ENVIRONMENTAL ASSESSMENT

for the

SOUTH DEER LANDSCAPE MANAGEMENT PROJECT

(EA# OR110-05-10)

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

July 2005

Dear Reader:

We appreciate your interest in the BLM's public land management activities. Public involvement for the South Deer Landscape Management Project began in March 2004 with an open house meeting. A scoping letter was sent on March 18, 2004 to residents and landowners near or adjacent to BLM parcels within the planning area, to federal, state, and county agencies, and to private organizations and individuals that requested information concerning projects of this type. Personal discussions and comment letters provided public input to BLM for consideration in the EA. During the scoping process the Deer Creek Valley Natural Resource Conservation Association (DCVNRCA), a community interest group, expressed interest in submitting an alternative that would be included in the Environmental Assessment. In the ten months following the request, BLM staff worked closely with DCVNRCA to develop the alternative. Alternative 4 represents their proposal. All public input was considered by the planning and interdisciplinary teams in developing the proposals and in preparation of this EA.

We appreciate your taking the time to review this environmental assessment (EA). If you would like to provide us with written comments regarding this project or EA, please send them to me at 3040 Biddle Road, Medford, OR 97504.

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

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

Abbie Jossie
Field Manager
Grants Pass Resource Area

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

EA COVER SHEET

RESOURCE AREA: *Grants Pass Resource Area* EA # OR-110-05-10

ACTION/TITLE: *South Deer Landscape Management Project*

LOCATION: T38S, R7W, Sections 14, 15, 17, 19, 21, 22, 23, 26, 27, 29, 31, 33, 35
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T39S, R8W, Section 1

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1.0 Purpose of and Need for Action

1.1 Purpose of Action

The purpose of the proposed action is to implement the Medford District Resource Management Plan. The purpose of this environmental assessment (EA) is to evaluate a range of alternatives, assessing regulatory compliance and efficacy in meeting project area needs. The EA would assist in the decision making process by assessing the environmental and human effects resulting from implementing the alternatives.

This EA complies with the following decisions and plans:

(1) *Final EIS and Record of Decision for the Medford District Resource Management Plan* (RMP) (June 1995).
(2) *Final Supplemental EIS on Management of Habitat for Late-Successional and Old-Growth Forest Related Species within the Range of the Northern Spotted Owl* (February 1994).
(3) *Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl and its attachment A entitled the Standards and Guidelines for Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl* (NFP)(April 13, 1994).
(4) *Final Supplemental Environmental Impact Statement for Amendment to the Survey & Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines* (March 2000), and the *Record of Decision and Standards and Guidelines for Amendment to the Survey & Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines* (January 2001)
(5) *Record of Decision* and the *Final Supplemental EIS to Remove or Modify the Survey and Manage Mitigation Measure Standards and Guidelines* (March and January 2004);
(6) *Record of Decision Amending Resource Management Plans for Seven Bureau of Land Management Districts and Land and Resource Management Plans for Nineteen National Forests Within the Range of the Northern Spotted Owl,* and its *Final Supplemental EIS for the Clarification of Language in the 1994 Record of Decision for the Northwest Forest Plan* amending wording about the Aquatic Conservation Strategy (March 2004).
(7) *Medford District Noxious Weed Environmental Assessment* (April 1998).
(8) *Final Supplemental Environmental Impact Statement, Management of Port-Orford Cedar in Southwest Oregon* (December 2003)

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

(1) *Deer Creek Watershed Analysis* (November 1997)
(2) *Rogue River/South Coast FY04-08 Timber Sale Projects Biological Assessment* (July 2003) and *USFWS Biological Opinion* (#1-15-03-F-511, October 2003).
(3) *2003 Survey and Manage Annual Species Review* (Forest Service Memorandum, November 20, 2001, file code 1900/2620; and BLM Information Bulletin No. OR-2002-033).
(4) *Visual Resource Contrast Rating BLM Manual Handbook 8431-1*
(5) South Deer CHU Biological Assessment and Letter of Concurrence (Section 7 log # 1-15-05-I-0484, June 2005)

Terminology used in this EA follows the definitions of the RMP.

1.2 Need for Action

Ninety-five percent of the South Deer project area lies in National Fire Plan (NFP) designated Wildland Urban Interface. Eighty five percent of the project area classifies into fire condition class 3. Condition class 3 results from departure from reference condition vegetation, fuels and disturbance regimes. As a result, vegetation attributes, fuel loading, and fire behavior have been significantly altered. Condition class 3 represents a greater risk for increased fire size, intensity, and severity.

Forest stands, including upslope and riparian areas, currently lack species diversity and structure. Importantly, high stocking density and underbrush competing for light and water resources has reduced stand vigor and resiliency, prolonging succession toward a diverse stand condition. Low diversity and over-stocked stands provide poor wildlife corridors and instream large wood recruitment potential. Additionally, stand growth rates and resiliency to disease are reduced.

Based on stream surveys, streams in the project area do not provide adequate fish habitat. Bank erosion, lack of wood and little pool habitat were identified as limiting aquatic conditions. Present conditions are likely to continue into the near future. Approximately 50 percent of the riparian zone stands do not contain a large tree component necessary for instream wood recruitment. High road densities and culverts, leading to accelerated erosion and restricted aquatic connectivity were also identified as limiting aquatic conditions.

The proposed action is designed to meet a variety of resource, social and economic needs of the South Deer landscape including:

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

1.3 Project Location and Land Use Allocations

The project area is located in the Deer Creek 5th field watershed. Project area maps are in Appendix A. The project area is in matrix (Southern General Forest Management Area) and riparian reserve land allocations, with inclusions of spotted owl Late Successional Reserves. Management objectives for the different land use allocations (LUA) are set forth in the Northwest Forest Plan (NWFP) and the Medford District's Resource Management Plan (RMP). Refer to these documents for a discussion of relevant objectives.

Matrix land allocation comprises approximately 8% of the Grants Pass Resource area. The South Deer Project area includes 7,477 acres of BLM managed lands of which 4,500 acres were designated matrix. As stated in the Northwest Forest Plan and the Medford Resource Management Plan (RMP 38, 39) objectives for matrix land are to:

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

The Record of Decision and Resource Management Plan (RMP), to which this project complies, states:

> The approved resource management plan responds to the need for a healthy forest and rangeland ecosystem with habitat that will contribute toward and support populations of native species, particularly those associated with late successional and old-growth forests. It also responds to the need for a sustainable supply of timber and other forest products that will help maintain the stability of local and regional economies, and contribute valuable resources to the national economy on a predictable and long term basis (RMP, p. 3).
>
> The Congressionally directed purposes for managing BLM-administered lands include both conserving the ecosystems upon which species depend and at the same time providing raw materials and other resources that are needed to sustain the health and economic well-being of the people of this country. To balance these sometimes conflicting purposes, [the RMP] adopted the alternative that will both maintain the late-successional and old-growth forest ecosystem and provide a predictable and sustainable supply of timber, recreational opportunities, and other resources at the highest level possible (RMP, p. 4).

1.4 Issues and Concerns

A variety of issues and concerns were raised during project scoping by interested individuals or groups outside the BLM and by BLM's interdisciplinary team. In this EA an issue is something unique to the project area that may need particular consideration and which may contribute to defining a particular action alternative.

Pertinent issues are listed below. Many of these issues were identified through the public scoping process and in the Deer Creek Watershed Analysis and were used in the design of the proposed project and alternatives. In some cases, an issue was initially considered by the planning team and then eliminated from further analysis because it was not within the scope of the project or did not meet the purpose and need. These are summarized in Appendix D.

The pertinent planning issues are:

1. High stand densities throughout the project area are resulting in declining vigor of conifers and shade intolerant species (i.e., ponderosa pine, sugar pine, black oak, Pacific madrone). Fire exclusion has

contributed to growth stagnation in some stands as well as to slow seral stage progression / succession. There is recent mortality from drought stress and subsequent mountain pine beetle (*Dendroctonus ponderosae*) infestation in the project area.

2. Fire exclusion has led to a departure from natural fire return intervals resulting in high fuel hazard conditions across the majority of the planning area.

3. Vegetation conditions combined with increasing rural residential development in the project area are continuing to increase the fire hazard and risk. The majority of the project area is within the designated Wildland Urban Interface (WUI).

4. The demand for recreation opportunities is increasing in the planning area, especially in the Lake Selmac area.

5. In select areas, poor road drainage has increased sedimentation, and poor culvert design has reduced migration of aquatic organisms.

6. Fish bearing stream reaches in the watershed provide poor habitat / channel conditions.

2.0 Proposed Actions for Each Alternative

Chapter 2 presents a no action and 3 action alternatives. Alternatives 2 and 3 represent BLM's recommendations based on purpose and need, and existing conditions. Alternative 4 is a proposal submitted by the Deer Creek Valley Natural Resource Conservation Association (DCV), an interest group located in the town of Selma. The BLM alternatives are presented in the following sections (2.1 and 2.3). The DCV Natural Selection Alternative (DCV NSA) is described in section 2.3.

2.1 Alternative 1: No Action

The no action alternative is defined as not implementing the proposed action. The no action alternative also serves as a baseline for evaluating the environmental effects of the action alternatives. Inclusion of this alternative is done without regard to whether or not it is consistent with the Medford District RMP.

The no action alternative is not static. Implied is a continuation of current environmental conditions and trends existing in the project area. This includes trends such as vegetation succession and consequent wildlife habitat changes, road conditions/deterioration, erosion, road densities, fire hazard, off road vehicle use, etc.

2.2 Alternatives 2, 3 and 4: Action Alternatives

Three action alternatives are proposed and analyzed. There are many elements common to all alternatives. The alternatives differ with regard to their objectives regarding older seral stage stands, fuels reduction and wildlife habitat. Alternative 2 retains more late-successional forest habitat than alternative 3. In alternative 3, fuel hazard reduction is prioritized on ridges and along private land in order to protect local communities, resulting in fewer acres treated than proposed in Alternative 2. Alternative 2 proposes treatment in riparian reserves while alternative 3 does not (Table 1). Alternative 4 is the DCV NSA.

The action alternative descriptions are based on general types of action such as road treatments, riparian restoration, fisheries enhancement, vegetation treatments, recreation developments, etc. While presented in

these discrete groupings, interrelationships between them must be kept in mind, especially when considering the overall effects of the alternatives.

Table 1. Vegetation treatment acres by alternative						
Management Theme	**Alternative 2**		**Alternative 3**		**Alternative 4 Natural Selection**	
	Matrix acres	**Riparian acres**	**Matrix acres**	**Riparian acres**	**Matrix acres**	**Riparian acres**
Fuel Hazard Reduction	2623	497	1668	0	3462	1036
Commercial Harvest*	1215	227	1203	0		
Young Stand Management	1310	261	1310	0		
Total	***5148***	***985***	***4181***	***0***	***3462***	***1036***
*Includes harvest in special management areas (BEMA and Core Areas)						

2.2.1 Fuel Hazard Reduction — Alternatives 2 and 3

a. Objective

The South Deer project area has historically evolved with fire as a key natural disturbance process. The management decision to suppress wildfires over the past 80 years has been the largest contributor to fuels build up and high hazard conditions. Calculations using fire return intervals estimate that two to five fire cycles have been missed in the low elevation southwest Oregon mixed conifer forests (Thomas and Agee 1986). Safe and effective fire suppression is extremely difficult under certain weather conditions. Ninety-four percent of the project area is within the National Fire Plan (NFP) designated wildland urban interface (WUI). Twenty-three percent of the project area is designated as community at risk (CAR) as described in the Federal Register. The NFP and the 10-Year Comprehensive Strategy place strong emphasis on reducing potential wildfire severity in these areas. The NFP also directs fuel hazard reduction in these areas to decrease the risk to residences, businesses and resources should a wildfire occur. Fuel reduction includes both activity generated fuels and natural fuel loading.

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

> Timber harvest, through its effects on forest structure, local microclimate, and fuel accumulation, has increased fire severity more than any recent human activity. If not accompanied by adequate reduction of fuels, logging (including salvage of dead and dying trees) increases fire hazard by increasing surface dead fuels and changing the local microclimate. Fire intensity and expected fire spread rates thus increase locally and in areas adjacent to harvest. **However, logging can serve as a tool to help reduce fire hazard when slash is adequately treated and treatments are maintained** [emphasis added].

The purpose of the proposed action is to proactively treat the activity fuels to reduce the time of elevated hazard and to reduce the potential for high intensity ground fire in the event of a wildfire.

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

The purpose of the proposed fuel hazard reduction work is to alter the fuel loadings and configuration in selected individual units / stands to reduce the potential for high severity fire, and to make suppression efforts safer and more effective in the event of a wildfire, thereby protecting resource values, and adjacent private property; this would also aid in attaining forest management objectives. In forest stands the purpose of the proposed action is to change areas of surface fire behavior Fuel Model 10 conditions to Fuel Model 8 and 9 and in brush fields from Fuel Model 4 to 6, thereby increasing the proportion of fire condition class 1 and 2 in the project area (and reducing the extent of fire condition class 3).

b. Proposed Actions

Two proactive fuel hazard reduction alternatives are proposed. They differ in the extent (acreage) and distribution of units proposed for fuel hazard reduction treatment (see below for treatment descriptions). However, in both alternatives, treatment focuses on reducing surface fuels and standing live fuels by removing standing live fuels (small trees and flammable brush) in the ≤8" dbh sizes. In all instances where the "home ignition zone" of a residence or structure on adjacent private land extends on to BLM, consultation would be done with the land owner to identify any special fuel treatment work necessary to reduce the wildland fire threat to the structure / residence.

The fuel treatments proposed in alternatives 2 and 3 (Appendix B) reflect the current best judgment regarding fuel hazard reduction. Proposed treatments may be adjusted based on interdisciplinary team post-harvest review of conditions and on considerations of site specific physical, biological, and social features at the time of review.

Fuel Hazard Reduction Treatments

Activity fuels would be treated in ***all*** units proposed for treatment in mid and older seral stage stands and in identified young stands (generally within the community-at-risk (CAR) boundary). Activity and natural fuel treatment units would be treated similarly. The method of treatment is as follows:

Initial fuel reduction: Understory vegetation would be thinned using manual and mechanical techniques to the desired tree densities and stocking levels. Slash created from the selective slashing treatment, including harvest activity slash would then be handpiled and burned (HP/B). It can be expected that ≤10% of each individual pile would not be consumed leaving pile "rings" and that ≤5% of the piles on the site would not burn resulting in scattered pockets of surface fuels remaining on site. To remove these fuels and achieve our desired surface fuel conditions of a fuel model 8 or 9, a light underburn is implemented as part of the initial treatment on select units (Appendix B) within the 1-2 years after the handpiles are burned.

Maintenance Underburning: Frequent, low intensity underburns would then be used to maintain the site in the desired condition. Frequency of underburns would be based on vegetation responses, vegetation types, and other natural disturbances such as wind throw and ice/snow damage or wildfire. It is estimated that

maintenance burning throughout the project area would be on a 7-15 year rotation. Prior to the maintenance underburn the cutting of approximately 90% of madrone (and some oak) resprouts (one to three stems on each plant would be retained) may be done.

Treatment Descriptions

A variety of tools would be used to reduce fuels/fuel hazards. Specific treatments and locations are identified in Appendix B. Proposed treatments include:

Selective Slashing (SL) Understory vegetation density would be reduced by cutting and spacing of vegetation that is <8" DBH for conifers and <12" DBH for hardwoods. All conifers >8" DBH and all hardwoods >12" DBH would be retained. Species diversity would be maintained by selectively slashing hardwoods, conifers and shrubs and by reserving specified species dependent on stand composition (i.e. Pacific yew, pine, vine maple). Vegetation groups and clumps ranging in size from 1/10 to two acres in size would be retained. Leave vegetation would be spaced 14-45' apart; wider spacing would be used for larger leave trees or for species such as pine or oak which thrive in less dense conditions.

Hand piling and burning (HP/B) reduces hazardous slash buildup that results from other vegetation treatments and 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 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 reduced. Some material may be removed from the site in the form of poles or firewood. The handpiles would remain on site until dry enough for complete combustion (cured). It is expected that handpiles would be burned in the first winter or early spring following the construction of the pile. Exceptions to this would be if piles did not have enough time to cure, unseasonably dry winter / spring conditions, or atmospheric conditions not conducive for adequate smoke management.

Understory Burning or Underburn (UB) is prescribed burning where residual trees and shrubs are present. The objective is to reduce dead and down woody material, live and standing dead vegetation such as shrubs and small trees in the understory, and live and dead branches close to ground level on overstory trees. Understory burning is conducted throughout the year when fuel and weather conditions permit. Typically, burning occurs between fall and spring. Summer or early fall burning is less common, but can be feasible to meet resource objectives and when risk of fire escape can be mitigated.

Underburning is conducted using hand ignition methods and drip torches as the primary ignition device. Fire would be applied to the unit in a strip head fire ignition technique. This involves spreading lines of fire which burn uphill and/or with the wind until an individual line reaches the already burned area ahead. Fire intensity is controlled by adjusting the distance between strips, the time between strips and the number of strips ignited at one time. Fire intensity desired is site specific based on the desired conditions of the site, vegetation type and size and fuel loadings. Most underburns require some sort of a control line, or fire line, around the burn area. Existing control lines such as major streams, rocky areas or other natural barriers or man made barriers such as roads are utilized as much as possible to minimize impacts to the site. Handline is the most common barrier used. Handline would be constructed where other barriers are absent using chainsaws and handtools. Handlines consist of the removal of all fuels down to mineral soil for a width of 1-3 feet. Width would be determined by the fuel type with narrower lines in light fuels such as grass and wider lines in heavier fuel loading such as timber and brush. Water bars would be used on slopes exceeding 10% and frequency would be based on slope. Handlines would be allowed to rehabilitate naturally as it is expected they would be utilized during the maintenance underburn.

Pruning (PR) - Ladder fuels are live and dead branches close to ground level which allow fire to climb into

the overstory. These lower limbs may be pruned close to the bole to a height of 6-12' from the ground. Pruning is primarily used on road side vegetation with control problems (e.g. power lines) or near boundary perimeters. Pruning slash would be hand piled and burned. No pruning would occur in riparian reserves.

Machine masticator (MM) - This treatment uses large excavators equipped with a ≤30' boom and a hydraulic chipping / shredding head to redistribute fuel loading and reduce fuel hazard. The machine mechanically shreds slash, brush, standing dead material and small diameter live trees. While fuels are not removed from the site they are immediately and substantially altered from a vertical fuel profile to a horizontal fuel profile. These smaller (shredded) fuels are susceptible to higher decomposition rates and underburning may be used as a second entry.

Alternative 2

There are approximately 4,855 acres in the project area that are within the NFP designated CAR and WUI designations that would be treated to reduce the fuel hazard. Appendix B outlines the units to be treated and the treatment in each unit. Also see Maps 3 East and 3 West. There are approximately 4,624 acres of selective slashing (SL), 4,319 acres of underburning (UB), 4,819 acres of handpiling and handpile burning (HP), 88 acres of roadside pruning (PR) and 505 acres of machine masticator (MM) treatment proposed. Individual units would typically receive multiple treatment types therefore the acres are overlapping. For example a 100 acre unit may be under thinned, hand piled/burned and under burned; by adding up total acres for treatment types, the total would be 300 acres of treatment.

Fuel hazard reduction in riparian areas, bald eagle management areas and spotted owl core areas would also occur (see riparian reserve and wildlife sections). Treatments are anticipated to take place over a 3 to 6 year period.

Alternative 3

Fuel hazard reduction work would be implemented on approximately 3,734 acres focusing on areas in the CAR and along ridgetops that have strategic importance in wildfire suppression (Table B-2). Approximately 3,287 acres of selective slashing (SL), 3,160 acres of underburning (UB), 3,482 acres of handpiling and handpile burning (HP), 88 acres of roadside pruning (PR) and 242 acres of machine masticator (MM) treatment are proposed.

Alternative 3 fuel hazard reduction treatments would provide wildland fire fighters anchor points for indirect fire fighting techniques while providing treated areas within the communities for safer and more effective structure protection. Fuel hazard reduction in riparian reserves, bald eagle management areas and spotted owl core areas would also occur, and are discussed further in the riparian reserve and wildlife sections, respectively. Treatments are anticipated to take place over a 3 to 6 year period.

2.2.2 Older Seral Stage Stand Treatments —Alternatives 2 and 3

a. Objectives

Objectives of the proposed harvest treatment under all action alternatives are to reduce stand densities, perpetuate the historic mixture of tree species, promote multi-layered stand structure, reduce the risk of a stand replacing fire, and to contribute to the BLM's commitment to provide timber / forest resources to the local economy.

1. *Reduce stand densities*: Growth stagnation, resulting from abnormally high tree densities renders even the dominant trees highly susceptible to bark beetles, defoliating insects, dwarf mistletoe, and root diseases (Knutson et. al. 1986; Byler and Zimmer-Grove 1991; Cochran and Barrett 1995; Filip et al. 1999). The purpose is to reduce tree density to increase individual tree vigor, leading to increased stand resistance to insects and diseases. This will increase the long-term integrity of the stands by producing conditions in which only small-scale (natural) insect and disease attacks are likely to occur.

2. *Perpetuate the historic mixture of tree species*: Fire exclusion has created a shift from fire-tolerant (ponderosa pine and black oak) to less fire-tolerant species (Douglas-fir) (Atzet 1995). Pines and black oaks require openings and bare mineral soil for regeneration. The pre-fire exclusion cohorts (overstory trees) are experiencing intense competition from abnormally high tree densities, resulting in reduced vigor and subsequent mortality. Treatments would focus on creating a more open stand structure to perpetuate or establish pines and oaks into the future stand.

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

4. *Reduce the risk of a stand replacing fire*: Vegetation density and composition, and surface fuels and fuel arrangement are factors which influence fire behavior that can be directly manipulated to reduce the risk of a stand replacing fire (Agee 1993; Graham et al. 1999). Treatments are designed to achieve a lower canopy bulk density, reduce surface fuels and increase canopy base height by reducing stand density and manipulating species composition.

5. *Contribute to the BLM's commitment to provide timber / forest resources to the local economy*: As stated in the Medford RMP (p. 38), the objective of matrix land is to provide forest products to support local and regional economies. In order to meet this objective, commercial harvest is an option for all matrix lands in the project area. Harvest would be balanced with other objectives. In order to provide a sustainable supply of timber some proposed actions may focus more on future stand development.

b. Proposed Actions

Two BLM alternatives regarding thinning and harvesting timber in mid and mature seral stage stands are presented. The proposed treatments apply to matrix lands and have been developed in order to meet the stated objectives. The most appropriate prescription for each stand is selected under the proposed action for each alternative depending upon the focus of each action alternative. Specific treatments and units are shown in Tables B-1 and B-2 (Appendix B). The following are descriptions of each possible prescription, rather than a proposal for treatment:

C*ommercial thinning* (CT) is typically prescribed for even-aged stands with little crown differentiation (single layer). These stands developed after a stand-replacing event in mesic sites, which allowed for good conifer regeneration and the development into a single layer. In 60 to 100 year old stands, growth rates are beginning to decline though crown ratios are still adequate on most trees. This makes these stands suitable for this prescription and allows trees to grow in diameter more evenly throughout the life of the stand. Commercial entry would focus on crown thinning the most vigorous dominant and co-dominant overstory

trees, while retaining vigorous ponderosa and sugar pines for species diversity. Spacing of the residual trees would use the crown radius of the healthiest dominant and co-dominant trees to achieve an average relative density of 0.45.

Density management (DM) is typically prescribed for uneven-aged stands for the primary purpose of widening the spacing of residual trees in order to promote the growth and structural development of the remaining stand. Many of these stands developed in conjunction with disturbance (fire, insects, harvest, etc.) and have several layers containing multiple species. Spacing of the residual trees would use the crown radius of the healthiest dominant and co-dominant trees to achieve an average relative density of 0.25 to 0.35.

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

Group selection (GS) is used in small patches (<3 acres), which lack conifer regeneration because of intense hardwood or brush competition. A "regeneration opening" would be created by cutting and removing large hardwoods and/or conifers, burning hardwoods on site when yarding is not feasible. These openings would be planted with conifer seedlings (scalping and subsequent seedling maintenance would occur as needed).

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, thus the RH prescription. Candidates for this prescription are older than 120 years and have a poor annual stand growth.

Since the adoption of the NWFP in 1994, regeneration harvest has been prescribed for very few stands (22 acres) within the Deer Creek watershed, showing an emphasis on thinning for forest health and structural/species diversity. The one stand proposed for regeneration harvest represents less than a hundredth of a percent of the watershed converted from mature to early with some mature trees left for overstory diversity. The regeneration of conifers in this stand would provide future timber supply and structure, which is not being provided for currently due to intense tanoak competition (see objectives).

Matrix lands in the Medford District are divided into the Northern General Forest Management Area (NGFMA) and the Southern General Forest Management Area (SGFMA). The Southern General Forest Management Area requires retention of 16 to 25 large conifer trees per acre, which is the general management baseline for RH prescribed stands in the project. However, there are "local situations in the northern GFMA that should be managed along SGFMA prescription guidelines and vice versa" (Medford District RMP ROD, p 73). Unit 38S-07W-22-006A is prescribed for RH under NGFMA guidelines, leaving 6-8 large conifers/acre. This unit has a site index comparable to NGFMA lands on the Medford District, BLM. At this time there are approximately 16 to 25 large conifers/ acre in this stand. This approximately 20 acre unit on a north slope currently has canopy closures too high to successfully regenerate the stand with conifers, and is now fully occupied with tanoak in the understory. The current condition is a result of past management rather than a naturally occurring hardwood stand. Keeping the stand at SGFMA retention levels will not allow enough sunlight for Douglas-fir in the understory to successfully out-compete the tanoak sprouts after initial treatment, so a NGFMA prescription is more appropriate (Birch and Johnson 1992; Acker et al. 1998; Zenner et al. 1998).

Density Management/Understory Reduction (DM/UR) is prescribed for stands 30-60 years old or older which may provide multiple forest products (ie. poles, sawlogs, firewood, special products) or opportunities for restoration (i.e. slashing, prescribed burning, road renovation, planting, etc.) In general, average tree sizes in these younger stands exceed pre-commercial thinning size, but the stands are not yet suitable for economically viable, traditional commercial harvest. Some of the stands prescribed for DM/UR may have overstocked clumps of overstory trees which need individual release, and/or the understory may need non-commercial thinning, underburning, planting, or other restoration activities.

Post Harvest Treatments for Harvest Units – Following harvest, activity generated fuels would be selective slashed (SL), handpiled / burned (HP) and/or underburned (UB).

Alternative 2

The primary objective of this alternative is to integrate multi-resource values to generate structural variability across the landscape while still providing timber / forest resources to the community. This is accomplished by prescribing various levels of thinning, deferral of harvest on mature stands that best represent late-successional structure, and regeneration of conifer stands for future wood supply.

The proposed treatments apply to matrix lands in the project area and are listed in Table 2. Under this alternative 57 acres would be treated with the commercial thinning (CT) prescription to a relative density of 45%. The density management (DM) prescription without modified group selection is proposed on 133 acres within areas with visual and spotted owl habitat concerns. Density management with modified group selection (DM/Mod GS) is proposed on 270 acres in order to facilitate pine and hardwood persistence and promote landscape variability. Two units (total of 80 acres) have been assigned a density management/modified group selection/group selection (DM/Mod GS/GS) prescription because past management created conditions which favored hardwoods over the conifers which existed on the site prior to harvest. In this prescription the hardwoods will be yarded out in two group openings from 1 to 3 acres in size and the opening will be planted with conifers. One unit (20 acres) has regeneration harvest (RH) prescribed because the conifer regeneration is poor to non-existent underneath the dominant conifer overstory which is declining in health and vigor.

Table 2. Treatment acres by type for Alternatives 2 and 3

Prescription	Alternative 2 Acres*	Alternative 3 Acres*
Commercial Thinning	57	57
Density Management	133	45
Density Management/Modified Group Selection	270	455
Density Management/Modified Group Selection/Group Selection	80	80
Density Management/Understory Reduction	508	0
Regeneration Harvest	20	303
*Additional harvest acres are covered under the wildlife and riparian reserve proposed action		

This alternative contains a proposal to treat 508 acres of forest stands with density management / understory reduction (DM/UR). These stands have very low amounts of sawlog / pole volume located in clumps which can be thinned, while also having areas in need of selective slashing (SL), handpiling / burning (HP), machine masticator (MM), planting (PL) and underburning (UB).

Alternative 3

This alternative proposes increased management of mature stands in order to ensure that subsequent conifer cohorts are provided more sunlight and growing space for future growth. Under this alternative, more stands are treated with the regeneration harvest prescription in order to emphasize the need for sustained wood production on the next conifer cohort. This alternative also focuses on harvesting stands with the highest volumes because these would be the highest priority for thinning (ie. containing highest stocking). The density management/understory reduction prescription is not implemented under this alternative because of lack of volume in sawlogs.

The proposed treatments apply to matrix lands in the project area and are listed in Appendix B. Under this alternative 57 acres would be treated with the commercial thinning (CT) prescription to a relative density of 45%. The density management (DM) prescription without modified group selection is proposed on one stand (45 acres) that already contains small openings. Density management with modified group selection (DM/Mod GS) is proposed on 455 acres. Two units (total of 80 acres) have been assigned a density management/modified group selection/group selection (DM/Mod GS/GS) prescription for the same reason stated in alternative 2.

In this alternative, 10 stands (303 acres) have regernation harvest (RH) prescribed for them. In these stands, the overstory is fairly sparse making commercial thinning difficult, yet there is enough canopy to shade the understory, retarding the growth of the next conifer cohort. The largest trees will be left to meet SGFMA requirements. The site will be prepared through underburning, and planted according to BLM stocking standards.

2.2.3 Young Stand/Forest Development — Alternatives 2 and 3

a. Objective

Many of the conifer plantations in the project area are experiencing intense competition from brush and hardwoods and need to be managed in order to reduce stand densities, promote species diversity, and maintain vigorous crowns. The primary objective of young stand treatment is to reduce surplus vegetation in order to accelerate the growth of desired conifers, promote stand differentiation, and maintain the non-tanoak hardwood component for future stand diversity.

b. Proposed Action

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

Brushing (BR) - This treatment primarily removes brush, tanoak and excess non-tanoak hardwoods. Surplus vegetation would be manually cut. All tanoak less than 12" dbh would be treated as surplus vegetation. Conifer leave trees less than 6" dbh would be spaced approximately 8' on most units and non-tanoak hardwoods less than 8" dbh would be spaced at 25'.

Precommercial Thinning (PCT) / Selective Slashing (SL) - This work consists of cutting or girdling surplus trees and brush. All tanoak less than 12" DBH and most brush would be cut. All sprouting hardwood stems not selected as leave trees and all surplus trees up to 8" dbh would be cut. For matrix and riparian, vigorous and well-formed conifer leave trees would be maintained at an average spacing of 14 to 16 foot spacing (+/- 25%). Non-tanoak hardwood sprout clumps would be thinned to the single largest stem and spaced at 25 to 40 feet apart in the matrix. For non-tanoak hardwoods within Riparian Reserves, sprout clumps would be thinned to the single largest stem and spaced 25' apart. Criteria for selecting which stems to leave would be based on largest diameter at 2' above ground level, straightest, and with the best formed crowns, and origins closest to the base of the stump. As noted in Appendix B, some of this work may be accomplished with a machine masticator.

Pruning (PR) - This work consists of selecting and pruning the largest, healthiest, best formed and least damaged conifers between 3" and 10" DBH to an average 20' x 20' spacing. Trees would be pruned to a maximum height of nine feet. All live and dead limbs, whiskers, and lateral sprouts would be removed using pruning shears or loppers to within ¼" of the main bole. Cut branches would be lopped and scattered so the slash height is no more than 2' above the ground. Pruning would not be done in the first rows of trees along paved or rocked roads. Pruning would not be conducted in riparian reserves.

Tree Planting (PL) - These include the initial or inter-planting of nursery seedling stock after site preparation has been completed on a unit. In some cases, the entire unit would be planted. In other cases, the 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 which can vary depending on the 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.

The locations of the proposed young stand treatments are outlined in Appendix B. The proposed actions (alternative 2 and 3) include approximately 909 acres of pre-commercial thinning, 1,001 acres of brushing, 232 acres of pruning, and 351 acres of planting within matrix land (see riparian reserves for riparian acres). Following these activities, fuels (slash) would be treated via handpiling and burning in all units within the Community at Risk (CAR). In areas outside the CAR, project created slash would be evaluated for fuel hazard reduction treatment need. Evaluation would be based on the level of the fuel hazard, the wildfire risk, and values of resources within stands and in the adjacent area. All acres may not be treated. The most common slash treatment would be hand pile and burning (HP). Other treatment options include lop and scatter (LS) or removal of slash as poles or firewood. Machine masticator (MM) may be used for slash treatments.

2.2.4 Wildlife

2.2.4.1 100 Acre Spotted Owl Core Areas — Alternatives 2 and 3

a. Objective

Within the South Deer project area there are four approximately 100 acre spotted owl core areas. These areas are managed as late-successional reserves (LSR). Fire exclusion has created a condition of high stem densities, high fuel loading (condition class 3), and reduced overstory tree vigor. This condition greatly increases time to develop late-successional habitat characteristics important to wildlife species dependent on this type of habitat. Treating vegetation within these core areas would reduce stem densities and fuel loading, reducing the potential for high intensity fire. Treatments would move stands towards their historic range of variability and on a successional pathway to the desired late-successional characteristics more rapidly than if left untreated.

b. Proposed Actions

Core area vegetation treatments would include density management commercial harvest and/or fuels reduction treatments including slashing, hand piling, and underburning. All treatments conducted within core areas would be subject to seasonal restrictions for Northern Spotted owls. Alternative 2 and 3 treatments proposed are shown in Appendix B. Alternative 2 proposes 393 acres of fuels treatments. Alternative 3 proposes 98 acres of density management and 228 acres of fuels reduction treatments.

2.2.4.2 Bald Eagle Management Area— Alternative 2 and 3

a. Objective

A Bald Eagle nesting territory site is known for Lake Selmac. The Lake Selmac Bald Eagle Management Plan has identified Bald Eagle management areas (BEMA) on BLM lands surrounding Lake Selmac (T38S-R8W-13, T38S-R7W-17 & 19). Fire exclusion has created a condition of high stem densities, high fuel loading, ladder fuels, and reduced tree vigor in the BEMA. Lake Selmac provides a variety of recreational opportunities to the public. Due to the close proximity of the BEMA to Lake Selmac there exists a wildfire hazard from human caused ignition. Vegetation treatments consisting of commercial thinning and/or fuels reduction, within the BEMA would reduce the risk of a high intensity wildfire destroying suitable Bald Eagle habitat. Commercial treatments would maintain stands within their historic range of variability and promote

a growing condition required to develop large diameter trees with large open limb structures needed for bald eagle nesting and roosting trees.

b. Proposed Action

BEMA treatments would include variable density thinning and/or fuels reduction treatments including slashing, hand piling, under burning and planting. All proposed treatments are consistent with the Lake Selmac Bald Eagle Management Plan. Seasonal restrictions and other project design criteria would apply to work activities consistent with the FY04-08 Programmatic Biological Opinion (USDA, USDI, 2003). Alternative 2 and 3 treatments proposed are shown in Appendix B. Alternative 2 proposes 155 acres of thinning and 99 acres of fuel reduction treatments. Alternative 3 proposes 209 acres of thinning and 36 acres of fuel reduction treatments.

2.2.5 Riparian Reserves— Alternative 2

a. Objective

More than fifty percent of the riparian zones lack large tree structure necessary to provide large instream wood. High tree density in many riparian zones has reduced tree vigor and health. As a result, the time required to provide function for wildlife connectivity and large wood recruitment has greatly increased. There is also need to treat fuels in many riparian zones to avert leaving a high fuel load corridor capable of spreading wildfire to adjacent landscapes. The objective of treating riparian zones would be to expedite large tree development for wildlife habitat and future instream large wood recruitment; thus, moving riparian conditions toward meeting the ACS objectives. Riparian treatments also seek to reduce fuel loads, decreasing the potential spread of wildfire to the watershed and to local communities.

b. Proposed Action

Vegetation would be treated in some riparian reserves. Riparian reserve treatments would be based on local stand / vegetation conditions and would be designed to benefit aquatic systems and be consistent with ACS objectives in the short and long term. Riparian reserve widths would conform to the interim widths prescribed in the NWFP (p. C-30) (Table 3). Unstable and potentially unstable areas (areas showing active movement and indications of past movement) are considered riparian reserves (NWFP, p. C-30, C-31).

Vegetation treatments would include precommercial thinning (PCT), brushing, slash and hand pile burning, and underburning in young stands. In older seral stands, commercial thinning and underburning would occur. Table 1 displays the riparian acres proposed for treatment and the associated treatment. There would be 497 acres of fuel hazard reduction, 227 acres of density management, and 261 acres of young stand management. Treatments would not occur in the no-treatment areas (Appendix B) adjacent to the stream banks. Ignition of underburning would occur outside the no treatment buffers but could burn into the no treatment zone.

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

Table 3. Riparian Reserve Widths and No Treatment Buffers	
Stream Type	**Riparian Reserve Width**
Fish-bearing streams (none identified in project)	300' or 2 site potential tree heights, whichever is greater
Perennial streams & springs and intermittent streams	150' or 1 site potential tree height, whichever is greater
Unstable or potentially unstable areas	150' or 1 site potential tree height, whichever is greater
Stream Type	**No Treatment Widths**
Perennial streams & springs	50'
Intermittent streams	25'

2.2.6 Watershed Restoration— Alternative 2

a. Objective

BLM stream surveys in 2004 showed that approximately fifty percent of fish bearing streams in the South Deer project area lack channel structure which creates an undesirable riffle to pool habitat ratio, widespread bank erosion, and little summer rearing habitat. A reduction of large wood and loss of sinuosity are the mechanisms attributed to poor aquatic conditions. Additionally, over 50 percent of the riparian areas do not provide adequate large tree structure necessary for long term instream wood recruitment.

