torch into some of the tree crowns in the event of a wildfire. Under certain weather conditions, crown fires would occur (Martin 2008).

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 be reduced. As a result, in the event of a wildfire, many stands would experience stand replacing wildfires.

As an example, the Deer Creek fire, which burned in 2005 on private, county and BLM lands, burned seven 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 22). 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 22. 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 23 provides a baseline (current condition) by describing modeled (FMA+) fire behavior in the typical stand types identified for vegetation treatments. Plot data was gathered in 2008 using the FIREMON fire effects and monitoring system. Plots were placed in the stands identified for management and are described in Table 23. Tree data (density, size, age class, CBD and CBH), surface fuel loadings, and species composition were gathered on each plot. This data was then modeled using Fire Management Analysis software (FMA+) to determine fire behavior characteristics for current conditions (Table 23) and post-treatment (Tables 24, 25 and 27). 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 (Martin 2008). In these areas, frequent fire intervals have a lower probability of crown fire.

Table 23. 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	Mid-Late mod closure, Dense mid canopy, Sparse understory Moderate dead and down FBPS FM 10	Dry	0-16 (5)	Surface	32
				16-17 (5-9.9)	Passive Crown	59
				25+ (10)	Active Crowning	0
			Wet	n/a	n/a	9
No Action Current Conditions	3	Late conifer mod closure, Sparse understory Moderate dead and down FBPS FM 10	Dry	0-22 (7)	Surface	90
				n/a	Passive Crown	0
				23+ (7)	Active Crowning	1
			Wet	n/a	n/a	9
No Action Current Conditions	4	Mid-Late mod closure, Dense mid canopy, Sparse understory Moderate dead and down FBPS FM 10	Dry	0-2 (1)	Surface	0
				3-24 (1-7)	Passive Crown	90
				25+ (8)	Active Crowning	1
			Wet	n/a	n/a	9
No Action Current Conditions	5	Mid-late closed, Moderate understory, Moderate dead and down FBPS FM 10	Dry	n/a	Surface	0
				0-25+ (0-10)	Passive Crown	91
				n/a	Active Crowning	0
			Wet	n/a	n/a	9
No Action Current Conditions	6	Mid-late closed, Dense understory, Heavy dead and down FBPS FM 10	Dry	n/a	Surface	0
				0-25+ (0-10)	Passive Crown	91
				n/a	Active Crowning	0
			Wet	n/a	n/a	9

Source: J. DeJuilio, Fire Effects Monitor Medford BLM and C. Martin, Fire Ecologist Medford BLM (Retired) (2010). Based on approximately 100 days a year - July 15 through October 20.

Other projects within the Deer Creek watershed include the South Deer Landscape Management which would treat approximately 6,000 acres including approximately 1,378 acres of harvest with follow up fuels hazard reduction, and the Anderson West Landscape Management Project which would treat approximately 350 acres including approximately 112 acres of harvest with follow up fuels hazard reduction. A programmatic fuels reduction EA (DOI-BLM-OR-M070-2009-0009-EA) is planned for BLM lands and could include projects in the Deer Creek watershed. In addition, 328 acres of fuels reduction have occurred on private ground through National Fire Plan (NFP) grants in the watershed.

3.4.2.2 Alternative 2 Effects to Fire and Fuels

Under Alternative 2 approximately 799 acres would be harvested. There would be 242 acres of regeneration harvest resulting in retaining at least six conifers per acre over 20 inches DBH.

Initially, there would be a large amount of post-harvest slash on the regeneration harvest units which would increase fire hazard. Depending on the amount of debris, fire behavior would be represented by either fuel model 11 or fuel model 12 described above. Typically, residual slash would be removed or burned within 18 months of creation depending on weather patterns and drift smoke. The FIREMON data plots placed in 2008 were imported and FMA+ runs were done subtracting vegetation following the prescription detailed in Section 2.0 of this EA. After post harvest slash is disposed of, crown fire potential would be dramatically reduced, with crown fire potential as high as 91% (Table 23) converted to surface fire (Table 24).

Table 24. Post slash disposal fire behavior predictions in regeneration harvest units

Treatment	Plot	Stand Type	Environmental Conditions	20' (midflame) Wind speed	Fire Behavior	Percent Days
Regeneration Harvest	1	Sparse canopy, sparse understory Light dead and down FBPS FM 8	Dry	0-25	Surface	91
				n/a	Passive Crown	0
				n/a	Active Crowning	0
			Wet	n/a	n/a	9
Regeneration Harvest	3	Sparse canopy, sparse understory Light dead and down FBPS FM 8	Dry	0-25	Surface	91
				n/a	Passive Crown	0
				n/a	Active Crowning	0
			Wet	n/a	n/a	9
Regeneration Harvest	4	Sparse canopy, sparse understory Light dead and down FBPS FM 8	Dry	0-25	Surface	91
				n/a	Passive Crown	0
				n/a	Active Crowning	0
			Wet	n/a	n/a	9
Regeneration Harvest	5	Sparse canopy, sparse understory Light dead and down FBPS FM 8	Dry	0-25	Surface	91
				n/a	Passive Crown	0
				n/a	Active Crowning	0
			Wet	n/a	n/a	9

Regeneration Harvest	6	Sparse canopy, sparse understory Light dead and down FBPS FM 8	Dry Wet	0-25 n/a n/a n/a	Surface Passive Crown Active Crowning n/a	91 0 0 9

Source: J. DeJuilio, Fire Effects Monitor Medford BLM and C. Martin, Fire Ecologist Medford BLM (Retired) (2010). Based on approximately 100 days a year - July 15 through October 20.

Over time proposed regeneration harvest units would increase in fire severity for several decades until trees occupy the site. Until that time, shrubs and grasses would dominate these units as would high stand densities of young, even aged conifers with low crowns which would allow fires to torch and run rapidly. Unless activity fuels are treated, young stand management would contribute to surface fuel loadings as brushing and pre-commercial thinning activities take place. If regeneration harvest units are heavily planted, they could become a plantation. There are several instances where conifer plantations have experienced high severity, stand-replacing fire in recent local large wildfires such as; the Biscuit Fire 2002, the Apple Fire 2002 on the Umpqua National Forest, and the Deer Creek Fire 2005. "The 2002 fires had a major effect on plantations. Seventy-four percent of plantations under 20 years of age experienced stand-replacement mortality" (Wildfire effects evaluation report, page 27, Umpqua National Forest, 2003).

In addition to the regeneration harvest units, Alternative 2 proposes an additional 557 acres of commercial harvest and/or density management treatment. Commercial forest thinning is also a tool to reduce fire hazard; fire severity and/or intensity is significantly reduced in commercially thinned stands when accompanied by surface fuels reduction (Graham et al. 2004). Stands would be thinned to varying degrees of tree canopy 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 25 include the acres and proposed treatments for the Alternative 2 non-regeneration units, again changing potential for crown fire to surface fire.

Table 25. Post slash disposal fire behavior predictions in non regeneration harvest units using FMA+

Treatment	Plot	Stand Type	Environmental Conditions	20' (midflame) Wind speed	Fire Behavior	Percent Days
Fuels reduction removal of 80% of >20" dbh conifer,	1	Moderate canopy, moderate understory Light dead and down	Dry	0-25 n/a n/a n/a	Surface Passive Crown Active Crowning	91 0 0

>16” hardwood and surface fuel reduction		FBPS FM 8	Wet		n/a	9
Fuels reduction removal of 80% of >20” dbh conifer, >16” hardwood and surface fuel reduction	3	Moderate canopy, moderate understory Light dead and down FBPS FM 8	Dry Wet	0-25 n/a n/a n/a	Surface Passive Crown Active Crowning n/a	91 0 0 9
Fuels reduction removal of 80% of >20” dbh conifer, >16” hardwood and surface fuel reduction	4	Moderate canopy, moderate understory Light dead and down FBPS FM 8	Dry Wet	0-25 n/a n/a n/a	Surface Passive Crown Active Crowning n/a	91 0 0 9
Fuels reduction removal of 80% of >20” dbh conifer, >16” hardwood and surface fuel reduction	5	moderate canopy, moderate understory Light dead and down FBPS FM 8	Dry Wet	0-25 n/a n/a n/a	Surface Passive Crown Active Crowning n/a	91 0 0 9
Fuels reduction removal of 80% of >20” dbh conifer, >16” hardwood and surface fuel reduction	6	Moderate canopy, moderate understory Light dead and down FBPS FM 8	Dry Wet	0-25 n/a n/a n/a	Surface Passive Crown Active Crowning n/a	91 0 0 9

Source: J. DeJuilio, Fire Effects Monitor Medford BLM and C. Martin, Fire Ecologist Medford BLM (Retired) (2010). Based on approximately 100 days a year - July 15 through October 20.

Below is a table displaying the breakdown on the 557 acres of harvest units other than regeneration harvest.

Table 26 Alt 2 non-regeneration harvest units

Harvest Type	Acres
Density Management / Modified Group Selection /Group Selection	223
Density Management / Modified Group Selection	59
Density Management / Understory Reduction	275
Total Acres	557

After thinning treatments and slash disposal, 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, and which are safer and more effective. Crown fire potential would also be reduced when compared with the No Action Alternative as displayed in the tables above.

3.4.2.3 Alternative 3 Effects to Fire and Fuels

Alternative 3 proposes vegetation thinning treatment on 746 acres; 319 acres Density Management / Modified Group Selection and 427 acres of Density Management / Understory Reduction. These prescriptions would reduce CBD and increase CBH but would leave more stems per acre than Alternative 2. An FMA+ run was used removing trees representing Alternative 3 prescriptions displaying crown fire potential and is shown below. As under Alternative 2, treatments are effective, reducing the percent days of crown fire, and converting those modeled fires to surface fires.

Table 27. Alternative 3 post treatment conditions fire behavior predictions using FMA+

Treatment Type	Plot	Stand Type	Env. Conditions	20' (midflame) wind speed	Fire Behavior	Percent Days
Fuels reduction removal of 80% of >8" dbh and surface fuel reduction	1	Moderate canopy, moderate understory Light dead and down FBPS FM 8	Dry	0-25	Surface	91
				n/a	Passive Crown	0
				n/a	Active Crowning	0
			Wet	n/a	n/a	9
Fuels reduction removal of 80% of >8" dbh and surface fuel reduction	3	Moderate canopy, moderate understory Light dead and down FBPS FM 8	Dry	0-25	Surface	91
				n/a	Passive Crown	0
				n/a	Active Crowning	0
			Wet	n/a	n/a	9
Fuels reduction removal of 80% of >8" dbh and	4	Moderate canopy, moderate understory Light dead and down	Dry	0-25	Surface	91
				n/a	Passive Crown	0
				n/a	Active Crowning	0

Treatment Type	Plot	Stand Type	Env. Conditions	20' (midflame) wind speed	Fire Behavior	Percent Days
surface fuel reduction		FBPS FM 8	Wet	n/a	n/a	9
Fuels reduction removal of 80% of >8" dbh and surface fuel reduction	5	Moderate canopy, moderate understory Light dead and down FBPS FM 8	Dry Wet	0-25 n/a n/a n/a	Surface Passive Crown Active Crowning n/a	91 0 0 9
Fuels reduction removal of 80% of >8" dbh and surface fuel reduction s	6	Moderate canopy, moderate understory Light dead and down FBPS FM 8	Dry Wet	0-25 n/a n/a n/a	Surface Passive Crown Active Crowning n/a	91 0 0 9

Source: J. DeJuilio, Fire Effects Monitor Medford BLM and C. Martin, Fire Ecologist Medford BLM (Retired) (2010). Based on approximately 100 days a year - July 15 through October 20.

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

Summary and Conclusions for Fire and Fuels

The Deer Creek Watershed is an area more than 72,000 acres in size of which 80% is in moderate or high fire hazard and risk. There has been a history of large fires in the watershed and there is currently a policy to suppress all wildfires within the watershed. Based on historic fire regime information, 71% of the watershed is out of historic range and could support large severe wildfires. The entire watershed is located within the Wildland Urban Interface (WUI) with no signs that the trend of people moving into the WUI would change. In addition, 64% of the Planning Area BLM acres are in an overcrowded Douglas fir stand condition resembling a fuel model 10 and 35% of the Planning Area BLM acres are in a mixed conifer tan oak series resembling a fuel model 9 which could propagate a high intensity wildfire.

Treatments proposed in the two action alternatives would reduce crown fire potential after post harvest slash treatments on approximately 800 acres of public land in the WUI. Alternative 2 would increase the fire hazard for two to three decades on 242 acres after regeneration harvest.

Overall, the Deer North project would decrease fire hazard on 557 acres and increase the fire hazard for two to three decades on 242 acres under Alternative 2 and decrease fire hazard on 746 acres under Alternative 3 with both action alternatives potentially producing forest products (biomass) from fuels treatment.

3.5 Fisheries and Aquatic Resources

3.5.1 Affected Environment Fisheries and Aquatic Resources

The Planning Area is in the Deer Creek 5th field watershed. The major fish bearing streams that could be affected by the proposed actions are Deer Creek, Draper Creek and Crooks Creek. Fish in these streams include fall Chinook salmon, coho salmon, winter steelhead, cutthroat trout, Pacific lamprey, and sculpin. Southern Oregon/Northern California Coast (SONCC) coho salmon are federally listed as threatened. None of the other species is federally listed.

The streams and riparian areas within the Planning Area are described in the Deer Creek Watershed Analysis (USDI 1997) as degraded for fish habitat due to the effects of historic and current land use (e.g., placer mining, and straightening of channels for agriculture and flood control). The Oregon Department of Fish and Wildlife (ODFW) has identified fish habitat benchmarks (Moore 1997) used to determine if a component of fish habitat is a limiting factor in trout or salmon production or survival. The ODFW benchmark for pool habitat is that pools comprise >35% of total stream area. Adequate riparian canopy coverage (stream shade), which affects water temperatures, is identified as >70%. Adequate levels of LWD exist when there are more than 20 pieces of large wood per 100 meters of stream. In the streams of the Planning Area, inadequate amounts of large woody debris (LWD), inadequate pool depth, inadequate pool frequency (percent occurrence of the total stream area), inadequate summer water flow, high water temperature, and too much fine sediment in the gravel of riffles have all been identified as limiting factors for salmon and trout production and survival. Summer water temperatures are higher than optimal levels for salmonids in Deer Creek and Draper Creek because temperatures of more than 64 degrees F were found. Instream water availability for fish in the summer is below historic ranges and is less than the instream flows established by ODFW for these streams. In Deer and Draper Creeks, the amount of fine sediments in the gravels of riffles is greater than the 15% by area identified as an upper threshold for proper function of the substrate as spawning material for salmonids. In Crooks Creek, the amount of sediment in gravels is at levels considered desirable. Information on habitat condition was obtained from the Deer Creek Watershed Analysis and from stream surveys which ODFW completed on Deer Creek (1993), Draper Creek (1995, 2008) and Crooks Creek (1995).

Approximately 50% of the fish habitat within the Planning Area is under BLM management, while the remainder is under private ownership. Due to the checkerboard ownership, BLM managed land may be either upstream or downstream of private land. Typically, however, fish habitat within the Planning Area is downstream of BLM managed land, on lower elevation private land.

3.5.2 Environmental Consequences Fisheries and Aquatic Resources

The following analysis considers the likelihood that the No Action and the two proposed 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, which details the impacts on stream conditions (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.

3.5.2.1 Alternative 1 (No Action) Effects to Fisheries and Aquatic Resources

Currently, the fish-bearing streams of the Planning Area have poor quality rearing habitat which limits salmonid growth and survival. Land use practices which have removed riparian vegetation, straightened channels, and removed LWD from streams have resulted in loss of pool habitat which is essential for salmonid rearing. The trend toward removal of older trees along streams has resulted in a decrease in the recruitment of large logs to channels. Loss of large wood removes a main mechanism for the creation of pools and the storage of sediment. As a result, more banks erode and the sediment is deposited in downstream spawning gravels. These become embedded and are less desirable for use by spawning salmon. In Deer and Draper Creeks, the amount of fine sediments in the gravels of riffles is greater than the 15% by area identified as an upper threshold for proper function of the substrate as spawning material for salmonids. In Crooks Creek, the amount of sediment in gravels is at levels considered desirable.

Under Alternative 1, programmatic road maintenance would continue to reduce sediment from chronic sources.

Fish growth and survival are limited by elevated stream temperatures in Deer Creek and Draper Creek. The trend toward decreasing riparian shade on private land is expected to continue as streamside vegetation is removed through continuing land-use practices such as logging, agriculture and development. Loss of shade results in continued elevated stream temperatures. Low summer flow exacerbates the high stream temperatures, and this is not expected to improve as more demands are made on available water through private land use. Under Alternative 1, there would be no change in primary shade on BLM streams and stream temperatures would not be impacted.

Two BLM land management actions which would occur within the Deer Creek watershed are the Anderson West and South Deer projects. The BLM concluded that the effects on fish from these projects would be negligible. There are no additional reasonably foreseeable actions on BLM land in the Planning Area except the BLM fuel hazard reduction projects being completed under decisions currently in effect and those that could be implemented under the fuels programmatic EA, which was recently completed. These small projects would not affect the fish habitat of the Deer North Planning Area because they are designed to be implemented without impacts to stream channels. The thinning from these projects would take place outside of the Deer North Planning Area and is not expected to have an impact on fish habitat on BLM managed land. See the introduction to Section 3.0 above for details on these projects on BLM Land.

3.5.2.2 Alternative 2 Effects to Fisheries and Aquatic Resources

Road Work

The proposed road work includes maintenance and upgrading of approximately 31.5 miles of existing road and approximately 0.8 mile of temporary spur road construction. One-half mile of road would also be constructed and blocked following use, but would not be obliterated. There is an estimated 2.3 miles of existing roads within the Riparian Reserves, in small segments

dispersed across the Planning Area. Prior to harvest activities, selected road surfaces and ditch lines would be bladed. To reduce maintenance generated sediment from entering streams, ditches would not be bladed within 50' of flowing streams, unless necessary to protect culvert or road stability.

Road maintenance would reduce chronic sources of sediment through improved road drainage. Road maintenance and construction have the potential to cause small inputs of fine sediments to streams immediately downstream of culverts, but the size and effects on fish would be so greatly reduced by implementation of PDFs (e.g., wet season restrictions, dust abatement, temporary erosion control) that these actions are not likely to alter fish habitat. This is because the amount of sediment delivery would be so small that it would not cause an increase in stream gravel embeddedness or deterioration in pool formation or quality. Through PDFs and Best Management Practices which minimize potential sediment routing to streams, activity-generated sediment in fish habitat would be so small as to be undetectable. Salmonid survival and production would not be affected because, as stated in the Soil and Water section (3.1), there would be no alterations to channel form (e.g., width to depth ratios, pool reduction, embeddedness) or channel processes (e.g., 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. Therefore, salmonid life stages (spawning, incubation, rearing) which depend on these channel conditions would not be affected.

Vegetation Treatments

Harvest- The units proposed for harvest are outside of the Riparian Reserves of both perennial and intermittent streams. Vegetation treatment prescriptions were developed to meet objectives for ecosystem function that are outlined in the Aquatic Conservation Strategy of the Northwest Forest Plan (ACS). Hydrologic analysis (Section 3.1) did not identify any impacts to channels which would result from harvest, which is outside of Riparian Reserves.

Under Alternative 2, there would be no change in primary shade on BLM streams; therefore, stream temperatures would not be impacted. Vegetation in the primary shade zone of perennial streams would be retained because there would be no harvest treatment within the Riparian Reserves. Potential for erosion would be minimized because Riparian Reserves would remain untreated, and skid trails outside of the Riparian reserves would be waterbarred to prevent mechanisms to route runoff into channels from being created. Off-site impacts are not expected due to limited disturbance and efforts to eliminate sediment routing into streams. Because there would be no reduction in streamside shade, there would be no increase in water temperature. The potential for large instream wood recruitment would not be reduced. Channel function and dynamics which depend on wood recruitment (e.g., pool formation) would not be affected, resulting in unchanged stream complexity and water quality.

Fuels – Activity fuels would be treated in the harvest units to reduce the fuel hazard and risk of severe wildfire (also see Fire and Fuels analysis Section 3.3). Fuel treatments include handpiling and burning, slashing, and underburning. Hand piles would not be burned within 150 feet of stream channels. Although these piles burn down to mineral soil, sediment would not migrate beyond the unburned litter around the pile. Following underburning, 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; no sediment routing mechanisms to streams would be created. There would be no changes to the channel environment that would adversely affect fish or fish habitat.

In Alternative 2, approximately 799 acres could 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. The use of designated skid trails from harvest treatments would prevent any additional soil disturbance from the biomass treatments.

The potential effects described above are negligible in this alternative because PDFs such as no treatment areas, designated skid roads, tractor use limitations, and prescribed burning restrictions would eliminate sediment delivery mechanisms and disturbance. Riparian functions of streamshade and large wood recruitment would not be affected. There would be no increase in peak flows, no increase in erosion due to compaction, and no alterations in channel form or processes (see Soil and Water analysis section 3.1). As a result, there would be no measurable adverse changes to aquatic habitat or fish at the 6th or 5th field watershed scales.

The Soil and Water analysis did identify small, localized inputs of sediment to streams from road maintenance. These were anticipated to be short term (3 years) but that there would be a long-term reduction in stream sediment as a result of road work. However, this reduction would not be likely to be detectable, even at the 6th field scale. These cumulative effects are within the scope of anticipated effects to water and soil determined in the 1995 RMP/EIS (pp.4-14 to 4-24). As a result, no changes in the environmental baseline condition of streams were identified, and therefore, no cumulative effects to fish and aquatic habitats would be expected to result from the proposed action in this Planning Area, or 6th or 5th field watershed scales.

3.5.2.3 Alternative 3 Effects to Fisheries and Aquatic Resources

Road Work

The proposed road work includes maintenance and upgrading of approximately 31.5 miles of existing road and approximately 0.8 mile of temporary spur road construction. There is an estimated 2.25 miles of road within the Riparian Reserves in small segments dispersed across the Planning Area. Prior to harvest activities, selected road surfaces and ditch lines would be bladed. To reduce maintenance generated sediment from entering streams, ditches would not be bladed within 50’ of flowing streams, unless necessary to protect culvert or road stability.

Road maintenance would reduce chronic sources of sediment through improved road drainage. Road maintenance and construction have the potential to cause small inputs of fine sediments to streams immediately downstream of culverts, but the size and effects on fish would be so greatly reduced by implementation of PDFs (e.g., wet season restrictions, dust abatement, temporary erosion control) that these actions are not likely to alter fish habitat. This is because the amount of sediment delivery would be so small that it would not cause an increase in stream gravel embeddedness or deterioration in pool formation or quality. Through PDFs and Best Management Practices which minimize potential sediment routing to streams, activity-generated sediment in fish habitat would be so small as to be undetectable. Salmonid survival and production would not be affected because, as stated in the Soil and Water section (3.1), there

would be no alterations to channel form (e.g., width to depth ratios, pool reduction, embeddedness) or channel processes (e.g., 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. Therefore, salmonid life stages (spawning, incubation, rearing) which depend on these channel conditions would not be affected.

Vegetation Treatments

Harvest- The units proposed for harvest are outside of the Riparian Reserves of both perennial and intermittent streams. Vegetation treatment prescriptions were developed to meet objectives for ecosystem function that are outlined in the Aquatic Conservation Strategy of the Northwest Forest Plan (ACS). Hydrologic analysis (Section 3.1) did not identify any impacts to channels which would result from harvest, which is outside of Riparian Reserves.

Under Alternative 3, there would be no change in primary shade on BLM streams; therefore, stream temperatures would not be impacted. Vegetation in the primary shade zone of perennial streams would be retained because there would be no harvest treatment within the Riparian Reserves. Potential for erosion would be minimized because Riparian Reserves would remain untreated, and skid trails outside of the Riparian Reserves would be waterbarred to prevent mechanisms to route runoff into channels from being created. Off-site impacts are not expected due to limited disturbance and efforts to eliminate sediment routing into streams. Because there would be no reduction in streamside shade, there would be no increase in water temperature. The potential for large instream wood recruitment would not be reduced. Channel function and dynamics which depend on wood recruitment (e.g., pool formation) would not be affected, resulting in unchanged stream complexity and water quality.

Fuels– Activity fuels would be treated in the harvest units to reduce the fuel hazard and risk of severe wildfire (also see Fire and Fuels analysis Section 3.3). Fuel treatments include handpiling and burning, slashing, and underburning. Hand piles would not be burned within 150 feet of stream channels. Although these piles burn down to mineral soil, sediment would not migrate beyond the unburned litter around the pile. Following underburning, 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; no sediment routing mechanisms to streams would be created. There would be no changes to the channel environment that would adversely affect fish or fish habitat.

In Alternative 3, approximately 799 acres would be treated for fuel reduction through biomass utilization. Effects from biomass treatments and subsequent underburning and handpile burning would be the same as for the fuel treatments described above for activity generated fuels. The use of designated skid trails from harvest treatments would prevent any additional soil disturbance from the biomass treatments.

The potential effects described above are negligible in this alternative because PDFs such as no treatment areas, designated skid roads, tractor use limitations and prescribed burning restrictions would eliminate sediment delivery mechanisms and disturbance. Riparian functions of streamshade and large wood recruitment would not be affected. There would be no increase in peak flows, no increase in erosion due to compaction, and no alterations in channel form or

processes (see Soil and Water analysis section 3.1). As a result, there would be no measurable adverse changes to aquatic habitat or fish at the 6th or 5th field watershed scales.

The Soil and Water analysis did identify small, localized inputs of sediment to streams from road maintenance. These were anticipated to be short term (3 years) but that there would be a long term reduction in stream sediment as a result of road work. However, this reduction would not be likely to be detectable, even at the 6th field scale. These cumulative effects are within the scope of anticipated effects to water and soil determined in the 1995 RMP/EIS (pp.4-14 to 4-24). As a result, no changes in the environmental baseline condition of streams were identified, and therefore, no cumulative effects to fish and aquatic habitats would be expected to result from the proposed action in this Planning Area, or 6th or 5th field watershed scales.

Summary and Conclusions Fisheries and Aquatic Resources

Alternative 2 Summary and Conclusions Fisheries and Aquatic Resources
In conclusion, Alternatives 2 and 3 would not likely disrupt normal behavior patterns such as migration, spawning, egg incubation, rearing, and feeding because habitat would not be degraded. The habitat condition would not be expected to be different from what was described above under the No Action Alternative. Hydrologic analysis (Section 3.2) did not identify any impacts to channels which would result from harvest or fuel treatments, all of which would be outside of Riparian Reserves. Road maintenance and construction have the potential to cause small inputs of fine sediments to streams immediately downstream of culverts, but the size and effects on fish would be so greatly reduced by implementation of PDFs that these actions are not likely to alter fish habitat. Salmonid survival and production would not be affected because, as stated in the Soil and Water section (3.2), there would be no alterations to channel form or channel processes. There would be no alteration to sedimentation processes which would create chronic adverse water quality or channel conditions.

