U.S. Department of the Interior
Bureau of Land Management

McKenzie Landscape Project

Environmental Assessment and Preliminary Finding of No Significant Impact

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BLM
Northwest Oregon District

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Tables, Figures, and Images

1.1 Introduction

The Upper Willamette Field Office, Northwest Oregon District (formerly Eugene District), Bureau of Land Management (BLM) is proposing to undertake forest management activities evaluated in this McKenzie Landscape Environmental Assessment (EA). The project proposes one thinning harvest and two regeneration harvests with retention and snag/coarse woody debris creation in the McKenzie River fifth-field watershed, approximately 1-3 miles north, northwest, and northeast of Vida, Oregon, in Lane County (Figure 1). Associated activities include road management (construction, renovation, improvement, decommissioning, culvert installation), truck haul, reforestation (site preparation, planting), and fuels management/reduction.

Table 1 summarizes the timber harvests proposed by this project. Please note that throughout the document, harvest acres are based on planning level data and should be considered close approximations or "maximums". Final acreages at the time of timber sales are usually lower.

Table 1. Project Summary: Proposed Timber Harvests

Harvest Unit Name	Location	Harvest Type	Study Area (Approximate Acres)	Proposed Harvest Area (Approximate Acres)
Wild and Woolly	T16S R2E Sec 23	Commercial Thinning	110	71
Finn Again	T16S R2E Sec 19	Regeneration	100	71-78
Mid Indian	T16S R2E Sec 20, 21	Regeneration	350	155-183

Public scoping for this McKenzie Landscape Project identified that the project was being developed in conformance with the Eugene District 1995 Record of Decision (ROD)/Resource Management Plan (RMP), referred to hereafter as the 1995 RMP (or RMP). The BLM signed a Record of Decision on August 5, 2016, for the 2016 Northwestern and Coastal Oregon Record of Decision/Resource Management Plan (2016 ROD/RMP). The proposed harvest areas are within the current Harvest Land Base (HLB) land use allocation (LUA) of the 2016 ROD/RMP. Project planning was initiated in 2013 and the project was designed to be implemented, and is proposed to be implemented, consistent with the management direction of the 1995 RMP (or RMP). The project is therefore regarded as a "transition project" under the 2016 ROD/RMP and has been reviewed to ensure consistency with transition project requirements. Please refer to Section 1.5 for further details on transition conformance.

This EA provides clarifications and updates to the November 2016 McKenzie Landscape EA (2016 EA). Based on public comments and some minor modifications to the project, the Upper Willamette Field Manager decided to issue this EA to clarify the project and address public concerns.

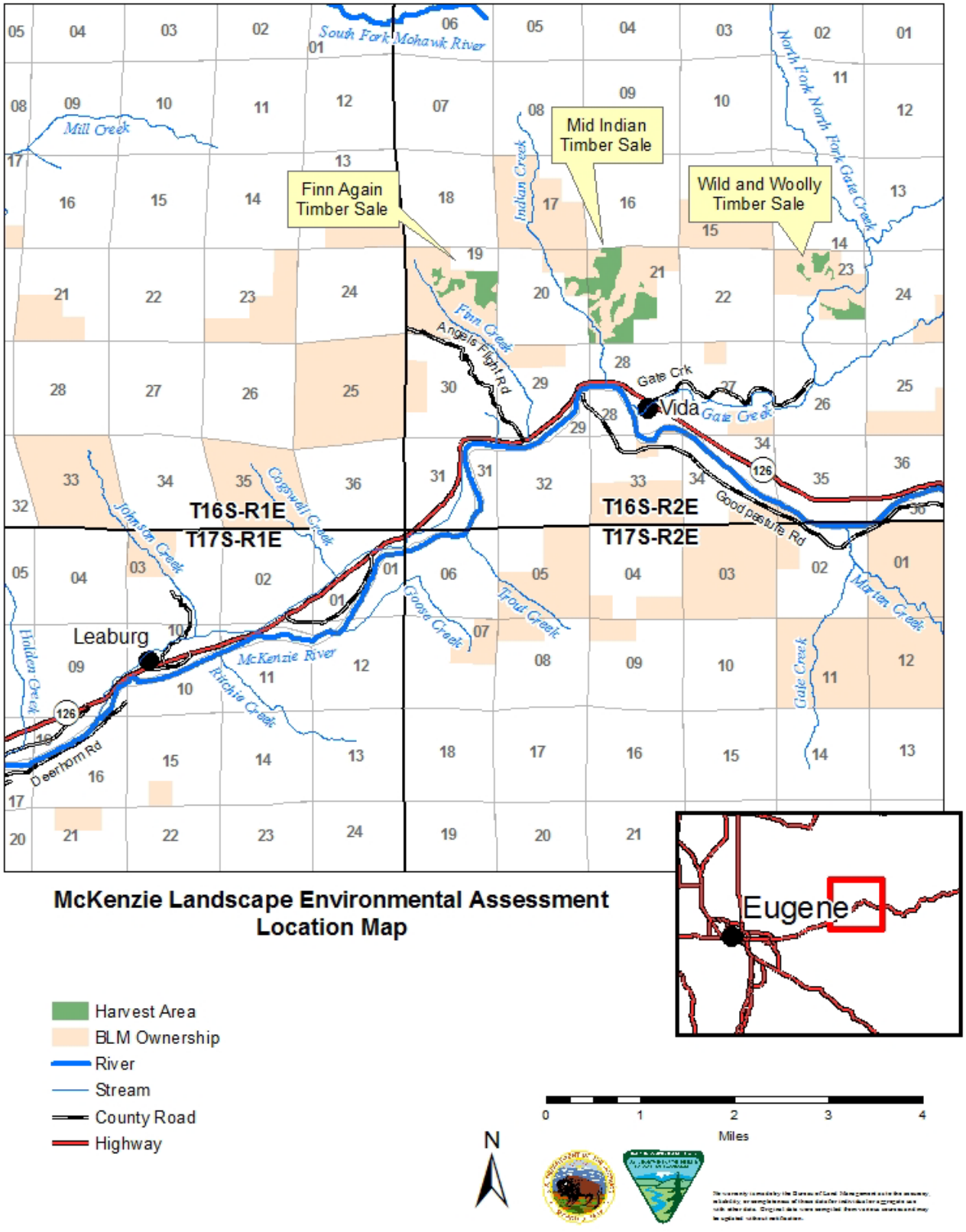


Figure 1. Vicinity Map for McKenzie Landscape Project.

For project planning and implementation purposes, the McKenzie Landscape Project falls within the land use allocation (LUA) formerly identified as the Central Cascades Adaptive Management Area (CCAMA) under the 1995 RMP. Adaptive Management Area (AMAs) included timber harvest as a primary objective. However, the AMA allowed for alternative management approaches to implement the RMP based on scientific research. The AMA designation was incorporated into the 1995 RMP from the 1994 *Final Supplemental Environmental Impact Statement On Management Of Habitat For Late-Successional And Old-Growth Forest Related Species Within The Range Of The Northern Spotted Owl* and 1994 *Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within The Range Of The Northern Spotted Owl* (SEIS/ROD or 1994 ROD), known simply as the Northwest Forest Plan (NWFP).

AMAs *were selected to provide opportunities for innovation, provide examples in major physiographic provinces, and provide a range of technical challenges* including *integration of timber harvest with ecological objectives* (1994 ROD, p. C-22). One of the objectives for the CCAMA in the 1995 RMP is to "*Develop and test new management approaches to integrate and achieve ecological and economic health and other social objectives*" (1995 RMP, p. 32). One of the project's action alternatives is based on adaptive management approaches developed for the CCAMA, while another is based on the standard 1995 RMP guidance for Matrix lands.

1.2 Project Area Description

The project area includes predominantly mature forest established as a result of fire disturbance episodes. Based on the stand year of origin, the last major fire events in the Vida/McKenzie Watershed (the relevant 5th field watershed at the time of the analyses for this project) occurred between 1850 and 1900. The fires were predominantly mid-sized stand replacement fires. Patterns from these stand-replacement fires created patchy forest stands with different densities ranging from many residual trees to very few. Most of today's mature stands in the CCMA lack structural components of snags and downed logs, likely due to a second, hotter fire which consumed the accumulated fuels (BLM, 1996).

Proposed harvest areas were identified as the most suitable lands (with treatment needs) within a larger study area. The original study area was nearly 1,000 acres. After eliminating areas in Sections 15 and 27 due to environmental or operational constraints, a smaller study area of approximately 560 acres was examined in more detail, through field visits and desktop analyses. The potential harvest boundaries were refined to avoid unstable slopes, rare plants, cultural sites, and other resource concerns. These refinements eliminated approximately 39 acres from the thinning project (Wild & Woolly) and 38 acres from the regeneration harvest areas (Finn Again and Mid Indian). After making these adjustments and removing no-cut buffers and aggregate retention areas, the project now includes about 275-325 acres across the three harvest units.

Stands in the harvest units generally range in age from 70 to 120 years old. Many of these stands are of high density with basal areas greater than 300 square feet per acre (sq.ft./ac) and with relative densities (RD) above 40. They are generally composed of closely spaced Douglas fir, with little development of understory vegetation or shade-tolerant species. Some stands are beginning to develop small size shade-tolerant trees in the understory, but, with a few exceptions, this process is in its early stages.

1.2.1 Summary of Notable Changes

Since this project was publicly scoped in 2013, there have been several notable changes which are encompassed in this EA, as summarized below:

- Public scoping for this project included potential harvest units named Second Tom, Rough Draw, View Marten, and Marten Ridge. These units were removed from the McKenzie Landscape Project EA because surveys for Survey and Manage species were still ongoing. Additionally, these units are in a different geographic context and were assessed to have different resource issues more suitably addressed in a separate EA. Separation of those units into their own EA allows for a more complete, site-specific consideration of resources and environmental effects.

Since the issuance of the 2016 EA for this project, the following project changes have been made in response to new information:

- Alternative 2A: The sub-option of Alternative 2 called Alternative 2A in the 2016 EA has been dropped from further consideration because road rights-of-way for access to a portion of Mid Indian have now been obtained, precluding the need for the alternative (see Section 2.6 for more details.)
- Haul Roads: An additional segment of the Finn Creek mainline haul road is now proposed to be used for Mid Indian. The new segment is a 3.41 mile portion of Road No. 16-2E-29 (Segment C), which would require renovation. Haul distance on this road has thus increased from 2.69 miles to 6.10 miles. The use of this road is anticipated to take some timber haul off of the Minney Creek Mainline (which encompasses Road Nos. 16-2E-21.1, 16-2E-21.2, 16-2E-21.5, 16-2E-23.3) and 0.40 miles of Road No. 16-2E-26 (Gate Creek Mainline). Those roads would likely still be used for mineral haul, but the Finn Creek mainline offers a better-maintained road system with shorter hauling distance/time for the timber. This route would reduce haul use on approximately 3.8 miles of County road (mainly Gate Creek Road and some of HWY 126). It would also preclude the need to construct the proposed junction between Road Nos. 16-2E-16 and 16-2E-21.5 (1163A junction). Another minor change in proposed road usage since the 2016 EA is that the 16-2E-16.1 road was previously identified for quarry/mineral haul only but is now proposed to include timber haul.

Effects analyses were reviewed for the above changes and revised in this EA where necessary. Other changes were mostly editorial, such as minor adjustments in harvest acres, clarifications of the proposed action, rewording of issue statements, and adjustment of Project Design Features (PDFs) to better address site conditions.

1.3 Purpose and Need

The purposes of this forest management project are bulleted below, followed by a description of conditions in the project area demonstrating a need for these purposes. The purposes of the McKenzie Landscape Project are:

- to contribute substantially to the achievement of the SEIS/ROD objective of providing a sustainable timber supply (1995 RMP, p. 84)
- to manage developing stands to promote tree survival and growth (to achieve a balance between wood volume production, quality of wood, and timber value at harvest (1995 RMP, p. 84)
- to base silvicultural treatments and harvest designs on the functional characteristics of the ecosystem and on the characteristics of each forest stand and site, with treatments designed as much as possible to match historical stand conditions (1995 RMP, p.85)
- to utilize harvested timber while reserving structural components such as snags and coarse woody debris (1995 RMP, p. 85)
- to meet Aquatic Conservation Strategy (ACS) Objectives (1995 RMP, pp. 18-19)

The 1995 RMP identifies that, to provide for a stable timber supply, regeneration harvest should be applied to those stands that have achieved Culmination of Mean Annual Increment (CMAI), and commercial thinning should be applied to those stands that have not yet achieved CMAI (1995 RMP, p. 200). Based on forest inventory data and stand exams, BLM resource specialists identified forest stands within the Mid Indian and Finn Again units as having achieved CMAI. Forest stands within Wild and Woolly have not yet achieved CMAI, and are in need of commercial thinning in order to stimulate or maintain vigorous tree growth. There is a need to apply commercial thinning to stands within the Wild and Woolly unit, and regeneration harvest to stands within the Mid Indian and Finn Again units to contribute to a sustainable supply of timber and to promote wood volume production for future timber value.

Research into the historical stand conditions in the middle McKenzie River watershed, where the project is located, revealed a fire-influenced landscape. In addition to creating the even-aged forest blocks in the project area, fires appear to have consumed remnant slash and down wood. There is currently a lack of down wood and snags and there is a need to create more and larger sizes of these components within the project area. Stand data show an average of 3.4 snags per acre among all sizes and decay classes (0.9-6.2 per harvest unit) and an average of 357 linear feet per acre of coarse woody debris (CWD) among all harvest units. The majority of these features -- the snags and CWD -- are in small size classes which are of relatively low value to wildlife. These features contribute nutrient inputs for upland and aquatic systems, and provide structure for the needs of some wildlife (cover, food, nesting), with larger sizes providing higher value.

Aquatic systems are stable in the project area. Research has indicated that mature forest cover over streams results in relatively low productivity, with stream production potentially limited by nutrients and sunlight. Improvements in aquatic habitat as well as productivity are possible through treatments in the riparian zone. Such improvements would support ACS objectives.

1.4 Decision to be made

The Upper Willamette Field Manager would consider the following factors in alternative development and selection for implementation:

- How well the alternatives meet the purpose and need of the project
- The trade-offs of short-term and long-term effects, both detrimental and beneficial, on resources impacted by proposed actions
- The cost effectiveness of the alternative.

1.5 Conformance

1.5.1 RMP Transition

The McKenzie Landscape Project is in conformance with the 2016 ROD/RMP. The BLM signed the ROD, approving the 2016 RMP, on August 5, 2016.

Revision of an RMP necessarily involves a transition from the application of the old RMP to the application of the new RMP. The planning and analysis of future projects such as timber sales requires several years of preparation before the BLM can design a site-specific project and reach a decision. Allowing for a transition from the old RMP to the new RMP avoids disrupting the management of BLM-administered lands and allows the BLM to utilize work already begun on the planning and analysis of projects.

This project was designed to conform to and be consistent with the management direction of the Eugene District's 1995 RMP. The 2016 ROD/RMP (p. 10-11) allows the BLM to implement projects consistent with the management direction of either the 1995 RMP or the 2016 ROD/RMP, at the discretion of the decision maker, if:

1. The BLM had not signed a project-specific decision prior to the effective date of the 2016 ROD/RMP
2. The BLM began preparation of NEPA documentation prior to the effective date of the 2016 ROD/RMP, and
3. The BLM signs a project-specific decision on the project within two years following the effective date of the 2016 ROD/RMP.

The Upper Willamette Field Office initiated planning and NEPA documentation for this project on September 3, 2013, prior to the effective date of the 2016 ROD/RMP, and no project-specific decisions have yet been made.

Another requirement of a transition project is that it does not include any actions in five categories known as "Exceptions", described on pages 9-13 of the 2016 ROD/RMP. The activities described in the exceptions are prohibited. The McKenzie Landscape Project was reviewed to ensure that it did not include any of these activities. Based on the LUAs in the project area and the activities proposed, the project does not include any of the prohibited actions, as detailed below. [Notes: It may be helpful to think of an Exception is a Prohibition when reading the below. Also, in the below section on Exceptions, the "approved RMP" means the 2016 RMP.]

Exception 1: Regeneration harvest within the Late-Successional Reserve (LSR) allocated by the 2016 ROD that is inconsistent with the management direction for the LSR contained within the

approved RMP. (Note: construction of roads or landings does not constitute regeneration harvest per the 2016 ROD/RMP.)

> ***Review:*** Under the 2016 RMP, the McKenzie Landscape Project includes lands designated as the Harvest Land Base – Moderate Intensity Timber Area, District-Designated Reserve (which in this project area consists only of land designated for road corridors), District-Designated Reserve – Timber Production Capability Classification, Late-Successional Reserve, and Riparian Reserve land use allocations. No Late-Successional Reserve lands within the project area are proposed for regeneration harvest. See Table 2 for a comparison of 1995 RMP and 2016 RMP land use allocations in the project area. The 9 acres of LSR in the project area are located within special yarding areas, no-cut buffers, and aggregates within which no harvest activities are proposed.

Exception 2: Issuance of right-of-way grants within the Late-Successional Reserve allocated by the 2016 ROD that are inconsistent with the management direction for the Late-Successional Reserve contained within the approved RMP.

> ***Review:*** The McKenzie Landscape Project does not include any proposal for issuance of rights-of-way grants within Late-Successional Reserve.

Exception 3: Commercial thinning within the inner zone of the Riparian Reserve allocated by the 2016 ROD that is inconsistent with the management direction for the Riparian Reserve contained within the approved RMP.

> ***Review:*** The McKenzie Landscape Project does not include any commercial timber harvest within the inner zone of the Riparian Reserve (RR) allocated by the 2016 ROD. Wild & Woolly is in a Class 1 watershed (Gate Creek) and Finn Again and Mid Indian are in Class 2 watersheds (Finn Creek, Indian Creek). For Class 1 and 2 watersheds, the inner zone of the RR per the 2016 RMP is 120 feet from the edge of the ordinary high water line. The no-cut distance (buffer) for Wild & Woolly is 120 feet and the no-cut buffers for Finn Again and Mid Indian are a minimum of 135 feet.

Exception 4: Projects within the District-Designated Reserve – Lands Managed for their Wilderness Characteristics allocated by the 2016 ROD that are inconsistent with the management direction for the District-Designated Reserve – Lands Managed for their Wilderness Characteristics contained within the approved RMP.

> ***Review:*** No portion of the McKenzie Landscape Project is located within the District-Designated Reserve – Lands Managed for their Wilderness Characteristics land use allocation.

Exception 5: Timber harvest that would cause the incidental take of northern spotted owl territorial pairs or resident singles and does not have a signed Biological Opinion and Incidental Take Statement that predates the effective date of the Biological Opinion for the approved RMP.

> ***Review:*** The McKenzie Landscape Project includes timber harvest that would cause the incidental take of northern spotted owl territorial pairs or resident singles. However, the BLM received a Biological Opinion from the U.S. Fish and Wildlife Service on October 6, 2014 (see EA Section 4.0), almost two years prior to the effective date of the Biological Opinion for the approved (2016) RMP. The October 2014 Biological Opinion grants

incidental take to northern spotted owls for anticipated effects of timber harvest included in the McKenzie Landscape Project (further details are in the EA Section 4.0).

The decision maker has chosen to implement the McKenzie Landscape Project consistent with the management direction of the 1995 RMP. The management direction for the land use allocations (LUAs) in the project area -- Adaptive Management Area and Riparian Reserves -- and the management direction for the resource programs as described in the 1995 RMP were used to design and develop the alternatives presented in this EA.

Table 2. Comparison of 1995 RMP and 2016 RMP) land use allocations in the project area

Land Use Allocation	Project Area Acres*	
	1995 Eugene RMP	2016 RMP
Adaptive Management Area	349	-
Riparian Reserve	209	211
Harvest Land Base	-	329
District-Designated Reserve	-	5
District-Designated Reserve – TPCC	-	4
Late-Successional Reserve	-	9

* Acres presented are total approximate acres for the project area, including acres on which no timber harvest would occur.

1.5.2 Survey and Manage Provision of the Northwest Forest Plan (NWFP)

The project is in conformance with the "Survey and Manage" provision of the NWFP, as adopted by the 1995 RMP. This provision requires the BLM and other federal agencies to survey for rare species, and create buffers around the species if found, before undertaking logging or other disruptive activities. The McKenzie Landscape Project is consistent with this provision, established by the 2001 *Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines* (2001 ROD) and incorporated into the 1995 RMP.

This project utilizes the December 2003 Survey and Manage species list, which incorporates species changes and removals made as a result of the 2001, 2002, and 2003 Annual Species Reviews (ASR), with the exception of the red tree vole. For the red tree vole, the Ninth Circuit Court of Appeals in *KSWC et al. v. Boody et al., 468 F3d 549 (9th Cir. 2006)* vacated the category change and removal of the red tree vole in the mesic zone, and returned the red tree vole to its status as existed in the 2001 ROD, which makes the species 'Category C' (species understood to be uncommon and for which pre-disturbance surveys are considered practical) throughout its range.

The potential presence of Survey and Manage species in the Project Area was thoroughly evaluated. Given the age of some trees in the regeneration units, pre-disturbance surveys for red tree vole were conducted in those units. No individuals or populations were found and no further surveys are necessary in those units.

Surveys for red tree vole were not required in the proposed thinning unit (Wild & Woolly) because of a 2006 court decision which exempts thinning projects in stands younger than 80 years old. In 2006, the District Court for the Western District of Washington (Judge Pechman) invalidated the BLM's and U.S. Forest Service's 2004 *Record of Decision to Remove the Survey and Manage Mitigation Measure Standards and Guidelines* (2004 ROD) on account of

violations of the National Environmental Policy Act (NEPA). Pursuant to the ruling, parties to the litigation agreed to certain stipulations exempting certain categories of activities from the Survey and Manage standard. These are informally known as the "Pechman Exemptions." As stated by the order:

> *Defendants shall not authorize, allow, or permit to continue any logging or other ground-disturbing activities on projects to which the 2004 ROD applied unless such activities are in compliance with the 2001 ROD (as the 2001 ROD was amended or modified as of March 21, 2004), except that this order will not apply to:*
>
> *a) Thinning projects in stands younger than 80 years old;*
> *b) Replacing culverts on roads that are in use and part of the road system, and removing culverts if the road is temporary or to be decommissioned;*
> *c) Riparian and stream improvement projects where the riparian work is riparian planting, obtaining material for placing in-stream, and road or trail decommissioning; and where the stream improvement work is the placement of large wood, channel and floodplain reconstruction, or removal of channel diversions; and*
> d) *The portions of projects involving hazardous fuel treatments where prescribed fire is applied. Any portion of a hazardous fuel treatment project involving commercial logging will remain subject to the survey and management requirements except for thinning of stands younger than 80 years old under subparagraph a. of this paragraph.*

The McKenzie Landscape Project includes approximately 71 acres of commercial thinning. The stands considered for thinning in Wild & Woolly consist of 40 year old and 69-70 year old stands and thus meet Exemption A of the above court order, such that they do not require survey.

1.6 Public Involvement

1.6.1 Scoping

On September 3, 2013, a scoping notice soliciting comments and announcing a public scoping meeting was sent to members of the Eugene District mailing list, nearby landowners, and members of the McKenzie River Guides with publicly posted addresses. The scoping notice was also posted to the Eugene District planning website. In addition, press releases were issued to local media outlets including television, radio, web-based, and print. A public scoping meeting was held in Leaburg, Oregon, on September 26, 2013, with over 70 attendees. The maps and PowerPoint presentation shown at the public scoping meeting, along with additional background information, were posted on the BLM's planning website on September 26, 2013. Written scoping comments were originally requested by October 17, 2013. However, due to the government shut-down and inaccessibility of the website during that period, this was extended through November 17, 2013.

The BLM received scoping comments from three organizations (American Forest Resources Council, Cascadia Wildlands, and Oregon Wild) and numerous individuals or groups of individuals. Many comments expressed opposition to logging on public lands and many comments expressed concern about the effects of the project on the scenic quality of the McKenzie River valley, where recreational uses support the local economy. Other concerns related to loss of carbon storage, water quality, and wildlife habitat. A minority of the commenters expressed support for the project.

1.6.2 2016 EA Comments

The 2016 EA was made available for public comment on November 23, 2016. During the 30-day review period, four comment letters were received on the EA. Commenters included Oregon Wild/Cascadia Wildlands (joint comments), the American Forest Resources Council, and two individuals.

Concerns were similar to those expressed during the scoping period. Concerns included loss of wildlife habitat, effects on northern spotted owls, loss of mature habitat, effects on water quality, loss of shade in riparian corridors, climate change (carbon) effects, effects of regeneration harvest (as it was compared it to clear cutting), and stand structure and development (including wood recruitment) relative to old growth needs. Several commenters requested clarification on whether the project would be in conformance with the 2016 RMP or not (based on the Exceptions for transition projects); and there were individual requests for clarification regarding public access to the project area and tribal coordination relative to archaeological resources.

1.7 Issues

In the context of an environmental analysis, an issue is a point of disagreement, debate, or dispute with a proposed action based on some anticipated environmental effect. An issue:

- has a cause and effect relationship with the proposed action or alternatives;
- is within the scope of the analysis;
- has not been decided by law, regulation, or previous decision; and
- is amenable to scientific analysis rather than conjecture.

1.7.1 Issues Presented in Detail

Issues carried into detailed analysis in Chapter 3 were those for which detailed analysis would aid in making a reasoned choice between alternatives and/or aid in determining the significance of potential impacts. Issues presented in detail in this analysis are:

- Issue 1: How would timber harvest change visual resources within the project area and the scenic quality within the McKenzie River corridor?
- Issue 2: How would proposed management actions change the levels of carbon storage within the project area?
- Issue 3: How would proposed management actions change wildlife habitat conditions associated with snags and down woody material?
- Issue 4: What are the effects of the proposed timber harvest and associated activities on the Northern Spotted Owl?
- Issue 5: How would proposed timber harvest, commercial haul, and road management change sediment delivery to streams within the project area? How would this change affect water quality, temperature, and aquatic habitat for ESA-listed fish in streams within the Middle McKenzie watershed?

1.7.2 Issues Considered, but Not Presented in Detail

Comments received during public scoping, during the 2016 EA comment period, and from the project's interdisciplinary impact analysis team (IDT) brought forward numerous issues related to potentially affected resources in the McKenzie Landscape project area. Some of these issues have been raised on previous projects and analysis for those projects resulted in determinations of negligible impacts. Results from those prior project analyses helped inform the IDT on the need for detailed analysis in this document. For other issues, the IDT conducted substantial analysis, including inventory and assessment, before concluding that no detailed presentation of the issue was warranted in this EA. Summaries of analyses conducted are provided, with the understanding that conclusions relative to environmental effects are tiered to (refer back to) the records completed for the issue considered. For reasons described below, these issues were not carried forward to be presented in detail.

Why is an EA being prepared rather than an EIS for regeneration harvest?

Comments received from the public expressed that the effects of regeneration harvesting warranted the completion of analysis in an Environmental Impact Statement (EIS), based on the perception that regeneration harvesting would result in significant effects and controversy. There will always be some disagreement about the nature of the effects for land management actions. However, when determining if these disagreements indicate a need for an EIS, Council on Environmental Quality (CEQ) regulations (40 CFR 1502) clearly outline the need for context and intensity to be measured in determining significance and controversy.

The significance of an action must be analyzed in the appropriate context. Both short-term and long-term effects are relevant. Intensity refers to the severity of the effect, which is done by looking at direct, indirect, and cumulative effects of an action (BLM Handbook H-1790-1, 2008). This EA evaluates the context and severity of the project's potential effects and thus will be used to determine whether an EIS or a Finding of No Significant Impact (FONSI) should be prepared.

Controversy means disagreement about the nature of the effects, not expressions of opposition to the proposed action. In the event there was substantial dispute within the scientific community about the effects of the proposed action, this would indicate that the effects are likely to be highly controversial. There is currently no substantial scientific dispute about the effects of regeneration timber harvesting.

Relative to the type of regeneration harvest implemented by the BLM, please note that clear cutting (regeneration harvest with no retention), is not permissible under the 1995 RMP. When treating stands to reset the age class to an early seral condition, the silvicultural treatment used is regeneration harvest with partial retention.

Retention of living trees (live green trees) is prescribed, with varying levels of retention established for different land use allocations. These trees are directed to be reserved from harvest as clumps, strips, and scattered individual trees, with no more than 40 contiguous acres having no trees present. Live ***green tree retention*** at these levels could be described in silvicultural terms as seed tree regeneration methods. For this project, however, this retention would primarily serve to preserve legacy structure to the stand, since reforestation is proposed.

What are the effects on camping/hiking opportunities?

Comments expressed concern about the impacts from the project to public opportunities for camping and hiking.

While multiple recreation opportunities (e.g., picnicking, fishing, camping, boating, kayaking, rafting, driving for pleasure, etc.) are found throughout the greater McKenzie River corridor, no developed recreation sites exist in close proximity to the proposed harvest areas. Developed recreation sites in the area are concentrated immediately adjacent to the McKenzie River. The project is not expected to change any conditions that would affect these existing camping and hiking opportunities.

People may access the project area on foot when the access gates are closed/locked, and may drive into the area when roads are open in the Wendling Travel Management Area (WTMA). The WTMA is a cooperative travel access venture based upon an agreement between Oregon Department of Fish & Wildlife, Guistina Resources, Guistina Land and Timber, and Weyerhaeuser Company, which enhances access for hunting. From August 1 to January 31 (annually through 2018), designated open roads within the WTMA allow public motorized vehicle travel 7 days per week. Open roads are designated open with orange road markers or indicated by green on the WTMA map (online at http://www.dfw.state.or.us/lands/AH/hunting/). The proposed Wild and Woolly units are located within the WTMA. The proposed Mid Indian and Finn Again unit sections are outside of but adjacent to the WTMA boundary. Due to their inclusion within the WTMA, haul routes--or portions thereof--identified for the three proposed timber sales are physically accessible to the public 6 months of the year.

Given these opportunities for public access into the proposed project area, there may be shared use of haul roads from August 1 through January 31. In addition, during active logging, the harvest areas would not be suitable for public uses, including camping and hiking. However, harvest activities would not occur on all units at the same time, may be carried out over several years, and would not all occur from August 1-January 31. Given the sporadic and temporary nature of the potential overlapping uses, combined with the availability of adjacent BLM forests where logging activities would not take place, the potential impacts on public hiking and camping were estimated to be minor, so-this issue was not considered in further detail.

What are the impacts to tourism and recreational fisheries in the McKenzie River corridor?

The immediate project area is not directly used by the tourist or recreational industries in the McKenzie River valley, but does contribute to the overall backdrop of the McKenzie River watershed. Many commenters expressed concern about potential adverse impacts to tourism in the McKenzie River valley as a result of potentially impacted views and impacted water quality from the project. However, the Visual Resource Analysis and the Aquatic Conservation Strategy Analysis for the project did not show noticeable impacts to the viewshed for the average visitor or to water quality, respectively. Therefore, no impacts to tourism or related businesses are anticipated from the project and this issue was not considered further.

What are the effects on "Survey and Manage" and Special Status species?

No Survey and Manage species were found in the McKenzie Landscape project area which required management action. All required surveys for Survey and Manage species were conducted according to the appropriate protocol. Red tree vole (RTV) line transect surveys in

regeneration harvest areas were conducted in accordance with the interagency survey protocol (version 3.0). All trees located with potential nest structures were climbed and none were found to have active or inactive red tree vole nests.

Plants and animals on BLM's list of sensitive species (Bureau sensitive species) were also considered. Habitat evaluations were carried out in all proposed action areas to determine the potential presence of these species. Evaluations for wildlife determined that the project area did not contain suitable habitat for Bureau sensitive wildlife species.

Evaluations for plants determined that *Hypotrachyna riparia*, a Bureau Sensitive lichen, is the only sensitive species present within the project area. The BLM 6840 directs the BLM "not to increase the need to list" a sensitive species. The project has been designed to incorporate the lichen site within a "grouped retention" (aggregate) area which would not be harvested. This measure will protect the site and maintain habitat for the species, so that there would be no effect to Special Status plants from the proposed action.

Based on the above findings and protective actions, potential effects on Survey and Manage and Special Status species were deemed negligible, so this topic was not evaluated in detail. Effects on Northern spotted owl (NSO) are evaluated in detail in Issue 4.

What are the effects on drinking water quality for communities which utilize the McKenzie River as a water source?

Water is drawn from the McKenzie River by water treatment facilities which provide drinking water to nearby communities. Potential impacts to water quality were analyzed by the IDT for this project and results are included in the IDT's *Consistency Analysis of the Middle McKenzie Landscape Project Alternatives with the Aquatic Conservation Strategy*. That report describes the following effects from the project:

- Water temperature was identified as the primary limiting factor for water quality requirements in the basin. The project was specifically designed to maintain water temperatures in all harvest areas. Water temperature would be maintained because the primary shade zone adjacent to all streams would be left intact (proposed 120-foot no-cut buffers).
- Reductions in road-related sediment delivery are expected to occur as a result of the proposed road improvements associated with the timber harvests, especially in the Indian Creek subbasin adjacent to the Mid Indian harvest area. Short-term temporary sediment pulses are expected at the time of culvert replacement; however, once culverts are constructed, subsequent sediment delivery would likely be lower than under current conditions. After culvert installations, sediment inputs and any corresponding effects on temperature, nutrients, pH, conductivity, available dissolved oxygen, and oxygen diffusion would likely be improved as a result of better drainage, better-functioning ditchlines, and more adequate cross drains.
- Some local road run off is likely to occur from log haul operations. However, roads would be properly prepared for heavy winter haul and maintained during and after hauling, such that sediment transport to streams is expected to be minimized. Water from roads would be intercepted by cross drains which transport runoff onto the forest floor where it would infiltrate and be filtered by debris and forest duff. Under this scenario, very little sediment reaches streams.

Overall, no adverse effects on drinking water quality are expected from the project. The temporary slight increases in sediment load resulting from the project would be so small compared to the total sediment load in the river system that they would not be noticeable. Over the longer term, conditions would be stable or potentially improved. The IDT has coordinated with the Eugene Water and Electric Board (EWEB) regarding the project, and the EWEB has not expressed concerns. Given these findings, this issue was not presented in detail in the EA.

What are the effects to soil productivity, erosion, and potential mass wasting (landslide)?

An analysis of the impacts of proposed timber harvest and associated activities (including road management) on soil quality and long-term soil productivity was conducted by the IDT Soils Specialist. All prescribed burning would be designed to meet soils productivity standards as analyzed in the RMP and contained in IM OR-83-361 for Soil and Fire Management Policy. This policy assumes that BLM would plan to minimize the intensity/severity of burns and would meet the following four objectives: 1) Maintain soil productivity to the highest level possible by minimizing the loss of duff and litter on site; 2) Meet resource objectives as stated in the incorporated Soils Specialist report; 3) Reduce fire hazard by reducing activity fuels; and 4) Minimize erosion. All action alternatives were designed to eliminate any impacts beyond those analyzed in the 1995 Eugene RMP/EIS.

Project Design Features (PDFs) would be implemented on all action alternatives to reduce the risk of detrimental soil compaction during harvest operations in order to maintain existing levels of soil productivity. The analysis also included evaluations of slope stability and mass wasting (landslide) risks. None of the alternatives would be expected to increase the risk of mass wasting beyond background levels. The potential for localized slope failure would continue at existing levels in areas that exhibit past mass movement, especially during large storm events.

How would the project affect the risk of fire and how would prescribed burning affect air quality?

Immediately following forest management activities and prior to slash disposal, the risk of fire could increase due to the presence of surface fuels created by logging (e.g., broken limbs and branches with needles.). Following slash disposal treatments, this risk would decrease. The BLM fuels management specialist would conduct a fuels assessment within each unit following timber harvest activity to determine the fuel hazard and fire risk based on surface fuel loading, aspect, slope, access, and location of each unit. Based on this assessment, the fuels management specialist would mitigate slash concentrations with the appropriate treatment(s) (see the EA Section 2.2.3 for description of treatments Post-treatment surface fuel loading would be reduced because the majority of the slash would be removed from the unit. Timber management activities could have potential short-term adverse effects on fuel loading, fuel structure, and fire behavior. However, planned fuels reduction mitigation measures would minimize the short-term effects and the long-term effects would be negligible.

Relative to air quality, for all prescribed burning activities, the Northwest Oregon District BLM is required to be in compliance with the Oregon Smoke Management Plan (OAR 629-048-0010). The Oregon Smoke Management Plan designates SSRA (Smoke Sensitive Receptor Areas), which are areas designated for the highest level of protection under the smoke management plan, as described and listed in OAR 629- 048-0140. An objective of the Smoke Management Plan is to prevent smoke from prescribed burns from entering the SSRA. Prior to conducting prescribed burning activities, the BLM shall register prescribed burn information with Oregon Department

of Forestry. Smoke management advisories and restrictions are generated on a daily basis by the State Meteorologist. This information is used to determine the appropriate time to conduct the planned prescribed burn.

This issue was considered but eliminated from further analysis because, by following the Oregon Smoke Management Plan, there would be negligible direct or indirect effects on air quality within the project area and the SSRA. Effects on air quality from activity slash burning would be short-term and localized. All units are not burned at the same time or in the same year. A large portion of particulate matter emissions produced during prescribed burning, including PM^{10}, is lifted by convection into the atmosphere, where it dissipates by horizontal and downward dispersion. At distances greater than five miles, the air concentrations for these emissions are expected to be small. As a result, prescribed burning emissions are not expected to adversely affect annual PM^{10} attainment goals established pursuant to the Clean Air Act. Under these conditions and by following the prescribed fire management guidelines in the Oregon Smoke Management Plan, there would be negligible direct or indirect effects on air quality within the project area and the SSRA.