Lake Selmac is a very popular warm water recreational fishery. Many shallow and deeper habitats in the lake offer little to no cover desired by bluegill, crappie and largemouth bass.

The objective of the proposed action is to increase aquatic roughness and complexity and to mitigate the loss of instream wood delivery from the riparian zones.

b. Proposed Action

Large instream wood would be placed in three reaches, two in section 5 and one in section 31 of McMullin Creek. Each reach would have five to ten pieces of wood placed in the channel. Reach 1 (above the bridge of road 38-7-31): a suspension cable system from road 38-7-31 would place the wood material. Source of wood would come from outside the riparian zone. Reach 2 (near the middle of section 5): five trees would be selected from the adjacent riparian zone for falling into the creek. To maintain riparian shade function, only trees from fully stocked riparian stands would be eligible for selection. Reach 3 (southern reach of McMullin in section 5): 10 trees would be felled within the riparian zone and outside the primary shade zone, and using a suspended cable system, placed in the creek.

Root wads and wood debris from log landings would be placed in Lake Selmac via helicopter. Structures would be placed at various depths to maximize use by various fish species throughout the year. Josephine County, who manages the park, has been informed and pledges to be a project partner.

2.2.7 Recreation— Alternative 2

a. Objective

A hiking trail in section 19 winds onto private land. The proposed action recommends modifying the trail route to avoid private land. The proposed action would also provide additional low-elevation, easily accessible recreational opportunities to meet the growing demand for recreation on public lands adjacent to a highly populated area.

b. Proposed Action

The trail that runs along the east boundary of the BLM land in section 19, adjacent to the creek, travels from BLM land to private land at the southern edge of the large block of BLM land. (See Map 6). The proposal would reroute that trail back on to BLM land. This trail would join with a trail to the west just up the ridge and would provide a continuous loop for the public. This proposal falls outside of the Josephine County Parks R&PP Lease area.

The trail would be constructed to a width of 3 feet, outsloped with rolling grades. The trail would be built either manually or mechanically (i.e. trail machine). The trail would be cleared to a width of 4 feet each side of centerline and 10 feet high and would be open to non-motorized uses only including horse riding, hiking, and mountain biking.

2.2.8 Roads— Alternatives 2 and 3

a. Objective

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

b. Proposed Actions

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

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

Following field reconnaissance of the road system a few roads were found to be routing surface flow resulting in erosion and transport to the stream system. Identified road segments were integrated into both alternatives for restorative actions.

Specific proposed road work (construction, maintenance, decommissioning, etc.) for all alternatives is listed in Appendix C and displayed on Maps 3, 4 and 5. The table lists the roads that would be used, constructed, improved, renovated, and/or decommissioned. Other proposed road work would be accomplished as future funding is available.

Transportation Management: Due to the checker board ownership pattern of this planning area, BLM is pursing reciprocal agreement and easements. These agreements allow the Bureau to use private roads to

access BLM lands. The objective is to provide access for long-term management of the land, including landscape management projects, any future fuels reduction needs, future fire suppression activities, and future restoration projects would benefit.

2.3 Alternative 4 — Natural Selection Alternative

This alternative is presented as submitted by the Deer Creek Valley Natural Resource Conservation Association (DCVNRCA) in their words. The statements made are those of the Association and do not necessarily represent the BLM's position or opinion regarding this alternative, nor does it represent the spectrum of concerns raised by others in the community (i.e. fuels reduction, snag and coarse wood retention and level of road construction proposed..

Natural Selection Alternative (DCV NSA)

Submitted by:
Deer Creek Valley Natural Resource Conservation Association

This science-based forest-friendly alternative was prepared by the Deer Creek Valley Natural Resources Conservation Association (DCV) in collaboration with BLM, South Deer Forest Committee, Selma community and the larger community. It is based on 14-Criteria for Sustainability (see Appendix E-1), supported and endorsed by hundreds of individuals, community leaders and organizations.

A consensus-based team from DCV, included the following individuals and focus: Mary Camp, team coordinator; Orville Camp, author of the Natural Selection Alternative; Lynne Campbell, research site specific data; and Pamela Tennity, community outreach. Andrea King provided editing. Numerous others from DCV and the general public have contributed to this project.

The fundamental concepts and philosophy regarding this Natural Selection Alternative were developed by and are copyrighted by Orville Camp. *Premises* and *Criteria for Sustainability*, were developed for the purpose of evaluating proposed forest practices before action is taken. Natural-selection-based concepts were first implemented at Camp Forest by Orville Camp in 1967. These concepts have since been implemented by many people in several countries.

Ecosystem-centered Purpose and Need

The purpose and need of the *Natural Selection Alternative* is to provide a variety of commodities and uses while allowing nature to retain and restore species, habitats, functions, and forest ecosystem health across the landscape.

Philosophy and Vision of Natural-Selection-Based Practices and Natural Selection Alternative Resource Objectives and Actions

The *Natural Selection Alternative* recognizes that natural forests contain biological, ecological, economic, recreational, aesthetic, historical and spiritual values. It would sustain these values.

Natural-Selection-Based perspectives recognize 1) that other species create forests, 2) that many forest lands, especially non-entered late-succession forests, should be preserved as they are, 3) the need for natural recovery of forests damaged by human management, 4) that human needs require the extraction of resources from some forest lands, and 5) the total forest ecosystem must remain intact, with human activities in harmony with nature.

Best traits, resource extraction, productivity, connectivity and restoration
Species sustainability relies on reproduction of best survival traits. Naturally evolved environments allow species to adapt to them. The natural-selection-based approach retains best traits for all species.

Green plants sustain life on Earth. Green plants with best traits sustain their species. Under the natural-selection-based approach, organisms with best traits (stronger dominants) are retained. Only the dying ("weaker members") or dead, are removed to serve human needs. The dead and dying (including snags and woody material of the forest floor) sustain the living. To extract sustainedly (both green and dead), humans must share these resources with all naturally evolved species. The more trees extracted the less snags and woody material would be left to serve other species needs. The Natural Selection Alternative would extract resources at sustainable levels.

Sustainable extraction levels require stewards with fundamental understanding of how ecosystems function, and how resource extraction would affect each of the "eight essentials": Climate, soil, water, air, food, shelter, habitat, and reproduction necessities that determine which species can survive. When there is uncertainty about resource extraction, those in question would be left until doubts are resolved. The Natural Selection Alternative would offer high skill forest work to qualified stewards that adhere to natural-selection-based criteria for sustainability.[1]

The Natural Selection Alternative would meet or exceed the Medford District Resource Management Plan objectives and actions/directions requirement for down wood, snags, and riparian reserves (p. 26-28) including ACS objectives (p. 22), and for Matrix lands (p. 38-40).

The Natural Selection Alternative would retain all naturally evolved successional habitats across the landscape including riparian reserves. A no-treatment area of 50 feet adjacent to perennial streams, and 25 feet adjacent to intermittent non-fish bearing streams and springs, would be maintained. There would be no treatment within the full riparian reserve where there is a domestic water source.

Since no trees are removed before they have been naturally selected, the volume of removal is restricted to what the forest is naturally able to produce. Retaining forest structure and functions at all times means no forest "down time" so the forest is always in full productivity.[2 3] No down time, means no restoration costs. Forest resource volume is expected to increase over time.[4]

Every part of the forested landscape including meadows, aquatic, and riparian areas, would remain or become a corridor for evolved species. The Natural Selection Alternative leaves habitats intact so early and late-successional ecosystems can evolve to their natural conclusions.

In natural-selection-based practices, the term 'restoration,' or 'recovery', means to restore original late-successional communities to their original species and ecological functions.

The Natural Selection Alternative would retain the few remaining small islands of natural late-successional and legacy forests in South Deer to 1) sustain late-successional species, 2) provide

wildlife reservoirs for restoring early successional plantations that currently encompass much of the South Deer Project area, 3) moderate climate locally, regionally and globally, 4) store and filter high quality water, 5) provide wildlife corridors across the landscape, 6) understand the meaning of forest recovery by showing what they look like and how they function, and 7) serve human visual, spiritual, educational, natural history, recreation and tourism needs.[5] [6]

Resource extraction would occur in early successional forests where past extraction has occurred and be such that young forests would be allowed to evolve to late-successional community conditions. Legacy, and structurally intact late-successional forests, would not have resource extraction. (See Maps 5 East and 5 West)

The Natural Selection Alternative would address climate change issues through optimal green plant and carbon storage, and reducing fire risk without burning.[7]

Fire and the Wildland Urban Interface
A higher level of resource extraction would be used in areas of South Deer that have dwellings within the home-ignition zone (approximately 100 feet beyond the dwelling).[8]

"Treating the home-ignition zone . . . can almost eliminate the possibility of homes burning in wildfires."[9]

Natural fire frequency and severity
Historic studies of fire in the region show a wide range in fire intervals.[10] Late-successional forests in South Deer represent a historical fire variable and would be retained in their natural state (natural fire would occur).

The Natural Selection Alternative would allow (if scientifically supported) natural fire in some areas where fire has been absent long enough to allow low fire severity.

Increased early successional tree plantations in the Deer Creek watershed have resulted in increased forest fire hazards and risks. The Natural Selection Alternative would restore and retain low fire hazard conditions by retaining stronger dominant trees and closed canopies.[11] Lower fire hazard conditions would return as canopies close and trees grow taller, ground fires are less likely to reach the canopy and as understory is reduced or disappears.

Prescribed fire, forest floor woody material, and slash
Natural Selection Alternative would not use prescribed fire unless it can be shown that an evolved species is in danger of extinction because of lack of fire. Since prescribed burning would not be used, the Natural Selection Alternative would retain natural levels of woody material on the forest floor necessary for retaining forest biological and ecological health and productivity. With the Natural Selection Alternative there is little slash and that is lopped and scattered.[12] [13] [14] [15] [16] [17] [18] [19]

Non-native plants
The Natural Selection Alternative would retain environments best suiting native species, preempting invasions of non-native species through: 1) canopy coverage that would retain climate, soil and water conditions not favorable to non-native species (one-lane roads would help retain or

achieve canopy coverage), 2) minimal soil disturbance (through use of rubber-tired resource extraction equipment on roads and restriction of off-road heavy equipment), and 3) minimal fire.

Stewards would prevent invasions of non-native species and eliminate them, when necessary, through: 1) physical removal, 2) manual application of least toxic effective chemicals, and 3) weed prevention protocols and eradication, in accordance with Medford District Integrated Weed Management Plan and programmatic EIS, that comply with BLM and NSA objectives of retaining forest health. [20]

Visual, spiritual, recreational, educational, historical and tourism
The Natural Selection Alternative would retain an environment in which the untrained eye would be unaware of ongoing forest product removal. It would develop aesthetically pleasing, hiker-friendly trail and road systems, creating opportunities for recreation, nature-based education, and tourism.

See Appendix E-2: South Deer *"Significant Features."*
See trail maps: Appendix E-2, Maps 1 and 2; Appendix A, Map 7.

Roads can serve human needs while retaining healthy forests
The concentric-contour-loop-access-system would be located and designed to retain biological and ecological integrity across the landscape, retain upper canopy structure connectivity where possible, allow economically efficient removal of products, and adhere to high visual standards.

The contour-access-road-system would be designed to contour the land perpendicular to natural water flows to minimize water diversion and erosion. Late-successional forests would not have products removed from them so would have roads only when necessary to connect to areas beyond them. Extremely steep slopes, unstable soils, swamps, alongside streams, and special habitats, would be avoided.

Access economics
The contour-access-road-system would be designed for perpetual use and economical access to a variety of resources. The system would aid in inventory and extraction of products for special markets. It would allow use of smaller equipment with less economic and environmental impact. Its low-cost design, construction, and maintenance would permit upgrading without major costs of road relocation.

Fire access
The Natural Selection Alternative looping-contour-access-road-system would serve as effective fire breaks and provide alternate entrance and escape routes.

Contour-access-systems design
Overall road density, with the contour-access-road system, would be less than current skid, temporary, and permanent road density.

Existing roads would be analyzed for low ecosystem impact and for efficient use and removal of forest resources. They would be used where appropriate. All skid roads would be eliminated. Natural decommissioning would be used where natural new growth would recover biological and visual values, active decommissioning would be used where natural recovery is unlikely.

Road 38-7-27.1 has design problems that cannot be corrected. It has a history of polluting domestic water. Road caused stream diversions would be restored to their natural channels. This road would be allowed to naturally decommission to a narrow foot trail. This road has been used as a trail and would be integrated into the Thompson Creek Overlook Trail System. Road 38-7-27.2, also part of the Thompson Creek Overlook Trail System, would be naturally decommissioned to a ten foot wide trail that would allow limited recreational vehicle uses related to trail uses. This road would be extended (possibly a few hundred feet) to allow a recreational vehicle turnaround to be developed. (See Thompson Creek Overlook Trail System Map 7.)

New concentric-contour-looped-access-roads would be predominantly ten feet wide surfaces with curve widening. Roads would parallel each other at 300 to 600 feet, and would retain grades of three to ten percent where feasible. Existing dead-end roads would be converted into loop roads where practicable. (See Road Maps 5)

Double-wide roads would be reduced to ten-feet wide road surfaces to reconnect canopy for wildlife corridors and to reduce erosion. Where practicable, road width would be allowed to naturally decommission to 10 foot wide surfaces on the outer edge to enable canopy closure and to reduce erosion. Roads with existing reciprocal agreements, would be negotiated with party holders on a case by case basis.

Access and vehicles
Resources not hand carried would be lined to the road. Rubber tired equipment would be used for resource extraction and would be kept on roads. No heavy equipment would be allowed off-road. No track vehicles would be used for resource extraction.

Cultural and socioeconomic
Ecosystem health would have priority over short-term economic health. Long term economic health would have priority over short-term economic health.

The Natural Selection Alternative of the South Deer Project would be a showcase demonstration project for sustainable relationships and practices. It would demonstrate economic solutions to the environmental/job dilemma, opening doors to sustainable cottage industries, added-value local enterprises, and increased tourism.

"In Oregon, the relationship between the environment and the economy is changing. Industries that extract raw materials are stagnating, while industries that benefit from the presence of environmental amenities are growing rapidly."[21]

Harvest volumes
Natural-selection-based extraction retains optimal green foliage across the landscape, thus optimal volume would first be attained, and then retained. As young cut-over forests recover to late-successional conditions, they would produce more products with greater values.

Certification
Products extracted would meet natural-selection-based criteria for sustainability. Forest health values would be prioritized through certification of stewards, products and processors. Certification of practioners and resources would allow consumers to support sustainable forest practices.

Stewardships

Forest stewardships would be created and tailored for local, small (one- or two-person), sustainable operations that would contribute to long-term stable local economies. Each steward(s) would have exclusive access to certain kinds of resources from a designated parcel of land. Parcels would be set up relative to available resources, geography, and logical access. Parcel size would be determined by the available resources that may be extracted sustainably under the Natural Selection Alternative criteria for sustainability and the guidelines of the Medford BLM RMP.

Within three years, a majority of South Deer should be under stewardship contracts; all, within five years. Existing roads would be used to start. Stewardship contracts with renewal options would be developed. Contracts would be jointly designed and approved by the community and BLM. People making forest practice decisions would receive on-the-ground training, apprenticeship, and continuing education to understand natural-selection-outcomes.

Monitoring

A research and monitoring program would be established to evaluate effects of using natural-selection-based criteria for sustaining long term forest health, and the ability to produce a sustainable local economy. BLM's current baseline data would be important to the process. Non-entered areas would be used as control areas.

Species traits and the environment determine "natural-selection-outcomes." Human actions that change climate, soil, water, air, food, shelter, habitat and/or reproduction necessities, would be evaluated in terms of the "cumulative effects of natural-selection-outcomes".

Demonstration/Research Project

The Natural Selection Alternative of the South Deer Landscape Management Project provides an opportunity to apply natural-selection-based resource extraction concepts to community forests. Scientific research, community participation, permanent jobs, tourism and recreation values are parts of this concept. Undisturbed heritage forests would provide educational opportunities unmatchable in any classroom.

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2.4 Project Design Features

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

2.4.1 Logging Systems

2.4.1.1 All Systems

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

All natural surface landings constructed during the logging operation would be decompacted to a minimum depth of 18", seeded with an erosion control grass and legume mixture or native grass seed, if available, and straw mulched 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.

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

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

2.4.1.2 Tractor Yarding

To reduce ground disturbance and soil compaction, yarding tractors would be limited to the smallest size necessary. Tractors would be equipped with integral arches and 75' bull lines to obtain one end log suspension during skidding and would be restricted to approved skid trails. Existing skid trails would be used when possible. Tractors would be restricted to slopes <35% although short pitches >35% may be permissible if necessary. Tractors would not be used when soil moisture content at a 4-6" depth, exceeds 25% by weight as determined by a Speedy Moisture Meter.

Skid roads would be water barred in a manner appropriate to the slope and soil type. Main tractor skid trails would be blocked where they intersect haul roads and would be decompacted and water barred shortly after yarding is completed to reduce the erosion potential. Skid roads would be used only during the dry season. If a skid road in a riparian reserve is used for more

than one season it would be winterized (water barred, covered with debris, etc.). In areas proposed for planting (Appendix B), ripped skid roads would also be planted. Other areas would be allowed to revegetate naturally.

2.4.1.3 Cable and Helicopter Yarding

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

All landings, including fill slopes, would be located away from headwalls and draw bottoms and adjacent draw side slopes. Some roads and landings already exist within the riparian reserves. If these roads and landings are stable, they would be reused to minimize additional new road or landing construction. All natural surface landings constructed during the logging operation would be decompacted after use, except landings on rocky ground or those planned for future use. They would be seeded with an erosion control grass and legume mixture or native grass seed. They would be straw mulched or covered with slash upon completion of the harvest activity and before the onset of the rainy season. At a minimum, effective drainage would be ensured on all landings and if erosion risk is high, seeding would help control erosion.

2.4.2 Seasonal Operating Restrictions

The table below outlines the seasonal operating restrictions:

Table 4: Seasonal Operating Restrictions

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

Table 4: Seasonal Operating Restrictions			
Location	**Restricted Activities**	**Restricted Dates**	**Reasons / Comments**
Entire project area	Fuel hazard reduction	Variable	Time fuel reduction treatments to reduce conditions that contribute to bark beetle build up in logging slash.
* An additional consideration would be made for continued road use and helicopter logging after rain events from October 15 to May 15 on some roads. Continued use would require roads that are well drained and have adequate surface stability (such as BST, crushed rock, grid roll rock, or pit run rock). The BLM would monitor road conditions during hauling, and road maintenance would be kept current with hauling. The affected area would be closed/blocked and weatherized if weather conditions change and hauling is suspended.			

2.4.3 Special Status Plants and Noxious Weeds

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

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

(1) Buffer sizes: a minimum of 25' radius from the population boundary (a site or the outer edge of a polygon encompassing the population). No activity within the buffer outside the dormancy period. Buffers can be treated manually during the dormancy period (September – February).
(2) Known occurrences can be treated (burning, hand brush/tree removal, sowing adapted native grasses etc) during the dormancy period if the net result improves habitat for the species.
(3) No tree falling into or yarding through buffered sites.
(4) Do not locate anchor trees within known sites.
(5) Construction of new landings would be at least 300' from known sites.
(6) Proposed logging road location, including temporary haul roads, would be surveyed and populations protected by a minimum 100' radius buffer. Use of existing roads within 100' of occurrence is allowed.
(7) Firewood collection would <u>not</u> be permitted within buffers. Road segments close to known occurrences may need to be closed to prevent incidental impacts.
(8) Cut materials must be piled outside the buffers.
(9) For mechanical thinning with a machine masticator, 100' radius buffers would be required.
(10) No tree planting or mechanical scalping in or within 75'of the buffer edge (100' from occurrence) so as to maintain more open habitat.
(11) No heavy equipment (dozers, machine masticator, excavators etc) within known sites.

For noxious weeds, noxious weeds would be treated using an integrated pest management approach (RMP p. 92). Management objectives are to contain and eradicate populations of *Cytisus scoparius* (Scotch Broom) and *Centurea debeauxii* (Meadow Knapweed). Populations of *Rubus discolor* (Himalayan Blackberry) and *Cirsium vulgare* (Bull Thistle) would be contained using appropriate methods based on species and conditions under the guidance of the Medford District Integrated Weed Management Plan (PA-OR110-98-14). All noxious weed populations that are treated would be monitored for treatment effectiveness.

Seed and straw used for restoration, replanting of bare soil, and post treatment throughout the project area would be native species and weed free to prevent the further spread of noxious weeds.

For prevention of noxious weeds, all heavy equipment would be cleaned prior to moving onto BLM lands. Equipment would also be cleaned when moving from known noxious weed areas into weed-free areas.

2.4.4 Wildlife

Work activities that produce loud noises above ambient levels would not occur within specified distances of any nest site or activity center of known spotted owl pairs and resident singles between March 1 and June 30th as described in the table above.

All Red Tree Vole nest trees identified with an orange placard as active or inactive would not be marked for harvest.

All snags ≥ 16" DBH would be reserved from cutting in all units unless they pose a safety hazard. If a designated snag/wildlife tree must be cut due to worker safety concerns, the tree would be left in the unit and a replacement standing tree would be identified for retention.

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

2.4.5 Fire and Fuels Management

Prescribed burning would be consistent with the Oregon Department of Forestry's Smoke Management Plan and the Department of Environmental Quality's Air Quality and Visibility Protection Program. Additional measures to reduce smoke emissions would include rapid mop-up, burning with lower fuel moisture in 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.

All prescribed burn areas with sensitive plant species would be burned under the weather, fuel

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

Prescribed fire escape - To prevent fire from escaping control and to minimize potential damage to overstory trees, burning would occur fall through spring when weather and fuel conditions allow the least active fire behavior. If conditions allow and risk of prescribed fire escape can be mitigated, some burning may occur during the summer and early fall to meet resource objectives.

Fireline construction would be used in broadcast and understory burning and would be built by hand. Water barring on fire trails where slopes exceed 10% would control water runoff and limit potential erosion.

Patrol and mop-up of burned areas would help prevent reburning or fire escape. A helicopter with water bucket may be used during mop-up to aid in extinguishing larger burning fuels and internal reburning in islands of unburned fuels.

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

Machine masticator - The machine masticator machine would operate on slopes <40% with occasional use on short pitches >40%. Only low ground pressure (<4 psi) machinery equipped with semi-grouser tracks would be used. The shredding head would be mounted on an articulated boom at least 30' long. Machine masticator operations would occur when soil moisture content is <20% at the 6" depth (8-12" depth on serpentine soils). Coarse wood >10" diameter and snags would be protected. Snags felled for safety reasons would be retained and protected on site. No mechanical operations would be conducted (or material deposited) within special status plant or cultural site buffers. The machine masticator would cross intermittent streams at approved crossings and perennials streams only at improved crossings (i.e., a road with a culvert). To limit ground disturbance, the machine masticator would operate primarily on top of shredded vegetation.

Slash and fuel reduction treatments in riparian reserves would include the use of a machine masticator machine. The machine masticator would not treat areas within 60' of perennial streams, with the treads stopping at 85'. There would be no slash busting or machine masticator treads within 50' of intermittent streams.

2.4.6 Roads - Construction, Improvement, Decommissioning, Closures

When roads would be used for more than one season, temporary roads or roads slated for decommissioning would be winterized and treated for erosion control (water barred, seeded,

mulched, etc.). Temporary blocks would prevent wet season use prior to decommissioning.

All new road construction and improvement would be done at the minimum standard appropriate, to the intended long term use of the road (All new road construction and improvements would be done at the minimum standard as appropriate for forest roads. Single lane roads shall be built to a maximum subgrade width of 17 feet or less. The driving/running surface shall not exceed 12 feet on straight tangents: curves will be designed not to exceed 5% of the curve radius. If turnouts are required for safety they may be installed at intervals from 500 feet to 1000 feet and shall not exceed 100 feet in length including 25 foot taper for each end. All roads used during the wet season October 15 through April 15 shall be surfaced with at least 6" of crushed aggregate.). Road closures and decommissioning are intended to reduce the potential for erosion and to reduce the impacts on wildlife. Roads proposed for decommissioning that are needed to support the prescribed burning/fuel reductions would be scheduled after burning is complete. During the wet season, these roads would be treated for erosion control (water bars, seeding, mulching) or slash where needed, as mentioned above for skid roads under tractor logging). Where needed, temporary blocks would be placed to eliminate wet season use.

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

During thinning and pruning of vegetation along roads for driver visibility, thinning would be favored over removal and any removal of vegetation would not occur through pulling out the vegetation by the roots.

Dust Abatement: 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.

2.4.7 Cultural Resources

Cultural resource features would be buffered with no-treatment zones.

Timber would be felled away from cultural resource sites.

No fire line construction or prescribed burning would occur within 20’ of cultural resource buffers.

No hand piling and burning of slash would occur within 20’ of cultural resource buffers.

Site specific protection measures would preserve the integrity of all existing or newly identified cultural sites and would be implemented in consultation with the State of Oregon Historic Preservation Office and BLM cultural resource specialists.

2.4.8 Visual Resources Management

The project area consists of VRM Class III and Class IV lands. The Lake Selmac area is a popular recreation area ; much of the project area is visible from the lake and surrounding recreation sites. Specifically, section 13 (T38S, R8W), along the east facing ridge above the campground; section 17 (T38S, R7W) along the southwest facing slope; and section 19 are in direct view from Lake Selmac. Project objectives are to manage to meet or exceed VRM designations.

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

The following design features would be followed for all VRM III units:

Minimize the impact on existing vegetation:

- Use irregular clearing shapes
- Mimic size and shape of existing openings or meadows in the characteristic landscape.
- Feather/thin the edges of cleared areas to reduce strong lines of contrast and to appear more natural. Retain a mix of tree/shrub sizes and species along edges.
- Retain most large crowned trees and a variety of tree sizes and shapes to ensure that the resulting visual canopy does not distract from the surrounding landscape.
- Feather and scallop edges of openings around legacy trees.
- Rather than evenly spacing, clump or vary overstory tree spacing in regeneration harvest units.
- Avoid fan shaped yarding corridors
- Space leave trees irregularly in machine masticator treated units.

In fuels reduction units:

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

For road construction

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

3.0. Chapter 3 - Environmental Consequences

Introduction

Incomplete or Unavailable Information

NEPA regulations (40 CFR 1502.22) require the BLM to acknowledge incomplete information and describe how it was addressed during the development of management alternatives. The management of large forest landscapes is a complex and developing discipline. There is less than complete information about many of the relationships and conditions of fire ecology, wildlife and plant species, forest habitats, the economy, and conditions in rural communities. However, a substantial amount of credible information about project activities exists and the planning team used the best available data when studying the relationships between activities and elements of the environment to estimate the effects of the alternatives.

While additional information could add precision to this analysis, the basic data required to achieve an understanding of resource dynamics was available for the analysis. Additional information would be unlikely to alter fundamental conclusions reached in this analysis.

Scientific Uncertainty

During development of the South Deer project, a substantial number of public comments were received regarding how lands in the project area should be managed. The primary issue, active versus passive management, was supported on both sides by peer-reviewed journal articles as well as input from local scientists.

The appropriate degree of active versus passive management is seen by some as a major issue in this project and throughout the Grants Pass Resource Area. Active management encompasses a range of activities including timber harvest, young stand management, planting and other silvicultural practices, fuel hazard reduction, riparian habitat enhancement and road renovation to achieve specific ecological and social objectives. Passive management is generally characterized by the absence of such practices with an expectation that natural recovery or natural selection will achieve ecological objectives. The debate really comes down to what are the ecological and social objectives for these landscapes (e.g. fuel hazard reduction, habitat enhancement, providing commercial timber products) and to what degree these objectives should be achieved through allowing natural processes to occur compared to more active management.

The RMP identifies a wide variety of objectives for lands in the project area (e.g., riparian health, fish and soils protection, special status species management, and timber production). Balancing of these sometimes competing objectives takes careful planning and weighing of all available information relevant to the project.

The planning team weighed the scientific evidence presented by the DCVNRCA and others, as well as that gathered by each resource specialist. Environmental consequences of each alternative were analyzed utilizing the best scientific data available, knowledge of on-the-ground conditions, and professional expertise of each member of the planning team.

Cumulative Effects

Current conditions in the project area result from a multitude of natural events and human actions that have taken place over many decades. Cumulative effects are defined as the, “impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions” (40 CFR § 1508.7). 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.) Cataloguing past projects and their individual effects would not be useful in discerning the contribution of the incremental impact of the project's action alternatives. However, cataloguing and analyzing other present and reasonably foreseeable actions relevant to the effects of the proposed action *is* necessary and is described below. By comparing the "no action" alternative (current condition) to the action alternatives, we can discern the "cumulative impact" resulting from adding the "incremental impact" of the proposed action to the current environmental conditions and trends.

Scoping for this project did not identify a need to exhaustively list individual past actions or analyze their environmental effects in order to fully analyze the effects, including cumulative, of this project's action alternatives. No individual past actions have been identified that would have a cause-and-effect relationship with the South Deer proposals. The following overview provides a context in which to analyze the effects of the South Deer project. Addressing the acreage affected by timber harvest on a decadal basis provides information on the extent of the major actions that have occurred since the mid-1950s, and the potential changes in stands and habitats since then. This decadal information also puts the project into the context of current conditions and allows for comparison of the action alternatives with the no action alternative (existing conditions). Additional resource-specific cumulative effects are addressed as necessary under each resource section.

Environmental History

The South Deer Forest Management Project is located within the Deer Creek 5th field watershed, a 72,679 acre watershed that is a tributary to the Illinois River. Of the total acreage, 29,924 acres, or 41% is federal BLM ownership, 26% is private-non-industrial, 16% is private-industrial, 12% is USFS, 3% is county, and 2% is State of Oregon. 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.

Table 5 summarizes past harvest activities on BLM land within the Deer Creek watershed, by decade, that have contributed to current environmental conditions, and which were considered and studied by the resource specialists during their cumulative effects analysis. Table 6 summarizes the future foreseeable timber harvest activities on BLM land within the Deer Creek watershed.

Table 5. Harvest acres* within Deer Creek watershed on BLM land by decade

Decade	Harvest Method	Acres	Timber sale name(s)
1940's	Selective cut	44	unnamed O&C sales
1950's	Clearcut	80	unnamed O&C sales
	Mortality salvage	258	
	Selective cut	253	
	Shelterwood	121	
	DECADE TOTAL	*712*	

1960's	Clearcut	1,650	Bear Creek West	N. Fork Salvage
	Mortality salvage	377	Big Windy	Quartz Creek
	Selective cut	995	Cedar Flat Salvage	Rabbit Lake
	Overstory removal	647	County Line	Robert's Mtn.
	Seed tree cut	37	Kerby Peak	Stockpile Ridge
			McMullin Creek	White Creek
			N. Fork. Deer Creek	unnamed O&C sales
	DECADE TOTAL	*3,706*	N.Fork Thompson Cr	
1970's	Clear cut	15	Anderson Creek	Siss's Gap
	Mortality salvage	1,095	Anderson Station	Deer Head
	Selective cut	6,356	Bear Remains	Dryden Overlook
	Shelterwood	638	Cedar Creek Ridge	Grange Hall
	Overstory removal	13	Crook's Crk Cleanup	Grayback Rabbit
	Commercial thinning	71	Deer Creek South	Harmon Divide
	Seed tree cut	60	Selmac Salvage	Spider Hill
			Thompson Reserve	Tri-delta
			Tunnel Crossing	White Tom
	DECADE TOTAL	*8,248*	unnamed O&C sales	
1980's	Clear cut	1,348	Bear Grapes	Bear Grapes Test
	Selective cut	594	Blue Draper	Crooked Cedar
	Shelterwood	1,250	Crooks Crk. Cleanup	Dear-Deer
	2 Stage OSR	202	Draper Test Site	Dry White
	Seed tree cut	129	Dryden Overlook	Holcomb Peak
			Howcome Peek	Jay Root
			Lucky Pot	Quarter Moon
			Scottish Verbascum	Spring White
	DECADE TOTAL	*3,523*	Tall Timber	Tri-delta
1990's	Clear cut	807	Bare Nelson	Crooked Moon
	Selective cut	22	Deer Mom	Deer Selmac
	2 Stage OSR	186	Dry White	Howcome Peek
	Overstory removal	409	McMullin	McMullin Creek
	Commercial thinning	306	Scottish Verbascum	Wildeer Ridge
	OSR/Com.Thin (CT)	28		
	Regeneration harvest	22		
	DECADE TOTAL	*1,780*		
2000 thru 2004	*DECADE TOTAL*	0		

Footnotes: - data compiled from BLM Microstorms database

* the same acres may have had two or more entries at different times during the analysis period (totals are not additive)

Table 6. Future Foreseeable Timber Harvest (2005-2010) on BLM land in Deer Creek watershed-

Project Name	Planned Harvest Treatments	Acres
Anderson West T.S.	Commercial thin (CT) -helicopter	213
(advertised, no-bid as of	Commercial thin (CT)-tractor/cable	94
winter 2005)	Commercial thin (CT)-cable	41
	TOTAL	348
Deer Mom T.S.	Commercial thin (CT)-cable	251
(sold/awarded/suspended	Commercial thin (CT)-tractor/harvester	296
as of winter 2005)		
	TOTAL	547

3.1 Soil and Water

3.1.1 Affected Environment

Introduction

In the absence of long term monitoring necessary to detect hydrologic, channel, or water quality environmental conditions, this assessment focuses on indicators of condition. The indicators of roads, vegetation, consumptive water uses, compaction, riparian vegetation and channel condition are tied to watershed processes of water and sediment delivery, riparian function, and channel processes. These watershed processes directly or indirectly influence aquatic conditions and, collectively, shape current conditions. Current channel and water quality conditions are then synthesized with indicators, or processes, to establish cause and affect relationships.

The cumulative effects analysis assesses the influence of proposed actions and future activities on current conditions and trends, which reflect past activities. Specifically, this assesses the potential effects of individual proposed actions to current watershed processes. The identified effects to each process are then integrated to determine possible cumulative effects leading to degradation of channel or water quality conditions.

Soils and hydrology

The South Deer project area includes the McMullin, Middle Deer, and Lower Deer 6th field sub-watersheds. All sub-watersheds discharge into the Deer Creek fifth field watershed (72,570 acres). McMullin Creek flows into Lake Selmac which is then released into the mainstem of Deer Creek. Thompson Creek is a major tributary flowing into McMullin Creek downstream of Lake Selmac. Project activities in the Lower and Middle Deer sub-watersheds lie in 575 and 2,941 acre 7th field drainages, respectively. Both these drainages contribute directly into the Deer Creek 5th field watershed and, due to topography, are hydrologically disconnected from the rest of the 6th field sub-watershed.

The primary soils in the project area include the Abegg, Beeckman, Cornutt-Dubakella, Josephine, Pollard, and Speaker soil series. These are moderately deep to deep, well drained soils. Productivity is high and well suited to support mixed conifer stands (USDA 1983). The Josephine, Cornutt-Dubakella, and Pollard soil units may be compacted if wet when heavy

equipment is used; designated skid trials are recommended to minimize compaction (USDA 1983). Additionally, the Cornutt-Dubakella soil, occurring on approximately 120 acres, contains 30% serpentine derived soil which is susceptible to slumping on slopes greater than 35%.

The project area is a rain dominated hydrologic system, receiving 40 to 55 inches of rain annually. Above 4,000 feet, snow accumulates for 3 to 4 months a year, usually melting by April or early May. The lack of late season snow pack yields low to intermittent baseflows. The two largest streams, McMullin and Thompson Creeks, have perennial flow in the upper watershed becoming intermittent below BLM managed land.. Moderate peak flows (2 to 5 year flood return interval) result from intense winter rainstorms. The transient snow zone, the area subject to rain on snow events, occupies 7% of the McMullin Creek watershed. Within the transient snow zone, 10 % is in early seral conditions. Due to the small area and minimal disturbance in transient snow zone, there are no effects to streamflows from past activities in the transient snow zone. There are no acres in the transient snow zone in the 7th field drainages. Peak flows of record such as the 1964 and 1974 flood events resulted from rain on snow events.

Consumptive water use for agriculture and domestic supplies has reduced summer surface water in McMullin and Deer Creeks. According to the Oregon Department of Water Resources, there are 47 and 255 points of diversion in McMullin Creek and Deer Creek, respectively. Currently, no water is available for future water rights claims in Deer, Thompson and McMullin Creeks. In other words, surface waters in the Deer Creek Watershed have been fully appropriated. Exacerbating the effects of surface water diversions on baseflows are groundwater withdrawals for domestic and irrigation use. Often water withdrawn from wells is hydrologically connected to the surface water. In these instances, ground water is removed that would have flowed subsurface, discharging into streams.

Roads have been identified as mechanisms altering surface flow routing. Specifically, roads intercept and route subsurface flow to the stream channel via road ditches and culverts (Wemple et al. 1996, Harr et al. 1975). Table 7 displays area of roads and early seral vegetative conditions.