3.5.3 Aquatic Conservation Strategy (ACS)

The Aquatic Conservation Strategy developed and identified nine objectives to maintain and restore the ecological health of watersheds and aquatic ecosystems contained within them on public lands. The strategy is designed to protect salmon and steelhead habitat on federal lands managed by the BLM within the range of the Pacific Ocean anadromy. The components of the ACS are *riparian reserves, key watersheds, watershed analysis, and watershed restoration* (RMP p. 22).

Riparian Reserves
Riparian reserve widths conform to the interim widths prescribed in the Northwest Forest Plan (p. C-20). Fish bearing streams would have a riparian reserve width of 380 feet (2 site potential tree heights), perennial and intermittent streams and springs would have riparian reserve widths of 190 feet (1 site potential tree height).

Key Watersheds
The project is not within a key watershed (RMP p. 23).

Watershed Analysis
The actions proposed in the Deer North Vegetation Management Project EA occur entirely within the Deer Creek 5th field watershed, analyzed in the Deer Creek (USDI 1997) Watershed Analysis. The WA recommendations support the management of vegetation and conditions inside Riparian Reserves to promote the objectives of the ACS, and the use of thinning, prescribed fire or mechanical treatments to reduce fuels (USDI 1997). The Deer North Vegetation Management Project includes commercial vegetation treatments, fuel treatments, and road treatments.

The actions proposed are consistent with the recommendations of the Watershed Analyses.

Watershed Restoration
Road improvements would **control and prevent road related runoff and chronic sediment production**.

The ACS was used as a guide to develop and refine treatments in the watershed as a whole. The ability of treatments to meet and promote the ACS objectives below is used to evaluate the project actions.

> **1. Maintain and restore the distribution, diversity, and complexity of watershed and landscape-scale features to ensure protection of the aquatic systems to which species, populations and communities are uniquely adapted.**
>
> The project would maintain and restore components of the watershed because "no changes in the environmental baseline condition of streams were identified, and therefore, no cumulative effects to fish and aquatic habitats would be expected to result from the proposed action in this Planning Area, or 6th or 5th field watershed scales. " (EA p. 85)
>
> "The proposed actions would not be likely to disrupt normal behavior patterns such as migration, spawning, egg incubation, rearing, and feeding because habitat would not be degraded. " (EA p. 85)
>
> **2. Maintain and restore spatial and temporal connectivity within and between watersheds. Lateral, longitudinal, and drainage network connections include floodplains, wetlands, upslope areas, headwater tributaries, and intact refugia. These network connections must provide chemically and physically unobstructed routes to areas critical for fulfilling life history requirements of aquatic and riparian-dependent species.**
>
> The project would not affect the watershed connections. The proposed road improvements would provide a benefit through reduction of sediment delivery and would not be likely to degrade habitat or to negatively affect salmonid life history requirements such as migration, spawning, egg incubation, rearing and feeding (EA pp. 84-86).
>
> **3. Maintain and restore the physical integrity of the aquatic system, including shorelines, banks, and bottom configurations.**

It is anticipated that the short term beneficial effects from road maintenance would maintain downstream salmon survival and production. Long term beneficial effects from road activities include sediment reduction, improving road conditions for peak runoff flows, and better water drainage (EA p. 86) "There would be no increase in peak flows, no increase in erosion due to compaction, and no alterations in channel form or processes" (EA p. 85), thus maintaining the physical integrity of the aquatic system.

4. Maintain and restore water quality necessary to support healthy riparian, aquatic, and wetland ecosystems. Water quality must remain within the range that maintains the biological, physical, and chemical integrity of the system and benefits survival, growth, reproduction, and migration of individuals composing aquatic and riparian communities.

Water quality would be maintained as would the biological, physical, and chemical integrity of the system (EA pp. 84-85). "Riparian functions of streamshade and large wood recruitment would not be affected." (EA p. 85).

5. Maintain and restore the sediment regime under which aquatic ecosystems evolved. Elements of the sediment regime include the timing, volume, rate, and character of sediment input, storage, and transport.

Objective 5 would continue to be met as sedimentation would be highly localized and short term in duration. Sediment would be maintained within a range that would be expected to occur in the natural sediment regime. There are no expected changes to the timing, volume, rate, and/or character of sediment input, storage, and transport at the local or watershed scale. Improved roads would decrease fine sediment input to the system. Road maintenance would help restore aquatic habitat by decreasing sediment delivery to streams (EA p. 84).

Through PDFs and practices which minimize potential sediment routing to streams, activity generated sediment in fish habitat would be undetectable. Isolated short term sedimentation from road maintenance activities would become immeasurable in downstream stream reaches. Long and short term reduction in sediment delivery to streams is expected from road drainage improvement.

The small amount of activity generated sediment would be short term, lasting the first few storms or one to two years following maintenance. After year two, sediment rates would drop below current levels due to road improvement, resulting in a long term reduction of sediment input.

6. Maintain and restore in-stream flows sufficient to create and sustain riparian, aquatic, and wetland habitats and to retain patterns of sediment, nutrient, and wood routing. The timing, magnitude, duration, and spatial distribution of peak, high, and low flows must be protected.

Peak flow amplification from rain and snow events would not occur at the 6th field watershed level. Since no measurable changes in peak flow would occur at the 6th field

watershed level, there would also be no measurable changes at the larger 5th field watershed scale (EA p. 34).

7. Maintain and restore the timing, variability, and duration of floodplain inundation and water table elevation in meadows and wetlands.

As there are no anticipated changes to water flow, channel structure or conditions, and reduction of sedimentation; the project would have little or no effect on timing, variability or duration of floodplain inundation or water table levels at both the project and watershed scale (EA pp. 34-35).

8. Maintain and restore the species composition and structural diversity of plant communities in riparian areas and wetlands to provide adequate summer and winter thermal regulation, nutrient filtering, appropriate rates of surface erosion, bank erosion, and channel migration and to supply amounts and distributions of coarse woody debris sufficient to sustain physical complexity and stability.

No vegetation treatments are proposed within riparian areas. Treatments outside of the Riparian Reserves would not disrupt channel processes and riparian function. Riparian functions of streamshade and large wood recruitment would be maintained (EA pp. 84-85).

9. Maintain and restore habitat to support well-distributed populations of native plant, invertebrate and vertebrate riparian-dependent species.

No vegetation treatments are proposed within riparian areas. Treatments outside of the Riparian Reserves would not disrupt channel processes and riparian function. Riparian functions of streamshade and large wood recruitment would be maintained (EA pp. 84-85). As habitat would be maintained, distribution of riparian dependent species would also be maintained.

Site Specific Effects

Roads
Road maintenance would maintain downstream salmonid habitat, survival and production. Project design would minimize the risk for sedimentation associated with road maintenance. Road activities would result in sediment reduction and improved road drainage conditions (EA pp. 83-84). Because of riparian reserve buffers, no vegetation treatments in Riparian Reserves, and PDFs requiring use of designated skid roads and subsequent restoration (EA p. 85), soils in Riparian Reserves would not be compacted or displaced.

Harvest –No harvest treatments are proposed for riparian areas, reducing the potential to negatively affect fish and aquatic habitat (EA p. 84). Vegetation in the primary shade zone of perennial streams would be retained, thereby protecting water quality. Vegetation treatments would not negatively affect LWD because they would not take place within Riparian Reserves.

The hydrology analysis determined that proposed vegetation treatments would not affect peak or base stream flows because of lack of routing mechanisms on skid trails, the low levels of area

occupied by roads, and the small spatial scale of harvest. As a result, fish habitat would not be altered in any detectable way (EA p. 84).

Fuels **-** Mechanical treatments and prescribed burning would be restricted to areas outside of Riparian Reserves. Sediment and ash are unlikely to be transported to fish habitat because of the unburned strip of vegetation and organics along streams and the mosaic pattern of unburned vegetation. Given the improbability of sediment reaching streams and the limited spatial extent, the potential for stream sedimentation is discountable (EA p. 85).

Summary and Conclusions for ACS
No measurable adverse changes to aquatic habitat or fish at the 6th or 5th field watershed scales were identified in the effects analysis of the action alternatives.

The Soil and Water analysis did identify small, localized inputs of sediment to streams from road maintenance, but these would not be likely to be detectable, even at the 6th field scale. As a result, no changes in the environmental baseline condition of streams were identified, and therefore, no cumulative effects to fish and aquatic habitats would be expected to result from the proposed action in this Planning Area, or 6th or 5th field watershed scales.

In conclusion, the proposed actions would not be likely to disrupt normal behavior patterns such as migration, spawning, egg incubation, rearing and feeding because habitat would not be degraded. The habitat condition would not be expected to be different from what was described above under the No Action Alternative.

The ACS is designed to protect salmon and steelhead habitat on federal lands managed by the BLM within the range of the Pacific Ocean anadromy. The strategy was used as a guide to develop and refine treatments in the watershed as a whole. The ability of treatments to meet and promote the ACS objectives was used to evaluate the project actions. The salmon and steelhead habitat on BLM managed federal lands within the Planning Area would be protected if either of the action alternatives were implemented.

3.6 Botanical Resources

3.6.1 Affected Environment Botanical Resources

Special Status Species
Special Status species are an official list designated by the State director (IM OR 2008-038). The most recent Special Status Species list went into effect on February 7, 2008 (IM OR 2008-038). This new list has two categories, Sensitive and Strategic. The former categories of Bureau Assessment and Bureau Tracking were removed from Special Status Species categorization in 2008 to provide consistency in the special status species lists between Forest Service and BLM. Species in these categories either went into the two remaining categories, or were dropped as species of conservation concern. Sensitive species require a pre-project clearance and management to prevent them from trending toward federal listing. There is no pre-project clearance or management required for the Strategic species at the BLM District level, so strategic species will not be analyzed in this document.

Threatened and Endangered (T&E), State Threatened (STO), Bureau Sensitive, and Survey and Manage (S&M) Category A, B, C, D, and E botanical species require protection and management. It is the BLM Oregon State Office's policy that the BLM would protect, manage, and conserve sensitive species and their habitats such that any Bureau action would not contribute to the need to list any of these species (IM OR-1991-57 and IM OR-2003-054).

The Medford District started surveying for and protecting special status species in the early 1980s. These lists are dynamic, and as new information became available, species are added or removed from protected status. Thus, the Bureau Special Status Species list from 1980 is not the same as the current list. Actions such as even-aged timber harvest and grazing prior to the 1980s likely had some impact on the species currently identified as Bureau Special Status. After 1980, measures were taken to prevent the listing of these species. While some populations may have been lost due to BLM activities, BLM has likely prevented the federal listing of most of these species. Only three species have been listed as Federally Threatened or Endangered since the Special Status program started. These species are: *Lomatium cookii* (Cook's desert parsley) listed as endangered in 2002; *Fritillaria gentneri* (Gentner's fritillary) listed as endangered in 1999; and *Limnanthes folccosa* ssp. *grandiflora* (large flowered woolly meadowfoam) listed as endangered in 2002. It should be assumed that on non-federal lands, past activities such as land development, even-aged harvest on private timber lands, mining, and grazing have locally extirpated populations of special status species.

On July 21, 2010 the US Fish and Wildlife Service published the critical habitat units for the Federally Endangered plant *Lomatium cookii* (Federal Register 2010). There is no critical habitat for *L. cookii* in the Deer North Planning Area; therefore, it will not be analyzed in this document.

BLM surveyed the Deer North Planning Area for the presence of federally-listed, State Threatened, Bureau Sensitive, Bureau Strategic, and S&M Category A and C botanical species, as well as noxious weeds during the 2008 field season. The Planning Area is within the range of the federally-listed plants *Fritillaria gentneri* and *Lomatium cookii*; however, no populations of either species were observed during the surveys. A post-survey review of the Planning Area showed there is no habitat for *Fritillaria gentneri* within the proposed treatment units. Five sensitive species, two Strategic species and eleven S&M species are located within the project boundary but only one sensitive species and six S&M species are located within a proposed unit. See Table 28 for a list of these species.

Table 28: Special Botanical Species Present in the Planning Area

Species	Common Name	Protection Status	# of Sites in the Planning Area*	# of Sites in Treatment Units*	# of Sites on the District*
Vascular Plants					
Allium bolanderi var. bolanderi	Bolander's onion	Strategic	1	0	14
Cypripedium fasciculatum	Clustered lady's slipper	Sensitive S&M C	13	1	901
Cypripedium montanum	Mountain ladyslipper	S&M C	1	0	431
Microseris howellii	Howell's microseris	Sensitive	1	0	248
Nonvascular Plants					
Bryoria tortuosa	Lichen	S&M B	1	1	587
Chaenotheca subroscida	Lichen	Sensitive	1	0	2
Dendriscocaulon intracatulum	Lichen	S&M D	11	10	536
Fungi					
Clavariadelphus pistillaris	Fungus	S&M B	1	1	2
Helvella crassitunicata	Fungus	Sensitive S&M B	1	0	2
Helvella maculata	Fungus	S&M B	1	0	2
Neournula pouchetii	Fungus	S&M B	1	1	1
Phaeocollybia olivacea	Fungus	Sensitive S&M B	1	0	12
Plectania milleri	Fungus	Strategic S&M B	1	0	176
Ramaria rubripermanens	Fungus	S&M B	16	12	76

*From the BLM GeoBOB data base 6/30/09.

The following are descriptions of the Bureau sensitive species found in the Planning Area. Strategic species are not described as they do not require protection.

Cypripedium fasciculatum is a native orchid that grows in the shade of mature coniferous forest canopies, but most frequently is found in mixed-successional forests in overstory openings, and edges where shade is provided by shrubs, saplings, and large perennial forbs. The plant has a strong connection with mycorrhizal fungi and a pollinator that preys on fungal gnats; these supporting species are found where there is a rich organic layer. This species has a scattered range in Washington, Oregon, Idaho, Montana, Wyoming, Colorado, Utah, and California.

Cypripedium montanum is a native orchid that grows in wooded communities with 60-80 percent canopy closure. This species is found in California, Oregon, Washington, Idaho, Montana, and Wyoming.

Microseris howellii is a native aster that grows on rocky serpentine soils from 1,000 to 3,500 feet. It is endemic to the Klamath Mountains, southern Curry and Josephine counties, Oregon.

Bryoria tortuosa is a pendent, filamentous lichen found in well-lit open stands. It typically grows on oak and pine species, but has been found on a large variety of trees and shrubs.

Chaenotheca subroscida is a pin lichen that is found in humid, intermontane old-growth forests at lower to middle elevations. It grows on conifer bark and occasionally on wood.

Dendriscocaulon intracatulum is a lichen that is endemic to the Pacific Northwest ranging from southeast Alaska to northern California. It grows on trees in open grown conifer or deciduous stands.

Clavariadelphus pistillaris is a club fungus found across western North America. It grows on soil or duff under mixed deciduous-coniferous forests on deciduous forests.

Helvella crassitunicata is a fungus endemic to Oregon and Washington. It grows on soils in montane regions with true fir species.

Helvella maculate is a fungus that grows in the range of the northern spotted owl. It is found at low to mid elevations under mixed conifers or hardwoods. This species is not restricted to old growth.

Neournula pouchetii is a cup fungus that grows in the range of the northern spotted owl. It is found in conifer stands ranging from 35 to over 200 years old.

Plectania milleri is a cup fungus known to occur in Oregon and Idaho. It grows on dead twigs and branches and is associated with mixed conifers.

Phaeocollybia olivacea is a fungus endemic to the western United States. It grows in mixed forests with oak or pine species in coastal lowlands.

Ramaria rubripermanens is a coral fungus that is endemic to the Pacific Northwest. It is associated with trees in the pine family.

Special Status Fungi

Surveys have not been conducted for Bureau Sensitive fungi, which is consistent with the BLM Oregon State Office Information Bulletin # OR-2004-145, Attachment 5. Above-ground fruiting structures (sporocarps) are short-lived, seasonal, and annually variable, making surveys difficult (USDA, USDI 2000). It is expected that field units will not conduct field surveys for these species due to survey impracticality. Protection of known sites along with ongoing, large-scale inventory work would provide the measures and means to meet agency policy. Occasionally surveyors find a sensitive fungus while surveying for other species. These sites are recorded and protected to prevent Federal listing of the species.. For the Deer North project there is one Sensitive fungi (*Phaeocollybia olivacea*) located in a project unit.

There are 20 sensitive fungi species that are suspected or documented on lands administered by Medford District BLM. For these 20 fungi species, specific information regarding connectivity, range, habitat requirements, and response to disturbance are lacking. The NWFP RMP, and technical information contained in the 2004 S&M FSEIS acknowledge incomplete or unavailable information regarding these species. Given the broad habitat and the lack of surveys completed for these species, it is assumed that more sites exist in the area of the NWFP. It is unknown how rare these species really are, but it is known they are associated with common tree species (Table 29). Given the acknowledged uncertainty, the association between these species and late-successional conditions, as well as unknown information regarding connectivity, habitat needs and range are not well understood. Therefore, there is uncertainty in the effects assessment.

Table 29 summarizes known information regarding the 20 sensitive fungi species, including; forest communities where these species may be found, species ranking from the Oregon Natural Heritage Information Center (ORNHIC), and number of known sites in the Deer Creek 5th field watershed. ONHIC maintains biodiversity databases for Oregon. These databases concentrate on rare and endangered plants, animals and ecosystems. Annually ORNHIC produces a booklet with the most up-to-date information on rare, threatened and endangered species of Oregon, which can be found at http://oregonstate.edu/ornhic/.

Table 29. Sensitive Fungi with Suitable Habitat within the Deer North Planning Area

Scientific Name	ORNHIC Rank	ORNHIC List	NWFP Sites	Forest Community Component	Known sites in the 5th field watershed
Boletus pulcherrimus	G2G3/S2	1	23	PSME, PIPO, ABCO	0
Dermocybe humboldtensis	G1G2/S1	1	4	PSME, PIPO	0
Gastroboletus vividus	G2?/S1	1	5	ABCO, Pine	0
Gomphus kauffmanii	G2G4/S3?	3	72	Pine, True fir	0
Gymnomyces fragrans	G2G3/S1S3	1	2	unknown	0
Helvella crassitunicata	G3/S2	2	27	True fir	1
Leucogaster citrinus	G3G4/S3S4	3	46	Pine	0
Otidea smithii	G2/S2	3	10	PSME,TSHE, POTR	0
Phaeocollybia californica	G2?/S2?	1	38	PSME	0
Phaeocollybia olivacea	n/a	n/a	110	PSME, ABCO, QUKE, Pine	1
Phaeocollybia oregonensis	G2?/S2?	1	13	ABCO	0
Phaeocollybia pseudofestiva	G3/S3?	3	47	Mature mixed conifers and hardwoods	2
Pseudorhizina californica	G4/S2	2	42	Pine	0
Ramaria largentii	G3/S2?	3	20	True fir, PIMO,	0

				PSME, TSHE	
Ramaria spinulosa var. *diminutiva*	GUT2/S1?	1	1	PSME, Pine	0
Rhizopogon chamaleontinus	G2G3/S1S2	2	1	PSME	0
Rhizopogon clavitisporus	G2G3/S1S2	2	3	unknown	0
Rhizopogon ellipsosporus	G2G3/S1S2	2	5	PSME	0
Rhizopogon exiguus	G2G3/S1S2	2	3	PSME	0
Sowerbyella rhenana	G3G4/S3	3	64	Older Pine	0

[1] Source: ISMS database 11-20-04, Handbook to Strategy 1 Fungal Species in the NWFP, Handbook to Additional Fungal Species of Special Concern in the NWFP, Medford District data.
Acronyms: PSME = Douglas-fir, PIPO = Ponderosa pine, ABCO = White fir, QUKE = California black oak, TSHE = western hemlock, PIMO = Western white pine, POTR=black cottonwood, Pine = Pinaceae family (includes pine, fir, Douglas-fir, spruce, hemlock),

3.6.2 Environmental Consequences Botanical Resources

3.6.2.1 Alternative 1 (No Action) Effects to Botanical Resources

The No Action Alternative would not result in any direct effects to T&E, Bureau Sensitive, State Threatened, or S&M botanical species because this alternative proposes no habitat/ground-disturbing activities. The No Action Alternative could have negative indirect effects on special status species and habitat requirements in the Planning Area as described below.

Forest Harvest

Fire has played an extremely important role in influencing the plant communities of southwestern Oregon. Fire created and perpetuated habitats are typically found in this Planning Area. According to Franklin and Dyrness (1988), this fire regime has been disrupted by fire suppression activities. Without the forest harvest treatments proposed in the action alternatives the stands would continue to grow and create an over-dense condition. This over-dense condition would favor moderate to high-intensity wildfires, which could result in excessive damage to plant sites or their habitat. Fire may also damage the mycelia networks of Sensitive, Strategic and S&M Fungi, possibly eliminating populations of those species (Hart, 2005).

Current and future foreseeable activities in the within the Deer Creek 5th field watershed are listed in the beginning of this chapter (Section 3.0). Special status plant species on BLM and other federal lands would continue to be protected and conserved following policy and management guidelines. Populations on non-federal lands would most likely remain undetected and unprotected because no laws governing rare plants on non-federal lands exist. The South Deer, fuels reduction, and young stand management projects in the Deer Creek watershed require buffers around special status species to protect them from project activities. Similar buffers are used throughout the Grants Pass Resource Area and the Medford District.

The No Action Alternative would have no effect on the T&E species *Fritillaria gentneri* ,or *Lomatium cookii*, or State Threatened botanical species because they were not found on BLM managed lands within the Planning Area. This alternative would not trend toward listing Bureau

Sensitive species or impact S&M Catagory A, B, C, D, or E species because there are no ground/habitat disturbing activities proposed in this alternative. It is not possible to predict where and how intense a wildfire would be, so impacts of potential wildfire are unknown.

3.6.2.2 Alternatives 2 and 3 Effects to Botanical Resources

Special Status Vascular Species

The T&E species *Fritillaria gentneri* and *Lomatium cookii* were not observed during surveys in the Planning Area. Because these species do not occur in proposed project units, actions proposed in these alternatives would have no effect on *F. gentneri* or *L. cookii*. Additionally there are no known sites of State Threatened botanical species in or adjacent to proposed project units, thus Alternatives 2 and 3 would have no impact on these species. The known sites of Bureau Sensitive and Survey and Manage species would be protected with a no disturbance buffer that would maintain the microhabitat (See PDFs in section 2.4). Thus Alternatives 2 and 3 would have no impact on these species and would not trend them toward listing.

Special Status Fungi Species

Timber Harvest and Biomass Removal

For the one known population of *Phaeocollybia olivacea*, a no disturbance buffer would be implemented to protect the mycelial network, maintain host trees, and maintain the microclimate. The buffer size would be determined after a site visit. The unit which the fungi is located in has a proposed prescription of Density Management/Understory Reduction for Alternatives 2 and 3 with greater than 60% canopy closure post treatment. This prescription would maintain host trees throughout the unit allowing for the possible expansion of the population. Because of the protection buffer, Alternatives 2 and 3 would not impact this species and trend it toward listing.

The following discussion describes the possible effects on fungi for which we are uncertain of their presence due to lack of surveys.

The 20 species of sensitive fungi listed in Table 29 are all mycorrhizal, forming associations with their hosts, mostly conifers. Commercial harvest would have varying degrees of adverse impacts depending on the level of tree removal and ground disturbance (Luoma et al. 2004 and Wiensczyk, AM et al. 2002). Commercial harvest, skid roads, and road building increases soil compaction and decreases organics and coarse wood debris, changing micro-climate conditions (RMP EIS, 1995 pp. 4-12 to 15; 4-66), and result in loss of host trees. Effects to species from the altered habitat could include reduced fungal species diversity, reduced fungal biomass, and localized loss of the mycelial network.

The project proposes four different harvest prescriptions. These harvest prescriptions have varying levels of post-harvest tree density (Table 30) that could affect populations of sensitive fungi if present. A study by Luoma et al. (2004) showed that as tree retention decreased so did the number of fungi present post-harvest. Alternative 2 in the only alternative that proposes regeneration harvest. Alternative 3 proposes no regeneration harvest, has the greatest tree retention, and the fewest acres of harvest. Therefore, Alternative 3 would have less impact on sensitive fungi populations that may be present in the project units than Alternative 2.

Table 30. Density of post harvest tree levels (acres) by harvest type

Harvest Type	Alternative 2	Alternative 3
Regeneration Harvest	6-9 Trees Per Acre (242)	N/A
Density Management/ Modified Group Selection	35% Relative Density (282)	40-60% Relative Density (319)
Density Management/Understory Reduction	40-60% Canopy Closure (275)	40-60% Canopy Closure (427)

Table 30 shows acres proposed for harvest by logging method and alternative. Percent of compaction by harvest method is estimated to be 10% for tractor and 5 % for cable. Approximately 61 acres of compaction would result from forest harvest activity in Alternative 2 and 59 acres in Alternative 3, representing 0.018% and 0.017% of BLM land in the Planning Area, respectively. These acres do not match the acres of compaction given in the soils analysis as the soils analysis subtracts acres that would be decompacted. For this analysis, compaction is looked at as a negative impact on sensitive fungi even if decompaction were to occur, as it is not known if decompaction would be beneficial to a sensitive fungi species. Dahlberg and Stenlid (1995) found that ectomycchorizal mycelia networks may range in size from 1.5 to 27 meters (5 to 89 feet). Given the potentially small range of mycelia networks, ground-disturbing harvest yarding may fragment the mycelia network, reducing or eliminating local populations if sensitive fungi are present in the disturbed area. However, given the small percentage of ground disturbed by compaction across the Planning Area and watershed, loss of local populations due to harvest method is not likely.

Post Harvest Fuels

For the one known population of *Phaeocollybia olivacea,* a no disturbance buffer would be implemented to prevent adverse impacts from post-harvest fuels activities. The fungi site is located in the corner of the unit and is not adjacent to other project units; therefore, it would be possible to exclude this area from the proposed post-harvest fuels activities.

The following discussion describes the possible effects on fungi for which we are uncertain of their presence due to lack of surveys.

Organic soils, nutrients, soil moisture, and abundance of coarse woody debris would be reduced by prescribed burning. PDFs have been designed to retain course woody material, future snags, and down wood, minimizing potential effects. While some coarse woody material can be lost through under-burning, prescribed burning usually occurs when moisture conditions are sufficient to retain duff and large woody material to protect moist habitat and reduce soil heating. As observed in past prescribed burning units, treatments create a mosaic of vegetation, duff, down wood, and shrubs (personal observation, 2007).

Unlike under-burning, the effects of pile burning are limited to the area under the pile, where the heat is most intense, consuming nearly all duff and organics. This heating may cause death of fungi down into mineral soil (the more diverse portion of the soil). Pile burning can also result in loss of available nutrients and soil moisture, leading to reduced fungal biomass and species diversity.