Northwest Oregon BLM is also required to be in compliance with the Oregon Visibility Protection Plan (OAR 340-200-0040, Section 5.2) which mandates that prescribed burning does not affect the visibility of Class I areas. The Project is not within a Class I area. The BLM does not expect prescribed burning to affect visibility within smoke sensitive Class I areas due to the distance of Class I areas from the project area and implementation of smoke management guidelines. Therefore, this issue was not analyzed further.

What are the effects on the spread of invasive weeds?

This issue was not analyzed in detail because previous experience with similar projects, including thinning and regeneration harvests, has demonstrated that with the contractual implementation of project design features (PDFs) there is no potentially significant impact to the environment from the potential spread or persistence of noxious weeds from this type of project. Vehicles/equipment traveling on roads are the primary vector for noxious weeds. The implementation of PDF 15, requiring logging, tilling and road construction equipment to be free of soil and plant debris prior to arrival on BLM lands, minimizes the risk of introduction of new weed species to the project area. The proposed use of BLM-provided seed and weed-free mulch, where activities such as culvert replacement and road decommissioning result in exposure of bare soil, would minimize the risk of weeds establishing.

How would the proposed project affect cultural resources?

The BLM conducted cultural resource inventories for the McKenzie Landscape Project in the fall of 2013 through the spring of 2014. New cultural resource sites were discovered and recorded. All newly discovered sites were considered potentially eligible for listing in the Register of Historic Places, pursuant to Section 106 of the National Historic Preservation Act, and were avoided through project redesign. Coordination related to the project has taken place with the following tribes: Confederated Tribes of Siletz; Confederated Tribes of Grand Ronde; and the Confederated Tribes of Warm Springs. No effects to cultural resources are anticipated from the project, so this issue was not carried forward for further analysis.

What are the economic impacts of the proposed action?

All of BLM timber harvest projects on O&C Lands are designed to be economically viable and to provide an opportunity for local timber companies to obtain timber resources to support their operations. These economic benefits have been well documented over time and the anticipated net value of the timber sales proposed by this project have been calculated. There is a small difference in net value between the action alternatives, as shown in Table 10. Alternative 2 would yield a net value of approximately $3,522,755, and Alternative 3 would yield approximately $3,838,980. The action alternatives are economically viable and have very similar net values. Further analysis would not lead to a more informed decision, so this issue was not carried forward.

2.0 Proposed Action and Alternatives

Pursuant to Section 102 (2) (E) of NEPA (National Environmental Policy Act of 1969, as amended), Federal agencies shall "Study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources." Within this EA, the BLM analyzed three alternatives in detail, presented in this section, and four additional alternatives were considered but eliminated from detailed analysis, presented in Section 2.6.

In developing the proposed project, the Vida/McKenzie 5th field watershed was the relevant watershed for analysis. Field surveys, watershed data, and GIS were used to evaluate existing conditions, establish desired future conditions, and assist in the formulation of appropriate alternatives. This watershed is now encompassed by the (re-delineated) McKenzie Watershed.

Alternative 2 has been identified as the proposed action. Common features of Alternative 2 and Alternative 3 are described below and are not repeated under the descriptions of each alternative (Sections 2.2 and 2.3, respectively). A summary of similarities and differences between these two action alternatives are summarized in Table 11 (Section 2.4).

Common Features of Alternative 2 and Alternative 3

Application of a 120-foot No-Cut Buffer on Riparian Management Thinning (Wild & Woolly)

In 2013, when the IDT was starting to develop the McKenzie Landscape EA project, an interagency team was examining relevant literature and scientific research on the relationship of riparian tree cutting and stream temperatures. The findings of the interagency team, described in Leinenbach et. al. (2013), informed the choice of the 120-foot-wide no-cut buffer (per side of stream) for the McKenzie Landscape project. This buffer was adopted by the IDT in 2014 to ensure that any proposed harvest treatments would not cause an increase in stream temperatures. Where thinning would occur in riparian areas (Wild & Woolly), the 120-foot no-cut buffer was applied. Where regeneration harvests were proposed, greater no-cut buffers were applied.

Riparian Management Thinning

Both action alternatives include thinning in riparian zones outside of the 120-foot no-cut buffers. There is a need to promote understory and stand diversity in near-stream areas in the McKenzie watershed due to the dominance of even-aged Douglas fir stands. This treatment is proposed in order to accelerate tree growth in riparian areas and increase primary productivity in streams.

Thinning would likely improve the distribution, diversity, and complexity of aquatic ecosystems in and near the project area (ACS Report).

Green Tree Retention (GTR) in the Regeneration Harvests

Both alternatives include live tree retention, or green tree retention (GTR). Both alternatives retain higher levels of GTR at the time of harvest than the final target retention level, so that some portion of standing trees remaining after harvest would be available to create snags and coarse woody debris (CWD). The levels of GTR differ between the alternatives.

Snag and Coarse Woody Debris (CWD) Creation in the Regeneration Harvests

Snags and coarse woody debris (CWD) would be created in certain areas under both alternatives. The location and quantity differ between the alternatives. The CWD/snag creation would occur several years after harvest. The specifications for methodology and size of selecting and creating snags and CWD are outlined in Project Design Features (PDFs) 48, 49, 56, and 57.

2.1 No Action

The No Action Alternative is the only alternative that may be analyzed which does not conform to the purpose and need for action. This alternative provides a baseline for comparison of the environmental effects. Under this alternative, no forest management actions would occur at this time. No treatments to stimulate tree growth would occur and no timber would be made available to stimulate the local economy and to provide timber receipts to O&C counties. In addition, no associated activities such as road management would occur.

2.2 Alternative 2 – Adaptive Management Area (AMA) Design [Proposed Action]

As described in the Introduction to this EA, the project area lies within the Central Cascades AMA land use allocation per the 1995 RMP. A leading objective for the AMA is: "*to develop and test new management approaches to integrate and achieve ecological and economic health and other social objectives*" (1995 RMP, p. 32).

To meet that objective, management directions for the AMA include the following:

- *Desired conditions* [in riparian areas] *may be achieved in a manner different than that prescribed for other areas* (1995 RMP, p. 33).
- *Develop approaches for integrating forest and stream management objectives and implications of natural disturbance regimes* (1995 RMP, p. 34).

A team of Eugene District BLM wildlife biologists, fish biologists, hydrologists, and foresters investigated the natural history of the McKenzie Valley in order to understand the natural disturbance regimes that have influenced the landscape. They conducted field surveys and researched scientific literature relevant to management actions and environmental responses in the McKenzie River Valley. They compiled information about the history of fire in the region and changes in forest structure over time. Based on this ecological background, the team developed a series of adaptive management approaches tailored for the project area. These approaches were compiled in a comprehensive report called the *Middle McKenzie Landscape Design* (MMLD) (USDI 2002).

The central concept of MMLD is to simulate key aspects of historical fire regimes through forest management practices, while sustaining native habitats and species, maintaining ecological processes within historical ranges, and providing a sustained flow of timber. The MMLD suggested alternate approaches for protecting riparian areas and integrating management for aquatic features with upslope management. The strategies put forward in the MMLD were evaluated to see how well they would meet the Aquatic Conservation Strategy (ACS) objectives. For all objectives, the strategies met or exceeded the requirements of the ACS.

The following are key elements of Alternative 2 based on MMLD approaches:

- Timber harvest design was adapted to retain a higher percent (%) canopy in the thinning units than what would normally be prescribed under the 1995 RMP.
- Timber harvest design in the regeneration harvest units was adapted to retain more green trees and to create more snags, CWD, and in-stream large woody debris (LWD) than what would normally be prescribed under the 1995 RMP.
- Levels of green tree retention and snag/CWD creation would be variable within the harvest area, depending on slope position, reflecting the variability that might be expected after certain fire disturbances.
- Streamside Management Areas (SMAs) were identified as transition areas between streams and uplands, where riparian management would be applied to integrate the protection of aquatic habitat with upslope management, with the ultimate goal of meeting or enhancing Aquatic Conservation Strategy (ACS) objectives. The McKenzie Landscape Project IDT conducted analysis and modeling on each stream reach, using site conditions to refine the SMAs and determine no-harvest widths necessary to meet aquatic and terrestrial riparian management objectives. The project SMAs were established to be 135'-270'from the edge of streams. For thinning harvest, there would be no entry (no harvest) within the 120' no-cut zone and riparian management (thinning) would occur within the SMA outside of the no-cut zone. For regeneration harvests, there would be no harvest within the full width of the SMAs.

  The SMA was developed as an adaptive management strategy to allow more variability of canopy cover near stream corridors. The potential benefits of creating "gaps" in riparian canopy cover have been identified by researchers such as Dr. Dana Warren of Oregon State University, who has sampled and studied the effects of canopy cover on temperature and nutrients. The IDT was aware of this research when developing the SMA boundaries for this project. (Note: Warren has recently published results of some of this research; [(Warren et. al. 2016 a; Warren et. al. 2016b)]. The key concept is that slight increases in solar gain from the creation of gaps in streamside canopy cover may stimulate primary productivity in the aquatic system without noticeably elevating stream temperatures. This would mimic solar energy characteristics of late successional forest where there are frequent gaps in near-stream areas, allowing in light and increasing primary production. The SMA distance varied with specific conditions on the ground but in all cases was evaluated sufficient to prevent noticeable stream temperature increases as a result of the proposed harvest treatments. While the SMA parameters differ from the 1995 RMP Riparian Reserves, the same level of aquatic protection would be achieved: no adverse effects on stream temperature would be anticipated with the given buffers. The analysis of ACS objectives prepared for this project found the two approaches to be very similar in their ability to meet ACS objectives.

This background is intended to help the reader understand the intent of the CCAMA as designated under the 1995 RMP and to understand that the McKenzie Valley-specific MMLD prepared by the BLM responded to the intent of the CCAMA and was utilized in developing forest management actions proposed by Alternative 2. In the following sections, the descriptions of the proposed treatments for each harvest unit are presented, followed by sections on post-harvest slash disposal, site preparation, reforestation, and road and culvert activities associated with the units.

2.2.1 Wild and Woolly Treatment (Thinning)

The Wild and Woolly area was identified to benefit from a commercial thinning harvest. The existing stands are second growth, even-aged, largely closed-canopy 60-70 year old stands, and a small portion of 40-year-old trees. Stands are composed mostly of Douglas fir (>80%), with smaller components of western hemlock, western redcedar, and incense cedar. Hardwoods such as golden chinquapin, madrone, big leaf maple, and red alder exist in varying amounts on the landscape, primarily in the riparian zones, and generally comprise less than 20% of the total species composition. The dominant understory vegetation consists of salal, hazel, vine maple, Oregon grape, and sword fern.

Commercial thinning would occur on approximately 71 acres, per the silvicultural prescription described below. Thinning would be conducted similarly in uplands and for riparian management outside the 120-foot no-cut buffer, and consist of 62 upland acres and 9 acres of SMA. This thinning would decrease tree-to-tree competition, thus stimulating the growth, productivity, and future value of the remaining trees. It was also designed to reserve structural components and meet ACS objectives.

Harvest methods include ground-based and cable yarding, as shown on Figure C-1 in Appendix C.

Silviculture Prescription

The silviculture prescription for Wild and Woolly thinning harvest is summarized in Table 3. The commercial thin-from-below would reduce stand density to an initial target of 200 square feet of basal area (BA), corresponding to a Curtis Relative Density of approximately 41 (see Glossary for more detailed descriptions of Basal Area and the Curtis Relative Density Index). This equates to a post-harvest canopy cover of approximately 60 %.Approximately 23 trees per acre (TPA) would later be used for future CWD and snag creation. After CWD and snag creation occurs, the BA would be reduced to approximately 160 ft^2/acre, with approximately 47 remaining trees per acre (TPA), corresponding to a final canopy cover of approximately 55%. (Please note that up to 10% variance of target BAs (higher or lower) could be expected during implementation.) The quadratic mean diameter (QMD), which is a measure of the average diameter (at breast height) of the average tree in a measured stand, would be approximately 23.

Trees selected for harvest would generally be the suppressed, intermediate, co-dominant conifer trees and trees exhibiting poor form. This prescription would result in a stand with variable spacing between remaining conifers and hardwoods. All hardwoods and Pacific yew would be retained, except where necessary to accommodate logging systems and for safety.

Table 3 Wild and Woolly Alternative 2 Silviculture Prescription (Before CWD/Snag Creation)

Unit	Acres	Basal Area	TPA	QMD	Curtis RD	Canopy Cover
Wild and Woolly	71	200 ft^2/acre	70	23 in.	41	60%

Minor conifer species would generally be selected for retention to ensure their continued presence in the stand. However, when minor conifer species are encountered in small scale pockets of atypical proportion relative to what was sampled in the stand exam, minor species would be cut to meet the target reserve basal area.

No-cut buffers of 120 feet from each side of streams have been applied to the Wild and Woolly harvest proposal. Outside of the no-cut buffer, the thinning prescription would be applied throughout the harvest area, including the outer zone of the SMA.

Coarse Woody Debris (CWD) and Snag Creation

CWD and snag creation would occur approximately 3-4 years after harvest and would be accomplished by hand methods (chain saws, hand tools). Trees chosen for snags would be ≥20 inch DBH. Target levels would be 300 feet of CWD per acre and 8 snags per acre, the same in uplands and SMA treatment areas. Snag and CWD specifications are described in Project Design Feature (PDF) 56 in Section 2.5.

2.2.2 Finn Again and Mid Indian Treatment (Regeneration with Retention)

The Finn Again and Mid Indian areas were assessed to have the appropriate conditions to support regeneration harvest with retention. These stands are the result of at least three non-stand replacing fires. Stand ages vary throughout the proposed treatment areas. Forest Operation Inventory (FOI) ages show that stand ages in 2017 will vary from 68 to 128 years old. All stands are dominated by Douglas-fir, with smaller components of western hemlock, western redcedar, and incense-cedar. Hardwoods such as golden chinkapin and madrone bigleaf maple, and red alder are present. The dominant understory vegetation consists of salal, hazel, vine maple, Oregon grape, and swordfern.

Stand structure is diverse throughout the project area. Several phases of stand development are present in the project area including stem exclusion, understory re-initiation, and old growth. Stem exclusion occurs when the canopies in the overstory begin to close and suppress the growth of the understory. Understory re-initiation occurs when gaps are created in the canopy which allows sunlight to reach the forest floor and understory development begins. Old growth occurs when structural complexity in the stand has peaked and numerous live and dead features are present in the stand (large diameter trees with large branches, snags of varying sizes, diverse understory).

The stocking is irregular throughout the project area. Some areas are clumpy and not evenly spaced while other areas are younger and more evenly distributed. There are a high number of trees that exhibit open grown conditions with large branches.

Regeneration harvest with retention would occur on approximately 261 acres, consisting of 78 acres in the Finn Again unit and 183 acres in Mid Indian (see Table 4). No harvest would occur within Streamside Management Areas.

Harvest methods include cable and ground-based in Finn Again, and helicopter, cable and ground-based in Mid Indian (see Figures C-2 and C-4 in Appendix C). Whole-tree yarding would be conducted on regeneration harvests to minimize residual fuels buildup, except in helicopter units.

Silviculture Prescription

The goals of the prescription are to provide for a stable timber supply, match historical stand conditions as much as possible, reserve structural components, and to meet ACS objectives. In order to accomplish these goals, a regeneration harvest is prescribed. Retention of some trees within harvest units would provide for GTR and for snag and CWD recruitment.

Units would retain a portion of the pre-harvest stand through a combination of grouped retention, where groups of trees (aggregates) are left together in a no-harvest patch, and dispersed retention, where individual trees are left scattered within the harvested area. The approximate acres of retention proposed in the unit are shown in Table 4. Grouped retention areas would vary in number, shapes, and sizes ranging from less than an acre to approximately 13 acres each. Mid Indian grouped retention areas would not receive treatment for CWD/snag creation due to other resource concerns, including poor site productivity and visual resources.

GTR levels and locations were proposed based on guidelines developed for the AMA in the MMLD (MMLD pgs. 48-50). Three levels of GTR were proposed, varying with slope position. For this project, the highest slopes have a target goal of 6 trees per acre (TPA), middle slopes have a target of 13 TPA, and lower slopes have a target of 20 TPA.

While the specific levels of retention, snags, and coarse woody debris would not likely mimic what would occur under natural conditions, creating variation in its location and density is an adaptive strategy to more closely resemble historic patterns after fire. This scenario comes closer to the mosaic of variable forest stands and ages across the landscape than a traditional timber harvest would provide. Applying variable retention regeneration harvest in the CCAMA would demonstrate new management approaches to integrate and achieve ecological and economic health.

Table 4. Regeneration Harvest Alternative 2: Approximate Acres Proposed for Grouped and Dispersed Retention within the Proposed Slope Bands

Harvest Area	Upper Slopes (6TPA)		Middle Slopes (13TPA)		Lower Slopes (20TPA)		Total Harvest Acres
	Dispersed	Grouped	Dispersed	Grouped	Dispersed	Grouped	
Finn Again	28	0	48.	2.	N/A	N/A	78
Mid Indian	N/A	N/A	95.	24.	53.	11.	183
Total Acres	28.	0	143.	26.	53	11	261

N/A indicates no occurrence of this position on the slope for this unit

Dispersed / Grouped Retention

Total GTR includes the total TPA of the combined grouped and dispersed retention areas. Tables 5 and 6 identify the varying levels of retention by units for Finn Again and Mid Indian that would occur at time of harvest and the final GTR values once CWD and snag trees have been created. For example, the Mid Indian lower slopes would retain approximately 24 TPA in the dispersed retention areas at time of harvest with a final GTR of approximately 11 TPA after CWD and snag creation. A minimum 18 inch diameter limit for retention trees would apply throughout the regeneration harvest units. The grouped retention areas within Mid Indian would not receive any treatment, including for CWD and snag creation.

Table 5. Alternative 2 Mid Indian Prescription: Green Tree Retention (in TPA)

		Middle Slopes			Lower Slopes		
		Acres	**Basal Area sq.ft.**	**TPA***	**Acres**	**Basal Area sq.ft.**	**TPA***
Retention at Harvest	Grouped Retention	24	312	105	11	312	105
	Dispersed Retention	95	139	21	53	153	24
Final GTR	Grouped Retention	24	312	105	11	312	105
	Dispersed Retention	95	62	8	53	84	11

*Tree numbers are an approximation based on modeling.

Table 6. Alternative 2 Finn Again Prescription: Green Tree Retention (in TPA)

		Upper Slopes			Middle Slope		
		Acres	**Basal Area sq.ft.**	**TPA***	**Acres**	**Basal Area sq.ft.**	**TPA***
Retention at Harvest	Grouped Retention	0	0	0	2	312	95
	Dispersed Retention	28	156	19	48	172	23
Final GTR	Grouped Retention	0	0	0	2	312	95
	Dispersed Retention	28	73	6	48	73	13

*Tree numbers are an approximation based on modeling.

Regeneration harvest would remove merchantable trees (greater than 7 inch diameter at breast height (DBH)) outside of grouped retention areas. Dispersed retention would focus on retaining the largest and most vigorous dominant and co-dominant trees, some of which would be expected to provide snags and large down wood within the harvested area. Minor species would also be favored where appropriate to meet the total tree target of the unit. Hardwoods would be

retained except where necessary to accommodate logging systems or for safety. Retained hardwoods would not count towards target basal area.

CWD and Snag Creation, and Large Woody Debris

CWD and snag creation would occur approximately 3-4 years after harvest and would be accomplished by hand methods (chain saws, hand tools). Targets for CWD and snags would be 300 feet per acre and 8 snags per acre in both regeneration harvest units. However, the units vary in the amount they are currently deficient and would need to be created post-harvest to achieve these levels. CWD and snags would be ≥20 inch DBH, with a minimum height of 15 feet. CWD/snag creation would not occur within the special visual management areas, which include 5 acres in Finn Again and 12 acres in Mid Indian (shown as "Visual Treatment Areas" on the figures in Appendix C). These areas would be maintained at the initial target levels of GTR in their respective slope positions for visual screening purposes (see EA Section 3.1)..

Large Woody Debris

The streams in the project area currently lack wood. Alternative 2 would include placement of large woody debris (LWD) in streams that are deficient. LWD would be placed in low to moderate gradient stream reaches within and/or directly adjacent to the harvest areas. Steep-gradient streams and small first-order streams in the harvest areas would not be treated, as they would not benefit from the treatment. One piece of in-stream LWD would be placed on average every 66 feet of stream; pieces would be ≥ 20" DBH and about 20 feet long. The LWD would interact with the stream to capture and store sediment. Sediment retention aids in maintaining stream temperatures and moderating sediment inputs.

2.2.3 Post-Harvest Slash Disposal, Site Preparation, and Reforestation

Post-harvest site-preparation would be conducted as necessary to reduce residual harvest slash levels to allow planting in the regeneration harvest units. Post-harvest reviews would be conducted in each unit by a team consisting of silviculturists, fuels, and soils specialists to determine the appropriate mix of site preparation techniques to meet resource objectives while maintaining soil productivity to the highest level possible.

The fuels specialist would conduct a post-harvest fuels assessment within each unit. This assessment would determine the appropriate methods to treat residual slash, reduce fire hazard and perform site preparation for planting. The fuels assessment would be based on factors such as fuel model, silvicultural prescription, logging systems, surface fuel loading, aspect, slope, access, and location of each unit. Fuels treatments could include but are not limited to lop-and-scatter, slash piling, slash pile burning, broadcast burning, jackpot burning, underburning, and biomass removal. At the landings cleared for yarding equipment during timber harvest, slash would be piled, chipped, sold for firewood, or prescription burned. Most fuels treatments would begin within 90 days after completion of harvest activities. However, burning would be seasonally timed to occur during wet and/or cool conditions appropriate for the type of burn, as determined by the fuels specialist.

Planting would occur on the harvested areas at a density of around 300 TPA (on approximately 12 x 12 foot spacing). Reforestation species composition would include Douglas fir, western hemlock, and western redcedar. Some amount of natural regeneration would likely supplement stocking over time.

2.2.4 Roads and Culverts

To support harvest and hauling activities, approximately 1.41 miles of new permanent roads would be constructed. Approximately 24 miles of existing roads would be renovated (including the installation or replacement of approximately 33 culverts) and 0.28 miles of existing roads would be improved (by converting from native surface to rocked surface and/or adding new stream crossings). Up to 4 new stream crossings with culverts would be created. All construction, renovation, and improvement would follow applicable PDFs, Best Management Practices, as well as Occupational Safety and Health Administration (OSHA) regulations, and all other applicable regulations. See Appendix B for a tabulation of the road and culvert work associated with this alternative.

2.3 Alternative 3

This alternative implements the project using the management direction of the 1995 RMP for Timber Resources in the General Forest Management Area (GFMA) (in Matrix) in upland portions of the project area and the management direction of the 1995 RMP for Riparian Reserves (RR) within the boundaries of this LUA as directed by the 1995 RMP. Silvicultural prescriptions follow the guidelines for thinning, regeneration, and retention set forth by the RMP, and RR definitions follow the RMP (220' from non-fish bearing streams and wetlands over 1 acre, and 440' from fish-bearing streams). The design and management elements applied to this alternative are detailed in Section 2.4 (Table 11) in comparison to Alternative 2.

2.3.1 Wild and Woolly Treatment (Thinning)

Under Alternative 3, the Wild and Woolly unit would be thinned from below on 71 acres, per the silvicultural prescription described below. Thinning would be conducted similarly in uplands and riparian areas outside the 120-foot no-cut buffer, and consist of 63 upland acres and 8 acres of RR. This thinning would decrease tree-to-tree competition, thus stimulating the growth, productivity, and future value of the remaining trees. It was also designed to reserve structural components and meet ACS objectives, similar to Alternative 2 (Section 2.2.1). The proposed logging systems are the same as for Alternative 2 (see Figure C-6 in Appendix C).

Prescription

This alternative calls for different thinning prescriptions in uplands vs. RR. Uplands would be thinned to 160 ft^2/acre BA (corresponding to approximately 55% cover) and the RR outside of the 120-foot no-cut buffer would be thinned to 190 ft^2/acre BA (corresponding to approximately 59% cover). The higher BA of retention in the RR (by 11 TPA) would accommodate the extra trees needed for CWD and snag creation within the RR. After CWD/snag creation, canopy cover in the RR would be approximately 55%. There would be no CWD/snag creation in uplands. Table 7 identifies the prescription and the projected stand metrics.

Coarse Woody Debris (CWD) and Snag Creation

CWD and snag creation targets for the Riparian Reserve portion of the commercial thinning area are 240 linear feet per acre of CWD, of at least 20 inch DBH, and 3.4 snags per acre.

Table 7. Wild and Woolly Alternative 3 Prescription (Thinning)

	Acres	Basal Area (ft^2/acre)	TPA	QMD in.	Curtis RD	Canopy Cover %
Uplands	63	160	48	25	32	55
Treated RR (at time of harvest)	8	190	59	22	40	59
Treated RR Post CWD/Snag Creation	8	160	48	25	32	55

2.3.2 Finn Again and Mid Indian Treatment (Regeneration with Retention)

In this alternative, regeneration harvest with retention would occur on approximately 226 acres, consisting of 71 acres in Finn Again and 155 acres in Mid Indian. No harvest would occur within Riparian Reserves.

Harvest methods would be identical to Alternative 2 and include cable and ground-based yarding in Finn Again, and helicopter, cable and ground-based yarding in Mid Indian (see Figures C-7 and C-8 in Appendix C). Whole-tree yarding would be conducted on regeneration harvests to minimize residual fuels buildup, except for in helicopter units.

Silviculture Prescription

The goals of the prescription are to provide for a stable timber supply, match historical stand conditions as much as possible, reserve structural components, and to meet ACS objectives. In order to accomplish these goals, a regeneration harvest is prescribed. Retention of some trees within harvest units would provide for GTRand for snag and CWD recruitment.

Units would retain a portion of the pre-harvest stand through a combination of grouped and dispersed retention, as shown in Table 8. Grouped retention areas would be located throughout the units in varying sizes and shapes ranging from less than an acre to 12 acres in size. Mid Indian grouped retention areas would not receive treatment for CWD/snag creation due to other resource concerns including poor site productivity and visual resources.

Proposed GTR levels and locations were based on 1995 RMP guidelines for Matrix harvest lands, which call for 6-8 TPA of retention. Tables 9 and 10 indicate the levels of GTR the units would have post-harvest and after CWD/snag creation. Harvest units would have 6 TPA final GTR in dispersed retention after CWD/snag creation. This alternative would distribute the average 6 TPA retention homogeneously across the harvest area, with no planned variation outside the grouped retention areas.

Table 8. Alternative 3 Approximate Acres of Grouped and Dispersed Retention and Total Harvest Acres

	Timber Sale	Dispersed Retention Acres	Grouped Retention Acres	Total Harvest Acres
Alt. 3	Mid Indian	155	28	183
	Finn Again	71	0.5	71
Total Acres		226	28.5	254

Table 9. Alternative 3 Mid Indian Prescription: Green Tree Retention (in TPA)

		Mid Indian Alternative 3		
		Acres	Basal Area	TPA
Retention at Harvest	Grouped Retention	28	312	105
	Dispersed retention	155	90	12.8
Final GTR	Grouped Retention	28	312	105
	Dispersed retention	155	46	6

Table 10. Alternative 3 Finn Again Prescription: Green Tree Retention (in TPA)

		Finn Again Alternative 3		
		Acres	Basal Area	TPA
Retention at Harvest	Grouped Retention	1	269	95
	Dispersed retention	71	125	13
Final GTR	Grouped Retention	1	269	95
	Dispersed retention	71	73	6

Coarse Woody Debris (CWD) and Snag Creation

In upland portions of the stands, CWD and snags would be provided for in the same manner as Alternative 2, except that CWD and snag targets for these areas are 240 linear feet per acre of

CWD, of a size at least 20 inch DBH, and 3.4 snags per acre. Approximately 7 TPA would be available/used for snag and CWD needs.

No creation of in-stream large woody debris would occur in this alternative.

2.3.3 Post-Harvest Slash Disposal, Site Preparation, and Reforestation

Post-harvest slash disposal and site preparation would be the same as described for Alternative 2.

Reforestation planting would occur on the harvested areas at a density of around 400 TPA (on approximately 10 x 10 foot spacing). Reforestation species composition would be predominantly Douglas fir with small amounts of western hemlock and western redcedar. Some amount of natural regeneration would likely supplement stocking over time.

2.3.4 Roads and Culverts

Road and culvert construction and maintenance activities for this alternative are the same as for Alternative 2. See Appendix B for a tabulation of the road and culvert work associated with this alternative.

2.4 Comparison of Action Alternatives

Table 11 starting on the next page shows a comparison of the key elements of the action alternatives, Alternative 2 and Alternative 3.

TABLE 11. Comparison of Action Alternatives (Alternatives 2 and 3)

ALTERNATIVE 2	ALTERNATIVE 3
Approximate Harvest Acres and Estimated Timber Volume in Million Board Feet (MBF)	
Wild & Woolly Acres: 71 - MBF: 1,488 ***Finn Again*** Acres: 78 MBF: 2,695 ***Mid Indian*** Acres: 183 MBF: 8,592	***Wild & Woolly*** Acres: 71 MBF: 2,108 ***Finn Again*** Acres: 71 MBF: 2,870 ***Mid Indian*** Acres: 155 acres MBF: 8,572
Riparian Zone Definition	
Streamside Management Area (SMA): Extends from edge of stream channel to: 135' to 270' per side on all streams and wetlands ≥ 1 acre	***Riparian Reserves (RR):*** Extends from edge of stream channel to: 1 site-potential tree height (220') per side on non-fish-bearing streams, intermittent streams, and wetlands ≥ 1 acre 2 site-potential tree heights (440) per side on fish-bearing streams
No-Cut Buffers in Riparian Areas	
Wild & Woolly (Thinning Harvest) 120' from edge of stream channel per side ***Finn Again and Mid Indian (Regeneration Harvests)*** Same as SMA definition	***Wild & Woolly (Thinning Harvest)*** 120' from edge of stream channel per side ***Finn Again and Mid Indian (Regeneration Harvests)*** Same as RR definition
Approximate Acres of Thinning Harvest in Upland vs. Riparian LUA (Wild & Woolly only)	
Wild & Woolly Upland: 62 SMA: 9	***Wild & Woolly*** Upland: 63 Riparian Reserves: 8

ALTERNATIVE 2	ALTERNATIVE 3
Thinning Harvest Prescription (Wild & Woolly Harvest Unit) *[See PDFs 56 and 57 for snag and CWD size specifications in Wild & Woolly]*	
Uplands - Thin from below to 200 ft^2/acre of BA at time of harvest, leaving 60% canopy cover ***SMAs Outside No-Cut Buffers*** - Same as above for Alt 2 Uplands - ***Final GTR / Canopy Cover %*** 160 ft^2/acre BA / 55% ***CWD/Snag Creation -- Uplands and SMAs*** 300 lf/acre CWD / 8 snags per acre	***Uplands*** - Thin from below to 160 ft^2/acre BA at time of harvest, leaving 55% canopy cover ***Riparian Reserves Outside No-Cut Buffers*** - Thin from below to 190 ft^2/acre at time of harvest, leaving 59% canopy cover ***Final GTR / Canopy Cover %*** 160 ft^2/acre BA / 55% ***CWD/Snag Creation -- RRs Only*** 240 lf/acre CWD / 3.4 snags per acre
Regeneration with Retention Harvest Prescription: GTR (Approximate) After Harvest and Final (After CWD/Snag Creation), in Trees per Acre (TPA) *Note: Applies to dispersed retention areas only; does not include group retention areas, which have higher TPAs.* *[See Project Design Features 48 and 49 for snag and CWD size specifications in the regeneration harvests]*	
Finn Again 19-24 TPA Final GTR: 6-10 TPA ***Mid Indian*** 20-24 TPA Final GTR: 8-11 TPA [In each unit, approximately 13 TPA would be used for CWD/snag creation] ***CWD/Snag Creation (both harvest units)*** 300 lf/acre CWD / 8 snags per acre ***LWD (both harvest units)*** One piece of in-stream LWD would be placed on average every 66' of stream; pieces would be ≥ 20" DBH and about 20' long	***Finn Again*** 13 TPA Final GTR: 6 TPA ***Mid Indian*** 13 TPA Final GTR: 6 TPA [In each unit, approximately 7 TPA would be used for CWD/snag creation] ***CWD/Snag Creation (both harvest units)*** 240 lf/acre CWD / 3.4 snags per acre ***LWD (both harvest units):*** None
Approximate Acres of Grouped Retention ("Aggregates") and TPA in Regeneration Harvest Units	
Finn Again 2 acres - 95 TPA ***Mid Indian*** 35 acres - 105 TPA	***Finn Again*** 1 acre - 95 TPA ***Mid Indian*** 28 acres - 105 TPA

<table>
<tr><th>ALTERNATIVE 2</th><th>ALTERNATIVE 3</th></tr>
<tr><td colspan="2">Post-Harvest Slash Reduction</td></tr>
<tr><td colspan="2">- Pile burning on landings
- Spring jackpot burning as necessary in harvested areas
- Hand-piling (optional machine piling in ground-based units)</td></tr>
<tr><td colspan="2">Reforestation Planting on Regeneration Harvest Units</td></tr>
<tr><td>300 trees per acre (on average of 12’x12’ spacing)</td><td>400 trees per acre (on average of 10’x10’spacing)</td></tr>
<tr><td colspan="2">Special Visual Treatment Acres -Regeneration Harvest Units (Same for Alternatives 2 and 3)</td></tr>
<tr><td colspan="2">Finn Again: 5 acres
Mid Indian: 12 acres</td></tr>
<tr><td colspan="2">Seasonal and Wet Weather/Conditions Restrictions (Same for Alternatives 2 and 3)</td></tr>
<tr><td colspan="2">Generally March 1 – July 15 for Wildlife
Other periods as determined by field conditions (see PDFs 3, 4, 22, 24, 32, 33, 36, 45, 51, 55)</td></tr>
<tr><td colspan="2">Roads and Culverts (Same for Alternatives 2 and 3)</td></tr>
<tr><td colspan="2">Wild & Woolly
0.00 miles permanent construction
0.09 miles of temporary native surface
2.69 miles renovation
0 - 3 culverts added/replaced
0 new stream crossings

Finn Again
0.23 miles permanent construction
4.63 miles renovation
0 miles of improvement
1-5 culverts added/replaced
1 new stream crossing

Mid Indian
1.09 miles permanent construction
17.13 miles renovation
0.28 miles of improvement
10 - 25 culverts added/replaced
2 -3 new stream crossings</td></tr>
<tr><td colspan="2">Estimated Timber Value: Gross vs. Net
Net Value = [value of harvested timber - cost of roads, harvesting, and hauling]</td></tr>
<tr><td>Gross: $7,920,500
Net: $3,522,755</td><td>Gross: $8,401,000
Net: $3,838,980</td></tr>
</table>

2.5 Project Design Features

Project Design Features (PDFs) are operating procedures developed by the interdisciplinary team used to avoid unacceptable environmental impacts and ensure conformance with the 2016 ROD/RMP. Site-specific waiver of PDFs during implementation would be infrequent and require review by specialists for the affected resource(s) to determine that single or aggregated extent of the site-specific waiver would not produce effects outside of those analyzed. Unless otherwise noted, all PDFs apply to all action alternatives.

All Areas

1. Cultural Resources surveys have been completed for all units. If any cultural and/or paleontological resource (historic or prehistoric site or object) is discovered during project activities, all operations in the immediate area of such discovery shall be suspended until an evaluation of the discovery can be made by a professional archaeologist to determine appropriate actions to prevent the loss of significant cultural or scientific values.
2. Retain all hardwoods, yew, and vigorous redcedar and hemlock to the extent possible, except where necessary to accommodate safety and logging systems and BA/TPA targets.
3. Consistent with Instruction Memorandum OR-99-036 (E-4 Special Provisions), apply seasonal restrictions, or suspension of harvest and road activities within 1/4 mile (or as determined by resource specialist) of: known nesting great blue herons, peregrine falcons, bald eagles, spotted owls, great grey owls, accipiter hawks, and other owls, hawks, or raptors if they are located at any time during project activities. If required, apply mitigations for Survey and Manage species detected in or near the project.
4. Disruption to spotted owls will be minimized through seasonal restrictions. The following actions would not occur between March 1 and July 15: blasting or rock crushing at quarries, felling, yarding, road construction, helicopter use, and other mechanized equipment use. Any burning restrictions to avoid adverse effects to spotted owls would be included in the burn plan and consulted on separately, if needed, at a later date.

   The above restrictions may be waived or modified (reduced or extended) by the Field Office wildlife biologist based on relevant survey information regarding occupation or nesting activity.
5. Retain all down logs and snags with diameters $\geq$16 inches (all decay classes) when possible except in road construction rights of way, landings, yarding corridors, and those posing a safety hazard. To the extent operationally feasible, locate cable corridors to avoid these habitat features. If such snags are felled, they will be left on site for CWD; CWD may be cut into sections and moved to facilitate operations or safety, and would be counted towards any post-treatment CWD requirement.
6. New landings will be located a minimum of 75' from stream and wetland no-cut boundaries, to the extent possible.
7. Cable corridors and skid trails would be limited to 12 feet in width.
8. Except during winching (ground-based) or skyline lateral yarding, skidding and yarding systems shall require at least one end suspension of all logs above the ground during in-haul.