Table 7. Area of roads and percent of sub-watershed in early seral condition by 6th Field Watershed

6th Field Watershed	Roaded Acres**	Percent of watershed in Roads	Percent in Early Seral Condition
McMullin	506	3	18
Middle Deer*	63	2.2	13
Lower Deer*	13	2.3	13

* Includes only 7th field watershed which contain the project activities
** Includes BLM and Private main roads, secondary roads and access roads to individual timber units

At these road levels, compared to unroaded basins, elevated peak flows in McMullin Creek are very unlikely. For comparison, (Jones and Grant 1996, Jones 2000) found no statistically significant increases in peak flows attributed to roads when roads occupied 6% of the basin. Similarly, Wright (1990) and Ziemer (1981), found no changes to the flows when roads occupied

5% of the basin. Road effects on peak flows were detectable when 12% of the watershed was roaded (Harr et al. 1975).

There are, however, roads which are routing water and delivering sediment to the stream network. Field reconnaissance identified sections of road along Upper McMullin Creek and unnamed tributaries in section 27, 31, and 35 routing water and eroding the road bed. The survey found that a small percentage of roads are responsible for the majority of surface flow interception and sedimentation. Luce and Black (1999), similarly, found that a few roads generated the majority of sediment.

Compaction with a high probability to effect flows are captured in roaded acres as they represent continuous linear features with the potential to route surface water and deliver to a stream segment. Additional compaction created through management history is highly variable in recovery due to time since implementation, local equipment techniques, slopes, and soils. Compacted surfaces are also often isolated by grasses, brush, trees and down logs, greatly reducing surface flow routing.

Soil compaction reduces plant growth and productivity; therefore, loss of productivity indicates detrimental compaction. Based on silvicultural and fuel vegetative descriptions, there has been little to no effect on tree productivity. Stand densities were found to high across the watershed (Table 15). In the Douglas fir and Douglas fire/tanoak stands, numbers of trees per acre are higher than prior to fire suppression. Additionally, fuel loading is high across the watershed due to high productivity of the understory supporting shade tolerant grass and brush species. Seventy percent of trees tested for individual growth received a low vigor index. High tree densities competing for limited resources were associated with low vigor. Further, soils in the watershed are well suited to support mixed conifer stands and are not sensitive to loss of productivity.

Removal of *vegetation* and associated reduction in evapotranspiration (plant uptake of soil moisture) has also been linked to increased flow volume. Loss of evapotranspiration from forest clearing leads to higher soil moisture, resulting in a greater percentage of precipitation available for surface runoff. Table 7 displays acres in early seral vegetative conditions. While research (Beschta et. al. 2000, Harr 1979, Harr 1975, Harr 1980, Jones 2000, Thomas and Megahan 2000, Ziemer 1981) found stream flow responses to timber harvest variable, consistent detectable changes to stream flow occurred when greater than 25% of the watershed was in clear-cut condition. The clear-cut conditions in the study removed all vegetation and was often followed by broadcast burning.

The 18% early seral in McMullin is not in clear-cut condition but rather has approximately15 years of vegetation regrowth. Forest stands in this age class currently have 40 percent canopy closure and an understory of brush. Jones and Grant (1996), documented significant hydrologic recovery six years following clear-cutting.

Within the Deer Creek watershed, BLM timber harvest acres in the 1990's were 20% of the peak harvest levels of the 1970's. In project area, acreage of timber harvest has decreased since 1970's with the last BLM clear-cut occurring in 1991(179 acres). Based on this shift in practices and current site conditions, hydrologic recovery has occurred, indicating an improving trend in hydrologic conditions. Likewise, aerial photography displays a reduction of harvesting on

private lands. Based on vegetation patterns and recovery of past harvest units there is very low potential for increases in water yield or peak flows.

Riparian

Floodplains in the lower gradient valley bottoms of McMullin, Thompson, and Quedo Creeks have been cleared for agriculture production, resulting in a narrow strip (30-50 feet) of hardwood dominated vegetation along the stream channel. In the moderate to high gradient reaches, rotational harvest on private lands and past BLM forest practices has reduced distribution of mature riparian forest stands.

Roads along sections of McMullin, Thompson, Reeves, and Haven Creeks, as well as reaches of several unnamed tributaries, prevent future riparian vegetation development. In many riparian zones, fire suppression in combination with past harvest activities have led to high density, slow growing riparian stand conditions.

Similar to upslope timber harvest, timber harvest in riparian areas has decreased since the 1970's. Additionally, over the last 11 years, management activities in the riparian zone focused on the protection of riparian functions of instream wood recruitment, and stream shade and wildlife corridor enhancement. Combined, the recovery of past riparian harvest units with a management emphasis to maintain or improve riparian zones has led to an improving trend in riparian and aquatic conditions. Table 8 displays riparian vegetation conditions and acres.

Table 8. South Deer Project Area BLM Riparian Vegetation Conditions and acres

Vegetation Class	Acres
Mature	340
Mid	579
Poles	295
Seedling	158
Early	205
Hardwood	13
Shrub	7

Nearly 50 percent of the riparian zones in the South Deer project area lack mature tree structure necessary to provide large instream wood. On private lands, in the lower gradient floodplain reaches of McMullin and Thompson Creeks, a reduction in riparian vegetation decreased stream shade, thereby increasing solar radiation input into surface waters. While harvest activities fragmented riparian habitats, streamside shade on BLM managed land in McMullin and Thompson Creeks is 90% and 78%, respectively (Hydrodynamics 2002). For thermal protection of cold water beneficial uses, the Oregon Department of Environmental Quality considers full recovery of shade at 80% (USFS, USDI 2002).

Stream Channel

Instream activities and direct modification to the channel over the past 100 years have increased streamflow velocities. Namely, in moderate to high gradient reaches, large roughness elements, particularly large wood, function to dissipate energy, scour pools and sort channel sediments.

Within the Deer Creek project area, approximately 40% of the stream channels have been identified as lacking sufficient large wood to dissipate streamflow energy. While not quantified, removal of large wood from the stream channel was a common practice in the 1960's and 1970's to improve fish migration.

In the lower gradient reaches, floodplains function to dissipate energy. As streams reach flood stage, streams flow over top channel banks and spread across the valley floor. The increase in width distributes flow velocities over a greater area, reducing in-channel stream velocities. Floodplains in McMullin, Thompson, and Quedo Creeks have lost this energy dissipating function due to channel bed degradation (lowering of the channel bed) from past mining and agriculture activities. Peak flows are now contained within the channel banks as they no longer access the adjacent floodplain. Associated with degradation is the straightening of the channel profile and an increase in stream gradient.

Fine sediment embeddedness was recorded in 20% of stream reaches on BLM managed lands. In the mainstem of McMullin Creek, field observation found clean gravels and very little pool filling of fine sediment. While historic distribution of fine sediment is not known, current conditions is assumed to represent an increase due to past harvest practices and road building. Due to variability in landscape conditions through time, it is also assumed that historically, gravels in a percentage of the stream reaches across the landscape were embedded. Importantly, given the reduction of upslope and riparian harvest, improved and reduced road building, increased culvert sizing, road closures and decommissioning, and vegetation recovery on past skid roads, fine sediment loading is decreasing.

In both 7th field watersheds, the mainstem channels have been rerouted or straightened in the lower ¼ to ½ mile prior to entering Deer Creek.

Synthesis of Current Condition

Identification of existing hydrologic cumulative effects focuses on channel conditions and water quality. In a physical model of the watershed, products of soil and water flow down slope. These products then interact with the riparian zone and their ability to deliver large wood, provide shade and stabilize channel banks. Together, upslope products and riparian function represent the terrestrial influence on channel conditions. Within the channel environment, stream gradient, channel confinement, and floodplain function determine processes of sediment transport / deposition and energy dissipation. Examining aquatic condition, therefore, integrates conditions of the upslope, riparian, and channel environments. Importantly, this assessment links aquatic conditions with past disturbances to establish cause and affect relationships.

Channel: Aerial photographs following the 1964 and 1974 flood events display widespread bank erosion in the low to moderate gradients on McMullin and Thompson Creeks. Miles of Creek were scoured, fully exposing the channel. Currently, channel conditions rate in poor condition as indicated by high levels of bank erosion and high pool to riffle ratios. Prevalent bank erosion indicates that energy moving through the system has increased or the ability to dissipate the energy has decreased. Peak flow increases have been linked to channel instability, as greater flow volume yields greater energy. Peak flow increases in McMullin and Thompson are unlikely given the vegetative condition, and lack of scale and disturbance, in the transient snow zone.

Selected roads, via interception of surface and groundwater, have increased flow routing to the stream network. Given the scale of roaded acres, the road network is creating isolated effects of runoff and sedimentation but not landscape scale changes resulting in increased peak flow magnitude.

Rather, stream flow velocity increased due to channel modifications. Stream kinetic energy increases exponentially with flow velocity. Stream velocity increases with depth and gradient, and decreases with complexity. With the lack of large wood in moderate gradient reaches and stream degradation in the lower watershed, water depth and stream slope increased and complexity decreased. All three variable adjustments lead to increased streamflow velocities. Additive to the effects of increased energy is decreased resistance to bank scour by removal of riparian vegetation. Riparian zones in the mid and lower reaches of both McMullin and Thompson Creek were cleared prior to the 1964 flood event. The combination of increased stream velocity and riparian vegetation removal led to high levels of bank erosion.

Presently, channel banks are the primary energy dissipater, resulting in continued bank erosion. The continued altered channel processes is the mechanism responsible for high levels of bank erosion and low habitat complexity.

Similarly, channel process in the valley bottom of the 7th field channels remain altered due to direct modification from straightening and rerouting.

Water Quality: DEQ found stream temperatures above 20° C in McMullin Creek, leading to listing on the 303(d) list. The listed stream segment is River Mile (RM) 0 to RM 6 measured near the mouth of McMullin Creek. The information is misleading as the water temperature site was located above the mouth, below Lake Selmac where flow releases are highly variable; the water quality data does not reflect conditions found upstream on BLM land. The maximum 7-day temperature in McMullin Creek on BLM managed land was 16.8° C, complying with DEQ's water quality standard set at 17.8° C.

A reduction of both baseflow and riparian vegetation in the mid- and lower reaches of Thompson and McMullin Creeks are primarily responsible for increased water temperatures. Reduced volumes of water are more susceptible to warming and reduced vegetative cover increases solar radiation input. On BLM managed lands, McMullin and Thompson Creeks have full shade recovery at approximately 80%, indicating adequate vegetation cover to protect water quality.

There are no perennial streams on BLM land in the 7th field watersheds. Therefore, water temperatures are not influenced by BLM managed lands.

3.1.2 Environmental Consequences

This Environmental Consequences analysis focuses on the potential alterations to current watershed process and environmental trends. These processes of sediment and water delivery, riparian function, and channel routing of water and sediment directly or indirectly influence aquatic habitat. Given that watershed processes and the effect of proposed project activities on those processes are similar for the entire project area, the analysis details potential effects of

individual activities on processes and trends in the McMullin sub-watershed which accounts for 80+% of project activities. Assessment of the smaller 7th field sub-watersheds tiers to these findings and integrates with current conditions and proposed activities to identify potential cumulative effects.

Alternative 1 – No Action

Under Alternative 1 all current conditions and trends will continue as specified in affected environment. Namely, roads with poor drainage would continue to deliver water and sediment to creeks. Riparian zones with high tree densities and low vigor would continue to develop slowly, increasing time to mature stand structure. Likewise, channel processes would maintain poor habitat conditions due to a lack of large instream wood. High potential for wildland fire would continue, posing a risk to the aquatic environment from a delivery of sediment or loss of riparian vegetation.

Alternative 2

Alternative 2 proposes a combination of forest thinning, fuel hazard reduction, and young stand management. Table 9 displays activities within the McMullin 6th field sub-watershed and two small 7th field watersheds located within the Middle Deer and Lower Deer 6th field watersheds.

Table 9. Treatment Acres in South Deer Sub-watersheds

Treatment	Proposed Treated Acres	% of Subwatershed
McMullin Creek Sub-watershed		
Commercial Harvest	1,323	8
Fuel Reduction	1,859	11
Young Stand Treatment	1,198	7
7th Field Drainage in Middle Deer 6th field Sub-watershed		
Commercial Harvest	91	3
Fuel Reduction	557	18
Young Stand Treatment	164	5
7th Field Drainage in Lower Deer 6th Sub-watershed		
Commercial Harvest	50	8
Fuel Reduction	92	16
Young Stand Treatment	5	1

McMullin Sub-watershed

Soil and Water

Silvicultural harvest, fuel reduction, and young stand management activities maintain an overstory and a mosaic of understory vegetation. Structural retention prescriptions on approximately 20 acres, representing 0.1 percent of the Mcmullin Sub-watershed, would reduce vegetation to 6-8 trees per acre. As a result, there would be a slight reduction in canopy cover

and transpiration rates within the harvested unit. However, with remnant overstory and understory vegetation and the very small scale, RH units would not lead to alteration to streamflow.

Tree thinning and subsequent low intensity underburnings would retain a mix of hardwoods and conifers, organic duff layer, leaf litter, and course wood debris. Collectively these forest components provide nutrients, bacteria and fungi decomposers, and mycorrhizal to maintain long term site productivity. Handpile and burning would leave bare soil areas on less than 10% of the treated area. Bare soils conditions would be fragmented surrounded by unburned ground, preventing concentration of runoff. It is expected that one year after treatment grasses and forbes would return. Additionally, treatments would occur over a ten year period, distributing activity over time.

There would be 2.1 miles of temporary spur development, adding 5 acres of soil compaction. Developed roads would be short spur extensions from existing roads (Map 3 East and 3 West). This would create short term erosion during development and use. All temporary spurs would be decommissioned following use. All roads lie outside riparian buffers. No spurs would cross a stream. There are no mechanisms delivering site erosion to the stream network.

Five ½ acre landings would be constructed along existing roads. All landings would be located away from streams and riparian areas. Designated skid roads would be developed in the proposed 246 acres of tractor harvest units. Less than 2% of the South Deer Project area would be tractor logged. Skid roads would be designated away from creeks and drainage features. Based on skid road spacing of 160 feet, approximately 15 acres of skid road would be developed during operations. A machine masticator would be used on 405 acres to reduce fuel loading. Using the same compaction rate as tractor logging, machine masticator activity would contribute 37 acres of compaction. It is expected that actual acres of compaction would be less given the low psi equipment (half the psi of tractors used for logging), soil moisture restrictions, and single pass operation. Additionally, machine masticator machinery typically rides atop slash debris and duff, further reducing compaction potential.

Compacted soil may pond water during high intensity rainstorm events. With riparian protection buffers, slope limitations and no skid roads leading to creeks, the potential for delivery of water and any entrained sediment to the stream network is extremely low. Therefore, there would be no adverse effects from temporary road construction and compaction to channel or water quality conditions.

The project also proposes 25 miles of road maintenance, including 5 miles of decommissioning and 20 miles of road drainage improvement. Associated with road maintenance is 0.5 miles of road side ditch clearing. Luce and Black (1999) found no significant increase in erosion when only the road tread was treated; however statistically significant increases in erosion occurred when road ditches were bladed.

Sediment delivery to streams from road-ditch renovation would primarily occur at road-stream crossings in years 1 and 2 following activity. Luce et al. (2001) observed an 87% increase in erosion and sediment transport from roads in year one and two following road maintenance

activities. Ditch clearing would not occur within 50' of stream crossings, reducing potential delivery of sediment to the channel system. The short term inputs may create isolated pockets of fine sediment deposition immediately below (5 to100 feet) culverts. During high flows, the introduced sediment will become an immeasurable fraction of the system sediment load and would not be detectable at downstream locations. A long term reduction in sedimentation and altered flow routing would be expected following road drainage improvement and decommissioning.

Similar to the findings of Luce (1999), field reconnaissance in McMullin Creek found that a few roads were responsible for a majority of sediment input to the channel system. Wemple (2001) also acknowledges that not all roads are equal in function or effects. The few roads that are modifying flow routing and sedimentation in McMullin Creek were identified, and are proposed for maintenance or renovation (Appendix C).

In summary, all forest thinning and fuel reduction activities would retain an overstory and a mosaic of understory vegetation, preserving evapotranspiration processes. Alternative 2 would add 55 acres of compaction to the project area. The compacted acres represent a very small decrease in infiltration across the watershed. Importantly, the 55 acres of compaction would be highly distributed across the landscape avoiding loss of site productivity and concentrated runoff. No spur roads or skid trails would cross a drainage feature. Riparian buffers would be implemented in all units. Therefore, there would be no routing mechanisms from the compaction or disturbance site to the stream network. As a result, there would be no increase of water availability to streams and no increase in routing mechanisms accelerating water delivery to streams. Therefore, there would be no adverse effects to peak flows. Road maintenance and drainage improvements, generating isolated short term erosion, would reduce water and sediment delivery in the long term (>3 years), benefiting aquatic conditions.

Water Quality

Alternative 2 proposes thinning and fuel reduction activities in the riparian zone. The Riparian zones identified for treatment have high stocking levels with consequent reduced stand resiliency and growth rates. In riparian areas that are over stocked, thinning will benefit water quality and aquatic conditions. As stated in the Sufficiency Analysis for Stream Temperatures (USDA, USDI 2003):

> *Treatment in the primary and secondary zones may increase stand resiliency, improving sustainability of the riparian ecosystem. Treatment can maintain and restore species and structural diversity of forest stands, shift vegetation growth to more open stands consisting of evenly mixed age classes, provide for recruitment of large wood, and enhance habitat diversity and connectivity. From the standpoint of shade, treatment can increase vegetative growth rates, reducing the time for stream shade recovery and may enhance growth of residual trees and regeneration of understory, temporarily mitigating effects of short-term reductions in overstory shade. Treatment of the secondary shade zone can reduce the risk of natural disturbance, thus reducing the risk of vegetation loss in the primary shade zone in the event of a catastrophic disturbance.*

Stands identified for thinning treatments currently have a high (>80%) canopy closure. A 50' no treatment zone would maintain primary shade. Thinning in the riparian zone outside 50' would reduce canopy closure to 50 - 60%, with the expectation that within 10 years canopy closure would increase to 60-70%. Thinning in the secondary shade zone has been found to have no effect on temperature or relative humidity microclimate when stands were thinned down to 50% canopy cover (Emmingham et al. 2002). The Sufficiency Analysis for Stream Temperatures (USDA, USDI 2003) recommends that vegetation treatments not reduce canopy cover below 50% to protect riparian site conditions.

Fuel reduction treatments focus on removal of understory brush and small diameter trees which afford minimal shade to the stream. Prescribed fire would also occur in the riparian areas. The prescribed fire would be low intensity, designed to create a mosaic vegetation pattern, thereby preserving existing shade.

BLM managed riparian zones in McMullin sub-watershed are at or near full streamshade potential. Project implementation would not reduce streamside shade, nor would the project reduce large wood recruitment potential. Rather, tree growth rates would increase in response to density reduction. Thus, time required to achieve stand structure with potential to deliver large instream wood would decrease.

Channel Conditions

Large wood introduced to the stream would improve channel processes. Placement of instream large wood would slow local water velocities, scour pools, and capture gravel, leading to improved aquatic habitat conditions.

Middle Deer 7th Field Watershed

There would be no road building or machine masticator activities. Twenty acres of tractor logging would generate one acre of compaction. As described above for the McMullin sub-watershed, forest thinning and fuel prescriptions maintain overstory and understory vegetation. Given the minimal levels of compaction, and no road building, peak flows would not increase. Similarly, there are no routing mechanisms from ground disturbing activities to the stream network. Hence, sediment delivery to the stream network would be negligible and immeasurable. The project would not reduce riparian functions of shade and large wood recruitment. Therefore, the processes of water and sediment delivery as well as riparian function would be maintained. As a result, the current improving trend in watershed condition would continue.

Lower Deer 7th Field Watershed

There would be no RH harvest prescriptions, road building, or machine masticator activity. Harvest, via tractor logging, would generate 2 acres of compaction. All vegetation treatments (thinning and fuels) maintain overstory and understory vegetation. Therefore, activities would not alter water or sediment delivery processes to the stream network. All improving trends in vegetation recovery and riparian condition would continue.

Cumulative Effects

Potential cumulative effects were analyzed for the South Deer project area which encompasses the McMullin 6th field sub-watershed and the two smaller 7th field sub-watersheds. Subsequently, all sub-watersheds are combined to assess cumulative effects to the Deer Creek 5th field watershed.

McMullin Sub-watershed: A loss of riparian function to provide large instream wood and streamside shade combined with channel simplification (see affected environment) has led to poor channel and water quality conditions. Project activities would not add disturbance to these mechanisms. Rather, on BLM managed lands, the proposed actions, inclusive of project design features, ensures that the improving trend in channel and water quality condition continues. Therefore, implementation of alternative 2 would not generate cumulative effects to the McMullen 6th field watershed.

Other than three culvert replacements, project activities include all foreseeable BLM projects in the South Deer project area. Forest early- and mid- seral conditions on private land will continue through rotational harvest practices. The RH treatments in 0.1 percent of the watershed, which maintain an overstory and understory vegetation, would not increase water availability leading to increased stream flow; therefore, would not add effects to future private land harvest. Additionally, the total acres in early seral conditions from the incremental increase falls far below those determined to have an effect in research findings on clear-cut acres and stream flow response.

Isolated short term sedimentation from road maintenance activities would be additive to the sediment input from three culvert replacements designed to improve fish passage and flood flows. Long term reduction in sediment delivery to streams and improved aquatic connectivity is expected from road drainage improvement.

Middle Deer 7th Field sub-watershed: Given the current vegetative condition, minimal levels of RH treatment (1%) and compaction (1 acre), and no road building, peak flows would not increase. Nor would the harvest add effects to future timber harvest on private lands assumed to be treated on a rotational schedule. Similarly, there are no routing mechanisms from ground disturbing activities to the stream network. Hence, sediment delivery to the stream network would be negligible and immeasurable. The project would not reduce riparian functions of shade and large wood recruitment. Therefore, the processes of water and sediment delivery as well as riparian function would be maintained. As a result, the current improving trend in watershed condition would continue with the implementation of alternative 2.

Lower Deer 7th Field sub-watershed: There would be no RH harvest prescriptions, road building, or machine masticator activity. Harvest, via tractor logging, would generate 2 acres of compaction. All vegetation treatments (thinning and fuels) maintain overstory and understory vegetation. Therefore, activities would not alter water or sediment delivery processes to the stream network. All improving trends in vegetation recovery and riparian condition would continue with the implementation of alternative 2.

Deer Creek Watershed: Since there would be no cumulative effects occurring in the McMullin Creek sub-watershed or the 7th field sub-watersheds, channel and water quality conditions at the

Deer Creek 5th field watershed level would not be adversely effected. The improving trend in hydrologic processes and riparian function would continue.

Alternative 3

McMullin sub-watershed: There would be approximately 303 acres of regeneration harvest, reducing stand densities to 16-25 trees per acre. In these units a reduction in transpiration processes is expected. The prescriptions would increase percent of watershed in early seral acres by less than 2% for a total of 20%. As previously mentioned, the early seral condition is not in clear-cut condition as 15 years of vegetation reestablishment has led to partial hydrologic recovery in terms of plant transpiration processes. Jones and Grant (1996), documented significant hydrologic recovery 6 years following clear-cutting.

In total, there are fewer acres of vegetation treatments proposed in alternative 3 than under alternative 2 (Table 1). There would also be fewer miles of temporary spur construction and road maintenance compared to alternative 2. No riparian acres would be treated. Based on the discussion and reasoning presented under alternative 2, there would be no measurable or detectable effect to water quality or channel conditions as a result of implementing alternative 3.

Middle Deer 7th field sub-watershed: There would be approximately 90 acres of regeneration harvest, reducing stand densities to 16-25 trees per acre. In these units a reduction in transpiration processes is expected. The prescriptions would increase percent of watershed in early seral acres by 3% for a total of 16% across the 7th field sub-watershed. Compared to research, which found alterations in stream flow typically occurs when 25% of the basin is in clear-cut condition, vegetation conditions in this 7th field watershed is sufficient to prevent increases to stream flow. There would be no road building and no riparian harvest. As a result, there would be neither an alteration to processes of water and sediment delivery nor riparian function. Protecting watershed processes maintains current aquatic conditions and trends. Therefore, there would be no adverse effects resulting from implementing alternative 3.

Middle Deer 7th field sub-watershed: There are fewer acres treated in alternative 3 compared to alternative 2. There would be no road building or riparian harvest. Based on the discussion and reasoning presented under alternative 2, there would be no measurable or detectable effect to water quality and channel conditions as a result of implementing alternative 3.

Cumulative Effects

McMullin, Middle Deer 7th field, Lower Deer 7th field sub-watersheds: Forest early- and mid-seral conditions on private land will continue through rotational harvest practices. The RH treatments in 2 percent of the watershed which maintain an overstory, and understory vegetation would not increase water availability leading to increased stream flow and; therefore, would not add adverse effects to future private land harvest. Additionally, the total acres in early seral conditions from the incremental increase falls far below research findings on clear-cut acres and stream flow response.

Based on the discussion and reasoning presented under alternative 2 and those discussed for each sub-watershed under alternative 3, processes of water and sediment delivery to creeks and riparian function would not be adversely effected. Therefore, there would be no cumulative effects to channel or water quality conditions in each of the three sub-watersheds.

Deer Creek watershed: Since there would be no cumulative effects occurring in the McMullin Creek sub-watershed or the 7th field watersheds, channel and water quality conditions at the Deer Creek 5th field watershed level would not be adversely effected. The improving trend in hydrologic processes and riparian function would continue.

Alternative 4 - DCV NSA

The natural selection alternative maintains or strives for full canopy cover, ensuring protection of hydrologic conditions. While riparian activities are not quantified, the alternative, through project design features, maintains all riparian functions of shade, large wood recruitment, bank stability, and wildlife habitat.

The 4.2 miles of new road construction would add 6 acres of roaded surface to the McMullin sub-watershed. Approximately 6 miles of 2 foot wide recreation trail would maintain current canopy cover and add 1.5 acres of compaction. Otherwise, the proposed actions would not add compacted acres. Road width would be 12 feet, allowing for nearly full canopy development above the surface. Additionally, with a narrow road surface, area of rainfall collection leading to surface runoff is minimized. Associated with the proposed roads are 2 road-stream crossings, representing possible mechanisms for water and sediment delivery to streams.

Short term erosion would be expected during and following road construction, primarily occurring the first two years following construction. Luce and Black (2001) found "tremendous decrease in erosion within one to two years". Sediment routing to streams would be isolated to stream crossings, and to a lesser extent, at relief culverts discharging near streams. Road designs will follow Best Management Practices (BMP's) including outsloping where possible, appropriate culvert sizing, and drainage features such as rolling dips or water bars. With outsloping and drainage features, potential routing of water and sediment to the stream would be greatly reduced to approximately 50 feet on either side of the 2 stream crossings. Sediment inputs would be minimal, increasing fine sediment to a short reach (2-100 feet) below the culverts. Sediment below the culverts would be dispersed via streamflows prior to entering the perennial channel ½ mile downstream, at which point sediment becomes undetectable and inconsequential to channel conditions.

Following year two, potential routing of water and sediment to the stream would reduce. Inputs would be negligible and are not expected to increase fine sediment deposition below stream crossings. Road drainage improvement in section 27 would reduce water and sediment delivery to the stream network.

Cumulative Effects – Alternative 4

Vegetation removal would not add adverse effects to future harvest on private lands which is assumed to maintain early- and mid seral stand conditions. The Natural Selection Alternative maintains vegetative cover and would not add canopy openings to the watershed; thereby preventing increased water availability leading to increased peak flows.

At the McMullin 6th field watershed scale, the proposed roads would increase roaded acres by 0.03% of the area. Added to existing roads, the roaded acres (3.03%) would remain far below levels associated with increased peak flows.

Erosion from road construction that cross streams would produce short term increases in fine sediment which would be additive to culvert replacements and road maintenance. Each sediment input would be short term (2 years) and isolated to a small reach below culverts. During high flows, the increases in sediment would mix with total sediment load of the stream and become immeasurable and undetectable in downstream channel reaches. Following year two, sediment input from culvert replacements would near zero. Similarly, road maintenance producing short term sediment would reduce sediment input over the long term(>3yrs) due to improved road drainage. Therefore, current channel and water quality conditions would continue to improve on BLM managed lands.

3.2 Vegetation

3.2.1 Affected Environment

The present day landscape pattern of vegetation in the area surrounding the South Deer Project Area is a result of topography, soils, natural and human disturbances, harvesting, and agricultural/residential development. Ownership patterns and subsequent use is the primary driver for current vegetative trends with residential use in the lowlands, rotational harvest on private timber lands, and BLM checkerboard ownership supporting multiple uses.

Approximately 7.5% of the Deer Creek watershed classifies as agricultural and residential development. As a result, many of the lowland areas have been converted from forestland to pasture. With this conversion, many of the upland forested areas have been disconnected from surrounding areas resulting in fragmentation of upland forests. 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).

<u>Plant Series</u>
Douglas fir is the most common plant series within the Deer Creek watershed, as well as in the project area (Tables 10 and 11). In this series, Douglas fir is the dominant species at > 80% of a stands' composition, and ponderosa and sugar pine are present in the overstory, with very little regeneration occurring in the understory. Conifer regeneration, primarily Douglas-fir, occurs in gaps created by overstory mortality. Understory hardwoods include Pacific madrone, black oak, canyon live-oak and tanoak. Tanoak, especially on north-facing slopes, is often successful at

regenerating under the canopy, resulting in a dense understory of tanoak seedlings/saplings. Overstory canopy closure averages 71% (Atzet 1996).

Table 10. Plant series in the Deer Creek watershed

	BLM	Percent BLM	Non-BLM	Percent Non-BLM
Non-forest	1442	4.8	355	1.1
Water	--	--	137	<1%
Developed/Non-Vegetated	20	<1%	272	<1%
Developed/Vegetated	65	<1%	4585	14.5
Riparian/Hardwoods	--	--	511	1.6
Jeffrey Pine	2056	6.8	842	2.7
Tanoak/Douglas-fir	325	1.1	385	1.2
Tanoak	1674	5.5	--	--
Douglas-fir	14882	49.3	18605	59.0
Douglas-fir/Tanoak	5380	17.8	5490	17.4
White fir	4299	14.2	339	1.1
Port-Orford Cedar	58	<1%	26	<1%
Total	30201	100	31547	100

The Douglas-fir plant series is fairly productive, capable of supporting an average of 254 ft^2 basal area/acre in the absence of natural disturbance (Atzet and Wheeler 1984). Fire is an important process in this plant series, with the average fire return interval estimated at 15 years (White et al. 1997). Frequent fire interval created a multi-aged stand structure supporting a diversity of tree sizes and species composition. In the absence of fire, stands in this plant series currently support more trees/acre with a less diverse canopy structure. Tree crowns from the post-fire exclusion cohort are competing directly with the crowns of the remnant old-growth trees. This not only reduces the vigor of the old-growth trees but also increases the risk of fire climbing into the overstory, resulting in stand replacement fire. The high productivity produces high duff/litter layer, shrub abundance, and regeneration is abundant. This translates into higher fuel loading and more ladder fuels, which are conditions considered to be outside the natural range of variability.

Another large percentage of the landscape is in the Douglas-fir/Tanoak and Tanoak/Douglas-fir series category which represents stands that could fall into either the Douglas-fir or the tanoak series, depending upon the amount of regeneration in a particular area. In this series, tanoak is becoming a more prevalent stand component as succession advances in the absence of fire disturbance.

Species composition in the tanoak series is similar to the Douglas-fir series, except tanoak abundance is great enough to be called the climax species (Atzet 1996). The overstory species include Douglas-fir, sugar pine and ponderosa pine with an average canopy closure of 85% (Jimerson 1996). Tanoak is the dominant hardwood, followed by madrone and black oak.

Productivity is the highest in the tanoak series, supporting as much as 262 ft^2 basal area/acre in absence of natural disturbance (Atzet and Wheeler 1984). Because productivity is high, concerns for this series are very similar to those discussed for the Douglas-fir series. In addition to the

fuels build-up, tanoak abundance is much greater and has significantly lowered and in some areas excluded conifer regeneration.

Table 11. Plant series in the South Deer project area

Plant Series	BLM	Percent BLM	Non-BLM	Percent Non-BLM
Water	0	0.0	20	0.3
Developed/Non-Vegetated	2	0.0	441	6.6
Tanoak	1674	22.5	0	0.0
Douglas-fir/Tanoak	1818	24.4	3140	47.1
Douglas-fir	3843	51.6	2971	44.5
White fir	104	1.4	97	1.5
Total	7441	100.0	6669	100.0

Disturbance History

Natural and human caused fire played an important role in vegetative community structure and composition prior to the adoption of effective fire suppression techniques. On south and west aspects within the project area, the fire regime has been characterized as high frequency (0-35 years), low severity. On these sites, frequent surface fires maintained more pine and oak than currently exists because these species are more fire resistant than Douglas-fir and tanoak. In this fire regime stand densities would be low due to frequent fire disturbance. Frequent fire also created un-even aged stands with multiple canopy layers. On north and east aspects the fire regime has been characterized as moderately frequent (35-100+ years), mixed severity. On these sites fire was more variable, creating a diversity of stand ages, size classes and densities (Agee 1993).

Other natural disturbances include insects, floods and wind. The disturbance pattern produced by floods can be anywhere from small patch mortality to a complete scouring of the site where vegetation is transported downstream. Wind typically plays an important role on ridges, where small patches are blown down or in some cases entire stands are destroyed. The primary insect agent in Southwest Oregon forests is bark beetles. These insects typically feed on weakened and stressed trees that are large enough in diameter to produce adequate nutrients for insects to feed on. The relation of growth to sapwood produces a vigor index for individual trees which can be used to predict the likelihood of attack by bark beetles. Vigor index was calculated on core samples taken from 140 Douglas-fir site trees within the project area. Approximately 100 of these trees had a vigor index below 80; this is considered the threshold for insect attack (Larson et al. 1983). Insect activity in 2002 and 2003 was mapped on approximately 5% of the area within and adjacent to the project area during the annual aerial insect inventory.

The impacts of timber harvesting have varied both spatially and temporally across ownerships. In managed stands which have been clearcut and replanted, the vegetative community lacks vertical and horizontal structure. Resprouting of hardwoods within these stands has occurred, creating species diversity with a hardwood component. Pre-commercial thinning in the last 5-10 years retained a mix of species to promote long-term stand development into a vertically diverse

structure. Individual tree selection harvest (selective cutting, commercial thinning, and mortality salvage) has had less impact on the vertical and horizontal structure than clearcut prescriptions.

Vegetation Condition Class/Stand Dynamics

There are five major vegetation condition classes within BLM lands in the Deer Creek watershed and the project area (Tables 12 and 13). These are seedling/sapling, early (0-5" dbh), poles (5-11" dbh), mid (11-21" dbh) and mature (21"+ dbh). These vegetation condition classes are also found on non-BLM lands within the Deer Creek watershed with the major difference in the amount of developed vegetative class (0.1% versus 13.9%) and the mature class (36.0% versus 0.8%).

The seedling/sapling and early condition classes most often represents plantation stands. Generally, the dominant plantation species is Douglas-fir, and to a lesser extent ponderosa pine. Successful re-sprouting of hardwoods in the stand initiation phase often represents a large proportion of the stand composition. These stands can either have one or two layers depending on the age and development of the stand. The plantations are in the stand initiation development phase. Within the South Deer project area, there are 1,558 acres of seedling/sapling and early stands on BLM (approximately 20.9% of the BLM lands within the project area) (Table 13). In the Deer Creek watershed, across all ownerships, there are 4,649 acres (7.2% of the watershed) of these two condition classes.

Table 12. Vegetation condition class in the Deer Creek watershed

	BLM	Percent BLM	Non-BLM	Percent Non-BLM
Developed/nonvegetated	2	0.0	487	1.4
Developed/vegetated	18	0.1	4729	13.9
Grass/forbs	22	0.1	107	0.3
Shrub	1178	3.9	73	0.2
Hardwood	847	2.8	979	2.9
Seedling/sapling	2283	7.6	96	0.3
Early (0-5" dbh)_	2107	7.0	163	0.5
Poles (5-11" dbh)	3807	12.6	8322	24.4
Mid (11-21" dbh)	9056	30.0	18829	55.3
Mature (>21" dbh)	10882	36.0	269	0.8
Total	***30202***	***100***	***34054***	***100.0***

The pole vegetation condition class (5-11" dbh) can represent natural or planted stands. In natural stands regeneration occurred after a stand replacement event approximately 60-100 years ago. Planted stands typically range between 25-60 years in age for this vegetation condition class. These stands have moved from the stand initiation development phase into the stem exclusion phase. In this phase crown closure has occurred resulting in shading of the forest floor excluding understory species such as grass, brush, forbs and seedlings. Crowns begin to recede and trees begin to differentiate into crown classes (suppressed, intermediate, co-dominant, and dominant). Self-thinning in the suppressed classed begins because of competition induced suppression. These stands are generally one-layered but if a remnant large tree overstory is present they can be two-layered. Species diversity is low because of the lack of sunlight to the forest floor. There are 1,300 acres of pole stands on BLM lands within the project area

(approximately 17.5% of the project area) (Table 13). Across ownerships within the Deer Creek Watershed there are 12,129 acres (approximately 18.9% of the watershed) of this condition class.