Within pile burning units, given a 7 foot by 7 foot hand pile and approximately 70 hand piles per acre, a maximum of 7% of the ground in each acre of pile burning treatment is subject to high

intensity heat. Alternative 2 proposes 799 acres of post-harvest fuels treatments that may receive pile-burning treatments, and understory or broadcast burning. Alternative 3 proposes 746 acres of pile burning and understory burning. At a maximum, area of piles would be approximately 56 acres in Alternative 2 (0.016% of BLM lands in the Planning Area), and 52 acres in Alternative 3 (0.015 % of BLM lands in the Planning Area). If a Sensitive fungi species were to be located under one of these burn piles, it would likely reduce or eliminate the local population. Given this small percentage of ground disturbance and low probability of species occurrence, impacts to species are not anticipated.

If the proposed maintenance underburning did not occur, the fuel hazard condition would increase over time, possibly creating more intense wildfires that could negatively impact Sensitive fungi as described in the No Action Alternative.

For the one known population of *Phaeocollybia olivacea,* a no disturbance buffer would be implemented to prevent adverse impacts from post-harvest fuels activities.

Road Work

No road construction would occur within the buffer for *Phaeocollybia olivacea,* thus road work would not impact this species.

The following discussion describes the possible effects on fungi for which we are uncertain of their presence due to lack of surveys.

Alternatives 2 and 3 propose 1.3 miles of temporary road construction. No new permanent road construction is proposed for either alternative. The road work would create approximately 3.9 acres of ground disturbance, representing 0.001% of BLM land in the Planning Area.

Similar to yarding in forest stands, ground disturbing road work may fragment the mycelia network, reducing or eliminating local populations if sensitive fungi are present in the disturbed area.

Summary and Conclusions for Botanical Resources

There are no populations of T&E, State Threatened Species, or Bureau Sensitive nonvascular plants in the proposed units. Therefore this project would create no additional impacts on these species when cumulatively looking at the impacts from the proposed activities, and past, present, and future reasonably foreseeable activities. Past activities have likely affected populations especially on non-federal lands.

While project activities are known to reduce duff and course woody material, create compaction, and generate heat sufficient to damage local populations, the project is not likely to impact unknown populations because of implementation of underburning during favorable conditions and low percent of ground disturbance from roads, yarding, and pile burning. Additionally the one known site of sensitive fungi located in a project unit would be protected from proposed activities. Although there are known populations of sensitive fungi in the Planning Area, this does not necessarily mean there are other populations that have not been located, a fungi survey of the Planning Area would be the only way to confirm further populations.

For the Bureau Sensitive vascular plants and fungi and Survey and Manage species located in project units, protection measures implemented in this project and other projects on BLM lands would not create a cumulative impact that would trend these species toward listing. Populations on non-federal lands would most likely remain undetected and unprotected because no laws governing rare plants on non-federal lands exist.

3.7 Noxious Weeds

3.7.1 Affected Environment Noxious Weeds

BLM surveys found six noxious weed species in the Planning Area: Himalayan blackberry, Scotch broom, meadow knapweed, spotted knapweed, yellow starthistle and everlasting peavine. Of these species, Himalayan blackberry is the only one considered an established species for which current control measures would have little effect on reducing the overall infestation; thus, only small (10 plants or less) isolated sites would be treated. A list of the noxious weed species found in the Planning Area is located in Table 31.

Table 31. Noxious weeds present in the Planning Area

Species	Common Name	Designation*
Rubus discolor	Himalayan blackberry	B
Cytisus scoparius	Scotch broom	B
Centaurea solstitialis	yellow starthistle	B
Centaurea pratensis	meadow knapweed	B
Centaurea maculosa	spotted knapweed	B
Lathyrus latifolius	everlasting peavine	B

* Designation is assigned to each noxious weed species by the Oregon Department of Agriculture Weed Board.
B = a weed of economic importance which is regionally abundant, but which may have limited distribution in some counties.

The following are descriptions of the noxious weeds species found in the Planning Area.

Himalayan blackberry (*Rubus discolor*) is a perennial bramble introduced from Western Europe that forms large impenetrable thickets of prickly canes. It colonizes disturbed sites including waste areas, pastures, forest plantations, roadsides, and waterways. Detrimental effects include displacement of native species, decrease of plant diversity, reduced forage, and reduced accessibility by humans and animals. Successful control methods include mechanical, prescribed burning, and chemical.

Scotch broom (*Cytisus scoparius*) is a perennial shrub native to Europe and Africa. It was introduced into the United States as an ornamental, and later used to stabilize roadcuts. Scotch broom invades roadsides, pastures, and other disturbed places. It produces a large amount of long-lasting seed (up to 80 years). It can form dense fields that displace native plants and degrade habitat for wildlife. Successful control methods include manually pulling the entire plant, herbicide application, controlled burning, and a combination of cutting and herbicide treatment.

Yellow starthistle (*Centaurea pratensis*) is an annual forb native to southern Europe that presently infects over 4 million acres in the Western United States. It was likely introduced accidentally in contaminated alfalfa seed. Once this species is established on a site, plant density can be as high as 500 plants per square yard. Primary reproduction is by seed, one large plant can produce 75,000 seeds. Successful control methods include hand pulling (if population is small), herbicide treatment, and biological control.

Meadow knapweed (*Centaurea pratensis*) is a perennial forb that is a fertile hybrid between black knapweed (*C. nigra*) and brown knapweed (*C. jacea*), which are both native to Europe. Meadow knapweed was originally introduced as a potential forage species. This species invades moist sites, including irrigated pastures and moist meadows, river banks, streams, irrigation ditches, and openings in forested areas. It reproduces primarily by seed, but root crown fragments will resprout when disturbed by heavy equipment or cultivations. Meadow knapweed seeds are carried in rivers, streams, or irrigations water, in hay, or by vehicles along roadsides. Successful control methods include grazing, herbicide application, mowing, manual digging if only a few plants are present, competitive planting, and biological controls.

Spotted knapweed (*Centaurea maculosa*) is a biennial forb with a stout tap root. This species is native to Europe. It can tolerate both dry and moist sites with sunny or shady conditions. It grows on roadsides, pastures, and hills. This species establishes well on disturbed soils, and early spring growth makes them competitive for soil moisture and nutrients. There is some evidence that this species releases an allelopathic chemical which inhibits the growth of surrounding vegetation. It primarily reproduces by seed. Effective control methods include hand pulling, herbicide, solarization, burning, mowing, and biological controls

Everlasting peavine (*Lathyrus latifolius*) is a perennial forb that has a semi-climbing growth habit. This species is native to Europe and was likely introduced as an ornamental. It grows in open areas and can quickly overgrow surrounding vegetation. The plant reproduces by seed, stolons, and rhizomes. Seeds of this plant are toxic to mammals. Control methods include hand pulling and herbicide.

Noxious weeds can out-compete native species for light, space, water, and nutrients. They can alter soil fertility, dry up water supplies, poison animals, decrease agriculture production, infest rivers, and reduce recreational value. Noxious weeds find disturbed sites favorable for establishment and spread. Vehicles are a primary method for transporting noxious weeds and creating new populations of noxious weeds. Repeatedly disturbed habitat, such as roads, are also good habitat, and facilitate the spread of weeds. On private land and throughout the watershed, the rate of weed spread is not possible to quantify, as it depends on many factors including, but not limited to, logging on private lands, motor vehicle traffic, recreation use, rural and urban development, and natural processes, such as wind, seasonal flooding, and animal migration patterns. Past activities on BLM land in the Deer Creek 5th field watershed, such as timber harvest, road building and maintenance, recreation, and wildfire, have created condition favorable for the spread of noxious weeds and introduction of new weed species. Past activities on non-federal lands similar to those on BLM land, plus grazing, and land development, have also created conditions conducive to weed introduction and spread. If the introduced species are not treated they would continue to spread and invade new areas each year. In the western US, weeds spread at a rate as high as 14% per year, which is an exponential doubling every five years

(Asher, 1999). However, the rate of spread is different for each species and is affected by environmental factors such as available suitable habitat, and physical factors such as presence of human created vectors (vehicles). Given these unknown factors it is not possible to predict the exact rate of spread for each species, but it is estimated that weed spread can be as high as14% per year. It is known that these species would continue to spread unless treated.

3.7.2 Environmental Consequences Noxious Weeds

3.7.2.1 Alternative 1 (No Action) Effects to Noxious Weeds

The No Action Alternative would not create additional disturbed areas or access points that may result in new weed populations. Conversely, under the No Action Alternative, noxious weeds treatments in the Planning Area would be a low priority and would continue to spread into existing suitable habitat at an unknown rate. There is no available or existing data regarding noxious weed occurrences on local non-federal lands. Therefore, for purposes of this analysis, BLM assumes that: 1) there is a source of noxious weeds on non-federal lands that can spread to federal lands, especially when the land ownership is checkerboard, as within the watershed; and 2) conversely, that noxious weeds are not established on non-federal lands but could spread to them from adjacent federal lands. Under either assumption, there is an equal need to reduce the risk of spread of noxious weeds from the federal lands to the adjoining non-federal lands. Seeds are spread by the wind, animal / avian vectors, natural events, and human activities. Additional human disturbance and traffic would increase the potential for spreading noxious weeds, but regardless of human activity, spread of these weeds would continue through natural forces. Thus, the BLM cannot stop the spread of noxious weeds from non-federal lands; it might only reduce the risk or rate of spread and control of known populations.

PDFs for washing equipment and seeding with native material are standard for all BLM activities and are included in the South Deer EA and fuels reduction projects, thus proposed foreseeable activities on BLM land would not affect noxious weeds. It is assumed that private lands would be entered on a 60 to 80-year rotational basis, providing opportunities for weed spread and establishment. Foreseeable activities that have the potential to spread weeds, such as motor vehicle traffic, development, recreational use including OHVs, and road construction are expected to continue or increase. These types of activities could result in new disturbed sites available for noxious weed establishment.

3.7.2.2 Alternatives 2 and 3 Effects to Noxious Weeds

Road work, tractor harvest, and landing construction represent opportunities for introduction of noxious weed seed from outside the Planning Area, as well as the spread of existing seed present in the Planning Area. Vegetation treatments would create openings in the forest canopy that increase light conditions, which are more favorable for noxious weeds compared to the pre-treatment condition.

Timber harvest

Alternative 2 proposes 242 acres of regeneration harvest, and Alternative 3 proposes none. Regeneration harvest treatments would create canopy openings that are more favorable to noxious weeds compared to pre treatment stands or thinning treatments. Therefore, based on the

extent of treatments, Alternatives 2 poses the highest potential to spread or introduce weeds and seeds.

Road Work

Roads are one of the main vectors for noxious weed spread and introduction. Alternatives 2 and 3 propose 0.8 miles of temporary roads. Temporary roads would be decommissioned after the project work is completed. There is 0.5 miles of permanent road in Alternative 2. This road would be barricaded after use. Given that vehicles would not be able to drive on the decommissioned and barricaded roads, the risk of weed introduction would only be for the short term. Weeds observed in the decommissioned areas would be treated as part of the Resource Area annual noxious weed treatment program as funding is available. These treatments are analyzed in and are constant with the Medford District Integrated Weed Management Plant and Environmental Assessment (USDI 1998).

Due to PDFs designed to reduce the risk of weed spread (e.g., equipment washing to remove dirt containing weed seeds or plants, seeding/mulching with native species to help native plants become established more quickly), increases in weed populations due to the timber harvest and road work would be equal among the alternatives and are not anticipated to be distinguishable above current levels and mechanisms (e.g., vehicles, wind, animals). The use of straw is not anticipated to increase the spread of noxious weeds because straw used for mulch would be native species and certified weed free. According to Todd Thompson (BLM Natural Resource Specialist and Restoration Coordinator, Oregon State Office), the PDFs for reducing or eliminating noxious weed impacts are widely accepted and utilized as best management practices in noxious weed control across the nation.

As stated in the PDFs, noxious weed treatments would occur before and after project implementation when practical. These noxious weed treatments would reduce the risk of establishment and spread of noxious weeds in the Planning Area. If the noxious weed pre-treatments were not to occur, the existing populations of noxious weeds may spread into stands because equipment may run through the weed sites, carrying seed and vegetative material into stands receiving harvest treatments. Additionally, weed populations adjacent to stands that would be opened up through regeneration harvest treatments could spread into neighboring stands that are now open. If noxious weed post-treatments were not to occur, existing weed sites would continue to spread and increase in size. Any new weed sites that may have established during project implementation would continue to spread as well.

Summary and Conclusions for Noxious Weeds

Given unpredictable vectors for weed spread, such as vehicle usage by private parties, wildlife behavior, and wind currents, it is not possible to exactly quantify with any degree of confidence the rate of weed spread in the future, or even the degree by which that potential would be increased by the proposed actions. The Medford District RMP states that the objectives for noxious weeds are to “contain and/or reduce noxious weed infestations on BLM-administered land.(p. 92),” and “survey BLM-administered land for noxious weed infestations…(p. 93).” These RMP directions for weed management are intended to be met at a landscape level. In an effort to continue to contain and/or reduce noxious weeds on federal land, the BLM has treated many of these known weed populations within the Deer North Vegetation Management Planning Area.

There are three main reasons why potential weed establishment is not expected to result in a detectable effect to overall ecosystem health. First, surveys indicate that a very small percentage - less than 1% of acreage within the Planning Area units - are affected by noxious weeds. Second, these sites located in units proposed for treatment have been reported during predisturbance surveys, and have received weed treatment under Medford District's Integrated Weed Management Plan and Environmental Assessment OR-110-98-14 Third, Project Design Features (PDFs) have been established to minimize the rate at which project activities might potentially spread noxious weed seed from outside/adjacent sources.

Seeds are spread by the wind, by animal/avian vectors, natural events, and by human activities - in particular through soil attachment to vehicles. BLM's influence over these causes of the spread of noxious weeds is limited to those caused by human activities. Additional human disturbance and traffic would increase the potential for spreading noxious weed establishment, but regardless of human activity, spread of these weeds would continue through natural forces. Thus, the BLM cannot stop the spread of noxious weeds, it may only reduce the risk or rate of spread

3.8 Northern Spotted Owl

3.8.1 Affected Environment Northern Spotted Owl

Habitats within the Planning Area include riparian, early seral forest, mid-seral forest, late-successional forest, rock outcrops/talus, snags, and down wood. Chappell and Kagan (2001) describe upland habitats within southern Oregon as southwest Oregon Mixed Conifer-Hardwood Forest.

Spotted owls are closely associated with older forests for nesting, foraging, and roosting throughout most of their range (Forsman et al. 1984; Carey et al. 1990; and Solis and Gutierrez 1990). Spotted owl habitat within the Planning Area was typed utilizing the McKelvey rating system, which has six levels of habitat classifications (Appendix D). McKelvey ratings 1 and 2 are used throughout this analysis to classify suitable spotted owl nesting, roosting, and foraging habitat (NRF). NRF habitat is characterized by forested stands with older forest structure, multiple canopy layers, and a canopy closure of 60 percent or greater. The best quality NRF habitat has large old trees with cavities, broken tops or mistletoe platforms, large branches, large dead standing and fallen decayed trees, and multiple canopies of shade tolerant hardwoods and conifers that support prey base. NRF habitat also functions as dispersal habitat. "Dispersal-only" habitat for spotted owls (McKelvey 5 and 6) is defined as stands that have a canopy closure of 40 percent or greater, and are open enough for flight and predator avoidance. "Dispersal-only" habitat is used throughout this document to refer to habitat that does not meet the criteria of NRF habitat, but has adequate cover to facilitate movement between blocks of suitable NRF habitat. Unsuitable habitat (McKelvey 3 and 4) does not currently meet the NRF or "dispersal-only" habitat criteria.

The McKelvey values for BLM lands within the Deer Creek 5th field watershed were derived from two sources: 1) a Grants Pass Resource Area maintained GIS data layer representing McKelvey values across BLM lands; and 2) field visits conducted in 2008 by BLM wildlife

technicians and biologists. The McKelvey values for US Forest Service (USFS) and non-federal lands within the Deer Creek 5th field watershed were not available at the time of this analysis.

Table 32 depicts, to the best of the wildlife biologist's knowledge, the current amount and type of NSO habitat as described using the McKelvey rating system for BLM land within the Deer Creek 5th field watershed, as well as the subset of NSO habitat within the Deer North Planning Area. Figure 9 represents the same data graphically for the Deer Creek 5th field watershed and the Deer North Planning Area. The geology, fire history, ownership patterns, and past management practices have resulted in this current distribution of NRF, dispersal, and non-habitat within the watershed and Planning Area. This mosaic pattern is common throughout the Klamath Mountains Province 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.

Table 32. NSO Habitat Acres on BLM lands within the Deer Creek 5th field watershed and Deer North Planning Area

	Deer Creek 5th Field Watershed	Deer North Planning Area
NRF Habitat	8,232 (27%)	1,355 (40%)
Dispersal Only Habitat	6,703 (22%)	1,208 (35%)
Non-Suitable Habitat	15,268 (51%)	849 (25%)
Total	**30,203**	**3,412**

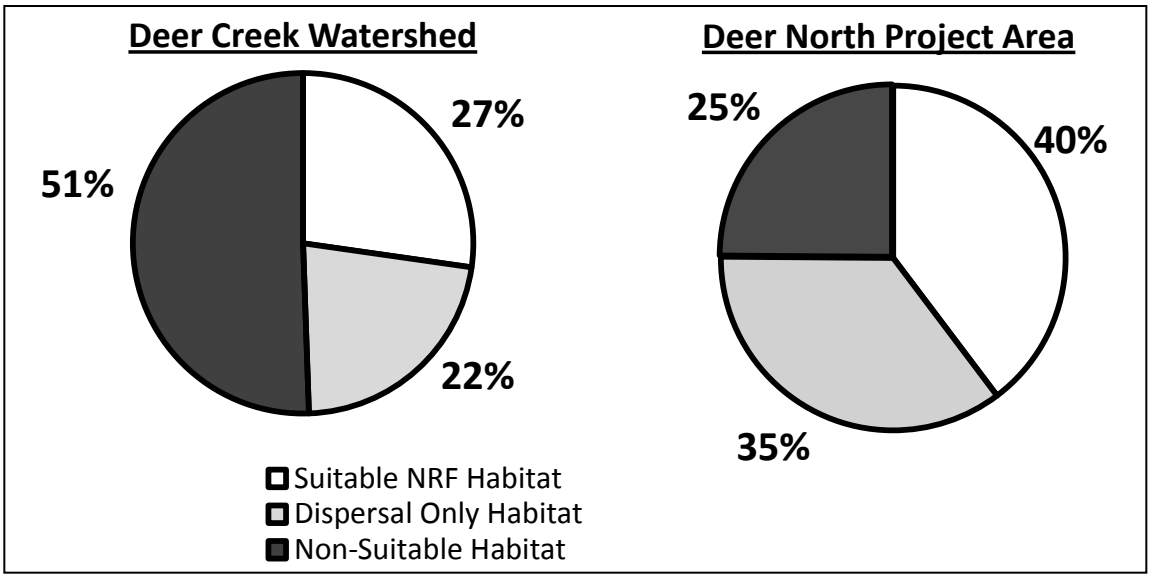


Figure 9: Percentages of Northern Spotted Owl Habitat on BLM lands within the Deer Creek 5th Field Watershed and Deer North Planning Area

Historic Spotted Owl Sites

There are nine historic northern spotted owl (NSO) sites with at least a portion of their home range (1.3 mile radius) within the Planning Area. However, the centers of activity for only three of these historic spotted owl sites are located within the Planning Area. No known nests are

located within proposed treatment units. Of these nine historic sites, three are designated Known Spotted Owl Activity Centers (KSOACs), with approximately 100 acre core areas. The KSOACs were established by Standards and Guidelines of the Northwest Forest Plan to protect the 100 best northern spotted owl habitat acres in close proximity to nest sites or activity centers, known to exist as of January 1, 1994 (NWFP, p. C-10).

While there is no requirement to survey for spotted owls prior to taking action, surveys have been done at least once since 2007 to all nine NSO sites associated with the Planning Area. Two of the nine sites have been occupied with spotted owl pairs at least once in the last two years. Limited surveys were conducted at these nine sites prior to 2007, so history for every site within the Planning Area is lacking. However, for purposes of this analysis all sites are conservatively assumed to be occupied.

The barred owl is a known competitor of spotted owls. No coordinated surveys for barred owls have occurred in the Grants Pass Resource Area, nor are any planned at this time. All barred owl observations on the Resource Area are from incidental observations. There have been barred owl observations within a mile of seven of the nine NSO sites associated with Deer North Planning Area the in the past three years. Three of these newly located barred owl observations occurred within the Deer North Planning Area.

Critical Habitat Unit (CHU)

Currently the Planning Area does not include any northern spotted owl Critical Habitat Units (USDI USFWS 2008). The USFWS's Critical Habitat delineations are being challenged in court. Although the project is not within 2008 CHU, information on the 1992 former CHU is incorporated for information in response to the pending court review. Lands in 1992 CHU were designated to maintain and improve existing essential nesting, roosting, foraging, and dispersal habitats located within the area that links the Western Cascades and the Klamath Mountains provinces. There are 1,280 acres of spotted owl critical habitat located within the Planning Area in a former CHU (CHU OR-72). CHU OR-72 is located on the Medford District BLM and the Siskiyou National Forest. Under the 1992 CHU designation, as a whole, CHU OR-72 provided very important east-west and north-south intra-provincial (Klamath Mountains Province) connectivity in an area of high fragmentation. The high fragmentation is a result of the geology, fire history, ownership patterns, and past management practices. The CHU/LSR portion of the Deer North Area contains 664 acres of suitable NRF habitat, 275 acres of suitable dispersal-only habitat, and 367 acres of non-suitable habitat.

Spotted Owl Prey

Dusky-footed woodrats, the primary prey species for spotted owls in southwest Oregon, are found in high densities in early seral or edge habitat (Sakai and Noon 1993). Down wood is an important habitat feature for these major prey species in southwest Oregon. Dusky-footed woodrats build stick nests, sometimes incorporating logs as part of the structure. Northern flying squirrels are another major source of owl prey in southwest Oregon, while red tree voles (RTV) comprise only 2.6 % of the diet of spotted owls in this area (Forsman 2004). Previous project surveys, as well as recent incidental observations, indicate RTVs, flying squirrels, and woodrats are present within the Planning Area.

3.8.2 Environmental Consequences Northern Spotted Owl

The following discussion describes relevant effects that each alternative would have on wildlife species and their habitat. The effects analysis on wildlife species is organized by vegetation treatment and road work. Only federally listed, Bureau Sensitive species, and Survey and Manage species known or suspected to be present within the Planning Area and impacted by the proposed actions are addressed in this EA. Impacts to wildlife from the proposed actions are measured by changes to stand structure in different habitat types. Effects to species are linked to the changes in acres and stand structures within their habitat.

3.8.2.1 Alternative 1 (No Action) Effects to Northern Spotted Owl

Under the No Action Alternative, future foreseeable actions within the Deer Creek 5th field watershed listed in the introduction of Chapter 3 would alter northern spotted owl habitat. A summary of ongoing and foreseeable actions on Federal lands within the Deer Creek 5th field Watershed is provided in the introduction to section 3.0 of this EA. Table 34 shows the acres of proposed changes to NSO habitat on BLM lands within the watershed that would occur regardless of the Deer North project. On privately owned lands, predicting future foreseeable actions is difficult due to the multitude of individual landowners. It is assumed that industrial timber lands would be harvested on a 60-year rotation (RMP EIS pp. 3&4-5 to 3&4-6) and would be maintained in early to mid-seral habitat. The vast majority already of private land quantify as unsuitable habitat across the watershed. The potential for retention and maintenance of existing late-successional forest, as well as the development of future late-successional forest in the Deer Creek 5th field watershed is greatest on federal lands. Since acres of existing spotted owl habitat on USFS and private lands were not available, this analysis will only focus on effects to BLM lands within the Deer Creek 5th field watershed.

Table 34: Effects to Spotted Owl Habitat on BLM Lands Within the Deer Creek 5th field Watershed from Existing and Foreseeable Projects

Alternative	NRF Removed	NRF Downgraded	NRF Treated and Maintained	NRF No Treatment	Dispersal Only Habitat Removed	Dispersal Only Habitat Treated and Maintained	Dispersal Only No Treatment
Alt. 1	0	174	3,257	4,814	21	2,819	12,455

Under Alternative 1, management activities would not remove or alter suitable habitat within the Deer North Planning Area and habitat would continue to develop along current successional pathways. The development of large tree structure comparable to that of remnant trees used by spotted owls is not likely to occur. This is because current stand conditions are too dense and trees are not developing the diameter to height ratio required to develop this structure. This ratio was historically created through frequent fire events that reduced stem densities and competition that created open-grown conditions. Current stand conditions would likely develop into less complex stand structures and species compositions than that of old growth stands (Sensenig 2002).

As a result of these dense forest stands, spotted owl NRF habitat characteristics, such as large live trees, large limbs, broken top snags, multi-storied stands, and higher canopy cover would be at greater risk for loss through stand replacing fires. Additionally, stand replacing fires would remove or downgrade habitat randomly across the landscape, setting back succession and development. Even with foreseeable fuel hazardous reduction projects proposed within the Planning Area, wildfire would remain the most immediate hazard to spotted owl habitat within the Planning Area under the No Action Alternative.

3.8.2.2 Alternatives 2 & 3 Effects to Northern Spotted Owls

Effects from Vegetation Management

All action alternatives may affect northern spotted owls to some degree (Likely to Adversely Affect or Not Likely to Adversely Affect) and therefore require consultation under Section 7 of the Endangered Species Act. Consultation with the USFWS has been completed for the maximum potential harvest acres outside of the old 1992 CHU. Consultation is ongoing for potential fuels and stewardship activities within the Planning Area. Prior to any activities to be implemented in the CHU, activities would be assessed under standards in effect at that time, and any required consultation would be completed before any decision on this activity is signed.

When discussing changes to spotted owl habitat, the following describes how various vegetation treatments change habitat conditions after treatment implementation. Canopy closure is used as one of the critical habitat thresholds because it is highly important to NSO nest site selection and general habitat use, because increased levels of canopy afford protection from predators, and regulate temperature extremes (Courtney et al. 2004). "NRF removed" denotes that canopy closure is reduced to < 40% in nesting, roosting or foraging habitat resulting in non-suitable habitat. NRF downgraded denotes that the NRF habitat has been downgraded to "dispersal-only" habitat because 40 to 59% canopy cover would be retained post harvest. NRF treated and maintained denotes that habitat is degraded but still provides nesting, roosting or foraging habitat because a minimum 60% canopy cover would be retained, as well as other key habitat features such as snags and coarse woody material. Dispersal removed denotes that canopy closure is reduced to < 40% resulting in non-suitable habitat. Dispersal treated and maintained denotes that habitat is degraded but still provides dispersal because at least 40% canopy cover would be retained.