9. If streams must be crossed, keep corridors as perpendicular to stream as possible (45-90 degrees). Fully suspend logs above the ground when yarding over water, stream banks, riparian vegetation, and sensitive soils.
10. Compacted surface of native surface spur roads, landings, and other compacted areas such as turnouts, truck turnarounds, and log decking areas shall be subsoiled (broken up, loosened, decompacted) with excavator attachments, log loader tongs or other effective equipment:
    a. All decompaction equipment shall be inspected and approved by Authorized Officer in consult with the resource specialist before tillage begins.
    b. Subsoiling shall be completed to a minimum depth of 18" below the ground surface and span the entire width of compacted surface.
    c. At least 80% of compacted soil profile shall be shattered, except within a five foot radius of the boles of residual trees where major roots can be cut or mangled or in areas where equipment is prohibited from operations (i.e., on slopes in excess of 35% or crossing streams).
    d. Subsoiling shall occur during the same summer season as harvest operations or completion of native surface road use and stabilized prior to fall rains (typically Oct. 1). Should fall rains come early and subsoiling does not get completed, all native surface roads would be put in an erosion resistant condition and blocked before Oct. 1 until such time as subsoiling could occur. This includes construction of waterbars, drainage dips, and barriers (root wads, large woody debris, or brush piles). Waterbar spacing to be based on gradient and erosion class.
11. Fuel and other petroleum products must be stored and refueling must occur at least 150 feet from any stream or forested wetland.
12. A Spill Contamination Kit (SCK) must be kept on-site during any operation within the project area; prior to starting work each day, all machinery would be checked for leaks and necessary repairs would be made.
13. Removal, notification, transport, and disposal of any diesel, hydraulic fluid, or other petroleum product released into soil and/or water would be accomplished in accordance with all applicable laws and regulations.
14. Operators shall be responsible for the clean-up, removal, and proper disposal of contaminated materials from the site.
15. All logging, tilling and road construction equipment must be washed and be free of dirt and plant debris prior to arrival on BLM lands.
16. For use of the quarry in T. 16 S., R. 2 E., Section 17; blasting, rock crushing/screening and pile driving operations related to this project would not occur from March 1 to July 15 in order to avoid adverse effects (disruption) to spotted owl nesting. Hauling activities would not be restricted. Relevant spotted owl survey data may be used by the wildlife biologist to modify or waive this restriction in a given year.

Roads

17. Remove and dispose of all culverts scheduled for replacement.
18. Right-of-way stumps shall be grubbed out only within the road prism (road surface, ditch line, and cut/fill areas) and not within other portions of the posted right-of-way unless necessary to facilitate intended function of the road (i.e. turnarounds, curve widening).
19. To protect fish species during critical life cycle functions, apply the Oregon Department of Fish and Wildlife (ODFW) in-stream guidelines for all stream culvert installation and removal.
20. Require the following for livestream culvert replacements:
    a. Stream flow would be routed around the construction activity as much as possible (i.e., temporary flow diversion structure).
    b. Sediment containment structure placed across the channel below the work section (i.e., weed free mulch) as needed.
    c. Work site would be pumped free of standing water as applicable.
    d. If present, fish and other aquatic species would be removed from the project area and block nets placed above and below the worksite by Field Office fisheries biologist.
    e. After installation, disturbed ground would be planted with appropriate BLM-provided seed or straw/wood mulch before the first rains.
    f. Countersink culverts in fish bearing streams at least 6-8 inches below the streambed to minimize scouring.
21. Non-functional cross drains would be rendered functional and cross drains to be added would be installed prior to log haul beginning. Roads would be renovated (add rock, blading, etc.) before winter haul would be allowed and would be maintained throughout the entire log haul period.
22. Construction of roads would not occur when soils are saturated, in order to minimize soil degradation, erosion, and sedimentation.
23. Design all roads to be constructed to move water rapidly (quickly and frequently) off the road surface and minimize water concentration. Maintenance (i.e., blading and rocking) of roads during the wet season would occur as needed to prevent and minimize erosion of material off roads.
24. Native surface roads would only be used during the dry season (typically July 1 through October 1).
25. Waterbars, drain dips, and/or lead-off ditches may be required to create an erosion resistant condition on roads during seasonal closures. Access to such roads shall be blocked during closures.
26. Locate waste disposal areas outside wetlands, riparian management areas, floodplains and unstable areas to minimize risk of sediment delivery to waters of the state. Apply surface erosion control prior to the wet season. Prevent overloading areas which may become unstable. Waste disposal sites outside roads and existing units need pre-clearance surveys by botany and archaeology.

27. Scatter limbs, slash, and logs greater than 6 inch diameter over the sub-soiled surface of decommissioned roads with an excavator equipped with a thumb or clamp. Debris would cover at least 50% of treated road length where quantity of this material is available.
28. Implement the following combination of methods year round to maintain drainage and minimize sedimentation from roads into stream channels:
    a. Keep ditch line, cross drains, and leadoff ditches clean and free to flow, while minimizing disturbance to existing ditch line vegetation.
    b. Sediment traps, rock armor, or other devices may be installed in ditch lines lacking vegetation and having the potential to deliver sediment to streams.
    c. Prior to and during haul operation, rock surfacing and road maintenance would be assessed for road damage, drainage, and erosion throughout the project and haul route to determine if haul may continue or if any damage has occurred that would require corrective actions (e.g., grading, crowning, adding rock) before haul may resume.
    d. If erosion and road degradation occurs during or after freeze and thaw or rainy periods, log haul operations may be discontinued.
    e. Revegetate bare cut and fill slopes with the potential for accelerated erosion.
29. Gravel, fill and borrow material would need to be weed free and/or approved by BLM. Gravel from pits known to be weedy should not be used.
30. Prior to use, areas used for borrow and fill need to be reviewed for special status plants by Field Office Botanist.

<u>Ground-based Units (Regeneration and Thinning)</u>

31. Logs would be skidded only to approved landings, with landing size up to 60' X 80' adjacent to log haul truck roads, except as needed for safety.
32. Ground-based equipment operations may be suspended during periods of prolonged rain as determined by the authorized officer.
33. To minimize soil compaction and increase in bulk density, limit ground disturbing activities, ground-based skidding, and yarding to the annual dry season (typically July 1 to Oct. 1) when soils provide the most resistance to compaction.
34. Skid trail locations would be approved by the BLM prior to use. Skidding areas shall keep a skid trail pattern to keep within 10% of the ground-based unit by restricting operations to 12 foot wide trails spaced at least 150 feet apart. Skidding/yarding equipment would remain on designated skid trails at all times.
35. BLM shall not approve skid trails through identified areas of high water tables, where decompaction cannot be accomplished (skeletal soils), or where skid trails would channel water into unstable headwall areas.
36. Mechanized harvest systems would only be approved for travel off of designated skid trails when all of the following are met:
    a. A unit has been analyzed for ground-based systems.
    b. On slopes less than 35%.

c. Restrict operations to dry conditions when soils are dry and provide the most resistance to compaction, typically July 1 to Oct. 1. Soil moisture measurements would be taken prior to entry of tracked ground-based machines.

d. Operate from a prepared slash mat that the machine creates of sufficient depth to prevent severe compaction.

e. Limit equipment movement to one pass over the same ground.

37. Design ground-based units with skid trail pattern on up to 35% favorable skidding to downhill ground-based landings, and a skid trail pattern with up to 20% adverse skidding to uphill ground-based landings.

Cable Units (Regeneration and Thinning)

38. Corridors for independent cable settings would be spaced 150 feet apart on average.

39. Minimize sidehill yarding by limiting lateral yarding to 75 feet.

40. Yard only to approved landings, with landing size average being 60' X 40', except as needed for safety.

41. After use, hand water-bar or lop and scatter slash on cable corridors that are prone to accelerated erosion.

42. Shape landings to direct surface water to preselected spots where it can be dispersed to stable well vegetated forest floor.

Regeneration Units

43. When using tracked equipment for site preparation, limit the use of such equipment to harvest units analyzed and operated with ground-based logging systems.

44. Low ground pressure tracked equipment would be required for site prep to minimize the extent and severity of compaction.

45. To minimize loss of soil productivity (consumption of duff and litter resulting in soil nitrogen losses) during all prescribed site prep activities, burning would occur when soil moistures and duff moistures are high.

46. Category B soils would be given the first priority for a cool spring burn. (Bohannon, Klickitat series).

47. To the extent operationally feasible, avoid yarding through grouped retention areas in Finn Again, and minimize the number of yarding corridors if it is necessary. No yarding corridors, tie-backs, or other entry would occur in Mid Indian grouped retention areas. Any exceptions based on specific operational needs would require authorization by the BLM contract administrator in consultation with the appropriate resource specialists.

48. Alternative 2: Within treated uplands, tally the amount of snags and CWD within 3 years after harvest. Treat reserve trees to achieve 8 snags per acre and 300 feet per acre of CWD in diameters, decay class, and heights/lengths specified in the MMLD (below). Retain sufficient live trees during harvest to provide for anticipated snag and down wood creation types and amounts.

Management specifications for retained/created snags and CWD:
All snags and CWD would be in decay class 1-2. Snags would be ≥ 16 inch diameter and ≥ 50 ft. tall, with ≥ 50% being ≥ 20 inch diameter. All CWD would be ≥ 20 inch diameter and ≥ 20 feet long. Snag and CWD management (retain, tally, create) would occur in treated uplands.

49. Alternative 3: Within treated uplands, tally the amount of snags and CWD within 3 years after harvest. Treat reserve trees to achieve 3.4 snags per acre and 240 linear feet of CWD per acre in diameters, decay classes, and heights/lengths specified below. Retain sufficient live trees during harvest to provide for anticipated snag and down wood creation types and amounts.

    Management specifications for retained/created snags and CWD:
    All snags and CWD would be ≥ 20 inch diameter in decay class 1-2. Snags would be ≥ 30 ft. tall and CWD would ≥ 20 ft. long. Snag and CWD management (retain, tally, create) would occur in treated uplands.

Thinning Unit

50. Avoid placing new skid trails within 75 feet from stream or wetland no cut boundaries. Apply directional felling of trees to lead of the skid trails and maximize winching distance within Streamside Management Areas or Riparian Reserves. Use existing skid trails where appropriate (as determined by Authorized Official).

51. Harvest activities during sap flow season should be minimized and monitored to ensure residual stand damage is not occurring. Additional protections to trees (e.g., plastic barreling) during sap flow would be required if damage to tree cambium is occurring.

52. Where operationally feasible, falling techniques would be utilized for the protection of retention trees and other reserve areas. Falling techniques include falling to lead towards yarding corridors, skid trails, and areas where residual tree damage would be minimized, and falling away from reserve areas.

53. Limit log lengths to 40' in length where necessary to minimize damage to residual trees, snags and coarse woody debris during yarding.

54. Yarding corridors through Special Yarding areas (see Maps D8 and D14) would be minimized to the greatest extent possible and all cut corridor trees would be left on site as down logs. No timber would be harvested from these areas.

55. Disruption to osprey nests will be minimized through seasonal restrictions. The following actions would not occur between March 1 and July 31: blasting or rock crushing at quarries, felling, yarding, road construction, helicopter use, burning, and other mechanized equipment use.

    The above restrictions may be waived or modified (reduced or extended) by the Field Office wildlife biologist based on relevant survey information regarding occupation or nesting activity.

56. Alternative 2 Thinning Harvest Only: Within all treated Streamside Management Areas and treated uplands, tally the amount of snags and CWD within 3 years after harvest. Treat reserve trees to achieve 8 snags per acre and 300 linear feet per acre of CWD in diameters, decay classes, and heights/lengths specified in the MMLD (below). Retain sufficient live

trees during harvest to provide for anticipated snag and down wood creation types and amounts.

Management specifications for retained/created snags and CWD:
All snags and CWD would be in decay class 1-2. Snags would be ≥ 16 inch diameter and ≥ 50 ft. tall, with ≥ 50% being ≥ 20 inch diameter. All CWD would be ≥ 20 inch diameter and ≥ 20 feet long. Snag and CWD management (retain, tally, create) would occur in treated Streamside Management Areas and treated uplands.

57. Alternative 3 Thinning Harvest Only: Within treated Riparian Reserve, tally the amount of snags and CWD within 3 years after harvest. Treat reserve trees to achieve 3.4 snags per acre and 300 linear feet per acre of CWD per acres in diameters, decay class, and heights/lengths specified below:

    Management specifications for retained/created snags and CWD:
    All snags and CWD would be ≥ 20 inch diameter in decay class 1-2. Snags would be ≥ 30 ft. tall, and CWD would ≥ 20 ft. long. Snag and CWD management (retain, tally, create) would occur in treated Riparian Reserves Areas (but not uplands).

58. Design yarding corridors so as to limit canopy loss in Riparian Reserves/Streamside Management Areas.

Helicopter Landings

59. Helicopter-log landing requires a cleared area sloped to no less than 2% to provide for adequate drainage and not in excess of 6% for safe operations. The area should be cleared to approximately 80’ x 225’- 250’, except as needed for safety.

2.6 Alternatives Considered but Eliminated from Detailed Analysis

An EA must explore and evaluate all reasonable alternatives. The BLM identifies alternatives to explore a range of means in meeting the purpose and need, and to explore a range of means necessary to permit a reasoned choice. Alternatives are presented as part of the interdisciplinary process, and are often presented by members of the public during scoping.The BLM may eliminate from detailed analysis any alternatives that are not reasonable. An alternative need not be analyzed in detail if:

- it does not meet the purpose and need
- it is technically or economically infeasible
- it is inconsistent with the basic policy objectives for the management of the area
- its implementation is remote or speculative
- it is substantially similar to an alternative being analyzed in detail or
- it would have substantially similar effects to an alternative being considered in detail.

The following alternatives were considered during this analysis, but were eliminated from detailed analysis in this EA for reasons explained below. These alternatives include those presented by members of the public as well as by the interdisciplinary team process.

Utilize helicopter logging rather than cable or ground-based logging in the southernmost harvest unit in Mid Indian (previous Alternative 2A)

This alternative was presented in the 2016 EA as Alternative 2A. It was nearly identical to Alternative 2 but would have substituted helicopter logging for cable and ground-based logging

in one small portion of Mid Indian (approximately 36 acres) that did not have road right-of-way access at the time. It would have required slightly less road construction (0.45 miles), less road renovation (0.81 miles) and fewer culvert installations (approximately 15). However, the analyses in the 2016 EA found no substantive difference in impacts between Alternative 2 and 2A. Helicopter logging is not a preferred logging method because of safety and cost concerns. It is generally only proposed where no alternate means of access to a harvest unit exist and where the timber is of high enough value to warrant the extra cost. Road access is now available, the impacts of Alternative 2 are not substantively different, and Alternative 2 is preferable from a safety and cost perspectives. Therefore, Alternative 2A was dropped from further detailed analysis because it is substantially similar to an alternative being analyzed in detail (Alternative 2) and was found to have substantially similar effects to that alternative.

Consider only thinning harvests.

This alternative would apply commercial thinning instead of regeneration harvest to the stands in the Mid Indian and Finn Again units. The BLM eliminated this alternative from detailed analysis because it would be inconsistent with the 1995 RMP direction to apply regeneration harvest to stands that are at or above CMAI (p. 200). Regeneration harvest was identified as appropriate in these stands, which are at or above the age of CMAI.

Only conduct regeneration harvest in young stands.

This alternative would apply regeneration harvest only in young (generally defined as 15-50 years old) stands. Commenters suggested that while high-quality early seral habitat is valuable, regeneration harvests should only be conducted in young stands. The BLM eliminated this alternative from detailed analysis because it would be inconsistent with the basic policy objectives established under the 1995 RMP. Regeneration harvests on young stands are not permitted under the management direction. The RMP, p. 200, states, “Regeneration harvests will not be planned for stands less than 56 years of age.” The Eugene RMP, p. 85, further directs regeneration harvests to occur at or above the age of volume growth culmination (typically 70 to 90 years of age in the planning area).

3.0 Affected Environment and Environmental Consequences

This section presents the analyses of issues considered in detail, identified in Chapter 2. For each issue, the analyses include descriptions of the existing conditions (Affected Environment) and the potential changes to those conditions (Environmental Effects) as a result of implementing the project alternatives. These sections provide the scientific and analytical basis for comparing alternatives.

3.1 Issue 1: How would timber harvest change visual resources within the project area and the scenic quality within the McKenzie River corridor?

3.1.1 Affected Environment

Visual resources consist of the land, water, vegetation, structures and other features that make up the scenery and physical features visible on a landscape. All Eugene District BLM-administered lands have been classified under a Visual Resource Management (VRM) class system that was established by BLM during the last planning effort in the early 1990s. In 2014 the BLM Eugene District re-inventoried for current scenic values and categorized BLM lands into Visual Resource

Inventory (VRI) classes derived from individual visual resource components. A VRI class is determined by overlaying the ratings of scenic quality (A, B, or C), public sensitivity to changes in visual character (H, M, or L), and distance zones as seen from major viewing platforms or travel routes (foreground-middle ground, background, or seldom seen). The foreground-middle ground zone includes areas seen from less than 3 miles away. Visible areas beyond 3 miles but usually less than 15 miles away are in the background zone. Areas either hidden from view or beyond 15 miles are in the seldom-seen zone (BLM Handbook H-8410).

The Visual Resource Management (VRM) Classification for the project area is VRM Class IV, which allows major modification of the existing character of landscape. This rating resulted from the overlap of a Scenic Quality Rating of B, which factors in the timber management landscape, coupled with low Visual Sensitivity to change. The allowable level of change to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of viewer attention ((USDI, 1995) p. 78). Regeneration harvest is an example of an allowable management activity in VRM Class IV that may dominate the landscape. The RMP states that every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic elements of line, form, color, and texture (USDI, 1995). It is the least restrictive category assigned to public lands based on scenic quality, sensitivity level, and distance zones.

The RMP (p.78) direction states: “No specific timber management constraints would apply to lands managed for VRM Class IV objectives. However, mitigation of visual effects would be incorporated where consistent with efficient timber harvest or other management activities.” The general viewshed from the McKenzie River corridor is a patchwork mosaic of various aged stands ranging from recent clear-cuts to mature timber. Although specific patches change over time as they mature and/or are harvested, the overall pattern has remained consistent for many decades.

The southern edge of the Mid Indian harvest area approaches within approximately ¼ mile of the nominated Wild and Scenic River corridor of the McKenzie River. BLM Manual 6400,Policy and Program Direction for Wild and Scenic Rivers, directs the BLM to consider the following guidance when analyzing site-specific projects and activities on BLM-administered lands within the river corridor or on lands that are adjacent to or border eligible or suitable rivers: “*The authorized officer may consider a range of vegetation management and timber harvest actions that are designed to protect, restore, or enhance the river environment, including the long-term scenic condition*.” .

McKenzie Landscape Project Area

Situated approximately 16 air miles west of Springfield, Oregon, in Lane County, the area is characterized as rural with small communities separated by agriculture lands and managed forests. The landscape exhibits extensive forest management on the rolling hills of the eastern slopes and hilltops of the Cascades.

Views of the project area are primarily available when traveling on Hwy 126 near the town of Vida, Oregon and along county roads located immediately south of the McKenzie River, including Goodpasture Road, a key travel corridor that enables access to popular picnicking, viewing, and other dispersed recreational pursuits along the south bank of the McKenzie River. The viewable landscape from this area covers approximately 111 acres on the eastern-most side

of the proposed Mid Indian/Finn Again timber sales; however, roadside trees, buildings, dips, and rises in the valley bottom can hide the harvest site from view.

The foreground and middle ground is predominately agricultural fields bordered by deciduous trees and shrubs, and as the lands become less flat within the middle ground, vegetation may include coniferous species. The background landscape consists of forest lands managed for timber harvest. The background landscape could be described as a quilt-like pattern with each parcel consisting of a different-aged stand defined by straight lines that may run vertically on facing slopes creating unnatural contrast of color and texture or may create horizontal patterns that flow with the landforms. The varying stand ages and heights provide various textures and colors to the landscape from browns of freshly harvested units to a range of greens, as planted parcels age.

Key Observation Points

The BLM identified three Key Observation Points (KOPs), where the project area is viewable to the casual observer, to analyze the potential effect of the project on the characteristic landscape. The BLM completed visual contrast rating worksheets. These worksheets document the basic elements of color, form, line, and texture that characterize the view of a landscape, and are used to describe impacts and plan mitigation measures.

For the purposes of the visual effects analysis, the landscape scale is from 3 to 15 miles (depending on the viewshed) and the temporal scale is from 10-15 years.

3.1.2 Alternative 1: No Action

3.1.2.1 Environmental Effects (direct and indirect)

Under this alternative, no timber harvest or road construction would occur at this time. There would be no change in scenic quality on lands managed by the BLM within the project area. The quality of recreational experience would continue in its existing condition for the areas in the river corridor and Highway 126 in view of the project area..

3.1.2.2 Cumulative Effects

There would be no change in scenic quality on lands managed by the BLM within the project area. Surrounding privately owned industrial timber lands would continue to be managed as they have in the past. Where those areas are visible from the river corridor and Highway 126, the overall viewshed would continue in its existing condition.

3.1.3 Alternative 2

3.1.3.1 Environmental Effects (direct and indirect)

Wild and Woolly Timber Harvest

The Wild and Woolly units are not visible from the McKenzie River corridor and harvest activities therefore would have no impact on the viewshed. This was determined first by computer simulation and verified by subsequent field investigation by the IDT Visual Resources Specialist (and summarized in the specialist report for the project).

Finn Again Timber Harvest

Based on initial viewshed computer modeling and the VRM analysis, the western portion of Finn Again (approximately 45 proposed harvest acres) cannot be seen from the McKenzie River

corridor due to the topographical configuration of the landscape and vegetative screening. Portions of the eastern unit, particularly the northeast corner, can be viewed to varying degrees from some places on the river corridor. Where the project area is most visible, three special visual management areas have been designated where no CWD/snag creation would occur, leaving more trees on the landscape than the surrounding harvest area (19 versus 6 trees per acre). This would minimize the direct, indirect, and long-term scenic impact in the area most visible from the McKenzie River and adjacent highway. The locations of these special visual treatment areas are shown on Figures C-2 and C-3 in Appendix C of this EA.

Streamside Management Areas and grouped retention areas within the upper northeast corner would retain the existing character of the landscape where they are located in addition to serving as a visual screen for lands harvested behind them due to the retention of standing, mature trees. The remaining acres proposed for harvest within the most eastern unit are minimally visible, if at all, from the river corridor due to the presence of the surrounding forest and/or physical landform characteristics. These units make up a small fraction of the acreage and would not substantially shift the balance in the existing mosaic appearance. The special visual treatment areas designed for the harvest unit, combined with retention of larger trees dispersed throughout the proposed harvest unit and the irregular shapes of harvest openings, would provide a screening effect. With these design features, landscape changes would not be expected to attract the attention of the casual observer.

Mid Indian Timber Harvest

A ribbon of high to very high visibility area (from the river corridor) is present along the eastern flank of the proposed harvest unit in addition to a smaller area of very high visibility lands within the southeast portion of the proposed project unit. Similar to Finn Again, however, areas noted with highest visibility potential would be overlaid with two special visual management areas (10 acres total) where no CWD/snag creation would occur, leaving more trees than the surrounding harvest area (20-24 versus 8-11 trees per acre). The locations of these special visual treatment areas are shown on Figures C-4 and C-5 in Appendix C. This would minimize the indirect, long-term scenic impact in the portion of the proposed harvest unit most visible from the McKenzie River and/or adjacent highway.

Implementing no-harvest Streamside Management Areas and grouped green tree retention (totaling approximately 40 acres) within portions of the proposed harvest units that have high to very high visibility would preserve the existing character of the landscape. Additionally, these design features would serve as a visual screen for lands harvested behind them due to the retention of standing, mature trees. Furthermore, remaining harvest acres outside of those previously described are minimally viewed, if at all, from the river corridor due to the presence of the surrounding forest and/or physical landform characteristics.

As previously noted, the general viewshed from the McKenzie River corridor is a patchwork mosaic of various aged stands ranging from current clear-cuts to mature timber. Portions of this proposed unit are more visibly prominent from some locations along the river corridor. This is particularly true immediately south of the McKenzie River, where the combination of the angle of observation between the viewer's line of sight and the project location emphasizes the visual impact of the project. The special visual treatment areas designed for the harvest unit, combined with retention of larger trees dispersed throughout the proposed harvest unit and the irregular

shapes of harvest openings, would provide a screening effect. With these design features, landscape changes would not be expected to attract the attention of the casual observer.

Initially following harvest activities slash (excess limbs and tree tops) would be scattered across the landscape. This material would quickly change from the initial greens and greys of the living tree to browns and reds as the plant material dries and decomposes. As a means to reduce fuel loading within the harvested units, broadcast burning and pile burning may occur. Any burning would be conducted when the moisture levels of the downed material and surrounding environment are at the appropriate levels to ensure a low intensity burn. Maintaining the low intensity fire promotes the consumption of the slash material while limiting the potential of causing damage to the seed bed of the grasses and shrubs currently existing.

Initially following site-preparation for planting, the viewable areas would consist of darker browns to black across the burned area for a short period of time (generally less than two years) and may include some dead or dying trees inadvertently killed by the heat of the burn. Since the lower-intensity burning methods anticipated for site preparation promote development of native grasses and vegetation, the areas would begin sprouting and ground coloration would move from the brown and black to the brighter green of new growth and continue to progress as the planted saplings develop. After three to five years, naturally regenerated trees and those seedlings planted after harvest would provide additional texture to the landscape as tree and shrub species continue to develop. It is expected the project area would have a medium contrast line, as the neighboring landscape consists of freshly harvested stands and young stands of varying age classes. Color variations of brown and green following harvest activities are common on the landscape. Following harvest, the ridge line would have a bumpy or jagged appearance due to remaining taller trees. The taller trees would contrast with neighboring units that have been completely harvested and replanted; the single aged stand structure in each unit maintains the smooth appearance of the ridge line.

The proposed action would not cause any change in the overall VRI Class rating or any of its components. The area would retain the features of the surrounding landscape which is comprised of a patchwork pattern with harvested and intact conifer stands of varying stand ages. The proposed action would not contribute to heightened sensitivity levels or cause the scenic quality of the overall landscape to change. This level of action is consistent with management under a VRM IV.

3.1.3.2 Cumulative Effects

Land ownership in the viewshed of the McKenzie River corridor is generally a checkerboard of privately owned industrial timberlands and federal lands managed under the O&C Act for timber production. Smaller private ownership and homes are interspersed and are more common closer to the river and lower on the landscape. Private timber lands in the area have primarily been managed for timber production since the turn of the century, resulting in a general viewshed from the McKenzie River corridor of a patchwork mosaic of various aged stands ranging from current clear-cuts to mature timber. Although specific patches change over time as they mature and/or are harvested, the overall pattern has remained consistent for many decades and is expected to continue into the future.

The proposed project is a forest management activity that fits within this mosaic pattern. The project would not substantially change the appearance of the larger landscape because it is similar to the type and size of forest management activities that occur in the area. Many of these

hillsides have recently been harvested and replanted. Replanted stands tend to consist of brighter green colors that darken as the stand ages. The BLM is currently evaluating thinning projects originally scoped as part of the McKenzie Landscape Project (Rough Draw, View Marten, and Marten Ridge) for forest management. However these projects are proposed as thinning treatments and, where visible from the McKenzie River corridor, would likely have low to no impact upon the viewshed, as the forest setting and most of the canopy would remain. The BLM has no other actions proposed which would affect the viewshed.

Cumulatively, this project, combined with reasonably foreseeable future actions on BLM lands within the viewshed, and combined with an expectation of continued timber management on privately owned industrial timber lands, would not substantially shift the ratio between newly harvested areas and more mature stands in the viewshed, nor would it contribute to heightened sensitivity levels or cause the scenic quality of the overall landscape to change.

3.1.4 Alternative 3

3.1.4.1 Direct and Indirect Effects (direct and indirect)

Effects from Alternative 3 would be essentially the same as Alternative 2. In dispersed retention areas in Mid Indian and Finn Again, Alternative 3 would retain 8 to 10 fewer green trees per acre at time of harvest (a difference of one tree approximately every 70 feet), and zero to 5 extra green trees per acre after CWD and snag creation. This difference would be expected to be nearly undetectable to the average visitor looking at the viewshed, due to the proposed placement and size (approximately 4) of the no-harvest areas (i.e., stream buffers and grouped retention), coupled with the designation of the same proposed special visual areas as Alternative 2 (see Figures C-7 and C-8 in Appendix C).

3.1.4.2 Cumulative Effects

Cumulative effects would be the same as for Alternative 2.

3.2 Issue 2: How would proposed management actions change the levels of carbon storage within the project area?

3.2.1 Affected Environment

The quantity of stored carbon in forests varies from stand to stand and is influenced by site quality and the amount, type, and size of vegetation present. The current amount of vegetation defines the existing levels of on-site carbon and is considered the baseline amount that would be affected by management actions. This analysis therefore presents descriptions of the present and proposed stand conditions in the project area, followed by estimations of the changes in carbon levels resulting from the project actions.

Stand ages and conditions upon which the carbon analysis is based are described below and shown in Tables 12-16.

Present Stand Conditions and History

Wild and Woolly

The stands proposed for commercial thinning treatment in the Uplands and the Riparian Areas/Reserves are second growth, even-aged, largely closed canopy 60-70 year old stands (and a small portion of 40 year old) described in Table 12. These stands are the result of at least 3 non-stand replacing fires. A small portion of the unit in the Southeast section of the unit has a

treatment history which includes a planting, a pre-commercial thin, a burn, and a commercial harvest. The rest of the unit does not have a documented treatment history. Stands are composed mostly of Douglas fir (>80%), with smaller components of western hemlock, western redcedar, and incense cedar. Hardwoods such as golden chinquapin, madrone, big leaf maple, and red alder exist in varying amounts on the landscape primarily in the Riparian Areas/Reserves and generally comprise less than 20% of the total species composition. The dominant understory vegetation consists of salal, hazel, vine maple, Oregon grape, and sword fern.

Table 12. Current Stand Conditions in Wild and Woolly (Proposed Thinning Harvest)

Sale Name	Age in 2017	BA sq.ft	TPA	QMD in.	RD	Canopy Cover %
Wild and Woolly	47, 63, and 73	278	138	19	63	75

Finn Again and Mid Indian

These stands are the result of at least 3 non-stand replacing fires. Stand ages vary throughout the proposed treatment areas. BLM's Forest Operation Inventory (FOI shows that stand ages currently vary from 68 to 128 years old. All stands are dominated by Douglas-fir, with smaller components of western hemlock, western redcedar, and incense-cedar. Hardwoods such as golden chinkapin and madrone bigleaf maple, and red alder are present. The dominant understory vegetation consists of salal, hazel, vine maple, Oregon grape, and swordfern.

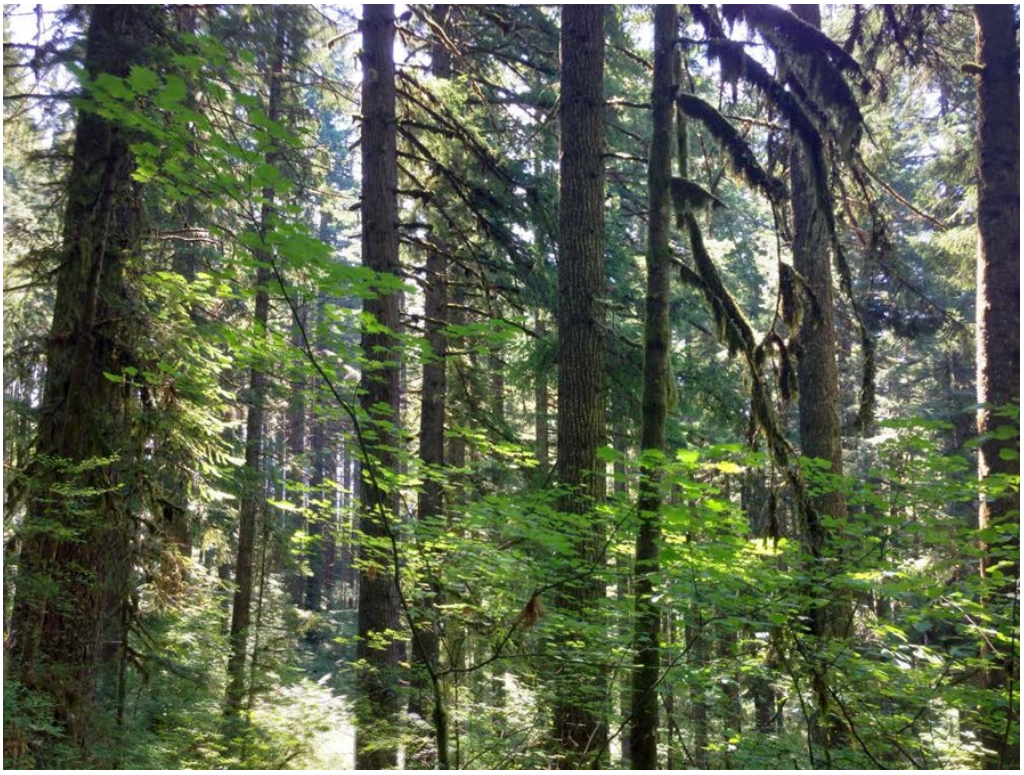
Stand structure is diverse throughout the project area. Several phases of stand development are present in the project area including stem exclusion, understory re-initiation, and old growth. Stem exclusion occurs when the canopies in the overstory begin to close and suppress the growth of the understory. Understory re-initiation occurs when gaps are created in the canopy which allows sunlight to reach the forest floor and understory development begins. Old growth occurs when structural complexity in the stand has peaked and numerous live and dead features are present in the stand (large diameter trees with large branches, snags of varying sizes, diverse understory).

The stocking is irregular throughout the project area. Some areas are clumpy and not evenly spaced while other areas are younger and more evenly distributed. There are a high number of trees that exhibit open grown conditions with large wolfy branches. Table 13 shows the current stand conditions of Mid Indian and Finn Again and Figure 2 shows a representative photograph of stand conditions in the Finn Again harvest area.

Table 13. Current Stands Conditions in Mid Indian and Finn Again (Proposed Regeneration with Retention Harvests)

Sale Name	TRS	Age in 2017	BA sq.ft.	TPA	QMD in.	RD	Canopy Cover %
Mid Indian	T16S. R2E. Sec. 20 and 21	68-118	312	105	23	64	62
Finn Again	T16S. R.2E. Sec. 19	73-128	269	95	23	57	67

Figure 2. Photograph of Current Stand, Finn Again



Age Class Distribution

The BLM manages approximately 17,000 acres of forested land in the CCAMA land use allocation within the McKenzie River sub-basin. On BLM-administered lands in the CCAMA there are no acres in the 0-10 age class (see Table 14 for AMA age class distribution). The majority (45%) of the stands within the CCAMA are in the 110-180 age class, with another 21% percent in the 80-109 age class.

Table 14: Age Distribution of BLM –managed lands within the CCAMA

Year 2017 Current/Pre-Harvest		
Age Class	**Acres**	**Percent**
0 to 9 Years	0	0%
10 to 39 Years	3,249	19%
40 to 79 Years	2,067	12%
80 to 109 Years	3,712	21%
110 to 180 Years	7,856	45%
Gte 190 Years	421	2%
Non forest-capable	161	1%
Grand Total	**17,466**	100%

The age class distribution at the larger 5th field watershed scale reflects a similar pattern. (As noted in the Introduction, the relevant 5th field watershed at the time of the analysis was the Vida/McKenzie watershed). There is relatively little early-seral forest on BLM-managed land in the area, making up 16% of the watershed. Less than 1% of the watershed is under age 20.

Carbon

The quantity of stored carbon varies from stand to stand and is influenced by site quality and the amount, type, and size of vegetation present. The current amount of vegetation defines the existing levels of on-site carbon and is considered the baseline amount that would be affected by management actions. The McKenzie Landscape harvest areas consist of some 40-year old stands but primarily 60 to 128 year old stands. The estimate of carbon currently stored within all of the harvest units (in tonnes) is 84,856 (Table 16).

Assumptions for Analysis

The proposed regeneration harvest and commercial thinning operations would result in greenhouse gas emissions as a result of timber harvest as well as from carbon sequestration in forest biomass as a result of forest growth over time. This analysis estimates the greenhouse gas emissions and carbon storage associated with implementation of all of the alternatives from the present to 50 years in the future, incorporating differences in merchantable live tree carbon storage and storage in wood products produced by the treatments. Carbon pools associated from the action alternatives are compared to the no action alternative.

A precise assessment of the total storage of carbon in forests on BLM administered lands or in wood harvested from BLM lands is not possible due to incomplete information on the current inventory of carbon storage and the effect of forest management on carbon storage. However, it is possible to approximate carbon storage and greenhouse gas emissions from above-ground forest biomass using the analysis assumptions to compare the alternatives (USDI, 2008).

This analysis is primarily concerned with the carbon in the aboveground live biomass (merchantable live trees). In order to measure and compare carbon among alternatives, total tonnes is used as the metric within this analysis and total tonnes is measured throughout the sale area acreage. In order to calculate total tonnes, a carbon calculation spreadsheet was used. This calculation takes the above ground standing live tree volume (mbf) and calculates the total

carbon (in tonnes). Current and projected harvest volume was calculated using the Forest Vegetation Simulator (FVS) modeling package (http://www.fs.fed.us/fmsc/fvs/index.shtml) to determine current and future carbon stocks. Throughout all units and alternatives, the model accounted for creation of all proposed CWD and snags. Tree retention under each alternative and unit can be found in Chapter 2 Proposed Action.

3.2.2 Alternative 1: No Action

3.2.2.1 Environmental Effects (direct and indirect)

Stand Structure/Age Class Distribution

Without treatment, the current stand would continue to grow to increasing density. Stand growth projections were made using the ORGANON growth and yield computer simulation model, Edition 9.1 (Hann et al. 2006) based on stand plot data collected in 2012. In 40 years, relative density index would be up to 54. Early-seral habitat would occur in small areas comprising 0–5 percent of the area as a result of disturbances such as disease, insects, and wind. Snag and coarse wood levels would have increased as a result of density mortality. The stands that make up the proposed regeneration area will reach culmination of mean annual increment, a slowing of average stand growth indicating economic rotation age.