Table 13. Vegetation condition class within the South Deer Project Area

	BLM	Percent BLM	Non-BLM	Percent Non-BLM
Developed/nonvegetated	2	0.0	19	0.3
Shrub	16	0.2	393	5.9
Hardwood	12	0.2	3	0.0
Seedling/Sapling	202	2.7	65	1.0
Early (0-5" dbh)_	1356	18.2	31	0.5
Poles (5-11" dbh)	1300	17.5	1472	22.1
Mid (11-21" dbh)	2532	34.0	4667	70.0
Mature (>21" dbh)	2021	27.2	19	0.3
Total	***7441***	***100***	***6669***	***100***

The mid vegetation condition class (11-21" dbh) generally represents natural stands. Stand age is highly variable in this class because the amount of time spent in the stand initiation and stem exclusion phases varied depending upon initial stocking, site factors, and disturbance history. These stands are moving into the understory reinitiation development phase in which mortality to large trees begins on an individual tree level, creating small canopy gaps. The light introduced into these canopy gaps allows for the regeneration of trees, brush and forbs. This creates another layer within the understory and enhances species and structural diversity. Large hardwoods that remain through the different development phases make up a mid-story level. Stands in this mid vegetation class in which individual tree selection has occurred typically contain more layers than un-entered stands. There are 2,021 acres on BLM lands within the project area (approximately 27.2% of the project area) in this vegetation class (Table 13). Across ownerships there are 27,885 acres of this condition class within the Deer Creek Watershed (approximately 43.4% of the watershed).

The mature vegetation condition class (>21" dbh) represent natural stands that are among the oldest age class on the landscape. These stands have been in the understory reinitiation phase for quite some time and contain multiple canopy layers and high species diversity. Mature stands also contain higher amounts of snags and down wood than the other vegetation condition classes. These stands represent both managed and un-entered stands in terms of harvest. There are 2,532 acres of mature stands on BLM lands within the project area (approximately 34.0% of the project area). Across ownerships there are 11,151 acres of this condition class within the Deer Creek Watershed (approximately 17.4% of the watershed).

Stand Inventory/Density

Stand exams were conducted by BLM on 10 representative stands within the project area (Table 14). The summary table illustrates the variability in species composition with some stands containing more hardwood trees per acre than conifers and others with conifers dominating. Hardwoods make up the majority of the trees/acre on the landscape, with most found in the understory (small diameter). Total trees per acre range from 432 to 1,620 in these stands. Basal areas range from 153 to 300 ft^2/acre with the least being found in small diameter (pole) stands. Relative densities range from 70% (0.705) to over 100% (1.152). Stands can remain above

100% relative density until mortality is caused by, disease, insects or drought. Mortality typically begins in the smallest suppressed size classes at relative densities of 55% or greater. Average diameters are low in these stands (4.5" to 10.3" dbh) because of the high trees per acre in the smaller size classes.

Table 14. Stand inventory summary

Unit (Twnship, Range, Section, OI #)	Trees Per Acre			Basal Area (ft^2/acre)	Relative Density	Average Diameter
	Douglas-fir	Pine	Hardwood			
38-7-35-001C	172	51	533	234	90.6%	7.5
38-7-27-004	405	1	204	250	91.3%	8.7
38-8-13-009	881	102	121	262	106.7%	6.6
39-7-4-006	231	0	970	153	70.5%	4.8
38-7-5-002	126	13	1481	183	86.3%	4.5
38-7-3-014A	87	1	1166	188	83.7?	5.2
38-8-13-001	520	25	382	178	75.6%	5.9
38-7-21-010	589	165	188	300	115%	7.6
38-7-21-003C	443	34	466	195	81.5%	6.2
38-7-21-013	264	25	143	252	86.0%	10.3

In order to characterize stand composition in terms of fuel arrangement, six of these stands were entered into Fuels Management Analyst (FMA), a fire behavior model. Canopy base height and canopy bulk density are the two vegetation parameters that influence fire behavior. Canopy base height refers to the distance from the ground to the lowest live limb; canopy bulk density refers to the amount of biomass within the canopy. Canopy base heights ranged from 2 to 11 feet in these six stands. Canopy bulk densities ranged from 0.0094 to 0.0485 lbs/ft^2 per acre; the critical threshold for crown fire potential is 0.0023 lbs/ft^2 per acre. These numbers illustrate that ladder fuels and high stand densities exist across the project area. (See fuels discussion for greater detail.)

3.2.2 Environmental Consequences

Alternative 1- No Action

Within the project area fire exclusion has created conditions favorable to Douglas-fir establishment, resulting in abnormally high stocking densities. Once established, these trees develop into the stem exclusion phase. During the stem exclusion phase, understory vegetation is shaded out, crowns recede, height growth is enhanced, and suppression-induced mortality begins in the smaller tree classes. Stands at high densities reach the stem exclusion phase faster than low density stands. Stands remain in the stem exclusion phase until mortality to the overstory creates canopy openings and structural complexity begins to develop (understory reinitiation phase). Therefore, structural complexity will eventually be attained through insect and disease attack, windthrow, and tree decadence but only if major stand replacement events do not occur.

Lack of disturbance in fire-adapted systems, such as those found in the project area, has resulted in higher stocking densities than the site is capable of maintaining. In this alternative, stands will

continue to have low individual tree vigor, reduced understory vegetation, and increased fuel loadings from suppression-induced mortality and litter fall. Higher levels of insect and disease infestations and infection is expected. These conditions are considered outside the range of natural variability for the Douglas-fir and Tanoak plant series. Once outside the range of natural variability, ecosystem stability, biological diversity, resilience and ecosystem health is reduced (Atzet and Martin 1991). The no-action alternative allows stands to remain outside the natural range of variability.

In the no-action alternative, abundance of early seral species such as pine and black oak would be reduced due to lack of regeneration opportunities and large tree mortality. Regeneration of these ecosystem components would continue to be limited by lack of canopy gaps (light to the forest floor) and high duff/litter layers. The longevity of large pre-fire exclusion pines and black oaks would be shortened by competition from post-fire exclusion vegetation. Thus, stand diversity in terms of species abundance and vertical structure would continue to be reduced.

Cumulative Effects

Annual insect surveys of Southwest Oregon indicate a recent increase in insect activity. As these populations build, the potential for insects to move into the project area increases. Stands with high densities and low vigor allows for an increase in insect and disease abundance. If insect populations are allowed to build-up on BLM lands within the project area, the potential for these to spread to adjacent lands increases. With background levels of insect infestation, only trees of low vigor are typically attacked, but once epidemic population levels are reached even healthy trees are subject to attack.

The high fuel loadings and ladder fuels created by the successful exclusion of fire and past management has created prime conditions for a wildfire start on BLM to spread to adjacent private/public lands. Stand replacement fire within the watershed will reduce structural complexity, create early-seral conditions, and increase brush abundance.

Alternative 2

Young stands prescriptions would release residual conifers and hardwoods and retain the most vigorous trees. Brushing and pre-commercial thinning would reduce canopy bulk density and ladder fuels (brush) and pruning would raise canopy base heights. Proposed initial planting and interplanting would ensure stocking levels are at or above BLM standards. Maintenance treatments may include some scalping or grubbing around seedlings. Surface fuels may increase in units where the slash goes untreated. All young stands within the Community at Risk (CAR) would be handpiled and burned which leaving the stands in a more fire resistant condition. Young stands outside the CAR will be evaluated after initial treatments for fire risk and hazard. Those considered at high risk and hazard will be handpiled and burned. In stands where this does not occur, treatments surrounding each unit would function to mitigate fire spread from the young stands to other areas. Long-term benefits of thinning and fuel treatments would be larger diameter trees, higher stand diversity by retaining a mix of species and structural diversity from crown differentiation.

Treatments in the pole and mid size classes would expedite development into the next vegetation condition class. Thinning from below would raise canopy base height and reduce canopy bulk

density making the stands more resistant to stand replacement fire. Underburning would reduce litter depths and down dead material, which would reduce flame lengths in the advent of a fire start. Some crown scorch and mortality (less than 15%) is expected to occur from the underburning. In past prescribed burns mortality has occurred on 8 to 15% of the total trees per acre.

The proposed action within the commercial thinning (CT) prescription includes crown thinning single layered stands to a relative density of 45%. The residual stand would be evenly spaced with 50 to 60% canopy cover. The release to the residual trees would increase individual tree vigor, accelerate diameter growth, and retain high crown ratios into the future. These stands currently have relatively little understory vegetation due to high crown closures. CT would produce a slight release in understory vegetation. Because the residual trees are so vigorous canopies would quickly close and once again suppress the understory vegetation, thereby, retaining a full canopy stand structure for landscape variability objectives.

Stands with density management (DM) prescription would include removal of trees primarily from the smaller size classes, retaining a canopy cover of 40-60% and creating a relatively evenly spaced residual stand. The underburning would create patches of bare mineral soil for regeneration of conifers dependent upon bare mineral soil for germination. Native grasses and forbs would respond as well, enhancing understory diversity. Current stand variability would be retained by releasing large hardwoods.

Stands with density management/modified group selection (DM/Mod GS) prescription would be similar to the prescription for DM but with some canopy gaps created around large hardwoods and dominant pines. The resulting stand structure would be vertically and horizontal diverse. The target canopy closure in these stands is 40%, which would result in a fairly open structure with light reaching the forest floor. Pine and oak regeneration is expected to increase, enhancing long-term survival of these species. Release of residual trees would accelerate diameter growth, retain high crown ratios and increase individual tree vigor.

Within the stands proposed for density management/understory reduction (DM/UR) the effects of the treatments will vary depending upon the level of removal. Some stands may receive a lighter thinning than others but no stand would be taken down lower than 35% relatively density, thus retaining an approximate 30% to 45% canopy closure. The effects to these stands would be a mix of the effects discussed for the commercial thinning, density management, and fuels reduction treatments. These stands have had multiple entries and the focus would be to restore structural diversity, enhance native species and reduce fire risk.

As you are addressing each alternative separately, not comparing Alt 2 &3 in one section, you need to address the 20 acres of RH under alternative 2.

A growth and yield model (Hann et al 1997), was used to simulate stand conditions after the implementation of density management. Post treatment relative densities ranged from 18% to 37% on the 10 representative stands (Table 15). The stand with the lowest relative density (38-7-5-002) is a pole-sized stand which would primarily be understory thinned with a few larger trees removed for products. Residual basal areas ranged from 60 to 148 ft^2/acre, which when

averaged across the ten stands, represents a removal of approximately 48% of the total basal area. The basal area removal is primarily in the small diameter class as evident by the increase in average stand diameter. The post harvest stand structure also shows a more even distribution of Douglas-fir, pine and hardwoods, supporting the attainment of a mixed species stand.

Table 15. Pre and Post density management stand conditions from ORGANON

Unit	Before/ After	Trees Per Acre			Basal Area	Relative Density	Average Diameter
		DF	Pine	Hard-wood			
38-7-35-001C	Before	172	51	533	234	90.6%	7.5
	After	60	33	16	108	31.0%	16.0
38-7-27-004	Before	405	1	204	250	91.3%	8.7
	After	50	1	13	108	29.8%	17.7
38-8-13-009	Before	881	102	121	262	106.7%	6.6
	After	28	14	19	148	36.8%	23.1
39-7-4-006	Before	231	0	970	153	70.5%	4.8
	After	97	0	16	105	32.7%	13.1
38-7-5-002	Before	126	13	1481	183	86.3%	4.5
	After	47	9	15	60	18.1%	14.0
38-7-3-014A	Before	87	1	1166	188	83.7%	5.2
	After	23	1	63	120	34.5%	15.9
38-8-13-001	Before	520	25	382	178	75.6%	5.9
	After	112	23	12	110	35.6%	11.7
38-7-21-010	Before	589	165	188	300	115.2	7.6
	After	30	25	17	140	35.4%	22.2
38-7-21-003C	Before	443	34	466	195	81.5%	6.2
	After	20	11	25	96	26.5%	17.7
38-7-21-013	Before	264	25	143	252	86.0%	10.3
	After	17.2	8	10	130	30.7%	26.2

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

Cumulative Effects

Commercial harvest has occurred on 59% of the BLM lands in the watershed since 1946. The earliest harvests have been regenerated and are progressing towards providing mature forest structure. Most of the private industrial lands have been and will continue to be moved from mid condition class to the early condition class. Under alternative 2, stand structure would be

enhanced, mean diameter would be greater, species diversity would increase, and fire hazard would be reduced. These effects would be beneficial to forest stands, rather than detrimental.

The propose action includes 1,442 acres of various levels of commercial harvest, representing 2% of the total watershed. In future foreseeable commercial entries on BLM lands there will be an additional 895 acres of commercial thinning (1% of the watershed). Josephine County has no foreseeable harvest planned in the Deer Creek watershed and Oregon Department of Forestry anticipates commercial thin on 95 acres. Private industry will continue on a harvest rotation schedule.

Since the adoption of the NWFP in 1994, regeneration harvest has been prescribed for very few stands (22 acres) within the Deer Creek watershed, showing an emphasis on thinning for forest health and structural/species diversity. The one stand proposed for regeneration harvest represents less than a hundredth of a percent of the watershed converted from mature to early with some mature trees left for overstory diversity. The regeneration of conifers in this stand would provide future timber supply and structure, which is not being provided for currently due to intense tanoak competition (see objectives).

Immediately following harvest, average stand diameter would be higher because most trees removed are from the smaller diameter classes. Over the long-term, average stand diameter would be substantially higher than in the no-treatment alternative as residual trees respond vigorously to the open growing conditions. Introducing stand variability, protecting against stand replacement events, and growing large trees faster would accelerate the attainment of mature forest stand structure. Through recovery of past harvest units and management activities emphasizing thinning to increase growth rates, there is and would continue to be an increase in mature stand structure at both the watershed scale and project level.

Alternative 3

The proposed action for young stands is the same as alternative 2, therefore the effects are similar. Stands labeled for no-treatment in this alternative would have the same effects as discussed for alternative 1 (no-action). Under alternative 3, there would be fewer acres treated for fuel hazard reduction and density management / understory reduction, and more regeneration harvest acres. Since no riparian reserves would be treated, current riparian conditions and processes would be maintained.

Alternative 3 identified 10 older seral stands for regeneration harvest harvest. This 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. The overstory would not be threatened by this, however, because canopy bulk density will be low and crown base heights will be high. Vegetation condition class would be taken from the mature to early class in less than one percent of the watershed. The high productivity of the remaining stands would increase future timber supply over current conditions where stands contain low conifer regeneration.

Many of the prescriptions for older seral stands remain unchanged from alternative 2; therefore the effects would be the same in these stands. In alternative 3, no commercial harvest is proposed for the (DM/UR) prescriptions. Most of these stands would receive no treatment, with the exception of stands near CAR and on the ridges in which fuel hazard reduction would take place. In the patches of dense large trees, individual tree vigor will remain low, pine and oak regeneration will be limited, and opportunity to provide commodities/services will be lost. In no treatment stands fire hazard will remain high, individual tree vigor will continue to decline and structural development will be delayed.

Cumulative effects

Approximately 2.7% of mature stands would be converted to early condition class. However, as with Alternative 2, this represents <1% of the watershed. Through recovery of past harvest units and management activities emphasizing thinning to increase growth rates, there would be an increase in mature stand structure at the watershed and project scale. This alternative treats fewer acres than alternative 2. In treated stands the effects are similar to those described for alternative 2. In untreated stands the effects are similar to the no-action alternative.

Alternative 4 - DCV NSA

In order to quantify the amount of removal proposed under alternative 4, several assumptions were made based on discussions with the DVNRCA group. The proposed action under this alternative is to remove only the smallest, least vigorous trees (low crown ratio) which do not contribute to the upper canopy, thus resulting in no microclimate changes in the understory. In order to be removed the tree must be marketable; therefore, most of the removal proposed under this alternative would be greater than 6" in diameter. To simulate this level of treatment the smallest least vigorous tree located on each stand exam plot would be removed (Oroville Camp, per comm.) (Table 16). This was done in ORGANON, an individual tree growth and yield model. The information provided by this assessment is summarized for all 10 stands representing a range of stand structures found within the planning area. The impact of harvest on each stand structure is then generalized across the landscape.

Table 16. Oraganon analysis for Alternative 4 - DCV NSA

Unit	Before/ After	Trees Per Acre			Basal Area	Relative Density	Average Diameter
		DF	Pine	Hard-wood			
38-7-35-001C	Before	172	51	533	234	90.6%	7.5
	After	150	51	533	214	83.8%	7.3
38-7-27-004	Before	405	1	204	250	91.3%	8.7
	After	381	1	204	230	84.7%	8.5
38-8-13-009	Before	881	102	121	262	106.7%	6.6
	After	855	102	118	242	99.5%	6.4
39-7-4-006	Before	231	0	970	153	70.5%	4.8
	After	180	0	970	137	64.0%	4.7
38-7-5-002	Before	126	13	1481	183	86.3%	4.5
	After	98	13	1481	174	82.5%	4.5
38-7-3-014A	Before	87	1	1166	188	83.7%	5.2
	After	87	1	1110	175	78.3%	5.2

38-8-13-001	Before	520	25	382	178	75.6%	5.9
	After	501	10	368	157	67.6%	5.7
38-7-21-010	Before	589	165	188	300	115.2	7.6
	After	558	160	188	280	108.2%	7.5
38-7-21-003C	Before	443	34	466	195	81.5%	6.2
	After	423	29	454	180	76.9%	6.0
38-7-21-013	Before	264	25	143	252	86.0%	10.3
	After	247	25	135	235	80.3%	10.3

For the natural selection alternative, it is assumed that the level of treatment represented in the ORGANON assessment (Table 16) would occur over the next five years on all stands proposed for natural selection (Appendix B). The intention of the proposal is to remove trees from each stand which meet their criteria for natural selection. Assuming that no disturbance to the landscape occurs, the level of removal under the natural selection alternative would be consistent through time, producing a steady level of products to the community.

The premise behind natural selection is that nature decides the weakest individuals through the process of succession. Those trees proposed for removal are the ones with extremely low crown ratios (less than 20%), which occupy the suppressed crown class. If not removed these trees would be thinned out by "natural selection". No canopy cover reduction occurs because all trees removed are from the lower stratum. Understory brush, grasses and forbs are shaded out as succession advances. Thinning would not occur around large pines and hardwoods, allowing succession to advance and reduce these early seral species abundance across the landscape (Franklin et al 2002).

Young stands will remain in the stem exclusion phase until mortality to the larger trees begins. The natural selection alternative proposes to remove dead trees which are still merchantable (decay classes 1 and 2) once the snag and down wood levels required by the RMP are met. Currently none of the 10 representative stands contain dead wood levels which meet these minimum standards. Therefore, the level of harvest in Table 16 represents the harvest opportunities under this alternative.

As succession advances, stands will move into the understory reinitiation phase in the same amount of time as described for the no-action alternative. Stand densities will remain high and individual tree vigor will continue to decline. No canopy gaps will be created and regeneration of pine and oak will be inconsequential. The proposal includes no thinning of smaller diameter classes, therefore ladder fuels would continue to pose a threat to large legacy trees. Removal would not occur from the upper canopy keeping canopy bulk density essentially at current levels. No underburning is proposed resulting in greater surface fuel amounts as succession advances in the absence of fire. The greater litter depths would inhibit regeneration of pines and oaks (Tappeneir and McDonald 1979; Burns et al. 1990) and brush, grass and forb diversity and abundance would decline. Landscape structural diversity would be relegated to dense, continuous canopy stands containing one to two layers in young and mid stands, with three layers only present in mature stands. Long-term site productivity has been correlated with ecological diversity and would be degraded because of stagnation of these stands(Tilman 1999; Petraitis et al. 1989). Ecological diversity is also directly tied to ecosystem resilience (Franklin et al, 1989) and would in turn be degraded. Forest productivity concepts advocate

accommodating early successional species, providing coarse woody debris, and creating mixed stands (composition and structure).

Cumulative Effects
The level of removal for this alternative is inconsequential which allows current stand trajectories to progress. The cumulative impacts to vegetation would be the same as those described for the no-action alternative.

3.3 Fire and Fuels

3.3.1 Affected Environment / Current Condition

Fire regime, fire condition class, fuel models and estimates of fuel hazard provide measures and indices of fuel loads, fire hazard, and difficulty for suppression. They provide for comparing the effects of the alternatives and, in turn, provide an assessment of the potential for the protection of homes and resources in the project area.

Wildfire History / Fire Regimes

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

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

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

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

These fire regimes are generally used with an historical perspective in the context of fire regimes prior to the era of fire exclusion. They also, however, provide an indicator of natural processes

that contributed to some of the forest vegetation and structure currently seen. They are thus useful in characterizing / generalizing broader conditions across a project area or the broader landscape. Agee (1993) has described the fire regime in southwest Oregon as moderate or mixed severity, that is, a mixture of stand replacement and low severity fires with fire return intervals ranging from 0-115 years.

The South Deer project area includes fire regime 1 and 3:

Fire Regime 1. 0-35 years, Low Severity

Typical climax plant communities include ponderosa pine, pine-oak woodlands, dry Douglas-fir sites and low elevation grasslands usually located within the valley bottoms. Large stand-replacing fire can occur under certain weather conditions, but are rare events (i.e. every 200 years). Valley bottoms and the drier south and west aspects within the project area fall within this regime. Approximately 49% of the project area is within this fire regime.

Fire Regime 3. < 50 years, mixed severity

Typical plant communities include mixed conifer and dry westside Douglas-fir. Lower severity fire tends to predominate in many events. This regime usually results in heterogeneous landscapes. Large, stand-replacing fires may occur but are usually rare events. Wetter and cooler north and east aspects and the higher elevations within the project area fall within this fire regime. Approximately 51% of the project area is within this fire regime.

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

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

The past 20 years in Southwest Oregon indicate that there has been a trend of more large fires which burn at higher intensities in vegetation types associated with low to mixed severity fire regimes. Recommmend condensing fire regime, FCC, risk, etc. into 1-2 paragraphs each. You don't need to include you data analysis (basic number crunching) in the EA, but it could be in the project record.

Fire Regime Condition Classes (FRCC)/Fire Hazard

Fire condition classes offer another current approach to evaluating potential fire conditions. It is an approach most useful at the project and larger scales with the effects of treatments being reflected in changes in the acreage in each FRCC. FRCCs are a function of the degree of departure from historical fire regimes resulting in alterations of components such as species composition, structural stage, stand age, and canopy closure. There are three fire condition classes:

> FRCC 1 - Fire regimes are within or near an historic range. The risk of losing key ecosystem components is low. Vegetation species composition and structure are intact and functioning within an historical range.
>
> FRCC 2 - Fire regimes have been moderately altered from their historical range (more than one return interval). This change results in moderate changes to one or more of the following: fire size, frequency, intensity, severity, or landscape patterns.
>
> FRCC 3 - Fire regimes have been significantly altered from their historical range. The risk of losing key ecosystem components is high. This change results in dramatic changes to fire size, frequency, severity, or landscape patterns.

Table 17 displays fire regime condition class acreages within the South Deer project area.

Table 17. Fire Regime Condition Class within the South Deer project area

Element	Fire Condition Class 1		Fire Condition Class 2		Fire Condition Class 3	
	Acres	% of Total Acres	Acres	% of Total Acres	Acres	% of Total Acres
BLM lands	0	6%	1,086	10%	6,356	84%
Non-BLM lands	864		336		5,468	

Source: Mitchell/Martin (USDI 2004). Data determined by Fire Regime Condition Class (FRCC) modeling software which utilizes local expertise, ground reconnaissance, historic and current photo comparisons and fire history indicator assessments.

Lands identified within the project area as FRCC 1 are mostly those lands found in the valley bottoms and include cultivated fields, vineyards, orchards, open grasslands and areas around private dwellings that have had vegetation management.

Areas of FRCC 2 are areas where vegetation / fuels have been moderately reduced by past land management activities including, density management or fire hazard reduction activities .

Areas of FRCC 3 are areas where vegetation / fuels have been substantially altered by past land management activities such as effective fire suppression, clearcut logging, and plantations. .

Fire Behavior Fuel Models

Shrub Group

Fire Behavior Fuel Model 4 - Fire intensity and fast spreading fires involve the foliage and live and dead fine woody material in the crowns of a nearly continuous secondary overstory. Stands of mature shrubs, six feet tall or more are typical candidates. Besides flammable foliage, dead

woody material in the stands contributes significantly to the fire intensity. A deep litter layer may also hamper suppression efforts.

Fire Behavior Fuel Model 5 - Fire is generally carried by surface fuels that are made up of litter cast by the shrubs and grasses or forbs in the understory. Fires are generally not very intense because the fuels are light and shrubs are young with little dead material. Young green stands with little dead wood would qualify.

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

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

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

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

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

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

Table 18 displays fire occurrences in the project area (all ownerships) over a 31 year period. Lightning accounted for 23% of the total fires; humans caused 77% of the total fires.

Table 18. South Deer historic fire occurrence (1969 – 2000)	
Total Number of Fires	**Size Class**
61	A (<.25ac)
9	B (.26-10ac)
1	C (10.1-100ac)
0	D (100.1-300ac)
0	F (> 300 ac)

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

Fire Hazard - Fire hazard is useful in the broad prioritization of fuels management treatment needs in a project area. It also provides a comparative index for alternative proposals. Fire hazard provides an index of resistance to control of a wildfire and is based on vegetation, fuel arrangement and volume, condition and location which are determinants of the potential for spread of a fire and the difficulty of fire control. See Appendix F for methodologies and concepts used to determine hazard ratings.

Based upon the fire hazard rating, the canopy base height, and canopy bulk density, the potential for a large fire to occur is high to extremely high for the project area. The extensive high hazard condition (Table 19) in the project area reflects the history of fire exclusion and the resultant build up surface and ladder fuels.

Table 19. Fire Hazard Ratings for the South Deer Project Area			
Fire Hazard Rating	**BLM Administered Lands (acres)**	**Non-BLM Land (acres)s**	**Percentage of Acres in each Category**
Low hazard	11	63	<1%
Moderate hazard	3,061	3,850	49%
High hazard	4,340	2,726	50%

Source: Parsons/Mitchell (USDI 2004)

Values at risk provide a relative index of resource and human values in an area. A majority (94%) of the South Deer project area is in the high and moderate values at risk category due to the residential, wildlife, recreational, and other forest resource values. Approximately 23% of the project area falls within the Illinois Valley designated Community at Risk (CAR); 94% lies in the Wildland Urban Interface(WUI) (Table 20).

Table 20. WUI and CAR Acres						
Designation	Total Acres	Percent of Project Area	BLM		Private	
			Acres	% of Total Acres	Acres	% of Total Acres
WUI	13,322	94%	6,975	49%	6,347	45%
CAR	3,233	23%	1,120	8%	2,113	15%

Source: Derived from GIS, Medford District BLM

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

Surface Fire Behavior Models – Fuel models are used to estimate potential fire behavior. Surface fuel treatments greatly reduce heat per unit area, fire line intensity and flame lengths. Flame lengths less than 4' are considered safe for direct attack. Flame lengths greater than 4' require an indirect attack strategy.

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

Canopy Base Height and Canopy Bulk Density

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

Air Quality

The population centers of Grants Pass and Medford/Ashland are the closest non-attainment areas. The non-attainment status is not attributable to particulates (PM-10, PM-2.5) from prescribed burning. Major sources of particulate matter within the Grants Pass and Medford/Ashland non-attainment areas are smoke from woodstoves, dust and industrial sources. Over the past eight years the population centers of Grants Pass and Medford/Ashland have been in compliance for the national ambient air quality standards for PM 10 and PM-2.5. 1

In general, air quality in the Illinois Valley is good with limited local emission sources including occasional construction and logging equipment, light industrial, vehicles, road dust, residential wood 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. All prescribed burning activities are regulated by the State of Oregon to ensure that burning complies with air quality standards.

1 Oregon Smoke Management Guide

Methodology: The environmental consequences of the alternatives are compared, in part, based on the Fire Regime Condition Class (FRCC) 2 and Fire Management Analyst + (FMA+) modeling. Modeling was done for each of the five representative forest stand types receiving fuel treatments to provide a generalized basis for comparing treated vs. untreated conditions. It allows a comparative estimate of the number of days of surface fire potential and also the number of days that an active crown fire would be sustained under average weather conditions (past 20 years of weather data used) for the area. Comparing current fire conditions with post treatment conditions yields relative effectiveness of the alternatives.

Changes in acres of different fuel model conditions, changes to fire risk and fire hazard (acres of high, medium and low) also provide parameters for comparing effects on fire potential, ease of wildfire suppression, and the potential for high severity fire.

3.3.2 Environmental Consequences

Alternative 1: No Action

Stand Level

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

With these conditions, wildland fire fighters and the local public would be at greater risk for loss of life and property. Direct attack capabilities would diminish as fuel hazard increases. Initial attack success would progressively decline over time resulting in larger fire sizes. Aerial attack effectiveness would decrease with extreme fire behavior and over time as the upper and mid level canopies close, preventing the penetration of water or retardant. As a result, many stand types would experience stand destroying wildfires reverting them back to early seral conditions.

Table 21 provides a comparative base by describing modeled (FMA+) fire behavior in each of the 6 typical stand types identified for fuel treatments.

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2 Modeling is based on field data gathered from 5 plots distributed over 3 sites located around Lake Selmac and within proposed fuels reduction units. Data from 5 other plots was gathered to assess fire behavior potential in areas proposed for thinning. The plots collect surface fuels information as well as tree data on representative sites for the stand type being assessed. From this information, current CBH and CBD are assessed for the stand types in their current state. Once the current canopy and surface fuels are assessed the information is combined with historic weather and environmental conditions to identify potential sites for crown fire activity. From this assessment, the change in fire behavior is modeled resulting from implementing the proposed activities.

Table 21. Pre-treatment fire behavior predictions using FMA+						
Treatment Type	Plot	Stand Type	Env. Conditions	Wind speed	Fire Behavior	Percent Days
No Action Current Conditions	013-1	Mid-Late closed Heavy dead and down FBPS FM 10	Dry Wet	0-4 4-12 13+ n/a	Surface Passive Crown Active Crowning n/a	29 47 10 10
No Action Current Conditions	13-2	Mid-Late closed Heavy dead and down FBPS FM 10	Dry Wet	0 4-12 13+ n/a	Surface Passive Crown Active Crowning n/a	23 27 36 10
No Action Current Conditions	17-1	Mid Closed Moderate dead and down FBPS FM 9	Dry Wet	0-4 4-12 13+ n/a	Surface Passive Crown Active Crowning n/a	29 21 36 10
No Action Current Conditions	17-2	Mid-Late closed Heavy dead and down FBPS FM 10	Dry Wet	0-2 3-12 13+ n/a	Surface Passive Crown Active Crowning n/a	25 30 31 10
No Action Current Conditions	19-2	Mid-Late closed Heavy dead and down FBPS FM 10	Dry Wet	0-5 6-20+ n/a n/a	Surface Passive Crown Active Crowning n/a	31 55 0 10

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

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

Project Level

With the no action alternative fire regimes 1 and 3 would continue on present trajectories of unnaturally heavy fuel loads, over stocked stands, increases in shade tolerant and fire intolerant vegetation and fire behavior outside the range of natural variability. Lands currently in condition class 3 (84% of the project area) would remain unchanged until a natural wildfire disturbance occurs. Acres in condition class 1 and 2 would continue to move towards a condition class 3. Fire risk would increase as population densities increase, residential development continues, and recreation and tourism become a focal point for the Illinois Valley.

The extent of fire condition class 3 would continue to increase in the project area. Table 22 estimates the increases in high fuel hazard levels in the project area over the next 10-20 years.

Table 22. Projected Hazard Classification							
Time period	Total Acres	High Hazard		Moderate Hazard		Low Hazard	
		Acres	% of Total	Acres	% of Total	Acres	% of Total
BLM – Current *	7,412	4,340	50%	3,061	49%	11	<1%
5-10 Years	7,412	5,188	70%	2,190	29%	10	<1%
10-20 Years	7,412	7,263	98%	143	2%	6	<1%
Projections are based on the assumption of 20% acreage increase in the high hazard for the first 5-10 years and an additional 40% for the next 10 – 20 years.							

As the acreage of high fuel hazard increase, the potential for high severity wildland fire increases within the project area. Strategies and tactics for fire suppression would shift to indirect attack utilizing topographic features such as ridgetops and existing road ways resulting in larger fire sizes. Initial attack suppression goals (94% of new fire starts to 10 acres or less) would become increasingly difficult to attain due to increased fire line heat and flame length. Therefore, the potential for a fire start to develop into a large fire would continue to increase. Typically, fires larger than 100 acres result in burn severities as follows: 30 - 50% of the area with moderate to high severity and with 75 - 100% canopy mortality.

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

Alternatives 2 & 3

Alternative 3 would treat 3,734 acres. Alternative 2 would treat an additional 1,400 acres for a total of 5,134 acres (Table 23). Total acres do not represent the sum of individual treatments as many acres would receive a combination of treatments.

Table 23. Planned treatment acres by treatment type and alternative

	Total	UT	HP/B	UB	MM	PR
			Alternative 2			
CAR	1,074	951	1,055	670	122	0
WUI	3781	3,510	3,597	3,404	271	88
Non-WUI	279	163	167	245	112	0
TOTAL	5,134	4,624	4,819	4,319	505	88
			Alternative 3			
CAR	956	835	939	656	21	0
WUI	2,563	2,353	2,440	2,323	109	88
Non-WUI	215	99	103	181	112	0
TOTAL	3,734	3,287	3,482	3,160	242	88

Stand Level

Stand level effects are similar for both alternatives as both have common fuel treatment prescriptions. In treated forest stands (see Table B-2), surface fuels and ladder fuels would be reduced resulting in low to moderate intensity surface fire. Surface fuel models would be reduced from a FM 10 (>6' flame lengths) to a FM 8 or 9 (<4' flame lengths). At these levels, direct attack suppression tactics are generally successful which are safer and more effective. Stands may experience some over story (<10%) mortality due to single tree or group torching. Stands labeled for no-treatment in Alts. 2 (1,028 acres) and 3 (2,430) would have essentially the same effects as discussed in the no-action alternative.

Fuel treatments, tools and prescriptions for the identified units/stands (Appendix B) in each alternative would have similar influence on the structure, composition and fuel loading (Table 24). Surface fuel models would be reduced from a fuel model 10 to fuel model(s) 8 or 9.

Table 24. Fuel Treatment Effects Comparison by Alternative (stand level)		
Element	**Alternative 2**	**Alternative 3**
Surface fuels reduction	Fuels would be reduced at the highest level of treatment (potential treatment of 5,134 acres)	Fuels would be reduced, but at a lower level (potential treatment of 3,734 acres)
Increase canopy base height (CBH)	Highest level of CBH increase within both the surface fuels and treatment of the overstory canopy. Highest level of pole and mid vegetation condition classes treated.	CBH increased but at a lower level. Limited treatment of understory vegetation treatment in the mid-slope region.
Reduce canopy bulk density (CBD)	The greatest level of reduction would occur within the pole and mid vegetation classes under the harvest prescription. This in conjunction with the highest level of fuel treatments would have the greatest reduction of CBD.	A lesser level of reduction would occur within the pole and mid vegetation classes. Level of active crown fire behavior would be reduced,. but under extreme conditions, would provide limited reduction in crown fire behavior
Riparian Reserve fuel treatments	The greatest level of fuels reduction (985 acres) within the riparian reserve. The greatest potential of retaining key ecosystem components in the event of wildfire.	No fuels treatment within the riparian reserve. Higher probability of losing key ecosystem components.
Fire Condition Class	The greatest level of fuels reduction treatments in stands classified as FCC 3 (5,574 ac.). 88% of condition class three would be returned 1 to 2 condition classes. The risk of losing key ecosystem components is the lowest.	A lesser level of fuels reduction in FCC 3. (4,384 ac.). 69% of FCC3 would be returned 1 to 2 condition classes. The risk of losing key ecosystem components is the reduced at a lesser level.
Fire Hazard	70% of high hazard areas would be treated.	54% of high hazards area would be treated.

Initial fuel reduction

Under story thinning: Stands would be thinned to varying degrees of tree canopies openings, reducing crown bulk densities and increasing crown base height. An increase in solar radiation on the forest floor may increase surface temperatures, decrease fine fuel moisture, decrease relative humidity, and may increase surface wind speeds compared to un-thinned stands increasing fire hazard if surface fuels are untreated. Therefore, surface fuels would be reduced to minimize the potential for high severity, high intensity fire.

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

Under burning: A typical underburn prescription would reduce 70% of the fine dead 1-100 hour timelag fuels (¼" – 3" diameter) and 50% of the 1,000 hour timelag fuels (3" – 9" diameter). In most units 10,000 hour time lag fuels are retained but it can be expected that up to 10% would be consumed, mostly in the smoldering phase. A high percentage of the loss of the large woody material is through outer layer charring, often reducing the overall diameter but not consuming the entire log. During fall burning conditions when fuel moistures are lower an

increase up to 25% consumption can be expected. Hand line would be constructed where other barriers are absent using chainsaws and hand tools. Hand lines consist of the removal of all fuels down to mineral soil for a width of 1-3 feet. Width would be determined by the fuel type with narrower lines in light fuels such as grass and wider lines in heavier fuel loading such as timber and brush. Water bars would be used on slopes exceeding 10% and spacing would be based on slope. Hand lines would be allowed to be rehabilitated naturally as it is expected they would be utilized during the maintenance underburn.

Mechanical thinning (machine masticator): Trees and understory vegetation are chipped and shredded and redistributed on the soil surface. In the short term, total fuel loading would not change. Fuel structure would be changed from a vertical fuel profile (ladder fuel) to a horizontal fuel profile (surface fuel), creating a compact surface fuel bed, ranging from 1" – 6" in depth. Less than 10% of the area would have a fuel depth of 6 inches. These smaller (shredded) fuels have a higher decomposition rates and underburning may be used as a second entry to reduce fire intensity. Past treatment units in the Illinois Valley have shown slower decomposition rates in units with heavy manzanita or hardwood components. Through personal observation during wildfire events and prescribed burning in fuels treated with a machine masticator, rates of spread and flame lengths were comparable to either fuel model 8 or 9 depending on the depth and compaction of the fuel bed. Fire line intensities and heat per unit area fluctuated with fuel bed depth and is comparable to a fuel model 10. However, canopy base height is increased and lower to mid level canopy bulk densities are decreased reducing the probabilities of crown fire initiation.