In addition to timber harvest units, hazard trees (per OSHA requirements) along haul roads would also be harvested. The impact on habitat of hazard tree removal would be negligible, because the scope would be small in comparison to the total Planning Area (< 1 %).

The proposed habitat modification associated with all action alternatives could affect individual adult spotted owls or young, such that their normal behavior, survival, and/or reproduction might be compromised. The loss of key habitat features would increase the likelihood of spotted owls in the Planning Area to be subject to: displacement from nesting areas; increased competition of suitable nest sites; decreased survival due to increase predation and/or limited forage availability; reduction of future nesting opportunities; and reduction of dispersal capabilities (USDI 2006). Recent landscape-level analyses suggest that a mosaic of late-successional habitat interspersed with other vegetation types may benefit northern spotted owls more than large, homogeneous expanses of older forests (Franklin et al. 2000; Meyer et al. 1998). Additionally, home ranges

composed entirely of pristine old forest may not be optimal for spotted owls in the Klamath province and Oregon Coast Range (Courtney et al. 2004). Therefore, even with the proposed habitat modification, a mosaic of habitat types (nesting, roosting, and foraging, as well as non-habitat) would still exist within the home ranges of the known spotted owl sites within the Planning Area. The proposed harvest in all action alternatives would not preclude spotted owls from nesting within the Planning Area, because NRF habitat would still be retained in untreated areas, including the three Northwest Forest Plan 100 acre core areas. Additionally, season restrictions listed as Project Design Features would prevent disturbance to nesting spotted owls within the Planning Area during the critical breeding season.

This analysis considered new information presented in the 2010 Draft Recovery Plan for the Northern Spotted Owl (USDI 2010). Specifically, the recovery plan identified barred owls as one of the primary threats to the recovery of the spotted owl. Barred owls reportedly have reduced spotted owl site occupancy, reproduction, and survival (USDI 2010). There is a perceived threat because barred owls use habitats typical of spotted owl habitat. They may be able to coexist through habitat segregation; however, whether this would occur is unclear (Courtney et al. 2004). Barred owls may be more of a habitat generalist and occupy a wider diversity of habitat types than spotted owls. Displacement of spotted owls by barred owls is likely occurring, but the rate and extent of this are unknown; further, whether this effect is exacerbated by other confounding issues is uncertain (Courtney et al. 2004).

The cause of the barred owl invasion is not clear and the BLM has no control over barred owls or their encroachment into NSO habitat. To what extent the barred owl range expansion is a result of humans altering the environment is unknown (Monahan and Hijmans 2007; Livezey et al. 2008). Currently, it is unclear whether forest management influences the outcome of interactions between barred and spotted owls (Courtney et al. 2004). The barred owl issue is being addressed at the range level by the Regional Barred Owl Working Group through research efforts, management strategies, and protocol revisions. However, at the local level, the Deer North project meets Recovery Action #32, which is intended not to further exacerbate competitive interactions between spotted owls and barred, by retaining older and more complex multi-layered conifer forests outside of Managed Owl Conservation Areas (MOCAs). All proposed treatment units would be surveyed for RA 32 habitat prior to project implementation and identified RA 32 habitat would be removed from treatment.

Effects to Spotted Owl Prey Species

Treatments associated with all action alternatives that would remove, downgrade, or maintain spotted owl habitat may also impact foraging by changing habitat for spotted owl prey species (USDI 2006). Residual trees, snags, and down wood retained in the thinned stands would provide some cover for prey species over time, and would help minimize harvest impacts to some prey species, such as dusky-footed woodrats. Regeneration harvest treatments would remove suitable habitat for arboreal prey species (flying squirrels, red tree voles), but may improve habitat for non-arboreal species (western red backed voles and deer mice). Treatment implementation would be spread out temporally and spatially within the Planning Area, which would provide areas for spotted owl foraging during project implementation and reduce the impact of these short-term effects at the project level. Northern spotted owls seldom venture far

into non-forested stands to hunt. However, edges can provide better hunting opportunities for owls due to the increased vulnerability of the prey and easier access to the prey (Zabel 1995).

Bingham and Noon (1997) reported that a spotted owl core area is the area that provides the important habitat elements of nest sites, roost sites, and access to prey, benefiting spotted owl survival and reproduction. Rosenberg and McKelvey (1999) reported that spotted owls are "central place" animals with the core area (the area closest to the nest) being the focal area. Several studies (Wagner and Anthony 1998; Dugger et al. 2005; Zabel et al. 2003; Bingham and Noon 1997) indicate the core area size for the Klamath province is 0.5 miles from the nest site (or 500 acres). Therefore, effects to prey species for each alternative would be assessed by the amount of habitat treated within the 0.5 mile core area. The core area is a 0.5-mile radius circle (approximately 500 acres) from the nest or center of activity to delineate the area most heavily used by spotted owls during the nesting season; it is included in the provincial home range circle. Due to the spatial distribution of the proposed treatments, adequate and sufficient prey habitat would remain outside of the core area, but within the home range, which would continue to provide suitable foraging opportunities within the home range.

3.8.2.3 Alternative 2 Effects to Northern Spotted Owls

Removal and downgrading of NRF would occur in five of the nine home ranges associated with the Planning Area. Regeneration harvest treatment types would remove 127 acres of suitable NRF spotted owl habitat and 114 acres of suitable "dispersal-only" habitat (See Table 35). These acres would not be expected to provide suitable NRF or "dispersal-only" habitat for many years post-treatment (USDI 2006) because specific key habitat elements would be removed, including large-diameter trees with nesting cavities or platforms, multiple canopy layers, adequate cover, and hunting perches (USDI 2006).

Table 35: Summary of Proposed Action Effects of All Alternatives on Spotted Owl Habitat on BLM Lands Within the Deer North Planning Area

Alternative	NRF Removed	NRF Downgraded	NRF Treated and Maintained	NRF No Treatment	Dispersal Only Habitat Removed	Dispersal Only Habitat Treated and Maintained	Dispersal Only No Treatment
Alt. 1	0	0	0	1,302	0	0	903
Alt. 2	127	129	129	970	114	254	840
Alt. 3	0	0	332	1,023	0	368	840

DM/ Mod GS treatment types would downgrade 129 acres of suitable NRF habitat to "dispersal-only" habitat. These acres would no longer be suitable NRF due to the loss of potential nest trees and the reduction of canopy closure. Specific key habitat elements removed by thinning harvest prescriptions may include some of those removed during regeneration harvest, but occur to a smaller degree because more of the original stand remains intact. The rate at which the residual stands return to NRF habitat after treatment can vary considerably depending on the abiotic (e.g., aspect, slope position, average rainfall, soil type) and biotic (e.g., tree species composition, disease, tree ages) factors at the site. However, thinned stands are expected to return to NRF habitat much more rapidly in comparison to stands treated with a regeneration

harvest prescription because more of the key habitat features are retained after a typical thinning operation (Zabel et al. 1992, Davis et al. 2007).

Approximately 129 acres would be thinned but still function as NRF habitat because higher canopy cover and key habitat features would be retained. Additionally, approximately 970 acres of suitable NRF habitat would not be treated within the Deer North Planning Area. Therefore, 80% of the existing NRF in the Planning Area would continue to provide NRF habitat throughout the Planning Area for nesting owls in the future. Even though treatments would occur in NRF habitat, the effects to would be minimal because they would be short-term in nature; activities would be distributed both spatially and temporally across the Planning Area; and seasonal restrictions listed as project design features would avoid adverse disturbance to nesting spotted owls within the Planning Area.

Alternative 2 would treat but maintain 254 acres of "dispersal-only" habitat. These treatments would reduce the canopy cover within the stand, but would still function as spotted owl "dispersal-only" habitat. Approximately 840 acres of "dispersal-only" habitat within the Planning Area would not be treated and would continue to provide suitable dispersal habitat. Additionally, suitable dispersal habitat would also be found in untreated suitable NRF habitat within the Planning Area. These untreated areas are sufficient in area and configuration within the Planning Area to continue to facilitate dispersal within and throughout the watershed.

Alternative 2 Effects from Road Construction

The majority of the new road construction (0.47 miles) is proposed on a ridge top adjacent to a Northwest Forest Plan (NWFP) 100 acre northern spotted owl core. However, due to the ridge location, only minimal effects to spotted owls are anticipated from the road construction because the previous nest locations, as well as better potential nesting habitat, are lower down the slope, away from direct construction effects. The NWFP 100 acre core is deferred from harvest, which would also reduce potential effects from the road construction. Additionally, seasonal restrictions listed as project design features would avoid adverse disturbance to adjacent nesting spotted owls during road construction.

Effects to Spotted Owl Prey Species

Proposed treatments in Alternative 2 would alter the current habitat conditions for spotted owl prey species in 793 acres of spotted owl habitat (NRF and dispersal-only) which may also provide foraging opportunities. Approximately 483 (30%) of the total potential foraging acres on BLM lands within the 0.5 mile core areas would be treated. Under this alternative, the majority of these treatments would remove or downgrade habitat, which would have negative long term effects. However, treatment implementation would be spread out temporally and spatially within the Planning Area, which would provide areas for spotted owl foraging during project implementation and reduce the impact of these short-term effects at the project level.

Effects to CHU-72

Approximately 262 acres NRF habitat would be removed or downgraded within the 1992 CHU. This would reduce nesting, roosting, and foraging opportunities for spotted owls, and contribute to further fragmentation of suitable habitat within this CHU. However, the intended conservation function of this unit (inter- and intra-province connectivity by maintaining essential nesting habitat) is still likely to be met given the residual 28,683 acres of suitable NRF habitat

that would remain after the proposed action is implemented. Consultation with the USFWS has been completed for the maximum potential harvest acres outside of the old 1992 CHU. Consultation is ongoing for potential fuels and stewardship activities within the Planning Area. Prior to any activities are implemented in the CHU, the project would be assessed under standards in effect at that time, and any required consultation would be completed before any decision on this activity is signed.

3.8.2.4 Alternative 3 Effects to Northern Spotted Owls

Alternative 3 would not remove or downgrade spotted owl habitat within the Planning Area **(**See Table 35). The alternative is designed to retain as much suitable spotted owl habitat as possible within the Planning Area. Thinning and density management (DM/UR and DM/Mod GS) is proposed to retain key structural elements (e.g., large trees, snags, coarse woody debris, hardwoods, higher canopy cover) while reducing overly dense stands and protecting habitat from stand replacing fire. Alternative 3 would treat but maintain 345 acres of NRF habitat and 395 acres of "dispersal-only" habitat. These treatments would reduce the canopy cover and understory vegetation within the stand, but stands would still function as spotted owl NRF or "dispersal-only" habitat post treatment due to the retention of higher canopy cover and key habitat features (USDI 2006). Approximately 1,023 acres of suitable NRF habitat would not be treated within the project and an additional 332 acres would be treated, but still function as NRF habitat. Therefore, 100% of the NRF would continue to provide suitable NRF habitat throughout the Planning Area for nesting owls in the future. Even though treatments would occur in NRF habitat, the effects to owls would be minimal because they would be short-term in nature, activities would be distributed both spatially and temporally across the Planning Area, and seasonal restrictions listed as project design features would avoid adverse disturbance to nesting spotted owls within the Planning Area.

Approximately 840 acres of "dispersal-only" habitat within the Planning Area would not be treated and would continue to provide suitable dispersal habitat. Additionally, suitable dispersal habitat would also be found in untreated suitable NRF habitat within the Planning Area. These untreated areas are sufficient in area and configuration within the Planning Area to continue to facilitate dispersal within and throughout the watershed.

Treatments would improve ecological health of the stand, reduce the chance of tree loss due to suppression mortality, and would reduce the intensity and risk of wildfire by removing excess fuels.

Effects to Spotted Owl Prey Species

Proposed treatments in Alternative 3 would alter the current habitat conditions for spotted owl prey species in 740 acres of spotted owl habitat (NRF and dispersal-only) within the core area, which may also provide foraging opportunities. Approximately 430 (27%) of the total potential foraging acres on BLM lands within the 0.5 mile core areas would be treated, but would still continue to provide foraging opportunities. Treatment implementation would be spread out temporally and spatially within the Planning Area, which would provide areas for spotted owl foraging during project implementation and reduce the impact of these short-term effects at the project level.

Effects to CHU-72

Under Alternative 3, no spotted owl habitat would be removed or downgraded within the 1992 CHU. Approximately 253 acres of spotted owl habitat would be treated, but maintained within the 1992 CHU. Long-term beneficial effects may be expected in this portion of the 1992 CHU, as these thinning treatments would improve the health of the stands and make them less susceptible to severe losses from wildland fire or suppression-related diseases. Consultation with the USFWS has been completed for the maximum potential harvest acres outside of the old 1992 CHU. Consultation is ongoing for potential fuels and stewardship activities within the Planning Area. Prior to any activities are implemented in the CHU, the project would be assessed under standards in effect at that time, and any required consultation would be completed before any decision on this activity is signed.

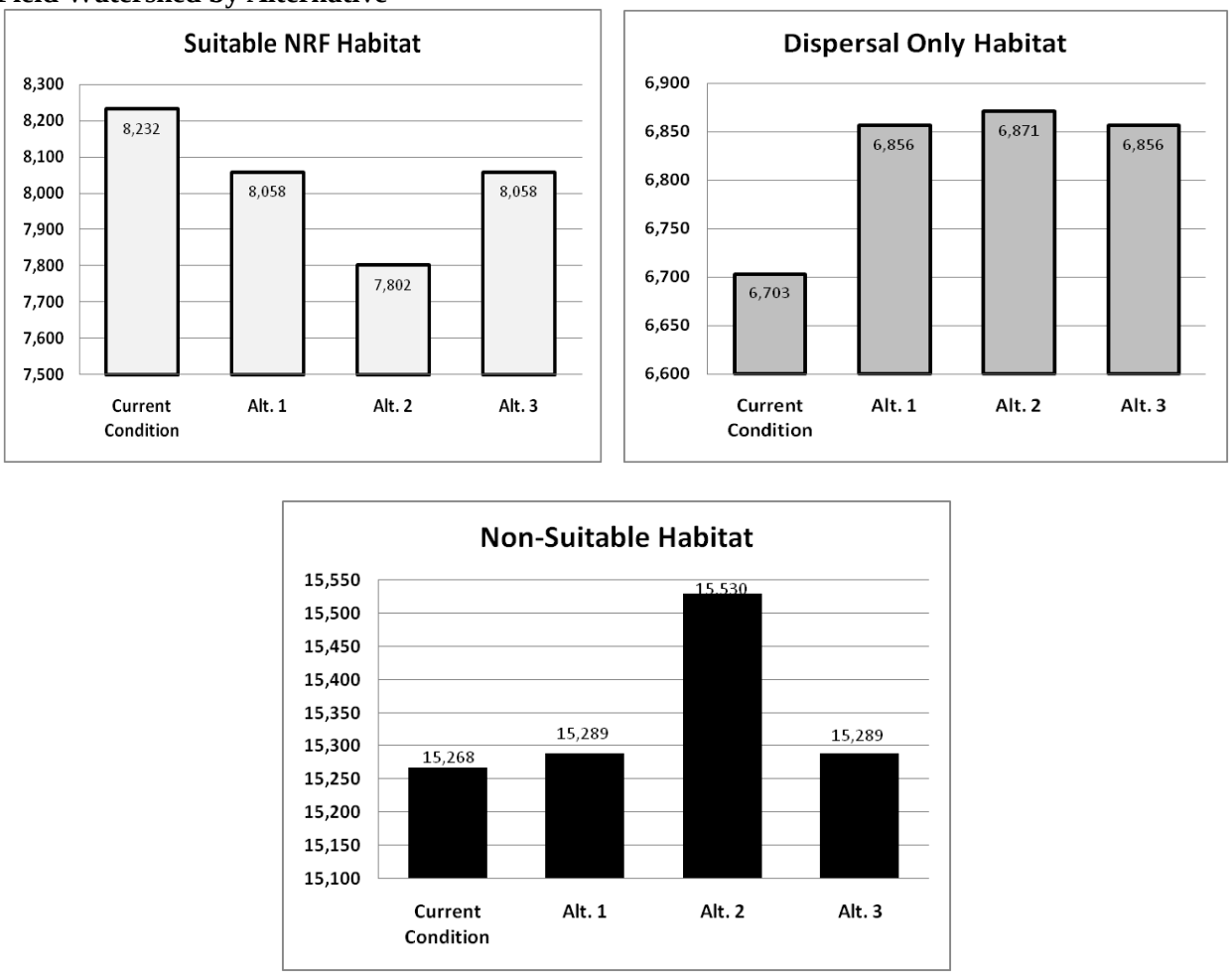
Summary and Conclusions for Northern Spotted Owl

When combined with these future foreseeable projects (See Table 36 and Figure 10), the small percentage of NRF removal at the Deer North project level would not preclude spotted owls or other late-successional forest species from nesting or dispersing within or through the Deer Creek 5th field watershed. Even though up to nine NSO sites associated with the could be affected by this project and future foreseeable treatments, untreated late-successional forest habitat would be retained throughout the Deer Creek 5th field watershed, which would reduce potential effects by continuing to provide NRF and dispersal habitat. Additionally, even when treatments proposed in the Deer North project are added with the future foreseeable actions, it is unlikely the actions proposed in the Deer North project would appreciably reduce or diminish the survival or recovery of the spotted owl due to the small percentage of habitat this would impact compared to the untreated habitat at the provincial and the range-wide levels. Additionally, down to the watershed level, approximately 7,802 (95%) to 8,058 acres (98%) of the existing NRF habitat would be maintained throughout the Deer Creek 5th field watershed in both action alternatives. These areas would continue to provide suitable spotted owl NRF habitat, provide habitat for late-successional forest habitat dependent species, and would help maintain future connectivity throughout the watersheds and between LSMAs.

Table 36: Summary of Cumulative Effects of All Alternatives on Spotted Owl Habitat on BLM lands within the Deer Creek 5th Field Watershed

Habitat	Existing Environment	Alt. 1	Alt. 2	Alt. 3
Suitable NRF	**8,232**	**8,058** (- 2%)	**7,802** (-5%)	**8,058** (-2%)
Dispersal Only	**6,703**	**6,856** (+2%)	**6,871** (+2.5%)	**6,856** (+2%)
Non-Suitable Habitat	**15,268**	**15,289** (+ <1%)	**15,530** (+ 2%)	**15,289** (+ <1%)
TOTAL	**30,203**	**30,203**	**30,203**	**30,203**

Figure 10. Cumulative Changes to Spotted Owl Habitat on BLM Lands Within the Deer Creek 5th Field Watershed by Alternative



Provincial

Northern spotted owl populations have declined range-wide 3.7% annually from 1985-2003 (USFWS 2004). However, 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 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 p.28). During this period of declining rates of habitat loss, spotted owl populations in southwestern Oregon appeared stable. 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). Not all of these estimated in-growth acres would function as suitable nesting, roosting, and foraging habitat; some would more likely function as dispersal or foraging habitat when they are added back into the baseline. 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). In summary, the proposed project would not incrementally affect the stability of the northern spotted owl population in southwestern Oregon since the rate of habitat loss is substantially reduced, there is substantial in-growth of habitat, and newly identified threats are independent to the proposed action.

3.9 Fisher (Federal Candidate)

3.9.1 Affected Environment Fisher

The Pacific fisher was petitioned for listing as endangered or threatened under the Endangered Species Act on three occasions. In 2004 and 2006, the USFWS determined that listing fishers as threatened was warranted, but was precluded by higher priority listing actions (USDI, USFWS 2004). In their 2006 update on the status of the Pacific fisher, the USFWS defined the reasons for listing as: "Major threats that fragment or remove key elements of fisher habitat include various forest vegetation management practices such as timber harvest and fuels reduction treatments. Other potential major threats include: Stand-replacing fire, Sudden Oak Death Phytophthora, urban and rural development, recreation development, and highways." The USFWS also states that the three remaining fisher populations "appear to be stable or not rapidly declining based on recent survey and monitoring efforts." (Id 71 Fed. Reg. 53777 (Sept. 12, 2006)). The species remains a USFWS candidate species (USDI, USFWS 2006).

Fishers are closely associated with low to mid-elevation (generally <4,000 feet) 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 2003). Buskirk and Powell (1994) hypothesized that the physical structure of the forest and prey associated with forest structures are the critical features that explain fisher habitat use, not specific forest types. Powell and Zielinski (1994) and Zielinski et al. (2004) suggest that habitat suitable for denning and resting sites may be more limiting for fishers than foraging habitat. Mckelvey habitat ratings 1 and 2, used above to describe suitable spotted owl NRF habitat, also adequately describes suitable fisher denning and resting sites as they have similar key habitat requirements (high canopy cover, multi-storied stands, large snags, and large down trees on the forest floor). Based on the McKelvey habitat analysis, approximately 8,232 acres and 1,335 acres of suitable fisher denning and resting habitat exist on BLM lands within the Deer Creek 5th field watershed and on BLM lands, respectively, within the Deer North Planning Area. However, all of these acres may not provide optimal fisher habitat because past harvest practices and land ownership patterns have fragmented this habitat within the project. 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). The largest contiguous blocks of suitable fisher denning and resting habitat are located outside of the Planning Area in the east end of the Deer Creek 5th field watershed.

Forest carnivore surveys using bait stations with motion and infrared detection cameras have been conducted throughout the Grants Pass Resource Area (RA) and have detected fishers in the

vicinity of Williams and the top of the Deer Creek drainage. Non-camera, incidental observations have also occurred near Galice Creek. No surveys have been conducted within the Planning Area. The nearest fisher detection through camera surveys is approximately 5 miles southeast of the Planning Area in the Deer Creek 5th field watershed.

3.9.2 Environmental Consequences Fisher

3.9.2.1 Alternative 1 (No Action) Effects to Fisher

No suitable fisher denning and resting habitat would be removed within the Deer Creek 5th field watershed through existing projects. Under the No Action Alternative, thinning treatments proposed in existing projects with at least 40% canopy cover retention would reduce the quality of 174 acres of suitable denning and resting habitat due to the reduced canopy cover. Approximately 8,058 acres (98%) of the existing denning and resting habitat would be maintained throughout the Deer Creek 5th field watershed. These areas would continue to provide suitable habitat for fisher and other late-successional forest habitat dependent species and would help maintain future connectivity throughout the watersheds and between LSMAs.

Throughout the remainder of the watershed, habitat would continue to develop along current successional pathways. The development of key late-seral and old-growth forest stand conditions would be the same as described above for the northern spotted owl. Particularly to fishers, the greatest risk of No Action is the potential wildfire related loss of large live remnant conifers as well as snags and down wood important to fisher natal and denning habitat.

3.9.2.2 Action Alternatives (Alts 2 & 3) Effects to Fisher

Effects from Vegetation Management

Proposed treatments in both action alternatives would remove and reduce the quality of suitable fisher habitat; however, no known denning sites would be impacted and proposed activities would not be expected to cause direct mortality of any fishers. Areas proposed for regeneration harvest would no longer provide suitable fisher denning and resting habitat, because key components, such as large snags, large down wood, multiple canopy layers, and canopy closure would be reduced and large trees would be removed. These areas would not provide foraging habitat until vegetation reestablishes to provide cover in approximately 5-10 years.

Proposed DM/Mod GS thinning treatments with at least 40% canopy retention would have short-term negative effects to fisher prey species due to the reduced vegetation. These effects are relatively short-term, as understory vegetation typically returns within 5 years and 60% canopy closure returns within 10-15 years. However, these short-term effects to fisher prey species would be minimal because the large amount of untreated areas within the Planning Area would continue to provide forage habitat while canopy cover in the treated stands increases. Additionally, all treatments would retain large snags and coarse woody debris (CWD) to provide future habitat for fishers, and reduce potential impacts.

Project activity disturbance effects to fishers are not well known. Fishers may avoid roaded areas (Harris and Ogan 1997) and humans (Douglas and Strickland 1987; Powell 1993). Disturbance from project activities would be temporally and geographically limited and would

occupy a geographic area smaller than the average fisher home range. Telemetry studies have determined that fishers are wide-ranging animals (Zielinski et al. 2004). Seasonal restrictions listed as Project Design Features for other resources would benefit fishers by restricting project activities until young are approximately six weeks old, approximately the age when fisher move young from natal dens and become more mobile. Fishers have large home ranges and would be able to move away from the action area while the disturbance is occurring without impacting their ability to forage and disperse within their home range.

The action alternatives would not contribute to the need to federally list the fisher as threatened or endangered because no known denning sites would be lost and suitable denning and resting habitat within the Planning Area would be retained in untreated units. Habitat features, such as large snags and coarse woody material, would be retained throughout the Planning Area, which would provide future habitat for denning and resting, and further reduce potential impacts. Fishers would not be precluded from dispersing or foraging in the Planning Area because suitable habitat would still be retained, units with higher canopy retention would aid in dispersal, and key habitat features would be retained throughout the Planning Area.

Where habitat altering treatments are proposed, the landscape is already highly fragmented by past management and ownership patterns, and the present habitat does not create sufficiently large enough blocks to support fishers in these areas. Consequently, it is unlikely that fishers maintain residence in the areas proposed for habitat altering treatments. Therefore, the action alternatives would not be expected to reduce the present fisher population in the Deer Creek 5th field watershed, or affect habitat that would likely be used now or in the future by fishers.

3.9.2.3 Alternative 2 Effects to Fisher

Regeneration harvest treatments would remove 127 acres of suitable fisher denning and resting habitat within the Planning Area (See Figure 11). However, some legacy components would be maintained since 6-9 trees per acre would be retained. Fishers use a variety of habitats, including old regeneration harvests and heavily thinned stands which have large residual trees either within the stands or at the edge. In the Southern Oregon Cascade Range Fisher Study, Aubry and Raley (2006) located fishers in managed forests with various degrees of overstory removal as long as the structures from the original forest were still present. Approximately, 1,037 acres (77 %) of suitable fisher denning and resting habitat would be retained throughout the Planning Area.