Carbon

No forest vegetation would be removed and the current amount of on-site carbon would not change as a result of harvest actions. In 50 years, the No Action alternative would store a total of 131,865 tonnes of carbon within the three harvest areas. Depending on the harvest area, the stored carbon would range from 19,020 to 89,293 tonnes.

3.2.2.2 Cumulative Effects

Stand Structure/Age Class Distribution

Under the No Action Alternative, stands would continue on the current trajectory of an unbalanced age class distribution.

Carbon

In 50 years it is expected that continued growth of forest vegetation would result in the increase of stored carbon. In the absence of stand replacing disturbance events, it is expected that continued forest growth would capture and store more carbon than would be lost from natural processes. Upon comparison of all alternatives, the No Action Alternative stores more net carbon in 50 years than all other action alternatives (see Table 14).

3.2.3 Alternatives 2 and 3

3.2.3.1 Environmental Effects (direct and indirect)

Stand Structure/Age Class Distribution

Within areas of grouped retention, timber would not be removed and would be subject to the same processes of growth and development, including regular and irregular mortality previously discussed under Alternative 1. The vegetation structure in the harvest units would change to that of an early seral forest. In addition to the CWD and snag trees created post harvest, some of the dispersed retention would eventually die and become snags and CWD. While retention trees would ideally remain standing, some of these green trees may eventually die and fall over in the

short term. Potential mortality of dispersed retention trees has been quantified (Maguire et al. 2006). Causes of mortality may include windthrow and wind topping. The photograph in Figure 3 shows a representative post-harvest condition after slash disposal and burning, showing approximately 20 TPA dispersed retention.

Within the project area, the early-seral habitat (age 0–39 years) makes up 17 percent of the 25,841 forested BLM-managed acres in the 5th field watershed. The youngest (1–20 years of age) early-seral habitat makes up only 7 percent. Regeneration of approximately 260 acres would re-distribute approximately 260 acres from the mature seral stage to the early-seral habitat, which would increase from 17 percent to 19 percent, and to the youngest early-seral habitat (age 0–20), which would increase from 7 percent to 8 percent.

Figure 3. Example of post-harvest unit condition after slash disposal and burning, showing approximately 20 TPA dispersed retention

The proposed treatments would result in carbon being released because of harvested wood, slash treatment, biomass recovery, and fuel consumption for harvesting operations. Table 15 shows the varying levels of emissions post-harvest and the emissions of carbon from the harvested wood 50 years in the future. Included in this analysis but not shown on Table 15 is the assumption of 33 miles haul distance to the mill. In total of all the sales, the emissions from Alternative 3 is slightly higher (16,068) than Alternative 2 (15,784) post-harvest as well as in 50 years.

Table 15. Carbon Emissions Associated with Alternatives 2 and 3

	Alternative 2		Alternative 3	
	Post-Harvest emissions (tonnes)	**50 year Post-Harvest emissions (tonnes)**	**Post-Harvest emissions (tonnes)**	**50 year Post-Harvest emissions (tonnes)**
Mid Indian (Regen Harvest)	6,419	4,461	6,608	4,887
Finn Again (Regen Harvest)	4,877	984	5,054	1,383
Wild and Woolly (Thinning)	4,488	731	4,406	789
TOTAL	15,784	6,176	16,068	7,059

Carbon Storage

After a timber harvest, some of the carbon would be stored in the harvested wood and some carbon would remain in the standing live trees. Table 16 shows that in all of the alternatives some of the carbon is re-distributed to the harvested wood and most of the carbon remains in the standing live trees. Continued forest growth following management is predicted to increase carbon storage at different rates after harvest for each alternative based on prescription types. Planted seedlings would also eventually store more carbon as they grow. Figure 3 shows a photograph that may be representative of a stand approximately 10 years post-regeneration harvest, with the lowest proposed GTR (6 8 TPA). Overall, Tables 16 and 17 show that Alternative 2 stores more carbon in 50 years than Alternative 3 but far less than the No Action Alternative.

Table 16. Carbon Storage in Alternative 2

	Present Stored Carbon (tonnes)	**Alternative 2, 50 years Post-Harvest (tonnes)**	**Wood Products Derived from Alternative 2, 50 Years Post-Harvest (tonnes)**	**No Action in 50 years (tonnes)**
Mid Indian (Regen Harvest)	59,365	26,199	9,701	89,293
Finn Again (Regen Harvest)	14,756	12,799	2,140	23,552
Wild and Woolley (Thinning)	10,735	11,324	1,590	19,020
Total	84,856	50,322	13,431	131,865

Table 17. Carbon Storage in Alternative 3

	Present Stored Carbon (tonnes)	Alternative 3, 50 years Post-Harvest (tonnes)	Wood Products Derived from Alternative3, 50 Years Post-Harvest (tonnes)	No Action in 50 years (tonnes)
Mid Indian (Regeneration Harvest)	59,365	17,583	10,627	89,293
Finn Again (Regeneration Harvest)	14,756	8,966	3,008	23,552
Wild and Woolley (Thinning)	10,735	11,324	1,717	19,020
Total	84,856	37,873	15,352	131,865

Figure 4. Example of future stand condition after regeneration (with retention harvest), representative of 6-8 TPA after post-harvest CWD/snag creation. Estimated condition 10 years after harvest (6-7 years after CWD/snag creation).

3.2.3.2 Cumulative Effects

Stand Structure/Age Class Distribution

The area analyzed for cumulative effects was the project area. This area provides a logical analysis area to assess stand conditions based on the homogenous plant association series and it is the area that all activities will occur within. The affected environment section describes the current conditions which are a direct result of the history in the project area. As a result of past disturbances, the current stand structure is that of a Douglas fir dominated stand in both stem exclusion and understory re-initiation phase of stand development. Other than the proposed action, there are no other present actions that would affect the development of these stands. The only reasonably foreseeable future actions affecting the vegetation are timber stand improvement treatments including but not limited to planting, pre-commercial thinning, and brush control. The proposed action would change the development of the stand in that stand density would be reduced and the trajectory of the stands would be leading it towards early seral conditions.

Carbon

The temporal scale of 50 years was chosen as an appropriate time frame because after 50 years management actions are more uncertain. Reasonable and foreseeable future actions on BLM land actions would include a planting after harvest and a pre-commercial thin 15 years after planting. Reasonable and foreseeable actions are not known on the adjacent landowner's property near the project area. However, a review of standard industrial practices, as well as aerial photography and driving through adjacent lands reveals that most of the privately or state owned lands within the vicinity will be managed on a 40-60 year rotation, with intense management.

Carbon stored and harvested on BLM-Administered lands in western Oregon represents 1% of the total carbon stored in forests and harvested wood in the United States, and 0.02% of the global carbon storage in vegetation, soil, and detritus ((USDI, 2008) Vol.1, Ch. 3, p. 220). The differences in carbon storage and sequestration among the alternatives over time are too small to reveal differences when placed in the context of regional, national, or global carbon storage.

3.3 Issue 3: How would proposed management actions change wildlife habitat conditions associated with snags and down woody material?

3.3.1 Affected Environment

The spatial area of analysis is the project area because it is the only scale at which adequate data are available. Project actions would not affect snags and CWD beyond this scale, and actions outside the project area are unlikely to affect snags and CWD in the project area.

A temporal scale of approximately 80 years is used to examine effects to snags and CWD. This coincides with the timeframe used to analyze spotted owl habitat. The stem-exclusion phase of mid-seral stands has a pronounced effect on snag and CWD recruitment. Stem exclusion within thinned stands would likely be complete within this timeframe (under the no action alternative).

Stand exams in the project area collected a variety of snag and CWD attributes useful for analysis, including: decay class, diameter, height (snags), and length (CWD). This assessment organizes discussion of snags ($\geq$ 15 ft. high) and CWD ($\geq$ 20 ft. long) into size categories as well as decay class. The collected data from the project area and the categories of snags and CWD are shown in Table 18.

Throughout their lifespan, snags and CWD progress from hard intact decay class 1 to soft and crumbing decay class 5, until eventually returning back to humus in the soil. The term "large" is used to describe snags and CWD at least 20 inches in diameter. The term "medium" is used in the effects discussion, and only to describe 16-20 inch diameter snags (based on MMLD guidance). All sizes of snags and CWD provide a variety of ecological functions and contribute to the broad habitat spectrum for fish, wildlife, plants and biotic and abiotic processes. However, important wildlife habitat attributes are closely tied to larger snag and CWD diameters. The value of $\geq$ 20 inches coincides with a common threshold used in science and literature to focus discussion of snags and CWD as wildlife habitat. The "total" category provides some insight into stand history and behavior. However, because this category is dominated by smaller snags and CWD, and too coarse to be useful for the analyses in this assessment, it is only briefly discussed.

Snags

Snags are an important structural component in forest communities, and many wildlife species depend on them to provide for key life cycle needs such as nesting, roosting, perching, foraging, shelter, and hibernation. Of the nearly 100 northwest forest species that use snags, over half are dependent on cavities for at least 1 of 18 life cycle needs, and at least 4 that relate to nesting (Appendix F, p. A-36, in USDI, 2002).

The ability of wildlife to fulfill life cycle needs utilizing snags is dependent on a variety of snag-specific attributes such as tree species, diameter, height, decay class, bark thickness, and hollowness in addition to the presence of cavities, fissures, and perching locations (e.g. side limbs). Environmental conditions, such as thermal exposure and humidity near snags, are affected by surrounding forest conditions and slope position. In the project area, snags are likely being used by primary cavity excavators (woodpeckers, nuthatches, chickadees) as well as secondary cavity nesting birds such as wood ducks, swallows, and owls. Additionally, bats and small mammals such as squirrels and woodrats may use these snags. Larger hollow snags are key habitat for bat and swallow colonies and larger mammals such as raccoons, skunks, or bears. Spotted owls will also use larger snags for nesting.

Total snags*:* Stand data show an average of 3.4 snags per acre among all sizes and decay classes (0.9-6.2 per harvest unit) among all harvest units. These snags are mostly remnants from early in the stand development and are located in riparian areas in small diameter pieces recently recruited by suppression mortality.

Small low decay snags (8-15 inch diameter in decay class 1-2) average 1.3 snags per acre among harvest units (0.0-4.0 per harvest unit). These features are a result of recent natural recruitment due to mortality of understory trees. They are the least important current or future wildlife habitat because of their smaller size and shorter life span. Additionally, small diameter snags are often common in and near the project area (compared to larger), and they are routinely recruited within younger mid-seral stands. *Because they are relatively low in importance as wildlife habitat, and would not be affected by snag management that focuses on larger diameters, these features are not discussed further in this EA.*

Table 18: Existing Coarse Woody Debris and Snags

		CWD (linear feet per acre)[2]				SNAGS (# per acre)[1]			
Harvest Unit	Decay Class	8-15 inch	16-19 inch	>20 inch	Total	8-15 inch	16-19 inch	>20 inch	Total
Finn Again	1	26	0	19	45	0	0	2.7	2.7
	2	19	0	19	38	0	0	0.6	0.6
	3	219	0	26	246	0	0	0	0.0
	4	64	26	38	129	0	0	0	0.0
	5	0	0	19	19	0	0	0	0.0
Finn Again Total		**329**	**26**	**121**	**477**	**0**	**0**	**3.2**	**3.2**
Mid Indian	1	0	0	0	0	3.1	0	0.7	3.8
	2	7	14	0	20	0	0	0	0.0
	3	83	22	48	154	1.7	0	0.7	2.4
	4	50	35	43	128	0	0	0	0.0
	5	0	0	0	0	0	0	0	0.0
Mid Indian Total		**140**	**71**	**91**	**302**	**4.8**	**0**	**1.4**	**6.2**
Wild and Woolly	1	0	0	0	0	0.9	0	0	0.9
	2	73	0	0	73	0	0	0	0.0
	3	73	0	0	73	0	0	0	0.0
	4	49	0	49	98	0	0	0	0.0
	5	49	0	0	49	0	0	0	0.0
Wild and Woolly Total		**244**	**0**	**49**	**293**	**0.9**	**0**	**0**	**0.9**
All Units Average	1	9	0	6	15	1.3	0	1.1	2.5
	2	33	5	6	44	0	0	0.2	0.2
	3	125	7	25	158	0.6	0	0.2	0.8
	4	54	20	43	118	0	0	0	0
	5	16	0	6	23	0	0	0	0
All Units Total		**238**	**32**	**87**	**357**	**1.9**	**0**	**1.5**	**3.4**

Footnotes:
[1]Includes only snags at least 15 feet high.
[2]Includes only CWD at least 20 feet in length
Any appearance of incorrect totals is due to rounding in stand exam EcoSurvey program and/or Excel.

Large low decay snags (≥ 20 inch diameter in decay class 1-2) represent current habitat and future habitat should they remain standing after harvest. Most of these snags were likely present as live trees that survived the last major stand disturbance. Data show an average of 1.3 snags per acre of this type (0.0-3.3 per harvest unit) among all harvest units. The proposed thinning unit contains none of these features. The average in proposed regeneration harvest areas is 2.0 per acre. These types of snags are the focus of management because they are key wildlife habitat that can be quickly created from live trees. Typical amounts in and near the project area, and in similar unmanaged western Oregon forests, range from 8.1-12.2 snags per acre, respectively ((USDI, 2002), Tables F-2 and F-3). Current stands are well below this range.

Large moderate decay snags (≥20 inch diameter in decay class 3-4) represent the most important current habitat for many wildlife species. Data show an average of 0.23 snags per acre of this type (0.0-0.7 per harvest unit) among all harvest units. All of these features (0.7 per acre) were detected in the Mid Indian proposed harvest area. These types of snags are uncommon in and

near the project area and are often a limiting obligate habitat need for many wildlife species. Their importance as current habitat is due to their longer life span, greater amount of usable habitat (especially when hollow), and ability to provide key life cycle needs never found in smaller or lower decay snags. For example, large snags are required for large mammals such as bears to hibernate, for colonies of bats to roost, and for spotted owls to nest. The greatest number of vascular plants, fungi, bryophyte and lichen species use these types of snags, largely due to its ability to retain and regulate water, especially in summer months.

Coarse Woody Debris (CWD)

CWD (also referred to as down logs) is a fundamental habitat component in forest communities. Many wildlife species depend on CWD to provide for key life cycle needs such as breeding, foraging, refugia, thermal protection, and protective cover. CWD provides important travel corridors for species with low mobility and small home ranges (i.e., small mammals, amphibians, and invertebrates). Small and large mammals (bears, foxes) use large well-decayed logs for denning and hibernation. CWD also provides a substrate for vascular plants, lichens, bryophytes, fungi, and microbes. CWD also contributes to basic abiotic ecological functions such as moisture retention, nutrient cycling, microclimate buffering, and lessening of soil erosion. High qualities and amounts of CWD are important for spotted owl foraging and nesting at the stand scale.

The relationship between CWD diameter and decay class, and its quality and longevity as wildlife habitat is similar to that for snags (i.e., large diameter CWD last longer and are higher quality habitat compared to smaller diameter CWD).

Total CWD: Stand data show an average of 357 linear feet per acre of CWD of all sizes and decay classes (293-477 per harvest unit) among all harvest units. The majority of this habitat is small 8-15 inch diameter features recruited since the last disturbance, or larger features from early in the life of the stand.

Small low decay CWD (8-15 inch diameter in decay class 1-2) has the least current or future value to wildlife species due to its smaller size and shorter life span. These snags are a result of recent natural recruitment in the stand due to mortality of understory trees. Stand data show these features average 42 linear feet per acre among all harvest units (7-73 per harvest unit). While still part of the wildlife habitat spectrum, and important for other ecosystem processes, smaller CWD are used by the fewest wildlife species and their life cycle needs, while having the shortest lifespan before decaying to humus**.** *Because they are of relative low importance as wildlife habitat, and would not be affected by CWD management that focuses on larger diameters, these features are not discussed further in this EA*

Large low decay CWD (≥ 20 inch diameter in decay class 1-2) represent current and key future habitat should they remain intact after harvest. The features were recruited early in the life of the stand, or they survived the last major stand disturbance. Stand data show an average of 12 linear feet per acre of this type among all harvest units (0-38 per harvest unit). None of these features are present in proposed thinning areas. The average among proposed regeneration harvest areas is 19 linear feet per acre. Because these types of CWD are key wildlife habitat, and the only types that can be quickly created from live trees, they are the focus of management targets for retention/creation. Typical amounts in and near the project area in unmanaged western Oregon

forests range from 312-400 linear feet per acre ((USDI, 2002), Appendix F6 and F7). All current stands are well below this amount.

Large moderate decay CWD (≥ 20 inch diameter in decay class 3-4) is a special habitat component that has been shown to strongly influence the diversity and abundance of wildlife species due to its size, longer life span and greater number of habitat attributes as compared to smaller CWD. Most of these features are remnants from the last major disturbance, or were recruited early in the current stand. Stand data show an average of 68 linear feet per acre among all harvest units (49-91 per harvest unit). The proposed thinning unit contains 49 linear feet per acre of this type of CWD. The average among proposed regeneration harvest units is 78 linear feet per acre. The greatest number of vascular plants, fungi, epiphyte, bryophyte and lichen species use this type of CWD, largely to its ability to retain and regulate available water, especially in summer months.

3.3.2 Alternative 1: No Action

See Table 11 that provides a comparison of the action alternatives, including snags, CWD and retained green trees.

Snag and CWD management varies by harvest type and alternative. Variations include the location for management (riparian or upland), snag and CWD diameters (≥ 16 and/or 20 inch), and snag heights ≥ 30 or 50 feet). Complete specifications for snag & CWD management are found in PDFs 48, 49, 56, and 57.

As explained in the Affected Environment section, the term “large” describes snags and CWD ≥ 20 inch in diameter. When discussing effects of the alternatives, the additional term “medium” describes snag diameters of 16-19 inch. This term is used only for snags because the MMLD includes this diameter in its management guidance.

3.3.2.1 Environmental Effects (direct and indirect)

Short Term (15-20 years) and Long Term (40-80 years)

No current snag or CWD habitat would be damaged, destroyed or otherwise impacted by project actions.

Wild and Woolly:

Harvest would not affect microclimates, canopy cover or surrounding forest around snags and CWD. However, unlike the action alternatives, no management would occur to increase the currently low amounts of medium and large diameter snags (≥ 16-20 inch) and large CWD (≥ 20 inch) in the Wild and Woolly thinning units. Stands would continue to be deficient in large snags and CWD for several decades.

Existing snags and CWD would continue to decay and decompose within the stand. Barring catastrophic events such as wildfire, disease, or windthrow, stem exclusion processes would continue to be the dominant process affecting snag and CWD recruitment. The greatest amounts of snag and CWD recruitment would occur in younger or densely stocked portions of the proposed harvest areas. Accurate modeling is not available to estimate the size, amount, and timing of snags and CWD that would be recruited over the next few decades. Therefore,

assessment of future conditions is conceptual. The process of natural recruitment of snags and CWD would likely be more prolonged and less pronounced than the single management action pulse of snag and CWD creation in the action alternatives. Diameters of naturally recruited snags and CWD would likely be less than would occur in the action alternatives. Because natural recruitment would occur throughout the stands, natural recruited snags in this alternative would be greater than Alternative 3 where snag and CWD creation would occur only in treated portions of Riparian Reserves (no creation in uplands).

Finn Again and Mid Indian:

Under this alternative, no harvest would occur to affect overall forest conditions, including actions to influence current or future amounts of snags and CWD. Because no harvest would occur, future conditions for snags and CWD would be the same as described for the Wild and Woolly thinning.

3.3.2.2 Cumulative Effects (All harvest units)

Snag and CWD data are not available at scales other than the harvest areas already discussed under direct and indirect effects. The BLM is the only party that would directly affect snag and CWD within these harvest areas. No reasonably foreseeable actions affecting snags and CWD would occur in or adjacent to proposed harvest for at least the next 20 years. Adjacent private lands are already clear-cut harvested, or likely would be within the next 10 years. CWD and snag creation on private lands would meet the minimum requirements under the Oregon Forest Practices Act. Adjacent clear-cuts could indirectly contribute to creation of snags or CWD on BLM lands due to increased chance of windthrow.

3.3.3 Alternative 2

3.3.3.1 Environmental Effects (direct and indirect)-Wild and Woolly

Short term (15-20 years)

Total Snags and Coarse Woody Debris (all diameters and decay classes):

Retention and Operational Damage: PDFs would protect and retain snags and CWD to the extent feasible during harvest operations. However, harvest actions (e.g., felling, yarding, road construction) would damage or destroy some snags or CWD (particularly those in higher decay classes); including snags knocked over inadvertently, or intentionally cut for operational or safety reasons. Harvest could also inadvertently initiate snag development by creating broken top or lift trees, or damaging live trees and introducing decay processes (e.g., cuts, gouging, bark, or root damage), however, the anticipated type and amount of any such damage is unknown.

Canopy, Microclimate and Surrounding Forest Conditions: Environmental conditions such as temperature, humidity and solar exposure surrounding snags and CWD would also change due to a reduction in canopy cover and surrounding forest vegetation. The most pronounced microclimate effects to snags would be short term (15-20 years) and vary between positive and negative depending on their slope location and specific species' use. For example: warmer conditions could benefit some types of bat roosting behavior; while reduced forest canopy could increase predation of cavity nesting birds or their young. Canopy conditions and microclimates are expected to recover to pre-harvest conditions within 15-20 years.

Wildlife Use of Snags and CWD: Many species would continue to use snags and CWD as canopy cover and microclimate conditions recover. Some wildlife species are more sensitive to environmental changes in snag and CWD habitat and their use of these habitats would change. For example, bats directly respond to the ambient air temperature and solar exposure near snags. Many amphibians require cool and moist conditions in or near their CWD habitat. After canopy conditions recover, wildlife use of retained snags and CWD would begin to return to pre-harvest conditions. Created snag and CWD would begin to benefit species within 3-5 years after harvest.

Medium to Large Snags and Large Coarse Woody Debris (Snags ≥ 16-20 inch, CWD ≥ 20 inch)

Snag and CWD Management: *See Project Design Feature 58.* Management would focus on retention/creation of decay class 1-2 snags ≥ 16-20 inch and CWD ≥ 20 inch. Within 3-5 years after harvest in treated Streamside Management Areas and treated uplands, snag and CWD management would retain/create per acre: 8 snags ≥ 16-20 inch diameter and ≥ 50 feet tall (with 50% of snags being ≥ 20 inch diameter), and 300 linear feet of CWD ≥ 20 inch diameter and ≥ 20 feet long. The amount of created snags and CWD would be based on post-harvest field exams showing amounts retained (or inadvertently created by harvest actions). This management would mitigate much of the operational damage or loss of CWD and loss of snags, while also mitigating future reductions in recruitment of snags and CWD. Management objectives are to restore large snags and CWD to levels more typical of similar age unmanaged stands in the watershed based on MMLD guidance.

Medium to Large Low Decay Snags and CWD (Snags ≥ 16-20 inch, CWD ≥ 20 inch, in decay class 1-2). No medium to large snags (any decay class) or CWD were detected in the Wild and Woolly harvest areas. Snag and CWD creation would immediately increase the number of these features after harvest.

Large Moderate Decay Snags and CWD (≥ 20 inch in decay class 3-4): Wild and Woolly currently contains no snags and 49 linear feet per acre of decay class 3-4 CWD ≥ 20 inches. Unless damaged by harvest, these CWD would persist through harvest actions.

Long Term (40-80 years)

Total Snags and Coarse Woody Debris (all diameters and decay classes)

Snag and CWD Recruitment: Thinning harvest can serve as an analogue to mimic the benefits of *tree growth* for trees that survive stem exclusion processes. However, thinning intentionally removes (for wood products) trees that would otherwise die during the stem exclusion phase and become snags and CWD. Harvest effectively prevents, reduces or delays the stem exclusion process in mid-seral stands. Additionally, snag and CWD recruitment usually is much less pronounced in mature seral stands. Therefore, thinning directly reduces the amount of naturally recruited snags and CWD within a treated mid-seral stand for many years. Consistent with objectives of many thinning prescriptions, Spies et al. ((Spies, Pollock, Reeves, & Beechie, 2013) pp. 2 and 8) demonstrated that conventional thinning (i.e., action alternatives) results in notably lower amounts of large tree mortality (snags and CWD) for decades after treatment, compared to no treatment. Such effects can still be present in modeling 100 years after thinning. As a result, most snag and CWD recruitment in treated stands (especially from larger trees)

would not occur until growth of residual trees slows and suppression mortality resumes during the latter mature seral stage of the stand (unless other sporadic or stochastic events such as disease, snow break or wind-throw occur earlier).

Medium to Large Snags and Large Coarse Woody Debris (snags ≥ 16-20 inch, and CWD ≥ 20 inch)

Snag and CWD Management and Wildlife Use: Snag and CWD creation would occur as a single pulse of medium to large snags (≥ 16-20 inch) and large CWD (≥ 20 inch) within 5 years of harvest, compared to stem-exclusion processes (Alternative 1) which would generate more gradual and prolonged inputs of smaller diameter snags and CWD. As a result, larger diameter snags and CWD created by this alternative would be available sooner as wildlife habitat compared to Alternative 1. Over the next few decades, created snags and CWD would begin to decay and provide their greatest benefits to the most wildlife species. Overall, snag and CWD management would result in treated stands being more suitable for wildlife species requiring these habitats as compared to Alternatives 1 and 3. Snag and CWD management would also accelerate the rate that stands become suitable for some late seral species, including foraging and nesting by the spotted owl.

Medium to Large Low Decay Snags and CWD (≥16-20 inch in decay classes 1-2): Snag and CWD management would reestablish large low decay snags and CWDs in amounts similar to unmanaged stands in the watershed based on MMLD guidance ((USDI, 2002) Appdx. F). Asthese features decay, they would replenish other snags and CWD that decay and disappear from the wildlife habitat spectrum.

Large Moderate Decay Snags and CWD (≥ 16-20 inch in decay classes 3-4): Current amounts of these features are low. The undamaged CWD that survive harvest would continue to provide wildlife habitat as it advances through natural decay processes and disappears from the wildlife habitat spectrum. Snags and CWD of this type would continue to be low until retained/created decay class 1-2 snags and CWD decay and replenish these decay class 3-4 features.

3.3.3.2 Environmental Effects (direct and indirect)-Finn Again and Mid Indian

Total Snags and Coarse Woody Debris (all diameters and decay classes):

Short Term (15-20 years)

Retention and Operational Damage: As described for thinning, PDFs would protect and retain snags and CWD to the extent feasible during harvest operations and inadvertently initiate some snag and CWD creation due to logging damage. However, damage or destruction of snags and CWD due to regeneration harvest would be much greater than that for thinning (especially snags).

Canopy Conditions and Microclimate: Environmental conditions such as temperature, wind, humidity and solar exposure surrounding snags and CWD would dramatically change due to a large reduction in canopy cover and surrounding vegetation due to regeneration harvest. These effects would be much greater than described for thinning harvest. Depending on the amount of green tree retention, canopy cover and associated microclimate variables would recover in

approximately 40-80 years. This would notably change the quality of snag and CWD habitat and its use by wildlife species.

Wildlife Use of Snags and CWD: Effects to snag and CWD wildlife habitat would vary between a range of positive and negative outcomes, depending on snag and CWD slope location, size, and specific species' use. For most wildlife species, the change in surrounding vegetation due to regeneration harvest would reduce the quality, longevity, and accessibility of snag and CWD habitat compared to pre-harvest conditions. Snags and CWD would generally dry and harden at a much faster rate compared to thinning harvest, thereby reducing their habitat quality for some wildlife species. Regeneration harvest would have both positive and negative effects to decay rates of individual snags and CWD based on tree species, diameter, slope position and other site conditions.

Low mobility forest dwelling species such as salamanders and mollusks may not be able to access or use CWD habitat due to surrounding conditions (e.g. lack of high canopy forest). Interior forest species, such as spotted owls, would generally not utilize this habitat for foraging once the surrounding stand is removed. However, species such as reptiles and some small rodents, that tolerate or favor non-forest or early-seral forest conditions, would be able to utilize CWD immediately after regeneration harvest.

Retained/created snags would be available within 3-5 years after harvest for many wildlife species. Forest dwelling species such as small owls would no longer use these snags. However, they would become new nesting habitat for early-seral cavity nesting species such as bluebirds and purple martins. The large number of created snags would allow some of these species to thrive in the first 10-20 years (or longer) after harvest. Due to fire suppression and other forest management practices, early seral snag habitat is chronically deficient and limiting in and near the project area and most of the watershed.

Medium to Large Diameter Snags and Large Coarse Woody Debris (Snags ≥ 16-20 inch, CWD ≥ 20 inch)

Snag and CWD Management

See Project Design Feature 57. Snag and CWD retention/creation targets would be the same as described for thinning (Wild and Wooly, Section 3.3.1); but would only occur within treated uplands (no harvest or snag and CWD would occur in Streamside management Areas).). However, compared to thinning, snag and CWD creation would mitigate less of the greater operational damage of these features due to regeneration harvest. The long-term effects of management are described below.

Medium to Large Low Decay Snags and CWD (Snags ≥ 16-20 inch and CWD ≥ 20 inch in decay class 1-2): Currently, an average of 2.0 per acre (0.7 and 3.3) snags, and 19 linear feet of CWD (0 and 38) of these types are present in regeneration harvest units. Snag and CWD creation would increase their amounts within 3-5 years after harvest.

Large Moderate Decay Snags and CWD (≥ 20 inch in decay class 1-2): An average of 0.35 snags (0 and 0.7) and 78 (64 and 91) linear feet per acre of these features exist in regeneration harvest units. Snag and CWD creation would increase their amounts within 5 years after harvest.

Long Term (40-80 years)

Snag and CWD Management (all diameters and decay classes):

Snag and CWD Recruitment: Aside from a large windthrow, or other stochastic event, the number of snags recruited during the first few decades after harvest would likely be low. Any snag recruitment from reserved green trees would be the result of small-scale natural processes such as snow, wind, insects or disease, or logging damage. As the regenerating stand redevelops into a mid-seral stage (40-80 years old), stem exclusion would likely be the dominant factor influencing snag and CWD recruitment. Pre-commercial or commercial thinning would reduce the intensity or duration of stem exclusion processes, and thereby reduce the amount of snags and CWD recruited by natural processes.

Wildlife Use of Snags and CWD: As forest stands redevelop, the types of wildlife species use would transition from those found in < 40 year old early-seral forests into 40-80 year old mid-seral forests. Some species such as bats would use suitable snags for different life history needs at all seral stages of forest development. Some created snags and CWD (especially) could persist into the eventual mid-seral forest stand. Created snags, in combination with reserved green trees, would enhance the mid-seral habitat quality for many wildlife species; this management strategy could accelerate the rate when these stands would be utilized by some wildlife species such as foraging by spotted owls. Any benefits to mid-seral habitat due to green tree retention, snag, and CWD management would be greater and more prolonged than those under Alternative 3 where up to 45% fewer green trees, 20% less CWD (240 linear feet per acre) and 57% less snags (3.4 snags per acre) would be maintained/created.

Medium to Large Diameter Snags and Large Coarse Woody Debris (Snags ≥ 16-20 inch, CWD ≥ 20 inch)

Medium to Large Low Decay Snags (> 16-20 inch in decay class 1-2)*:* As discussed above, snag creation would increase the amount of features within 3-5 years after harvest. This would immediately benefit some early-seral species but would not provide snag habitat for species requiring forested conditions. If these snags persist, they would enhance the quality of the stand as it redevelops into mid-seral forest.

Large Moderate Decay Snags and CWD (≥ 16-20 inch in decay classes 3 -4): As discussed above, snag creation would increase the amount of features within 3-5 years after harvest. The positive and negative effects to wildlife species habitats would be similar to those described for snags, including enhancing the quality of the future mid-seral stand if these features persist beyond 40 years.

3.3.3.3 Alternative 2 Cumulative Effects (15-80 years) All Harvest units

A coarse period of 15-80 years coincides with that for direct and indirect effects analysis at the project scale. The BLM is the only party that would directly affect snag and CWD within harvest areas. Other than post-harvest actions already discussed, there are no reasonably foreseeable actions that would occur within harvest areas. Thinning units may be subject to regeneration harvest in as little as 20 years. Regeneration harvest units may receive pre-commercial thinning in approximately 15-20 years. If it occurs, this treatment would affect microclimates that would generally slow decay rates of CWD and snags. For this analysis, commercial thinning generally

is anticipated to occur at approximately ages 40 and 80 under the 1995 RMP. Effects from commercial thinning would generally be the same as described under the direct and indirect effects from Wild and Woolly. As described under direct and indirect effects, pre-commercial or commercial thinning would reduce the intensity or duration of stem exclusion processes, and thereby reduce the amount of snags and CWD recruited by natural processes.

Adjacent private lands were either recently clear cut harvested or likely would be as they reach 40-60 years of age. Adjacent clear-cuts could indirectly contribute to creation of CWD on BLM lands due to increased chance of windthrow. Despite the benefits of snag and CWD management (including when compared to Alternative 3), natural disturbance events comparable to regeneration harvest, typically leave a much greater variety and amount of snags and CWD that carry over into the regenerating stand. Cumulatively, the effects of the proposed action would result in a lower quality and amount of snags and CWD than found in comparable unmanaged stands.

3.3.4 Alternative 3

3.3.4.1 Environmental Effects (direct and indirect)-Wild and Woolly

All effects would be the same as described for the Wild and Woolly Alternative 2, except for the differences discussed below. The key differences of this Alternative compared to Alternative 2 would be less snag and CWD creation in fewer treated locations within harvest units.

Short term (15-20 years)

Total Snags and CWD (all diameters and decay classes)

Wildlife use would continue along trends similar to those described for Alternative 2, except for wildlife use that would be dependent on snag and CWD creation which would be less than under Alternative 2.

Medium to Large Diameter Snags and Large Coarse Woody Debris (Snags $\geq$ 16-20 inch, CWD $\geq$ 20 inch)

Snag and CWD Management and Wildlife Use

Within 3-5 years after harvest, in treated portions of Riparian Reserves, snag and CWD management would retain/create, 240 linear feet per acre of decay class 1-2 CWD $\geq$ 20 inch diameter and $\geq$ 20 feet long; and 3.4 snags per acre $\geq$ 20 inch diameter and $\geq$ 30 feet high (*See Project Design Feature 57)* . No snag or CWD creation would occur in treated uplands. Minimum snag diameters for retention/creation would be 20 inches under this alternative, compared to 16 inches (for half of managed snags) under Alternative 2. Snag heights of 30 feet are less than the 50 feet specification for Alternative 2.

Compared to Alternative 2, Alternative 3 would create equal amounts of CWD and 63% fewer snags in treated Riparian Reserves, and 100% fewer (none) snags and CWD in treated uplands.

As with Alternative 2, within treated Riparian Reserves, snag and CWD management would mitigate much of the operational damage and future reductions in recruitment to snags and CWD. In treated Riparian Reserves, CWD would be reestablished to amounts similar to

unmanaged stands in the watershed (based on MMLD data). For snags, this would be partially achieved by creating 3.4 (vs. 8) snags per acre (MMLD, Appendix. F). None of these benefits would occur in uplands, where there would be no snag and CWD creation.

Medium to Large Low Decay Snags and CWD (Snags ≥ 16-20 inch, CWD ≥ 20 inch, in decay class 1-2): Snag and CWD creation would immediately increase the number of these features after harvest; but only in treated Riparian Reserves (compared to also in uplands under Alternative 2).

Large Moderate Decay Snags and CWD (≥ 20 inch in decay class 3-4): Effects to these features would be the same as described for Alternative 2.

Long Term (40-80 years)

Total Snags and Coarse Woody Debris (all diameters and decay classes)

Snag and CWD Recruitment: The current low amounts of snags and CWD would continue to decay and disappear as wildlife habitat. Because thinning harvest can prevent, reduce or delay the stem exclusion process that is key to recruiting snags and CWD in mid-seral stands, snags and CWD would continue to be below natural levels for many decades in treated areas. *See applicable discussion under thinning Alternative 2.*

Wildlife Use of Snags and CWD: The reduced quality and amount of snags and CWD would result in a meaningful reduction in the type and amount of wildlife species using treated areas for several decades or more. Several hundred fewer snags and linear feet of CWD would be created compared to Alternative 2 (no snag/CWD creation in uplands). These lesser amounts of snags and CWD would also slow the rate, and reduce the quality of wildlife habitat in the redeveloping stands. The eventual development of spotted owl suitable nesting habitat would occur at a slower rate compared to Alternative 2. The amount of primary and secondary snag cavity nesting birds would be less. Small mammals and amphibians that require ample types and amounts of CWD would be less common or not present in treated stands. This is a common, chronic, and long-term effect when snags and CWD are not created after thinning harvest. Natural snag and CWD recruitment trajectories, including those due to stem exclusion processes, would continue unaffected in untreated Riparian Reserves.

Medium to Large Low Decay Snags and CWD (≥16-20 inch in decay classes 1-2): As these created features decay, they would replenish other snags and CWD that decay and disappear from the wildlife habitat spectrum; but only in Riparian Reserves (compared to also occurring in the uplands under Alternative 2).

Medium to Large Moderate Decay Snags and CWD (≥ 16-20 inch in decay classes 3 -4): Effects to these features would be the same as described for Alternative 2, except that they would be replaced by newly created features only in treated Riparian Reserves (compared to also being replaced in uplands under Alternative 2).

3.3.4.2 Environmental Effects (direct and indirect)-Finn Again and Mid Indian

Short term (15-20 years)

Total Snags and Coarse Woody Debris (all diameters and decay classes)

Effects would be similar to those described for Finn Again and Mid Indian in Alternative 2; except for differences discussed below. The notable differences of this alternative compared to Alternative 2would be less overall snag and CWD creation in fewer locations, and less GTR (potential future snags/CWD).