High levels of mortality to overstory vegetation can be expected during wildfire events in areas w/out follow up fuel treatment. Prescribed burning would decrease fuels reducing flame length and heat intensity of wildfire. Over time, mortality levels associated with wildfire would decrease as fuels decompose and fuel loading is reduced.

Table 25displays the percentage of days of expected fire behavior given historical weather inputs following fuel reduction activities. Compare Tables 21 and 25 to see how the number of crown fire days is reduced to zero following treatment.

Table 25. Post treatment fire behavior

Treatment Type	Plot	Stand Type	Env. Conditions	Wind-speed	Fire Behavior	Percent Days
Fuels reduction removal of 85% of >8" dbh and surface fuel reduction	013-1	Mid-Late closed Heavy dead and down FBPS FM 10	Dry Wet	0-20 n/a	Surface Passive Crown Active Crowning n/a	86 0 0 10
Fuels reduction removal of 85% of >8" dbh and surface fuel reduction	13-2	Mid-Late closed Heavy dead and down FBPS FM 10	Dry Wet	0-5 6-29 29+ n/a	Surface Passive Crown Active Crowning n/a	29 57 0 10
Fuels reduction removal of 85% of >8" dbh and surface fuel	17-1	Mid Closed Moderate dead and down FBPS FM 9	Dry wet	0-20 20+ n/a n/a	Surface Passive Crown Active Crowning n/a	86 0 0 10

reduction						
Fuels reduction removal of 85% of >8" dbh and surface fuel reduction	17-2	Mid-Late closed Heavy dead and down FBPS FM 10	Dry wet	0-20 20+ n/a n/a	Surface Passive Crown Active Crowning n/a	86 0 0 10
Fuels reduction removal of 85% of >8" dbh and surface fuel reduction	19-2	Mid-Late closed Heavy dead and down FBPS FM 10	Dry wet	0-20 20+ n/a n/a	Surface Passive Crown Active Crowning n/a	86 0 0 10

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

Maintenance Fuel Reduction

Maintenance Underburning: Periodic low intensity underburns would be used to maintain units in the desired condition. Frequency and location of the underburns would be based on the representative fire regime and subsequent vegetation response. It is estimated that maintenance burning throughout the project area would be on a 7-15 year rotation in areas classified as fire regime 1 and on a 10-30 year rotation for areas within fire regime 3.

Project Level

Due to urban growth, population increases and recreation and tourism becoming a focal point in the Illinois Valley, fire risk is expected to increase. The priority in both alternatives is to treat stands within and adjacent to the CAR and in stands with activity created fuels. Table 26 displays acres treated in the project area by alternative. Under Alternative 3, fuel hazard reduction treatments focus on strategic areas within the CAR and stands on main ridgelines, resulting in fewer acres being treated overall (3,734 acres). Alt 2 treats these areas and more of the mid and lower slope areas in the project area. Alternative 2 would have the greatest reduction in fire hazard as 70% of the high hazard lands would be treated; alternative 2 would treat 1,400 more acres than Alternative 3.

Table 26. Fuel Treatment Comparison by Alternative

Element	Alternative 2	Alternative 3
Total acres treated	5,134 acres	3,734 acres
Fire Regime Condition Class 3	88% of FRCC acres treated.	69% of FRCC acres treated.
Communities at Risk (CAR)	91% of lands designated as CAR.	85% of lands designated as CAR.
Wildland Urban Interface	54% of lands designated as WUI.	37% of lands designated as WUI.
Fire regime	70% of fire regime 1 and 63% of fire regime 3 would be treated.	52% of fire regime 1 and 43% of fire regime 3 would be treated.
High Fire Hazard	70% of high hazard areas would be treated.	54% of high hazards area would be treated.

Stand level treatments are common to alternative 2 and 3 and therefore the effects would be the same. The difference is in the objective, reflected in the difference in acres treated. Treated stands would be more resistant to crown fire initiation due to the reduction in the crown base height and crown bulk density reducing mortality to over story vegetation. Both alternatives would result in a reduction of the potential for large scale, high intensity fire as fire suppression would be more successful across the project area. Alternative 2 would have the greatest number of treated stands at all elevations (valley bottoms, mid-slope, ridgetops) throughout the project

area, minimizing potential fire spread from untreated stands. Alternative 3 treats fewer acres within the mid-slope region. The untreated stands would have the same wildfire behavior and intensity as those described in the no-action alternative.

Alternative 4 - DCV NSA

Alternative 4 proposes no treatment of activity or natural fuels. The proposal relies on the occurrence of natural fire to reduce fuel loads. However, the Medford District Fire Management Plan (p.33) states that a fire plan must be in place to use natural fire for resource benefit. The Medford District RMP (p.90) states that natural fire would only be permitted in areas where ACS and riparian reserve objectives would be met and there is an approved fire management plan.

Stand Level

When trees are cut and removed, limbs and slash would be lopped and scattered and left on site to decay. This would increase surface fuel loading within the stand. This increase would not change the ground fuels models. Removal of only an occasional over story tree would not change current crown bulk densities to a degree that would alter the current crown fire behavior. Ladder fuels would be reduced slightly in those stands where the under story trees >6" dbh are cut.

The minimal under story thinning would have very little effect on the current crown base height and not alter the potential for crown fire initiation. The stand level effects would be comparable to those described for Alternative 1, the no action alternative. Suppression efforts would continue to be difficult and would tend to be reliant on indirect suppression and holding fire at strategic landscape scale locations. The trend toward increased fire behavior would continue as indicated in Table 20.

Project level

At the project level, fuel hazard and the potential for severe wildfire would be similar to Alternative 1. Because there would be essentially no short term changes to fuel hazard conditions and severe wildfire potential at the stand level, natural fires would have a high probability of being severe fires at the landscape scale. Suppression targets of 94% of the fire starts being held at 10 acres or less would be difficult to attain. Over time, fuel hazard would increase at the project level (Table 22). Suppression efforts would be difficult and would be reliant on indirect suppression, holding wildfires at strategic landscape scale locations.

The construction of additional roads to support the proposed logging systems would provide increased ease of access. Conversely, roads also represent an increased potential for human caused fire starts.

Air Quality

Alternatives 1 and 4 would not have any smoke from prescribed burning activities, yet have the greatest potential for large scale smoke events from wildfires. Wildfires have the potential to emit large quantities of smoke over long periods of time (single day to several weeks) and at uncontrollable times and levels. High levels of PM 10 and PM 2.5 emissions would be expected from major wildfire events within the local area or region.

Prescribed fire would produce smoke. However, through appropriate smoke management measures, the quantities, duration, and timing of the burn can be adjusted to manage such production. Alternative 2 would have the highest amount of smoke produced from prescribed burning but at lower levels compared to wildfire events. Smoke levels from alternative 3 would be less than alternative 2. Importantly, prescribed fire in call cases would comply with Oregon smoke management constraints. If standards were exceeded they would most likely be highly localized and several hours in duration.

3.3.3 Cumulative Effects

Air Quality

There are no known on-going or foreseeable projects that would impact air quality at the same time fuels would be treated under alternatives 2 or 3. Therefore, alternatives 2 and 3 are not expected to contribute cumulatively to any air quality impacts beyond direct impacts identified already.

Fuel Reduction and Fire Behavior

Since 1990, 964 acres of UT/HP/B, 389 acres of mechanical treatment and 290 acres of UB have been completed on BLM land in the Deer Creek watershed (the Deer Mom, McMullin and Free & Easy projects). Approximately 800 acres (1% of the Deer Creek watershed) are planned in the next two years under the Anderson West project. Combined with the proposed action which treats up to 5,134 acres, 7,577 acres representing 10% of the Deer Creek Watershed would be treated; 31% of the South Deer project area would be treated.

The proposed fire hazard reduction treatments of alternatives 2 and 3 would return a large portion of the project area to near its historical ranges of fuel loadings, canopy base height and canopy bulk densities. This would result in a substantial reduction to fire hazard, and associated loss to values at risk within the project area. It would compliment several other fuel reduction projects (including Free and Easy, Deer Mom, Anderson West, 3 + 3 and NFP grant projects) currently planned within the Deer Creek watershed. Wildland firefighter and public safety would greatly increase in treated areas and direct strategies and tactics could be utilized to control the fire, resulting in fewer acres burned and less threat to private property.

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

3.4 Recreation/Cultural/Visual Resources

3.4.1 Affected Environment

Recreation

Recreation resources within the project area are abundant. Lake Selmac, a man-made lake, has two developed campgrounds, as well as day use areas, hiking trails, miniature golf, an RV Park and boat rentals. The area attracts anglers, hikers, horseback riders, mountain bike riders, boaters and campers. Josephine County Parks Department has a Recreation and Public Purposes (R&PP) Lease with BLM for management of 48.56 acres of land around Lake Selmac. This land is to be managed for picnicking, swimming, boating, fishing, camping, hiking and horseback riding and includes a portion of the campground in section 13, and 8.56 acres in section 19. South of the lake, in section 19, there are several miles of non-motorized trails. Trails also leave the campground in section 13, and continue onto BLM land. There are also many other unofficial, non-designated trails that are used by horseback riders and Off Highway Vehicles (OHV). These trails are used often for special events, such as equestrian endurance rides and adventure races. There is interest among recreationists to development a trail from Lake Selmac to the Oregon Caves. While there is no specific route, this trail would include existing roads, non-designated trails and would cross private lands.

Highway 199, the main highway from southern Oregon to the Oregon/California coast and Redwoods, travels to the west of the project area. The closest point from Highway 199 to the project area is approximately .75 miles at the north end of the project area (section 13).

Cultural

Archaeological evidence indicates that human occupation of southwest Oregon dates back at least 8,000 years before present. The Native Americans who inhabited the project area were primarily hunter-gatherer-fishers. They occupied low elevation areas along major rivers and tributaries and utilized the hinterlands to procure food during the different seasons. The arrival of Euro-Americans in large numbers began in the early 1850s and can be directly tied to the discovery of gold. This abrupt influx of miners and settlers devastated the local Native American population. Through mining and agriculture their food resources were destroyed and the most productive lands were settled by the whites. Conflicts between the whites and the Indians eventually lead to the Rogue River Indian Wars and the subsequent removal of the Indians to the Grande Ronde and Siletz Reservations by 1856.

Mining played an important role in the settlement of the Illinois Valley. The first significant gold strike in Oregon occurred in 1850 in the Illinois Valley. This rich find followed by others brought a large influx of miners into the area. As miners came into the area whole towns sprang up overnight. By the mid-to-late 1850s mining had become commonplace and a regular element of southwestern Oregon (Kramer 1999:18, 21). After the First World War, very little mining was being carried out in the area but the effects of mining on the landscape are still evident today. These features include tailing piles, hydraulic cut banks, mill sites, and the remains of habitation areas.

Logging within the project area was not a large part of the local economy until World War II. Prior to this time logging was comprised mostly of small family owned logging operations

producing wood products for the local use and mining operations. With the end of World War II a building boom occurred. This boom coupled with improved logging technology created the impetus for the logging industry to expand (Draper 1997:21). Evidence of past logging activity is still evident within the project area.

Previous archaeological research in the project area includes several small BLM management related survey projects and two larger landscape surveys. The Deer Mom Cultural Resource Survey which surveyed a total of 590 acres, was completed in 1998. The South Deer Landscape Management Cultural Resource Survey was completed in February 2005. The total acreage surveyed was 863 acres within the project area. From the surveys, one historic site, a mining ditch, along with five new sites and three new isolates were recorded during the survey.

Visual Resource Management

The VRM classes in the project area are VRM III and VRM IV. Class III objectives are to manage lands for moderate levels of change to the characteristic landscape; management activities may attract attention but should not dominate the view of the casual observer. Class IV objectives are to manage lands for high levels of change; management activities may dominate the view and be the major focus of viewer attention. Currently, the characteristic landscape can be described as modified natural, with modifications ranging from the man-made lake, to the campgrounds, facilities, and residences in the area and the abundance of private industry land surrounding and interspersed in the project area.

3.4.2 Environmental Consequences

Alternative 1 – No Action

Recreation: In the no action alternative, recreation opportunities would remain unchanged. An existing trail that begins on BLM in section 19 and continues onto private land would remain blocked at the private property boundary, forcing users to double back along the trail to BLM managed lands. No loop trail opportunity would be created, and people would tend to create their own trail to stay on BLM land. There would be no additional recreational/tourism opportunities for those traveling through the area or for local residents.

Cultural: None of the proposed actions would be implemented in the South Deer project area. 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.

VRM: Visually, the area would remain the same. There would be no changes to the characteristic landscape.

Alternative 2 and 3

Recreation: The proposed action includes increased recreation opportunities in section 19 on BLM lands. The trail reroute would keep the trail on BLM land, avoiding trespassing on private lands and provide another loop trail within the system. Fuel reduction work within the watershed and around recreation resources reduces the potential of a catastrophic, stand replacing fire, allowing recreationists to continue to enjoy the current views/trees within the section 19 BLM lands. Potential negative effects of the fuels and harvest work on BLM include opening up the understory to more illegal / unauthorized uses (i.e. increased OHV use off designated roads and trails).

Cultural: Indirect impacts on cultural resources may include sites becoming more susceptible to vandalism and looting, with the reduction of vegetation created by proposed management activities-adverse impact. Positive effects include the recordation of previously unknown cultural sites within the project area located during the Cultural Resource Survey (CRS). This CRS provides an increased knowledge of the history within the area. The cultural sites within the project area would be protected, using project design features. The vegetation management around these sites would afford additional protection of wooden features and artifacts associated with historic sites, protecting them from possible catastrophic fire. Due to inclusion and implementation of the project design criteria there would be no direct effects to cultural resources.

VRM: Effects of the proposed action on visual resources, including from the Lake Selmac shoreline and from the lake, include short term increases in browns and light greens as the understory is opened up. The texture of the vegetation would become slightly rougher when openings are created. Vertical lines would be slightly more pronounced in the foreground views, as individual trees may stand out more. All of these changes to the characteristic landscape would meet VRM III and IV objectives, due to the fact that they would blend with the existing variances on the landscape. Project design features such as feathering, irregular shapes, avoiding straight lines and screening would also aid in meeting VRM objectives. The project would not be apparent to the casual observer from Highway 199, as the closest unit is 0.75 miles from Highway 199, and is blocked by a ridge. Observers may see background views of the project area, but the treatments would not be apparent to the casual observers, who are normally traveling Highway 199 through the area at speeds of 45-55+ mph.

Alternative 4 - DCV NSA

Recreation: The concentric loop roads would add recreation opportunities for hiking, biking and viewing. However, these roads and adjacent areas could have increased OHV and motorized use if not blocked post use.

Six miles of trail have been proposed as the Thompson Creek Overlook Trail System. It is assumed, based on the width proposed (1.5 to 2 feet wide) that the trails proposed are designated for non-motorized uses, with the exception of roads 27.1 and 27.2, which would be accessible by motorized vehicles. The trails would provide additional opportunities for low elevation recreational use of the area, and would allow access to areas along the ridgeline above Thompson Creek (meadows in section 26) that have not been previously accessible. Keeping roads 27.1 and 27.2 as trails for motorized access increases the potential for unintended /unauthorized

motorized use on the other trails in the Thompson Creek Overlook Trail system, and in adjacent areas.

VRM: Since only a few trees would be removed, maintaining canopy closure there would be no change to visual resources. In the short term in the no treatment units closest to Lake Selmac (sections 13, 17 and 19), there would be no change in the view from the lake. However, without treatment, long term negative visual effects may be evident if a stand replacing fire occurs in these units.

Cumulative Effects

Recreation: The project would add to the recreation opportunities within the watershed and an associated increase in tourism for the Illinois Valley. However, reducing vegetative cover in the low elevations increases the opportunity for illegal OHV uses.

Cultural: Cultural resource inventory has been completed. Proposed management direction includes protecting and managing the integrity of all historic / prehistoric sites identified in the cultural survey. The minimum level of protection for sites is avoidance-therefore, there is no effect from the proposed action. This includes timber removal and road building. Other activities that might damage cultural resources include controlled burning and fuel hazard reduction methods. All known cultural sites have been identified. Proposed treatments would occur near the cultural resources. The sites would be buffered and no activities would occur within the buffered area. As there is no effect to cultural resources from this project, no cumulative impacts on cultural resources are anticipated.

VRM: Cumulative effects of this and future projects in the Deer Creek watershed on visuals would be negligible, due to the current prescriptions used in the projects. Previous BLM projects (in the 1960s, 1970s and 1980s), as well as projects on private land, have altered forest stands leading to negative visual images. However, today's prescriptions include project design features such as feathering and screening, so that the unit repeats the characteristic landscape and are not noticed by the casual observer. Due to the prescription and project design features, the South Deer project would not contribute to additional negative visual impacts in the watershed. This has been confirmed on other recent projects in the Grants Pass RA, which have gone largely un-noticed by the general public (i.e. Round Bull unit along Hwy 199, Stratton Hog along the Rogue River, Savage Green along Interstate 5). This project, as stated above, would not be apparent to the casual observer traveling along Highway 199 and would meet VRM III and IV objectives.

3.5 Wildlife

3.5.1 Affected Environment

BLM manages approximately 30,201 acres (49%) in the Deer Creek Watershed and 7441 acres (53%) within the South Deer project area. Chappell and Kagan (2001) describe upland habitats within southern Oregon as Southwest Oregon Mixed Conifer-Hardwood Forest; the stands in the project area fit within this description and are in various stages of stand development. Other

habitat types in the project area are Westside Oak and Dry Douglas-fir Forest and Woodlands, Ceanothus-Manzanita Shrublands, and Westside Riparian-Wetlands.

Since completion of the Deer Creek Watershed Analysis in 1997, the Bureau Special Status Species list has been updated, and there have been several changes in management direction specifically as they relate to the NWFP Survey and Manage Mitigation Measures (USDA and USDI 2004b). This new information was used to determine habitat types and determine species expected to be present in the South Deer project area. This has resulted in some differences between the discussions found in the watershed analysis (USDI BLM 1997) and those in this section concerning species and habitats.

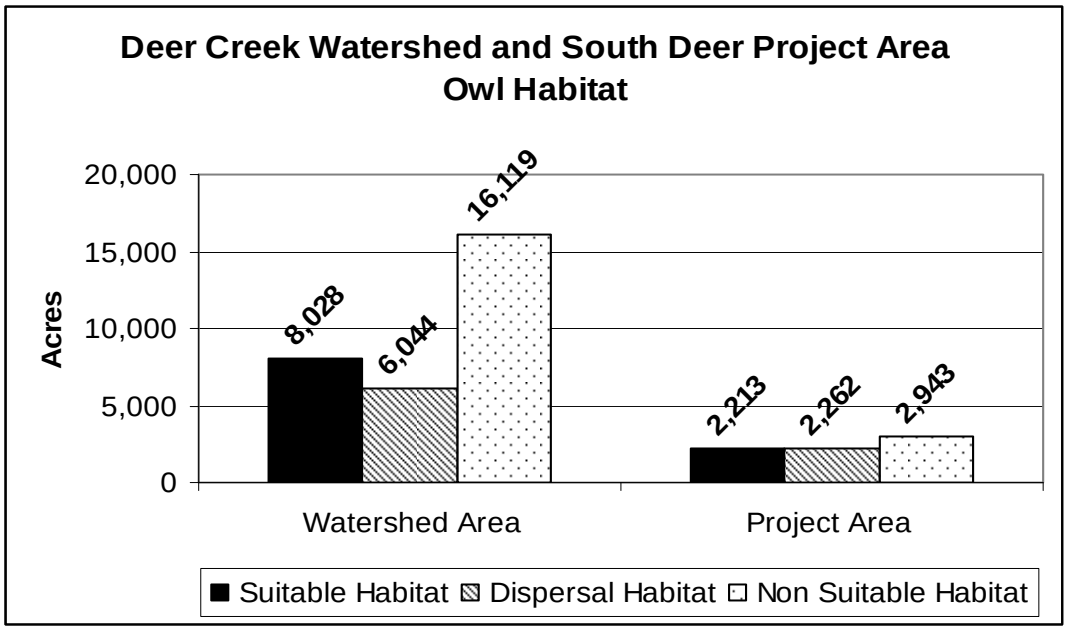
Since the late 1800's, timber harvest and fire suppression have replaced natural disturbance as the primary forces shaping forest landscapes. Perhaps the most important consequence of timber harvest has been the significant reduction in amounts of old growth forest on private land and its high degree of fragmentation on federal land. A significant proportion of low elevation forest land in western Oregon has been converted to other uses, primarily agriculture and suburban development, resulting in both fragmentation and loss of forest habitat (Rochelle 1998).

Habitats in the project area would be discussed as they relate to the Special Status Species (SSS) policy for species known or suspected to occur in the project area. Proposed treatments may affect SSS due to modified habitat (see species discussions below). There is one federally threatened species (Northern Spotted Owl), three Bureau Sensitive species (Pacific fisher, Northern Goshawk and Townsend's big-eared bat) and two Bureau Assessment species (fringed myotis and Pacific pallid bat) that are known or suspected to occur in the project area.

The red tree vole and Great Gray Owl were Survey and Manage species, and would be further discussed because their status as S&M species has changed throughout the planning of this project. Great gray owl and red tree vole surveys were completed in the project area per S&M policy and protocols in affect at that time (USDA & USDI 2000; 2001a; 2001b; 2002a; 2002b; 2003a). Extensive protocol surveys were conducted to locate and color band spotted owls across the Grants Pass Resource Area and in the project area during the early 1990s.

Habitat within the project area for BLM lands was typed utilizing the McKelvey rating system (see Appendix G for description). This habitat typing system was designed specifically for spotted owls, but can be used to assess habitat availability for other species because the habitat typing accounts for habitat condition and structure important to other species. The Deer Creek watershed currently contains 8,028 acres (27%) of suitable owl habitat, 6,044 acres (20%) of dispersal only habitat (suitable habitat is also dispersal habitat) and 16,119 acres (53%) of non-suitable habitat. The South Deer project area currently contains 2,213 acres (35%) of suitable owl habitat, 2,262 acres (34%) of dispersal only habitat and 2,943 acres (31%) of non-suitable habitat (Figure 1).

Figure 1. Owl Habitat within Deer Creek Watershed and South Deer Project Area.



There are three federally threatened, two Bureau Sensitive and two Bureau Assessment species that are known or suspected to occur within the project area.

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

Over the past 10 years the Northwest Forest Plan (NWFP) has been implemented across Federal lands and there has been considerable change in forestry practices during this implementation period. The overall trend towards the recovery of the northern spotted owl and old growth and late-successional forest related species has improved (USFWS 2004). There is no evidence that current forest practices immediately threaten any terrestrial vertebrate species in Oregon; current conservation measures appear adequate for species known to be vulnerable to forest practices (e.g., northern spotted owl). Many species designated "at risk" in Oregon are at risk primarily because of agricultural practices and consequent urbanization.

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

the biological opinion; or (3) a new species is listed or critical habitat is designated that may be affected by this action.

3.5.2 Environmental Consequences

Assumptions

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

Species Associated with Late-Successional Habitat

Northern Spotted Owl

Affected Environment

Spotted owls are closely associated with old forests for nesting, foraging, and roosting throughout most of their range (Forsman, et al. 1984, Carey et al. 1990, Solis and Gutierrez 1990). The Northern Spotted Owl (*Strix occidentalis caurina*) was federally listed as a threatened species in 1990. The eastern portion of the project area and watershed were designated as spotted owl Critical Habitat Unit OR-72 in 1992. OR-72 is located on the Medford District BLM and the Siskiyou National Forest. Eighty-nine percent of this CHU is located within the East IV/Williams LSR. This unit provides a 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. This unit is an important link for the Highway 199 Area of Concern (USDI USFWS 2003).

In addition on Federal lands within matrix or AMA land allocations, unmapped Late-Successional Reserves were established by Standards and Guidelines of the Northwest Forest Plan to protect the best 100 acres of northern spotted owl habitat in the closest proximity to all northern spotted owl nest sites or activity centers, known to exist as of January 1, 1994. These approximately 100 acre areas are termed *Known Spotted Owl Activity Centers (KSOACs)*. Within the project area there are seven historic spotted owl sites (see Appendix G for a detailed account of monitoring efforts in the project area). Of the six known sites within the project area, four known sites are designated KSOAC with approximately 100 acre core areas. An owl pair may use several different nest trees over the years, but the pair usually continues to spend the majority of their nesting and roosting time in a 125 acre activity center (pers. comm. Jim Harper, 2005).

A Late Successional Reserve Assessment for these four KSOACs was prepared for the South Deer Landscape Management Project and was submitted for review to the Regional Ecosystem Office, Portland, Oregon in May 2005 (USDI BLM 2005d).

No Action Alternative

Under Alternative 1, no proposed activity would occur. Current habitat conditions within the KSOACs and throughout spotted owl home ranges within the project area and the watershed would continue to develop along their current successional pathways. Wildfire would remain the most immediate hazard to spotted owl habitat (Courtney et. al., 2004). Current stand conditions reflect past fire suppression efforts. Fuel loading and ladder fuel conditions make spotted owl habitat susceptible to higher fire severity potential, the results of which would remove or downgrade habitat randomly across the landscape, setting back succession and development, and likely resulting in the loss of large tree structure critical to spotted owl nesting success. Additionally, fire severity may be higher than historical due to current stand conditions, resulting in more severe impacts to soils which may prolong the recovery and colonization of mycorizzal processes, and macroinvertebrate and small mammalian prey food webs important to suitable foraging areas for spotted owls.

The current successional development trend of stands toward late-successional habitat under Alternative 1 is uncertain. In southwest Oregon the reduction in fire frequency, from historic frequencies, has reduced the role of fire as an ecological factor influencing stand development, and altering historic forest structures, processes and functions. As a result, young stands are on a developmental pathway different than old growth stands. Therefore, the currently abundant young forest stands would likely develop stand structures and species compositions very different than that of old growth. Further, both the young and old forest stands are increasing in density, placing them at an increasing risk of accelerated density related mortality and increased fire severity (Sensenig 2002). Ultimately, the greatest risk is in the loss of large diameter remnant conifers important to spotted owl nesting success. Alternative 1 would fail to maintain or develop large diameter conifers within the project area, and over time these habitat structures would be lost with negligible future recruitment. Stand conditions within the project area are susceptible to wildfire, disease, insects and competition from shade tolerant species.

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).

Alternatives 2 & 3

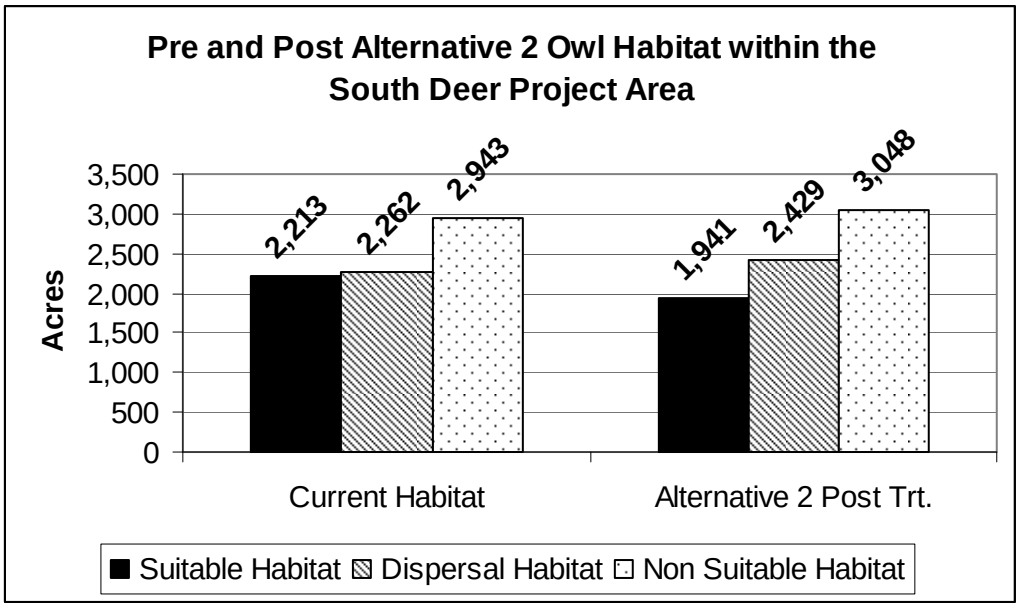
Under alternatives 2 & 3, actions are proposed throughout the project area in KSOACs and known spotted owl home ranges. In alternative 2, timber harvest is proposed in 450 acres of suitable habitat and in alternative 3, harvest is proposed in approximately 667 acres of suitable habitat.

Alternative 2 would reduce suitable owl habitat by 272 acres (12%), and degrade an additional 178 acres. Dispersal only habitat would increase by 167 acres (7%) and non-suitable habitat, due to removal of dispersal, would increase by 105 acres (4%) within the project area. Alternative 3

proposes to reduce suitable owl habitat by 338 acres (15%), downgrade an additional 251 acres and remove 87 acres through regeneration harvest prescriptions. Dispersal only habitat would decrease by 7 acres (0.3%) and non-habitat would increase by 345 acres (35%) within the project area. Figure 2 displays the type of change to nesting, roosting, foraging (NRF) spotted owl habitat (McKelvey 1 and 2) by alternative. NRF degraded denotes that habitat is degraded but still provides nesting, roosting or foraging habitat. NRF downgraded denotes that the nesting, roosting or foraging habitat has been downgraded to dispersal habitat. NRF removed denotes that canopy closure is reduced to < 40% in nesting, roosting or foraging habitat resulting in non-suitable habitat. Dispersal removed denotes that canopy closure is reduced to < 40% in dispersal habitat resulting in non-dispersal habitat.

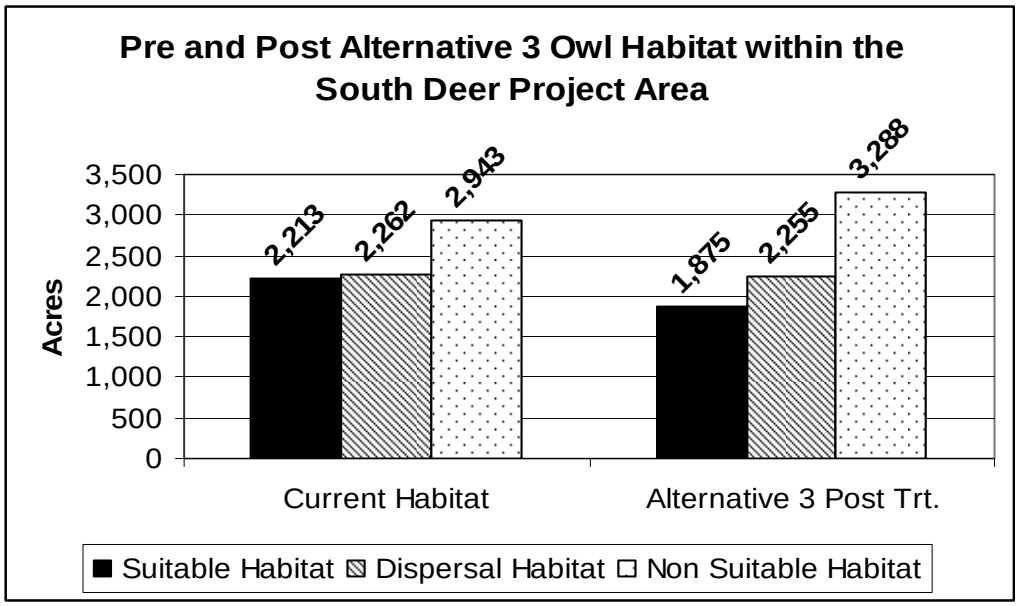
Figures 2 and 3 display the amount of habitat change to spotted owl habitat by alternative.

Figure 2. Pre and Post Alternative 2 Owl Habitat Change.



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

Figure 3. Pre and Post Alternative 3 Owl Habitat Change.



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

Effects to spotted owl prey species

Taken in whole, project activities would lead to an increase in "edge" or ecotonal habitats. While this would degrade or downgrade suitable habitat, this may increase prey species populations and allow spotted owls to adjust habitat use to adapt to the changes in habitat quality for nesting, roosting and foraging. In the Klamath Province of California, Franklin et al (2000) found a positive relationship between habitat heterogeneity and Northern Spotted Owl demographic responses.

Fuel hazard reduction could be perceived as creating "edge" and degrading suitable owl habitat. Recent research (indicates that owl productivity is enhanced by having an edge component in the home range Franklin, et al. 2000, Zabel et al. 1995, Olsen et al. 2004). Woodrats, the primary prey of spotted owls, are more vulnerable to predation at habitat edge openings.

Dusky-footed woodrats (*Neotoma fuscipes*), the primary prey species for spotted owls in Southwest Oregon, are found in high densities in early seral or ecotonal habitats (Sakai and Noon 1993, 1997 cited in Brown et al 2004). Thinning may impact foraging by changing habitat conditions for prey. Sakai and Noon (1993) stated that dusky-footed wood rats, the primary prey of owls in our area, may benefit from some thinning or harvest which would increase shrub and pole stands. Bushy tailed woodrat presence is more dependent upon cover and food availability than on seral stage, and they often use areas previously disturbed by fire (Carey 1991). Flying squirrels would likely respond negatively to habitat fragmentation, resulting in lower abundance of this species.

In regeneration harvest units, a legacy component of large, green conifer trees would be retained to provide for the unique structure and functions associated with these large old trees (RMP 75). The retention of legacies can accelerate the pace of ecosystem recovery such that the rate of change in a new, self-organizing community would be rapid and prey species would be affected

differentially (Franklin et al. 1997). Retaining legacies also provides perching structure for spotted owls that could allow owls to forage opportunistically in the uncharacteristic (for foraging) environment of a regeneration harvest unit because prey populations could be high.

The commercial thin/modified group select (CT/MGS) and density management/modified group selection (DM/MGS) prescriptions and, to a lesser extent, fuel hazard reduction in Douglas-fir and tanoak stands, would cause short term disturbance to understory plants and below ground fungi through tree removal and surface disturbance. CT/MGS (40% canopy closure maintained) would likely reduce flying squirrel populations through reduced truffle production and fragmentation of arboreal travel ways (Colgan et al. 1999, Carey 2000b). Spotted owl foraging would also likely be reduced until canopy closures increase to 60% (10-15 years) and forest floor rodent (prey) populations increase (Meiman et al. 2003, Wilson and Carey 2000). Stands with 40% canopy closure would likely be utilized more for dispersal than foraging. Thinned stands with 60% canopy closure would degrade flying squirrel habitat and truffle production but would likely maintain arboreal travel ways. CT/MGS may accelerate the development of spotted owl habitat and dense prey populations especially when decadence (snags, cavity trees and down logs) is provided for, as in the West Fork project. There may be short term impacts on truffle production, flying squirrel abundance, and owl foraging, but habitat and prey populations recover more quickly with these prescriptions compared to more aggressive treatments (clear cutting, regeneration harvest). The CT/MGS prescription increases tree growth, crown differentiation, understory development, and understory plants' flowering and fruiting (Buermeyer and Harrington 2002, Wender et al. 2004, EA), which provide ancillary foods to spotted owl prey. More aggressive treatments have greater negative mechanical impacts, and produce greater loss of canopy connectivity, spatial heterogeneity, and woody plant diversity (CT/MGS focuses on multiple species management).

In addition to timber harvest units, hazard trees (per OSHA requirements) along haul roads would also be harvested. Less than 10% (less than 5 truck loads) of the roadsides would have hazard trees felled. The impact on habitat of hazard tree removal would be negligible.

Restoration projects such as fish structures, culvert replacements, and noxious weed treatments would have minimal effects on owls and their habitat. Road projects would have no impact when seasonal restrictions are implemented for owl activity centers and new spur roads are blocked following use as proposed. With the proposed road renovation, access would increase, potentially leading to increased human disturbance. Reforestation would not benefit spotted owls until replanted areas develop to support marginal foraging habitat (approximately 30 years).

Habitat modification through commercial harvest described for alternatives 2 and 3 could result in a short term change in the behavior patterns that would require owls to expend more energy by maintaining a larger home range and traveling greater distances to forage. This could result in reduced survival, productivity, and occupancy of known sites in the long term (Meiman et al. 2003). However, in Southwestern Oregon, brushy-tailed woodrats, dusky-footed woodrats, flying squirrels, and red tree voles can be abundant in the same patch of habitat or stand. The mosaic of different seral stages and species composition found within the project area can provide diverse patches of habitat with an abundance of one or more of these prey species (Zabel et al. 1995). Spotted owls could exploit untreated areas without increasing their home range by

shifting their foraging use patterns within the same approximate area. This situation is unique within the range of the spotted owl and the abundance of prey would likely minimize the need to expand their home range in response to commercial treatments.

Seasonal restrictions would be in effect for all proposed activities occurring in units within ¼ mile of spotted owl activity centers (RMP 55). This protection would prohibit disturbance during the breeding season and would avoid any negative effects to reproduction from disturbance.

In summary, approximately 272 acres in alternative 2 and 251 acres in alternative 3 of suitable spotted owl habitat would be degraded to dispersal habitat. Approximately 87 acres of suitable habitat would be removed in alternative 3. This would result in short term impacts to prey availability and a potential shift in owl use of that habitat. This project and the expected effects to spotted owls are compliant with the formal consultation with U.S. Fish and Wildlife Service (USFWS) issued in the Biological Opinion (#1-15-03-F-511, October, 2003). The CHU portion of the project is in compliance with the Biological Assessment and Letter of Concurrence (Section 7 log # 1-15-05-I-0484).

Spotted Owl Critical Habitat

There are 1,809 acres of spotted owl designated critical habitat (CHU OR-72) within the project area. This CHU was identified for its contribution to connectivity as well as for its contribution to nesting, roosting and foraging habitat (Tweton 1992, as cited in USDI 2003). The 28,415 acres (53.2%) of NRF within the 53,380 acre CHU (USDI 2003) would continue to provide habitat for owls and continue to provide the important east-west and north-south intra-provincial connectivity for which this CHU was established (Biological Assessment and associated Letter of Concurrence: Section 7 log #1-15-05-I-0484).

Alternative 2 proposes fuel hazard reduction, young stand management and commercial harvest on 1,558 acres of critical habitat. Silvicultural prescriptions were designed to minimize impacts to suitable spotted owl habitat within critical habitat. Within CHU, timber harvest would degrade 195 acres of suitable spotted owl critical habitat, but the habitat would retain habitat characteristics (canopy cover, coarse large wood, etc.) necessary for this habitat to remain suitable. An additional 150 acres of habitat would be degraded because of fuel hazard reduction treatments, but would also remain suitable. Approximately 39 acres of dispersal habitat would be reduced to <40% canopy cover and no longer function as dispersal habitat. Additional activities are proposed for areas that are currently non-suitable habitat for spotted owls.

Alternative 3 proposes young stand management, commercial harvest and fuel hazard reduction on 1,027 acres of critical habitat. Alternative 3 would remove 31 acres of suitable habitat, downgrade 172 acres to dispersal habitat and 57 acres of dispersal habitat would be treated, but retain dispersal habitat characteristics on the stand level. Activities proposed in the CHU are in compliance with the Endangered Species Act. The ESA in Section 7 (a)(2) states that federal agencies shall ensure that *any action authorized, funded, or carried out by such agency…is not likely to result in the destruction or adverse modification of habitat of such species which is determined by the Secretary, after consultation as appropriate with affected States, to be critical.*

Connectivity
An assessment of connectivity for the project area was made utilizing the McKelvey ratings for each unit. Units with McKelvey ratings 1 or 2 (spotted owl nesting, roosting and foraging habitat) were identified as providing habitat structure that could facilitate connectivity. Units within riparian corridors in T39S-R7W-Sections 3 and 5 were further identified as important for providing connectivity along the south part of the project area. In these units, a minimum 50% canopy would be retained in young stands and a minimum 60% canopy cover would be retained in units identified for treatment within this area. Within the CHU portion of the project area, a minimum 60% canopy closure would be maintained where it currently exists which would also provide for connectivity in the project area.

Proposed fuel hazard reduction treatments within these units would not modify the overstory structure and canopy closure, and thus would not impact the function of the stands to provide for connectivity. Density management units in which the target canopy closure is 60% (DM 60% CC in Appendix B) would not impact the function of the stand to provide habitat structure important for connectivity. This is because the higher canopy density would be maintained, thus maintaining arboreal travel ways. Density management units in which the target canopy closure is 40% (DM 40% CC) would reduce the function of the stand and no longer provide habitat structure for connectivity in the short term (10-15 years), by disrupting arboreal travel ways. However, this type of treatment would accelerate the development of the stand and in the long term, would again function and provide habitat important to connectivity. Regeneration harvest units (RH) would essentially remove habitat providing connectivity. Although 16-25 large, green conifer trees per acre would be retained to provide for the unique structure and functions associated with these large old trees, it would take a long time for the stand to recover to the level to again provide habitat important to connectivity.

Alternative 3 proposes to remove habitat in two sections that contribute to the network of connectivity into and out of the project area as these two regeneration harvest units are at the ridge top of the watershed. However, neither alternatives 2 or 3 would severely impact habitat that is providing connectivity within the project area, because NRF and dispersal habitat would be well distributed throughout the project area. On the larger scale, an analysis of dispersal habitat and connectivity for the entire Rogue River Basin was conducted for the spotted owl with USFWS. Even with other Federal and private timber harvest, and wildfires, there remains ample dispersal habitat across the landscape to enable owl genetic interchange between LSRs (USDI 2003 (Biological Opinion log #1-15-03-F-511, Section 7 log # 1-15-05-I-0484).

In summary, the effect of alternatives 2 and 3 to the spotted owl and its habitat would downgrade and remove spotted owl habitat that would result in short term impacts to prey availability. This may shift owl use of that habitat, and potentially affect reproductive success and/or lead to an increase in vulnerability to predation; however predation is not considered a major influence on population dynamics or behavior (USFWS 2004). The Northern Spotted Owl Five-year Review: Summary and Evaluation (USFWS 2004) go on to say, “At this point, a strong effect of predation is best regarded as an untested hypothesis which, while possible, lacks any empirical support, and is not favored by circumstantial evidence (SEI 2004).” At the NWFP scale alternatives 2 or 3 would have no effect to spotted owl population demographics (USDI USFWS 2003; p.75; USDI USFWS 2004, p. 54).

Alternative 4 - DCV NSA

Alternative 4, the natural selection treatment prescription, proposes to treat approximately 4,616 acres of the project area. These actions are proposed throughout the project area in known spotted owl home ranges.

Alternative 4 would not accelerate succession. In fact, succession would advance at the same rate as the no action alternative (See Vegetation effects section for more detail). Effects from the no action alternative were described above for the spotted owl and remain relevant in their entirety for alternative 4. Other impacts associated with alternative 4 would include the short term negative effects on understory plants (mechanical destruction) and below ground fungi (death of host trees and mechanical destruction). However, the area affected would be considerably smaller than alternatives 2 and 3, because alternative 4 proposes to remove only approximately 30 ft^2 basal area (Table 17). Overstory canopy closure would not be affected retaining arboreal travel ways, and result in minimal impacts to flying squirrels and truffle production.

Alternative 4 proposes to treat 652 acres of NRF habitat. Overstory canopy closures would not be affected, because all trees removed would be from the lower canopies. Therefore, there would be little structural change to stands treated.

A seasonal restriction would be in effect for all proposed activities occurring in units within a ¼ mile of spotted owl activity centers. This protection would prohibit disturbance during the breeding season and would mitigate any negative effects to reproduction from disturbance activities only.

Spotted Owl Critical Habitat
There are 1,809 acres of spotted owl designated critical habitat within the project area. Alternative 4 proposes natural selection harvest on 502 acres of critical habitat. Actions under alternative 4 would not degrade primary constituent elements that support nesting, roosting and foraging in critical habitat as it would not remove large trees, though it may reduce coarse downed wood and snags in the long term.

Connectivity
Alternative 4 treatments would not negatively impact habitat structures important to connectivity, because only small diameter size trees from the lower canopies would be removed. However, the development of large habitat structure important to connectivity would not be accelerated, but would advance at the same rate as the no action alternative.

As described above, alternative 4 proposes to minimally impact existing spotted owl habitat. Therefore, cumulatively alternative 4 would not prohibit owl movement at the Rogue River Basin landscape scale (USDI USFWS 2003).

In summary, the affect of alternative 4 to the spotted owl and its habitat as proposed would result in short term impacts to prey availability.

Northern Goshawk
The Northern Goshawk, a Bureau Sensitive species, is found in a variety of mature, deciduous and coniferous forest types. Nesting habitat is mature forest with high canopy closure and an open understory. Suitable habitat is in the project area but no nests have been found. Goshawks are rarely found in the Grants Pass Resource Area, likely due to the brush and small diameter tree component found in the understory of most stands. Fire exclusion may have reduced the suitability of some stands for goshawk by allowing the understory to develop.

A petition to list the Northern Goshawk in the western United States as a threatened species was considered by the U. S. Fish and Wildlife Service (USFWS) in 1998 and the final conclusion was published that year (Federal Register, Vol. 63, No. 124, June 29, 1998, 35183-35184). USFWS found no evidence to support the contention that the goshawk was in danger of extinction or that the species was likely to become endangered in the foreseeable future throughout all or a significant portion of its range. Incidental sightings of goshawks in the watershed indicate they are present, although in low numbers. No nests have been located and there are no historic records of nesting in the watershed. The only known historic goshawk nest in the GPRA is near Galice, approximately 16 air miles from the Deer Creek watershed.

Spotted owl habitat, as defined by the McKelvey rating system, incorporates habitat structure and canopy closures important to Northern Goshawks. The McKelvey rating system, therefore would be used for assessing the impacts of the alternatives to the northern goshawk.

3.5.2 Environmental Consequences

No Action Alternative

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

Alternatives 2 & 3

Effects of alternatives 2 and 3 for the spotted owl were described above and are relevant to the northern goshawk, because habitat and prey species use are similar (Reynolds et al. 1992). However, goshawks would likely respond to the action alternatives by foraging more in thinned stands than would owls. Goshawks are habitat generalists and thinned stands would provide more suitable foraging habitat, with unimpeded flight paths for this sit-and-wait predator.

Noise disturbance from timber sale operations could impact goshawks during the breeding season, though there are no known nests in the project area. If an active nest is found, seasonal restrictions (Table 5) would be imposed on units near active goshawk nest sites which would minimize that disturbance and likely prevent nest abandonment. Goshawks are highly mobile habitat generalists and could further avoid disturbance by utilizing more distant habitat in the project area and watershed.

Alternative 4 - DCV NSA

Affects for alternative 4 for the spotted owl were described above and are relevant in their entirety for effects to the northern goshawk, because habitat structures and condition, as well as prey species use are similar for the project and watershed area (Reynolds et al. 1992).

Noise disturbance from timber sale operations would be critical during the breeding season, in which a seasonal restriction (Table 5) would be imposed on units if an active goshawk nest site is located. Goshawks are a highly mobile habitat generalist and could avoid disturbance as adequate habitat exists within the project area and the watershed.

Great Gray Owl

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

Studies show logging can create "temporary meadows" capable of supporting rodent populations used by breeding Great Gray Owls. Unlike naturally occurring mountain meadows, forest clearings created by logging undergo rapid forest reestablishment. Therefore, successional development makes the usefulness of such openings short lived.

In this project, surveys were conducted to protocol along meadows, clear cuts and lower elevations in the project area (USDA and USDI, 2004). No great gray owls were detected. Since the late 1990s, eleven landscape management project areas evenly distributed across the Grants Pass Resource Area have been surveyed for great gray owls using the two year survey protocol (USDI BLM 2004). Only one project area on the Grants Pass Resource Area (east of Williams approximately 12 miles distance) has documented nesting great gray owls. These are the closest known sites to the project area. Additionally, no nesting territories have been detected west of Williams on Forest Service or other BLM lands (ISMS database).

Alternative 1 – No Action

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

Alternatives, 2 and 3

Alternatives 2 and 3 propose treatment in potential great gray owl habitat. Because no owls were located during protocol surveys in suitable habitat, it is unlikely that treatments would have a negative effect on this species. However, treatments may modify potential nesting habitat to a non-nesting condition. Short term effects for both action alternatives include reducing canopy closures and structural complexity within stands, and providing opportunities for predators, such as the great horned owl to become established. However, these habitat changes would also open stands to allow for unobstructed flight, potentially increasing the amount of suitable habitat. Long term effects for both action alternatives include the accelerated development of late-successional forest habitat conditions and enhancement of foraging areas from thinning and burning. Alternative 2 proposes to treat more acres than alternative 3, providing more potential nesting and foraging opportunities in the future for great gray owls.

Pacific Fisher

The Pacific fisher (*Martes pennanti*) has been extirpated from extensive regions of its historical range in the Pacific states (Powell and Zielinski 1994). Buskirk and Powell (1994) concluded that fishers are one of the most habitat specialized mammal species in North America. However, views differ about the fisher's need for extensive tracts of mature, largely coniferous, forest stands. Most researchers in the western United States emphasize that fishers are associated with extensive mature conifer forests, and that elements of these forests (such as old live trees, snags and large logs) are required (Buck et al. 1994, Harris et al. 1982, Rosenberg and Raphael 1986, Weir and Harestad 2003, Zielinski et al. (in press), Zielinski et al. 2004). In contrast, research in the Northeastern and Midwestern United States suggests that mid-successional mixed broad-leaved and coniferous forests provide suitable fisher habitat (Arthur et al. 1989b, Buskirk and Powell 1994, Krohn 1994). Fishers are generally closely associated with low to mid-elevation forests with a coniferous component, large snags or decadent live trees and logs for denning and resting, and complex physical structure near the forest floor to support adequate prey populations (Aubry and Lewis 2002). Fishers in southern Oregon have been documented using a variety of habitats such as young successional open habitats, oak woodlands and previously harvested areas (pers. comm. Jeff VonKienast). Telemetry studies have determined that fishers are wide-ranging animals (Zielinski et al. 2004). One female moved 26 km from her original trap location. One male captured on the Rogue River National Forest north of Prospect moved 55 km northeast to the Deschutes National Forest (Aubry and Raley 2002). In the Rogue River study, males had a larger home range (~147 km^2) during the breeding season compared to ~63 km^2 during the non-breeding season (Aubry and Raley 2002). Given that fishers are capable of moving long distances, the entire South Deer project area and watershed can be considered fisher habitat; however, certain inferences can be made on suitability of habitat for natal dens, resting and foraging.

The fisher was petitioned for listing as endangered or threatened under the Endangered Species Act on three occasions. On July 10, 2003, a 12 month status review by the U. S. Fish and Wildlife Service (USFWS) was initiated to determine if listing was warranted (Federal Register Vol. 68, No. 132, July 10, 2003, 41169-41174). USFWS published a finding in April 2004 that a petition to list fishers as a "Federally Threatened" species was warranted but precluded by higher

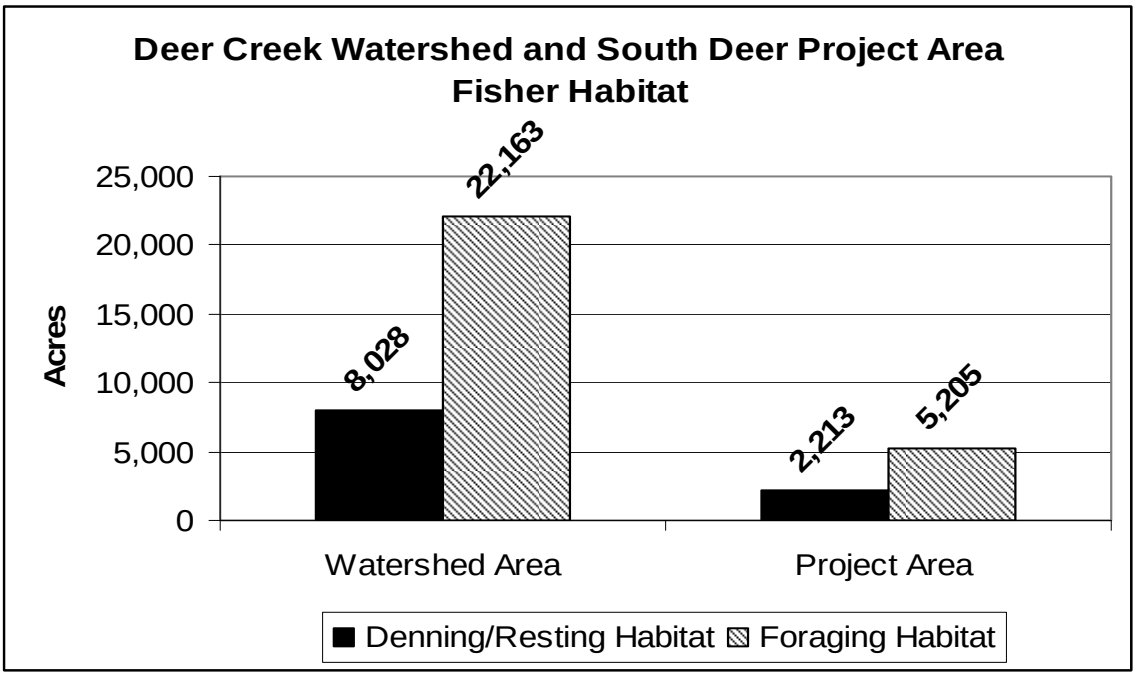
priority listing actions (Federal Register Vol. 69, No. 68, April 8, 2004, 18769-18792). The species remains a USFWS candidate species (USDI USFWS 2004).

Fishers are restricted to two small, disjunct and genetically isolated populations in southwestern Oregon: an introduced population in the Southern Cascades and an extant, historic population in the Siskiyou Mountains (Wisely et al. 2004, Aubry et al. 2004). The Siskiyou Mountain population is likely connected to a coastal population in Humboldt and Trinity counties of California, because there are no human or habitat barriers to their genetic interchange (pers. comm. K. Aubry 2004).

The Grants Pass Resource Area has conducted surveys for forest carnivores using bait stations with motion and infrared detection cameras throughout the resource area. Fishers have been detected during these surveys near Williams and near the top of the Deer Creek drainage, and observations have been recorded on BLM lands near Galice Creek. Fishers are suspected to occur in the South Deer watershed and project area.

The McKelvey rating system discussed above includes and adequately describes habitat structures and canopy closures important to fishers and would be used for assessing impacts of the alternatives to the fisher. There are approximately 2,213 acres of denning and resting habitat, and 5,205 acres of foraging habitat for fishers in the project area (Figure 4).

Figure 4. Fisher Habitat within Deer Creek Watershed and South Deer Project Area



No Action Alternative – Alternative 1

Effects for the no action alternative were described above for the spotted owl and are relevant in their entirety for effects to the fisher due to similar habitat conditions and requirements (Powell & Zielinski 1994, Aubry & Raley 2002, Buskirk & Powell 1994). Ultimately, the greatest risk of

no action is the wildfire related loss of large remnant conifers and hardwoods important to fisher natal and maternal denning sites.

Alternative 1 would fail to maintain or develop large diameter conifers and hardwoods within the project area, and over time these habitat structures would be lost with very low future recruitment.

Alternatives 2 & 3

Figures 5 & 6 display the amount of habitat change to fisher habitat by alternative. Affects for alternatives 2 & 3 for the spotted owl were described above and are relevant in their entirety for effects to the fisher, because habitat structure and condition, as well as prey species use are similar for the project and watershed area (Powell & Zielinski, 1994; Aubry & Raley, 2002; Buskirk & Powell, 1994).

Figure 5: Pre and Post Alternative 2 Fisher Habitat Change

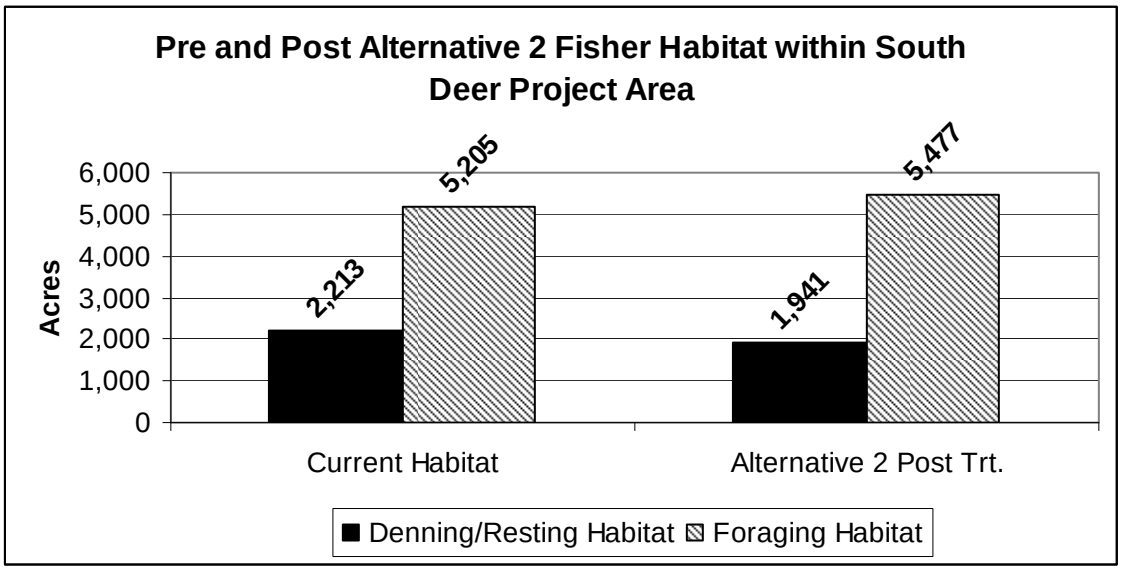
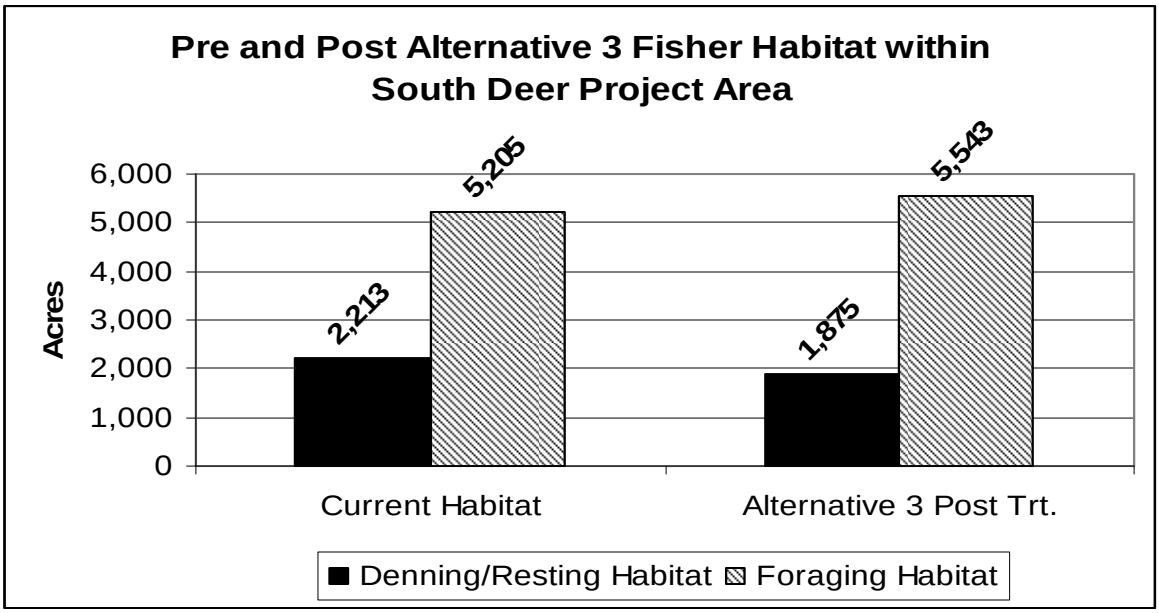


Figure 6: Pre and Post Alternative 3



Fisher Habitat.
Alternative 2 proposes to decrease denning/resting habitat 12% and increase foraging habitat 5%. Alternative 3 proposes to decrease denning/resting habitat 15% and increase foraging habitat 6%. Regeneration harvest treatments are proposed on 20 acres under alternative 2 and 303 acres under alternative 3. Regeneration harvest would no longer provide suitable fisher habitat. These areas would not provide foraging habitat until vegetation reestablishes to provide cover, in approximately 5-10 years. Fishers were found to use recovering regeneration units for foraging on the Rogue River National Forest (Aubry and Raley 2002; Aubry and Lewis 2003). Fisher prey species included ground squirrels, rabbits, skunks and birds in these old clearcuts. This study also found that fishers ate berries and yellow jackets. Fishers apparently used recovering clearcuts for foraging, rather than resting and denning.

As described above, a component of large, green conifer trees would be retained in regeneration harvest units to provide for the unique structure and functions associated with these large old trees (RMP 75). A study in northern California found fishers to be associated with residual forest structures where large hardwoods and live trees were left in patches and riparian reserves in managed landscapes (pers. comm. L. Diller 2004). Retaining legacies would provide habitat structure for natal and maternal denning sites, resting sites and structure important to fisher prey species as these stands develop through their successional pathways.

As described above the variable density thinning, riparian reserve thinning and to a lesser extent fuels reduction treatments (under story thinning, hand piling, hand piling and burning, under burning, mechanical thinning and maintenance under burning) would have short term negative effects on understory plants (mechanical destruction) and below ground fungi (death of host trees and mechanical destruction). Variable density thinning in stands in which 40% canopy closure would be maintained (approximately 914 acres for alternative 2 and 900 acres for alternative 3)

would likely result in lower squirrel (*Glaucomys* spp. and *Sciurus* spp.) abundance, because of reduced truffle production and arboreal travel ways (Colgan et al. 1999, Carey 2000b). Additionally, these treatments would result in lower abundance of other small mammals such as snowshoe hare (*Lupus americanus*), brush rabbit (*Sylvilagus bachmani*), White-footed mice (*Peromyscus leucopus*), deer mice (*P. maniculatus*), red-backed voles (*Clethrionomys gapperi*), and meadow voles (*Microtus pennsylvanicus*), because of the reduction of habitat from the removal of under story and over story vegetation. Fishers were found to avoid forested stands with less than 40% canopy cover (Aubry and Lewis 2003), likely due to the reduce abundance of prey species. However, as described previously, fishers have been known to forage in these types of forested stands in Southwest Oregon. Effects to prey species are relatively short term, as these stands revegetate in the under story within 5 years, and 10-15 years for the over story canopy to close to 60%. Riparian reserve thinning and other units with a treatment prescription of maintaining over story canopy closures between 50-60% would minimally affect fisher prey species and their habitat. The effects of uneven-aged timber management practices, such as are proposed for this project, have not been studied but are likely to have less effect on fisher habitat than even-aged management (Powell and Zielinski 1994).

Impacts associated with timber sale operation noise disturbance are unknown due to a lack of scientific literature. There is evidence that fishers avoid roaded areas (Harris and Ogan 1997), and the fisher has been characterized as a species that avoids humans (Douglas and Strickland 1987; Powell 1993). Many roads within the project area are already closed year round or seasonally. Alternatives 2 and 3 propose constructing only 1.47 miles of new road, and would decommission 4.03 miles of road. Disturbance from timber sale operations would be temporally and geographically limited and would occupy a geographic area smaller than the average fisher home range. Fishers have large home ranges and would be able to move away from the action area while the disturbance was occurring.

Fishers are naturally rare and have a disjunct distribution in the Pacific Northwest. Appendix J-2 of the NWFP determined that their range included 34% non-federal land and that although federal lands may provide suitable well-distributed habitat, fisher populations may never become well distributed due partly to limited federal land ownership at lower elevations and the species' naturally low abundance. The NWFP concluded that "habitat is of sufficient quality, distribution, and abundance to allow the species population to stabilize. However, significant gaps in the historic species distribution on federal lands may cause some limitation in interactions, and thus loss of genetic exchange among local populations (USDA and USDI 1994b).

Forest fragmentation remains a concern for fishers, as stated by Powell and Zielinski (1994):

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

Alternatives 2 and 3 would, in the short term, degrade fisher habitat through thinning and noise disturbance that would reduce prey species. However, the action alternatives would not contribute to the need to federally list the fisher; while some habitat would be degraded, it would still remain suitable for fisher dispersal and foraging, fishers are wide-ranging species and thus are able to move to minimize disturbance, seasonal restrictions for soils and POC management would restrict activities until young are approximately six weeks of age, and habitat features such as large snags and coarse downed wood would be maintained across the project.

Additionally, late-successional habitat would be provided within the 5th field watershed by riparian reserves, 100 acre KSOACs, connectivity blocks, and 15% late-successional forest retention (RMP 38-40). In the Deer Creek watershed, past harvest practices, and land ownership patterns are the main cause of fragmentation. BLM checkerboard ownership may be one of the primary factors limiting the ability of BLM lands to provide optimal habitat for fishers (USDA and USDI 1994b).

Connectivity

Affects to connectivity from alternatives 2 & 3 for the spotted owl were described above and are relevant in their entirety for effects to the fisher, because habitat structure and condition, as well as prey species use are similar for the project and watershed area.

Private timberlands may provide foraging and dispersal for fishers, but would not provide the large live trees, snags and logs necessary for natal and maternal den sites, and resting sites. Fisher would travel across private lands within their home range, because of the checkerboard ownership of BLM and private lands within the project area and watershed. Although they generally avoid recent clearcuts, telemetry research indicates fisher use recovering clearcuts and mid-seral stands on both private and federal lands in Southern Oregon (Aubrey and Raley 2002).

Fishers are naturally rare and have a disjunct distribution in the Pacific Northwest. Appendix J-2 of the NWFP determined that their range included 34% non-federal land and that although federal lands may provide suitable well-distributed habitat, fisher populations may never become well distributed due partly to limited federal land ownership at lower elevations and the species' naturally low abundance. The NWFP concluded that "habitat is of sufficient quality, distribution, and abundance to allow the species population to stabilize. However, significant gaps in the historic species distribution on federal lands may cause some limitation in interactions, and thus loss of genetic exchange among local populations (USDA and USDI 1994b).

Alternatives 2 and 3 would degrade fisher habitat through mechanical thinning and noise disturbance from vegetation treatments that would result in reducing prey species and use of these habitats by fisher in the short term, but would not contribute to the need to federally list the fisher.

Alternative 4 - DCV NSA

Affects for alternative 4 for the spotted owl were described above and are relevant in their entirety for effects to the fisher, because habitat structures and condition, as well as prey species

use are similar for the project and watershed area (Powell & Zielinski, 1994; Aubry & Raley, 2002; Buskirk & Powell, 1994). Additionally, the affects described above for alternatives 2 & 3 for the fisher are relevant in their entirety for alternative 4, although to a lesser extent because of the lower impact of the treatments proposed, as previously described.

Connectivity
Alternative 4 proposes treatments that would result in less impact to fisher habitat. As described above for alternatives 2 & 3, alternative 4 would not affect fisher habitat and fisher populations from stabilizing as described in the NFP (USDA and USDI 1994b).

Red Tree Vole
The red tree vole is the most arboreal mammal in the Pacific Northwest (Carey 1996). Habitat is mesic Douglas fir forest. Although the red tree vole may occur in younger stands, old growth forests seem to provide optimum habitat. Nests are built on suitable foundations such as large tree limbs, whorls, and the nests of birds or squirrels. They feed mostly on fir needles, bark, and lichens (Verts and Carraway 1998). Red tree vole surveys were conducted in May of 2002. There were 60 active nests and 102 inactive nest sites found within the project area. Population numbers are unknown. As surveys had already been completed prior to the change in management status, all active and inactive red tree vole nest trees would not be marked for harvest. Red tree voles are an important prey species for the spotted owl.

On September 30, 2002, the Secretaries of Agriculture and Interior entered into a settlement agreement with Douglas Timber Operators and the American Forest Resource Council concerning a lawsuit involving the 2001 Record of Decision for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines (USDA and USDI 2001a,b). The subsequent EIS and Record of Decision discontinued the Survey and Manage program and transferred selected Survey and Manage taxa to Agency Special-Status Species Programs (SSSP). Survey and Manage taxa that met the criteria for addition to Agency SSSP lists would now be managed pursuant to the SSSP policies of the respective Agencies. Under this project, RTVs would be managed as per the SSSP. The RTV is currently a Bureau Tracking species and is not considered a management species under the SSSP.

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

Alternatives 2 & 3

Effects for alternatives 2 and 3 for the spotted owl were described above and are relevant in their entirety as they relate to spotted owl prey species, because the RTV is a prey species important to

the spotted owl within the project and watershed area (Carey 1996; Carey 2004; Courtney et al. 2004; Forsman et al. 2004).

In the xeric forests of the Rogue Valley and within the project area there is a poor understanding of RTV distribution and habitat relationships, especially as habitat becomes more isolated with progressively less connectivity towards the edges of this zone where it intergrades with oak woodlands (USDA and USDI 2000, p. 384). However, habitat is sufficient to support stable populations range wide in the NFP area (USDA and USDA 2004c, p. 208).

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

Red tree vole (RTV) nest trees have been reserved from cutting, however, as active nest sites would not be protected, populations in units proposed for harvest in which the canopy would be reduced to below 60% would likely not persist in these stands. Stands with a 60% canopy retention prescription may provide adequate habitat to maintain populations in the stands. In the long term, effects for both action alternatives include an increase in mature and late-successional habitats in the project area, with high canopy closures that may facilitate more successful dispersal of the species. Dispersal would be restricted through stands until canopy closures recover to 60% or greater. Additionally, the proposed pre-commercial thinning and brushing throughout the project area would accelerate the development of potential red tree vole habitat in the future, contributing to the maintenance of the species and its habitat in the watershed. Alternative 2 proposes to treat more acres than alternative 3, and would make available more potential habitat for red tree voles in the long term.

Alternative 4 - DCV NSA

Effects for alternative 4 for the spotted owl were described above and are relevant in their entirety as they relate to spotted owl prey species, because the RTV is a prey species important to the spotted owl within the project and watershed area (Carey 1996; Carey 2004; Courtney et al. 2004; Forsman et al. 2004). In summary, because of the low level of harvest activities proposed, activities would be unlikely to negatively affect the species.

In the xeric forests of the Rogue Valley there is a poor understanding of RTV distribution and habitat relationships, especially as habitat becomes more isolated with progressively less connectivity towards the edges of this zone where it intergrades with oak woodlands (USDA and USDI 2000). However, habitat is sufficient to support stable populations range wide in the NFP area (USDA and USDA 2004c).

Dead Wood Dependent Species

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

Primary excavators create cavities used by other species (secondary cavity users). Primary excavators also transmit heartrot and other decay fungi, by probing and excavating, into trees; heartrot is important to other primary excavators not able to excavate sound wood (Aubry and Raley, 2002). The following SSSP species are either primary cavity excavators or secondary cavity nesters, suspected to occur in the project area and the South Deer River watershed (fisher, fringed myotis (*Myotis thysanodes*), Pacific pallid bat (*Antrozous pallidus pacificus*) and the Townsend's big-eared bat (*Corynorhinus townsendii*).

Fishers use live tree and snag cavities (many of which are excavated by Pileated Woodpeckers) as well as down logs in southern Oregon (Aubry and Raley 2002b, pers. comm. Keith Aubry 2004). Bats use live tree and snag cavities as well as rock crevices, mines, caves, stumps, loose bark, bridges, buildings, and other protected sites (Verts and Carraway 1998). Pallid bats roost in rock crevices, tree hollows, mines, caves and a variety of anthropogenic structures, including vacant and occupied buildings (Sherwin 1998). Townsend's big-eared bats hibernate in caves and mines during winter (Sherwin 1998). The fringed myotis is a crevice dweller found in crevices of mines, caves, rocks, and large conifers (Bradley et al. 1998). No bat roosting sites are known within the project area; however Townsend's big-eared bats have been detected within the Deer Creek watershed, the fringed myotis and pallid bat are known to occur in the Grants Pass Resource Area. Older forest stands receive greater use by bats due to the availability of roosts, a complex vertical structure and less clutter.

Four bat species (the silver-haired bat (*Lasionycteris noctivagans*), long-eared myotis (*Myotis evotis*), long-legged myotis (*Myotis volans*), and pallid bat) are listed in the NWFP as protection buffer species (USDA and USDI 1994a,b). These bats are crevice dwellers and may use crevices under loose bark and in decaying stumps, or wedge into spaces in tree bark. Some species may roost in cavities created by rot or excavated by woodpeckers. The status of these protection buffer species was not removed or modified in the 2004 Survey and Manage ROD (USDA and USDI 2004b). There are no known caves or abandoned mines, wooden bridges or buildings in the project area that would warrant management as an occupied bat site. Studies show that older stands and thinned stands received more use by bats than unthinned stands, clearcuts and shelterwoods. Riparian habitats received the greatest use of all habitats (pers. comm. H. Ober 2003).

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

No Action Alternative

Effects of the no action alternative were described above for the fisher and are relevant in their entirety for effects to bats and cavity users due to similar habitats (Weller and Zabel 2001).

Additional effects to bats include restrictions on access to snags in dense stands due to cluttered flight paths (clutter results in echolocation interference) (pers. comm. John Hayes 2003).

Alternatives 2 & 3

Snags that provide potential roost sites may be felled to meet OSHA safety standards. However, project design features (PDFs) would ensure adequate snag retention and recruitment by retaining all snags >16" dbh unless designated as a hazard tree; as per PDF, these trees would be left on site for down wood. Proposed thinning would reduce understory clutter and thus improve flyways. . Marking guidelines mitigate these potential negative affects by: 1) retaining all snags >16" dbh, 2) no trees with old growth characteristics are marked for harvest, and 3) the largest deformed or diseased trees are the preferred wildlife leave trees retained to meet dead wood targets (see Marking Guidelines for full description). Proposed thinning of stands would reduce under story densities reducing clutter. Study results show that older stands and thinned stands received more use by bats than unthinned stands, clearcuts and shelterwoods. Riparian habitats received the greatest use of all habitats (pers. comm. H. Ober 2003).

The NWFP identified snag and green tree retention mitigation measures that would reduce the risk of local extinctions and improve the likelihood that well-distributed populations of snag dependent species would be maintained (USDI and USDA 1994b). Where snags are currently available, alternatives 2 and 3 meet or exceed these snag and green tree retention guidelines. The CT/MGS prescription would maintain habitat structure and foraging substrates associated with snags and large conifers, though retained snags and large conifers can be susceptible to wind throw. Regeneration harvest treatments reduce habitat structure and foraging substrates to such an extent that bats would likely use only the edges of these stands. Retained snags and large conifer trees can be susceptible to wind throw, and the lack of canopy closure increases the risk of predation. The greatest concern for bat habitat is the retention of undisturbed roosting sites in snags, caves, mines, bridges, abandoned buildings or other potential roost sites during critical seasons for bats. Under alternatives 2 and 3, snag levels would be maintained and treatments would not affect caves, mines or anthropogenic structures, and therefore, bat populations would be minimally affected by project activities.

Alternative 4 - DCV NSA

The effects described for alternative 2 & 3 above are also relevant in their entirety. Additionally, the natural selection prescription relies heavily on the premise that tree harvest is based on those trees that are dying or dead. In the project area, as described in the vegetation section, the number of dead trees does not currently exceed RMP levels (RMP 48). This situation limits the available trees for harvest under the alternative, because the same marking guidelines and project design features apply in order to meet RMP standards for cavity users.

As emphasized above, alternative 4 would have very little affect on the vegetation change around these structures and potential snag roosts. Additionally, existing snags are protected as per the RMP and there is minimal anticipated effect to bat populations within the project area. However, continuation of this prescription over the long term may reduce snag and thus roost availability for snag dependent species in the future.

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

Bald Eagle
In southwest Oregon, the majority of bald eagle nests are in large trees near lakes, rivers, and ponds. Bald eagles (*Haliaeetus leucocephalus*) feed on fish in Lake Selmac, Deer Creek, and along the Illinois River, and forage in the open meadows in the lowlands along creeks in the watershed. Eagles build their nests in large dominant over story trees, often at the edge of a stand or on a ridge. Nest trees have broken or deformed tops and/or large branches to support the nest. A pair of bald eagles nests at Lake Selmac within the project area.

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

A bald eagle habitat management plan has been written for the Lake Selmac site (USDI GPRA 2005c). This plan is site specific and provides specific management guidelines for the Lake Selmac site. Bald eagle management areas (BEMA) have been identified on 262 acres of BLM lands surrounding Lake Selmac. There are three areas identified of which 248 acres are in Matrix land allocations and 14 acres are in Riparian Reserve land allocations. EA Map 10 displays the Lake Selmac BEMA. Approximately 57% of the stands within the BEMA are older than 150 years.

Alternative 1

Under Alternative 1, no proposed activity would occur. Affects for the no action alternative were described above for the spotted owl and are relevant in their entirety for affects to the bald eagle, because the consequences of no action to bald eagle nesting habitat structure and condition are similar (Isaacs et al. 2003; Anthony et al. 1989; Anthony et al. 1982). Ultimately, the greatest risk is in the loss of large diameter remnant conifers important to bald eagle nesting, roosting and perching. Alternative 1 would fail to maintain or develop large diameter conifers within the project area and specifically around Lake Selmac, and without further recruitment, these habitat structures would be lost over time (Sensenig 2002).

Alternatives 2 & 3

Under alternatives 2 & 3, proposed actions are consistent with the Lake Selmac bald eagle habitat management plan (USDI GPRA 2005c). Effects from alternatives 2 & 3 for the bald eagle and its habitat would be relevant to the area within approximately ½ -1 mile radius surrounding the nest tree (USDI USFWS 2003). Treatments proposed within ½ mile radius of the nest site include only those stands located in T38S R7W section 19. A seasonal restriction from January 1 - August 31st would be in affect for treatment activities proposed in this section (EA PDFs, Seasonal Restriction Table). Alternative 2 proposes only fuel hazard reduction treatments which would not modify the overstory structure of the stands. Alternative 3 proposes commercial and fuel hazard reduction treatments. Commercial treatments would modify the

overstory structure, but would maintain a 60% canopy closure from the largest green conifer trees. All known perch trees would be retained and protected from treatment activities. Commercial and fuel hazard reduction treatments would open the understory through the removal of brush and small trees, and afford off trail access for pedestrian and equestrian travel. A designated trail is located in section 19 that promotes pedestrian, equestrian and bicycle recreation travel. Motorized travel is prohibited. Off trail travel from this designated trail could result in the unauthorized creation of additional trails and human disturbance to the nest site. In the late 1990's an unauthorized trail was the likely cause of nest failure at the Lake Selmac site.

An interpretive sign location at the beginning of the trail head would be used to inform recreationists of the treatment activities and rules of use for the trail. This signing effort would be used to mitigate any potential negative effect of off trail travel by recreationists.

Alternatives 2 & 3 treatments proposed within a distance of ½ to 1 mile north of section 19 (sections 13 & 17) that are within the BEMA and have been designed to meet the bald eagle habitat management plan. These treatment activities would not be subject to a seasonal restriction. Eagle use of these areas is limited to only one known perch tree that would be retained and protected from treatment activities. Treatment of these units is designed to promote future bald eagle habitat.

In summary, the affect of alternatives 2 & 3 to the bald eagle and its habitat as proposed would result in no change to existing roosting, nesting or perching trees and to foraging areas.

Alternative 4 - DCV NSA

Effects for alternative 4 for the spotted owl were described above and are relevant in their entirety for effects to the bald eagle, because habitat structures and condition are similar for the project and watershed area (Isaacs et al. 2003; Anthony et al. 1989; Anthony et al. 1982). Alternative 4 does not propose any activities within ½ mile of the nest site. Activities proposed within a distance of ½ to 1 mile north of section 19 (sections 13 & 17) that are within the BEMA have not been designed to conform to the bald eagle habitat management plan. The natural selection treatment would not reduce fuel hazards or competition from high stem densities. Prescribed treatments in these stands do not address the concerns identified in the habitat management plan. Eagle use of these areas is limited to only a few known perch trees that would be retained and protected from treatment activities. Treatments in the BEMA in these sections are not designed to promote future bald eagle habitat.

In summary, the affect of alternative 4 to the bald eagle and its habitat as proposed would result in no change to existing roosting, nesting or perching trees and to foraging areas. Additionally, alternative 4 would not reduce the risk of wildfire damage to existing habitat.

Peregrine Falcon

Habitat for peregrine falcon (*Falco peregrinus*) is primarily tall cliffs (Henny and Pagel 2003). Forested lands provide habitat for prey species for falcons. Peregrines prey almost entirely on birds. There are no suitable cliffs within the project area. One confirmed active site occurs within approximately 2 miles east of the project area.

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

No suitable habitat for peregrine falcons exists in the South Deer project area. There are no suitable cliff habitats within the project area. There is no anticipated effect to this species from project activities as there is no suitable habitat for this species in the project area, the distance to the one known site in the area is > 1 mile, and activities would not affect prey species availability for falcons,

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

Neotropical migrants migrate to Central or South America each year. They are addressed here due to widespread concern regarding downward population trends, habitat declines, and the BLM's efforts to comply with Executive Order 13186, the Migratory Bird Treaty Act (per a MOU between the BLM, U.S. Forest Service and the U.S. Fish and Wildlife Service. None documented as occurring on the Medford District BLM are listed as endangered or threatened. In February 2003, USFWS identified migratory non-game birds that were species of conservation concern (Federal Register July 10, 2003 Vol. 68, No. 25, 6179). Six of the birds on this list (Table 27) are known to occur on the Medford District BLM (USDI USFWS 2002). Neotropical birds, as a group, are not special status species.

Table 27. Birds of Conservation Concern for Medford District BLM

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

Resident birds remain in the same general area (e.g., the Pileated Woodpecker) or migrate to lower elevations in the winter (e.g., the Dark-eyed Junco). Populations of late-successional dependent migratory or resident birds for the South Deer watershed are unknown. Breeding bird surveys indicate increasing evidence that regionally, songbirds are declining (Sauer et al. 2004,

Alexander et al. 2005). However, the cause of these declines is still unclear, but is suspected to be on their winter grounds.

Alternative 1

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

Alternatives 2 & 3

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

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

Alternative 4 - DCV NSA

Affects for alternative 4 for the spotted owl were described above and are relevant in their entirety for landbirds in terms of late-successional habitat. Ultimately, the greatest risk is in the loss of large diameter remnant conifers and hardwoods important to land birds. Alternative 4 would fail to maintain or develop large diameter conifers and hardwoods within the project area, and over time these habitat structures would be lost with no future recruitment (Sensenig 2002, p.144).

In summary, each action alternative would modify habitat to varying degrees shifting habitat suitability for land birds. Since causation of population declines in land birds is unclear, and adequate habitat for these species occurs within the project area and Deer Creek watershed, the alternatives would not result or contribute to the need for federal listing.

Big Game

Deer and elk are not late-successional dependent species. They depend upon early seral vegetation for forage and need dense vegetation for hiding cover for fawning and calving and to escape predators. The project area provides year round habitat for deer and elk. Since the late 1970's, the belief that thermal cover constitutes a key component of ungulate habitat has resulted in its widespread application, to the extent that virtually all elk habitat evaluation procedures currently use this variable as a measure of abundance in the Pacific Northwest (e.g., Wisdom et al. 1986; Thomas et al. 1988) and many other regions in the western United States (e.g., Christensen et al. 1993). These habitat evaluation procedures were used extensively in the development of national forest plans (Edge et al. 1990) and in the Medford BLM RMP (USDI BLM 1995, p. 48; USDI BLM 1994, Vol. I, p.3-39). Nonetheless, the concept of thermal cover remained a poorly tested hypothesis until Cook et al. (1998) concluded that thermal cover effects (summer and winter) on animal condition, had little relevance to herd productivity and demographics (Cook et al. 1998, p.52; Duncan 2000, p. 2). The Medford District RMP designated big game winter range (USDI BLM 1995, MAP 7); however there is no designation within the project area or the Deer Creek watershed. Deer winter range has been identified by ODFW within the watershed (USDI BLM 1997).

In contrast, the effects of nutrition on population demography of free-ranging ungulates has been reasonably well established (e.g., Clutton-Brock et al. 1982; Verme and Ullrey 1984; Coughenour and Singer 1996). In fact, there is a long recognized inverse relationship between forage production and forest canopy closure (Pase 1958; Young et al. 1967; McConnell and Smith 1970), such that emphasis on thermal cover over food production can reduce forage production and, in turn, carrying capacity. The quality and quantity of forage directly relates to physical condition of deer and elk, and plays an important role in their management.

Alternative 1

Effects of the no action alternative to deer and elk would be two fold. First, there would not be any creation of early successional habitat or rejuvenation of decadent foraging habitat through mechanical or prescribed fire which these species require for browse. Historic fire regimes prior to fire suppression provided for these open habitats and succulent browse important to the

nutritional needs of does and cows. Secondly, alternative 1 would sustain the current fuel hazard condition of the project area, in which the loss of habitat if a wildfire occurs would reduce the available cover for security and fawning and calving habitat.

Alternatives 2 & 3

Commercial harvest would reduce canopy closures and increase available forage for deer and elk. Harvest and fuel hazard reduction treatments would open the understory, providing for easier access, increased forage availability, but would reduce security cover. ODFW recommends road density reduction and habitat improvement projects, such as prescribed burns on south slope aspects, to maintain or improve big game habitat. Alternatives 2 & 3 would reduce road density through the decommissioning of 4.03 miles of road. Alternatives 2 & 3 would likely benefit deer and elk primarily through the increase in available forage.

Alternative 4 - DCV NSA

Alternative 4 is not likely to increase available forage measurably because the overstory canopy would not be modified. In addition, the risk from the current fuel hazard condition of the project area would remain, in which the loss of habitat due to wildfire would reduce the available cover for security and fawning and calving habitat. Road density would increase and no prescribed burning is proposed to improve habitat for deer and elk. Alternative 4 would provide little to no benefit to deer or elk and their habitat.

Invertebrates

The following invertebrate discussion as it relates to the March 2004 *Record of Decision to Remove or Modify the Survey and Manage Mitigation Measure Standards and Guidelines* has been previously described under the RTV section. There are two Bureau Sensitive snail species: the Oregon shoulderband (*Helminthoglypta hertleini*) and the travelling sideband (*Monadenia fidelis celeuthia*).

Since the late 1990s, more than 15 landscape management project areas throughout the Grants Pass Resource Area have been surveyed for these two species using the terrestrial mollusk survey protocol (USDA and USDI 1997, USDA and USDI 2002b, USDA and USDI 2003a,b). Only three project areas in GPRA (one east of Williams and two north of Grants Pass) have detected this species. Oregon shoulderbands were found in rocky areas associated with damp grassy areas, oak woodlands, and shrub lands, or in conifer forests closely associated with these habitat types. Shoulderband survey data analysis determined that they were not late-successional or old growth habitat dependent, and surveys are no longer required (USDA & USDI 2003a). During past surveys, unknown mollusks were collected and submitted to taxa experts. None of the *Monadenia* species submitted were identified as the travelling sideband. Surveys on the Grants Pass Resource Area have revealed no detections for the sideband and only three detections for the shoulderband east and north of the project area. Surveys have been conducted on other areas in the Medford District BLM area using the same protocol for terrestrial mollusks. The traveling sideband is known to occur in the Ashland Resource Area and the Oregon shoulderband occurs more commonly to the north in the Glendale and Butte Falls Resource Areas.

Alternative 1

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

Alternative 2 and 3

All lands identified for commercial timber harvest were surveyed for S&M molluscs. None were located. If SSSP molluscs are located during project activities the approved management recommendations would be implemented. This group generally requires cool moist environments with the exception of *Helminthoglypta hertleini* which may utilizes rocky talus in open exposed slopes. With the implementation of the management recommendations there are no anticipated impact to these species. Habitat in sites adjacent to known sites could experience short term effects, including warmer, drier conditions which could reduce mollusc use of those areas. This affect could extend into known sites because of the edge effect, but would be minimized because of the retention of approximately 40% canopy cover in treated units. These effects could be expected to mimic what would have occurred under normal disturbance regimes prior to the fire suppression era. Long term effects would be a reduced risk of stand replacing fire, which would likely maintain high canopy closures and mollusc populations. Alternative 2 proposes to treat more areas of habitat than alternative 3, which would provide a greater long term benefit to the species through the reduced risk of severe fire.

Amphibians

Affected Environment

Habitat (rock, talus and coarse wood) for amphibians, including the Del Norte salamander (*Plethodon elongates*), is sporadically distributed throughout the project area, occurring primarily near rock outcrops, ridge tops, and along riparian areas. Surveys have not been done for amphibians and are not planned nor required under current management guidelines. A summary of the S&M policy changes was previously described. The Del Norte is currently a Bureau Tracking species and is not considered a management species under the SSSP. Additionally, under the Survey and Manage program, pre-disturbance surveys are no longer required (S&M ROD 2001). A variety of amphibians are suspected to occur in the project area including riparian associated species as well as those that use upland habitats.

Alternative 1

The amount of amphibian habitat would remain at its current level. Forested vegetation on talus would remain at risk from wildfire. Talus slopes are not highly productive sites and would not be expected to provide late-successional habitat. However, suitable talus habitat can exist in late-successional forest stands, and high canopy closures can be attained from overstory trees to

maintain a cool, moist microclimate important to salamanders. Fuel loading and ladder fuel conditions make amphibian habitat susceptible to risk of high severity fire which would reduce canopy closure over talus habitat randomly across the landscape, retarding succession and development of shade tolerant trees.

Alternatives 2 and 3

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

Cumulative Effects

Cumulative effects in the project area result from the incremental impact of the alternatives, added to other past, present and reasonably foreseeable future actions regardless of who undertakes the action.
The majority of remaining older forest occurs on public lands managed by the BLM and the Forest Service. Past activities have changed the distribution and abundance of many wildlife species in the watershed. Species associated with younger forested conditions have benefited from these changes. Species associated with late-successional forests, such as the spotted owl, have declined, but as habitat in the Deer Creek watershed are naturally fragmented because of private ownership, agricultural development and edaphic conditions on valley bottoms, the impact on these species is likely less than in more contiguous late-successional habitats. Land development and agriculture have reduced low elevation habitats, creating barriers and prohibiting dispersal of some species. Overall, these past activities have resulted in a loss of habitat.

Fire suppression, mining, road building, grazing, land development, agriculture and timber harvest throughout the watershed have altered historic conditions. The majority of remaining older forest occurs on BLM lands. These past activities have changed the distribution and abundance of habitats and many wildlife species. For example, riparian habitats have been altered by road construction and mining, changing the hydrology and vegetation potential from historic conditions, which has affected the quality of connective habitat these areas provide.

Approximately 18,013 acres have been harvested from BLM lands in the Deer Creek watershed since 1950 (Table 5); however, as some of these acres may have been treated more than once, this is likely an overestimate of the acreage impacted by timber harvest. The precise impact of

this harvest on spotted owl habitat and other late-successional dependent species is unknown, but is reflected in the current conditions or (Affected Environment sections). Proposed BLM timber sales in the watershed include 348 acres in the Anderson West project and 547 acres in the Deer Mom project. Additional areas of thinning and/or burning for fuel hazard reduction have been associated with these sales. No additional timber sale activities on federal lands are projected to occur in the watershed in the next five years.

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

As a result of the NWFP, there has been a shift in management on federal lands in the Rogue Basin. Prior to the plan, harvest treatments were dominated by regeneration harvest. In the Deer Creek watershed, harvest treatments shifted to density management as a result of the NWFP. This has resulted in the treatment of many more acres compared to regeneration harvest of equivalent timber volume. Density management has fewer adverse effects on wildlife than regeneration harvest. Additionally, due to the National Fire Plan, management activities have been designed to move vegetation towards its historic range of variability by reducing fuel levels. This combination has resulted in treatments more in line with historic disturbance regimes.

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

The rate of suitable habitat loss due to timber harvest on private, state, and federal forest lands declined in the late 1980s and early 1990s (USFWS 2004). The harvest rates in suitable habitat on BLM lands in Oregon was 3% per year (22,000 acres) in 1990 and dropped to 0.52% per year (4,911 acres) by 2003 (USFWS 2004). During this period of declining rates of habitat loss, spotted owl populations in southwestern Oregon appeared stable. The future rate of habitat loss due to timber harvest on federal lands is expected to be less than 4% per decade (USDA, USDI, 2004 p.111). Since harvest rates on federal lands in Oregon are expected to remain low for the foreseeable future, it is reasonable to expect that the northern spotted owl population would remain stable in southwestern Oregon. The harvest of up to 667 acres of suitable habitat for this project is included in the projected BLM timber harvest program for southwestern Oregon. In addition, it is estimated that in the NWFP area, late-successional forest habitat development through in-growth (tree growth) is occurring at approximately 8% (600,000 acres) per decade over the baseline condition established in the NWFP (USFWS, 2004). This development is 2.5 times the rate of loss through stand replacement fire and harvest, and would result in a 2.7 million acre net increase in late-successional forest over 3-4 decades (USDA, USDI, 2004). Private forest lands and federal, non-reserved matrix lands are not expected to develop into suitable spotted owl habitat. Managed, mid-seral stands on federal, non-reserved matrix and on

private lands produce spotted owl dispersal habitat that may be used to connect blocks of late seral habitat in the federal reserves.

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

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

In summary, the rate of habitat loss is substantially reduced from historic trends, there is substantial in-growth and recovery of habitat, and newly identified threats are unconnected to the proposed action. Therefore, even with the additional downgrading of 251 acres, and removal of 87 acres of suitable nesting, roosting, foraging habitat, this project would only mimimally affect the stability of the Northern Spotted Owl population in southwestern Oregon and is unlikely to substantially effect the demographics of the spotted owl (USFWS 2003 log #1-15-03-F-511). Additionally, the South Deer project would have relatively minor effects to persistence of other species in the watershed. Cumulatively, while this project would further degrade late-successional habitat, this project combined with other actions in the watershed would not contribute to the need to federally list any Bureau sensitive or assessment wildlife species.

3.6 Botanical Resources

3.6.1 Affected Environment

The South Deer project area was surveyed for the presence of federally listed plant species, Bureau Special Status plant species, and noxious weeds during the field seasons in 1995 - 2004 Surveys were completed using intuitively controlled methodology. Surveys documented 25 occurrences for 9 species of Special Status plant within the project area (Table 28). Over 27 occurrences for 6 species of noxious weeds were documented from surveys (Table 29). The project area is within the range for the federally listed species *Fritillaria gentneri* and *Lomatium cookii*; however, neither species were found within the project area.

Table 28. Special Status Plants Survey Findings

VASCULAR PLANTS				
Species	**Habitat**	**Protection Status**	**# of Populations in Project Area**	**# of Populations on the District**
Cypripedium fasciculatum (Clustered ladyslipper)	Moist microsites in mixed evergreen forests	Bureau Sensitive	9	545
Festuca elmeri (Elmer's fescue)	Wooded Slopes	Bureau Assessment	2	55
Lotus stipularis (Stipuled trefoil)	Open forests, stream beds, ditches, chaparral, and logged areas below 4,000ft	Bureau Assessment	2	2
Allium bolanderi var. bolanderi (Bolander onion)	Opening on stony slopes and gravelly flats on serpentine soils	Bureau Tracking	2	79
Cypripedium montanum (Mountain ladyslipper)	Moist microsites in mixed evergreen forests	Bureau Tracking	5	170

NON-VASCULAR PLANTS				
Species	**Habitat**	**Protection Status**	**# of Populations in Project Area**	**# of Populations on the District**
Crumia latifolia (Moss)	Wet rocks and cliff faces	Bureau Assessment	1	108
Sulcaria badia (Bay horsehairLichen)	Found on trees, usually oaks	Bureau Assessment	1	30
Tripterocladium leucocladulum (Moss)	Rocks, cliffs, and the bark of hardwoods	Bureau Assessment	1	98
Fissidens grandifrons (Moss)	Rocks and soil	Bureau Tracking	2	37

Table 29. Noxious Weeds Survey Findings				
NOXIOUS WEEDS				
SPECIES	**COMMON NAME**	**SPECIES CODE**	**DESIGNATION**	**SECTION**
Centaurea debeauxii	Meadow Knapweed	CEDE5	B	**38S-07W**-31
Centaurea debeauxii ssp. thuillieri	Meadow Knapweed	CEDET	B	**39S-07W**-05
Cirsium arvense	Canada Thistle	CIAR4	B	**38S-07W**-29,31
Cirsium vulgare	Bull Thistle	CIVU	B	**38S-07W**-14,17,21, 23,25,29,31,35; **39S-07W**-03,04, 05,08,09
Cytisus scoparius	Scotch Broom	CYSC4	B	**38S-07W**-17,21,22, 23,31; **38S-08W**-13,25; **39S-07W**-4,5

Ten former Survey and Manage fungi species, now managed as Bureau Sensitive Species (BSS) have suspected or documented occurrence on lands administered by Medford District BLM. For these 10 fungi species, specific information regarding connectivity, range (including presence or absence within the project area), habitat requirements, and disturbance effects are lacking. The 2004 *FSEIS to Remove or Modify the Survey and Manage Mitigation Measure Standards and Guidelines* addressed incomplete or unavailable information regarding these species (USDA/USDI 2004 p. 108-109), and the effects of land management activities as described under the Northwest Forest Plan. It disclosed the lack of survey information from Reserve areas compared to Matrix and Adaptive Management areas.

These BSS fungi species are present in southwestern Oregon in the Klamath Mountains and Cascade Range (Table 30). These species would best be detected during fall surveys. Surveys for special status fungi species have not been completed for proposed treatment areas within all of the project area. Above-ground fruiting structures (sporocarps) are short-lived, seasonal in occurrence, and annually variable making surveys difficult (USDA and USDI 2004). According to BLM Information Bulletin No. OR-2004-145, 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.

The following table summarizes the information known regarding the ten former Survey and Manage fungi. It summarizes by whether habitat and known sites are sufficient to support stable

populations in the Northwest Forest Plan area and whether insufficiencies were due to federal actions. Outcomes not due to federal actions could include such factors as: (1) limited potential habitat and few populations on federally managed lands; (2) potential for stochastic events; (3) low number of individuals; (4) limited distribution; and, (5) narrow ecological amplitude (USDA and USDI 2004). It describes the broad forest community components where these species may be found. The final column summarizes results from a likelihood of occurrence key designed to assist in conservation planning (USDA/USDI Interagency Special Status and Sensitive Species program website) for the project.

Table 30. Habitat Sufficiency, Locations and Forest Community Components For BSS Fungi based on 2004 FEIS

Scientific Name	Number Sites in NFP[1]	Number Sites in Reserves[2]	% in Reserves	Forest Community Component	Likelihood of Occurrence/Risk to Species
Habitat Not Sufficient – not due to federal action					
Boletus pulcherrimus	36	5	13.9	PSME, PIPO,ABCO	Low likelihood of occurrence; low risk to species viability
Dermocybe humboldtensis	4	1	25.0	PSME,PIPO	Low likelihood of occurrence; low risk to species viability
Gastroboletus vividus	4	2	50.0	ABCO,Pine	Low likelihood of occurrence; low risk to species viability
Ramaria spinulosa var. diminutiva	1	0	0	PSME,Pine	Low likelihood of occurrence; low risk to species viability
Rhizopogon chamaleontinus	1	0	0	PSME	Reasonable likelihood of occurrence; low risk to species viability
Rhizopogon ellipsosporus	3	0	0	PSME	Reasonable likelihood of occurrence; low risk to species viability
Rhizopogon exiguus	5	3	60.0	PSME	Reasonable likelihood of occurrence; low risk to species viability
Habitat Not Sufficient – due to management					
Phaeocollybia californica	30	5	16.7	PSME	Reasonable likelihood of occurrence; low risk to species viability
Habitat Sufficient					
Phaeocollybia olivacea	93	19	20.4	PSME,ABCO, QUKE,Pine	Reasonable likelihood of occurrence; low risk to species viability
Phaeocollybia oregonensis	11	5	45.5	ABCO	Low likelihood of occurrence; low risk to species viability

[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.

[2] Reserves = Land Use Allocations Late Successional Reserve and Congressionally Reserved

Bolded species = occurs on or within Medford District, PSME = Douglas-fir, forest community component, PIPO = Ponderosa pine, forest community component, ABCO = White fir, forest community component, QUKE = California black oak, forest community component, Pine = Pinaceae family (includes pine, fir, Douglas-fir, spruce, hemlock), forest community component

The 10 Bureau Sensitive fungi are species that form mycorrhizae or mutually beneficial relationships with the rootlets of host plants that are typically conifers. The mycorrhizae form an underground mycelial network that can be considered the vegetative body of the fungi. Sporocarps, the fruiting bodies or "mushrooms", may develop above or below the ground surface depending on the species. Spores produced by the fruiting bodies are then transported by animals or wind. The extent of the underground mycelial network in relation to the fruiting bodies found above ground is unknown. The habitat components for these species are very broad with only general plant community types known.

Those species where habitat sufficiency outcome is not due to federal actions and that are not known to be found in or adjacent to the project area are *Boletus pulcherrimus, Dermocybe humboldtensis, Gastroboletus vividus,* and *Ramaria spinulosa var. diminutiva.* The actions proposed would not change this outcome put forth by the FEIS. Also, general habitat components (the ABCO plant community) for one species, *Phaeocollybia oregonensis*, are not present in the project area (Table 30).

Five species would have a reasonable likelihood to occur in the project area. *Rhizopogon exiguous, R. chamaleotinus* and *R. ellipsosporus* habitat was determined to not be sufficient to support stable populations in the Northwest Forest Plan area and this insufficiency was not due to land management actions. Three species*, Rhizopogon exiguous, R. chamaleotinus, R. ellipsosporus* were found in Josephine county during BLM State Office strategic surveys. *R. exiguous* was found in the lower Applegate 5th field watershed approximately 7.7 miles north of the project. It has a very broad habitat description; it is associated with the roots of Douglas fir and western hemlock. It is endemic to Oregon and Washington and has known sites also in Lane and Benton county. *R. chamaleotinus* was found in the Rogue River, Taylor creek 5th field watershed approximately 20.8 miles north of the project. Its habitat is also broad; it is found in association with Douglas fir and scattered sugar pine roots. Besides its one known site in the range of the northern spotted owl, it is also known from Idaho (Castellano et al 2003). *Rhizopogon ellipsosporus* was found during State Office strategic surveys in the Lower Applegate River 5th field watershed 7.4 miles north of the project and in the West Fork Illinois watershed south of the project. It is also broadly associated with the roots of Douglas fir and sugar pine. It has been found in both Josephine and Jackson counties.

Phaeocollybia olivacea was determined to have habitat (including known sites) sufficient to support stable populations in the Northwest Forest Plan area. These species would stabilize in a pattern similar to or different from their reference distribution because a substantial number of known sites are located in reserves or managed under the Agencies' Special Status Species Programs (USDA, USDI 2004, p. 152). *Phaeocollybia olivacea* has been found in the Rogue River, Taylor creek watershed as well as the Williams 5th field watershed approximately 7 miles southeast and 14.6 miles northeast from the project area, respectively. One potential site was found to the south in the West Fork Illinois watershed. This species is endemic to western

United States from the central Oregon coast south to Santa Cruz county. It has a very broad habitat description essentially stating that it can be found in oak family or pine family mixed forests in coastal lowlands (Castellano et al 2003).

For one of the ten fungi species (*Phaeocollybia californica*), the 2004 FSEIS determined the outcome of insufficient habitat is due to land management activities. Known sites of *Phaeocollybia californica* are not substantially protected by reserves and are susceptible to adverse impacts from soil disturbance and/or a significant loss of host species. Although Matrix Standards and Guidelines of the Northwest Forest Plan provide for minimizing soil and litter disturbance, there is lack of knowledge about how much disturbance can be tolerated by these species. Loss of even a few known sites could adversely impact this species persistence within the Northwest Forest Plan area (USDA, USDI 2000, p. 154).

Phaeocollybia californica was historically known in the East Fork Illinois watershed 10.5 miles southeast of the project area. It was also listed on a general species list for a survey in the Deer Creek watershed (i.e. its exact location is unknown). The species is broadly associated with the roots of Pacific silver fir, sitka spruce, Douglas fir and western hemlock. It is endemic to Washington and Oregon and as mentioned above has 30 known sites ranging from the Olympic peninsula to southwestern Oregon.

Given the broad habitat and the lack of surveys completed for any of these species, it can be assumed that more sites do exist. It is unknown how rare these species really are, but it is known they are associated with the common tree species discussed above. As mentioned, the 2004 *FSEIS to Remove or Modify the Survey and Manage Mitigation Measure Standards and Guidelines* addressed incomplete or unavailable information regarding these species (USDA/USDI 2004 p. 108-109). It disclosed the unknown strength of the association between these species and late-successional conditions as well as unknown information regarding connectivity, habitat needs and range. It stated that any discussion of risk based on rarity and likelihood of disturbance must recognize that, for many species, only a small percentage of potential habitat has been surveyed.

3.6.2 Environmental Consequences

Bureau Sensitive plants are required to be protected and managed by the Bureau. Bureau Assessment species are ones currently not eligible for federal listing, but are of a conservation concern and may need protection or mitigation in BLM activities. It is Oregon State Office policy that the Bureau of Land management would protect, manage, and conserve those sensitive species and their habitats such that any Bureau action would not contribute to the need to list any of these species (IM OR-91-57). Bureau Tracking species are not considered Special Status species for management purposes, but these species are documented to better determine future status and management for that species. Protection for these species is discretionary.

Alternative 1 – No Action

The no action alternative would not result in direct effects to T & E or special status species. Special Status plants would have both a negative and positive effects towards the no action alternative based on the species and habitat requirements as described below.

Fuels treatment and timber harvest

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

Certain plant species, such as *Cypripedium fasciculatum, Cypripedium montanum, Tripterocladium leucocladulum,* and most of the fungi require a sufficient amount of down logs, snags, duff layer, and canopy cover to maintain soil moisture and mycorrhizal associates. Species that thrive in canopies with dense conditions would succeed if the canopy cover is within the correct percentage required for that species.

Habitat conditions for species requiring canopy openings, such as *Lotus stipularis*, *Allium bolanderi var. Bolanderi, Festuca elmeri*, and where most of the non-vascular species are found, would decline due to shrub/conifer encroachment and crowded conditions. Certain areas where natural thinning has been suppressed such as fire have resulted in dense stands and limited openings within the canopy. These conditions can lead to a decline in special status plants that require openings for survival.

Road work and noxious weeds

Noxious Weeds can out-compete native plants, reduce habitat for native insects and animals and threaten biological diversity. They can alter soil fertility, dry up water supplies, poison animals, decrease agriculture production, clog rivers, and reduce the recreational value of our lands. Noxious weeds find disturbed sites favorable for habitat. Vehicles are a primary method for transporting noxious weeds and creating new populations of noxious weeds. No action would mean no disturbance or increased access that may result in new weed populations. However, existing populations would not receive priority for treatment compared to alternatives 2 and 3. Overall, the risk of weed infestations would be greater for no action than for alternatives 2 and 3.

Alternative 2 and 3

Short and Long Term Effects

Effects are similar in comparing both alternatives although, less disturbance would occur with alternative 3 due to the reduction in treatment acres. Due to the inclusion and implementation of the project design features there should be no direct or indirect effects to existing Special Status plants. For some species that require higher canopy closures, buffers are often expanded past the extent of the actual population in order to protect habitat for future population expansion. The action alternatives would not contribute to the listing of vascular plants, non-vascular plants, or fungi. Buffers surrounding Special Status plant sites would provide protection from treatment implementation. Buffer sizes would be implemented based on species, habitat, and treatment.

Fuels treatment and timber harvest

Treatments would degrade habitat for species requiring canopy cover when opening of canopies reduces or dries moist microsites for *Cypripedium faciculatum*, *Cyripedium montanum, Tripterocladium leucocladulum,* and most of the fungi species. These treatments though would not lead to the listing of any Special Status plant species, given that habitat for these species is found adjacent to the project area, within the watershed, throughout the district and the Pacific Northwest.

Canopy thinning should improve habitat overall for those Special Status plant species requiring openings by reducing competing vegetation and opening the canopy (*Lotus stipularis, Allium bolanderi, Festuca elmeri* and most of the non-vascular species found).

By underburning, burning slash and chipped material instead of handpiling, conditions for prescribed burning would better replicate natural, low intensity burns on the landscape, as long as the slash layer is not too thick. A thick layer of slash (>6") may, however, create potential for smoldering under the event of a wildland fire (if mulch isn't burned as part of the fuels treatment) which could damage the soil and seedbed to a point where many species in the herbaceous layer would have difficulty re-establishing. This potential for high intensity smoldering and impediment of germination, which is expected to occur on less than 5% of the project area, would decrease over time as slash settles and decomposes. Although these effects are possible, careful administration during the operation of this equipment, plus the PDF requirements for leaving untreated areas and avoiding placing material in buffered areas, would ensure that deep layers would not be created across the landscape or where special status plants are located.

In the long term, Special Status plant species that prefer open conditions would improve from treatments. Thinning or burning in the fall, or dormancy period, would reduce competition from encroachment from other plant species and improve the habitat conditions. Also, hazard fuel reduction treatments involving thinning of dense understory in these projects would help to return forests to healthier conditions simulating a more natural fire regime. This, in turn, would reduce the risk of high intensity fire.

The prescription for the South Deer project calls for commercial timber harvest on less than 2% of the total BLM watershed acres. Five Bureau Sensitive fungi species (*Rhizopogon chamaleontinus, R. ellipsosporus, R. exiguus, Phaeocollybia californica, P. olivacea)* are reasonably likely to occur in the proposed project area, but habitat requirements for these species are too broad or poorly understood to reasonably mitigate adverse effects through management of habitat at the project specific scale. Broad-scale inventories with management of all known sites may contribute towards species viability (Likelihood of Occurrence key - USDA/USDI Interagency Special Status and Sensitive Species program website).

While there is a reasonable likelihood for occurrence, the level of risk is low as explained in the following: The prescription of the South Deer project calls for commercial timber harvest on less than 2% of the total BLM 5th field watershed. The species of most concern, given that loss of known sites may lead to reduction in persistence, is *Phaeocollybia californica*. No sites of this species or the other four species are known in the area. Therefore, no direct effects should

occur to these species and no reduction in persistence should occur for *Phaeocollybia californica.*

Indirect effects to these five species could occur; namely due to changes in fungi habitat from stand treatments. These could include changes in microsite conditions (i.e. temperature, humidity, light intensity, and wind) from reduction of canopy cover, edge effects, changes in soil moisture regimes, fragmentation of the mycelial network, reduction in availability of host trees, reduction of root and root tip availability, decrease in organic soil layer, soil compaction/bulk density increase, and a decrease in the amount of coarse woody debris that may serve as a source of moisture in the dry months. These effects may reduce or eliminate sporocarp reproduction, change fungal species composition and species diversity, and decrease fungal biomass. Management methods that retain living trees and shrubs provide host trees and substrates to maintain mycorrhizal networks (Amaranthus and Perry 1994). A study by Luoma, et al. (2004) examined the effects of varying levels and patterns of green-tree retention on ectomycorrhizal sporocarp production; aggregated versus dispersed patterns of green tree retention were compared. Results of the study showed that while sporocarp production declined in all treatments, effects varied. Sporocarp production was substantially reduced only after 85% of basal area was removed. No effect was detected in fall mushrooms at higher percentages of green-tree retention under a dispersed pattern of treatment (such as a commercial thin from below). This was most likely due to the greater area occupied by the root systems of the remaining trees. The physical spacing of the trees allowed the initial fall rains to reach the forest floor better than when intercepted by the canopy of aggregate patterns.

While indirect effects or effects to unknown sites could occur, the risk is low due to the small amount of habitat that may be changed. The prescription calls for reduction in stand densities to 35%, which equates roughly to 40% canopy retention. Based on the above study results, the dispersed pattern of commercial thinning proposed should not affect Bureau Sensitive fungi that were not surveyed for, but could be present. These species may survive subsequent habitat conditions because the design of commercial harvest treatments would favor retaining habitat components for fungi. Habitat components important to fungi include dead, downed wood; standing dead trees; and live old-growth trees; as well as a diversity of host species(including trees and underbrush) and microhabitats (USDA/USDI 2004 p. 148) Proposed project actions and project design features for South Deer including treatments retaining 40% or greater canopy cover, retention of coarse woody debris and surrounding vegetation, retaining old growth trees and associated trees, riparian reserves, special status plant reserves, and logging systems that minimize or create only localized ground disturbance would support fungi viability. While there is a reasonable likelihood of occurrence for these species in the project area, because such PDFs would be in place, there is low risk to local unknown populations because so little potential habitat would be affected.