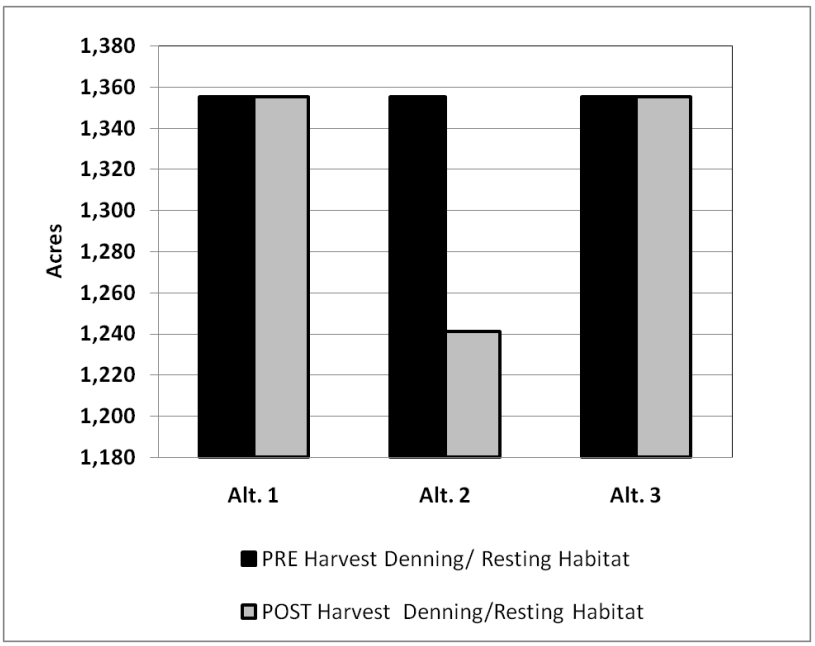


Figure 11: Pre and Post Fisher Denning/ Resting Habitat Change by Alternative

Proposed DM/Mod GS thinning treatments with at least 40% canopy cover retention proposed in Alternative 2 would reduce the quality of 129 acres of suitable denning and resting habitat due to the reduced canopy cover. Proposed treatments retaining 60% canopy cover (179 acres) would continue to provide cover and key habitat features (large overstory trees, snags, hardwoods, and CWD) essential for the life cycle of the fishers. These units would still meet fisher habitat needs for resting and foraging, and fishers would still be expected to use these stands.

3.9.2.4 Alternative 3 Effects to Fisher

No regeneration harvest is proposed under alternative 3, so no habitat would be removed (See Figure 11). Additionally, no treatments are proposed that would reduce the existing canopy below 60% canopy cover in suitable denning and resting habitat. Proposed treatments retaining 60% canopy cover (332acres) would continue to provide cover and key habitat features (large overstory trees, snags, hardwoods, and CWD) essential for the life cycle of the fishers. These units would still meet fisher habitat needs for resting and foraging, and fishers would still be expected to use these stands. Alternative 3 would have some potential to negatively impact fisher habitat due to amount of thinning type treatments. However, the impacts to suitable fisher habitat would be less than those generated by Alternative 2 because thinning is less impactive to habitat than regeneration harvest and more residual late-successional forest legacy components would be retained.

Summary and Conclusions for Fisher

Under the No Action Alternative, thinning treatments proposed in existing projects with at least 40% canopy cover retention would reduce the quality of 174 acres of suitable denning and resting habitat due to the reduced canopy cover. Cumulatively, thinning treatments would reduce the quality of 303 acres in Alternative 2 and 174 acres in Alternative 3 of suitable

denning and resting habitat within the Deer Creek 5th field watershed. An additional 127 acres of denning and resting habitat would be removed within the Deer Creek 5th field watershed under Alternative 2, but no denning and resting habitat would be removed under Alternative 3. Approximately 7,802 acres (95%) and 8,058 acres (98%) of the existing denning and resting habitat would be maintained throughout the Deer Creek 5th field watershed respectively under Alternative 2 and 3. These areas would continue to provide suitable habitat for fisher and other late-successional forest habitat dependent species and would help maintain future connectivity throughout the watersheds and between LSMAs.

Where habitat altering treatments are proposed, the landscape is already highly fragmented by past management and ownership patterns, and the present habitat does not create sufficiently large enough blocks to support fishers in these areas. Consequently, it is unlikely that fishers maintain residence in the areas proposed for habitat altering treatments. Therefore, the action alternatives would not be expected to reduce the present fisher population in the Deer Creek 5th field watershed, or affect habitat that would likely be used now or in the future by fishers

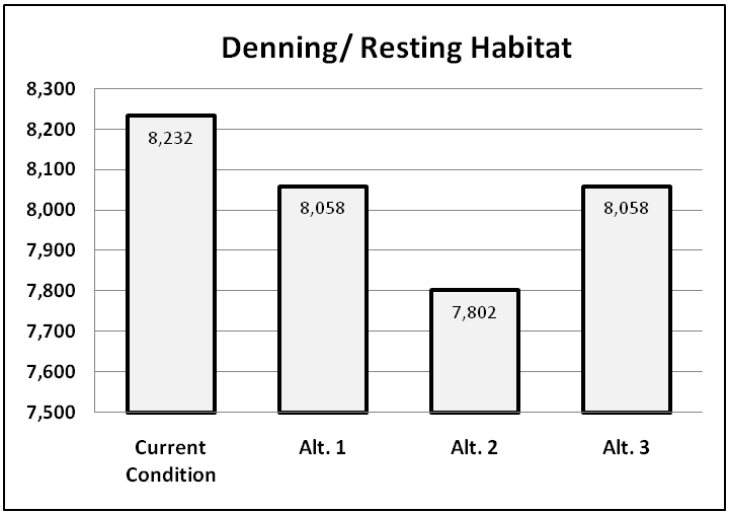


Figure 12. Cumulative Changes to Fisher Denning/Resting Habitat on BLM Lands Within the Deer Creek 5th Field Watershed by Alternative

3.10 Bureau Sensitive Species

3.10.1 Affected Environment Bureau Sensitive Species

The Bureau Special Status Species list has been updated since completion of the Deer Creek Watershed Analysis. The most recent update was February 7, 2008 and the list is now divided into Sensitive and Strategic species (IM No. OR-2008-038). However, following the Special Status Species Management Policy, only Sensitive species will be addressed in this EA.

Bald Eagle

On August 8, 2007, the USDI Fish and Wildlife Service removed (delisted) the bald eagle from the Federal List of Threatened and Endangered Wildlife (USDI USFWS 2007); however, they

remain as a Bureau Sensitive species. Bald eagles nest in large trees, usually within one mile of large bodies of water (Anthony and Isaacs 1989). However, in the Grants Pass Resource area, nest locations have been found up to two miles from large water body sources. Deer Creek and Lake Selmac are south of the Planning Area, and are the primary source of foraging opportunities for bald eagles within Deer Creek 5th field watershed. Considering all older mature forest habitat with large trees existing within two miles of Deer Creek and Lake Selmac, there are approximately 4,221 and 948 acres of suitable nesting habitat, respectively, on BLM lands within the Deer Creek 5th field watershed and the Deer North Planning Area. Bald eagles have been observed within the Planning Area; however, no nests have been located within the Planning Area. There is one historic nest near Lake Selmac.

Bats

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). Townsend's big-eared bats (Bureau Sensitive) hibernate in caves and mines during winter (Sherwin 1998). There is one known mine adit within the Planning Area with historic Townsend's big-eared bat observations. This site was historically used as a maternity and possible interim roost for Townsend's big-eared bats. However, the microsite vegetation around the adit was burned and killed in the 2005 Deer Creek fire. The site has not been checked for occupancy since the fire, but for this analysis it is assumed Townsend's big-eared bats are still using the adit. The fringed myotis and pallid bat, also Bureau Sensitive bat species, are associated with late-successional habitat, and suspected to occur within the Planning Area. Three additional bat species (the silver-haired bat, long-eared myotis, and long-legged myotis) are listed in the NWFP as protection buffer species (USDA and USDI 1994a, b) and are also associated with older stands. Older forest stands receive greater use by bats due to the availability of roosts, a complex vertical structure, and less clutter. Dense stand conditions existing within the Planning Area negatively affect bats by causing echolocation interference, cluttered flight paths, and reducing access to snags (personal communication J. Hayes 2003).

3.10.2 Environmental Consequences Bureau Sensitive Species

3.10.2.1 Alternative 1 (No Action) Effects to Bureau Sensitive Species

Bald Eagle

There are approximately 137 acres of thinning treatments in existing projects within the Deer Creek 5th field watershed which would modify the overstory within the 2 mile analysis area (See Affected Environment) and may also result in the loss of some potential future nest/roost trees.

Approximately 4,084 acres (97%) of the existing nesting habitat would be maintained throughout the Deer Creek 5th field watershed. Under Alternative 1, management activities would not remove or alter suitable habitat within the Planning Area and habitat would continue to develop along current successional pathways. The development of key late-seral and old-growth forest stand conditions would be the same as described above for the northern spotted owl. Particularly to bald eagles, the greatest risk of No Action is the potential wildfire related loss of large live remnant conifers needed to support bald eagle nesting structures.

Bats
Under Alternative 1, forested stands would continue to develop along their current pathways. Successional stand development would continue to be influenced by fire suppression and high stem densities. The risk of stand replacement fire would remain at current levels or increase, which could cause the loss of large trees and snags, which provide important roosting habitat. Additional effects to bats would include reduced access to snags in dense stands due to cluttered flight paths, which causes echolocation interference (personal communication, J. Hayes 2003).

3.10.2.2 Action Alternatives (Alternatives 2 & 3) Effects to Bureau Sensitive Species

Bald Eagle
No known Bald eagle nest trees are located within the Planning Area. Therefore, no direct negative effects are anticipated. If a nest is located prior to implementing the project, it would be protected under the 1995 RMP guidelines and the Bald and Golden Eagle Protection Act. Even though all of the alternatives would remove some potential nest/roost trees, bald eagles would not be precluded from nesting and foraging within the watershed due to retention of larger suitable nest trees in areas set aside for "no treatment."

Bats
No disturbance effects are anticipated to Townsend's big-eared bats because no units are located within 250 feet of the mine adit within the Planning Area. The 250 foot no-harvest buffer around Townsend's big-eared bat colonies was a distance suggested in the 1995 Medford District RMP requirement for protection of microclimate conditions and is expected to greatly reduce adverse impacts to Townsend's big-eared bats by preventing disturbance and changes to cave temperatures or drainage patterns. Some loss of potential roosting sites, such as snags and large mature trees, important to other bat species is expected from harvest activities. The treatment of dense stand conditions existing within the project would improve bat habitat by reducing echolocation interference, cluttered flight paths, and access to snags (personal communication, J. Hayes 2003).

Alternative 2 and 3 would continue to provide additional roosting habitat through green tree and snag retention, which would also help minimize potential effects for other sensitive bat species dependent on these roosting structures.

3.10.2.3 Alternative 2 Effects to Bureau Sensitive Species

Bald Eagle
Alternative 2 proposes 328 acres of commercial harvest in potential nesting habitat within 2 miles of foraging areas. Of these, 127 acres are proposed for regeneration harvest. Regeneration harvest treatments would remove the majority of the overstory, but would retain 6-9 large trees per acre. These treatments would result in the loss of potential nest/roost trees. Density Management treatments (including DM, DM/Mod GS) are proposed on 99 acres, which would modify the overstory and may also result in the loss of some potential nest/roost trees. However, a greater number of large trees would be maintained than in regeneration harvest units, and commercial thinning treatments would promote growing conditions required to develop large diameter trees with large open limb structures needed for bald eagle nesting and roosting trees.

3.10.2.4 Alternative 3 Effects to Bureau Sensitive Species

Bald Eagle
Alternative 3 proposes 275 acres of commercial harvest in potential nesting habitat within 2 miles of foraging areas. No regeneration harvest treatments are proposed under alternative 3. Only 9 acres of Density Management treatments (DM/Mod GS) are proposed which would modify the overstory and also result in the loss of some potential nest/roost trees. However, very few large trees would be removed in these treatments because the objective is to retain 60% canopy cover. A greater number of large trees would be maintained than in regeneration harvest units, and commercial thinning treatments would promote growing conditions required to develop large diameter trees with large open limb structures needed for bald eagle nesting and roosting trees.

Summary and Conclusions for Bureau Sensitive Species

Bald Eagle
Cumulatively under Alternative 2, thinning treatments proposed in existing projects with at least 40% canopy cover retention would reduce the quality of 236 acres of suitable nesting habitat within the 2 miles of foraging areas, which may result in the loss of some potential future nest/roost trees. An additional 127 acres of potential nesting habitat would be removed within the Deer Creek 5th field watershed as a result of this project. Approximately 3,858 acres (91%) of the existing nesting habitat would be maintained throughout the Deer Creek 5th field watershed.

Cumulatively under Alternative 3, thinning treatments proposed in existing projects with at least 40% canopy cover retention would reduce the quality of 146 acres of suitable nesting habitat within the 2 miles of foraging areas, which may result in the loss of some potential future nest/roost trees. Approximately 4,075 acres (96%) of the existing nesting habitat would be maintained throughout the Deer Creek 5th field watershed.

Bats
Even though the action alternatives may potentially adversely disrupt local bat populations and may cause the loss of habitat in some cases, this project is not expected to affect long-term population viability of any Bureau Sensitive bat species known to be in the area. Additionally, the action alternatives, combined with other actions in the watersheds would not contribute to the need to federally list any Bureau Sensitive bat species because of the small scope of the proposed actions compared to the combined acreage of the Deer Creek 5th field watershed. The proposed actions would only treat up to a maximum of 2.6% (799 acres) of the Deer Creek 5th field watershed, leaving a mosaic of untreated patches across the landscape.

3.11 Survey and Manage Species

3.11.1 Affected Environment Survey and Manage Species

Red Tree Voles
The red tree vole (RTV) is an arboreal rodent species with very low dispersal capabilities. Red tree voles depend on conifer tree canopies for nesting, foraging, travel routes, escape cover, and

moisture (Carey 1991). Douglas-fir needles provide the primary food and building materials for nests (USDA, USDI 2000a). The broad management objective for this species under the Survey and Manage program is to retain sufficient habitat to maintain its potential for reproduction, dispersal, and genetic exchange.

Approximately 1,155 acres proposed for treatment within the Deer North Planning Area qualify as suitable RTV habitat (RTV Protocol Version 2.1, October, 2002). Historic and recent surveys have indicated that RTVs are present within the Planning Area. RTV ground and climbing surveys were completed in 2010 for some proposed treatment units (approximately 210 acres). Protocol surveys located 5 active and 27 inactive nests. Protocol surveys, including climbing, would be completed for all units scheduled for implementation prior to signing of a decision.

Great Gray Owls

Great gray owls nest in open forests adjacent to meadows. Broken top trees, abandoned raptor nests, mistletoe clumps, and other platforms provide suitable nest trees (USDA USDI 2004b); suitable nesting habitat is defined in the protocol as large diameter trees with roosting cover within 200 meters of suitable foraging habitat. Suitable nesting habitat exists within this Planning Area. Surveys would be completed for units with suitable nesting habitat prior to signing a decision. There is a low likelihood of great gray owls nesting in the Planning Area. Since the late 1990s, 12 landscape management Planning Areas evenly distributed across the GPRA have been surveyed for GGOs using the two-year survey protocol (USDA, USDI BLM 2004b). Only one area within the GPRA, east of Williams, has documented nesting GGOs; this is approximately 13 miles Southeast of the Deer North project boundary. All known detections of GGOs on the Medford district have been primarily east and north of the Planning Area, where natural meadows and open, grassy forest stands are more widespread.

Mollusks

The Survey and Manage mollusk, *Monadenia chaceana*, is associated with rocky areas, talus deposits, associated riparian areas, and coarse woody material (Mollusk protocol version 3.0) and this potential habitat exists within the Planning Area. However, the pre-disturbance survey requirement for the Grants Pass Resource Area was removed in The Survey Protocol for the Survey and Manage Terrestrial Mollusk Species from the Northwest Forest Plan, Version 3.0, due the *Monadenia chaceana* range change (USDA and USDI 2003). Therefore, no surveys have been completed for the Deer North Planning Area. Additionally, since the late 1990s, more than 17 landscape management Planning Areas throughout the Grants Pass Resource Area have been surveyed for mollusks using the terrestrial mollusk survey protocol (USDA and USDI 1997 and USDA and USDI 2003). These surveys also include units in the Deer Mom project that have since been incorporated into the Deer North Planning Area. Surveys have revealed no detections of *Monadenia chaceana.* Surveys have also been completed for *Helminthoglypta hertleini* across the resource area; however, all detections 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. This habitat type does not occur in the Planning Area.

This project is not anticipated to affect any Survey and Manage mollusk species because the Planning Area does not contain suitable habitat for *Helminthoglypta hertleini* and the project is outside the range of *Monadenia chaceana.* Therefore, further analysis of project level effects is unnecessary.

3.11.2 Environmental Consequences Survey and Manage Species

3.11.2.1 Alternative 1 (No Action) Effects to Survey and Manage Species

Red Tree Voles
Under the No Action Alternative, future foreseeable actions within the Deer Creek 5th field watershed listed in the introduction of Chapter 3 would alter red tree vole habitat. Thinning treatments proposed in existing projects with at least 40% canopy cover retention would reduce the quality of approximately 161 acres of suitable red tree vole habitat due to the reduced canopy cover. Approximately 8,058 acres (98%) of the existing spotted owl nesting habitat, which is similar to RTV habitat, would be maintained throughout the Deer Creek 5th field watershed.

Under Alternative 1, management activities would not remove or alter suitable habitat within the Planning Area and habitat would continue to develop along current successional pathways. The development of key late-seral and old-growth forest stand conditions would be the same as described above for the northern spotted owls. Particularly to red tree voles, the greatest risk of No Action is the potential wildfire related loss of important habitat components such as high canopy cover, large live remnant conifers, and large limbed conifers.

Great Gray Owls
Under the No Action Alternative, future foreseeable actions within the Deer Creek 5th field watershed listed in the introduction of Chapter 3 would alter great gray owl habitat. Thinning treatments proposed in existing projects with at least 40% canopy cover retention and adjacent to suitable foraging habitat would have the greatest effects to GGO nesting habitat.

Under Alternative 1, management activities would not remove or alter suitable habitat within the Planning Area and habitat would continue to develop along current successional pathways. The development of key late-seral and old-growth forest stand conditions would be the same as described above for the northern spotted owls. Particularly to great gray owls, the greatest risk of No Action is the potential wildfire related loss of important habitat components such as high canopy cover, large snags, and large limbed conifers. Foraging areas would continue to be encroached upon by fire intolerant plant species, thereby reducing potential foraging opportunities.

Alternatives 2 and 3 Effects to Survey and Manage Species

Red Tree Voles
Prior to implementation, all active and associated inactive RTV nests discovered during surveys would be buffered according to the 2000 RTV management recommendations, version 2.0 (USDA, USDI 2000). These buffers (Habitat Areas) delineated under the management guidelines, are intended to provide for protection of the physical integrity of the nests and retain adequate habitat for the expansion of active nests at that site (USDA, USDI 2000). These Habitat Areas would remove available acres from potential commercial harvest treatments, and essentially eliminate the direct effects to RTVs from the proposed action.

Great Gray Owls
While structural retention and some commercial thinning treatments may modify potential nesting habitat to non-nesting habitat, it is unlikely that GGOs would be negatively affected,

because the likelihood of GGOs nesting in the Planning Area is low. The proposed regeneration harvest units are spread throughout the Planning Area, which would reduce potential effects to nesting opportunities. Additionally, regeneration harvest treatments are only proposed under Alternative 2, and only 60 acres occur in suitable nesting habitat located within a 0.25 miles of potential foraging habitat. Short-term effects would include reduced canopy closure and structural complexity and the loss of future potential nest trees. However, these habitat changes would also open stands for unobstructed flight and increased foraging success. Long-term beneficial effects include accelerated development of late-successional forest habitat suitable for potential GGO nesting and improved potential GGO foraging due to thinning and burning.

Summary and Conclusions for Survey and Manage Species

Red Tree Vole
Even though the action alternatives may potentially cause the loss of habitat in some cases, this project is not expected to affect long-term population viability of RTVs in the watershed. Additionally, action alternatives combined with other actions in the watershed would not contribute to the need to federally list RTVs because of the small scope of the proposed action compared to the combined acreage of the Deer Creek 5th field watershed. The action alternatives would only treat up to 2.6% (799 acres) of the Deer Creek 5th field watershed, leaving a mosaic of untreated patches across the landscape.

Great Gray Owl
Even though the action alternatives may potentially cause the loss of GGO habitat, this project is not expected to affect long-term population viability GGOs in the Grants Pass Resource Area. Suitable nesting habitat proposed for treatment would be surveyed prior to implementation. If a great gray owl nest is discovered, the nest would be protected with a ¼ mile protection zone, as well as seasonal restrictions during the breeding season (USDA 1994) Additionally, the action alternatives, combined with other actions in the watershed would not contribute to the need to federally list GGOs because of the small scope of the proposed action compared to the combined acreage of the Deer Creek 5th field watershed. The proposed action would only treat up to 2.6% (799 acres) of the Deer Creek 5th field watershed, leaving a mosaic of untreated patches across the landscape.

3.12 Additional Species of Concern

3.12.1 Affected Environment Additional Species of Concern

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 clear-cuts, and small trees in developing stands. Some birds, such as the olive-sided fFlycatcher, use residual canopy trees for perching and forage over adjacent clear-cuts. Recovering clear-cuts in the Planning Area with lower tree and shrub heights would provide these optimal foraging conditions. Many land birds are associated with deciduous shrubs and trees in early-successional habitats (e.g.., Rufous hummingbirds). All neotropical migrants go to Central or South America each year. They are addressed here due to widespread concern regarding downward population trends and habitat declines. Neotropical birds, as a

group, are not on BLM's list of special status species. 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).

BLM has issued interim guidance for meeting BLM's responsibilities under the Migratory Bird Treaty Act and Executive Order (EO) 13186. Both the Act and the EO promote the conservation of migratory bird populations. The interim guidance was transmitted through Instruction Memorandum (IM) No. 2008-050. The IM relies on two lists prepared by the U.S. Fish and Wildlife Service in determining which species are to receive special attention in land management activities; the lists are *Bird Species of Conservation Concern* (BCC) found in various Bird Conservation Regions and *Game Birds Below Desired Condition* (GBBDC). In December, 2008, the USFWS Service released The Birds of Conservation Concern 2008. This publication identifies species, subspecies, and populations of migratory and nonmigratory birds in need of additional conservation actions, updating the April 2008 Birds of Conservation Concern List. Medford BLM biologists conferred with local bird groups and knowledgeable individuals to identify which birds on the list in our region (Bird Conservation Region 5, USFWS Region 1) are present within Medford BLM lands. Table 33 displays a list of the Migratory Birds of Conservation Concern (BOCC) and Game Birds below Desired Condition (GBBDC) in the Grants Pass Resource Area that are known or likely to be present in the Planning Area and could be affected by the proposed actions.

Table 33: Birds of Conservation Concern and Game Birds Below Desired Conditions that could be affected by the Deer North Project

Species	Status	Presence in the Deer North Planning Area
Bald Eagle	BOCC	No nests in the Planning Area
Band Tailed Pigeion	GBBDC	unknown
Mourning Dove	GBBDC	unknown
Olive-sided Flycatcher	BOCC	Present
Peregrine Falcon	BOCC	No Suitable Nesting Cliffs
Purple Finch	BOCC	unknown
Rufous Hummingbird	BOCC	Present

Del Norte Salamanders

Currently the Del Norte salamander is not a Bureau Sensitive species and is not considered a management species under the Special Status Species Program. The 2001 S&M ROD changed Del Norte salamanders to Category D species, which required management of known sites, but not pre-disturbance surveys. Rock and talus habitat used by Del Norte salamanders is sporadically distributed throughout the Planning Area, occurring primarily near rock outcrops, ridge tops, and riparian areas. Surface microhabitat conditions important for these salamanders include the three dimensional physical structure of the substrate and surface cover features, and microclimate (USDI 1999). There have been four incidental Del Norte observations within the Planning Area.

3.12.2 Environmental Consequences Additional Species of Concern

3.12.2.2 Alternative 1 (No Action) Effects to Additional Species of Concern

Land Birds (Neotropical Migrants and Year-Round Residents)
Neotropical birds that favor dense conditions may benefit from the No Action Alternative because the dense understories would continue to build within the Planning Area. The increased chance of stand replacing fires as a result of no action could also lead to the loss and decline of a variety of habitat conditions, including the present dense conditions that benefit some species.

Under the No Action Alternative, 12,974 acres of a variety of habitat would still be treated under future foreseeable projects. Those projects include Deer Willy, South Deer, Anderson West, Tennessee Lime, fuels, and silviculture treatments.

Del Norte Salamanders
Under Alternative 1, management activities would not remove or alter suitable habitat within the Planning Area and habitat would continue to develop along current successional pathways. The development of key late-seral and old-growth forest stand conditions would be the same as described above for the northern spotted owl. Particularly to Del Norte salamanders, the greatest risk of No Action is the potential wildfire related loss of mature habitat and higher canopy cover conditions which provide favorable microsite conditions over occupied talus areas.

3.12.2.3 Alternatives 2 & 3 Effects to Additional Species of Concern

Land Birds Effects from Vegetation Management
While the extent and scope would change for each action alternative, (see Table 37), the general effects would be the same all action alternatives. Species requiring dense cover and forage that have benefited from lack of fire and dense understories could be negatively affected by density management and thinning treatments designed to reduce vegetation density. Due to habitat removal, songbird composition and abundance in treated stands could be reduced in the short-term (Janes 2003; Hagar et al. 2001; Siegel et al. 2003).

Some individual birds may be displaced during project activities. However, untreated areas adjacent to the treatment areas would provide refuge and nesting habitat, minimizing short-term loss of habitat. In treated stands, riparian areas not receiving treatment would also serve as refugia within the proposed harvest units. Activities occurring during active nesting periods could cause some nests to fail. However, seasonal restrictions (Section 2.4, Project Design Features) would protect most nests from disturbance during project activities. Timber harvest and thinning occurring during the critical nesting periods for most species may cause some nests to fail. However, the failure of a nest during one nesting season would not be expected to reduce the persistence of any bird species in the watershed because sufficient habitat of all types would be retained throughout the Planning Area to support the wide diversity of bird species in the area. Additionally, a Memorandum of Understanding (MOU) was signed between the USFWS and the BLM in April, 2010, which identified strategies to avoid or minimize adverse impacts on migratory birds. The Deer North Project would follow these guidelines where feasible to reduce the impacts to migratory birds. For example, many of the PDFs listed to mitigate effects to some species, such as seasonal restrictions, would also benefit migratory birds.

Due to the variety of land-bird habitat requirements, any action that changes or removes vegetation used by one species may benefit another. Consequently, the best way to understand and interpret the impacts to the many land birds that occur across the Planning Area is by comparing the total acres treated under each alternative. Table 37 below compares the acres treated for the Deer North Planning Area, while Table 38 compares the cumulative effects at the Deer Creek 5th field watershed level.

Table 37: Deer North Proposed Treatment Acres by Action Alternative

Alternative	Total Proposed Project Treatment Acres	Percent of Planning Area Treated
Alt. 1	0	0
Alt. 2	759	22%
Alt. 3	706	21%

Del Norte Effects from Vegetation Management

Both action alternatives propose treatments within talus habitat for Del Norte salamanders. Short-term effects would be a reduction in canopy closure that may change current cool moist forest floor conditions to warmer and drier conditions post harvest. This change in microsite conditions may decrease the suitability of some talus habitat patches for Del Norte salamanders until the vegetation layers have been restored and the canopy cover increases. However, canopy closures in thinning units would be retained at or above 40% which is the recommended canopy closure for Del Norte habitat (RMP pp. 47, 57), and would likely provide at least marginal microclimatic conditions.

Alternatives 2 & 3 Effects to Del Norte

Regeneration harvest proposed in Alternative 2 would cause more canopy reduction in talus areas than in than Alternative 3. However, effects would be minimized to known Del Norte sites under both alternatives because known Del Norte sites would be buffered as described in the project design features and outlined in the 1995 Medford RMP/ROD (pp. 47, 57).

3.12.2.4 Alternative 2 Effects to Additional Species of Concern

Land Birds Effects from Vegetation Management

There would be a reduction of 127 acres of late-successional forest habitat as a result of proposed regeneration harvest treatments. This would remove hiding cover and nesting habitat for neotropical birds that use older forests. Regeneration harvest treatments would retain 6-9 large green trees per acre. Green-tree retention may help maintain connectivity of habitats for some species between treated and untreated stands (Bunnell et al. 1997). Untreated late-successional forest habitat would continue to provide adequate hiding cover, foraging, and nesting habitat within the Planning Area for birds that use older forests.

Habitat for birds that use early seral habitat would increase as a result of regeneration harvest treatments. Species, such as the Rufous Hummingbird, which use nectar producing plants would benefit from the increase in forbs and flowering shrubs that would occur post treatment. This increase would continue until the tree canopy recovers and shades out these plants. Additionally,

the Olive-sided flycatcher would benefit from the creation of additional openings through regeneration harvest and group selection treatments because they forage in open areas.

3.12.2.5 Alternative 3 Effects to Additional Species of Concern

A Land Birds Effects from Vegetation Management
There would be no complete removal of any type of potential bird habitat under Alternative 3. Treatments would maintain key habitat features, which would minimize impacts within the Planning Area. There would be a small increase of early seral habitat in the small openings (¼ acre to ½ acre in size) created in the modified group selections in Alternative 3.

Summary and Conclusions for Additional Species of Concern
A Land Birds (Neotropical Migrants and Year-Round Residents)
Partners in Flight support the ecoregional scale, as appropriate, for analyzing bird populations (http://www.partnersinflight.org/description.cfm). The potential failure or loss of some nests would not be measurable at the regional scale because of the small scope of the project in relationship to the regional scale. Therefore, under both action alternatives, populations in the region would be unaffected**.** Breeding bird surveys in the Southern Pacific Rainforest Physiographic Region (which includes western Oregon) indicate that songbirds are declining. The exact cause of these declines is still unclear, but issues associated with their winter grounds (Central and South America) are suspected to be an important factor (Sauer et al. 2004; Alexander 2005, personal communication).

Del Norte
Even though the proposed actions may potentially cause the loss of habitat in some cases,the action alternatives are not expected to affect long-term population viability of Del Norte salamanders in the watershed. Additionally, this project combined with other actions in the watershed would not contribute to the need to federally list Del Norte Salamander because of the small scope of the proposed action compared to the combined acreage of the Deer Creek 5th field watershed. The proposed action would only treat up to 2.6% (799 acres) of the Deer Creek 5th field watershed, leaving a mosaic of untreated patches across the landscape.

3.13 Cultural Resources

3.13.1 Affected Environment Cultural Resources

The Deer North Vegetation Management Project is situated in a region that has a rich history. Archeological evidence indicates that human occupation of southwest Oregon dates back about 10,000 years. The native inhabitants of the area are generalized as hunters and gatherers.

The settlement pattern of the ethnographic-era Takelma was closely related to their subsistence regime. People wintered in small permanent villages and dispersed during the spring, summer and fall to utilize upland resources, returning to their permanent villages in mid-autumn. The permanent winter villages were located in low elevation river valleys of the region in close proximity to predictable and significant food resources (Gray, 1987; Atwood and Gray 1996).

Today the descendants of the Takelma are included in the Confederated Tribes of the Grand Ronde and the Confederated Tribes of the Siletz.

Maritime exploration along the southwest Oregon coast began in the late 18th century, but the interior remained unknown to white explorer's until the early part of the 19th century (Beckham 1978). The first recorded history of Euroamericans arriving in southwestern Oregon occurred around 1827. They belonged to a party of Hudson's Bay Company trappers from Fort Vancouver under the leadership of Peter Skene Ogden. Others trappers and explorers made periodic visits to the area up to the time of the discovery of gold in Jackson County which occurred in late 1851 or early 1852. Although gold was discovered elsewhere along the Applegate and Illinois Rivers previously, this gold discovery brought an influx of thousands of miners to the region in search of gold. Gold mining occurred on a small scale within the Deer North Vegetation Management area when compared to the region's major producers further south.

Gold mining occurred on a small scale within the Deer Creek watershed in the early years. The majority of the mining in the mid 1800s within the watershed was small scale, primarily prospecting, and the level of hydraulic gold mining was low in the watershed. No records of large scale gold mining operations were found for the Deer Creek watershed (USDI 1997). Other minerals, such as chromite were mined in the Deer Creek area (McKinley and Frank 1996).

A series of chromite mines were established near Squaw Creek on the western most boundary of the watershed. Previously recorded sites, such as the Derby Squaw Mine located in the western portion of this watershed attest to this fact.

In the 1850s, in conjunction with the increased mining and settlement in southwest Oregon, a road was constructed from Crescent City to Jacksonville. With the increase in population, agricultural pursuits increased and by 1907 the first Grange in Josephine County was established at Deer Creek (USDI 1997). The first post office in the region was established at Dryden on February 8, 1892 (McArthur 1952).

Cultural resources are recognized as fragile, irreplaceable resources with potential public and scientific uses, representing an important and integral part of our Nation's heritage. The BLM manages cultural resources under its jurisdiction or control according to their relative importance, protecting against impairment, destruction, and inadvertent loss, and encouraging and accommodating the uses determined appropriate through planning and public participation (BLM Manual Section 8100.06A:2004).

There have been previous archaeological surveys in the Planning Area. During these previous surveys, eight cultural sites were recorded, all historic and related to mining in the area. Sites within the Planning Area include landscapes representing the development of different mining technologies, camp sites associated with mining activities and refuse scatters. No prehistoric sites have been recorded in the Planning Area. Additional surveys for the Deer North Vegetation Management project were completed in July 2008. The total new acreage surveyed was 765 acres with no new sites being recorded. During archaeological surveys in 2008, the eight

previously recorded historic sites were revisited to assess their condition. All known cultural sites have been identified and none are located within designated treatment units.

3.13.2 Environmental Consequences Cultural Resources

3.13.2.1 Alternative 1(No Action) Effects to Cultural Resources

None of the proposed actions would be implemented in the Deer North Planning Area. The current level of cultural resource site protection would be maintained. When cultural resource sites are discovered through survey prior to any future project implementation, these sites would be protected using Project Design Features (PDFs).

All environmental conditions and trends would continue. Fuels build-up would continue to increase and could result in a catastrophic fire which could threaten or destroy cultural resources. Vegetation would continue to encroach on cultural resources and could result in the damage and/or destruction of those resources through root disturbance and bioturbation.

3.13.2.2 Alternative 2 and 3 Effects to Cultural Resources

All known cultural resource sites have been identified within the Deer North Planning Area. No known sites are located within proposed treatment units. The sites would not be directly affected by proposed project activities.

Cultural sites in the vicinity may be indirectly affected by proposed project activities. Sites are susceptible to damage from a wide range of different actions including illegal digging, damage from OHV vehicles displacing the soils and damaging or displacing artifacts, fire, encroachment of vegetation, and vandalism. Areas cleared for fire-lines could provide opportunities for OHV riders to leave designated roads with their vehicles and gain access to cultural resource sites, possibly damaging them.

With the reduction of vegetation created by proposed management activities, potential indirect impacts on cultural resources may include sites becoming more susceptible to vandalism and looting because of increased visibility and access. However, with roadside buffers (PDF Section 2.4), risk of these effects should be minimized. Recorded sites are monitored by BLM archaeologists on a systematic basis to assure there are no impacts. If looting is occurring law enforcement would be notified.

The proposed vegetation management would reduce fuel loads and provide additional protection to cultural sites from possible catastrophic fire, especially wooden features and artifacts associated with historic sites.

If cultural resources are found during project implementation, the project would be redesigned to protect the cultural resource values present, or evaluation and mitigation procedures would be implemented based on recommendations from the Resource Area archaeologist with concurrence from the Field Manager and State historic Preservation Office.

Summary and Conclusions for Cultural Resources

Management direction includes protecting and managing the integrity of all historic / prehistoric sites identified in the cultural survey for this and other projects. Activities from the action

alternatives that might damage cultural resources include controlled burning, fuel hazard reduction, and unauthorized use. Currently OHV use occurs within the Planning Area. Fuels and harvest work on BLM would reduce understory vegetation, creating potential illegal/unauthorized uses (i.e. increased OHV use off designated roads and trails) and cultural sites could potentially be negatively affected by this use. Damage to cultural resources by OHV use is uncertain and depends on user responsibility and the degree to which they would actually access thinned stands.

PDFs would be implemented to minimize effects from potential OHV use and other ground disturbing activities in this and other projects. No cumulative impacts on cultural resources are anticipated. The BLM would continue to manage cultural resource sites according to the direction provided in BLM Manual 8100.

3.14 Visual Resource

3.14.1 Introduction

The Visual Resource Management (VRM) classes are described in the Medford RMP. The Planning Area contains both VRM III and VRM IV classes. 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.

Key Observation Points
Two Key Observation Points (KOP) were established to identify potential effects to the visual resources. Key observation points were determined by following "commonly traveled routes" (BLM Manual Handbook, Visual Resource Contrast Rating, Rel. 8-30, 1/17/86, page 2, Section II.C.) and using topographic maps and photo documentation. The following is a breakdown of KOPs along commonly traveled routes through the Planning Area:

KOP #1: T38S, R7W, Section 10. Off Deer Creek Road, 1/10 mile east of Lakeshore drive. Three views:

a. View from Deer Creek road looking northwest. Sections 31 and 29 are not visible. The upper elevations and ridgelines of Section 3 are not in the direct line of sight but a small portion of the vegetation of the Planning Area would be visible by looking sideways and above the foreground vegetation, 1 ½ miles towards the northwest.
b. View from Deer Creek road looking north/northwest. Sections 29 and 33 are not visible. The upper elevations and ridgelines of Section 3 are not in the direct line of sight but small portion of the vegetation of the Planning Area would be visible by looking sideways and above the foreground vegetation, 1 ½ miles towards the north/northwest.
c. View from Deer Creek road looking north/northeast. The upper elevations and ridgelines of Section 3 are not in the direct line of sight but small portion of the vegetation of the Planning Area would be visible by looking sideways and above the foreground vegetation, 1 ½ miles towards the north/northeast.

KOP #2: T38S, R7W, Section 14. Off Deer Creek Road, 1/10 mile east of Cedar Creek Road. Two views:

a. View from Deer Creek road looking north/northwest. In Section 11, the Planning Area, which rises steeply uphill behind the foreground vegetation, parallels Deer Creek Road on the south side of the ridge line. A small portion of the Planning Area would be visible from the road.

b. View from Deer Creek road looking northeast. In Section 11, the Planning Area, which rises steeply uphill behind the foreground vegetation, parallels Deer Creek Road on the south side of the ridge line. A small portion of the Planning Area would be visible from the road.

3.14.2 Affected Environment Visual Resource

Currently, the characteristic landscape can be described as variable. On the valley floor and lower slopes, the area is modified by human alterations, including clearings, farm lands, structures, buildings, fences and power lines. The town of Selma is approximately three miles southwest of the Planning Area. State Highway 199 is outside and to the west and Deer Creek Road runs along the south edge of the Planning Area. There are numerous private residences and roads off of the two major roadways.

Knight Draper Creek and Crooks Creek form the main valleys in the Planning Area, running parallel to each other and flowing from the northeast to the southwest. There is a wide distribution and diversity of species and seral stages within the planning area. With the exception of previously treated areas, tree densities in the planning area are high. Both the older and younger stands range from variable to homogenous in shape, form, color and texture. The lower slopes of the BLM land are often blocked by foreground vegetation and structures (houses, telephone poles).

The Planning Area can not be seen from Highway 199. Deer Creek Road runs along the southern portion of the Planning Area and is the only commonly traveled route where the Planning Area is visible. Views of the middle slopes and ridgelines from Deer Creek Road are distant and short except where the road is in close proximity to BLM land in the southeast corner of the Planning Area.

3.14.3 Environmental Consequences Visual Resource

3.14.3.1 Alternative 1 (No Action) Effects to Visual Resource

The No Action Alternative is not a “static” alternative. Visually, the existing landscape would continue to change with the present economic and environmental conditions and trends, especially on private lands. This would include trends such as vegetation succession and consequent terrestrial and aquatic habitat changes; deteriorating road conditions; and increases in fire hazard. If a stand-replacing fire were to occur, it would significantantly change the visual landscape.

3.14.3.2 Alternative 2 and 3 Effects to Visual Resource:

Visual resources have been analyzed by treatment type. The following information is common to all alternatives.

Density management (DM) is typically prescribed for uneven-aged (80 to 120 years old) stands for the primary purpose of widening the spacing of residual trees to promote growth and structural development of the remaining stand. This treatment, average relative density of 25 to 45%, would increase browns and tans as more understory and ground would be visible. Spacing of the residual trees would repeat the characteristic lines and forms found on the existing landscape. Management activities may attract attention of the casual observer, but would not dominate the view. The proposed treatment would meet VRM III and IV objectives.

Modified group selection (Mod GS) is the removal of trees (usually Douglas-fir) that are competing with vigorous pines and non-tanoak hardwoods with greater than 30% live crown ratio. This treatment would increase browns/light greens and tans, as more understory and ground would be visible. Small openings (1/4 to 1/2 acre) around large pine and non-tanoak hardwoods would repeat the characteristic lines and forms found on the existing landscape. Due to the level of canopy closure remaining and repeating the characteristic lines/forms found on the existing landscape, the proposed treatment would meet VRM III and IV objectives.

Group selection (GS) is used in small patches (<3 acres), which lack conifer regeneration because of intense conifer, hardwood or brush competition or in areas where the overstory trees are showing signs of declining health (stagnating growth patterns, dead, dying, or diseased). This treatment would increase browns and tans as "regeneration openings" are created and until conifer seedlings and young stand management treatments would take effect. Management activities may attract attention of the casual observer, but would not dominate the view. Due to project design features of feathering/thinning edges and using irregular clearing shapes the treatment would meet VRM III and IV objectives.

Density Management/Understory Reduction (DM/UR) is prescribed for older seral stands. In areas with a continuous canopy, removal would occur primarily from below. In more patchy areas, vigorous large trees would be retained in patches while thinning lower and middle tree layers. Post treatment, there would be patches of more light greens and browns from the understory. Overstory patches would remain dark green with slightly more rough edges, as spacing between trees increases, especially along ridgelines, where there may be more light/sky visible through the trees. Due to the level of canopy closure being left and the project design features of mimicking the characteristic landscape, the treatment would meet VRM III and IV objectives.

Postharvest Follow-up Treatments

Fuels Treatments: These treatments include cutting small diameter understory, handpiling and burning, underburning, and broadcast burning. These treatments would slightly increase patterned shapes to the landscape in the short term. However, these patterns would not be noticeable to the casual observer, due to the existing landscape, which is discontinuous from both

natural and human influences. In the long term, these treatments would preserve the landscape from a stand replacing fire.

***Tree Planting* (PL)** – Tree planting of nursery seedling stock would occur after site preparation (i.e. slashing, handpiling, underburn, etc.) has been completed on regeneration harvest and hardwood conversion areas. In some cases, the entire unit would be planted. Treatments may include removing competing grasses and forbs with hand tools, scalping an area around the seedling, or installing paper or Vispore® mulch to prevent soil moisture loss. Tree netting may also be used to prevent browsing by wildlife. The effects of these treatments would not be noticeable to the casual observer and in the long term, tree planting would return vegetation patterns, and natural lines, color, and texture to the landscape.

3.14.3.3 Alternative 2 Effects to Visual Resource

Alternative 2 is designed to meet management direction under the 1995 Medford District Resource Management Plan (1995 RMP pp. 38-40). Under the 1995 RMP alternative, the majority of the Planning Area is classified as VRM III and the rest VRM IV.

Regeneration harvest (1995 RMP 6-9 large trees / acre retained) is used when the objective is to increase the growth of the existing understory trees or to regenerate a new understory with natural seeding and/or tree planting. Regeneration harvest units in the Planning Area are proposed to be done under NGFMA guidelines, leaving 6-8 large conifers/acre.

This treatment type would have a strong visual effect on the landscape, as large openings are created. Regeneration harvests are proposed in section 3, 11, 29, and 31. Browns would increase, as the ground would be visible and greens would diminish, as trees are removed. Where visible from KOPs, openings would dominate the view of the landscape. The characteristic lines and forms would be discontinuous. Many of these units are proposed in dense, homogenous stands, and the openings would not match the characteristic landscape.

Changes to the characteristic landscape would be moderate from KOP 1 in the regeneration harvest units in Section 3 (units 15, 16, 20) and strong from KOP 2 in Section 11 (unit 18). The regenation units visible from the KOPs would not meet VRM III objectives. 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.

Proposed Mitigation Measure #1: To meet VRM III objectives in units 3-15, 3-16, 3-20 and 11-18, change the prescription from regeneration harvest to density management. Overstory remaining after treatment would be a minimum of 40%.

3.14.3.4 Alternative 3 Effects to Visual Resource

Alternative 3 is also designed to meet management direction under the 1995 RMP and seeks to retain suitable spotted owl habitat while still providing forest products to meet the purpose and need of this project. Regeneration harvest is deferred under this alternative. Thinning and

density management is proposed to retain key structural elements (large trees, snags, coarse woody debris, hardwoods, etc.) and to protect overly dense stands from stand replacing fire. Density management and/or modified group select would occur on 319 acres; and density management / understory reduction would occur on 427 acres would meet VRM III objectives.

Summary and Conclusions for Visual Resource

The Planning Area is characterized by development along the valley and human alterations of the characteristic landscape. The vegetation and land forms within the Planning Area are very diverse, from flat valley bottom vegetation and meadows, to slopes and ridges with young/mid and older forest stands. Effects of the proposed treatments on visual resources include short term and long term increases in browns and light greens as the understory becomes more visible. The texture of the vegetation would become slightly rougher when 1/4 to 1/2 acre clearings around large dominant trees are created. In larger openings, texture would be more smooth, due to the lack of trees, branches and vegetation in patches. Vertical lines in thinned stands would be slightly more pronounced in the foreground views, as individual trees may become more visible, especially on the ridges. From longer, further views of thinned stands, edges would become more blurred. Post followup harvest treatments would repeat the characteristic landscape and not be noticed by the casual observer. These changes to the landscape would meet VRM III objectives since they would blend with the characteristic landscape which is already varied by human alterations, as well as a variety of vegetation types.

Project design features such as feathering, irregular shapes, avoiding straight lines and screening would also aid in meeting VRM objectives.

As stated above, the proposed regeneration harvest unit under Alternative 2 within view of casual observers from key observation points in the Planning Area would not meet VRM III objectives. The cumulative effect of creating large openings in areas where vegetation was homogenous and continuous, would visually impact the view to the casual observer from common travel routes. However, implementing the mitigation measure, density management vs regeneration harvest, in units visible from KOP #1 and KOP #2 would blend in with the characteristic landscape since the crown area of the remaining overstory would be over 40% versus 25-35%, and some multi-layered canopy would remain providing more greens and rough texture. Therefore, density management would meet VRM III objectives in units 3-15, 3-16, 3-20 and 11-18.

4.0 List of Preparers

The following individuals participated on the interdisciplinary team or were consulted in the preparation of this EA:

Interdisciplinary Preparers	Title	Resource Values
Dave Maurer	Soil Scientist	Soil and Water
Cori Francis/Sean Gordon	Forester	Vegetation
Jim Collins	GIS Specialist	GIS
Jon Raybourn	Fisheries Biologist	Fisheries
Dave Ballenger	Outdoor Recreation Planner	Recreation and Visual Resources
Lisa Brennan/Merry Haydon	Cultural Specialist	Cultural Resources
Martin Lew	Environmental Coordinator	NEPA Contact/Editor
Tim Gonzales	Fire Mitigation & Education Specialist	Fire and Fuels
Jim Roper	Engineer	Roads and Engineering
Robin Snider	Wildlife Biologist	Wildlife
Bob Murray	Forester	Harvest Systems
Susan Fritts	Botanist	Plants/Noxious Weeds

5.0 Public Involvement and Consultation

5.1 Public Scoping and Notification

5.1.1 Public Scoping

The BLM extended an invitation to the local and regional communities, Native American tribes and other state and federal agencies, private organizations and individuals to develop issues and resources important to local, state, national, and international economies.

Public involvement began on December 5, 2008, with a scoping letter being sent to agencies, organizations, and members of the public on the Grants Pass Resource Area Umbrella list as well as residents and landowners near or adjacent to BLM parcels within the planning area, to federal, state, and county agencies, and to tribal and private organizations and individuals that requested

information concerning projects of this type.

The BLM held a public meeting at the Selma Community Center on February 12, 2009 which provided public input to BLM for consideration in the EA.

5.1.2 30 Day comment Period

Copies of the EA will be available for public review in the Grants Pass Interagency Office. A formal 30-day public comment period will be initiated by an announcement in the Grants Pass Daily Courier. If you would like a copy of the EA, please stop by the office or contact Martin Lew, Environmental Planner, at (541) 471-6504. Written comments should be addressed to Katrina Symons, Field Manager, Grants Pass Resource Area, at 2164 NE Spalding Avenue, Grants Pass, OR 97526. E-mailed comments may be sent to *Medford_Mail@blm.gov*.

5.2 Consultation

5.2.1 United States Fish and Wildlife Service

In April 2010, the BLM prepared a Biological Assessment to evaluate impacts to Northern Spotted Owls including potential timber sale treatments in the Deer North project area outside of the 1992 CHU boundary. In June 2010, the USFWS issued BLM a Biological Opinion (Tails # 13420-2010-F-0082). Additionally, in August 2010, the BLM prepared a Biological Assessment to evaluate impacts to Northern Spotted Owls including potential hazardous fuels and stewardship treatments in the Deer North project area outside of the 1992 CHU boundary. In October 2010, the USFWS issued BLM a Letter of Concurrence (Tails # 13420-2010-I-0178). Prior to implementation, additional consultation would be initiated for all units not covered by these two consultation documents.

5.2.2 National Marine Fisheries Service

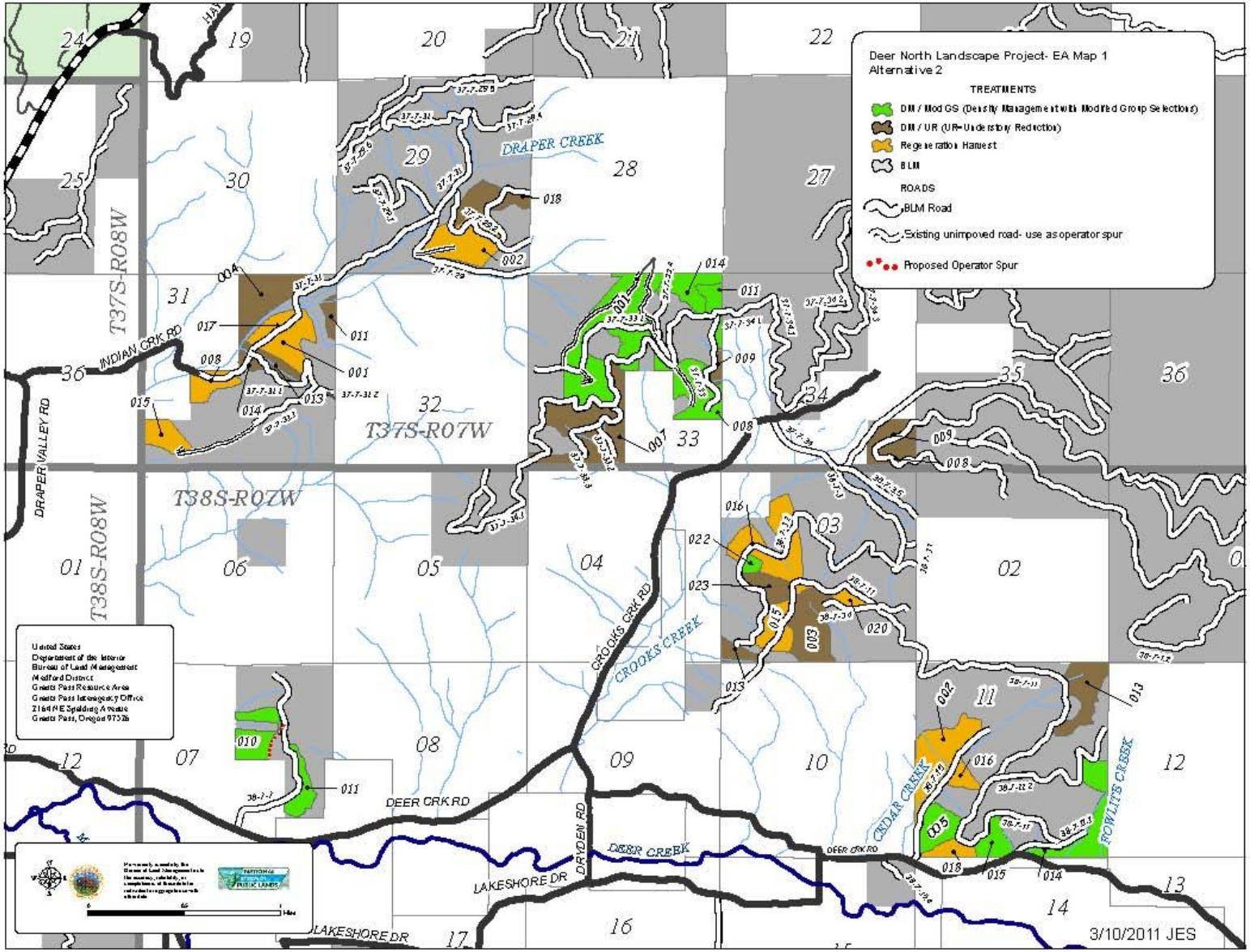
The timber sale action, fuels treatments, road maintenance and hauling activities which would occur within the Rogue Basin and the range of the federally threatened Southern Oregon Northern California and Oregon Coast coho salmon were determined to have no effect on coho or critical habitat.

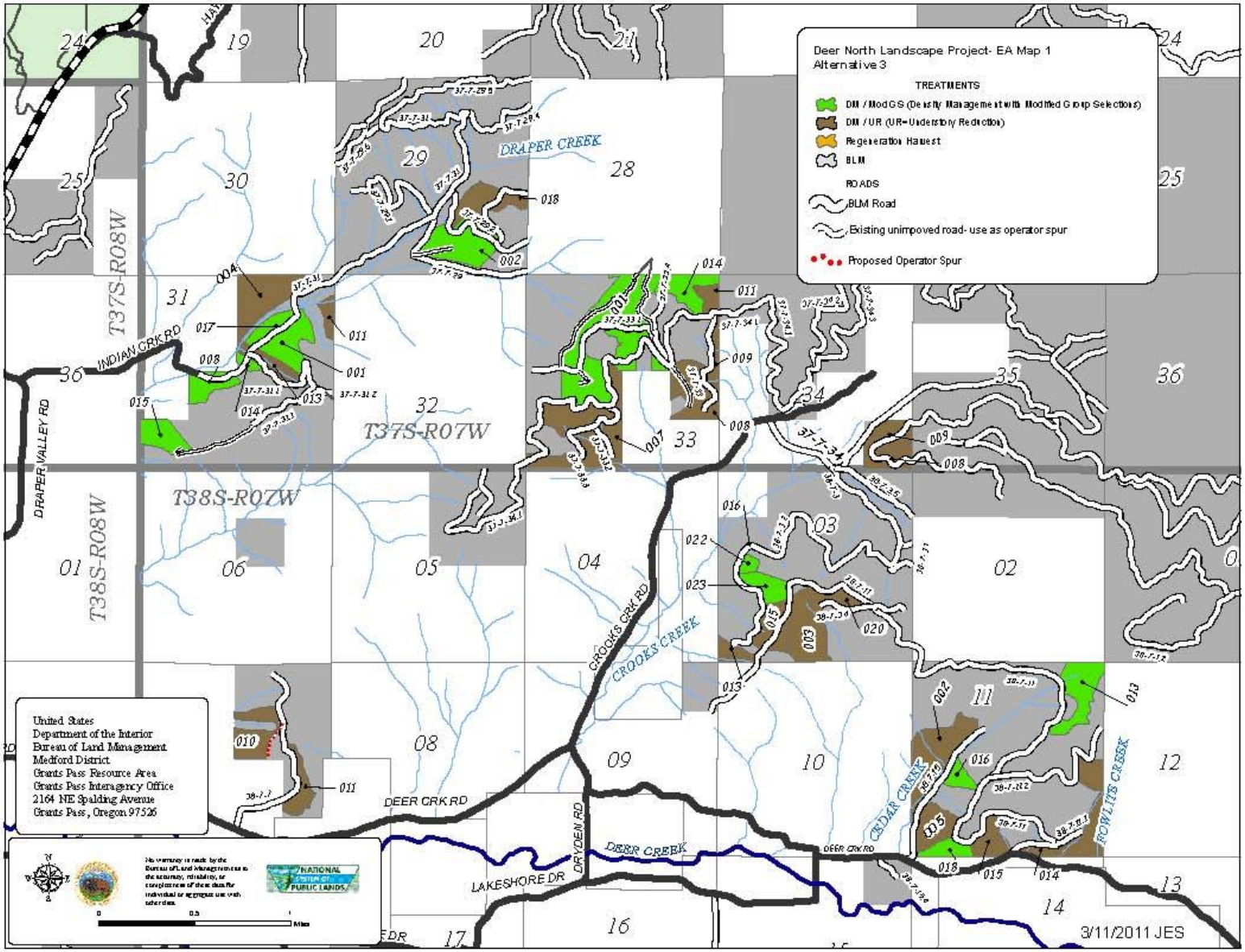
Consultation for the Endangered Species Act with NMFS is not needed as the Action Alternatives would not affect listed species or their habitat. No consultation as required under the Magnuson-Stevens Fishery Conservation and Management Act for adverse affects on Essential Fish Habitat as there is No Affect to EFH coho and chinook within the Rogue Basin

5.2.3 State Historical Preservation Office

The State Historical Preservation Office approved the clearance/tracking form for the Deer North Vegetation Management Project. The form is contained within the Deer North Vegetation Management Project Analysis file.

Appendix A. Maps


Deer North Landscape Project- EA Map 1
Alternative 2
TREATMENTS
DM / Mod GS (Density Management with Modified Group Selections)
DM / UR (UR=Understory Reduction)
Regeneration Harvest
BLM
ROADS
BLM Road
Existing unimproved road- use as operator spur
Proposed Operator Spur
United States
Department of the Interior
Bureau of Land Management
Medford District
Grants Pass Resource Area
Grants Pass Interagency Office
2164 NE Spalding Avenue
Grants Pass, Oregon 97526
DRAPER CREEK
INDIAN CRK RD
DRAPER VALLEY RD
T37S-R08W
T37S-R07W
T38S-R07W
T38S-R08W
CROOKS CRK RD
CROOKS CREEK
DEER CRK RD
DEER CREEK
DRIVEN RD
LAKESHORE DR
CEDAR CREEK
ROWLITS CREEK
3/10/2011 JES


Deer North Landscape Project- EA Map 1
Alternative 3
TREATMENTS
DM / ModGS (Density Management with Modified Group Selections)
DM / UR (UR=Understory Reduction)
Regeneration Harvest
BLM
ROADS
BLM Road
Existing unimproved road- use as operator spur
Proposed Operator Spur
United States
Department of the Interior
Bureau of Land Management
Medford District
Grants Pass Resource Area
Grants Pass Interagency Office
2164 NE Spalding Avenue
Grants Pass, Oregon 97526
No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data.
NATIONAL SYSTEM OF PUBLIC LANDS
Miles
3/11/2011 JES
T37S-R08W
T37S-R07W
T38S-R07W
T38S-R08W
DRAPER CREEK
INDIAN CRK RD
DRAPER VALLEY RD
CROOKS CRK RD
CROOKS CREEK
DEER CRK RD
DRYDEN RD
DEER CREEK
LAKESHORE DR
CEDAR CREEK
FOWLITS CREEK

Appendix B. Treatment Tables

Deer North Landscape Management Project								
TRSU	**Land Use Allocation**	**Alt. 2 Acres**	**Alternative 2**	**Alternative 2 Density after Logging**	**Alternative 3 Acres**	**Alternative 3**	**Alternative 3 Density after Logging**	**Logging System**
37S-07W-29-002	Matrix	39	Regeneration Harvest	6 - 9 tpa retained* (NGFMA)	39	DM / Mod GS	> 40% canopy closure	Tractor
37S-07W-29-018	Matrix	23	DM / UR	> 40% canopy closure	23	DM / UR	> 40% canopy closure	Tractor/Cable
37S-07W-31-001	Matrix	30	Regeneration Harvest	6 - 9 tpa retained (NGFMA)	30	DM / Mod GS	40 - 60% canopy closure	Tractor
37S-07W-31-004	Matrix	30	DM / UR	> 40% canopy closure	30	DM / UR	> 40% canopy closure	Tractor/Cable
37S-07W-31-008	Matrix	8	Regeneration Harvest	6 - 9 tpa retained (NGFMA)	8	DM / Mod GS	> 40% canopy closure	Tractor
37S-07W-31-011	Matrix	4	DM / UR	> 60% canopy closure	4	DM / UR	40-60% canopy closure	Tractor/Cable
37S-07W-31-013	Matrix	2	DM / UR	> 40% canopy closure	2	DM / UR	40 - 60% canopy closure	Tractor/Cable
37S-07W-31-014	Matrix	3	DM / UR	> 40% canopy closure	3	DM / Mod GS	> 40% canopy closure	Tractor
37S-07W-31-015	Matrix	21	Regeneration Harvest	6 - 9 tpa retained (NGFMA)	21	DM / Mod GS	> 40% canopy closure	Tractor/Cable
37S-07W-31-017	Matrix	4	Regeneration Harvest	6 - 9 tpa retained (NGFMA)	4	DM / Mod GS	40 - 60% canopy closure	Tractor
37S-07W-33-001	Matrix	118	DM / Mod GS/	35% relative density	118	DM / Mod GS	40 - 60% canopy closure	Tractor

37S-07W-33-007	Matrix	50	DM / UR	> 60% canopy closure	50	DM / UR	> 60% canopy closure	Tractor/Cable
37S-07W-33-008	Matrix	34	DM / Mod GS / GS	35% relative density	34	DM / UR	> 60% canopy closure	Tractor/Cable
37S-07W-33-009	Matrix	6	DM / UR	> 40% canopy closure	6	DM / UR	40 - 60% canopy closure	Tractor/Cable
37S-07W-33-011	Matrix	9	DM / Mod GS / GS	35% relative density	9	DM / UR	> 60% canopy closure	Tractor
37S-07W-33-014	Matrix	16	DM / Mod GS / GS	35% relative density	16	DM / Mod GS	> 40% canopy closure	Tractor
37S-07W-34-008	Matrix	14	DM / UR	> 40% canopy closure	14	DM / UR	> 40% canopy closure	Cable
37S-07W-34-009	Matrix	22	DM / UR	> 60% canopy closure	22	DM / UR	> 60% canopy closure	Cable
38S-07W-03-003	Matrix	46	DM / UR	> 60% canopy closure	46	DM / UR	> 60% canopy closure	Cable
38S-07W-03-013	Matrix	7	DM / UR	> 60% canopy closure	7	DM / UR	> 60% canopy closure	Cable
38S-07W-03-015	Matrix	26	Regeneration Harvest	6 - 9 tpa retained (NGFMA)	26	DM / UR	> 60% canopy closure	Tractor/Cable
38S-07W-03-016	Matrix	53	Regeneration Harvest	6 - 9 tpa retained (NGFMA)	0	No Harvest		
38S-07W-03-020	Matrix	11	Regeneration Harvest	6 - 9 tpa retained (NGFMA)	11	DM / UR	> 60% canopy closure	Tractor/Cable
38S-07W-03-022	Matrix	6	DM / Mod GS	35% relative density	6	DM / Mod GS	> 40% canopy closure	Tractor
38S-07W-03-023	Matrix	18	DM / UR	> 40% canopy closure	18	DM / Mod GS	> 40% canopy closure	Tractor/Cable
38S-07W-07-010	Matrix	25	DM / Mod GS / GS	35% relative density	25	DM / UR	> 60% canopy closure	Cable
38S-07W-07-011	Matrix	18	DM / Mod GS	35% relative density	18	DM / UR	> 60% canopy closure	Tractor/Cable
38S-07W-11-002	Matrix	28	Regeneration Harvest	6 - 9 tpa retained (NGFMA)	28	DM / UR	> 60% canopy closure	Tractor

38S-07W-11-005	Matrix	22	DM / Mod GS	35% relative density	22	DM / UR	> 60% canopy closure	Tractor/Cable
38S-07W-11-013	Matrix	34	DM / UR	> 40% canopy closure	34	DM / Mod GS	> 40% canopy closure	Tractor/Cable
38S-07W-11-014	Matrix	8	DM / Mod GS / GS	25% relative density	8	DM / UR	> 60% canopy closure	Tractor
38S-07W-11-015	Matrix	13	DM / Mod GS / GS	25% relative density	13	DM / UR	> 60% canopy closure	Cable
38S-07W-11-016	Matrix	9	Regeneration Harvest	6 - 9 tpa retained (NGFMA)	9	DM / Mod GS	> 60% canopy closure	Tractor/Cable
38S-07W-11-018	Matrix	13	Regeneration Harvest	6 - 9 tpa retained (NGFMA)	13	DM / Mod GS	> 40% canopy closure	Cable
38S-07W-15-001	Matrix	13	DM / Mod GS	35% relative density	13	DM / Mod GS	> 40% canopy closure	Tractor
38S-07W-15-006	Matrix	6	DM/ UR	> 40% canopy closure	6	DM/ UR	> 40% canopy closure	Tractor
38S-07W-15-007	Matrix	10	DM/ UR	> 40% canopy closure	10	DM/ UR	> 40% canopy closure	Tractor
Totals		799			746			

Appendix C. Roads Table

Road Number	Road Name	Miles	Control	Surface Type	Level	Miles	Miles	Miles	Miles	Closure Type	POC	PL	Comments
37 S 07 W 29.00	Knight Draper C	**Error! Bookmark not defined.**0.89	BLM	ABC	3	0.89					No	No	TMO recommendation to remain in its existing condition for access to BLM managed lands.
37 S 07 W 29.01	Knight Draper H	0.87	BLM	ABC	3	0.87					No	No	TMO recommendation to remain in its existing condition for access to BLM managed lands.
37 S 07 W 29.02	Knight Draper B	1.06	BLM	ABC	2	1.06					No	No	TMO recommendation to remain in its existing condition for access to BLM managed lands.
37 S 07 W 29.04	Knight Draper	0.45	BLM	NAT	2	0.45					No	No	TMO recommendation to remain in its existing condition for access to BLM managed lands.
37 S 07 W 29.05	Knight Draper	0.48	BLM	NAT	2	0.48					No	No	TMO recommendation to remain in its existing condition for access to BLM managed lands.
37 S 07 W 29.06	Knight Draper	0.24	BLM	NAT	2	0.24					No	No	TMO recommendation to remain in its existing condition for access to BLM managed lands.
37 S 07 W 31.00A	Knight Draper	2.96	BLM	ABC	3	2.96				Gate - ADM	No	No	TMO recommendation to remain in its existing condition for access to BLM managed lands.
37 S 07 W 31.00B	Knight Draper	0.97	BLM	NAT	2	0.97					No	No	TMO recommendation to decommission, option is not available due to reciprocal agreement
37 S 07 W 31.01	Knight Draper Sp	1.08	BLM	NAT	2	1.08					No	No	TMO recommendation to remain in its existing condition for access to BLM managed lands.

37 S 07 W 33.00A	Mooney Mtn West	0.35	BLM	ASC	2	0.35					No	No	TMO recommendation to remain in its existing condition for access to BLM managed lands.
37 S 07 W 33.00B	Mooney Mtn West	0.27	BLM	NAT	2	0.27					No	No	TMO recommendation to remain in its existing condition for access to BLM managed lands.
37 S 07 W 33.01	Mooney Mtn West	1.06	BLM	PRR	3	1.06					No	No	TMO recommendation to remain in its existing condition for access to BLM managed lands.
37 S 07 W 33.02A	Mooney Mtn West	0.23	BLM	ASC	2	0.23					No	No	TMO recommendation to remain in its existing condition for access to BLM managed lands.
37 S 07 W 33.02B	Mooney Mtn West	0.19	BLM	NAT	1	0.19					No	No	TMO recommendation to remain in its existing condition for access to BLM managed lands.
37 S 07 W 33.03	Mooney Mtn West	0.32	BLM	ASC	2	0.32					No	No	TMO recommendation to remain in its existing condition for access to BLM managed lands.
37 S 07 W 33.04	Mooney Mtn West	0.23	BLM	ASC	2	0.23					No	No	TMO recommendation to remain in its existing condition for access to BLM managed lands.
37 S 07 W 34.00A	Crooks Creek	0.47	BLM	BST	4	0.47					No	No	TMO recommendation to remain in its existing condition for access to BLM managed lands.
37 S 07 W 34.00B	Crooks Creek	2.1	BLM	PRR	3	2.1					No	No	TMO recommendation to remain in its existing condition for access to BLM managed lands.
37 S 07 W 34.01A	Mooney Mtn	0.13	BLM	ASC	3	0.13					No	No	TMO recommendation to remain in its existing condition for access to BLM managed lands.
37 S 07 W 34.01B	Mooney Mtn	1.73	BLM	ASC	3	1.73					No	No	TMO recommendation to remain in its existing condition for access to BLM managed lands.
37 S 07 W 34.01C	Mooney Mtn	1.71	BLM	ASC	3	1.71					No	No	TMO recommendation to remain in its existing condition for access to BLM managed lands.

37 S 07 W 34.01D	Mooney Mtn	1.19	BLM	ASC	3	1.19					No	No	TMO recommendation to remain in its existing condition for access to BLM managed lands.
37 S 07 W 35.5	CrooksCreek Sp	0.86	BLM	GRR	3	0.86					No	No	TMO recommendation to remain in its existing condition for access to BLM managed lands.
38 S 07 W 03.00	Crooks Creek Sp	0.58	BLM	ASC	3	0.58					No	No	TMO recommendation to remain in its existing condition for access to BLM managed lands.
38 S 07 W 03.02	Crooks Creek Sp	2.02	BLM	ASC	2	2.02					No	No	TMO recommendation to remain in its existing condition for access to BLM managed lands.
38 S 07 W 03.04	Cedar Ridge Sp	0.26	BLM	NAT	2	0.26					No	No	TMO recommendation to remain in its existing condition for access to BLM managed lands.
38 S 07 W 07.00	Ranch Resort	1.11	BLM	ASC	3	1.11				Gate - ADM	No	No	TMO recommendation to remain in its existing condition for access to BLM managed lands.
38 S 07 W 11.00A1	Cedar Ridge	0.25	BLM	ASC	3	0.25					No	No	TMO recommendation to remain in its existing condition for access to BLM managed lands.
38 S 07 W 11.00A2	Cedar Ridge	0.45	BLM	ASC	3	0.45					No	No	TMO recommendation to remain in its existing condition for access to BLM managed lands.
38 S 07 W 11.00B	Cedar Ridge	3.62	BLM	ASC	3	3.62					No	No	TMO recommendation to remain in its existing condition for access to BLM managed lands.
38 S 07 W 11.01	Cedar Ridge Sp	0.17	BLM	NAT	2	0.17					No	No	TMO recommendation to remain in its existing condition for access to BLM managed lands.
38 S 07 W 11.02	Cedar Ridge S Sp	0.93	BLM	NAT	2	0.93					No	No	TMO recommendation to remain in its existing condition for access to BLM managed lands.
38 S 07 W 15	Cedar Creek	0.7	BLM	NAT	2	0.7					No	No	TMO recommendation to remain in its existing condition for access to BLM managed lands.

38 S 07 W 15.04	Dryden Overlook	0.64	BLM	NAT	2	0.64					No	No	TMO recommendation to remain in its existing condition for access to BLM managed lands.
38 S 07 W 11.02	Cedar Ridge South	0.93	BLM	NAT	2	0.93					No	No	TMO recommendation to remain in its existing condition for access to BLM managed lands.
	TOTAL	**31.5**				**31.5**							TMO recommendation to remain in its existing condition for access to BLM managed lands.
													TMO recommendation to remain in its existing condition for access to BLM managed lands.
Road Number	Road Name	Miles	Control	Surface Type	Maint Level	Maint Miles	Const Miles	Renov Miles	Deco Miles				TMO recommendation to remain in its existing condition for access to BLM managed lands. TMO recommendation to remain in its existing condition for access to BLM managed lands.
Section 29 Spur	OI Unit 002	0.25	BLM	NAT	N/A	0.25	0.25		0.25				TMO recommendation to remain in its existing condition for access to BLM managed lands.
Section 31 Spur	OI Unit 015	0.35	BLM	NAT	N/A	0.35	0.35		0.35				TMO recommendation to remain in its existing condition for access to BLM managed lands.
Section 7 Spur	OI Unit 010	0.2	BLM	NAT	N/A	0.2	0.2		0.2				TMO recommendation to remain in its existing condition for access to BLM managed lands.
	TOTAL	0.8					0.8		0.8				

Appendix D. Wildlife

Spotted Owl Habitat McKelvey Rating System
Spotted owl habitat within the Planning Area was evaluated based on the McKelvey model. Operations Inventory polygons were given an owl habitat suitability rating from 1 to 6 using aerial photo interpretation, ground truthing and roadside reconnaissance.

The McKelvey Rating System is based on a model that predicts spotted owl population based on habitat availability. Stands were examined for criteria such as canopy layering, canopy closure, snags, woody material and other features. Biological potential of a stand to acquire desired conditions is also taken in consideration. The McKelvey Rating System uses the following six classes:

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.

Grants Pass Wildlife Special Status Species

On February 7, 2008 a new Special Status Species list went into Effect (IM No. OR-2008-038). This new list has two categories, Sensitive and Strategic. According to BLM Special Status Species Management (6840), only Sensitive species are required to be addressed in NEPA documents. All Sensitive species were considered and evaluated for this project, and only those that could be impacted by the proposed actions are discussed in more detail in the EA.

The table below lists the Bureau Sensitive species that are documented or Suspected on lands within the Grants Pass Resource Area.

SPECIAL STATUS SPECIES IN THE GRANTS PASS RESOURCE AREA				
SPECIES	**2/07/08 STATUS**	**Project within RANGE (Y/N)**	**PRESENCE Within the Planning Area**	**PROJECT SPECIFIC COMMENTS/ BASIC CONCLUSIONS**
Birds: Bureau Sensitive & Federally Threatened				
American peregrine falcon	BSEN	Y	A	No nesting habitat within the planning area, but they could forage within the planning area. Project activities would not affect this species at the landscape scale.
Bald eagle	BSEN	Y	A	No known nest sites within the planning area, no foraging habitat present in the Planning area. Project activities would not adversely affect individuals.
Lewis' woodpecker	BSEN	Y	P	Adequate potential habitat exists within and adjacent to the Planning Area. Project activities would adversely affect this species at the landscape scale as adequate levels of snags would be retained (PDF Ch. 2) post treatment.
Marbled murrelet	FT	N	N/A	N/A
Northern spotted owl	FT	Y	P	Seasonal Restrictions would protect known sites from project activity disturbance. Adequate potential habitat exists within and adjacent to the Planning Area. Proposed activities impacts have been addressed in detail in the EA.
Purple martin	BSEN	Y	U	Possible migrant in Josephine County. No detectable effects from proposed actions.
Tri-colored Blackbird	BSEN	Y	A	No habitat within the Planning Area.
White-headed woodpecker	BSEN	Y	U	Adequate potential habitat exists within and adjacent to the Planning Area. Project activities would not adversely affect this species at the landscape scale as adequate levels of snags would be retained (PDF Ch. 2) post treatment.
White-tailed kite	BSEN	Y	U	No anticipated effects.

SPECIAL STATUS SPECIES IN THE GRANTS PASS RESOURCE AREA				
SPECIES	**2/07/08 STATUS**	**Project within RANGE (Y/N)**	**PRESENCE Within the Planning Area**	**PROJECT SPECIFIC COMMENTS/ BASIC CONCLUSIONS**
Amphibians: Bureau Sensitive				
Black salamander	BSEN	Y	U	Adequate potential habitat exists within and adjacent to the Planning Area. No known sites located within project units. Primary habitat (rocky talus in open oak meadows) would remain untreated.
Foothill yellow-legged Frog	BSEN	Y	U	Project activities would not affect this species if present in the Planning Area.
Reptiles: Bureau Sensitive				
Northwestern pond turtle	BSEN	Y	S	Located within the watershed at large water sources, but not expected to occur in or adjacent to project units. No anticipated effects.
Mammals: Bureau Sensitive and Federal Candidate				
Fisher	FC	Y	S	Adequate potential habitat exists within and adjacent to the Planning Area. Proposed activities impacts have been addressed in detail in the EA.
Fringed myotis	BSEN	Y	S	Adequate potential habitat exists within and adjacent to the Planning Area. Proposed activities impacts have been addressed in detail in the EA.
Pacific pallid bat	BSEN	Y	U	Adequate potential habitat exists within and adjacent to the Planning Area. Proposed activities impacts have been addressed in detail in the EA.
Townsend's big-eared bat	BSEN	Y	S	Project activities should not affect maternity or hibernacula areas.
Invertebrates: Bureau Sensitive				
Chase sideband snail	BSEN	N	N/A	N/A
Coronis Fritillary	BSEN	Y	U	No known sites in Planning Area. No habitat present in the Planning Area.
Franklin's Bumblebee	BSEN	N	N/A	N/A

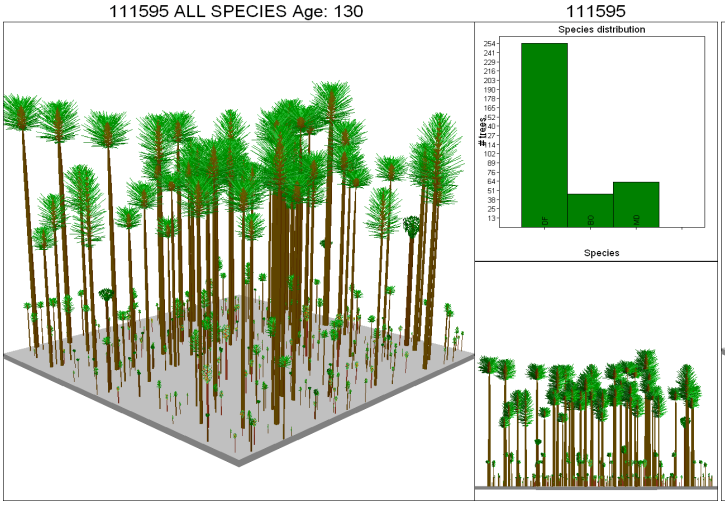
SPECIAL STATUS SPECIES IN THE GRANTS PASS RESOURCE AREA				
SPECIES	**2/07/08 STATUS**	**Project within RANGE (Y/N)**	**PRESENCE Within the Planning Area**	**PROJECT SPECIFIC COMMENTS/ BASIC CONCLUSIONS**
Johnson's Hairstreak	BSEN	N	N/A	N/A
Mardon skipper butterfly	FC	N	N/A	N/A
Oregon Shoulderband snail	BSEN	Y	N	See Wildlife Effects Section in EA regarding effects to mollusks.
Travelling sideband snail	BSEN	Y	U	See Wildlife Effects Section in EA regarding effects to mollusks.

Status:

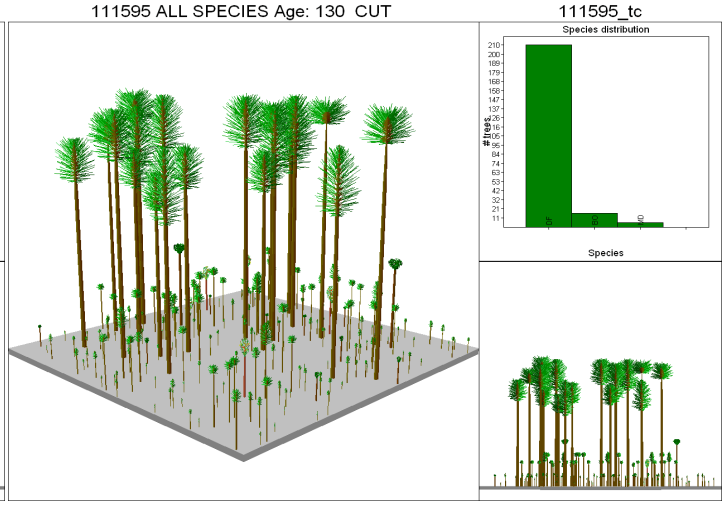
FT - USFW Threatened - likely to become endangered species within the foreseeable future
FC - USFW Candidate - proposed and being reviewed for listing as threatened or endangered
BSSEN - Bureau Sensitive (BLM) - Generally these species are restricted in range and have natural or human caused threats to their survival.
Presence: indicates 'P' if a species is known to occur in the Planning Area, 'S' suspected to occur based on known sites adjacent to the Planning Area, or suitable breeding habitat exists, 'U' uncertain that the species occurs within the Planning Area based on insufficient data, 'A' absent from the Planning Area based on no known sites and/or no suitable breeding habitat within the Planning Area, and 'T' possibly transitory species utilizing habitats within the Planning Area during migration.

Appendix E. Vegetation

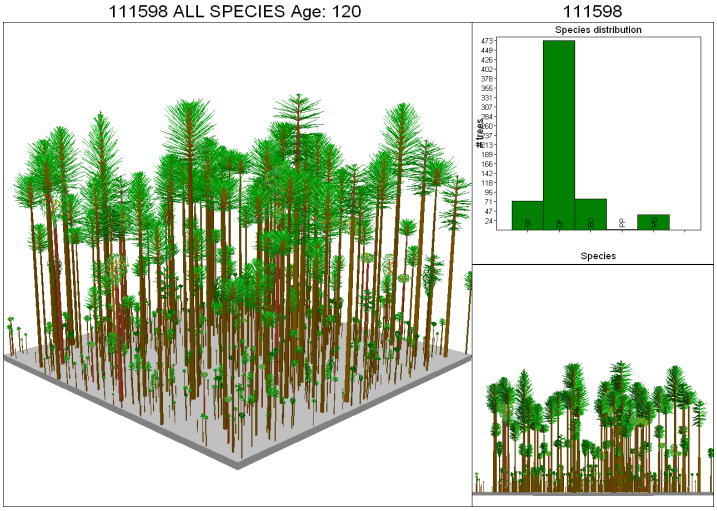
Figure V-1. . SVS Illustrations of ORGANON Modeled Stands – Alternatives 2 and 3.



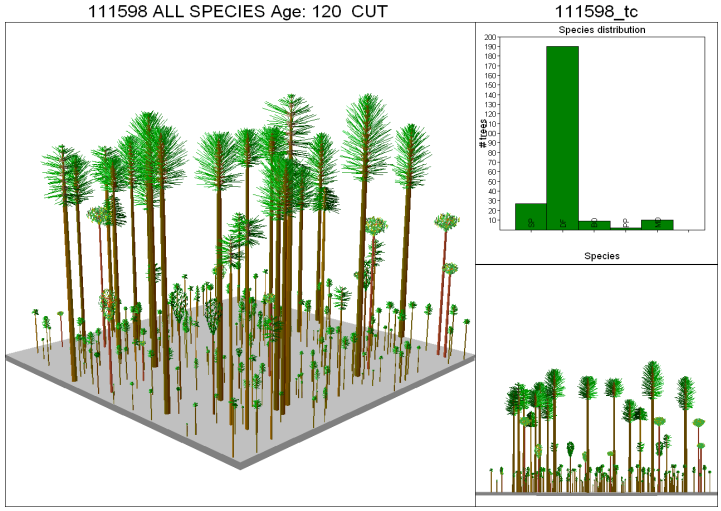
(a) Current Condition



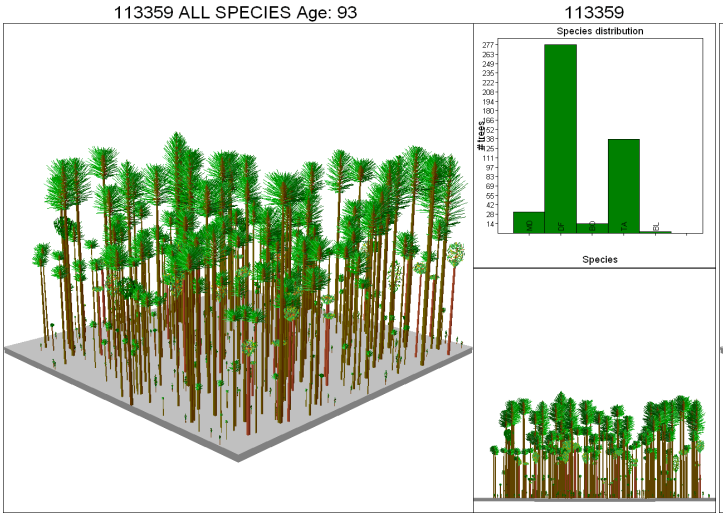
(b) Alternative 2: Regeneration Harvest 16-25 TPA



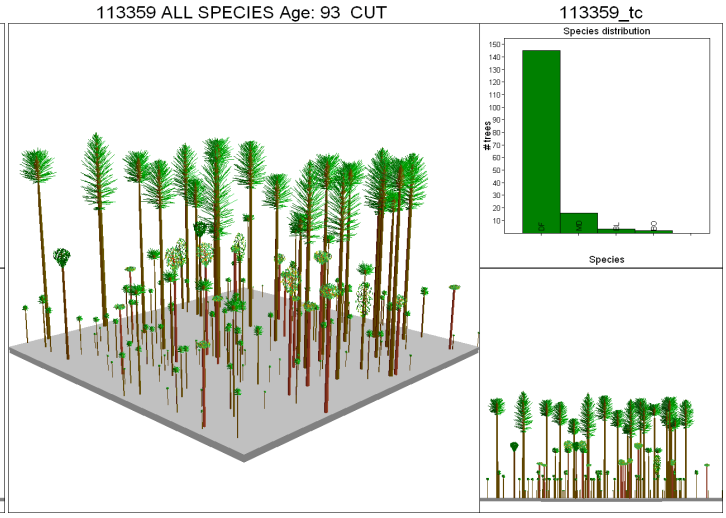
(a) Current Condition



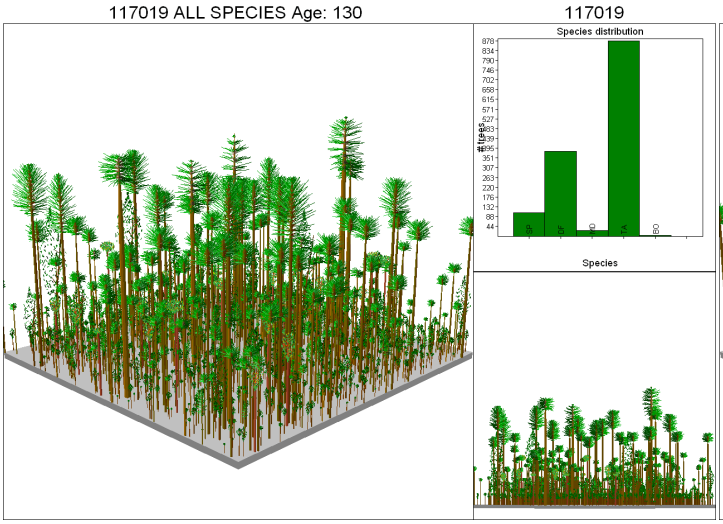
(b) Alternative 2: Density Management (≥40% Crown Closure)



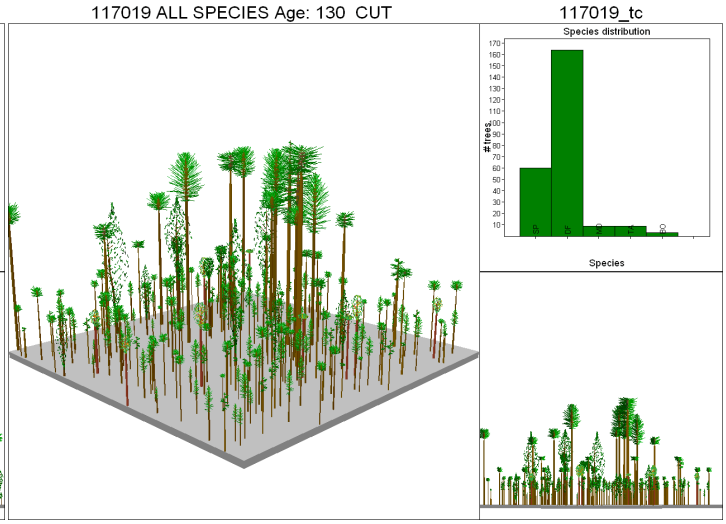
(a) Current Condition



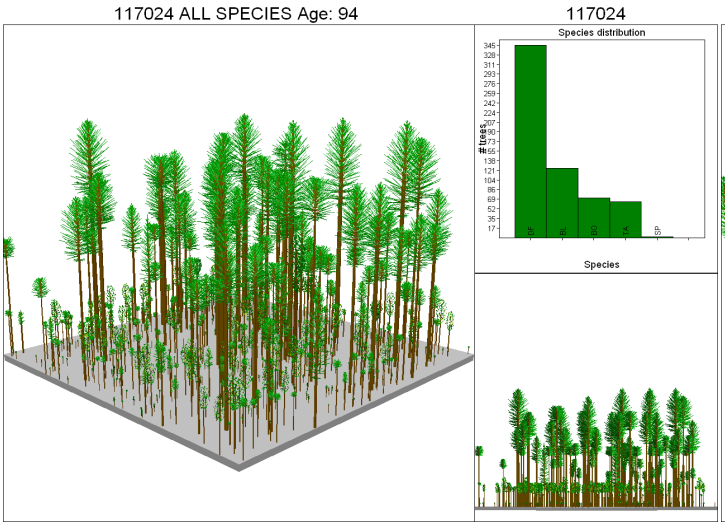
(b) Alternative 2: Density Management (≥40% Crown Closure)



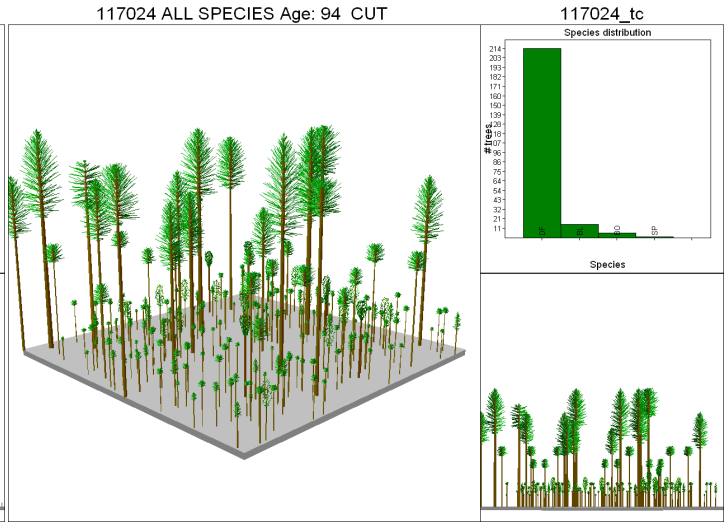
(a) Current Condition



(b) Alternative 2: Regeneration Harvest 6-8 TPA



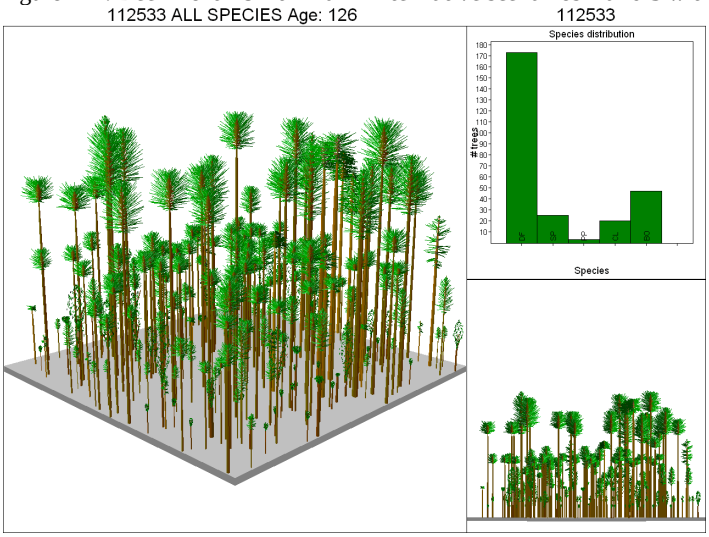
(a) Current Condition



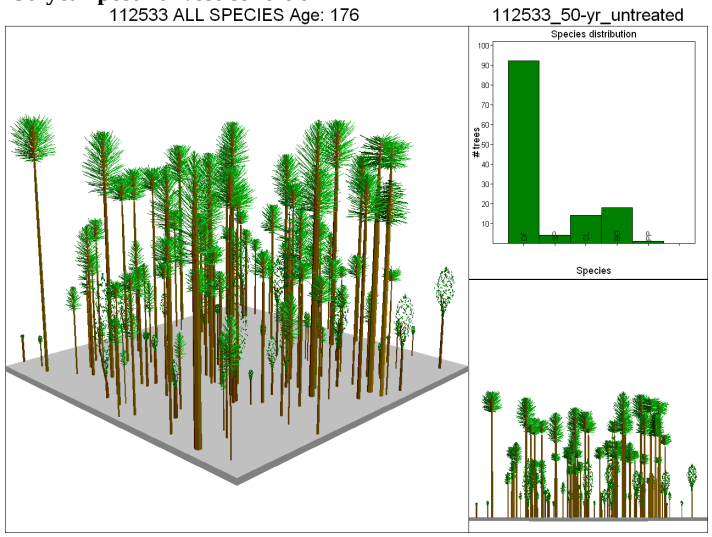
(b) Alternative 2: Density Management (≥40% Crown Closure)

Alternatives 2 and 3

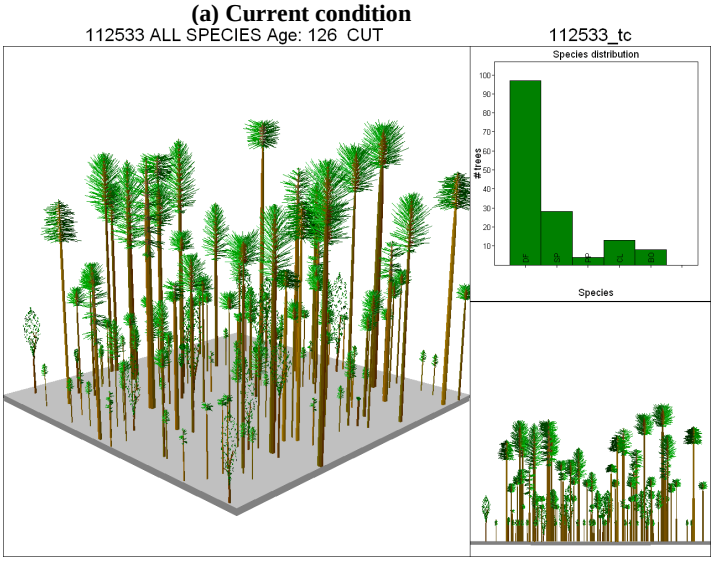
Figure A-2. **Deer North Unit #7-011 Alternative scenarios 2 and 3 with 50-year post harvest condition**



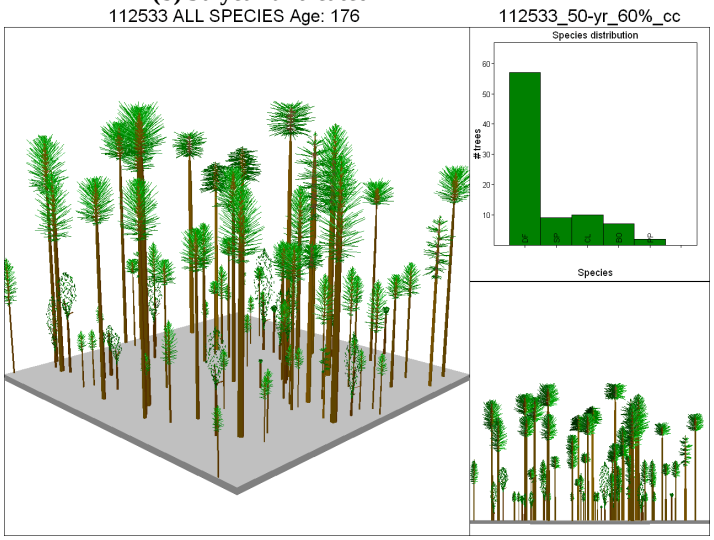
(a) Current condition



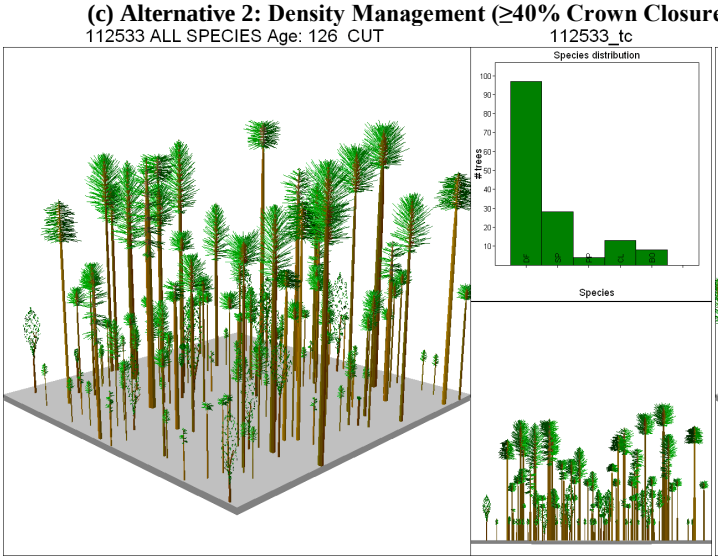
(b) 50-year untreated



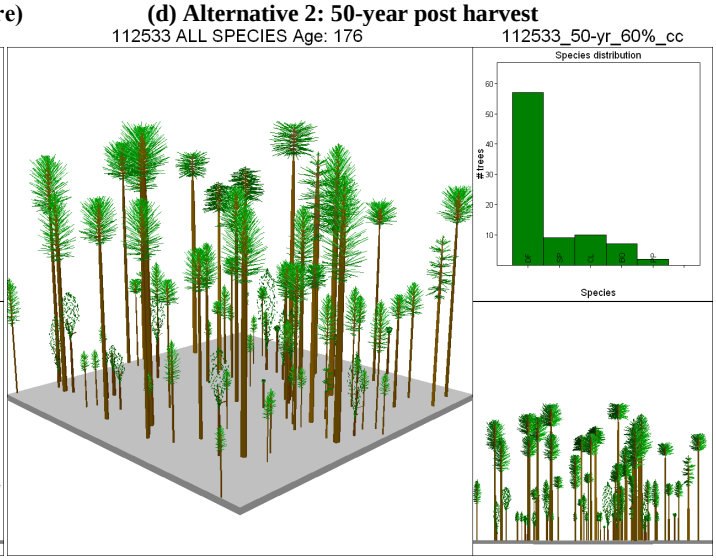
(c) Alternative 2: Density Management (≥40% Crown Closure)



(d) Alternative 2: 50-year post harvest



(e) Alternative 3: Maintain ≥60% Crown Closure



(f) Alternative 3: 50-year post harvest

Appendix F. Alternatives and Issues Considered, but not Analyzed in Detail

Pursuant to Section 102 (2) (E) of NEPA (National Environmental Policy Act of 1969, as amended), Federal agencies shall "Study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources." The CEQ (Council on Environmental Quality) regulations for implementing the procedural provisions of NEPA states, alternatives should be "reasonable" and "provide a clear basis for choice" (40 CFR 1502.14).

In light of the direction contained in both NEPA and the CEQ Regulations, the following questions were used to 1/ identify the alternatives to be analyzed in detail in this environmental, including the No Action Alternative, and 2/ document the rationale for eliminating alternatives from detailed study.

1 **Are there any unresolved conflicts concerning alternative uses of available resources?** If yes, document and go to Question #2. If no, document rationale and stop evaluation

Yes. Maintain existing northern spotted owl habitat within the provincial radius (1.3 miles) of known active northern spotted owl sites and all or substantially all of the older and more structurally complex, multilayered conifer forests**.**

No. The following alternatives were considered but eliminated from further consideration: The Citizen's alternative was adequately addressed in the analysis for the No Action and action alternatives.

A) Citizen's Alternative was submitted that requested the following:

- *Provide Forest Products*
- *Improve conifer forest vigor*
- *Reduce tree mortality*
- *Reduce hazardous fuels*
- *Thin plantations*
- *Thin off-site white fir*
- *Retain Late Successional Forests*
- *No removal or downgrade of NSO NRF*
- *No new or temporary roads*
- *Upgrade existing roads*
- *Reduce road density*

The Deer North Vegetation Management Project is designed to meet BLM's obligation to implement the RMP and to address three primary needs identified for lands in the Planning Area. The three primary needs identified for lands in the Planning Area are: 1) the need for production

of commercial and non-commercial forest products; 2) the need for improved forest health and vigor; and 3) the need to enhance socioeconomic conditions. This forest management project is designed to address each of the needs and achieve each of the associated objectives which would assist in moving the current conditions found on the Deer North Planning Area toward desired forest conditions for lands within the Matrix land allocation. Each proposed action alternative must meet all objectives of the project; however, there is a different emphasis for each alternative based on achieving different resource objectives to varying degrees

Most of the roads within the Deer North Vegetation Management Planning Area are not public roads and are under reciprocal right-of-way agreements with private landowners because of the checkerboard ownership pattern. The BLM does not have the option to close these roads.

B) Global Warming and carbon sequestration

Scientific knowledge on the interrelationship between greenhouse gas levels and climate change is rapidly changing. Substantial uncertainties and key limitations exist. Because forests store carbon, they can affect atmospheric concentrations of carbon dioxide, a greenhouse gas. Forest management can change the amount of carbon stored in a forest.

Treatments within the Deer North Vegetation Management Project were compared to treatments in other recent projects such as the Wolf Pup Timber Sale and considered to be similar . Carbon storage and carbon emissions in the proposed actions of Wolf Pup were calculated to determine the net contributions of greenhouse gases resulting from the treatments. Those carbon calculations were based on assumptions in the 2008 FEIS (USDI/BLM 2008 Appendix C) and subsequent improvements to those assumptions, as set forth in R. Hardt, personal communication, November 6, 2009 (on file in the Medford District BLM Office, and incorporated here by reference). Carbon storage was analyzed by quantifying the change in carbon storage in live trees, storage in forests other than live trees (dead wood and roots, non-tree vegetation, litter and soil organic matter), and storage in harvested wood products. Changes in forest ecosystem carbon over time were calculated using site specific data and the ORGANON Growth Model (Hann et al. 2007). Stand volume in cubic feet per acre per year was used to calculate tonnes of carbon stored per year. Carbon emissions (carbon dioxide) were calculated from timber harvest activities (including fuel consumption) and post-harvest fuel treatments. Net carbon storage was calculated by subtracting carbon emitted from carbon stored.

Similar to treatments in the other projects, Deer North proposed treatments would reduce carbon stores temporarily but would result in net increases over time. For units similar to the Deer North Understory Thinning units, growth within five years following treatment resulted in carbon storage that exceeded direct and indirect carbon emissions, resulting in a net storage of carbon compared to pretreatment conditions.

C). Effects to Wildlife from Road Work

Alternative 2 would consist of constructing 0.5 miles of new permanent road construction and 0.8 miles of temporary routes. Road construction could cause warmer, drier conditions in adjacent interior forest habitats, because of canopy closure reduction and increased 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). Species with greater dispersal capabilities could likely move to areas with more favorable microclimate conditions if suitable habitat were nearby. In stands not proposed for commercial harvest, temporary and permanent road construction would be expected to decrease interior forest habitat due to newly created edges and preclude dispersal of short dispersal-distance species through habitat fragmentation (Trombulak and Frissell 2000). However, with the exception of approximately 0.45 miles of new road construction, all road construction would occur within units proposed for vegetation treatments. Therefore, since these unit level treatments would affect canopy cover and interior forest at the stand level, rather than just within the road clearing width, only limited edge effects to wildlife species from road building are anticipated.

Not all species would respond equally or even negatively to road construction. Habitat generalists or species that forage in edge habitat (e.g., fly-catchers, avian predators) may be unaffected or even benefit from the creation of edge habitat. For example, recent studies have found that ovenbird nest success is significantly higher within 0-75 meters of maintained forest roads in comparison to nest success at 75-150 meters from maintained forest roads (King and DeGraaf 2002). On a project scale, effects would be minimal because of the small amount of road construction, and project activities would not be expected to substantially affect any wildlife species at the population level.

New roads would be barricaded and closed, while temporary roads would be obliterated and barricaded, reducing potential future disturbance to wildlife from Off-Highway Vehicles (OHV). The RMP identified traffic control devices, such as gates, as an accepted method to prevent or reduce adverse OHV impacts (RMP p. 68). Although gates are not guaranteed to be 100 % effective, they do reduce the potential of inappropriate OHV use and adverse OHV impacts. Additionally, as proposed, OHV trails would be closed and signs posted explaining appropriate OHV use. Therefore, even if the gates are not 100 % effective, disturbance to wildlife would be reduced due to the reduction of inappropriate OHV use.

Under Alternative 3, the road density within the Planning Area would not increase because no new permanent roads would be constructed. This would result in a lower likelihood of potential road related disturbance effects to wildlife.

Even though the proposed road construction may potentially cause the loss of habitat in some cases, this project is not expected to affect long-term population viability of species with low dispersal capabilities, such as mollusks and possibly amphibians in the watershed. Additionally, this project combined with other actions in the watershed would not contribute to the need to federally list special status or Survey and Manage mollusks and salamanders because of the small scope of the proposed action compared to the combined acreage of the Deer Creek 5th field watershed. The proposed action would only treat up to five acres with roads within the 30,203 acre Deer Creek 5th field wate

2 What alternatives should be considered that would lessen or eliminate the "unresolved conflicts concerning alternative uses of available resources"? List alternatives and go to Question #3. If no alternative is identified other than the "No Action" Alternative, document and stop evaluation.

One alternative was considered that would eliminate the unresolved conflict regarding the risk of maintaining existing northern spotted owl habitat within the provincial radius (1.3 miles) of

known active northern spotted owl sites. Alternative 3 retains as much suitable spotted owl habitat as possible while still providing forest products to meet the purpose and need of this project. No regeneration harvest would occur under Alternative 3. Thinning and density management is proposed to retain key spotted owl habitat structural elements (large trees, snags, coarse woody debris, hardwoods, etc.) and to protect overly dense stands from stand replacing fire.

Density management and/or modified group select would occur on 319 acres; and density management / understory reduction would occur on 427 acres. Target densities for all of these prescriptions have been designed to maintain current suitable spotted owl habitat.

3 **Of those alternatives identified in Question #2, are there reasonable alternatives for wholly or partially satisfying the need for the proposed action?** If so, briefly describe alternatives and go to question #4. If no, document rationale and stop evaluation.

Yes, Alternative 3 identified in Question #2 would partially meet the purpose and need of meeting the Oregon and California Revested Lands Sustained Yield Management Act (O & C Act) which requires the Secretary of the Interior to manage O & C lands for permanent forest production in accord with sustained yield principles (RMP, p.17) and the desired landscape of a mosaic of even-aged stands between 0 and 100 years old, distributed relatively evenly within the watershed, with each age class in approximately even proportions (WA, p. 66).

4 Of those alternatives identified in Question #3, will such alternatives have meaningful differences in environmental effects? If so, seek line officer approval to carry alternatives forward for detailed analysis in the environmental assessment. If no, document rationale and stop evaluation.

Yes. See Chapter 3 of the EA (Environmental Consequences for Alternative 3)

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