Retention and Operational Damage: Due to a more intense harvest (fewer reserved green trees), the quality and amount of snags and CWD that survive harvest would be slightly lower, and the amount of damage from harvest actions would be greater, compared to Alternative 2.

Canopy, Microclimate, and Surrounding Forest Conditions: Due to fewer reserved green trees, the reduction in canopy cover and corresponding microclimate conditions would be slightly greater under this alternative when compared to Alternative 2.

Snag and CWD Management:
See Project Design Feature 49. The types and amounts of wildlife species using treated areas would be less when compared to Alternative 2. This alternative would retain/create 240 linear feet of CWD $\geq$ 20 inch in diameter and $\geq$ 20 feet long, and 3.4 snags $\geq$ 20 inch diameter and $\geq$ 30 feet high. These amounts would be less than, Alternative 2, which would create 300 linear feet of CWD and 8 snags per acre. Compared to Alternative 2, Alternative 3 would create 20% less linear feet of CWD, 57% fewer snags in treated uplands, and less GTR for potential future snag/CWD recruitment.

Within the redeveloping early and mid-seral stands, most benefits to stand habitat (including the quality and rate of habitat development) would be much less pronounced under this alternative compared to Alternative 2. These differences would be notable for snags and minor for coarse woody debris.

Long Term (40-80 years)

Any long-term negative effects to snags, CWD, and overall stand habitat quality would be greater under Alternative 3 (compared to Alternative 2).

3.3.4.3 Alternative 3 Cumulative Effects

Cumulative effects for all harvest units would be the same as described under Alternative 2 in Section 3.3.3.3.

3.4 Issue 4: What are the effects of the proposed timber harvest and associated activities on the Northern Spotted Owl?

3.4.1 Affected Environment

Multiple spatial scales are used to examine effects to spotted owls and their habitat. Effects to habitat types are examined within harvest units, individual site territories (Provincial Home Range), and the surrounding fifth field watershed. The site scale examines effects to site-specific habitat and spotted owl occupation and reproduction within site territories. The watershed scale coarsely examines larger landscape habitat conditions and trends.

Several temporal scales are used to analyze effects of treating spotted owl habitat. The Forest Vegetation Simulator (FVS) modeled stand conditions in 30 years under all alternatives. This timeframe is examined because it coincides with when treated stands would be suitable for nesting, and when stem exclusion would be concluded under the no action alternative. Thirty years also is a reasonable time to evaluate the tradeoffs between the negative and positive effects of thinning without diluting this comparison with longer timeframes.

The potential effects to spotted owl individuals, and breeding behavior due to disturbance, and effects due to competition from barred owls, are all analyzed because they are relevant to spotted owl occupation and successful reproduction. Consistencies with Recovery Actions 10 and 32 are also discussed.

Species Status

The northern spotted owl (NSO), *Strix occidentalis caurina*, is a long-lived owl species ranging from northern California to British Columbia. Spotted owls prey mostly on a variety of small mammals, and typically nest and forage in interior mature and late-seral forest stands. The species was listed as 'threatened' by the U.S. Fish and Wildlife Service (USFWS) in 1990 because of its decreasing numbers. Since 1990, removal of habitat has slowed across its range on federal lands, but populations have continued to decline and competition from barred owls (*Strix varia*) is now an equally pressing concern (USFWS 2011). The USFWS has initiated experimental removal of barred owls to explore the possibility of controlling barred owl numbers and reducing competition with spotted owls (USFWS 2012). There are no current plans to conduct removal within the project area or surrounding fifth field watershed. The USFWS has also recently revised their Recovery Plan (USDI, 2011) to provide Federal land managers such as the BLM additional direction for habitat management.

Habitat

General Habitat

This assessment uses the italicized habitat names and type descriptions below that apply to conifer forests in the project area, Middle McKenzie AMA, and surrounding fifth field watershed.

Suitable habitat for spotted owls provides for all of this species' life cycle requirements. It is also called Nesting/Roosting/Foraging (NRF) habitat, suitable nesting habitat, or simply nesting habitat. This habitat is generally described as interior conifer dominated forest greater than 80 years old with sufficient qualities and amounts of mature or late-seral characteristics such as large-diameter trees with nesting structure (broken tops, cavities, or platforms), multiple canopy layers, large sizes and amounts of snags and coarse woody debris, and a somewhat open

understory. Stands that exhibit these characteristics for roosting and foraging opportunities, but lack an adequate quality or amount of nesting attributes, are called *foraging habitat*. This is also called Roosting/Foraging. Foraging habitat is typically found in stands approximately 60 years and older. Stands without nesting and roosting components, negligible amounts of foraging components, but sufficient canopy cover and sub-canopy space for spotted owl movement and short-term roosting, are referred to as *dispersal habitat*. Dispersal (only) habitat facilitates spotted owl movement at both the site and landscape scale while providing minimal roosting and foraging opportunities. Dispersal habitat is generally found in 40 to 80 year old stands in the project area fifth field watershed.

The phrase "*total habitat"* used in this EA, collectively refers to all three types of usable habitat (e.g., dispersal, forage and suitable). This assessment uses the term *dispersal/forage* habitat to describe stands that are a combination of dispersal and forage habitat. In this context it includes dispersal habitat, and stands that exhibit moderate to high amounts of forage attributes (i.e., not minimal or negligible amounts). This terminology is useful when stands exhibit a mosaic of dispersal and foraging attributes, or when stand data alone cannot distinguish whether a specific dispersal stand also contains more than negligible amounts of foraging habitat, and field examination is not possible (e.g., corporate stand age data used at larger scales outside the project area).

The distinction between dispersal (only) and dispersal/forage habitat was examined in the field for proposed harvest areas and most of the affected spotted owl site home ranges. Field exams and use of corporate (BLM) stand data, LiDAR (Light Detection and Ranging) coverage, and aerial photo interpretation were adequate to assess all spotted owl habitat and determine the effects of the alternatives. Forested areas that currently provide little or no habitat function for spotted owls due to small, dense trees are called *unsuitable habitat.* Unsuitable habitat is typically less than 40 years old. Non-forest capable areas that would never provide for spotted owl use (e.g. rock outcrops or water bodies) are called *non-habitat.*

Habitat in Harvest Areas

The phrase "harvest areas" used in this issue refers to all areas of tree removal, including harvest units, road construction, and vehicle or helicopter landings.

Proposed harvest areas are generally mid-seral to mid mature-seral stands with scatted large late-seral remnant trees left over from previous disturbances. Among all harvest areas, stand ages range from 44–125 years old and include dispersal, forage, and lower quality suitable nesting habitats. Overall, proposed sale units would harvest up to approximately 214 acres of 40-80 year old mid-seral dispersal/forage habitat, and 118 acres of 80-125 year old mature-seral low quality nesting habitat. Most dispersal habitat also contains moderate-high amounts of forage components.

Wild and Woolly harvest would commercially thin approximately 71 acres of dispersal and high quality forage habitat.

Finn Again would regeneration harvest approximately 10 acres of dispersal habitat and 68 acres of suitable nesting habitat.

Mid Indian would regeneration harvest approximately 174 acres of dispersal/forage habitat mixed with an irregular mosaic of suitable habitat. Within this stand, there are about 124 acres of dispersal/forage habitat and 50 acres of suitable nesting habitat. This dispersal habitat exhibits

moderate to high quality for foraging. The 115-125 year old suitable habitat is atypically low quality for nesting compared to similar age stands in the watershed. This is due to its recent history. Native Americans managed the stand with repeated burning, presumably to cultivate native filbert shrubs. This resulted in a healthy, well-spaced class of large trees, some suitable for nesting. However, canopy layers are deficient in depth, complexity, and heterogeneity at the stand scale to the point that nesting is precluded in many portions of these stands, but possible at the stand scale.

Finn Again and Mid Indian proposed harvest areas combined would remove approximately 118 acres of low quality nesting habitat.

Overall, the qualities and quantities of snag habitat for spotted owl nesting or prey are low or absent, and CWD habitat for spotted owl prey is low, except in riparian areas and scattered upland pockets.

Most snags in or near proposed harvest areas are small 8-15 inch diameter features recently recruited by suppression mortality, except for Finn Again which contains 3.3 snags $\geq$ 20 inch diameter. CWD habitat is mostly distributed in two groups: large, moderate to highly decayed pieces ($\geq$ 20 inch diameter and $\geq$ 3 decay class) concentrated in riparian areas; and small diameter 8-15 pieces (all decay classes) scattered throughout proposed harvest areas. Most CWD is in the 8-15 inch diameter range.

Critical Habitat

No alternatives would affect critical habitat.

Spotted Owl Sites

This section discusses known and potential spotted owl site surveys, habitat and chances of pair occupation and reproduction.

Project actions would affect habitat within the Finn Creek, Rail Creek and S Fork Gate Creek known sites and the 03NEWITS potential site because they are within 1.2 miles of harvest actions.

Surveys

Information on the location and status of spotted owl sites in the project area is available from surveys conducted beginning in the late 1980s. The total number of spotted owl sites in the project area is thought to have been identified. However, survey efforts have been sporadic and inconsistent by site and year and spotted owl detections are often suppressed by barred owl presence.

Site survey data from 2006-2016 are summarized in the Table 20. The USFWS survey protocol typically requires at least six complete properly-spaced visits per year to define site status and consider a site fully surveyed. Consistency with survey protocol direction is most important in regards to considering a site unoccupied in a given survey year. Less than six visits are appropriate if occupation or reproduction status is determined. All affected sites have received at least six or seven visits in the years 2013, 2014, 2015, and 2016. Survey effort before 2013 varies by site. Full surveys (at least six visits to entire site home range) would continue at all sites in 2017. Beginning in 2018, all sites would receive either full or spot check surveys (at least three visits to harvest unit and vicinity) during years when the project is active. Survey methods would depend on cumulative results of previous surveys. Site activity conclusions routinely

change based on new survey data. It is common for spotted owl sites to fluctuate from active to inactive over a given period. This includes banded resident individuals that continually occupy a site but are not detected in every year of surveys. Barred owl suppression of spotted owl vocalizations can compound this effect. *Activity conclusions are an ephemeral snapshot used to assess current status and facilitate analysis in this assessment and ESA consultation.*

Finn Creek*:* Six or seven visits were conducted each year from 2012-2016. The last detection was a male spotted owl heard one time in July 2015 in the Mid Indian harvest unit. A follow up visit, three subsequent full site visits in 2015, and seven full site visits in 2016 did not detect spotted owls. Seasonal restrictions until July 15 would allow full 6-visit surveys to further determine site status in 2017 and later years (if necessary). Based solely on survey data, this site is currently active (occupied) for the purposes of effects analyses.

Rail Creek*:* Six or seven visits were conducted each year from 2012-2016 and no spotted owls were detected. Based solely on recent survey data, this site is currently not active (unoccupied) for the purposes of effects analyses.

S Fork Gate Creek: Six or seven visits were conducted each year from 2012-2016. The last detected spotted owl was a single individual in 2012. A spotted-barred owl hybrid/barred owl pair occupied the site in 2014, 2015 and 2016. This same pair probably also occupied the site in 2013 even though an individual spotted owl was also detected. Due to the small amount of habitat at the site, occupation by this mixed species pair would preclude occupation by spotted owl(s). Based solely on spotted owl detection data (i.e, excluding barred-spotted hybrid owls), and the recent repeated occupation by a non-spotted owl pair, this site is currently not active (unoccupied) for the purposes of effects analyses. The name “S Fk Gate Creek” (no punctuation) is used in this assessment because it is the state-issued site name used in all data curation and the project biological assessment.

03NEWITS*:* Six or seven visits were conducted each year from 2012-2016 and no spotted owls were detected. Based solely on survey data, this potential site is currently not active (unoccupied) for the purposes of effects analyses.

Site Habitat

Consistent with analytical methods used by the Willamette Planning Province interagency biological assessment, the effects of habitat modification to spotted owl sites in the Western Cascades physiographic province are assessed by assigning generalized Nest Patches, Core Areas, and Provincial Home Ranges (PHRs) with radii of 300 meters, 0.19 mile, 0.5 mile, and 1.2 miles respectively (USDI-USDA 2015). The quality, amount, and orientation of habitat in these three areas are used to determine the ability of a site territory to provide for pair occupation and reproduction before and after harvest. No harvest is proposed in site Nest Patches. Consistent with ESA consultation, habitat analysis, including any change from harvest, is analyzed for Core Areas and PHRs.

When the amount of *suitable* nesting habitat is below 50% (252 acres) in the Core Area and/or below 40% (1,158 acres) in the PHR, a site is considered at risk of not being able to provide for pair occupation and reproduction. In such circumstances, even a low intensity or amount of habitat alteration can result in adverse effects. When *total habitat* (dispersal, foraging, and nesting) is below these 50/40% thresholds, a site is even further at risk of not providing for occupation and reproduction. Therefore, when suitable nesting habitat is below the described 50/40% thresholds, all habitat (especially foraging) within a site becomes increasingly important

to site occupation and reproduction. Within the UW and Siuslaw Field Offices, it is known that a site can still provide for pair occupation and reproduction when suitable or total habitat falls below these thresholds. This is presumably due to having an adequate amount and orientation of foraging habitat to supply *some* of the attributes of older suitable habitat, including protection of a nest and a rearing area for young. However, occupation and reproduction over time are more consistent and productive in sites with greater amounts of suitable nesting habitat. Within affected site PHRs, private lands provide small amounts of dispersal and forage habitats and no suitable nesting habitat. Most of the PHR habitat on non-federal lands has been recently harvested, or is expected to be in the next few years.

Table 19 displays the types and amounts of site Core Area and PHR habitats before and after harvest actions. The Finn Creek site would be affected by the Finn Again and Mid Indian harvest areas. The S Fork Gate Creek and Rail Creek sites would be affected by the Wild and Woolly harvest area. 03NEWITS would be affected only by the Finn Again harvest area. Project actions would not affect any site Core Area or Nest Patch.

*Habitat Conditions in All Sites***:** Suitable nesting habitat is below 50% (252 acres) in the Core Area of all sites. Except 03NEWITS, total habitat (dispersal, foraging and suitable) is also below 50% in the Core Area for all sites. Both suitable and total habitats (dispersal, foraging and suitable) are below 40% in the PHR of all sites.

Based on the current amounts of suitable and/or total habitat within site Core Areas and PHRs, all sites are at risk of not providing for successful occupation and reproduction. As habitat decreases, this risk increases.

Chance of Site Occupation

A combination of survey data, habitat conditions, and site-specific information are used to assess the overall chance of spotted owl pair occupying and reproducing at a site. Based on these considerations, the chances of pair occupation and reproduction are moderate for Finn Creek and 03NEWITS, moderate-low for S Fk Gate Creek, and very low for Rail Creek.

Disturbance

The current ambient noise disturbance potential to spotted owls within their site territories is small because public use is sporadic and low in amount and frequency, many key habitats are inaccessible by roads, and public road access is closed for many areas. Disturbance of low-intensity occasionally occurs on nearby private timber and residential lands, but probably not to an intensity or duration that would adversely affect site occupation and reproduction.

Table 19: Spotted Owl Site Core Area and Provincial Home Range Habitat Before & After Project Actions

Affected Spotted Owl Core Area & Provincial Home Range (PHR) Habitat Before & After Project Actions									
	Current Habitat Conditions – (& Alternative 1) Acres & Percentages				*Total Habitat Affected by Harvest -Acres*			Total Habitat Conditions after Harvest - Percentages [2]	
Site Name	**Dispersal /Forage [3]**	**Suitable Nesting**	**Total Habitat Acres [1]**	**Total Habitat % [2]**	***Harvest Type***	***Alt. 2***	***Alt. 3***	**Alt. 2**	**Alt. 3**
CORE AREA (0.5 mile, 503 acres)									
Finn Creek	62	53	115	**23%**	*none*				
Rail Creek	60	8	68	**14%**	*none*				
S Fk Gate Creek	30	38	68	**14%**	*none*				
03NEWITS	80	215	295	**58%**	*none*				
PHR (1.2 mile, 2895 acres)									
Finn Creek	352	540	892	**31%**	*Regeneration*	*226*	*202*	**23%**	**24%**
Rail Creek	177	232	409	**14%**	*Thinning*	*2*	*2*	**14%**	**14%**
S Fk Gate Creek	130	186	316	**11%**	*Regeneration*	*76*	*76*	**8%**	**8%**
03NEWITS	406	382	788	**27%**	*Thinning*	*10*	*6*	**27%**	**27%**

[1] "Total Habitat"= Dispersal/Forage plus Suitable Nesting.

[2] Percent Value represents the portion of the 2895 acres in the 1.2 mile PHR; & 503 acres in 0.5 mile Core Area. Habitat that would be thinned is subtracted from current condition habitat because it would effectively remove most forage habitat until stands recover in at least 15-20 years. Thinned stands would continue to function as dispersal habitat after treatment.

[3] Most dispersal habitat is also functioning as medium to high quality forage habitat.

All values are for federal lands only. Any real or apparent discrepancies in math or acres mentioned elsewhere in this EA are due to rounding functions in Excel and ArcGIS.

Recovery Actions

Recovery Action 10

Recovery Action 10 (RA10) in the spotted owl recovery plan provides guidance to prioritize conservation and management actions within known and potential spotted owl sites. These priorities are guidance for planning and are not required to be implemented for every site. This recovery action is analyzed because it directly relates to spotted owl conservation objectives in the recovery plan and is a necessary component of ESA consultation. These conservation priorities are based on site occupancy and reproduction status combined with habitat conditions in the Core Area and Provincial Home Range. The Willamette Province Level I Team developed a framework to rank sites and evaluate management action consistencies with RA10. The ranking method combines habitat conditions and survey effort to generate a relative priority for site conservation from 1 (high) to 10 (low).

Project actions would affect sites with RA10 rankings ranging from 4 to 9 (Table 20). The RA10 rank of 4 for Finn Creek would be much lower except for assumed pair occupancy in 2011 due to no surveys. The RA10 rank of 4 for 03NEWITS is due to habitat conditions and assumed pair occupancy in 2011 and 2012 due to incomplete surveys (although much of site was surveyed in this years). The RA10 rank of 6 for S Fk Gate Creek is due to a single individual detected in 2012. However, the recent repeated occupation of a barred/spotted-barred owl hybrid pair effectively lowers actual conservation concern for this site. RA10 ranks of 4-6 indicate a moderate priority for conservation. The RA10 rank of 9 for Rail Creek is largely based on very poor habitat conditions. Consistent with RA10 and other factors, this site is a low priority for conservation, and therefore a high priority for restorative actions such as thinning.

Recovery Action 32

No Recovery Action 32 habitat exists within proposed harvest areas and therefore it will not be analyzed in this assessment

Table 20: Survey Results and Recovery Action 10 Rankings for Affected Spotted Owl Sites

Site Name & MSNO	Year Located	RA 10 Rank	Data Summarized 2006-2016		Site Suitability for Pair Occupation and Reproduction (based on survey data and habitat conditions)
			Survey Effort (# visits) [1]	Survey Results	
Finn Creek 3405O	1992	4	2016, 2015, 2014, 2013-2012: ≥ 6 visits. All other years: ≤ 3 visits. 2011, 2010 & 2007: No visits.	Pair: 2009, 2004, 2003 & 2000. Single: 2015 & 2002. No detections: All other survey years. No known reproduction.	Surveys difficult and incomplete at times due to access issues. Moderate chance of pair occupation based on habitat. RA10 rank due mostly to presumed pair occupation in 2011 when not surveyed. From 2012-2016, spotted owl detections were a single male heard (not seen) one time in July 2015. A follow-up and 3 full site subsequent visits did not detect spotted owls.
Rail Creek 4110O	1992	9	2016, 2015, 2014 & 2013: 6-7 visits. 2007: 1 visit. 2006: 3 visits. All other years: No visits (see comments).	Pair: None (last in 1995). Single: 2006(could have been S Fk Gate Creek site male). No detections: All other survey years. No known reproduction.	Very low chance of pair occupation based on habitat & surveys. Nest patch and core area has low amounts of lower quality forage-only habitat and only 10 acres of nesting habitat adjacent to a clearcut. Assume unoccupied. RA10 rank based heavily on poor habitat conditions.
S Fk Gate Creek 0527O	1988	6	2016, 2015, 2014, 2013 & 2012: 6 visits. 2009, 2008, 2007, 2006, 2005, 2004 & 2003: ≤ 3 Visits. All other years: N o visits.	Pair: 2016, 2015 & 2014 (Barred owl & Spotted-Barred hybrid pairing). 2013 (possible Spotted-Barred owl hybrid plus possible spotted owl). Single: 2012, 2009 (possible hybrid), 2006, 2005 & 2003: No detections: All other survey years. Last reproduction in 2013 (potential Spotted-Barred owl hybrid & Barred Owl or Spotted Owl).	Moderate to low chance of pair occupation based on habitat and mixed pair occupation. However, site occupied in recent years, despite low survey effort. RA10 rank due to single individual in 2012.
03Newits 03Newits	2009	4	2016, 2015, 2014 & 2013: 6-7 visits. 2012, 2011, 2010 & 2009: No visits (see comments).	No Detections: All survey years.	Moderate chance of pair occupation based on habitat. All surveys at nearby Johnson Creek 2375O site (since 1990) covered much of the habitat within this potential site. RA10 rank due to presumed pair occupation in 2011-2012 when not surveyed.

[1] Protocol surveys in a given year typically require at least six visits, unless positive detection and status determinations are made in fewer visits. Years with less than 6 visits, and less than full pair status, are considered partial or incomplete surveys.
All data are for spotted owls unless noted otherwise.

Barred Owls

Barred owl detections are increasingly common within spotted owl sites in the project area, watershed and District. Barred owls likely exist in nearly all UW/Siuslaw FO spotted owl sites in a given year. The species is known or presumed to occur in or near all harvest units and spotted owl sites analyzed in this EA. The barred owl has been identified as a known threat to spotted owl recovery. The topic of interspecies competition between barred and spotted owls, and the resulting effects to spotted owls, involves many aspects. Factors such as behavioral interactions, habitat preferences, foraging patterns, fecundity, and potential predation of spotted owls by barred owls all are known or presumed to affect spotted owl detection rates, survival, site occupancy, reproduction, and displacement of spotted owls by barred owls (USDI, 2011).

3.4.2 Environmental Effects Alternative 1 (No Action)

Under ESA consultation, this alternative would have *no effect* on the northern spotted owl or its habitat.

3.4.2.1 Environmental Effects (direct and indirect effects) (15-80 years)-Wild and Woolly

Habitat

Habitat in Proposed Harvest Areas

The No Action alternative would not directly affect spotted owl habitat. Canopy cover, and vertical and horizontal complexity, would not be reduced within proposed harvest areas. However, this alternative would not increase the quantity of potential nest trees in 30 years.

No harvest actions would be taken to damage or destroy snags and CWD. Natural stem exclusion processes would continue to recruit a more gradual and prolonged input of snags and CWDs. However, these features would overall be smaller in diameter and available later as habitat enhancements compared to the action alternatives, No management would occur to increase the currently low amount of large snags and CWD.

Without large-scale stochastic disturbance such as fire, insect, disease or windthrow, habitat conditions would be mostly affected by the condition of the dominant overstory trees, which would continue to shade out suppressed trees, and reduce middle and understory stand density. As dominant trees continue to grow, they would gain late-successional habitat features like large diameters, deeply fissured bark, deep crowns, large branches, broken tops, and cavities. As individual dominant trees die, they would become large snags or down wood. As large trees or snags fall, they would knock over other trees and branches, creating growing space. This growing space would release understory conifers and hardwoods, allowing them to grow into dominant trees, and stimulate growth of shrubs and herbaceous vegetation. The overall effect of these successional processes would create a mosaic of tree ages, species composition, and late-successional habitat features in the stands. Additionally, patches of overstory trees would continue to suffer mortality from sporadic processes such as root rot or other disturbance such as windthrow. This would create larger areas of growing space for surviving overstory trees, hardwoods, conifer regeneration, shrubs, and herbs to occupy. Therefore, habitat in the project area would primarily develop late-successional characteristics, with patches of early- or mid-successional habitat throughout. Realization of the first stage late-seral habitat would occur in an estimated 50-150 years.

Table 21 shows key metrics in untreated stands in approximately 30 years. Lower story small trees and shrubs would continue to be shaded out and develop at a much slower rate compared to the action alternatives. Overall, stands would become suitable for nesting in 30 years. However, compared to the action alternatives, the quality of nesting habitat would be less due to fewer suitable nest trees and a smaller weighed average DBH of trees greater than 20 inches (see Table 21 and discussion at end of Section 3.4.2.1). Untreated stands would develop suitable nesting attributes at a slower rate.

Critical Habitat

No alternative would affect critical habitat.

Spotted Owl Sites

Site Habitat and Chances of Pair Occupation
The Rail Creek and S Fk Gate Creek sites would maintain their current quality and amounts of dispersal/forage habitat.

Rail Creek: Effects to this site would be nearly the same as described under the action alternatives that would affect only 2 acres on the periphery of the PHR.

S Fk Gate Creek: This site would not experience removal or degradation of forage habitat, and therefore any adverse effects to the ability of the site to provide for occupation and reproduction. The site would continue to provide for spotted owl persistence and reproduction in the watershed. However, untreated stands would develop into spotted owl suitable nesting habitat at a slower rate, with reduced quality, compared to the action alternatives. Any continued presence of the barred/spotted-barred hybrid owl pair at the site would result in the chances of spotted owl pair occupation and reproduction being the same as for the action alternatives (this pair would prevent spotted owl single or pair occupation).

Surveys
It is unknown if surveys would continue in proposed harvests under this no action alternative. Due to staffing constraints, the BLM focuses on areas that have the potential to affect spotted owl habitat due to timber harvest and other habitat modifying management actions.

Disturbance
The potential for any spotted owls to experience noise disturbance would be the same as for the action alternatives (due to seasonal restrictions).

Recovery Actions

Recovery Action 10
This alternative would be consistent with Recovery Action 10 in that no site habitat would be affected. However, beneficial thinning in sites prioritized for such actions under RA10 would not occur at this time.

Recovery Action 32
No alternative would affect Recovery Action 32 habitat.

Barred Owls

As discussed in the Affected Environment, barred owls occur within and near the project area and affected spotted owl sites. Barred owls would continue to interact with spotted owls and compete for their prey and habitat. Barred owls numbers appear to be stable or increasing within the McKenzie River fifth field watershed and the Upper Willamette/Siuslaw Field Offices. This alternative would not slightly increase the competitive influence of barred owls by directly affecting spotted owl habitat in the short term (15-20 years) the way the action alternatives would. However, any effects beyond 20 years would be the same as described for the action alternatives because barred owl occurrence, and therefore potential direct or indirect interactions with spotted owls throughout the watershed, are expected to be stable or increasing within the next 10 years.

3.4.2.2 Environmental Effects (direct and indirect effects) (15-80 years)-Finn Again and Mid Indian

Many effects would be the same or similar to those described under the Wild and Woolly no action alternative in Section 3.4.2.1. Only meaningful differences and comparisons are described below.

Habitat

Habitat in Proposed Harvest Areas
This alternative would not modify spotted owl habitat.

The untreated harvest areas would continue to develop from the mid-seral to mature-seral stages. There would be no direct effects to spotted owls or their habitats if the proposed units are not harvested. Harvest would not remove dispersal, forage and suitable nesting habitats. Snags and CWDs would not be damaged or degraded and would continue along trajectories described in CWD/Snags discussion. Current dispersal habitat (mostly in Finn Again units) would continue to develop as described for Wild and Woolly. Suitable nesting habitat (mostly found in Mid Indian units) would develop from mature-seral to late-seral habitat. The remaining habitat (mostly found in the Mid Indian units) contains a mixture of 70-125 year old dispersal/forage and low quality suitable nesting habitat. These areas would develop based on processes common to both mid-seral and mature-seral forests. This development would continue to provide a beneficial mosaic of varied habitat conditions throughout the stand. These conditions would be favorable to spotted owl habitat due to exhibiting a variety of attributes for both spotted owl and their prey.

Spotted Owl Sites

Site Habitat and Chance of Pair Occupation
Finn Creek: Compared to the action alternatives, harvest would not remove 226 acres of site habitat or adversely affect the potential of the site to provide for spotted owl occupation and reproduction. The site would continue to provide for spotted owl persistence and reproduction in the watershed as habitat continues to develop.

03NEWITS: Effects to this site would be nearly the same as described under the action alternatives that would affect only 10 acres of foraging habitat on the periphery of the PHR.

Barred Owls

Since barred owls are common in and near the project area, they would continue to interact with spotted owls and compete for their prey and habitat. Compared to the action alternatives, this alternative would not increase the short and long-term potential for barred owls to affect spotted owls in the project area due to habitat alteration.

3.4.2.3 Cumulative Effects (15-80 years)

Habitat

Under No Action, there would be no contribution to degrading or removing spotted owl habitat in the watershed. However, cumulative effects to habitat would be very similar to the action alternatives as described under Alternative 2

Barred Owls

Under this alternative, local effects to spotted owls from barred owls would not be increased. Barred owl occurrence, and therefore potential direct or indirect interactions with spotted owls throughout the watershed, are both expected to be stable or increasing within the next 10 years. All effects to spotted owls discussed in 3.4.2.1 would likely continue or increase in frequency and magnitude.

3.4.3 Alternative 2

3.4.3.1 Environmental Effects (direct and indirect) (15-80 years)-Wild and Woolly

Habitat

Habitat in Proposed Harvest Areas

Wild and Woolly thinning harvest would degrade approximately 71 acres of dispersal and high quality forage habitats between 40-71 years old. Scattered small pockets ($\leq$ 1 acre) of suitable nesting habitat also exist in portions of the affected stands. Aside from occasional individual tree removal due to operational or safety needs, this suitable habitat would be reserved from harvest.

Thinning would immediately reduce vertical and horizontal cover and stand complexity due to removal of understory, codominant, and occasionally dominant trees. Harvest would also damage or remove existing shrub and herb layers in the short term.

Despite design features to retain snags and CWD, an unknown amount of these features would be inadvertently damaged or destroyed by harvest actions. This operational damage to retained green trees could however create some snags or convert some snags into CWD. Within treated Streamside Management Areas and uplands, snag and CWD management would retain/create 300 linear feet per acre of decay class 1-2 CWD, and create 8.0 snags per acre. *See CWD/Snag for more discussion of snags and CWD, and PDFs for detailed management specifications.*

Harvest would alter or remove many of the forage components of dispersal habitat. Since post-harvest canopy cover would remain approximately 50-55%, these habitats would still be classified as low-quality dispersal habitat; but with low forage value until conditions recover. Spotted owl use would be less frequent at least until canopy cover returns to higher levels (est. 60-80% or more). Improved forage habitat recovery would occur when retained understory trees

grow and re-establish canopy depth and vertical complexity at the stand level. Untreated riparian areas would still facilitate landscape dispersal and provide reduced quality forage and nesting habitat. However, their value would be diminished by smaller stand size, edge effects and fragmentation until canopy conditions of nearby treated stands recover.

Increased light penetration post-harvest would result in beneficial increased growth of shrub and herb layers in the medium term until the canopy re-closes. However, thinning in this watershed can also result in periods of detrimental excess growth of brush and larger shrubs. For example, homogenous dense expanses of salal can diminish the foraging quality of stands due to reduced flying room and inaccessibility of prey items on the forest floor.

As discussed in Section 3.2, thinning would prevent, reduce, or delay mid-seral stem exclusion processes, and therefore natural snag and CWD recruitment by suppression mortality. However, snag and CWD management would mitigate many of these effects as well as any operational damage to snags and CWD. Snag and CWD creation would reestablish qualities and amounts of large snags and CWD ($\geq$ 20 inch diameter) that are more typical of similar age unmanaged conifer stands in western Oregon (MMLD, Appendix F). Management would increase the amount of large snags and CWD which are completely absent in Wild and Woolly (shown in Table 18). In combination with enhanced tree growth, snag and CWD creation would enhance the quality of forage and nesting habitat and accelerate the rate that it would be achieved compared to Alternatives 1 and 3.

After canopy conditions recover and understory growth resumes, treated stands would again provide at least a moderate quality forage habitat in an estimated 15-20 years. New suitable nesting attributes would develop in approximately 20-30 years. Beyond 30 years, treated stands would continue to benefit from thinning and provide a higher quality of suitable nesting habitat sooner than if not treated. *See the modeling discussion below*

Modeling Results of Habitat in 30 Years:

Table 21 shows key tree metrics relevant to the spotted owl in 30 years under all alternatives. *See the rationale for use of this scale at the beginning of this issue.* These modeled results are theoretical and approximate, and not intended to represent exact or guaranteed scenarios. However, these data are commonly used to assess and model stand conditions (primarily tree growth) because they represent the best available quantified information to compare and contrast alternatives and derive conclusions about future stand conditions, including specific stand attributes relevant to the spotted owl. While very useful, stand data are just one analysis tool used in combination with other qualitative assessment or inference of tree and stand characteristics (i.e. large side limbs, crown differentiation, canopy complexity). One of these assumptions discussed below is that large trees with a DBH $\geq$ 30 inch would have a high potential to exhibit nesting structure for spotted owls.

Table 21 shows how the treated stand would react to thinning compared to no treatment under Alternative 1.

Trees with a DBH $\geq$ 30 inch are dominant overstory trees with a potential for spotted owl nesting structure. In 30 years, the amount of trees per acre (TPA) would increase by 12 (172% of current) while maintaining a similar DBH-weighted average diameter as a group.

Trees with a 20-28 inch DBH are a good measure of the stand's depth and complexity in its mid-story canopy. In 30 years, these mid-story trees would be reduced about 32 TPA (40% of

current) by thinning, but would realize a 3 inch increase (113% of current) in their DBH-weighted average group diameter. This indicates an increase in biomass, depth, and canopy complexity within the stand.

Trees with a DBH ≥ 20 inch would be reduced by about 19 (72% of current), but experience a 5 inch (120% of current) increase in their DBH-weighted average diameters. This indicates an overall reduction of trees per acre coupled with a beneficial increase in the size of individual trees.

Summary: Overall, treatments would reduce the number of 20-28 inch DBH trees in the mid-story to achieve a greater number of large potential nest trees (≥ 30 inch DBH) combined with a weighted average increase in the collective DBH-weighted diameters of trees greater than 20 inches. Compared to no action, this would result in a net benefit to spotted owl habitat in a relatively short time coupled with acceptable short-term negative effects of mid-story tree removal. The most notable benefit would be the relatively large increase in the number of potential nest trees in only 30 years. Stand conditions with approximately 50 TPA ≥ 20 inch DBH would allow for lower canopy herb, shrub and smaller tree (<20 inch DBH) development while also establishing a favorable condition for future stand development beyond 30 years.

Table 21: Wild and Woolly Thinning Harvest: Comparison of Key Tree Metrics for All Alternatives in 30 years

Metric Measured	Alt. 1 No Action	Alts. 2 & 3	Percent Difference [2]	TPA[3] Difference
TREES PER ACRE (TPA)				
TPA ≥ 30 inch DBH [1]	16.7	28.7	172%	-12.0
TPA 20-28 inch DBH	53.0	21.4	40%	-31.6
Total TPA ≥ 20 inch DBH	**69.7**	**50.1**	72%	-19.6
WEIGHTED AVERAGE OF DBH (WT. AVG)				
Wt. Avg. DBH of TPA ≥30 inch DBH [1]	33.4	33.9	101%	+0.5
Wt. Avg. DBH of TPA 20-28 inch DBH	23.2	26.2	113%	+3.0
Wt. Avg. DBH of TPA ≥ 20 inch DBH	**25.6**	**30.6**	120%	+5.0

[1] Trees ≥ 30 inch represent potential spotted owl nest trees.
[2] "Percent Difference" equals treated versus not-treated values for the same 30 year period. Compared to No Action; 100% equals no difference; > 100% represents an increase; and < 100% represents a decrease (e.g., 40% equals 60% less; 172% equals 72% more).
[3] TPA = trees per acre.

Critical Habitat

No alternative would affect critical habitat.

Spotted Owl Sites

Site Habitat and Chance of Pair Occupation

See Table 19 that displays habitat amounts in site Core Areas and Provincial Home Ranges immediately after implementing the action alternatives.

The Wild and Woolly thinning harvest would affect the PHR of the Rail Creek and S Fk Gate Creek known sites. No effects would occur to site Nest Patches or Core Areas. The other two sites would be affected only by regeneration harvest actions.

Rail Creek: No site habitat would be affected in the Core Area or Nest Patch. Only 2 acres of 70 year old dispersal/foraging habitat would be affected within the outer edge of the PHR. Harvest actions would result in a trivial impact on site habitat and would not affect the ability of spotted owls to occupy or reproduce at the site. Therefore, under ESA consultation harvest actions *may affect, but are not likely to adversely affect,* spotted owls due to habitat modification within the Rail Creek site. Additionally, because no spotted owl have been detected from 2013-2016, *it is unlikely that project actions would result in take under ESA consultation.*

S Fk Gate Creek: No site habitat would be affected in the Core Area or Nest Patch. Thinning would degrade approximately 76 acres of 45-71 year old dispersal/foraging habitat within the PHR. This would reduce the amount of PHR habitat not recently affected by (i.e., recovering) harvest from 11% to 8%. However, 76 acres represents about one quarter of existing habitat in the PHR. Although harvest would maintain dispersal habitat within $\geq$ 50% canopy cover, harvest would degrade or remove many of the foraging components of the stand. Affected areas represent a known high use area by spotted owls and some of the best habitat closest to the site center. The site is currently at risk of not providing for occupation and nesting due to very low amounts of habitat, and would be extremely vulnerable to habitat modification. Therefore, any effects to habitat would further reduce the ability of spotted owls to occupy the site. The short-term loss of forage habitat, in combination with effects due to barred owls discussed below, would adversely affect the ability of the site to provide for pair occupation and reproduction until forage conditions adequately recover in 15-20 years. Under ESA consultation, harvest actions *may affect, and are likely to adversely affect,* spotted owls due to habitat modification within the S Fk Gate Creek site. Due to several years of occupation by a barred/spotted-barred hybrid owl pair that prevents site occupation by spotted owls, *it is unlikely that project actions would result in take under ESA consultation.*

Surveys

As discussed in Section 3.4, surveys would continue during the life of project actions (full site visits to entire site, or spot-check surveys in and near harvest units). Full site surveys would occur for the Finn Creek, Rail Creek, and S Fk Gate Creek known sites in 2017. Survey areas and methods after 2017 would depend on current habitat configurations, and results of previous surveys in both sites and harvest areas.