Fuels treatments could also affect unknown populations or potential fungi habitat. The impacts of prescribed burning for removal of slash and site preparation depend on fire intensity. High intensity burns that get into mineral soils may eliminate mycorrhizal fungi and create habitat that is colonized by non-mycorrhizal plant species including weeds. A recent study by Smith, et al (2004) examined short-term effects of seasonal prescribed burning on ectomycorrhizal fungi. Results showed that fall underburning (in dry ponderosa pine stands of eastern Oregon)

significantly reduced duff depth, live root biomass, and ectomycorrhizae species richness compared to spring underburning, for at least two years. Also, the probability of residual tree mortality was greater for fall burning. The data suggests that spring burning should be favored over fall burning if the objective is to maintain ectomycorrhizae species diversity.

High intensity burns, such as pile burning to remove slash, that enter mineral soils would create a localized disturbance including death of fungi down into mineral soil (the more diverse portion of the soil), incineration of the organic soil layer, loss of available nutrients, reduced soil moisture, decrease in fungal biomass, decrease in fungal species diversity, fungal species composition change, degradation of soil physical structure, and reduce fungi which increases non-mycorrhizal species' (many that are weedy) ability to become established at the site (Amaranthus and Perry 1994, Korb et al 2004).

While handpiles may create these effects, their footprint across the landscape is small compared to the area where such high intensity burns would not take place. For the project, an average of 70 handpiles per acre would be implemented. Based on a 6' by 6' handpile only 6% of the acreage would be directly affected by the handpiles. Handpiles would be well distributed across the landscape covering only 278 acres (or 1.6%) of the entire project. At the 5th field watershed scale, this equates to handpiles occurring over 0.4% of the watershed. While there is a reasonable likelihood of occurrence for five fungi species in the project areas, the small percentage of area handpiled and the ability for spring underburning to occur, should reduce the risk to these species. Any directly affected unknown populations should have the opportunity to recover due to the mosaic of mychorrhizae left intact and reduction in burning intensity.

Road work and noxious weeds

If left un-checked, noxious weeds would occupy habitat for Special Status plants and native species. Adverse effects to Special Status species from the encroachment of noxious weeds could impact populations due to competition for light, water, and nutrients. These effects may reduce populations and potential habitat over time. Disturbances associated with treatment, road maintenance, and road construction represent opportunities for seed dispersal of noxious weeds from outside the project area as well as the spread of existing seed already growing in the project area (Table 29). However, known sites would be treated and PDFs that require washing equipment and using native species for restoration or revegetation would further minimize the risk of noxious weed infestations.

Alternative 4 – DCV NSA

Short and Long Term Effects

Due to the inclusion and implementation of the project design features there should be no direct or indirect effects to Special Status plants. The alternative would not contribute to the listing of vascular plants, non-vascular plants, or fungi (See discussion under alternatives 2 and 3). Buffers surrounding Special Status plant sites would provide protection from treatment implementation. Buffer sizes would be implemented based on species, habitat, and treatment. A 20ft minimum buffer would be placed on Bureau Sensitive species.

Fuels treatment and timber harvest

Without fuel reduction treatments, a build-up of fuels would continue to occur within the plant populations. This build-up would create favorable conditions for higher intensity wildfires outside of the normal range of variation, which could result in extensive damage to plant species where this high intensity occurs.

Because treatments would only occur within 150' of the roads, the vast majority of the project area would not be disturbed. Within the 150', disturbance would be minimal (heavy equipment would not go off the road).

Habitat for species requiring openings would decrease over time with shrub/conifer encroachment and crowded conditions outside of these treatment strips. Certain areas where fire has been suppressed have resulted in dense stands and limited openings within the canopy. These conditions can lead to a decline in populations of species that require openings for survival due to competition for space, light, water, and nutrients.

Habitat for species requiring dense canopy conditions would continue to increase.

Road work and noxious weeds
The addition of 4.2 miles (6 acres) of roads provides additional ground disturbance, but due to the width of the road which maintains canopy coverage and the project design features, the potential introduction of noxious weeds would be minimal.

Cumulative Effects
Land ownership within the project area includes a checkerboard of government and privately owned land. Management treatments in the past include logging, road construction, tree planting, and recreational development. BLM treatments have occurred in the Deer Creek watershed since the 1940s. Past management activities have trended towards early seral, single age stands. Harvesting entries have occurred within the Deer Creek Watershed from 1946 to 2000 resulting in 17,969 acres (59%) out of 72,679 BLM acres. Fuels treatments that have occurred in the past in the Deer Creek Watershed 1990 to 2004 resulted in 1,643 acres (2%) of BLM acres. This project is relatively small, encompassing 8,206 acres, approximately 11% of the 72,679 acres of BLM land found in the Deer Creek 5th field watershed.

As human populations increase in this region, available habitat for Special Status plant species would decrease. Management and treatment activities would continue to occur on private and BLM lands. Special Status plant populations and their habitat would continue to need protection and management as these actions are carried out on federal lands. Plant species on 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. Because habitat and populations for the Special Status species found are abundant on federal land, impacts associated with the South Deer project should not lead to the need to list any plant species even when considered in conjunction with habitat or plant impacting activities on non-federal land.

Past actions may have affected fungi habitat directly through damage to sporocarps or underground portions of populations or indirectly through changes in habitat as described in

detail above. Whether these changes have affected fungi habitat substantially is unknown due to the lack of information regarding the five fungi species discussed above.

Information regarding the frequency of occurrence for S&M fungi are only available from surveys done at the landscape scale; not the project level. Also information available on the habitat for such species is very broad and does not provide the specificity needed to analyze project level or cumulative actions. The only way to obtain more detailed information at the project level would be through surveys which have been determined to be impractical by the Oregon/Washington State Office (BLM IB No. OR-2004-145). It is unlikely that other avenues for conducting pre-project evaluations, such as habitat examinations, habitat evaluation, evaluation of species-habitat associations and presence of suitable or potential habitat, and the review of existing survey records, inventories and spatial data would yield sufficient information to make an adequate evaluation at the field level (BLM IB No. OR-2004-145).

Information that is available states that fire has played an important role in influencing the plant communities of southwestern Oregon. The mixed evergreen forests typically found in the project area have been created and perpetuated in the past by fire. This regime has been disrupted by fire control activities (Franklin and Dyrness 1988, Atzet and Wheeler 1982). If individual species have evolved under a more natural fire cycle, then the assumption can be made that these species will persist under more open conditions. If dense stands and hazardous fuel loadings can be reduced in a way that ensures that the habitat components important to fungi can be retained through a mosaic across the landscape, then risk of damage due to high intensity wildland fire would be reduced for fungi and as well as other Special Status plant species.

In summary, based upon known information about these fungi species, it can be construed that the proposed actions are unlikely to have substantial effects and furthermore, it is unlikely that creation of more open stand conditions, hypothesized to occur historically, would have a substantive indirect effect on these species. Additionally, the actions proposed would not incrementally add to changing fungi habitat substantially due to the size of the project in relation to the 5th field watershed.

Fire suppression over the last 100 years has altered plant communities. The current trend in forest structure is dense stands with decreased understories. Fires often create a mosaic across the landscape creating a structure that supports diversity.

This project does not incrementally affect the viability of Special Status species. The Bureau Sensitive species within the South Deer Project area would be protected through project design features as described previously. Past actions led to a reduction in habitat at least for *Cypripedium* species because of a reduction in canopy cover associated with harvest activities. Reasonably foreseeable actions would potentially reduce habitat for these species even further. But while site specific habitat for these species would be potentially reduced, the species viability, populations, and health as a whole within Medford District would not be affected incrementally and therefore the species as a whole would not be impacted due to the abundance of habitat and numerous populations in the Medford District. Habitat would increase as canopies continue to close over time. These species were probably never a dominant species in the

watershed, but with shaded microsite conditions and more moisture their numbers may have been higher (USDI 1997, p74).

Reasonably foreseeable future actions within the watershed would potentially create favorable habitat for species requiring conditions with open canopies. With a more open habitat, species requiring a more open canopy condition, may thrive and populations of the species requiring these habitat conditions may increase.

Noxious weeds have started to impact plant communities, especially in drainages and along road-sides in the South Deer project area. Disturbances such as large machinery used in road construction, logging, and traffic most likely would continue to act as a seed/ weed dispersal mechanism and create prime habitat for the spread of noxious weeds. By applying the project design features (treating known populations and washing vehicles, etc.) and with very few miles of road which would be utilized, there would be a minimal increase of noxious weeds at the watershed scale. Populations of noxious weeds found on BLM lands are documented and managed, which is not necessarily the case on non-federal lands.

3.7 Fisheries / Aquatic

3.7.1 Affected Environment

The project area includes three 6th field sub-watersheds within the Deer Creek 5th field watershed. The major streams and aquatic habitats that could be affected by the proposed actions are within the McMullin sub-watershed. They are McMullin, Thompson, Haven, Ryan, and Camp Creeks, and Lake Selmac. Fish species that inhabit these streams include coho salmon (*Oncorhynchus kisutch)*, winter steelhead (*O. mykiss)*, cutthroat trout (*O. clarki)*, Pacific lamprey (*Lampetra tridentata)*, western brook lamprey (*Lampetra richardsoni*), and sculpins (*Cottus spp.)*. Southern Oregon/Northern California (SONC) coho salmon are federally listed as threatened. Pacific lamprey is a Bureau tracking species in Oregon. The Deer Creek watershed is not a key watershed. The watershed is not identified in the Governor's salmon recovery plan as a core habitat area of critical importance to the maintenance of coho salmon populations.

The Oregon Department of Fish and Wildlife (ODFW) has identified fish habitat benchmarks used to determine if a component of fish habitat is a limiting factor in trout or salmon production or survival. In the streams of the project area, large woody debris (LWD) levels, pool depth and frequency, water flow and temperature, and riparian condition have been identified as limiting for salmon and trout production and survival. The ODFW benchmark for pool habitat is that pools comprise >35% of total stream area, adequate riparian canopy is identified as coverage >75%, and >20 pieces of large wood per 100 meters of stream.

Thompson Creek supports coho salmon as far upstream as Section 3 (approximately 7.6 miles from the mouth). Winter steelhead are present for 6.4 miles, and cutthroat trout are present 8.4 miles upstream of the mouth. Pacific lamprey, western brook lamprey, and sculpin are found throughout Thompson Creek. However, Thompson Creek only flows through BLM ownership in Section 3, where the only fish found have been cutthroat trout and sculpin.

In Thompson Creek as a whole, salmon production and survival are limited by temperature, channelization, lack of LWD, and low flows in the late summer. The low flows are attributable

to lack of annual snow pack and irrigation withdrawals in the summer.

The portions of Thompson Creek on BLM land in Section 3 were surveyed in 2003. They were characterized as having adequate habitat for cutthroat with a gradient of 4-5%. The substrate was dominated by boulders with pockets of cobble and gravel present. The fine sediment content of the substrate was low and at desirable levels. Woody debris consisted of small pieces and was inadequate. In areas, the riparian vegetation was characterized as a young hardwood stand with low levels of canopy closure. The habitat included riffles, glides, and deep pools with adequate cover. Caddis fly larvae and stone fly larvae were found, indicating conditions supportive of salmonids.

McMullin Creek contains steelhead, sculpin, western brook lamprey, and Pacific lamprey up to the dam impounding Lake Selmac. Upstream of the dam, cutthroat are present to RM 5.3, approximately the center of Section 5, and the east fork of McMullin supports cutthroat upstream to Section 4, approximately 2.0 miles. In addition, several unnamed tributaries to McMullin Creek contain cutthroat in the lowest 0.25 mile where they connect with the mainstem. Quedo Creek, which flows into Lake Selmac, contains cutthroat for approximately 0.5 mile.

The McMullin Creek drainage does not contain anadromous fish. Lake Selmac was created for irrigation and recreational purposes, and the dam impounding it blocks all upstream fish migration. Coho habitat is abundant above the dam and would be used for coho spawning if passage past the dam were possible. Although habitat upstream of manmade barriers usually meets the current definition of coho Critical Habitat (CH), the final rule (CFR 50, Part 226.210) regarding SONC Designated CH establishes that the Selmac Lake Dam is the upstream extent of CH.

Cutthroat trout habitat above the lake is limited by warm summer water temperatures, channelization, lack of LWD, and, in the lowest reaches, high levels of silt (Deer Creek Watershed Analysis 1997). Aquatic macroinvertebrate monitoring on McMullin Creek in Section 31 revealed that cold water invertebrate biota were nearly absent, indicating that water temperatures were borderline supportive of salmonids. Low quality erosional and margin habitat, and very low quality detritus habitat for aquatic macroinvertebrates were found. Further upstream in Section 5, both erosional and margin habitat were within a moderate range, and detritus habitat quality was low. Levels of cold water biota again indicated that water temperatures were borderline supportive for salmonids. The most significant factors limiting the integrity of the benthic invertebrate community were warm summer temperatures lethal to most cold water biota, high levels of embeddedness and silt, very low overall habitat complexity, and very low summer flows. The high levels of fine sediments found at both sites in this survey (c. 1998) were not found during channel surveys conducted in 2003. The recent surveys found embeddedness in 20% of the reaches, clean gravels in riffles, and very little sediment in pools, all of which indicate desirable levels of fine sediments.

Haven Creek supports steelhead and cutthroat for 1.8 miles upstream from its confluence with Thompson Creek, to a point which is near the center of Section 35. The fish-bearing segment of Haven Creek and its two unnamed tributaries total approximately 0.75 mile and comprise the only portion of Haven Creek that is on BLM land. The upper extent of Haven Creek provides

habitat for coho to at least the center of Section 34, where a tributary entering Haven Creek from the south contains coho and cutthroat. Haven Creek is perennial but has a segment with interrupted flow in Section 35. In a BLM stream survey, Haven Creek was characterized as 15-20% gradient, the substrate being dominated by boulders with pockets of cobble and gravel present. Fine sediment was nearly absent. The dominant stream habitat type was cascades over boulders, with few pools present. Caddisfly, stonefly, and dipteran larvae were found, indicating the potential for conditions supportive of salmonids. There was adequate LWD, with pieces up to 40 feet in length and 30-40 inches DBH present. Hardwoods dominated the riparian, with canopy closure at 75%. LWD recruitment potential was adequate, with large Douglas-fir present in the overstory.

Ryan Creek, a tributary to Thompson Creek, contains cutthroat for 1.0 mile. Though coho have not been found in surveys, the stream is accessible and is considered coho Critical Habitat. Approximately 0.25 mile of the stream flows on BLM land, in Section 21. The stream is perennial, with interrupted flows. The stream has a gradient of 3-4% and the channel is incised in portions of the BLM reach. During a BLM stream survey, the substrate was characterized as dominated by gravel with undesirably high levels of fine sediment. Pools with adequate cover were present in the survey reach. Off channel habitat was present in a secondary channel. Caddisfly, stonefly, and dragonfly larvae were found, indicating the potential for conditions at least moderately supportive of salmonids. Small diameter hardwoods dominated the overstory and the understory. Only small pieces of woody debris were found and LWD recruitment potential was low.

Camp Creek, a tributary to Thompson Creek, is perennial. Coho were found in the portion of Camp Creek that flows through BLM land in Section 21 (approx. RM 0.4). The stream gradient is 2-3% through the BLM segment. Camp Creek is considered coho Critical Habitat from the mouth upstream for approximately 1 mile until the gradient is greater than 5% and probably excludes coho. Camp Creek has a ditched channel through the segment that is on BLM land. During a BLM stream survey, the dominant habitat type found was a glide, with no pools. The substrate, however, was dominated by gravel suitable for coho spawning.

Lake Selmac supports largemouth bass (*Micropterus salmoides*), smallmouth bass (*Micropterus dolomieui*), black crappie (*Pomoxis nigromaculatus*), black bullhead (*Ictalurus melas*), bluegill (*Lepomis macrochirus*), green sunfish (*Lepomis cyanellus*), pumpkinseed sunfish (*Lepomis gibbosus*), Klamath smallscale sucker (*Catostomus rimiculus*), and golden shiner (*Notemigonus crysoleucas*). Hatchery rainbow trout (*O. mykiss)* are stocked in the lake to supplement the recreational fishery.

3.7.2 Environmental Consequences

The following analysis considers the likelihood that the proposed actions of the four alternatives would affect fisheries and aquatic resources, and then assesses the magnitude, duration, and nature of effects that would probably occur. 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. The effects on habitat are in turn used to evaluate the potential of the proposed actions to affect fish populations through production and survival. No effects to fish

habitat were identified from the proposed actions in the two adjunct 7th field watersheds discussed in the soils and water analysis. This discussion would address the 6th field watershed which contains the bulk of the project area.

Alternative 1 – No Action

Under Alternative 1, the current conditions and trends of channel processes and water quality, and therefore fish habitat, would continue. Current levels of sedimentation in spawning gravels in streams on BLM lands do not appear to be excessive, except on Ryan Creek. Although programmatic road maintenance would continue at current levels, improvements proposed in other alternatives would not be made on the few isolated roads that are the main sources of sediment being routed to streams.

Alternative 1 would have no direct effect on summer stream temperatures. However, the increased risk of a high severity wildfire in the riparian zone could indirectly affect stream temperatures by substantially reducing stream shade. Fish growth and survival currently are limited by elevated stream temperatures in middle and lower reaches of McMullin and lack of flow in Thompson Creek.

The loss of future Large Woody Debris (LWD) recruitment potential from a high severity wildfire in the riparian would result in decreasing pool frequency and depth, decreasing stream complexity, and a decrease in salmonid growth and survival through reduced rearing habitat quality. Instream placement of LWD in two reaches of McMullin Creek would not take place under Alternative 1. The reaches would continue to have low pool frequency and depth, little stream complexity, high stream velocities, and excessive bank erosion. This would continue the current condition of poor quality rearing habitat which limits salmonid growth and survival.

Alternative 2

<u>Road Work</u>
Overall, road maintenance and renovation would maintain downstream salmon survival and production. Road activities would result in sediment reduction and improved road drainage conditions. The use and subsequent decommissioning of pre-existing but unrecovered skid roads and landings in the riparian reserves under Alternative 2 would provide an immediate benefit for aquatic resources by reducing sediment delivery and a long term benefit of re-establishing canopy cover on riparian roads.

Road maintenance and renovation would add sediment to streams, but are not likely to alter fish habitat due to the implementation of PDFs (wet season restrictions, dust abatement, etc.). The amount of sediment delivery would be so small as to not cause an increase in streambed embeddedness, an increase of fines in the gravel, or turbid water in fish habitat. The operator spur roads to be constructed and decommissioned are short and not connected to the stream network. They are located on stable ridge tops and midslopes and would not affect floodplain connectivity. Road density would not be increased, because the roads would be decommissioned following use. There is minimal potential for impacts to riparian and stream habitats, and hydrologic function as a result of the proposed road activities. Any impacts would be negligible

at the sixth field level. Therefore, road maintenance and/or renovation would have negligible affects to salmonid migration, spawning, egg incubation, rearing, and feeding.

During road renovation, any cross drain culverts that are replaced would be sized according to 100-year flood criteria. Decommissioning spur roads would increase infiltration and decrease overland flows and in the riparian reserve allow the reestablishment of riparian vegetation. The reduction in sediment delivery resulting from the renovation of problem roads would aid egg and juvenile fish survival because the risk of egg suffocation would be lower. The risk of direct or latent mortality to juvenile fish from sediment delivery is less than with the no action alternative.

No cumulative adverse affects from the proposed road work are anticipated because no new roads would be added, existing roads which are current sources of sediment would be renovated or decommissioned, and only a small percentage of the watershed would be involved in the proposed action (See Section 3.1). The production and survival of salmonids would be maintained.

Vegetation Treatments

Harvest - There are proposed harvest units adjacent to fish or fish habitat in McMullin, Thompson, Haven, and Ryan Creeks. Vegetation treatment prescriptions within the Riparian Reserve were developed to meet objectives for ecosystem function that tier to the NFP's ACS. PDFs establish restrictions for the implementation of the prescriptions in riparian areas minimizing the potential to negatively affect fish and aquatic habitat. Tractors would operate in riparian areas that have slopes less than 35%, and logs would be lined to existing or designated skid trails, which would be decompacted following use. Silvicultural treatments in Riparian Reserves would not reduce the canopy coverage below 50%, with the overall long term target of greater than or equal to 60%. Vegetation in the primary shade zone of perennial streams would be retained because a 50 foot no treatment area would be implemented next to the channel, thereby, protecting water quality.

Fuels - Fuels reduction treatments would take place adjacent to fish-bearing reaches of McMullin, Thompson, and Haven Creeks. Perennial and intermittent streams without fish habitat would be adjacent to treatment areas as well. Mechanical treatments and prescribed burning within Riparian Reserves would be restricted to areas outside of no treatment zones.

Small woody material would be consumed during prescribed burning, but large coarse woody material would be left largely intact. During underburns in riparian areas, higher fuel moisture and relative humidity combine to slow the movement of fire, reducing the risk of mortality of large trees and consumption of snags and large down wood. The low intensity fires have a very low risk of resulting in the mortality of large overstory trees. The future recruitment of large woody debris and shade would not be reduced by the application of prescribed fire in the riparian reserve. 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 outside the no treatment zone. The timing and duration of any sediment transport resulting from these burns would coincide with high winter flows and would not be likely to adversely affect fish or fish habitat.

In Alternative 2, approximately 77 acres within Riparian Reserves would be treated for fuel reduction using a machine masticator. Effects from machine masticator and subsequent underburning would be highly localized, unmeasurable, negligible, and have short term impacts. Stream bank stability would be maintained because the tracks of the machine masticator would be restricted from entering the no treatment zone along the channel. Based on monitoring of previous machine masticator treatments, because the tracks are riding on an 1-4" layer of shredded /chopped vegetation and have a low ground pressure, only 2 - 4% of the treatment area would be likely to have signs of soil compaction. Potential for sediment input to streams would be low due to the presence of a shredded vegetation layer and the untreated strip next to streams, preventing a sediment routing mechanism. It is unlikely that the machine masticator would need to cross any streams in the proposed treatment areas. If necessary, perennial streams would be crossed at culverts, and intermittent streams would be crossed when the stream is dry and at designated locations where the channel is naturally armored and banks are low to minimize the potential for erosion.

Large wood placement - The proposed placement of LWD in McMullin Creek would improve spawning and rearing habitat because pools would be scoured and gravel would be captured by logs. Logs would retain small woody material that moves through the system, slowing water around the complexes and adding to instream cover. LWD placed in Lake Selmac would improve rearing habitat by increasing cover for juveniles.

Density management - The proposed action includes thinning in the riparian reserves to accelerate the development of late-successional forest conditions. Late-successional forest conditions in the riparian reserves would be characterized by increased structural diversity, canopy, and large woody debris recruitment, with improved stream complexity and water quality. Salmonid production would likely increase as improved channel function results in increased adult holding areas and improved gravel retention. Sediment reduction in spawning gravels and improved water quality would increase egg survival. Improved rearing habitat resulting from lower summer water temperatures and increased pool quality would increase the probability for juvenile survival.

Cumulative Effects

The cumulative effects are minimal or negligible in this alternative because of the efforts to eliminate sediment delivery mechanisms and disturbance through PDFs. There are no foreseeable actions on BLM land in the McMullin sub-watershed. Private lands are assumed to continue to harvest on a rotation schedule in accordance with ODF guidelines. The McMullin Creek sub-watershed's poor riparian structure, inadequate large woody debris, elevated summer water temperatures, sedimentation, and irrigation withdrawals have contributed to a decline in salmonid populations. The harvest management of riparian forest stands on a short (approximately 40-60 year) rotation on private timber land is not likely to accelerate watershed recovery. However, if the proposed actions are taken on federal lands, currently degraded riparian areas would have the opportunity to move more quickly toward recovery. Since there are no cumulative effects in McMullin Creek there would be no cumulative effects at the Deer Creek 5th field scale.

In conclusion, based on this analysis of potential impacts, the proposed actions would not likely disrupt normal behavior patterns such as migration, spawning, egg incubation, rearing and feeding. Habitat would not be degraded. The habitat would be expected to improve as late-successional forest develops in the riparian reserves. In areas where instream LWD placement is proposed, habitat quality would improve.

Alternative 3

Harvest - The proposed action in this alternative does not include any vegetation treatments within the Riparian Reserves. The restriction of fuel management to areas outside of the Riparian Reserves would have the effect of maintaining the current risk trend within the Riparian Reserves. This alternative does nothing within the Riparian Reserves to reduce the risk of stream corridors burning in wildfires. However, the treatments in adjacent matrix units would still decrease the hazard across the landscape and somewhat reduce the risk of wildfire moving into the Riparian Reserves.

Fuels - Prescribed burning that takes place in units containing streams could be expected to back into the outer edges of Riparian Reserves but would be approximately 150 feet away from channels, even on intermittent streams. There would be 0.5 mile less of temporary spur road construction than in Alternative 2. The Soil and Water analysis (Section 3.1) concluded that there would be no measurable or detectable effect to water quality and channel conditions as a result of implementing Alternative 3. As such, there are no causal mechanisms in the alternative which would affect fish and aquatic resources. The proposed actions would not disrupt normal behavior patterns such as migration, spawning, egg incubation, rearing and feeding. Significant modifications or degradations of habitat would not occur.

Large wood placement - Since the Watershed Restoration treatments would not be implemented in this alternative, McMullin Creek and Lake Selmac would not benefit from the placement of instream wood, as described in Alternative 2.

There are no cumulative effects anticipated from this alternative due to the absence of causal mechanisms which could affect fish and aquatic resources.

Alternative 4 - DCV NSA

The vegetative treatments proposed in Alternative 4 would be implemented at such an infrequent pace and dispersed nature that they would have the same effects on fish and aquatic resources as Alternative 1, the No Action Alternative. In most Riparian Reserves, no treatment is proposed. Fuel treatments and prescribed burning are not proposed; wildfire risk would remain at current levels with the increasing trend in the stream corridors. The risk of indirect effects from loss of stream shade and LWD due to wildfire would be the same as in Alternative 1, with the resulting decrease in salmonid growth and survival through reduced rearing habitat quality.

The small amount of sediment input to streams associated with the construction of natural surface roads would not affect fish because it would be distributed by streamflows prior to reaching perennial streams and in turn, fish habitat further downstream. The proposed trail

improvements and construction would not affect fish because it would include only a small number of crossings of intermittent stream without fish.

There are no cumulative effects anticipated from this alternative due to the absence of causal mechanisms by which fish and aquatic resources would be affected.

3.8 Socioeconomics

3.8.1 Affected Environment

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.

There are no specific land use allocations related to socioeconomic conditions. Management actions / direction supports assisting in development of economic opportunities for rural, resource-based communities, increasing emphasis on management of special forest products, and "…other activities identified by BLM and the involved communities as benefiting identified economic strategies" (RMP p. 81). It concludes by stating that the Medford District should:

> Design and implement forest management activities to produce a sustained yield of products to support local and regional economic activity. A diversity of forest products (timber and nontimber) will be offered to support large and small commercial operations and provide for personal use. Service contracts will include opportunities for both large and small contractors.

The BLM extended an invitation to the local and regional communities and other state and federal agencies, private organizations and individuals to develop issues and resources important to local, state, national, and international economies (RMP 80).

Public involvement began in March 2004, via letters and newspaper ads, inviting the public to attend an open house meeting. A scoping letter was sent on March 18, 2004 to residents and landowners near or adjacent to BLM parcels within the planning area, to federal, state, and county agencies, and to private organizations and individuals that requested information concerning projects of this type. The BLM held an open house in Selma, Oregon on April 7, 2004.

Information was gathered through questionnaires, personal discussions, and comment letters, which provided public input to BLM for consideration in the EA. Letters, phone calls, meetings, and field visits elicited the following issues or concerns:

- Maintain the quality of life by protecting forest resources
- Creation of local jobs from forest activities
- Water Quality
- Fuel loading/fuel reduction activities
- Recreation and tourism
- Support for maintaining current road access to public lands
- Protection of older forests

During the scoping process the Deer Creek Valley Natural Resource Conservation Association (DCVNRCA), a community interest group, expressed interest in submitting an alternative that would be included in the Environmental Assessment. In the ten months following the request, BLM staff worked closely with DCVNRCA to develop the Natural Selection Alternative (alternative 4). Many letters and petitions were received from the public during the planning process in support of the Natural Selection Alternative. However, concerns were raised by the Oregon Natural Resources Council regarding fuels treatments, down wood and snag retention, and road construction, and by the Oregon Chapter of the Sierra Club regarding fuels treatments proposed in their alternative.

All public input was considered by the planning and interdisciplinary teams in developing the alternatives and analyzing effects.

During the planning process the BLM identified a number of units in the project area that would be difficult to treat under our traditional contract or timber sale processes. Stewardship contracting was identified as one potential method to treat areas to accomplish ecological objectives while providing opportunities which would benefit the local community.

As an example, there is an opportunity to utilize stewardship contracting in many of the density management / understory reduction (DM/UR) units. The sawlog/pole volume within these units is not conducive to inclusion within a commercial timber sale. Stewardship contracting would allow the BLM to treat units, which contain various products and provide ecological services, while providing local contracting opportunities and added economic benefits to the local community.

3.8.2 Environmental Consequences

Alternative 1 – No Action

Under the no action alternative, the objectives stated in the RMP would not be met. Contributions to local, state, national, and international economies would not occur and economic opportunities to the local and regional economies would not be made. There would be no opportunities for local contractors to create jobs from forest activities. Amenities such as recreation facilities, protected special areas and high quality fisheries would not be enhanced.

Fuel hazards would not be addressed and there would be no opportunities to enhance the forest resources important to local communities as identified through scoping. Recreation and tourism activities would not be created and forest resources important to these activities would continue

to be threatened by risk of wildfire and would continue to degrade because of dense stand conditions.

Alternatives 2 and 3

Economics

The BLM alternatives were designed to help achieve the objectives of the RMP. The commercial timber sale, fuel hazard reduction activities, stewardship opportunities and recreation enhancement would all 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" (RMP p. 80). Amenities such as recreational opportunities would enhance tourism and in turn contribute to local economies as well as improving local communities as places to live, work, and visit. Fuel hazard reduction would provide for safer communities in the case of wildfire and alternative 2 would provide a greater benefit for community safety because of the greater number of acres treated for fuel hazard reduction.

Proposed actions would assist in development of economic opportunities for rural, resource-based communities by providing opportunities for local contractors in fuel hazard reduction and stewardship contracts for special forest products. As an example of economic opportunities presented by alternative 2, the fuels reduction alone is expected to generate approximately $2 million, most of which would go to local contractors. Stewardship contracts would enhance forest resources and provide economic opportunities, as well as produce a sustained yield of products to support local and regional economic activity.

Alternative 4 – DCV NSA

Alternative 4 would provide local jobs and economic opportunities at a lower level than for alternatives 2 and 3. Fuel hazard reduction would not occur under this alternative and thus would not contribute to making rural communities safer from wildfire. In addition to the continued risk of wildfire, and potential loss of homes and property values, a potential $2 million would not be realized for the local and regional community in fuel hazard reduction contracts. Some economic opportunities will be available under stewardship contracts, though less than under alternatives 2 and 3 as some of the stewardship contracts will be for a combination of special forest products (poles, sawlogs) and fuel hazard reduction.

Objectives as outlined in the RMP would be met in some areas, but not in others. Minimal contributions would be made to local, state, national, and international economies, at levels much lower than in alternatives 2 and 3. Alternative 4 would only minimally contribute to the Medford District's timber harvest / forest products commitment on matrix lands, and thus would not meet the project's stated purpose and need.

Additionally, alternative 4 would not meet the fuel hazard reduction portion of the purpose and need of the South Deer project because fuels would not be reduced. Forest stand vigor and resiliency would not be improved, leading to a loss of stand diversity (oaks and pines would continue to be lost because of density induced mortality) and would not promote important

recreational and community values (wildlife habitats, sustainable forest conditions, and maintenance and improvement of water quality and fisheries) identified during the scoping process as important for recreation and tourism. Creation of trails under alternative 4 would provide recreational opportunities and enhance tourism, but would not improve forest stand health which would enhance these community values.

Alternatives 2 and 3

Logging Activity Impacts to Residents

The South Deer planning area has numerous access roads on BLM lands from decades of forest management activities. In order to minimize new road construction helicopter yarding is proposed for some areas of the project.

Helicopter logging proposed under alternatives 2 and 3 would have an increased noise impact on residents living near or adjacent to proposed helicopter units and landings. These impacts would occur during daylight operating hours. The number of passes to and from the log landing could vary from as few as two to as many as 150+ passes per day. Previous experience indicates that rural interface residents are most affected in the early morning and late evening. In many cases, helicopter noise is audible most of the day depending on how close residences are to flight paths and the blocking or enhancing effect of local topographic features.

Restrictions reduce but do not eliminate noise associated effects. This is an unavoidable adverse effect resulting from the increased use of helicopter logging required to implement the Medford RMP. In general, normal operating times for helicopter logging include the majority of daylight hours. Flight time is also greatly influenced by weather conditions and FAA rules, such as pilot work/rest requirements. It is not uncommon for a helicopter to be grounded by low clouds or wind for hours or days at a time.

Noise from helicopter logging can be heard most of an operational day, with the greatest amount of noise disturbance when the helicopter is within 500 feet of residences. One residence is within 500 feet of a proposed helicopter yarding unit. After one day of yarding, that proximity would extend out quickly to 1,000 feet or greater as the helicopter gradually works outward from this property. For Alternative 2 it is estimated that there would be 7–10 days of operational noise for residences within one half mile of helicopter units. The noise for this period would be dispersed over four different locations. For residences within 0.5–1 miles of helicopter units there would be two to three days of operational sound at one location. There would be an estimated two days of operational sound for residences within one mile or more at one location. Alternative 3 has an additional two days of helicopter flying activities at one location for residences within one half mile of logging units, and an additional three days, (over two locations) of helicopter sound for residences one mile or greater.

No project design features restricting helicopter flight hours are proposed in the South Deer project. By not restricting flight hours and/or days, effects of helicopter yarding on people would be minimized simply by allowing a quicker “in and out,” thus reducing the duration of operations (fewer days of yarding). Some other effects on people associated with logging are chain saw noise, dust and log truck traffic. Chain saw noise has different properties and duration

than helicopters, but the possible effects on people follows a similar pattern as described above for helicopters. Sound would be dispersed and of short duration so restrictions are not deemed necessary. Dust from truck hauling would be mitigated by watering, lignin and/or speed reductions. Log truck traffic on publicly owned roads would follow all laws, regulations and speed limits, and special measures would be implemented as needed during special times of the day such as school bus pick-up and drop-off times.

In summary, effects of increased noise from chainsaw use, helicopters and logging trucks, and dust and traffic from project activities will be relatively short in duration and mitigated as necessary. There are no cumulative effects as the disturbance ceases when the project is completed.

Alternative 4 – DCV NSA

Logging Activity Impacts to Residents

Helicopters would not be used in alternative 4. Chainsaw noise, dust and log truck traffic under alternative 4 would have an increased noise impact on residents living near or adjacent to timber harvest units. Effects would be similar in pattern to those described above in alternatives 2 and 3, but would likely be of shorter duration during any one time period, but occur over a longer time interval as activities are expected to occur over a 10 year period.

4.0 Agencies and Persons Consulted

4.1 Public Involvement

Public involvement began in March 2004 with invitations, via letters and news ads, inviting the public to attend an open house meeting. A scoping letter was sent on March 18, 2004 to residents and landowners near or adjacent to BLM parcels within the planning area, to federal, state, and county agencies, and to private organizations and individuals that requested information concerning projects of this type. The letter invited interested persons to comment on the proposal, and also announced an open house meeting at the Selma Community Center in Selma, Oregon, held on April 7, 2004. The open house provided an opportunity for community members to meet the planning team and BLM management, who presented displays and handouts highlighting the scope of the project as well as the issues and concerns that supported action in the planning area. Answers to BLM-provided questionnaires, personal discussions, and comment letters provided public input to BLM for consideration in the EA. The scoping letter and questionnaire were also posted on the BLM website at *www.or.blm.gov/Medford/planning.*

Conversations with BLM employees and adjacent landowners/residents about the project have occurred by arrangement and as crews performed field work. Letters, phone calls, meetings, and field visits solicited the following issues or concerns:

- Maintain the quality of life by protecting forest resources
- Creation of local jobs from forest activities
- Water Quality

- Support for the selection of Alternative 4 - DCV NSA
- Fuel loading/fuel reduction activities
- Recreation and tourism
- Support for maintaining current road access to public lands
- Protection of older forests

During the scoping process the Deer Creek Valley Natural Resource Conservation Association (DCVNRCA), a community interest group, expressed interest in submitting an alternative that would be included in the Environmental Assessment. In the ten months following the request, BLM staff worked closely with DCVNRCA to develop the alternative. Alternative 4 represents their proposal. Many letters and petitions were received from the public during the NEPA planning process in support of the Natural Selection Alternative (Alternative 4). However, concerns were raised regarding fuels treatments, downed wood and snag retention, and level of road construction proposed in their alternative.

All public input was considered by the planning and interdisciplinary teams in developing the proposals and in preparation of this EA.

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

4.2 Availability of Document and Comment Procedures

Copies of the EA would be available for public review in the BLM Medford District Office and online at *www.or.blm.gov/Medford/planning*. A formal 30 day public comment period would be initiated by an announcement in the Grants Pass Daily Courier.

Written comments should be addressed to Abbie Jossie, Field Manager, Grants Pass Resource Area, at 3040 Biddle Road, Medford, OR 97504. E-mailed comments may be sent to *or110mb@or.blm.gov*.