Disturbance

Harvest and other project actions can result in noise to nesting spotted owls, including rearing of young in the Nest Patch and beyond. Such disturbances can adversely affect breeding behavior, including the risk of predation of young in or out of the nest. Disturbance to potentially nesting owls at the Rail Creek or S Fk Gate Creek sites due to project actions would be unlikely due to seasonal operating restrictions (see, PDFs). This chance is further reduced by the lack of recent spotted owl detections in the site. Under ESA consultation, harvest actions *may affect, but are not likely to adversely affect* spotted owls due to disturbance.

Recovery Actions

Recovery Action 10

The RA10 rank of 6 for the S Fk Gate Creek site indicates a relative moderate priority for conservation. However, the known or suspected presence of a barred/spotted-barred owl pair in the site from 2013-2016, and the detection of a single spotted owl only once in the last 4 years, lowers its immediate conservation concern. This increases its priority for lower impact actions such as thinning that would eventually improve habitat conditions. Therefore, thinning of only 10 acres outside of the Core Area of this site would be consistent with RA10 guidance.

The RA10 rank of 9 for the Rail Creek site indicates a low relative priority for conservation, and a high priority for restorative actions such as thinning. Surveys in 2013-2016 did not detect spotted owls. Although full site surveys (6 visits) did not occur from 2006-2011, much of the best habitat in the site was surveyed in many of these years due to survey of the nearby Rough Creek site. There is sufficient information to indicate that any chance of pair occupation at the site is low. Additionally, thinning would benefit the poor densely stocked habitat conditions within the Nest Patch. Therefore, restorative thinning actions that affect only two acres of this site are appropriate at this time and consistent with RA10 guidance.

Recovery Action 32

No alternative would affect Recovery Action 32 habitat.

Barred Owls

Effects discussed below apply to all four affected spotted owl sites. Effects are generalized and similar for all types of habitat and harvest actions. Based on survey data and trends throughout the district, watershed and project area, barred owl presence is known or very likely at all four spotted owl sites

While there is uncertainty on some aspects of the broad topic of barred and spotted owl interspecies competition, science and other information are available for many parts of such a discussion. Barred owl effects to spotted owls, in combination with habitat modification by project actions, are discussed below.

The proposed action alternatives would remove or degrade habitat conditions for both barred and spotted owls. Both species use mid-seral and older types of conifer forest and prefer older forests, especially for nesting. However, barred owls appear to be more tolerant of younger and lower quality forest conditions and seem to preferentially use forest stand types in proportion to their availability (versus age), while spotted owls are reliant on older forest ((Dugger, Anthony, & Andrews, 2011) (Wiens, Anthony, & Forsman, 2014)). When manipulation of older forest stand structure alters habitat conditions for both barred and spotted owls, the relative effect on barred owls may be lesser because they do not appear as dependent on older forests. Furthermore, barred owl effects on spotted owl survival and colonization appear to be substantial and additive to any effects of habitat alteration, reduction or fragmentation in spotted owl home ranges.. Any reduction of habitat in spotted owl home ranges increases the effect of the habitat loss disproportionally when barred owls are present (i.e., due to real habitat reduction plus the effect of exclusion from habitat due to barred owl competition).

After harvest, barred owls would be more likely than spotted owls to reside in or near the project areas, including within the Finn Creek and S Fk Gate Creek sites specifically where barred owl

presence is well established in recent years. Reduced habitat alone, plus the likely continued presence of barred owls, would result in these two sites being degraded and unsuitable for spotted owl pair occupation or successful reproduction. If displaced by harvest actions, the chance that spotted owls would recolonize affected areas would be reduced for at least 15-20 years until canopy conditions recover. However, the competitive influence of barred owls could result in spotted owls being unable to recolonize the project area even after habitat conditions recover.

3.4.3.2 Environmental Effects (15-80 years) (direct and indirect)-Finn Again and Mid Indian

Habitat

Habitat in Proposed Harvest Areas

Regeneration harvest in the Finn Again and Mid Indian units would remove approximately 252 acres of spotted owl habitat. This value includes approximately 33 acres of grouped retention where habitat-modifying actions would be limited to yarding corridors, and snag and CWD creation. Total acres that would be affected by regeneration harvest include approximately 134 acres of 65-80 year old dispersal habitat and 118 acres of 80-115 year old nesting habitat. Harvest openings would immediately become unsuitable for owl use after project actions, including grouped retention areas not contiguous with other spotted owl habitat. The sizes of retained green trees would be variable with a minimum diameter of 20 inches. Within the actual regeneration harvest footprint areas, green trees retained per acre would be approximately 6 and 10.2 (8.7 wt. avg.) for Finn Again and 8 and 11 (8.9 wt. avg.) for Mid Indian.

Snags and CWD would be retained to the extent possible, but many of these features would be physically degraded or destroyed by operations. *Within treated uplands,* snag and CWD management would retain/create per acre 300 linear feet of decay class 1-2 CWD and would create 8.0 snags. *See PDFs for detailed management specifications.*

Stands would redevelop into dispersal habitat in approximately 35 years, into dispersal/forage habitat in approximately 50 years, and into nesting habitat in approximately 60-65 years. Green tree retention would enhance the quality of redeveloping stands, and accelerate the time when they would otherwise become suitable habitat (80 years) by an estimated 10-15 years. These effects assume that all reserved trees would be at least 20 inch DBH and that most would survive into the redeveloping mid-seral stand. However, the marking, size, characteristics and long-term survival of green trees would affect the assessed quality and time for habitat redevelopment.

Additionally, an unknown amount of retained/created snags and CWD features would persist into the next stand and help accelerate the rate it becomes forage habitat for spotted owls. The quality, amount, and longevity of these benefits would depend on a variety of factors including the diameters and decay rates of these features. Most likely, most of these features (especially CWD) would not persist long enough to effect redeveloping suitable nesting habitat (at least 60-65 years after harvest).

Untreated riparian areas would continue to facilitate reduced quality forage and nesting habitats. However, spotted owl habitat is negatively associated with fragmentation and positively associated with the amount of interior forest (Courtney et al. 2004, pp. 5-9 to 5-11, Glenn et al 2004). These effects are most pronounced at forested/non-forested edges similar to conditions

after regeneration harvest. Therefore, the habitat quality of untreated riparian reserves would be diminished, especially for roosting and nesting, due to the narrowed linear shapes, more isolated configurations, and reduced amounts of interior habitat with greater forest/non-forest edge effects.

Critical Habitat

No alternative would affect critical habitat.

Spotted Owl Sites

Site Habitat and Chance of Pair Occupation
See Table 19 that displays habitat amounts in site Core Areas and Provincial Home Ranges (PHRs) immediately after implementing the action alternatives.

The Finn Again and Mid Indian regeneration harvests would affect the PHRs of the Finn Creek known site and 03NEWITS potential site. The other two sites would be affected only by thinning harvest. No harvest would occur in site Nest Patches or Core Areas.

Finn Creek: Regeneration harvest would remove approximately 226 acres of 65-115 year old forage and nesting habitat in the site PHR. This would reduce the amount of PHR total habitat (dispersal, forage and suitable nesting) from 31% to 24%. This would affect a relatively large portion of the existing habitat (about one quarter). Additionally, removed habitat includes likely locations for any resident owls to establish a new activity center (or site center) after ongoing clearcut harvest is complete on non-federal lands in section 20. Since the site is currently at risk of not providing for occupation and nesting due to very low amounts of habitat at the Nest Patch, Core Area, and PHR scales, any habitat loss would reduce the ability of spotted owls to occupy the site for at least 35-65 years. The loss of 226 acres of habitat, in combination with effects due to barred owls, would adversely affect the ability of the site to provide for pair occupation and reproduction. Under ESA consultation, harvest actions *may affect, and are likely to adversely affect*, spotted owls due to habitat modification within the Finn Creek site and removal of suitable habitat. Due to a male spotted owl detected at the site in 2015, project actions would have the *potential to result in take under ESA consultation*. Full site surveys during the seasonal restriction period in 2017 would clarify effects determinations, including any potential for take.

03NEWITS: Regeneration harvest would remove 10 acres of 80 and 115 year old nesting habitat in the PHR.This would reduce the amount of PHR total habitat (dispersal, forage and suitable nesting) less than 1%. Affected habitat would be within the outer edge of the site PHR. This small amount of habitat loss on the periphery of the PHR would not meaningfully affect any resident owls or the ability of the potential site area to provide for pair occupation and reproduction. Under ESA consultation harvest actions *may affect, but are not likely to adversely affect*, spotted owls due to habitat modification within the 03NEWITS potential site. Although relevant to recovery of the species, the USFWS no longer assesses take for federal actions that occur in potential sites.

Surveys
Surveys (full site visits or spot-checks) would continue during the life of project actions. Survey methods and area covered would be based on habitat conditions and previous survey results.

Disturbance
Harvest and other project actions can result in noise disturbance to nesting owls. Such disturbances can adversely affect breeding, including predation of young in or out of the nest. Disturbance to potentially nesting owls at the Finn Creek or 03NEWITS sites due to project actions would be unlikely due to seasonal operating restrictions (see PDFs). Under ESA consultation, harvest actions *may affect, but are not likely to adversely affect*, spotted owls due to disturbance.

Recovery Actions

Recovery Action 10
The RA10 rank of 4 for the Finn Creek site indicates a relative moderate priority for conservation. Habitat conditions are below the at-risk thresholds of 40%/50% suitable nesting habitat in the Core Area and PHR respectively, but the site territory has ample habitat to support a spotted owl pair and reproduction. A single individual was detected in 2015. However, during full site surveys (at least 6 visits) from 2012-2016, this was the only spotted owl detection. Surveys were either incomplete (3 or fewer visits) or did not occur from 2006-2011. The only detection from 2006-2011 was a resident pair in 2009. Project actions are moderately inconsistent with Recovery Action because of a RA10 rank of 4. However, Recovery Action 10 is planning guidance and not applicable to management at all sites. This scenario has been consulted on with the USFWS.

The RA10 rank of 4 for the 03NEWITS potential site indicates a relative moderate priority for conservation. Habitat conditions are below the at-risk threshold of 40%/50% suitable nesting habitat in the Core Area and PHR respectively, but the site territory has ample habitat to support a spotted owl single or pair, including reproduction. No spotted owls were detected during full surveys (at least 6 visits) from 2013-2016. Surveys were either incomplete (partial site area coverage) or did not occur from 2006-2011. However, only 10 acres of habitat would be removed at the periphery of the site PHR. While this action would be moderately inconsistent with Recovery Action 10, it would not result in an adverse effect to the ability of the area to provide for a resident spotted owl pair, including reproduction.

Recovery Action 32
No alternative would affect Recovery Action 32 habitat.

Barred Owls

General effects from barred owls are described under the thinning action in Section 3.4.3.1, except that affected stands would not recover to current conditions for at least 50-65 years.

3.4.3.3 Alternative 2 Cumulative Effects

Habitat (15-80 years)

A timeframe of 10-80 years is examined because it coincides with that for direct and indirect effects. No reasonably foreseeable federal actions would occur within the project area and the provincial home ranges of the four affected spotted owl sites. Additionally, because cumulative effects at the project or spotted owl site scale are not informative, these effects are discussed only at the McKenzie River fifth field watershed scale. Trends for both general and site-specific habitats are similar at this scale. Table 22 shows current conditions, recent actions, reasonably foreseeable federal actions in the watershed, and affected acres from all action alternatives.

Planning information is adequate only to address reasonably foreseeable actions within the next 10 years.

Existing Conditions: Of the approximately 165,192 acres in the watershed, 32,790 (20%) are federally administered lands: 25,775 acres administered by BLM (16%) and 7015 acres administered by USFS (4%). The remaining 80% of lands are administered or owned by non-federal parties, with an estimated 121,000 acres (74% of watershed) being managed for timber production. Table 22 displays approximate age classes and spotted owl habitat types on federal lands in the watershed. Non-federal lands, when forested, are typically under 40-60 years old and provide either unsuitable habitat or low quality dispersal habitat. Suitable nesting habitat is scarce on private land.

Acres Affected by Project Action Alternatives: The acres of spotted owl habitat affected by all action alternatives are shown in Table 19. The majority of the watershed (estimated 74%) is owned and managed by small and large timber companies, most of which is harvested by clearcut methods before stands are 40-60 years old. When considered with other ongoing private actions, all of the action alternatives would contribute to limiting the amount of suitable nesting habitat in the watershed.

Reasonably foreseeable federal and private landowner actions: Reasonably foreseeable federal actions within the next 10 years are shown in Table 19. No information is available on future federal actions beyond the next 10 years. Information on future harvest actions on private lands is never available. However, it is reasonable to expect recent trends to continue in the watershed. Private forest lands are typically clear-cut harvested at an age of 40-60 years and will not develop into suitable nesting habitat. Private landownership patterns and past practices indicate that high amounts of harvest will continue to occur over the next 80 years throughout the watershed (or parts thereof) until operations move to other geographic areas. Many private forest stands could be clear cut harvested up to two or three times in the next 80 years. Under the current RMP for BLM lands, regeneration harvest can occur in any age stand. On federal lands, Riparian Reserves plus other non-harvestable outs would develop into mature-old forest suitable for nesting. Early-seral and mid-seral habitats (unsuitable and dispersal/forage) would continue to dominate the total watershed acres.

Cumulative Effects: The cumulative effects of the above past, present, (Wild and Woolly, Finn Again, and Mid Indian) and reasonably foreseeable future actions (Marten Ridge, Rough Draw and View Marten thinnings) would be to limit the amount of mature and old forest habitat in the watershed to far below historic levels, while simultaneously spatially restricting its extent to reserved areas on BLM lands. Thinning harvests on federal lands would improve mid-late seral forest habitat if it is not eventually regeneration harvested.

Barred Owls

Barred owl occurrence and therefore potential direct or indirect interactions with spotted owls throughout the watershed are expected to be stable or increasing within the next 10 years. All effects to spotted owls discussed in 3.4.2.3 would likely continue at current rates or increase in frequency and magnitude.

Table 22: Existing Northern Spotted Owl Habitat Conditions on Federally Administered Lands in McKenzie River 5th Field/HUC10 Watershed

McKenzie River Fifth Field Watershed (formerly the Bear Marten and Vida/McKenzie watersheds)			
Current Conditions	**Acres**	**% Federal Lands [4]**	**% All Lands**
Non-Forest Capable	312	1%	0%
NSO Unsuitable (future) Habitat (0-39 yrs. old)	5,950	18%	4%
NSO Dispersal/Forage Habitat (40-79 yrs. old)	8,086	25%	5%
NSO Suitable Nesting Habitat (≥80 yrs.)	18,442	56%	11%
TOTALS	**32,790**	**100%**	**20%**
Affected by Federal Harvest Actions Since Year 2000 [1]			
NSO Future Habitat (0-39 yrs. old)	140	0.4%	
NSO Dispersal/Forage Habitat (40-79 yrs. old)	2,483	7.6%	
NSO Suitable Nesting Habitat (≥80 yrs.)	418	1.3%	
TOTALS	**3,041**	**9.3%**	
Affected by Alternatives 2 & 3(Alt. 3 values in parenthesis **if different)** [2]			
NSO Future Habitat (0-39 yrs. old)	1	< 0.1%	
NSO Dispersal/Forage Habitat (40-79 yrs. old)	209	0.6%	
NSO Suitable Nesting Habitat (≥80 yrs.)	122 (94)	0.4%	
TOTALS	**331**	**1.0%**	
Reasonably Foreseeable Federal Harvest Actions in AMA Area [3]			
NSO Future Habitat (0-39 yrs. old)	10	< 0.1%	
NSO Dispersal/Forage Habitat (40-79 yrs. old)	173	0.5%	
NSO Suitable Nesting Habitat (≥80 yrs.)	951	2.9%	
TOTALS	**1,134**	**3.5%**	

[1] All effects due to thinning harvests that are completed or currently being logged.

[2] Alternative 3 values are shown in parenthesis only when different from Alternative 2 .Any differences shown are trivial at the watershed scale.

[3] Acres are approximate potential harvest areas in the watershed within the AMA area over the next 10 years. This includes the potential thinning harvests originally scoped as Rough Draw, View Marten, and Marten Ridge.

Federal lands include BLM and USFS. Other federal land owners comprise less than 0.5% of lands in watershed.

3.4.4 Alternative 3

3.4.4.1 Environmental Effects (direct and indirect) (15-80 years) Wild and Woolly

All effects, including to the two spotted owl sites, would be the same as described for the Wild and Woolly Alternative 2; except for meaningful differences and alternative comparison discussed below.

The key differences between this alternative, and Alternative 2 is that there would be less snag and CWD creation in fewer locations in this alternative (only in Riparian Reserves).

Habitat

Habitat in Proposed Harvest Areas

Effects to vegetation and stand growth trajectories would the same as described under Alternative 2. Uplands would experience the same benefits of enhanced large tree growth due to thinning as described for Alternative 2; and therefore the same times when a greater amount of large potential nest trees would be available.

However, the quality of both forage and nesting habitat is closely tied to the quality and amount of snags and CWD. Lesser amounts and locations of snag and CWD management under this alternative would reduce the quality and delay the achievement of forage and suitable nesting habitat compared to Alternative 2.

Within treated Riparian Reserves, snag and CWD management under this alternative would retain/create 240 linear feet per acre of decay class 1-2 CWD and 3.4 snags per acre. Under Alternative 2, 8 snags per acre would be created in SMAs. Unlike Alternative 2, this alternative would not create snags and CWD. *See CWD/Snags for more discussion of snags and CWD, and PDFs for detailed management specifications.*

Snag and CWD management would enhance stand habitat quality for spotted owls in treated portions of Riparian Reserves by adding these key habitat features and restoring conditions more typical of similar aged stands in the watershed. *See CWD/Snags for discussion of snags and CWD.*

3.4.4.1 Environmental Effects (direct and indirect) (15-80 years) – Finn Again and Mid Indian

Habitat

Habitat in Proposed Harvest Areas

This alternative would remove approximately 222 acres of spotted owl habitat, approximately 34 fewer acres compared to Alternative 2. This value includes approximately 27 acres of grouped retention where habitat-modifying actions would be limited to yarding corridors, and snag and CWD creation. Within the actual regeneration harvest footprint areas, 6 green trees retained per acre would be retained in all areas (compared to 6-11 trees per acre under Alternative 2).

Within treated uplands, snag and CWD management would retain/create 240 linear feet per acre of decay class 1-2 CWD and create 3.4 snags compared to 300 linear feet per acre of CWD and 8 snags per acre under Alternative 2 in the uplands. *See Issue on snags and CW and PDFs for detailed management specifications.*

Stands would redevelop into dispersal habitat in approximately 35-40 years, into forage habitat in approximately 55 years, and into nesting habitat in approximately 75 years. Due to lower green tree retention, stands would redevelop slightly slower than under Alternative 2. A difference of 10-15 years between when stands become suitable nesting habitat could be meaningful as it represents more opportunities to breed and sustain local populations. However, the marking, size, characteristics and long-term survival of green trees would affect the assessed times.

Additionally, the habitat quality of redeveloping stands would be lower than for Alternative 2 due to less snag and CWD creation. This would mostly affect the forage quality of the redeveloping stand as it enters the mid-seral stage.

Reforestation is discussed in Section 2. This alternative would emphasize Douglas fir stocking, versus a more natural range of conifer species under Alternative 2. Depending on the unknown details of how this is implemented, the amount of natural regeneration, and ultimately the proportion of Douglas fir that survive into the next phases of stand development, stand conditions could be diminished due to less conifer diversity.

Spotted Owl Sites

Compared to Alternative 2, approximately 24 fewer acres of nesting habitat would be removed within the PHR of the Finn Creek site, and 4 fewer acres removed within the PHR of the 03NEWITS site. However, the overall capability of these sites to provide for occupation and reproduction of spotted owls after harvest would be the nearly the same under all action alternatives. ESA effects determinations to both sites, including any potential for take, would be the same as determined for Alternative 2.

Barred Owls

The direct and indirect effects described in 3.4.2.1 would be the same as described under Alternative 2.

3.4.4.2 Alternative 3 Cumulative Effects

Habitat

Cumulative effects to habitat would be nearly the same as those described under Alternative 2

Barred Owls

Cumulative effects to spotted owls due to barred owls would be the same as described under Alternative 2**.**

3.5 Issue 5: How would proposed timber harvest, commercial haul, and road management change sediment delivery to streams within the project area? How would this change affect water quality, temperature, and aquatic habitat for ESA-listed fish in streams within the Middle McKenzie watershed?

3.5.1 Affected Environment

Clean gravel is an important habitat component for spawning fish. Spawning gravel for salmon and trout ranges in size from 0.5 to 4 inches (Meehan, 1991). When high, fine sediment levels occur in spawning gravels, less spawning occurs, eggs tend to suffocate and emerging fry become trapped, resulting in mortality and reduced production (Phillips, Lantz, Claire, & Moring, 1975) (Tappel & Bjorn, 1983) (Chapman, 1988), (Meehan, 1991), (Hausle & Coble, 1976). Relative to coho salmon and steelhead, when concentrations of sand exceed >20% in spawning beds, fry emergence success declined. Increased concentrations of suspended sediment and turbidity can also have direct effects on fish behavior, physiology, and growth (Anderson, 1996).

Oregon Department of Fish and Wildlife (ODFW) considers properly functioning substrates to have <20% fines, sands or sediment. In general, these streams are a little steeper (~10%) and transport finer material downstream where it is able to settle out in slower moving water. Table 23 displays the name of the stream surveyed, what year the survey was conducted, and the percentage of silt / organics and sand.

Table 23: Stream Survey Data

Stream Name	Year of Survey	% of Silt / organics plus sand
Finn Creek	2000	23%
Indian Creek	2001	11%
Minney Creek	2007	12%

Fish Passage, Roads Utilized during Log Haul and Transportation Infrastructure

Forest transportation systems can harm salmonids and their habitats because of fine sediments they release to streams (Meehan, 1991). Ditchlines that drain to streams from area roads are in need of maintenance and the addition of cross drains to disconnect road run-off from local streams.

A road inventory was conducted in the planning area that included an assessment of road and culvert conditions. Numerous cross drain and stream culverts were assessed and found to be at risk of failure, and not properly functioning. These culverts would be replaced under the action alternatives where the BLM maintains and manages the road for this project.

Watersheds with road densities over 3.5 miles of road per square mile are considered Not Properly Functioning (FEMAT, 1993). All sub watersheds in the project area are above this threshold.

Limited data exists on Chinook salmon use in Gate Creek; however, ODFW surveys do show adults spawning in Gate Creek, as indicated by the number of nests (redds) dug into the stream bed by spawning fish (Table 24).

Table 24: Number of redds in Gate Creek from 1995-2000

Gate Creek ChS spawning surveys		
Year	**Redds**	**Comments**
1995	2	Unknown survey area
1996	2	Mouth to falls 2.1 miles up S. Fk.
1997	14	Mouth to falls 2.1 miles up S. Fk.
1998	0	Dry fall
1999	7	Mouth to falls 2.1 miles up S. Fk.
2000	2	Mouth to falls 2.1 miles up S. Fk.

3.5.2 Alternative 1- No Action

3.5.2.1 Environmental Effects (direct and indirect)

Turbidity in streams in and adjacent to the project area would continue to have the potential for chronic sediment problems due to road-related sedimentation including drainage and erosion issues. Chronic sources of sediment from forest roads would continue to be sources of sediment (some roads that have not been maintained would remain ungraded and rutted). Water quality and impacts to fish bearing habitat would continue to be impacted by road related sedimentation under this alternative. As a result, direct sediment delivery to streams via the ditch line from those roads would continue as well as water runoff from rutted gravel roads. No at-risk culverts would be replaced, such that there could be an increasing risk of catastrophic failure as they age.

3.5.2.2 Cumulative Effects

Cumulative effects from a variety of sources of sediment (ditch lines without culverts) would continue to produce fine sediment into the stream channels in the watershed and negatively affect downstream fish habitat. Road maintenance would either not take place, or be postponed until a later date. Water quality degradation and impacts to fish bearing habitat may increase as road crossings further deteriorate due to the lack of maintenance. The potential to improve aquatic habitat conditions through road renovation, replacement of high risk road-stream crossings, and road drainage improvements would not occur. It is assumed that private industry would continue to implement timber operations in the area, which includes: road maintenance, renovation construction, and log haul. All of these activities have the potential to increase local turbidities.

3.5.3 Alternative 2

3.5.3.1 Environmental Effects (direct and indirect)

Adverse effects from the proposed action on Upper Willamette Spring Chinook salmon would be produced primarily from wet weather haul in close proximity to Critical Habitat in Gate Creek. Critical habitat (CH) is defined as specific areas: within the geographical area occupied by the species at the time of listing, if they contain physical or biological features essential to conservation, and those features may require special management considerations or protection; and outside the geographical area occupied by the species if the agency determines that the area itself is essential for conservation.

Timber and rock haul would occur on approximately 20 miles of road in the project area. Timber transport is allowed during the wet season on all aggregate surfaced and paved roads. An aggregate surface road (North Fork Gate Creek Road - Road 16-2-26) is located directly

adjacent to North Fork Gate Creek, which is identified as Critical Habitat (Chinook salmon occupy this habitat). This road parallels North Fork Gate Creek for about 1 mile, varies in proximity from North Gate Creek (between 5 feet to over 50 feet), and crosses seven tributary streams (culverts). The BLM would attempt to mitigate impacts by placing sediment traps in areas within close proximity to Gate Creek.

North Fork Gate Creek Road does not have ditch lines, is vegetated on both sides, is flat with little to no grade, and is maintained and used by private industry all year long. The only crossing directly over LFH is a cement or concrete Bridge over North Fork Gate Creek, just before the road is paved. The only timber to be hauled over this bridge is from Wild & Wooly over road 16-2-26.1). Mid-Indian and Wild and Woolly would have some or all of its volume come down road 16-2-26.0. (Note that the 2017 addition of segment C of haul road 16-2E-29 would take some haul off of 16-2-26.) This road is adjacent to Listed Fish Habitat (LFH). Approximately 2,000 log truck loads would travel this road from Mid Indian and 234 log truck loads would travel this road from Wild and Woolly. Due to seasonal restrictions, most of this timber would be hauled out during the wet season, when sediment transport off gravel roads is likely to occur. Timber and rock haul would not occur on road segments that are unstable.

Hauling would be restricted at any time of the year, if necessary, to avoid sedimentation, road rutting, and road deformation. The Hydrologist, Field Office Fish Biologist, District Fish Biologist, or Soil Scientist would monitor haul routes during periods of extended precipitation in conjunction with the Contract Administrator. Additionally, improvements to existing roads would occur prior to hauling and would be ongoing as needed during the project to ensure proper drainage of the roads being used.

Hauling during periods when water is flowing on roads and into ditches would increase stream turbidity when flows from ditches are substantial enough to enter streams and LFH. No wet season haul would be allowed on native-surfaced roads, but would be allowed on aggregate-surfaced roads. No aggregate-surfaced haul route, slated for wet season haul, crosses LFH/CH, except for a bridge on Road No. 16-2E-26.1. Approximately 53 log trucks would cross this bridge from the harvest units during the wet season haul. Approximately 26 log trucks would cross this bridge during the summer ground base season after September 15th. Hauling would not be allowed during intense or prolonged rainfall that may cause generation of road related runoff or during freeze and thaw periods when the matrix of fines and gravel comprising the road surface becomes loosened. Timber transport operations would be stopped immediately if road use is causing rutting of the road surface, ponding of water on the road, failure of any drainage structure, or any other action that increases the sediment delivery to a stream. Spot rocking and/or sediment traps would be employed to reduce potential sediment inputs to streams. As stated above, Road No. 16-2-26 road parallels LFH and crosses seven small tributaries connected to LFH. There are also numerous other stream crossings along the haul routes that are connected to LFH (see haul route maps). There is a high probability that the use of haul roads, particularly in the wet season, would introduce sediment into ditch lines and to streams and LFH.

Road origin sediment yield is distributed across the landscape and is dependent upon road surface type, location and intensity of road use. A significant portion would be stabilized in vegetation (through ditch relief culverts) or into channels with no surface connection to LFH/CH. Research has demonstrated that relatively short segments of small ephemeral/intermittent

streams (300 to 400 feet) can effectively store coarse sediment washed from roads which would in turn contribute to protection of water quality in fish bearing habitat downstream (Duncan et al, 1987). At least three of the seven stream crossings adjacent to LFH are intermittent/ephemeral. While a large majority of sediment would be captured in riparian vegetation or stored in ephemeral and intermittent streams, sediment is expected to reach Chinook salmon LFH in pulses during periods of high precipitation.

Of the sediment that reaches a perennial stream or Chinook salmon LFH, research on sediment transport from perennial streams crossings has found that sediment and turbidity is unlikely to be detectable beyond a half mile below the site of the disturbance (Foltz et al 2008; Lachance et al 2008). Therefore, it is unlikely that higher turbidities would travel downstream of the confluence of the main stem Gate Creek, which is located well over a half mile away from the nearest perennial stream crossing. However, sediment is expected to have a negative but localized impact to the lower section of North Fork Gate Creek.

Bull Trout CH is present at the main stem McKenzie River and the confluence of Gate Creek. Sediment can affect the ability of Bull Trout to migrate and forage. Bull Trout utilizing salmonids as a prey source may have reduced feeding success as a result of the increased turbidities in the spring when juvenile salmonids are migrating. However, as described above, sediment and turbidity effects are unlikely to be of sufficient quantity to affect Bull Trout in the mainstream McKenzie River. Therefore, negative impacts to Bull Trout species are expected to be insignificant.

Increased turbidities and increases in sediment are likely to occur in CH adjacent to the haul route in North Fork Gate Creek down to Gate Creek Main stem for approximately ¾ of a mile. After this distance, it is expected that other tributaries to Gate Creek would dilute the amount of material in suspension to an immeasurable amount. In addition, research on sediment transport from perennial streams crossings has found that sediment and turbidity is unlikely to be detectable beyond a half mile below the site of the disturbance (Foltz, Copeland, & Elliot, 2009); (Lachance et al 2008). Some improvements of the background sedimentation and turbidity levels could be expected from the proposed replacement of at-risk culverts and drainage improvements.

Seasonal restrictions do not allow much of the drier months to be used for haul, and most of the timber would come out during the wet season. Haul is expected to create high turbidities and sediment transport off forest roads each year of hauling in the winter and late spring when rain would be able to transport material to LFH.

The timber sale would occur over a period of 3 years. The effects of increased sedimentation and higher turbidities would last each year until higher flows recede and material settles out. Sedimentation effects could change the invertebrate community and affect smolt production on foraging Chinook salmon in Gate Creek. Turbidity levels as low as 5 Nephelometric Turbidity Units (NTU) have been found to decrease primary productivity by 3–13%. An increase of suspended sediment levels increases the drift fauna and may reduce benthic densities as well as alter community structure (Ryan, 1991).

Most sediment transport would occur during periods of heavy rain in the winter (Chinook Salmon CH goes up into the North and South Fork near Road No. 16-2E-26). There are likely to be short-term negative effects to the suspended sediment and substrate in stream reaches within Gate Creek. Transport of sediment and road runoff would likely occur during periods of heavy

rain during the wet winter months and spring after Chinook salmon have spawned but their eggs are in the gravels of North Fork Gate Creek and Gate Creek. This would happen during the 3-year timber sale contract period during the winter and spring months. Therefore, Chinook salmon adults attempting to spawn would not be affected. Eggs in the gravel are unlikely to be affected by increased turbidities because most material would settle out quickly in tributary streams and only finer material that stays in suspension would move through the area without affecting egg survival (Hausle & Coble, 1976). Young of the year and yearling juveniles could be adversely affected by higher turbidities by losing feeding opportunities or by displacement. Any reduction in the numbers of migrating juvenile Chinook could negatively affect Bull Trout Critical Habitat in the McKenzie River.

Due to the localized nature (North Fork Gate Creek down to Gate Creek main stem ~0.5 mile) of the effects described above, this project would only adversely affect a small portion of the Chinook salmon population in the project area (Gate Creek immediately adjacent to the project and haul route area). Chinook Salmon may be affected by high turbidities, which may cause them to leave the area and become susceptible to predation by larger fish or be flushed down stream, putting them at risk in the larger rivers (with larger fish, etc.). Bull Trout Critical Habitat may be impacted by a reduction in the number of Chinook juveniles originating in Gate Creek.

The SMA no-cut buffers of 135 or 270 feet offer the potential to slightly increase the level of solar radiation reaching streams, which has been shown by research to increase plant and algae growth, thereby improving invertebrate and fish production. Project analyses have determined that these changes in solar gain would have no-increase to a negligible-increase in stream temperatures.

3.5.3.2 Cumulative Effects

This project would increase sediment transport to local streams from heavy log haul during wet conditions. The surrounding area is dominated by private industrial timberland that has been harvested and continues to be harvested on short rotations. Private timber harvest includes log haul, road renovation and construction, all of which would increase sediment transport to local streams. In the long term, small pulses of sediment would be expected to occur as treatments are implemented. Road improvements could reduce sediment yield from roads depending on the level of maintenance they receive. Private timber lands have smaller no-harvest buffers that contribute to the deficiency of LWD recruitment to streams, keeping the rate of recovery for the watersheds very slow.

3.5.4 Alternative 3

3.5.4.1 Environmental Effects (direct and indirect)

Alternative 3 would have similar effects on the aquatic environment as Alternative 2, with virtually all of the adverse effects resulting from road related work and log haul (localized increased turbidity and sediment). Alternative 3 would include some of the enhancements of Alternative 2 resulting from the replacement of at-risk culverts and drainage improvements. However, there would be little potential for increased primary productivity, as the no-harvest buffers would likely shield streams from any potential increase in sunlight from the proposed harvests. In addition, there would be no LWD added to the stream network to provide beneficial structural elements. The buffers would maintain the current microclimate of the Riparian Reserves and the productivity levels of the streams inside them.

3.5.4.2 Cumulative Effects

Alternative 3 would have very similar cumulative effects as Alternative 2, with very little long-term change in the background conditions for the watershed.

4.0 Consultation and Coordination

A scoping notice and invitation to participate in the planning process was sent to recognized tribes on September 3, 2013. No responses were received from any of the tribes.

Northern Spotted Owl

Project actions were consulted on with same sale names used in this EA: Finn Again, Mid Indian and Wild and Woolly. The Willamette Province Level 1 Team (terrestrial subgroup) prepared a batched biological assessment: Willamette Planning Province FY2015. Biological Assessment of LAA Projects with the Potential to Modify Habitat and/or Disrupt Northern Spotted Owls (USDI-USDA 2014). This assessment was submitted to the USFWS on approximately July 30, 2014. The USFWS issued a corresponding BO on October 6, 2014: Biological Opinion Regarding the Effects of Habitat Modification Activities on the Northern Spotted Owl and its Critical Habitat within the Willamette Planning Province, FY 2015, Proposed by the Eugene District, Bureau of Land Management; Salem District, Bureau of Land Management; Mt. Hood National Forest; Willamette National Forest; and the Columbia River Gorge National Scenic Area (FWS Reference Number 01EOFW00-2014-F-0221). By design, project actions would conform to the standards and analyses in these documents for habitat modification, disturbance and consistency with analyzed recovery plan recovery actions.

ESA consultation considered effects to general habitat, habitat within sites, reproduction, and disturbance; and effects relevant to Recovery Actions 10 and 32 in the recovery plan. Project actions would not affect critical habitat. Consultation determined that overall project actions *may affect, and are likely to adversely affect,* the spotted owl primarily due to removal of suitable nesting habitat, and habitat modification within the Provincial Home Range of both the Finn Creek and South Fork Gate Creek known owl sites. The biological opinion granted incidental take for project actions that would affect the Finn Creek and S. Fk. Gate Creek known sites. Based on new information from surveys in 2015 and 2016, incidental take would apply only to the Finn Creek site. This is because no spotted owls were detected within the S. Fk. Gate Creek site in 2015 and 2016. These determinations could change based on the results of future surveys, which will continue before and during project implementation. Regardless of the results of future survey results, project actions would conform to the standards, analyses, and other guidance in these documents. The effects of project actions would conform with the biological opinion, with respect to the type, manner and extent of any granted incidental take.

Listed Fish Species

The BLM consulted with the National Marine Fisheries Service (NMFS) and received a Biological Opinion with a *may affect - likely to adversely affect* determination for timber sales on Upper Willamette Spring Chinook Salmon (NMFS). Upper Willamette River Spring Chinook salmon have critical habitat downstream of Wild and Woolly in Gate Creek, about 500 feet downstream from Gate Creek tributaries, about 0.3 mile away on Indian Creek, and 0.75 mile away on Finn Creek. The BLM also consulted with the United States Fish and Wildlife Service

(USFWS) and they concluded that implementation of the activities as described within the Biological Assessment would not jeopardize the continued existence of bull trout nor would it adversely modify their critical habitat (April 22, 2015).

Table 25: List of Preparers

Name	Title	Contributions
Elizabeth (Liz) Aleman	Outdoor Recreation Planner	Recreation, Visual Resources Management, Wild & Scenic Rivers
Jessica Gallimore/ Kristen Allison	Fuels Specialist	Fuels
John (Mike) Blow	Wildlife Biologist	Wildlife, ACS
Todd Bush	Natural Resource Specialist – Soil, Air, & Water	Hydrology, Hazardous Materials, ACS
Christina (Chrissy) Cate	Forester	Logging Systems
Michael Fieber	Archaeologist	Archaeology
Douglas Fuller	Forester	Logging Systems
Dale Gough	Natural Resource Specialist (GIS)	GIS, Maps
Andrew Hamilton	Hydrologist	Hydrology, ACS
Gregory Hedrick	Engineer	Roads, Engineering
Steven Liebhardt	Fisheries Biologist	Fisheries, ACS
Cheryl (Cheshire) Mayrsohn	Botanist	Botany
Janet Zentner	Forester	Forestry
Cary Swain	Forester	Lead Logging Systems, Forestry
Chris Worthington, Kristine Struck, Linda Wright	Planning & Environmental Specialist	Team Lead, NEPA
Robert Titcomb	Silviculturist	Silviculture, Climate Change, ACS
Heather Ulrich	Archaeologist	Archaeology
Jennifer Puttere/Susan (Rudy) Wiedenbeck	Soil Scientist	Soils, ACS

5.0 Citations

Anderson, P. (1996). Sediment generation from forestry operations and associated effects on aquatic ecosystems. *Proceedings of the Forest-Fish Conference: Land Management Practices Affecting Aquatic Ecosystems, 5.* Calgary, Alberta.

Chapman, D. (1988). Critical review of variables used to define effects of fines in redds of large salmonids. *Transactions of the American Fisheries Society, 117*(1), 1-21.

Curtis, R. (1982). A simple index of stand density for Douglas-fir. *Forest Science, 28*(1), 92-94.

Dugger, K., Anthony, R., & Andrews, L. (2011). Transient dynamics of invasive competition: Barred owls, spotted owls, habitat, and the demons of competition present. *Ecological Applications, 21*, 2459-2468.

FEMAT. (1993). *Forest ecosystem management: an ecological, economic, and social assessment.*

Foltz, R., Copeland, N., & Elliot, W. (2009). Reopening abandoned forest roads in northern Idaho, USA: Quantification of runoff, sediment concentration, infiltration, and interrill erosion parameters. *Journal of Environmental Management, 90*, 2542-2550.

Hausle, D., & Coble, D. (1976). Influence of sand in redds on survival and emergence of brook trout (Salvelinus fontinalis). *Transactions of the American Fisheries Society, 105*(1), 57-63.

Leinenbach, P., McFadden, G., and Torgersen, C. (2013). Effects of riparian management strategies on stream temperature. Science Review Team Temperature Subgroup. U.S. Environmental Protection Agency, U.S. Geological Survey, and Bureau of Land Management.

McKenzie Watershed Council. (2002). *The McKenzie River Watershed Conservation Strategy.*

Meehan, W. (1991). *Influences of forest and rangeland management on salmonid fishes and their habitats.* (W. Meehan, Ed.) Bethesda, Maryland, USA: American Fisheries Society Special Publication 19.

Phillips, R., Lantz, R., Claire, E., & Moring, J. (1975). Some effects of gravel mixtures on emergence of coho salmon and steelhead trout fry. *Transactions of the American Fisheries Society, 104*(3), 461-466.

Ryan, P. (1991). Environmental effects of sediment on New Zealand streams: a review. *New Zealand Journal of Marine and Freshwater Research, 25*(2), 207-221.

Spies, T., Pollock, M., Reeves, G., & Beechie, T. (2013, January 28). *Effects of riparian thinning on wood recruitment: A scientific synthesis.* Forest Sciences Laboratory, Corvallis and Northwest Fisheries Science Center, Seattle.

Tappel, P., & Bjorn, T. (1983). A new method of relating size of spawning gravel to salmonid embryo survival. *North American Journal of Fisheries Management, 3*(2), 123-135.

USDI. (1995). *Eugene District Proposed Resource Management Plan/Environmental Impact Statement.* Eugene, Oregon: Bureau of Land Management, Eugene District.

USDI. (1995). *Record of Decision and Resource Management Plan.* Eugene, Oregon: Bureau of Land Management, Eugene District Office.

USDI. (2002). *Middle McKenzie Landscape Design.* Bureau of Land Management, Eugene District Office.

USDI. (2008). *Final Environmental Impact Statement for the revision of the Resource Management Plans of the western Oregon Bureau of Land Management.* Portland, OR: Bureau of Land Management.

USDI. (2011). *Revised recovery plan for the northern spotted owl (Strix ocidentalis caurina).* Portland, OR USA: United States Fish and Wildlife Service.

Warren, D. R., S. Collins, E. Purvis, M J. Kaylor, and H.A. Bechtold. (2016a) Spatial variability in light yields colimitation of primary production by both light and nutrients in a forested stream ecosystem. *Ecosystems* DOI: 10.1007/s10021-016-0024-9

Warren, D. R., W. S. Keeton, P. M. Kiffney, M. J. Kaylor, H. A. Bechtold, and J. Magee. (2016b). Changing forests - changing streams: riparian forest stand development and ecosystem function in temperate headwaters. *Ecosphere* 7(8):e01435. 10.1002/ecs2.1435

Weisberg, P.J. (1997). Fire history and fire regimes of the Bear-Martin Watershed and some relationships with contemporary stand structures. Final report to BLM Eugene District.

Wiens, J., Anthony, R., & Forsman, E. D. (2014). Competitive interactions and resource partitioning between northern spotted owls and barred owls in western Oregon. *Wildlife Monographs, 185*, 50.

Wonn, H., & O'Hara, K. (2001). Height:Diameter ratios and stability relationships for four northern Rocky Mountain tree species. *Western Journal of Applied Forestry, 16*(2), 87-94.

6.0 Appendix A: Glossary

Unless otherwise indicated, all definitions are from the 1995 Eugene RMP.

Basal Area - the cross sectional area of a single tree stem, including the bark, measured at breast height (4.5 ft.) above the ground. Basal Area in this EA is described in square feet and includes all conifers ≥ 8" DBH. If not specified, BA in table headings implies square feet per acre.

Baseline - The starting point for Analysis of Environmental Consequences; may be the conditions at a point in time (e.g., when inventory data is collected) or may be the average of a set of data collected over a specified period of years

Biological Corridor - A habitat band linking areas reserved from substantial disturbance.

Broadcast Burn - Allowing a prescribed fire to burn over a designated area within well-defined boundaries for reduction of fuel hazard or as a silvicultural treatment, or both.

Bureau Sensitive Species - Plant or animal species eligible for Federal Listed, Federal Candidate, State Listed, or State Candidate (plant) status, or on List 1 in the Oregon Natural Heritage Data Base, or approved for this category by the State Director.

Canopy Cover – Proportion of the forest floor covered by the vertical projection of tree crowns. (BLM 2009)

Clear-Cut Harvest - A timber harvest method in which all trees are removed in a single entry from a designated area, with the exception of wildlife trees or snags, to create an even-aged stand.

Commercial Thinning - The removal of merchantable trees from an even-aged stand to encourage growth of the remaining trees.

Core Area - That area of habitat essential in the breeding, nesting, and rearing of young, up to the point of dispersal of the young.

Cover - Vegetation used by wildlife for protection from predators, or to mitigate weather conditions, or to reproduce. May also refer to the protection of the soil and the shading provided to herbs and forbs by vegetation.

Critical Habitat - Under the Endangered Species Act, (1) the specific areas within the geographic area occupied by a Federally listed species on which are found physical and biological features essential to the conservation of the species, and that may require special management considerations or protection; and (2) specific areas outside the geographic area occupied by a listed species when it is determined that such areas are essential for the conservation of the species.

Culmination of Mean Annual Increment (CMAI) - The peak of average yearly growth in volume of a forest stand (total volume divided by age of stand).

Cumulative Effect - The impact that results from identified actions when they are added to other past, present, and reasonably foreseeable future actions regardless of who undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time.

Curtis Relative Density Index - Relative Density is a means of describing the relative degree of inter-tree competition in stands of differing average tree size and stand density of conifers over 8'' DBH (Curtis, A Simple Index of Stand Density for Douglas-fir, 1982). Relative Density is calculated by dividing the Basal Area by the square root of the Quadratic Mean Diameter (QMD).

Diameter At Breast Height (DBH) - The diameter of a tree 4.5 feet above the ground on the uphill side of the tree.

Endangered Species - Any species defined through the Endangered Species Act as being in danger of extinction throughout all or a significant portion of its range and published in the Federal Register.

Environmental Assessment (EA) - A systematic analysis of site-specific BLM activities used to determine whether such activities have a significant effect on the quality of the human environment; and whether a formal Environmental Impact Statement is required; and to aid an agency's compliance with NEPA when no EIS is necessary.

Environmental Impact - The positive or negative effect of any action upon a given area or resource.

Environmental Impact Statement (EIS) - A formal document to be filed with the Environmental Protection Agency that considers significant environmental impacts expected from implementation of a major Federal action.

Even-Aged Management - A silvicultural system that creates forest stands, which are primarily of a single age or limited range of ages.

Forest Canopy - The cover of branches and foliage formed collectively by the crowns of adjacent trees and other woody growth.

Forest Health - The ability of forest ecosystems to remain productive, resilient, and stable over time and to withstand the effects of periodic natural or human-caused stresses such as drought, insect attack, disease, climatic changes, flood, resource management practices and resource demands.

Forest Succession - The orderly process of change in a forest as one plant community or stand condition is replaced by another, evolving towards the climax type of vegetation.

Green Tree Retention - A stand management practice in which live trees as well as snags and large down wood, are left as biological legacies within harvest units to provide habitat components over the next management cycle.

High Level -A regeneration harvest designed to retain the highest level of live trees possible while still providing enough disturbance to allow regeneration and growth of the naturally occurring mixture of tree species. Such harvest should allow for the regeneration of intolerant and tolerant species. Harvest design would also retain cover and structural features necessary to provide foraging and dispersal habitat for mature and old growth dependent species.

Low Level - A regeneration harvest designed to retain only enough green trees and other structural components (snag, coarse woody debris, etc.) to result in the development of stands, which meet old growth definitions within 100-120 years after harvest entry, considering overstory mortality.

Habitat Fragmentation - The breaking up of habitat into discrete islands through modification or conversion of habitat by management activities.

Home Range - The area that an animal traverses in the scope of normal activities; not to be confused with territory, which is the area an animal defends.

Landing - Any place on or adjacent to the logging site where logs are assembled for further transport.

Land Use Allocations - Allocations that define allowable uses/activities, restricted uses/ activities, and prohibited uses/activities. They may be expressed in terms of area such as acres or miles, etc. Each allocation is associated with a specific management objective.

Log Decomposition Class - Any of 5 stages of deterioration of logs in the forest; stages range from essentially sound (class 1) to almost total decomposition (class 5).

Mitigating Measures - Modifications of actions that (a) avoid impacts by not taking a certain action or parts of an action; (b) minimize impacts by limiting the degree or magnitude of the action and its implementation; (c) rectify impacts by repairing, rehabilitating or restoring the affected environment; (d) reduce or eliminate impacts over time by preservation and maintenance operations during the life of the action; or (e) compensate for impacts by replacing or providing substitute resources or environments.

Prescribed Fire - A fire burning under specified conditions that will accomplish certain planned objectives.

Quadratic Mean Diameter (QMD) –The diameter (DBH) of the tree of average per-tree basal area.

Reforestation - The natural or artificial restocking of an area with forest trees; most commonly used in reference to artificial stocking.

Regeneration Harvest - Timber harvest conducted with the partial objective of opening a forest stand to the point where favored tree species will be reestablished. A cutting procedure by which a new age class is created. The major methods are clear-cutting, seed-tree, and shelterwood (which retains some amount of trees for the purposes of shelter) - (*Dictionary of Forestry*).

Resource Management Plan (RMP) - A land use plan prepared by the BLM under current regulations in accordance with the Federal Land Policy and Management Act.

Rotation - The planned number of years between establishment of a forest stand and its regeneration harvest.

Seed Tree Regeneration Method - the cutting of all trees except for a small number of widely dispersed trees retained for seed production and to produce a new age class in fully exposed microenvironment. (SAF, 2014).

Seral Stages -The series of relatively transitory plant communities that develop during ecological succession from bare ground to the climax stage. There are five stages:

1) **Early-Seral Stage** - The period from disturbance to crown closure of conifer stands usually occurring from 0-15 years. Grass, herbs, or brush are plentiful.
2) **Mid-Seral Stage** - The period in the life of a forest stand from crown closure to ages 15- 40. Due to stand density, brush, grass, or herbs rapidly decrease in the stand. Hiding cover may be present.
3) **Late-Seral Stage** - The period in the life of a forest stand from first merchantability to culmination of mean annual increment. This is under a regime including commercial thinning, or to 100 years of age, depending on wildlife habitat needs. During this period, stand diversity is minimal, except that conifer mortality rates will be fairly rapid. Hiding and thermal cover may be present. Forage is minimal.
4) **Mature-Seral Stage** - The period in the life of a forest stand from Culmination of Mean Annual Increment to an old growth stage or to 200 years. This is a time of gradually increasing stand diversity. Hiding cover, thermal cover, and some forage may be present.
5) **Old Growth** - This stage constitutes the potential plant community capable of existing on a site given the frequency of natural disturbance events. For forest communities, this stage exists from approximately age 200 until when stand replacement occurs and secondary succession begins again. Depending on fire frequency and intensity, old growth forests may have different structures, species composition, and age distributions. In forests with longer periods between natural disturbances, the forest structure will be more even-aged at late mature or early old growth stages.

Site Class – A classification of site quality, usually expressed in terms of ranges of dominant tree height at a given age or potential mean annual increment at culmination. (Dictionary of Forestry)

Site Preparation - Any action taken in conjunction with a reforestation effort (natural or artificial) to create an environment that is favorable for survival of suitable trees during the first growing season. This environment can be created by altering ground cover, soil, or microsite conditions, using biological, mechanical, or manual clearing, prescribed burns, herbicides, or a combination of methods.

Skid Trail - A pathway created by dragging logs to a landing (gathering point).

Slash - The branches, bark, tops, cull logs, and broken or uprooted trees left on the ground after logging.

Snag - Any standing dead, partially-dead, or defective (cull) tree at least 10 inches in diameter at breast height (DBH) and at least 6 feet tall. A hard snag is composed primarily of sound wood, generally merchantable. A soft snag is composed primarily of wood in advanced stages of decay and deterioration, generally not merchantable.

Soil Compaction - An increase in bulk density (weight per unit volume) and a decrease in soil porosity resulting from applied loads, vibration, or pressure.

Soil Displacement - The removal and horizontal movement of soil from one place to another by mechanical forces such as a blade.

Soil Productivity - Capacity or suitability of a soil for establishment and growth of a specified crop or plant species, primarily through nutrient availability.

Stand (Tree Stand) - An aggregation of trees occupying a specific area and sufficiently uniform in composition, age, arrangement, and condition so that it is distinguishable from the forest in adjoining areas.

Stand Density - An expression of the number and size of trees on a forest site. May be expressed in terms of numbers of trees per acre, basal area, stand density index, or relative density index.

Stocked/Stocking - Related to the number and spacing of trees in a forest stand.

Sustained Yield - The yield that a forest can produce continuously at a given intensity of management.

Wildlife Tree - A live tree retained to become future snag habitat.

Yarding - The act or process of moving logs to a landing.

7.0 Appendix B: Road Construction, Improvement, and Renovation

Appendix B Table 1: Wild and Woolly Roads – Alternatives 2 and 3

Road/SpurName	Proposed Work	Segment	Length Miles	Surface Type		Culvert Replace/New		Post-Harvest Decomm Plan
				Current	Proposed	X-Drain	Stream	
16-2E-26	N/A	A & B1	0.98	Rock				Open/None
16-2E-26	Renovation	B2	0.61	Rock	Rock		1	Open/None
16-2E-26	Renovation	B3	0.20	Rock	Rock			Open/None
16-2E-23.5	Renovation		0.66	Rock	Rock			Open/None
16-2E-26.1	Renovation	A & B	0.82	Rock				Open/None
16-2E-23.1	Renovation		0.40	Rock	Rock			Open/None
Spur 23A	Construction		0.09	Native	Native			Block & Till

Appendix B Table 2: Finn Again Roads – Alternatives 2 and 3

Road/Spur Name	Proposed Work	Segment	Length Miles	Surface Type		Culvert Replace/New		Post-Harvest Decomm Plan
				Current	Proposed	X-Drain	Stream	
Spur 19A	Construction		0.17		Rock			Open/None
Spur 19A1	Construction		0.06		Rock			Open/None
16-2E-29	N/A	A	0.45	Paved				Open/None
16-2E-29	Renovation	B - portion	0.22	Paved				Open/None
16-2E-29	Renovation	B - portion	0.85	Rock				Open/None
16-2E-29	Renovation	C	2.69	Rock				Open/None
16-2E-19.1	Renovation		1.13	Rock	Rock	2	1	Open/None
16-2E-19.3	Renovation		0.15	Rock	Rock			Open/None
16-2E-19.7	Renovation		0.25	Rock	Rock			Open/None
16-2E-18.3	Renovation		0.07	Rock				Open/None

Appendix B Table 3: Mid Indian Roads – Alternatives 2 and 3

Road/Spur Name	Proposed Work	Segment	Length	Surface Type		Culvert Replace/New		Post-Harvest Decomm Plan
			Miles	Current	Proposed	X-Drain	Stream	
ALTs 2 and 3 Haul Route								
Spur 16A	Construction		0.38		Rock	2	2	Open/None
Spur 21A	Construction		0.29		Rock	4		Open/None
Spur 21A	Improvement		0.07	Native	Rock	1	1	Open/None
Spur 21A1	Construction		0.12		Rock	2		Open/None
Spur 21A2	Construction		0.04		Rock			Open/None
Spur 21B	Construction		0.20		Rock	2		Open/None
Spur 21C	Construction		0.06		Rock	1		Open/None
16-2E-16 (WY 1163)	Renovation		0.73	Rock	Rock			Open/None
16-2E-16.1 (WY 1160)	Renovation	B	1.30	Rock				Open/None
16-2E-21.1	Renovation		0.10	Rock	Rock			Open/None
16-2E-21.2	Renovation		0.08	Rock	Rock			Open/None
16-2E-21.5 (1163A)	Renovation		0.36	Rock	Rock			Open/None
16-2E-22.2 (WY 37)	Renovation		0.76	Rock				Open/None
16-2E-23.3	Renovation		2.81	Rock	Rock	2	1	Open/None
16-2E-23.6 (WY 30)	Renovation	A	2.02	Rock				Open/None
16-2E-23.6	Improvement	B	0.21	Rock	Rock	2	1	Block Only
16-2E-23.6	Renovation	C	0.81	Rock	Rock			Open/None
16-2E-23.6 Jct.	Construction		0.02		Rock	1		Open/None
16-2E-26	Renovation	A-B1	0.97	Rock				Open/None
16-2E-29	N/A	A	0.45	Paved				Open/None
16-2E-29	Renovation	B - portion	0.22	Paved				Open/None
16-2E-29	Renovation	B - portion	0.85	Rock				Open/None
16-2E-29	Renovation	C	6.10	Rock				Open/None

8.0 Appendix C - Figures

Figure C-2
Finn Again, T. 16 S., R. 2 E., SEC. 19
Proposed Regeneration Harvest - Alternative 2

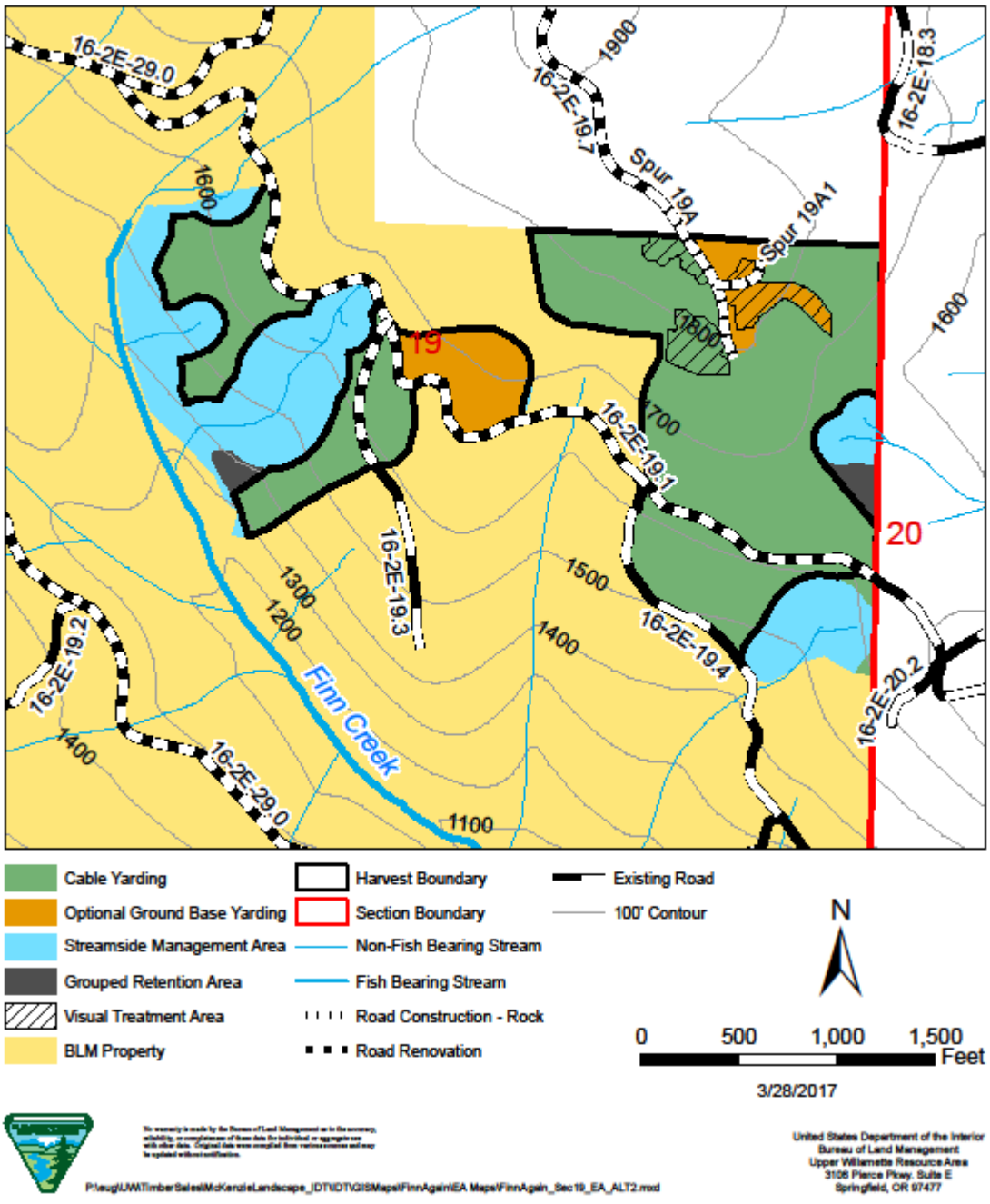


Figure C-3
Finn Again, T. 16 S., R. 2 E., SEC. 19
Proposed Green Tree Retention - Alternative 2

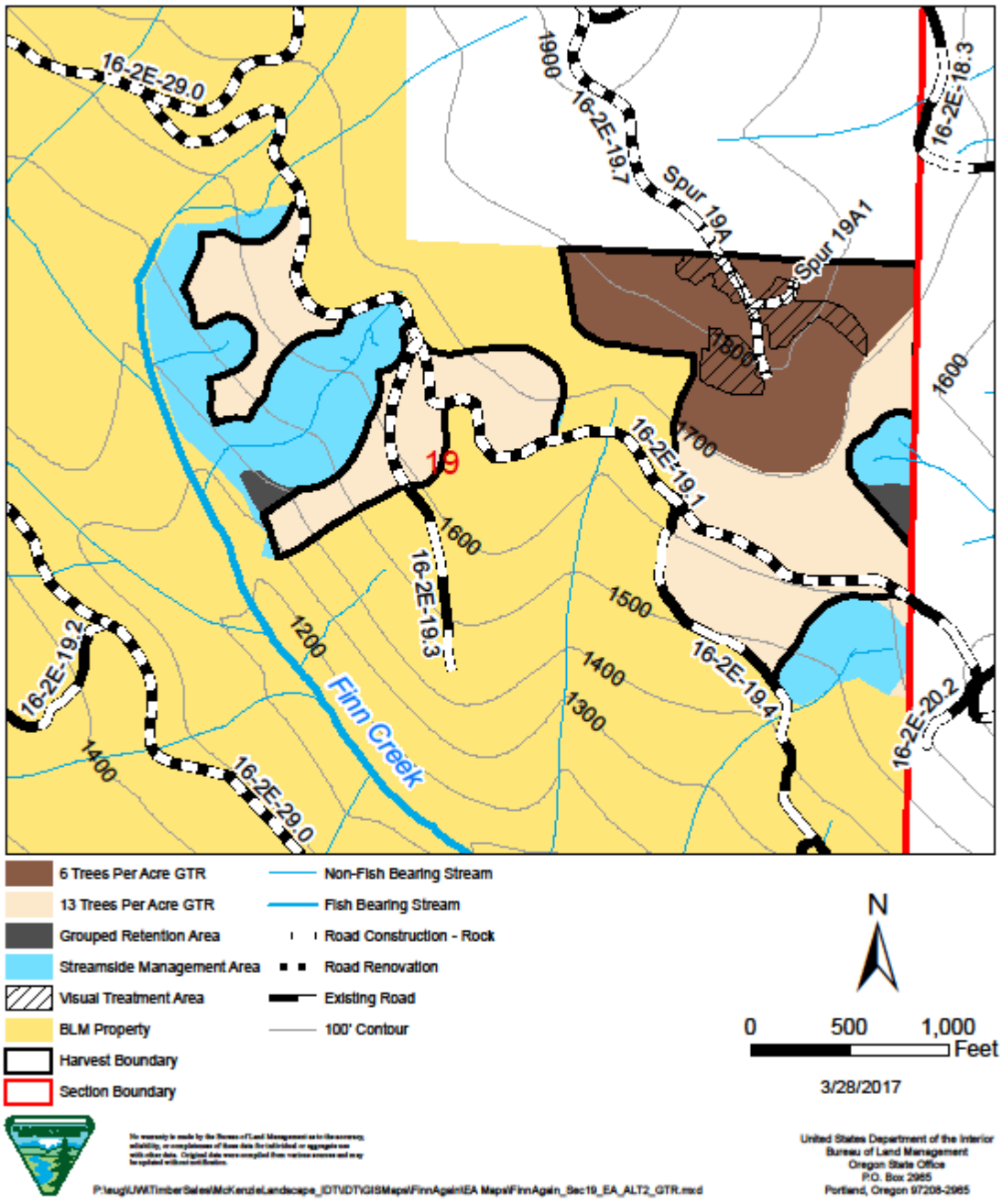


Figure C-4
Mid Indian, T. 16 S., R. 2 E., SEC. 20 and 21
Proposed Regeneration Harvest - Alternative 2

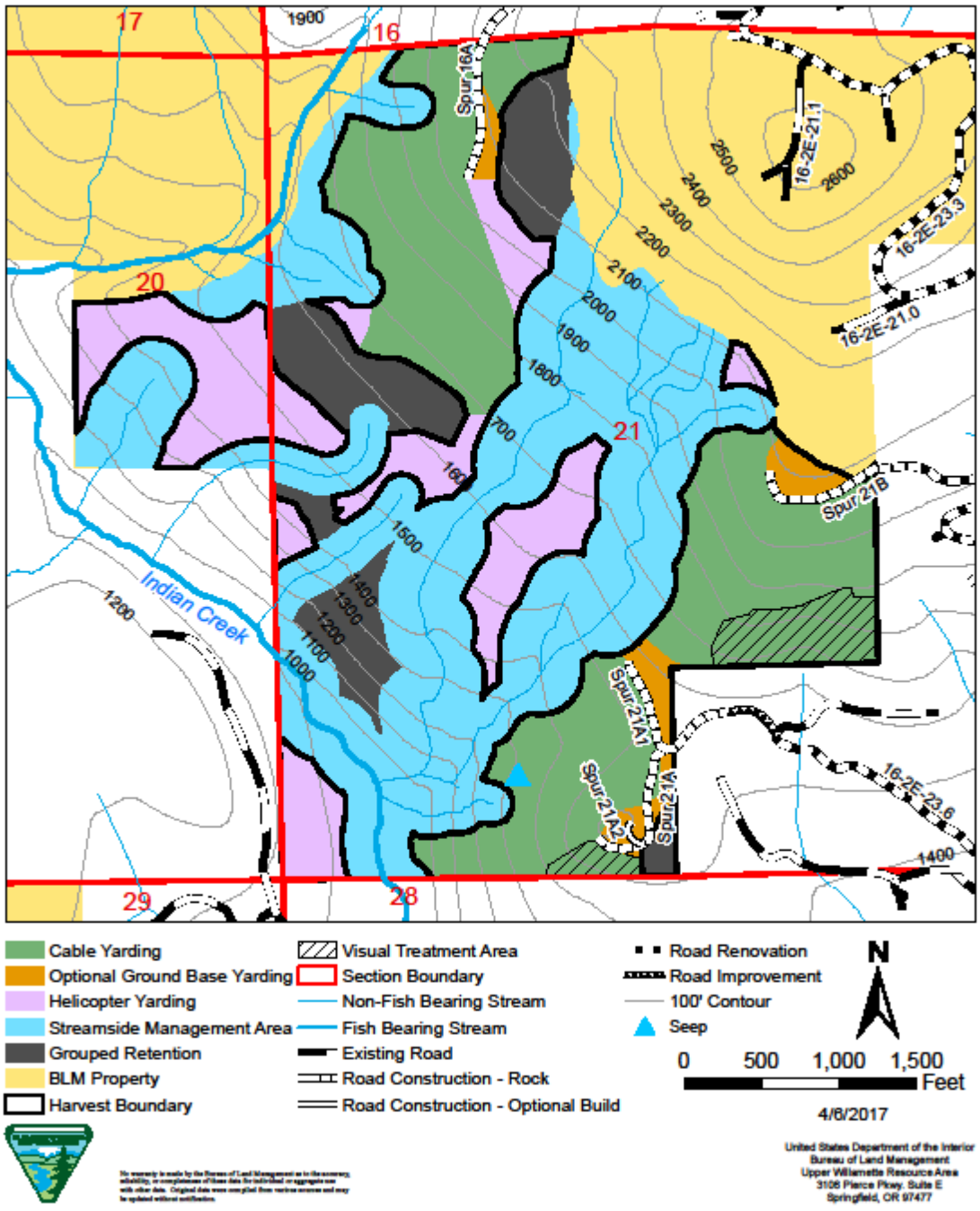


Figure C-5
Mid Indian, T. 16 S., R. 2 E., SEC. 20 and 21
Proposed Green Tree Retention - Alternative 2

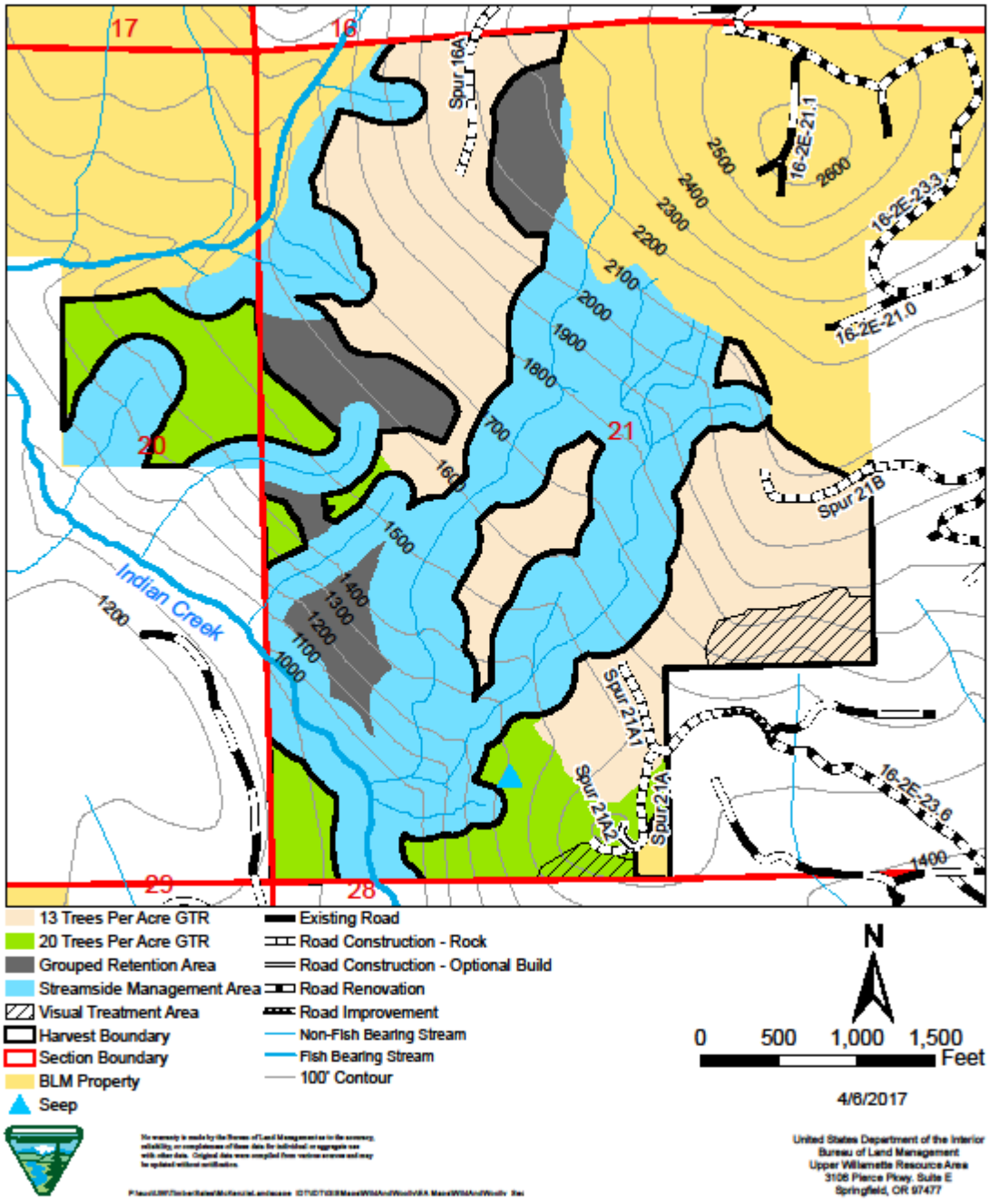


Figure C-6
Wild and Woolly, T. 16 S., R. 2 E., SEC. 23
Proposed Thinning Harvest - Alternative 3

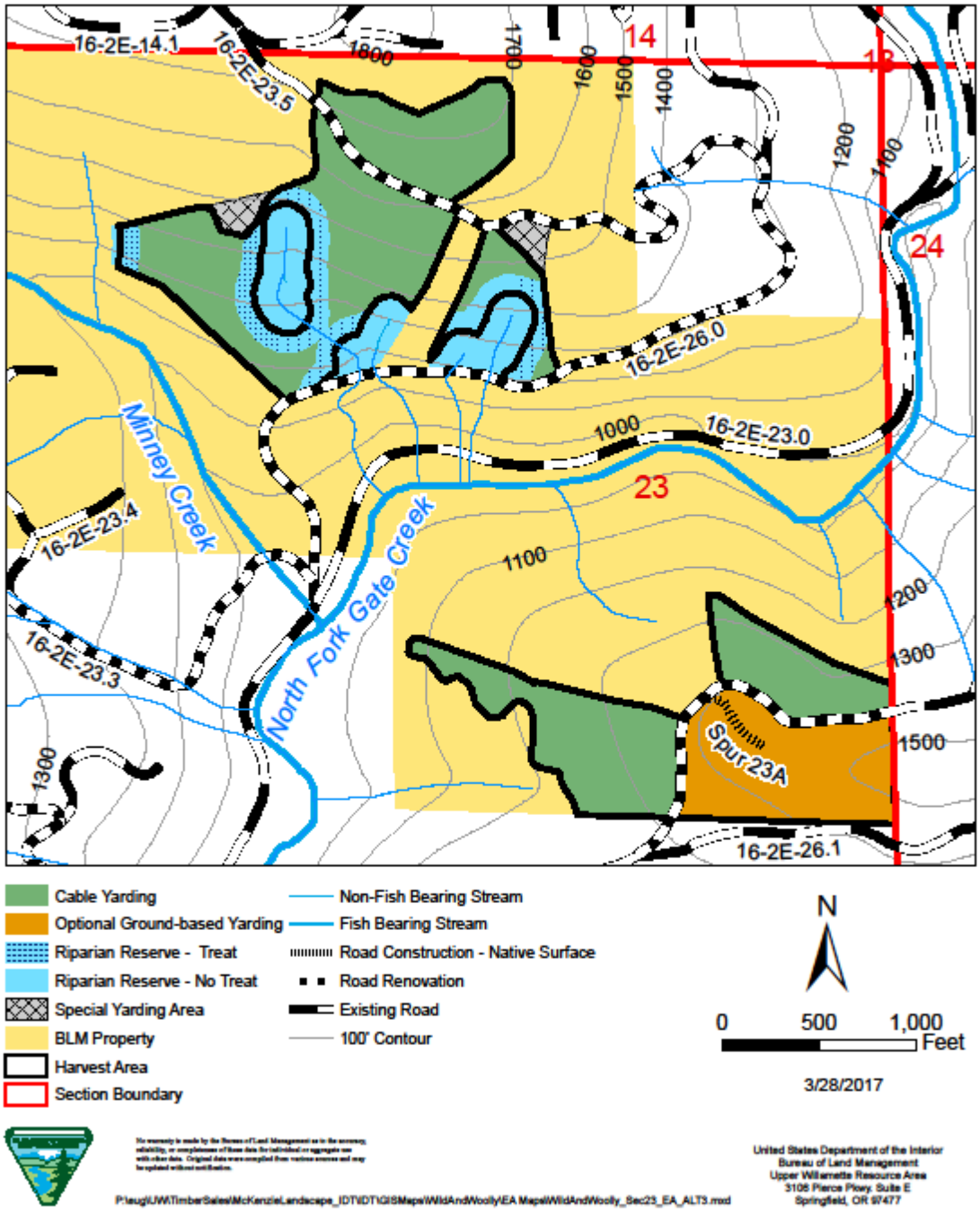


Figure C-7
Finn Again, T. 16 S., R. 2 E., SEC. 19
Proposed Regeneration Harvest - Alternative 3

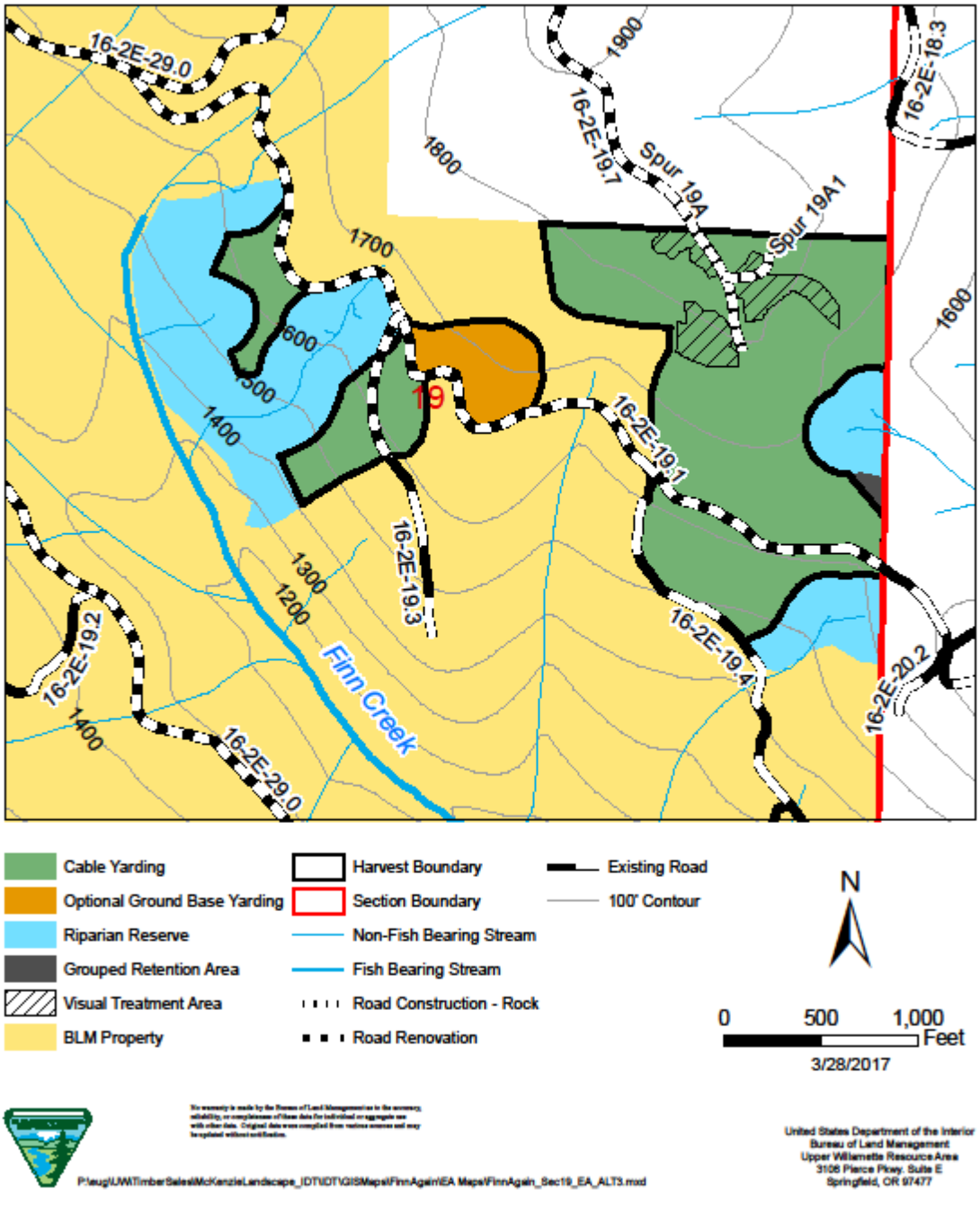


Figure C-8
Mid Indian, T. 16 S., R. 2 E., SEC. 20 and 21
Proposed Regeneration Harvest - Alternative 3

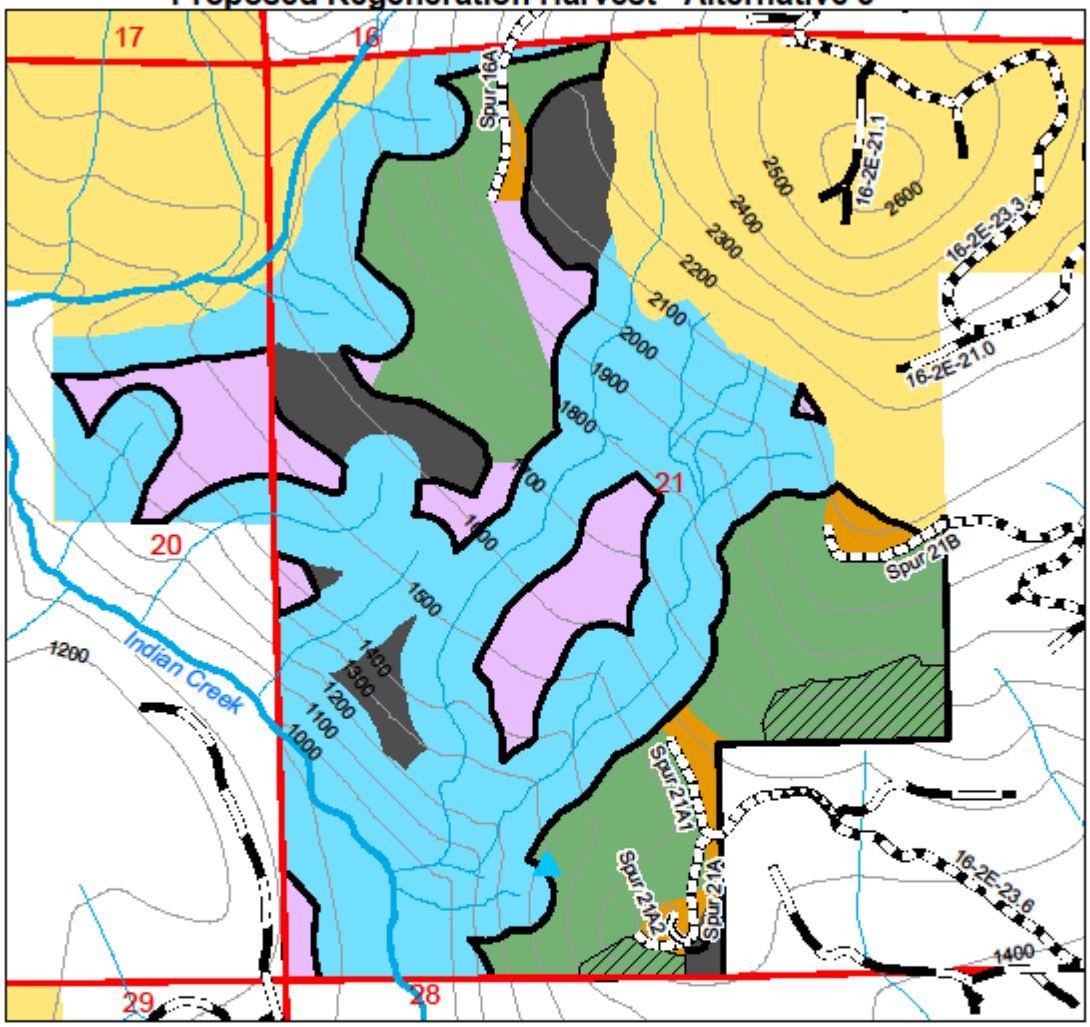
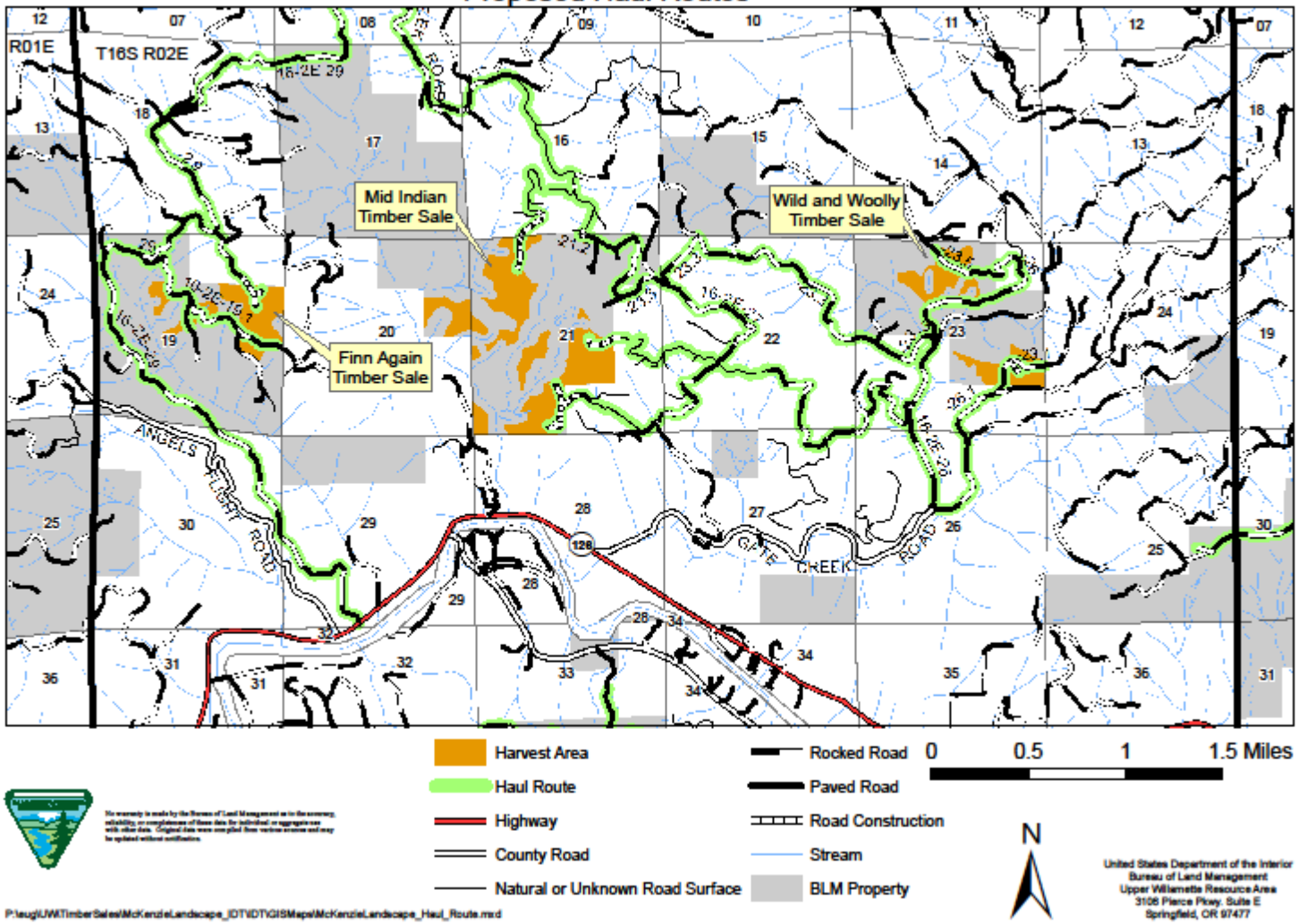


Figure C-9
Proposed Haul Routes



UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
NORTHWEST OREGON (formally Eugene) DISTRICT OFFICE

PRELIMINARY FINDING OF NO SIGNIFICANT IMPACT

DOI-BLM-ORWA-N050-2013-0001-EA
McKenzie Landscape Project Environmental Assessment

The Bureau of Land Management (BLM) has prepared an Environmental Assessment (EA), (DOI-BLM-ORWA-N050-2013-0001-EA), for the McKenzie Landscape project, which analyzed the effects of the proposed action and alternatives. On the basis of the information contained in the EA, and all other information available to me, it is my determination that the implementation of the action alternatives would not have a significant effect on the quality of the human environment, considering the context and intensity of impacts (40 CFR 1508.27). Therefore, an environmental impact statement is not necessary and will not be prepared.

This finding is based on my consideration of the Council on Environmental Quality's (CEQ) criteria for significance (40 CFR 1508.27), both with regard to the context and to the intensity of the impacts as described in the EA.

Brief Project Description

The Upper Willamette Field Office, Northwest Oregon District (formerly Eugene District), Bureau of Land Management (BLM) is proposing to undertake forest management activities evaluated in this McKenzie Landscape Environmental Assessment (EA). The project proposes a commercial thinning harvest on approximately 71 acres and two regeneration harvests with retention and snag/coarse woody debris creation on approximately 261 acres. The project is located in the McKenzie River fifth-field watershed, approximately 1-3 miles north, northwest, and northeast of Vida, Oregon, in Lane County, in Township 16S Range 2E Sections 19, 20, 21, and 23. Associated activities include road management (construction, renovation, improvement, decommissioning, culvert installation), truck haul, reforestation (site preparation, planting), and fuels management/reduction.

Public Involvement

On September 3, 2013, a scoping notice soliciting comments and announcing a public scoping meeting was sent to members of the Eugene District mailing list, nearby landowners, and members of the McKenzie River Guides with publicly posted addresses. The scoping notice was also posted to the Eugene District planning website. In addition, press releases were issued to local media outlets including television, radio, web-based, and print. A public scoping meeting was held in Leaburg, Oregon, on September 26, 2013, with over 70 attendees. The BLM received and reviewed comments submitted on the project and incorporated substantive comments into issues in the EA. An EA was made available for a 30-day public comment period on November

23, 2016. Comments received, in combination with haul road changes, led to revisions and reissuance of the EA in April, 2017, with a 15-day public comment period.

CONTEXT

BLM adopted its Eugene District Resource Management Plan in 1995, incorporating the 1994 Northwest Forest Plan (NWFP) and its EIS. BLM has thus prepared two EISs that consider the significant and potentially significant effects of conducting timber harvest in the Eugene District within stands of the age classes found in this project. The EISs for the NWFP and 1995 Eugene RMP projected effects over the lifetime of that plan to date for 10,260 acres of regeneration harvest. In actuality, the Eugene District offered 3,167 acres of regeneration harvest, only 31% of the projected amount of regeneration harvest. The approximately 255 acres proposed for regeneration harvest under the McKenzie Landscape EA would equate to an additional 2.5%. Given the very large discrepancy between the acreage of regeneration harvest assumed within the effects analysis of the NWFP and RMP EISs and what the Eugene District has actually offered for sale, it is clear that the incremental effect of the harvest proposed in the McKenzie Landscape EA is well within the effects of the total regeneration harvest projected within the Eugene District's RMP EIS. Even though the incremental harvest within the McKenzie Landscape EA falls within the RMP EIS's effects analysis, the BLM analyzed the specific effects of the proposed action to determine if the McKenzie Landscape EA timber sales are in and of themselves significant under NEPA. The BLM has determined the effects are not significant, for the reasons detailed below in the evaluation of the NEPA intensity factors.

This project is a site-specific action that by itself does not have international, national, region-wide, or statewide importance. The actions described in the action alternative would be limited in scope and geographic application (40 CFR 1508.27(a)). The location of the action is described in the EA (pp.1-3) and displayed on maps (EA, Appendix C). The affected environment sections of Chapter 3 in the EA describe the locations and current conditions of the various resources. The direct and indirect effects of the action alternatives along with cumulative effects (incremental effects of the proposed action in light of past, present, and reasonably foreseeable future actions) for each resource are described in Chapter 3. The physical and biological effects were found to be limited. Most of the direct and indirect environmental effects would be confined to the project area, with some effects extending slightly outside the project area. These analyses were reviewed in consideration of the Council on Environmental Quality (CEQ) guidance on cumulative effects analysis, and results were disclosed in the EA.

The actions would occur in the Central Cascades Adaptive Management Area (AMA) Land Use Allocation (LUA) as designated by the 1995 Eugene District Resource Management Plan (1995 RMP). The action alternatives are in compliance with the 1995 RMP, as amended. Listed under Timber Resources as acres available for scheduled timber harvest, AMA objectives are similar to those for Matrix lands (General Forest Management Areas). The relevant Timber Resources objectives with which the McKenzie Landscape project complies include:

- Provide a sustainable supply of timber and other forest products

- Manage developing stands on available lands to promote tree survival and growth and to achieve a balance between wood volume production, quality of wood, and timber value at harvest.

The McKenzie Landscape project is consistent with the 2001 ROD and *Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines*, as incorporated into the 1995 RMP. The project utilizes the December 2003 Survey and Manage species list. This list incorporates species changes and removals made as a result of the 2001, 2002, and 2003 Annual Species Reviews (ASR) with the exception of the red tree vole. For the red tree vole, the Ninth Circuit Court of Appeals in KSWC et al. v. Boody et al., 468 F3d 549 (9th Cir. 2006) vacated the category change and removal of the red tree vole in the mesic zone, and returned the red tree vole to its status as existed in the 2001 ROD Standards and Guidelines, which makes the species Category C throughout its range. All required surveys and management actions required under the Survey and Manage program were followed for the project area.

The BLM signed a Record of Decision approving the Northwestern and Coastal Oregon Resource Management Plan (2016 ROD/RMP) on August 5, 2016. This ROD/RMP will provide overall future direction for management of all resources on BLM-administered lands in western Oregon, including the Eugene District (now consolidated with the former BLM Salem District into the Northwest Oregon District). Revision of an RMP necessarily involves a transition from the application of the old RMP to the application of the new RMP. Allowing for a transition from the old RMP to the new RMP avoids disrupting the management of BLM-administered lands and allows the BLM to utilize work already begun on the planning and analysis of projects.

For a project like the McKenzie Landscape EA, which was initiated but not completed before the issuance of the 2016 ROD/RMP, the 2016 ROD allows the BLM to implement the project consistent with either the 1995 RMP or the 2016 RMP, at the discretion of the decision maker, if:

- the BLM had not signed a project-specific decision prior to the effective date of the ROD (August 5, 2016)
- the BLM began preparation of NEPA documentation prior to the effective date of the ROD
- the BLM signs a project-specific decision on the project within two years of the effective date of the ROD, and
- [for projects undertaken under the 1995 RMP] the project does not include any of the five actions that are excepted by the ROD and therefore prohibited during the 2-year transition period.

The McKenzie Landscape EA meets these criteria, as the District initiated planning and NEPA documentation for this project in August, 2013, with a project initiation letter to the interdisciplinary team, and the project does not include any of the five prohibited actions ("exceptions"), as described in the below review of each exception. [Note: it may be helpful to think of an Exception is a Prohibition and, in the below section on Exceptions, the "approved RMP" means the 2016 RMP.]

Exception 1: Regeneration harvest within the Late-Successional Reserve (LSR) allocated by the 2016 ROD that is inconsistent with the management direction for the LSR contained within the approved RMP. (Note: construction of roads or landings does not constitute regeneration harvest per the 2016 ROD/RMP.)

> ***Review:*** Under the 2016 RMP, the McKenzie Landscape Project includes lands designated as the Harvest Land Base – Moderate Intensity Timber Area, District-Designated Reserve (which in this project area consists only of land designated for road corridors), District-Designated Reserve – Timber Production Capability Classification, Late-Successional Reserve, and Riparian Reserve land use allocations. No LSR lands within the project area are proposed for regeneration harvest.

Exception 2: Issuance of right-of-way grants within the Late-Successional Reserve allocated by the 2016 ROD that are inconsistent with the management direction for the Late-Successional Reserve contained within the approved RMP.

> ***Review:*** The McKenzie Landscape Project does not include any proposal for issuance of rights-of-way grants within Late-Successional Reserve.

Exception 3: Commercial thinning within the inner zone of the Riparian Reserve allocated by the 2016 ROD that is inconsistent with the management direction for the Riparian Reserve contained within the approved RMP.

> ***Review:*** The McKenzie Landscape Project does not include any commercial timber harvest within the inner zone of the Riparian Reserve (RR) allocated by the 2016 ROD. Wild & Woolly is in a Class 1 watershed (Gate Creek) and Finn Again and Mid Indian are in Class 2 watersheds (Finn Creek, Indian Creek). For Class 1 and 2 watersheds, the inner zone of the RR per the 2016 RMP is 120 feet from the edge of the ordinary high water line. The no-cut distance (buffer) for Wild & Woolly is 120 feet and the no-cut buffers for Finn Again and Mid Indian are a minimum of 135 feet.

Exception 4: Projects within the District-Designated Reserve – Lands Managed for their Wilderness Characteristics allocated by the 2016 ROD that are inconsistent with the management direction for the District-Designated Reserve – Lands Managed for their Wilderness Characteristics contained within the approved RMP.

> ***Review:*** No portion of the McKenzie Landscape Project is located within the District-Designated Reserve – Lands Managed for their Wilderness Characteristics land use allocation.

Exception 5: Timber harvest that would cause the incidental take of northern spotted owl territorial pairs or resident singles and does not have a signed Biological Opinion and Incidental Take Statement that predates the effective date of the Biological Opinion for the approved RMP.

> ***Review:*** The McKenzie Landscape Project includes timber harvest that would cause the incidental take of northern spotted owl territorial pairs or resident singles. However, the BLM received a Biological Opinion from the U.S. Fish and Wildlife Service on October 6, 2014

(see EA Section 4.0), almost two years prior to the effective date of the Biological Opinion for the approved (2016) RMP. The October 2014 Biological Opinion grants incidental take to northern spotted owls for anticipated effects of timber harvest included in the McKenzie Landscape Project (further details are in the EA Section 4.0).

INTENSITY

I have considered the potential intensity of the impacts that would result from the action alternatives relative to each of the ten areas suggested for consideration by the CEQ, as detailed below (40 C.F.R. § 1508.27(b)):

1. **Impacts that may be both beneficial and adverse.**

   I considered both beneficial and adverse impacts associated with the action alternatives as presented in the Mckenzie Landscape EA. These impacts are within a range of effects identified in the Eugene District Final Proposed Resource Management Plan/Final Environmental Impact Statement (FEIS; 1994) for timber resources (Chapter IV, p. 4-106 to 4-119) and other resources as they relate to timber management (Soils, p. 4-15 to 4-20; Water, p. 4-21 to 4-25; Fish, p. 4-66 to 4-67; Wildlife, p. 4-51 to 4-65; Recreation, p. 4-103 to 4-105; Cultural Resources, p. 4-97; and Climate Change, p. 4-9) and the NWFP EIS to which this EA is tiered.

   The EA for the McKenzie Landscape project identified impacts, both beneficial and adverse, for six issues presented in detail. The potential for adverse impacts from the action alternatives are similar to other projects previous to this one and are not unique to this project. These impacts are minimized and/or avoided using the Project Design Features (PDFs) found in the EA (pgs. 31-37). In BLM'S experience implementing previous projects, we have found similar activities using these or similar design criteria to be effective in avoiding or minimizing adverse effects. The analysis indicates that the disclosed adverse impacts are within the range of effects analyzed in the Eugene District RMP/FEIS.

   Visual Effects

   Thinning harvest: The thinning units are not visible from the McKenzie River corridor and harvest activities therefore would have no impact on the viewshed.

   Regeneration harvest: Although the project area is within VRM Class IV, the special visual management areas combined with retention of larger trees dispersed throughout the proposed harvest areas and the irregular shapes of harvest openings would also meet the more restrictive VRM Class II objective of permitting management activities to be seen without attracting the attention of the casual observer. Lands in the area have primarily been managed for timber production since the turn of the century resulting in views from the McKenzie River corridor of a patchwork mosaic of various aged stands ranging from current clear-cuts to mature timber. The proposed project is a forest management activity that fits within this mosaic pattern. The project would not substantially change the

appearance of the larger landscape because it is similar to the type and size of forest management activities that occur in the area. Many of these hillsides have recently been harvested and replanted. The actions would not substantially shift the ratio between newly harvested areas and more mature stands in the viewshed nor would it contribute to heightened sensitivity levels or cause the scenic quality of the overall landscape to change.

Carbon storage/release

Carbon stored and harvested on BLM-Administered lands in western Oregon represents 1% of the total carbon stored in forests and harvested wood in the United States, and 0.02% of the global carbon storage in vegetation, soil, and detritus ((USDI, 2008) Vol.1, Ch. 3, p. 220). With the implementation of the project design features described in EA Section 2.6, potential effects to the affected elements of the environment are anticipated to be site-specific and/or not measurable (i.e. undetectable over the watershed, downstream, and/or outside of the project areas). The differences in carbon storage and sequestration among the alternatives over time are too small to reveal differences when placed in the context of regional, national, or global carbon storage.

Course woody debris/snags

Retention and Operational Damage: PDFs would protect and retain snags and CWD to the extent feasible during harvest operations. However, harvest actions (e.g., felling, yarding, road construction) would damage or destroy some snags or CWD (particularly those in higher decay classes); including snags knocked over inadvertently, or intentionally cut for operational or safety reasons. Harvest could also inadvertently initiate snag development by creating broken top or lift trees, or damaging live trees and introducing decay processes (e.g., cuts, gouging, bark, or root damage), however, the anticipated type and amount of any such damage is unknown.

Canopy, Microclimate and Surrounding Forest Conditions: Environmental conditions such as temperature, humidity and solar exposure surrounding snags and CWD would also change due to a reduction in canopy cover and surrounding forest vegetation. The most pronounced microclimate effects to snags would be short term (15-20 years) and vary between positive and negative depending on their slope location and specific species' use. For example: warmer conditions could benefit some types of bat roosting behavior; while reduced forest canopy could increase predation of cavity nesting birds or their young. Canopy conditions and microclimates are expected to recover to pre-harvest conditions within 15-20 years.

Wildlife Use of Snags and CWD: Many species would continue to use snags and CWD as canopy cover and microclimate conditions recover. Some wildlife species are more sensitive to environmental changes in snag and CWD habitat and their use of these habitats would change. For example, bats directly respond to the ambient air temperature and solar exposure near snags. Many amphibians require cool and moist conditions in or near their CWD habitat. After canopy conditions recover, wildlife use of retained snags and CWD would begin to return to pre-harvest conditions. Created snag and CWD would begin to benefit species within 3-5 years after harvest.

Cumulative Effects

Commercial thinning as a regular forest management action in the project area would reduce the intensity or duration of stem exclusion processes, and thereby reduce the amount of snags and CWD recruited by natural processes. Cumulatively, the effects of the proposed action would result in a lower quality and amount of snags and CWD than found in comparable unmanaged stands, with associated habitat losses.

Northern Spotted Owls

ESA consultation considered effects to general habitat, habitat within sites, reproduction, and disturbance; and effects relevant to Recovery Actions 10 and 32 in the recovery plan. Project actions would not affect critical habitat. Consultation determined that overall project actions *may affect, and are likely to adversely affect,* the spotted owl primarily due to removal of suitable nesting habitat, and habitat modification within the Provincial Home Range of both the Finn Creek and South Fork Gate Creek known owl sites. By design, project actions would conform to the standards, analyses, and other guidance in these documents.

Listed fish

There are likely to be short-term negative effects to the suspended sediment and substrate in stream reaches within Gate Creek. Transport of sediment and road runoff would likely occur during periods of heavy rain during the wet winter months and spring after Chinook salmon have spawned but their eggs are in the gravels of North Fork Gate Creek and Gate Creek. This would happen during the 3-year timber sale contract period during the winter and spring months. Due to the localized nature of these effects (North Fork Gate Creek down to Gate Creek main stem, approximately 0.5 mile), the project would only adversely affect a small portion of the Chinook salmon population in the project area (Gate Creek immediately adjacent to the project and haul route area). At these times of year, Chinook salmon adults attempting to spawn would not be affected.

The BLM consulted with the National Marine Fisheries Service (NMFS) and received a Biological Opinion with a *may affect- likely to adversely affect* determination for timber sales on Upper Willamette Spring Chinook Salmon (NMFS). Upper Willamette River Spring Chinook salmon have critical habitat downstream of Wild and Woolly in Gate Creek, about 500 feet downstream from Gate Creek tributaries, about 0.3 mile away on Indian Creek, and 0.75 mile away on Finn Creek. The BLM also consulted with the United States Fish and Wildlife Service (USFWS) and they concluded that implementation of the activities as described within the Biological Assessment would not jeopardize the continued existence of bull trout nor would it adversely modify their critical habitat (April 22, 2015).

2. The degree to which the proposed action affects public health and safety.

No aspect of the action alternatives would have an effect on public health and safety.

The project's effects to public health and safety would not be significant because the project occurs in a forested setting, removed from urban and residential areas, where the primary

activities are forest management and timber harvest. Public safety along haul routes would be minimally affected because log truck traffic from forest management activities on both private and public land is common and the majority of the public using these haul routes are aware of the hazards involved in driving on these forest roads.

Smoke management from pile burning would comply with the Clean Air Act and the State of Oregon Air Quality Standards by adhering to the Oregon Smoke Management Plan. Adherence to the Oregon Smoke Management Plan would greatly limit smoke dispersal. Due to the combination of burning only on days with stable atmospheric conditions and limited smoke dispersal, there would be no significant impacts on air quality associated with burning, and hence no significant impacts on public health or safety from burning.

The proposed action would have no impact on geologic conditions or increase risk of catastrophic landslides. No drinking water sources are present in the project area and, therefore, would not be affected by the proposed action.

No herbicides would be used in conjunction with this project. Thus there would be no public health or safety issue presented by the use of herbicides associated with this project.

3. Unique characteristics of the geographic area such as proximity of historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas.

There would be no significant effects on unique characteristics of the area such as historic or cultural resources, park lands, prime farmlands, wild and scenic rivers, or ecologically critical areas (including areas of Critical Environmental Concern) as there are no such areas in the project vicinity.

4. The degree to which the effects on the quality of the human environment are likely to be highly controversial.

The effects on the quality of the human environment are not likely to be highly controversial. CEQ guidelines relating to controversy refer not to the amount of public opposition or support for a project, but a substantial dispute as to the size, nature, or effect of the action. The effects of actions planned under the action alternatives are similar to many other forest management projects implemented within the scope of the 1995 Eugene RMP. No unique or appreciable scientific controversy has been identified regarding the effects of the project. There is, therefore, no known scientific controversy over the impacts of the project. The proposed projects are not unique or unusual.

The BLM is, as noted, aware that social controversy is ongoing over the existence and practices of the BLM's timber harvest program across western Oregon. The societal debate, reflected in the comments received by the BLM, is precisely the public opposition or support that the CEQ guidelines have identified as not relevant to the term "controversy" as applied to NEPA. The BLM has addressed comments provided during scoping and will respond to comments on the EA in the Decision Record. Comments have not constituted a

true dispute over the size, nature, or effects of the action. Because the comments received from the public do not establish such a dispute, the action is not controversial under NEPA.

5. The degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks.

The action alternative would not impose highly uncertain impacts or involve unique or unknown risks. The analysis has not shown that there would be any unique or unknown risks to the human environment not previously considered and analyzed in 1994 FEIS, to which this decision is tiered. Timber harvest is a common practice on lands managed by the BLM in western Oregon, and the activities and associated design criteria incorporated with this decision are well-established land management practices. The risks are well known and understood. Based on this, and previous similar actions, the probable effects of this decision on the human environment, as described in the EA, do not involve effects that are highly uncertain or involve unique or unknown risks.

6. The degree to which the action may establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration.

This project neither establishes a precedent nor represents a decision in principle about future actions. The timber management program on BLM managed lands in western Oregon is well established and this project would not establish a new precedent of management for this program. The action alternatives are consistent with actions appropriate for the Adaptive Management Area land use allocation as designated by the RMP. This project would not bind any future BLM actions and would not shape or determine BLM forestry methods or strategies beyond this project.

7. Whether the action is related to other actions with individually insignificant but cumulatively significant impacts.

The Interdisciplinary Team evaluated the project in context of past, present, and reasonably foreseeable actions and determined that there is not a potential for significant cumulative effects beyond those analyzed in the Eugene District RMP / FEIS and the NWFP FEIS. There are no individual or cumulatively significant impacts identified by the analysis conducted for the McKenzie Landscape Project EA. Cumulative effects analysis for the project area, by Issues, were presented in Chapter 3 of the EA. Effects from the action alternatives were largely localized with minimal impacts outside the project area.

8. The degree to which the action may adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural, or historic resources.

The BLM conducted cultural resource inventories for the McKenzie Landscape Project in the fall of 2013 through the spring of 2014. New cultural resource sites were discovered and recorded. All newly discovered sites were considered potentially eligible for listing in the Register of Historic Places, pursuant to Section 106 of the National Historic Preservation Act, and were avoided through project redesign. As a result, no effects to resources listed in or eligible for listing in the National Register of Historic Places are anticipated from the

project. No other resources of a scientific, cultural or historic nature were identified in the project area.

9. **The degree to which the action may adversely affect an endangered or threatened species or its habitat that has been determined to be critical under the Endangered Species Act of 1973.**

Terrestrial Species

Northern Spotted Owl

Project actions were consulted on with same sale names used in this EA: Finn Again, Mid Indian and Wild and Woolly. The Willamette Province Level 1 Team (terrestrial subgroup) prepared a batched biological assessment: Willamette Planning Province FY2015. Biological Assessment of LAA Projects with the Potential to Modify Habitat and/or Disrupt Northern Spotted Owls (USDI-USDA 2014). This assessment was submitted to the USFWS on approximately July 30, 2014. The USFWS issued a corresponding BO on October 6, 2014: Biological Opinion Regarding the Effects of Habitat Modification Activities on the Northern Spotted Owl and its Critical Habitat within the Willamette Planning Province, FY 2015, Proposed by the Eugene District, Bureau of Land Management; Salem District, Bureau of Land Management; Mt. Hood National Forest; Willamette National Forest; and the Columbia River Gorge National Scenic Area (FWS Reference Number 01EOFW00-2014-F-0221). By design, project actions would conform to the standards and analyses in these documents for habitat modification, disturbance and consistency with analyzed recovery plan recovery actions.

ESA consultation considered effects to general habitat, habitat within sites, reproduction, and disturbance; and effects relevant to Recovery Actions 10 and 32 in the recovery plan. Project actions would not affect critical habitat. Consultation determined that overall project actions may affect, and are likely to adversely affect, the spotted owl primarily due to removal of suitable nesting habitat, and habitat modification within the Provincial Home Range of both the Finn Creek and South Fork Gate Creek known owl sites. By design, project actions would conform to the standards, analyses, and other guidance in these documents.

The McKenzie Landscape project would not appreciably diminish the effectiveness of the conservation efforts established under the Revised Recovery Plan for the Spotted Owl, the Northwest Forest Plan, or the Critical Habitat Rule. Reasonably foreseeable future actions on adjacent private lands in the project area, watershed, and Willamette Planning province would not result in cumulative effects that would change these effects determinations.

There are no other Threatened or Endangered wildlife or botany species within the project area, and there is no causal mechanism for the project to affect any Threatened or Endangered terrestrial species outside of the project area.

Aquatic Species

The BLM consulted with the National Marine Fisheries Service (NMFS) and received a Biological Opinion with a *may affect- likely to adversely affect* determination for timber

sales on Upper Willamette Spring Chinook Salmon (NMFS). Upper Willamette River Spring Chinook salmon have critical habitat downstream of Wild and Woolly in Gate Creek, about 500 feet downstream from Gate Creek tributaries, about 0.3 mile away on Indian Creek, and 0.75 mile away on Finn Creek. The BLM also consulted with the United States Fish and Wildlife Service (USFWS) and they concluded that implementation of the activities as described within the Biological Assessment would not jeopardize the continued existence of bull trout nor would it adversely modify their critical habitat (April 22, 2015).

Implementation of the proposed actions would not change the likelihood of and need for listing of any Special Status Species under the ESA as identified in BLM Manual 6840 and BLM OR/WA 6840 policy.

10. Whether the action threatens a violation of Federal, State, or local law or requirements imposed for the protection of the environment.

The action alternatives do not threaten to violate any Federal, State, or local laws imposed for the protection of the environment including, but not limited to, the Clean Water Act, Clean Air Act, and Endangered Species Act. The action alternatives comply with the 1995 Eugene RMP, which provides direction for the protection of the environment on public lands. Project design criteria listed in the EA would assure compliance with these laws. The EA also meets National Environmental Policy Act disclosure requirements.

Pursuant to Executive Order 13212, the BLM must consider the effects of this decision on the President's National Energy Policy. As there would be no impact to the exploration, development, or transportation of undeveloped energy sources from the proposed action, a Statement of Adverse Energy Impacts is not required.

CONCLUSION

Based on the information contained in the EA (DOI-BLM-ORWA-E060-2013-0005-EA), and all other information available to me, I have determined that the action alternatives would not have a significant impact on the human environment within the meaning of section 102(2)(c) of the National Environmental Policy Act of 1969, and that an Environmental Impact Statement is not required. I have determined that the effects of the proposed activities would be in conformance with the 1995 Record of Decision/Resource Management Plan for the Eugene District.

Signature of the Responsible Official:

William O'Sullivan
Upper Willamette Field Manager
Northwest Oregon District Office

Date: