U.S. Department of Interior
Bureau of Land Management
Medford District, Ashland Field Office

Bear Grub Vegetation Management Project Environmental Assessment

DOI-BLM-ORWA-M060-2020-0001-EA

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OR/WA Bureau of Land Management
Medford District, Ashland Field Office
3040 Biddle Road
Medford, Oregon 97504
541-618-2200

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BEAR GRUB VEGETATION MANAGEMENT PROJECT ENVIRONMENTAL ASSESSMENT, DOI-BLM-ORWA-M060-2020-0001-EA

1 INTRODUCTION TO THE BEAR GRUB PROJECT

This environmental assessment (EA), DOI-BLM-ORWA-M060-2020-0001-EA, documents Bureau of Land Management (BLM) analysis to estimate potential site-specific effects on the human environment that may result from implementation of the Bear Grub Vegetation Management Project (Bear Grub VMP). This EA provides the BLM's Authorized Officer (Ashland Field Office Manager) with current information to aid in the decision-making process. It will also provide the basis for determining if there are significant impacts not already analyzed in the 2016 Proposed Resource Management Plan (PRMP)/Final Environmental Impact Statement (FEIS) for Western Oregon (2016 PRMP/FEIS) and 2016 Record of Decision and Resource Management Plan (2016 ROD/RMP)—to which this EA tiers—or if a Finding of No Significant Impact (FONSI) is appropriate. This EA complies with the Council on Environmental Quality's (CEQ) Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act (NEPA); (40 CFR Parts 1500-1508) and the Department of the Interior's regulations on implementation of the National Environmental Policy Act of 1969 (43 CFR part 46).

1.1 Project Overview

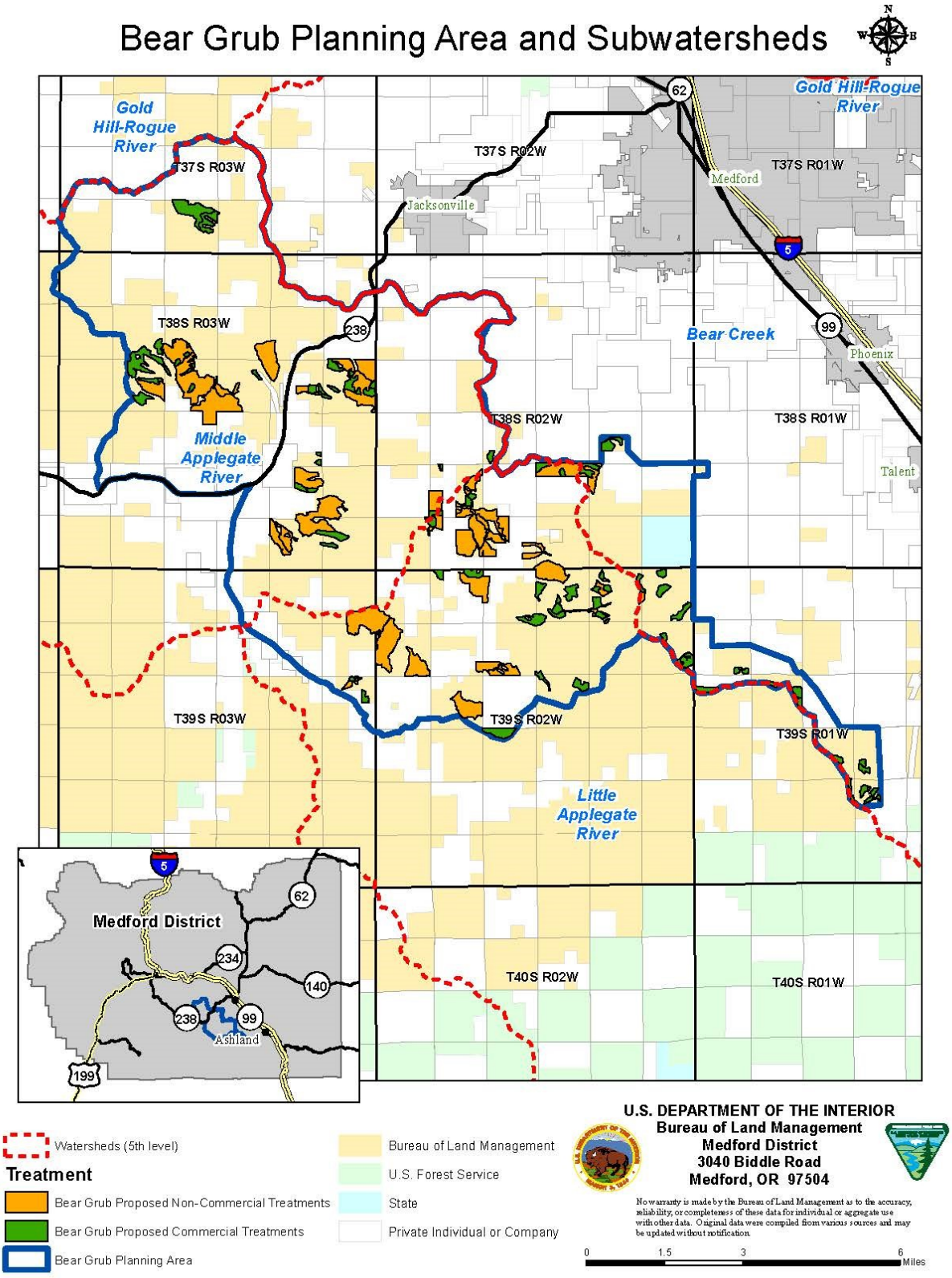
The Ashland Field Office is proposing vegetation management actions that consist of commercial and non-commercial treatments in Harvest Land Base (HLB), Late-Successional Reserve Dry (LSR-dry), District-Designated Reserves (DDR), and Riparian Reserve-Dry (RR-dry) land use allocations (LUA). These proposed vegetation management actions include selection harvest, commercial thinning, and riparian thinning. Other forest management actions include hazardous and activity fuels reduction through prescribed burning, and/or biomass removal. The prescriptions are tailored to the various site and stand conditions found throughout the Bear Grub VMP Planning Area. The various forest management treatments could be accomplished through a combination of commercial timber sale contract(s), service contracts and stewardship contracts. The BLM has identified roads that would be available for wet season haul, depending on road surface type and their current condition, and if adequate rock were added to the roadbed. A more detailed description of BLM's proposed action alternatives, as well as other action alternatives considered is included in section 2, Alternatives.

1.2 Background

1.2.1 Location of the Planning and Project Areas

The Bear Grub VMP Planning Area (Planning Area) is located just south of the city of Jacksonville and east of the town of Ruch in Jackson County, Oregon. Lands in the Planning Area are a mix of BLM-administered, Oregon Department of Forestry, and private, or individual company ownership (Table 1-1). All proposed activities and analysis in this EA apply only to BLM-administered lands within the Planning Area. The Bear Grub VMP Project Area (Project Area) only applies to the specific units identified for treatment within the Planning Area (Figure 1-1).

Figure 1-1. Bear Grub Project Planning and Area Location(s).



In the Bear Grub Planning Area, there are 28,383 acres (58%) in the Middle Applegate watershed, 14,018 acres (29%) in the Little Applegate watershed, and 6,053 acres (13%) in the Bear Creek watershed. The Little Applegate and Bear Creek watersheds are entirely composed of Class I subwatersheds. The Middle Applegate watershed is composed of Class I subwatersheds, except for the Spencer Gulch subwatershed, which is identified as Class II. Revested Oregon and California Railroad lands comprise 92% (25,205 acres) of the BLM-administered lands, and Public Domain lands comprise 8% (2,250 acres).

Table 1-1. Land Ownership in the Bear Grub VMP Planning Area.

Ownership	**Acres**	**Percent**
BLM	27,455	57
Private or Individual Company	20,368	42
State or Local Government	631	<1
Total	**48,454**	

The Public Land Survey System description of the Project Area is as follows:

Table 1-2. Bear Grub VMP Project Area Location.

Township	**Range**	**Sections**
37 South	3 West	33
38 South	2 West	21,23,26,27,28,29,32,33
38 South	3 West	8,9,10,11,13,14,15,16,17,21,22,23,25,26,35,36
39 South	1 West	7,17,18,21,22,27,28
39 South	2 West	1,2,3,4,5,6,7,8,9,10,11,12,15,17,21
39 South	3 West	1,12,13

*All locations are based on the Willamette Meridian.

Table 1-3. BLM-Land Use Allocations in the Planning Area.

Land Use Allocation	**Acres**	**Percent**
HLB-UTA (Uneven-Aged Timber Area)	11,686	42
DDR-Timber Production Capability Classification	8,421	31
Riparian Reserve-Dry	4,130	15
Late-successional Reserve-Dry	3,148	11
Harvest Land Base (Low Intensity Timber Area)	70	<1
Total	**27,455**	

The vegetative management actions presented in section 1.1 above would occur within the HLB- UTA, LSR-dry, RR-dry, and DDR-Timber Production Capability Classification (DDR-TPCC) land use allocations. The proposed action alternatives would include commercial and non-commercial forest management actions within the HLB-UTA, LSR-dry, and RR-dry LUAs. Field surveys of the DDR-TPCC LUAs verified that the LUAs were non-forested lands and would not be productive for timber treatments. Therefore, the action alternatives include only non-commercial forest management actions within the DDR-TPCC LUAs. The action alternatives also include transportation management actions that will facilitate access to units proposed for forestry management treatment in the Bear Grub VMP EA. Access and exit roads are within or pass through the HLB-UTA, LSR-dry, RR-dry, and DDR-TPCC LUAs. BLM LUAs designated as Low Intensity Timber Area within the Planning Area are not part of the proposed project. Hazardous and activity fuels reduction through prescribed burning, and biomass removal may occur on any of the land use allocations in the Project Area and identified in Figure 1-1.

1.3 Purpose and Need for Action

The BLM manages Oregon and California (O&C) Railroad Lands (O&C Lands) under the statutory requirements established under the O&C Act (43 U.S.C 2601 et seq.) and the Federal Land Policy and Management Act of 1976 (FLPMA, 43 U.S.C. 1701 et seq.), and under the specific management established through the 2016 ROD/RMP. The BLM developed the 2016 ROD/RMP under the requirements of FLPMA, while in compliance with other laws and statutes, including the O&C Act. The 2016 ROD/RMP describes desired conditions for resources and land use allocations, and provides management direction, for lands that the Ashland Field Office manages.

Purpose 1: Implement Commercial Timber Harvest to Contribute to the Allowable Sale Quantity (ASQ)

The 2016 ROD/RMP management direction reflects the need to produce the declared ASQ and requires action by the Medford District BLM. Specifically, the following management direction establishes the need for this project:

In the HLB, "*Conduct silvicultural treatments to contribute timber to the ASQ*" (2016 ROD/RMP, p. 62) in a manner that follows the restrictions in the 2016 ROD/RMP on incidental take of northern spotted owls [1] (2016 ROD/RMP, pp. 121, 127);

In the Uneven-aged Timber Area (UTA), "*produce timber to contribute to the attainment of the declared ASQ*" (2016 ROD/RMP, pp. 68).

Need: The Ashland FO needs to contribute to the Medford District Sustained Yield Unit (SYU) declared annual Allowable Sale Quantity (ASQ).

The Ashland Field Office is one of three field offices within the Medford District SYU, as defined in the 2016 ROD/RMP (p. 5). The declared annual ASQ for the Medford SYU is 37 million board feet (MMbf) of timber per year (*Id*.).[2] Timber sale planning is a multi-year, capacity-intensive process and the district identified the Ashland Field Office for providing ASQ for the Medford SYU in fiscal year 2020.

[1] *"The BLM will not authorize timber sales that would cause the incidental take of northern spotted owl territorial pairs or resident singles from timber harvest until implementation of a barred owl management program consistent with the assumptions contained in the Biological Opinion on the RMP has begun" (2016 ROD/RMP, pp. 121, 127).*
[2] *The BLM can offer for sale in each SYU as much as 40% variation on an annual basis, and up to 30% over the entire decade (RMP, p. 6). For the Medford SYU, the BLM can offer for sale between 22 MMbf and 52 MMbf annually, and between 260 MMbf and 480 MMbf per decade (Id.).*

Deferring commercial harvest in the Ashland Field Office would forego the opportunity to contribute timber volume toward meeting the Medford SYU's planned annual ASQ, as required in the 2016 ROD/RMP, for fiscal years 2020. Without this project, the Medford District would fall short on meeting its declared ASQ for 2020, as timber sale planning and preparation is a multiple year process. The declared ASQ is the BLM's contribution to supporting local communities and industry by providing a sustainable supply of timber (*Id*.).

Purpose 2: Implement integrated vegetation management in Late Successional Reserve-Dry.

The BLM proposes to utilize integrated vegetation management[3] in designing and implementing treatments in LSR-dry stands to promote the development and retention of large, open grown trees and multi-cohort stands (2016 ROD/RMP, p.72).

Need: The Ashland FO needs to treat the proposed LSR-dry stands because they are currently lacking large hardwoods, pine trees, and trees of various ages or cohorts. Field surveys revealed these stands are over stocked with single-age Douglas fir trees that are competing for water and growing space with more drought tolerant and open grown trees. Thinning around these trees would greatly reduce competition from smaller single-aged understory Douglas-fir trees that dominate the lower-mid canopy layers. Thinning would also provide opportunity for other conifer species to grow and regenerate, particularly ponderosa pine.

Purpose 3: Implement thinning in Riparian Reserve-Dry LUAs within Class I and II Subwatersheds.

The purpose of the proposed actions is to thin the outer zone of Class I sub watersheds to ensure that stands are able to provide trees that would function as stable wood in the stream (2016 ROD/RMP, p.82). The purpose of the proposed action in the outer zone of Class II subwatersheds is to increase diversity of riparian species and develop structurally complex stands (2016 ROD/RMP, p.84).

Need: The Ashland FO needs to treat within Class I subwatersheds in the Bear Grub Project Area because they are currently lacking large trees that would provide future stable wood to the streams. Thinning these stands that are over stocked and contain mostly small Douglas-fir trees would increase the growth of desirable trees for the future and increase the number of large trees better suited as stable wood to the streams. The Ashland FO also needs to treat within Class II subwatersheds in the Bear Grub Project Area currently lacking structural complexity and riparian species diversity. Thinning these stands would help reduce the amount of Douglas-fir trees, while retaining those species less prominent in the stand to increase species diversity in the riparian zones. Also, thinning treatments would favor the retention of all size classes of trees and in turn would help promote more structural complexity in these stands

Purpose 4: Modify the fuel profile to reduce fire behavior and intensity.

In all land use allocations, the purpose of the proposed action alternatives is to manage activity fuels and natural hazardous fuels to modify the fuel profile (i.e. surface, ladder and canopy fuels and heterogeneity) and reduce potential fire behavior and severity (2016 ROD/RMP pg. 91).

[3]*Integrated vegetation management includes the use of a combination of silvicultural or other vegetation treatments, fire and fuels management activities, harvest methods, and restoration activities. Activities include but are not limited to vegetation control, planting, snag creation, prescribed fire, thinning, single tree selection harvest, and group selection harvest.*

The proposed fuels treatments in DDR-TPCC have the additional purposes to restore or maintain community-level structural characteristics, promote desired species composition, and emulate ecological conditions produced by historic fire regimes. (2016 ROD/RMP, pp. 55-56).

Need: The BLM-administeredlands within the project area contain proposed fuels units as displayed in Figure 1-1. Ninety percent of these units were treated to reduce hazardous fuels under previous Environmental Analysis and on-the-ground fuels reduction work. Previous treatments included combinations of cutting and piling with handpile burning; and follow up underburning. Approximately 31% of the units have not been treated in 15 years or more, and 48% have not been retreated in the last 11 to 15 years. Fuels treatment on 20% of the units occurred 5 to 11 years ago. In order to mimic a natural fire regime in these previously treated areas it is important to retreat these areas every seven to fifteen years. The remaining 10% of proposed fuels reduction units, were identified as areas of high hazard and fuel loading or are located in strategic areas to aid in wildfire containment. These high fuel loading conditions threaten the persistence of community-level structural characteristics, and desired species composition indicative of low-mixed severity fire regimes.

1.4 Conformance with Land Use Plans

The BLM signed the 2016 ROD/RMP on August 5, 2016. The Bear Grub VMP project is in conformance with the 2016 ROD/RMP, which addresses how the BLM will comply with applicable laws, regulations, and policies in western Oregon including, but not limited to the: O&C Act, FLPMA, Endangered Species Act (ESA), NEPA, Archaeological Resources Protection Act, Clean Air Act, and Clean Water Act.

1.5 Public Input and Alternative and Issue Development

Scoping is the process by which the BLM solicits input from the public on proposed actions to help identify issues, concerns, and potential impacts in preparation for design of a range of alternatives and analysis. The BLM initiated a 30-day public scoping period for the Bear Grub VMP on October 1, 2019. The BLM sent over 600 scoping letters to adjacent landowners on record, permittees, agencies, and other interested parties. A legal notice appeared in the *Mail Tribune of Medford Oregon* on October 1, 2019. The BLM also posted the scoping notice on the BLM national ePlanning Register website. The BLM received over 1,100 comment letters during the formal scoping period. Over 700 of these were identical or nearly identical form letters sent by interested public who downloaded the letter from internet websites. All scoping comment letters and emails received are in the administrative project record.

The BLM IDT reviewed the scoping comments and used the relevant comments to help identify issues and develop alternatives and project design features. Issues are points of discussion, dispute, or debate about the environmental effects of the proposed action. Issues and concerns raised by the BLM and the public were taken into consideration in the formulation of alternatives, project design features, and/or environmental effects. Some comments were not related to the proposed action, expressed procedural concerns, or are already decided by law, regulation, policy, or direction. Comments requesting analysis of information that would not further contribute to making a reasoned choice between alternatives and a fully informed decision for the project were not included in the EA.

1.5.1 Issues Considered but not Analyzed in Detail

Issues raised by the public or BLM during scoping that did not relate to how an alternative responded to the purpose and need, and did not point to a potentially significant environmental effect beyond what was analyzed in the 2016 PRMP/FEIS (2016 PRMP/FEIS) were not analyzed in detail, See Appendix A.1.

1.5.2 Issues Identified for Detailed Analysis

The detailed analysis of these issues is in section 3.

Issue 1: *(Silviculture)*

How much volume would result from the proposed timber harvest in this project? How would this volume contribute to the achievement of the declared Allowable Sale Quantity (ASQ) for the Medford Sustained Yield Unit (SYU) for fiscal year 2020?

Issue 2: *(Silviculture)*

How would proposed commercial harvest treatments in the HLB-UTA, RR-dry, and LSR-dry affect forest resiliency in the Project Area?

Issue 3*: (Water Resources, Fisheries, and Aquatic Habitat)*

Would there be changes in erosion rates, sediment transport, and turbidity resulting from timber haul, road maintenance, road building, and other related activities affect water quality and aquatic habitat?

Issue 4: *(Fuel and Fire)*

How would the proposed vegetation treatments affect stand fire resistance (i.e. fuel profile and potential fire behavior) in the fire-adapted dry forests, within proposed units?

Issue 5: *(Threatened and Endangered Biological Species)*

Would forest management treatments in the Late-successional Reserves-Dry speed the development or improve the quality of nesting habitat, and not preclude or delay (by 20 years or more) the development of northern spotted owl nesting/roosting habitat?

Issue 6: *(Special Status Biological Species)*

How would vegetation management treatments affect the pacific fisher and its habitat?

Issue 7: *(Recreation)*

How will timber harvest, fuels reduction and associated connected actions impact the Recreation Setting Characteristics (RSCs) and recreation opportunities and objectives of the Extensive Recreation Management Areas (ERMAs), and Special Recreation Management Areas (SRMAs) within the project area?

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2 ALTERNATIVES

This section describes the alternatives the BLM analyzed in detail in this EA (including the No Action Alternative). It also describes the alternatives the BLM considered but did not analyze in detail. See Appendix B for a more detailed listing of proposed action, including descriptions of silvicultural

prescriptions and objectives, harvest methods, and proposed roadwork. Maps of proposed activities are in Appendix B-7.

2.1 Alternative 1 (No Action)

Under the No Action Alternative, the application or implementation of silvicultural treatments, fuels treatments, forest management and follow-up fuels reduction activities would not occur within the project area at this time. Existing activities in the planning area would continue and the present environmental conditions and trends in the treatment area would continue.

The No Action Alternative does not suggest that the BLM would stop implementing the 2016 ROD/RMP. The proposed treatment areas contain lands designated as HLB by the RMP. If no action were selected at this time, it is reasonably foreseeable that the Field Office would implement a vegetation management project in this area within the next five to ten years.

The No Action Alternative serves as a baseline that represents current conditions and trends, and a reference point from which to compare the environmental effects of the action alternatives.

2.2 Project Elements Common to All Action Alternatives

2.2.1 Transportation Management Activities

The design of the proposed transportation management activities would improve or provide road access to areas in need of forest management treatment and their decommissioning when no longer needed for this or future treatments.

The BLM proposes to improve road conditions used for timber haul by maintaining and renovating existing roads as described below. Timber haul could occur during the wet season on paved roads or roads with adequate surfacing.

The BLM also proposes to construct new roads to provide access to select timber harvest units (under Alternatives 2 and 3). Road construction would be either temporary or permanent, as described below. The BLM also proposes to open existing roads that were previously and are currently barricaded then decommission them upon completion of harvest treatments (under Alternatives 2, 3, and 4). These roads are not needed in the near future but may be re-opened when needed for BLM administrative purposes.

Complete descriptions of Road Maintenance and Renovation; Temporary Road Construction; Permanent Road Construction; Road Opening, Renovation and Long-Term Closure (Decommissioning) and; Access to Service Landings can be found in Appendix B.2.

The BLM would apply a comprehensive suite of Best Management Practices (BMPs) to provide stable, well-draining roads that protect water quality and accommodate harvest operations during all stages of the project (see Appendix B.1.1: **Project Design Features**).

2.2.1.1 Proposed action alternatives by Road Number

The Table B-3 in Appendix B-2 lists the existing, new, and temporary roads, by number, proposed for use during timber harvest for the Bear Grub VMP.

2.2.2 Vegetation Treatments

The vegetation treatments proposed under each Alternative are in two categories: commercial and non-commercial treatments. Commercial refers to stand harvesting involving the removal of some or all of the cut trees from the stand for timber volume and an assessed monetary value. The implementation of

commercial harvest is through a variety of mechanisms, including timber sale contracts, stewardship agreements, or other types of contracts. (2016 ROD/RMP, p. 62) Non-commercial activity refers to cutting merchantable trees but retaining the cut trees within the *stand* or moving them to other stands or to streams for non-commercial purposes. (2016 ROD/RMP, p. 308) For this project, non-commercial treatments include cutting vegetation and trees smaller than 8 inches diameter at breast height (DBH) through fuels reduction treatments. Some stands may require both commercial and non-commercial treatments based on the forest condition.

Silvicultural prescriptions consider changes in the potential vegetation based on factors such as aspect, slope, available moisture, and soil type, in addition to species composition and stand density. The silvicultural prescriptions used to accomplish commercial and non-commercial treatments are described in the following sections. Refer to Appendix B.3 for detailed silvicultural prescriptions for this EA. Tables B-4 to B-6 in Appendix B.4 identify the vegetation management treatments for specific units.

The action alternatives do not include manual or mechanical reforestation activities. Reforestation activities would be on a case by case basis, usually depending on the status of natural reforestation. If it is determined reforestation activities would be needed, a subsequent NEPA document would be completed.

Proposed timber harvest, treatment of activity fuels, and various types of roadwork and timber haul are in all action alternatives. Below is a summary of the actions that are common to all action alternatives; however, the type and amount of each treatment/activity may vary by alternative (see Table 2-1).

2.2.2.1 Commercial Treatment (Harvest)

Commercial harvest operations involve pairing various methods of felling timber and skidding or yarding it to a landing. For more information on landings, ground base harvesting, cable harvesting, helicopter harvesting, as well as snag creation refer to Appendix B.3.2.2 Timber Harvest Practices and Design Features.

This project proposes the use of both manual and mechanized felling, ground-based skidding, and both cable and helicopter yarding.

Table 2-1. Detailed Comparison of Alternatives for Commercial Treatments– UTA, LSR-Dry, and RR-Dry
*Non-Commercial Treatments (Hazardous Fuels Reduction and Understory Reduction) and Roadside Vegetation Maintenance are common across all Alternatives.

LUA and Treatment	*Alternative 2-RX	*Alternative 3-RX	*Alternative 4-RX
UTA (HLB) **Selection Harvest**	20-25 percent RD Target 30% of stand in Group Select openings 4-acre Group Selection openings 10% of stand in Skips (No more) Canopy Cover range between 25-35% Basal Area range between 70-100ft2	20-40 percent RD Target <30% of stand in Group Select openings Group Selection openings up to 4 ac. 10-15% of stand in Skips Canopy Cover range between 30-50% Basal Area range between 80-140ft2	40-45 percent RD Target <10% of stand in Group Select openings Group Selection openings up to 1 ac. >10% of stand in Skips Canopy Cover range between 45-60% Basal Area range between 120-180ft2
LSR-Dry **Selection Harvest**	20-25 percent RD Target <25% of stand in Group Select openings 4-acre Group Selection openings No Group Selects >2.5 ac.in stands <10 ac. 10% of stand in Skips (No more) Canopy Cover range between 25-40% Basal Area range between 70-100ft2	30-40 percent RD Target <25% of stand in Group Select openings Group Selection openings up to 4 ac. No Group Selects >2.5 ac.in stands <10 ac. 10-15% of stand in Skips Canopy Cover range between 35-50% Basal Area range between 100-140ft2	40-45 percent RD Target <10% of stand in Group Select openings Group Selection openings up to .5 ac. No Group Selects >2.5 ac.in stands <10 ac. >10% of stand in Skips Canopy Cover range between 45-60% Basal Area range between120-180ft2
RR-Dry **(outer riparian zone)** **Riparian Reserve Thinning**	20-25 percent RD Target No Group Selection or Skips Maintain at least 30% Canopy Cover and 60 trees per acre across the treated portion of the Riparian Reserve Basal Area range between 80-100ft2	30-40 percent RD Target No Group Selection or Skips Maintain at least 30% Canopy Cover and 60 trees per acre across the treated portion of the Riparian Reserve Basal Area range between 100-140ft2	40-45 percent RD Target No Group Selects Maintain Canopy Cover 45-60% and 60 trees per acre across the treated portion of the Riparian Reserve Basal Area range between 160-180ft2 Retain trees >20” DBH

Acronyms:
DBH: Diameter at Breast Height
HLB: Harvest Land Base
LUA: Land Use Allocation
LSR-Dry: Late-Successional Reserves-Dry
RD: Relative Density
UTA: Uneven-aged Timber Area
RR-Dry: Riparian Reserve-Dry

2.2.2.2 Non-Commercial Treatment (Hazardous Fuels Reduction)

The treatments below are common to all action alternatives and proposed within the Harvest Land Base Uneven-aged Timber Area, Late-Successional Reserve-Dry, Riparian Reserve-Dry, and the DDR-TPCC land use allocation.

Activity Fuel Treatments

Activity fuel treatments refer to the reduction of slash following commercial harvest. Management of activity slash would be within ground-based, cable and helicopter units. Refer to Appendix B.3.3 for detailed descriptions.

Natural Hazardous Fuels Reduction (Non-commercial or non-merchantable thinning outside of Commercial Harvest Units)

The design of hazardous fuels reduction is to thin (trees and shrubs) to reduce fuels in conifer forests, hardwood woodlands, and shrublands. This treatment consists of cutting small trees (less than 8 inches diameter) and vegetation with chainsaws and disposing of the material by hand-piling and burning or use of a lop and scatter method in lighter fuels. Beside the use of hand piling and burning to reduce ground fuels another prescribed burning method used is underburning. These treatments are proposed in all land use allocations in forested and non-forested sites to improve and/or maintain existing desired conditions. Refer to Appendix B.3.4 for detailed descriptions.

Understory Reduction (Non-commercial treatment within Commercial Harvest units)

The design of understory reduction is to thin vegetation (trees and shrubs) to reduce fuels in conifer forests only. These treatments are similar in description to the thinning, prescribed burning, and the management of cut material for the Hazardous Fuels Reduction treatment described above. Refer to Appendix B.3.3 for detailed descriptions.

Hazardous Fuels Reduction in the Riparian Reserve-Dry LUA

Both natural and activity fuels treatments may occur within the Inner, Middle and Outer Riparian Zones. These treatments are similar in description to the thinning, prescribed burning, and the management of cut material for the Hazardous Fuels Reduction treatment thinning, burning described above. Refer to Appendix B.3.4 for detailed descriptions.

Hazardous Fuels Reduction in Riparian Reserve and Late-successional Reserve LUAs

When conducting fuels reduction or prescribed fire treatments, retain down woody material at levels specified in the 2016 ROD/RMP, page 74 (Table 5).

2.2.3 Implementation Monitoring

Monitoring of the implementation of contracts and agreements, compliance with the RMP, and effects to NSO and its habitat are in Appendix B.5.

2.2.4 Treatment Types by Land Use Allocation

A summary of the action alternatives by land use allocation is in Table 2-2. A description of treatment types and the objectives by land use allocation is in Appendix B.3.1

2.3 Summary of Action Alternatives

Table 2-2: A summary of the acres of management actions by land use allocation for each of the Action Alternatives.

Management Action (Treatment)	Land Use Allocation	Acres in Alternative 2	Acres in Alternative 3	Acres in Alternative 4
Selection Harvest	HLB-UTA	1100	1262	867
	LSR-Dry	108	181	162
Riparian Reserve thinning	RR-Dry	6	7	5
Total acres of Commercial Units (Timber Harvest)		1209	1445	1034
Non-Commercial Units which Overlap with Commercial Units (Understory Reduction)	HLB-UTA	1100	1262	867
	LSR-Dry	108	181	162
	RR-Dry	6	7	5
Non-Commercial Units which *Do Not* Overlap with Commercial Units (Hazardous Fuels Reduction)	HLB-UTA	1521	1521	1521
	LSR-Dry	255	255	255
	RR-Dry	496	496	496
	DDR-TPCC	1193	1193	1193
Total acres of Non-Commercial Units (Fuels Management)		4679	4915	4499
Cable Yarding		499	662	483
Ground-based Yarding		142	150	58
Helicopter Yarding		573	638	493
Management Action (Roads)		**Alternative 2-miles**	**Alternative 3-miles**	**Alternative 4-miles**
Temporary Road Construction		0.15	0.53	0
Permanent Road Construction		0.30	0.30	0
Road Renovation		67.02	68.11	61.65
Timber Haul		68.07	68.94	61.65
Wet Season Haul		49.76	49.76	47.64
Road Decommissioning (Long Term Closure)		3.74	3.74	3.74
Roadside Vegetation Maintenance		12.09	12.54	12.09
Landing Type		**Alternative 2-Total No.**	**Alternative 3-Total No.**	**Alternative 4-Total No.**
Existing Helicopter Landings		7	9	7
New Helicopter Landings		10	12	9

2.4 Alternative 2 (Action)

This alternative proposes commercial harvest activities on approximately 1,209 acres of BLM-administered lands and 4,679 acres of non-commercial treatments. Management activities proposed are within the Harvest Land Base Uneven-aged Timber Area, Late-Successional Reserve-Dry, District Defined Reserves-TPCC, and the Riparian Reserve-Dry. Treatments of the various Land Use Allocations would be with selection harvest, Riparian Reserve thinning, and non-commercial treatments.

Compared to the other action alternatives, Alternative 2 proposes the highest intensity of harvest in that it prescribes treatments at the lowest end of the post-harvest relative density (RD) range allowed in the RMP (20-25% stand average RD, depending on the LUA) and prescribes larger group selection openings.

Forest management treatments consist of commercial treatments in the Outer Zone of the Riparian Reserve-Dry fish-bearing, perennial, and intermittent streams. Alternative 2 prescribes the minimum RMP requirement for tree retention in these zones.

Table B-4 in Appendix B identifies unit by unit the proposed management treatments for Alternative 2.

2.5 Alternative 3 (Action)

This alternative proposes commercial harvest activities on approximately 1,445 acres of BLM-administered lands and 4,915 acres of non-commercial treatments. Proposed management activities are within the Harvest Land Base Uneven-aged Timber Area, Late-Successional Reserve-Dry, District Defined Reserves-TPCC, and the Riparian Reserve-Dry LUAs. The various LUAs would be treated with selection harvest, Riparian Reserve thinning, and non-commercial treatments.

Alternative 3 proposes a moderate intensity of harvest in that it prescribes treatments at a variable range of the post-harvest relative density (RD) range allowed in the RMP (20-40% stand average RD, depending on the LUA). These prescriptions consider changes in the potential vegetation based on factors such as aspect, slope, available moisture and soil type. Of the three action alternatives, Alternative 3 proposes the most commercial and non-commercial treatment acres.

Forest management treatments consist of commercial treatments in the Outer Zone of the Riparian Reserve-Dry fish-bearing, perennial, and intermittent streams. Alternative 3 prescribes the minimum RMP requirement for tree retention in these zones and the most Riparian Reserve acres treated.

Table B-5 in Appendix B identifies unit by unit the proposed management treatments for Alternative 3.

2.6 Alternative 4 (Action)

This alternative proposes commercial harvest activities on approximately 1,034 acres of BLM-administered lands and 4,499 acres of non-commercial treatments. Management activities are proposed within the Harvest Land Base Uneven-aged Timber Area, Late-Successional Reserve-Dry, District Defined Reserves-TPCC, and the Riparian Reserve-Dry. The various Land Use Allocations would be treated with selection harvest, Riparian Reserve thinning, and non-commercial treatments.

Alternative 4 proposes the lowest intensity of harvest in that it prescribes treatments at the highest range of the post-harvest relative density (RD) range allowed in the RMP (40-45% stand average RD, depending on the LUA) and has fewer group selection openings than other alternatives. Of the three action alternatives, Alternative 4 proposes the least amount of commercial and non-commercial treatment acres.

Forest management treatments consist of commercial treatments in the Outer Zone of the Riparian Reserve-Dry fish-bearing, perennial, and intermittent streams. Alternative 4 prescribes the maximum RMP requirement for tree retention in these zones and the least Riparian Reserve acres treated.

In contrast to the other action alternatives, Alternative 4 does not include any new or temporary road construction.

Table B-6 in Appendix B identifies unit by unit the proposed management treatments for Alternative 4.

2.7 Alternatives Considered but Eliminated from Detailed Analysis

In the development of the proposed action alternatives, the BLM considered numerous alternatives to meet the purpose and need. Proposed alternatives that would not fully meet the purpose and need; would be outside the scope for the project; or were not analyzed in further detail are discussed in Appendix B.6.

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3 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This section describes the affected environment and the environmental consequences of the alternatives discussed in section 2, as they related to the issues identified for detailed analysis. The BLM has combined the affected environment and the environmental consequence into this single section to provide all the relevant information on an issue in a single discussion. Under each issue, the BLM describes the methodologies and assumptions of the analysis, the affected environment, and then answers the question captured in the issue statement by describing the environmental consequence of the alternatives analyzed in detail, including the No Action Alternative.

3.1 Cumulative Actions

Cumulative effects are defined in the CEQ regulations (40 CFR 1508.7) as "...the impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions." The Council on Environmental Quality (CEQ) provided guidance on June 24, 2005, as to the extent that agencies of the federal government are required to analyze the environmental effects of past actions when describing the cumulative environmental effect of a proposed action in accordance with Section 102 of the National Environmental Policy Act (NEPA). The CEQ noted the "[e]nvironmental analysis required under NEPA is forward-looking," and "[r]eview of past actions is only required to the extent that this review informs agency decision making regarding the proposed action." This is because a description of the current state of the environment inherently includes effects of past actions. Guidance further states that "[g]enerally, agencies can conduct an adequate cumulative effects analysis by focusing on the current aggregate effects of past actions without delving into the historic details of individual past actions."

The cumulative effects of the BLM timber management program on the Medford District have been described and analyzed in the 2016 PRMP/FEIS. A discussion of the cumulative effects analyses, including incorporation by reference to the 2016 PRMP/FEIS, is in the environmental effects section of each issue analyzed.

Ongoing and future foreseeable actions or projects are specifically named in the cumulative effects analysis for each issue. A list of ongoing and foreseeable actions is in Appendix C.1 as an overview of land management actions that have occurred in the recent past, are ongoing, or are reasonably foreseeable within or adjacent to the Bear Grub VMP planning area or associated Analysis Areas. Only those ongoing and future foreseeable actions or projects that are potentially implicated in each issue being analyzed are included in the issue's cumulative effects.

3.2 Issue 1: How much volume would result from the proposed timber harvest in this project? How would this volume contribute to the achievement of the declared Allowable Sale Quantity (ASQ) for the Medford Sustained Yield Unit (SYU) for fiscal year 2020?

3.2.1 Methodology

This analysis focuses on answering how well the alternatives meet the purpose and need for conducting timber harvest within the selected stands in the Harvest Land Base (HLB) to produce timber to contribute to the attainment of the declared ASQ for the Medford SYU for fiscal year (FY) 2020 (see *sections Purpose and Need*). The unit of measure used in this analysis is volume of timber, in thousands of board feet (Mbf) and millions of board feet (MMbf), that is harvested from HLB. Per the RMP, the BLM must offer for sale in each SYU as much as 40% variation on an annual basis[4], which equates to between 22 MMbf and 52 MMbf annually (USDI 2016c, p. 6). The BLM also notes whether each alternative would produce timber volume within the allowable annual range.

Assumed harvest levels range from 7.5 Mbf per acre to 11.5 Mbf per acre, with 10 Mbf per acre for the average. Each alternative looks at different harvest levels in keeping with the model of the different relative densities. Baseline numbers were estimated using recent cruise data within the Medford District and extrapolated based on the stand modeling discussed in this EA.

3.2.2 Assumptions

Other planned projects with proposed timber harvest in the Harvest Land Base for fiscal year 2020 in the Medford SYU include: the Round Oak (Lodgepole and Ranchero) Forest Management project for the Butte Falls Field Office; and Pink Panther and Poor Quartz Forest Management projects for the Grants Pass Field Office.

Based on the Medford District's Annual Timber Sale Plan, the projected volume from these other projects is estimated to be 39.7 MMbf of the total contribution to the Medford District's declared ASQ for FY 2020. These projected volume contributions would remain the same for all alternatives.

These numbers are estimates based on the methodology described above. Final cruised volumes may vary from estimated volume.

3.2.3 Measurement Indicators

The measurement indicator for evaluating this project's contribution to the declared ASQ for the stated fiscal year is the anticipated volume. The BLM does propose timber harvest in other land use allocations in this EA, such as riparian reserves and late-successional reserves, therefore, some non-ASQ volume would result from this project, as well.

[4] The RMP also requires that the BLM offer for sale between 260 MMbf and 480 MMbf decadally under the declared ASQ for the Medford sustained-yield unit (USDI 2016c, p. 6). Since this is beyond the temporal scope of this analysis, it is not discussed in this analysis.

3.2.4 Affected Environment

The Ashland Field Office is one of three field offices on the Medford District that contributes timber volume towards meeting the declared ASQ for the Medford SYU.

3.2.5 Environmental Consequences

The table below shows the estimated volume of timber that would be harvested in the Bear Grub VMP for each alternative, in million board feet (MMbf), as well as combined with other projects on the Medford SYU (cumulatively).

Table 3-1: Estimated timber volume available, representative percentage of ASQ, and percentage of ASQ when combined with other planned Medford SYU projects for each Bear Grub Alternative

Measurement Indicators	Alternative			
	1	2	3	4
Volume (MMbf)[5]*	0.0	6.5	6.8	3.7
Combined SYU Volume (MMbf)	39.7	46.2	46.5	43.4

Alternative 1

Under Alternative 1, the implementation of a timber harvest would not occur at this time. This alternative would not provide timber to contribute volume to the SYU and therefore would not contribute ASQ for the fiscal year during which sales are to be sold . Other projects in the Medford District would continue as planned.

Alternative 2

Direct and Indirect Effects

At the scale of the SYU for fiscal year 2020, Alternative 2 would contribute approximately 6.5 MMbf to the Medford SYU's ASQ requirement based on the annual variation range of the declared ASQ (Refer to *Table 3-1*).

Cumulative Effects

Assuming that the offered timber sales take place on the currently planned schedule, the BLM would implement timber sales from the Bear Grub VMP and other planned projects in the Medford SYU, and these projects would all contribute to the cumulative ASQ volume.

The approximately 6.5 MMbf estimated to be produced in Alternative 2, combined with the approximately 39.7 MMbf from other planned projects in the Medford SYU would contribute a total of approximately 46.2 MMbf.

The cumulative effect of these projects, combined with the timber harvest proposed under Alternative 2, would be the attainment of the Medford SYU declared ASQ for fiscal year 2020.

Alternative 3

Direct and Indirect Effects

At the scale of the SYU for fiscal year 2020, Alternative 2 would contribute approximately 6.8 MMbf to the Medford SYU's ASQ requirement based on the annual variation range of the declared ASQ (Refer to *Table 3-1*).

[5] Timber volumes analyzed are estimates and actual volumes may vary by a range of approximately 30% (see *section 3.2.2, Assumptions*).

Cumulative Effects
The cumulative effects of Alternative 3 would be very similar to that of Alternative 2, with a slightly increased volume providing approximately 6.8 MMbf of volume to the ASQ. The approximately 6.8 MMbf estimated to be produced in Alternative 2, combined with the approximately 39.7 MMbf from other planned projects in the Medford SYU would contribute a total of approximately 46.5 MMbf.

The cumulative effect of these projects, combined with the timber harvest proposed under Alternative 2, would be the attainment of the Medford SYU declared ASQ for fiscal year 2020.

Alternative 4
At the scale of the SYU for fiscal year 2020, Alternative 4 would contribute approximately 3.7 MMbf to the Medford SYU's ASQ requirement based on the annual variation range of the declared ASQ (Refer to *Table 3-1*).

Cumulative Effects
The approximate 3.7 MMbf produced by Bear Grub VMP Alternative 4 combined with the approximate 39.7 MMbf from other planned projects in the Medford SYU, would contribute a total of approximately 43.4 MMbf, to the fiscal year ASQ for 2020.

The cumulative effect of these projects, combined with the timber harvest proposed under Alternative 4, would contribute of the attainment of the mid-point of the annual Medford SYU declared ASQ range for fiscal year 2020.

3.3 Issue 2: How would proposed commercial harvest treatments in the HLB-UTA, RR-dry, and LSR-dry affect forest resiliency in the Project Area?

3.3.1 Introduction
This analysis addresses how the proposed alternatives impact forest resiliency over time, as measured by various indicators. The following indicators include stand density, forest composition, and stand structure. This section discusses measurement indicators, metrics and associated effects from forest management actions being proposed. The Bear Grub Project proposes to treat vegetation to achieve several goals and objectives in the Uneven-aged Timber Area (UTA), Riparian Reserve-Dry, and Late Successional Reserve Dry (LSR) land use allocations.

3.3.2 Methodology and Assumptions
Field reconnaissance, the utilization of LiDAR (Light Detection and Ranging) technology, and 2016 digital orthographic photographs associated with the Geographic Information System (GIS) was used to gather information for this analysis.

Stand-level inventory plot data was collected and was processed for input into ORGANON Growth and Yield Model (Hann 2013). Once entered, existing stand conditions were modeled through a series of harvest or cutting scenarios, whereby a diversity of tree size classes were retained and removed (proportional thinning trials).

The collected inventory plot data statistically represents the current "average" stand conditions by vegetative type in the Bear Grub Project Area.

LSR-dry stands with high relative habitat suitability for the northern spotted owl were modeled separately to demonstrate that harvest treatments can improve the quality of this habitat long-term and will not preclude or delay the development of the habitat by 20 years or more. These stands were modeled at 30 years post treatment and again at 50 years post treatment to demonstrate this.

Plant Association Group (PAG) forest type descriptions were derived using a GIS data layer of existing vegetation created by the USDA Forest Service Remote Sensing Lab using Forest Service Regional and National Vegetation Mapping Standards.

Forest stands identified for potential treatment within the project area were randomly sampled to determine forest vegetative characteristics for each sampled stand. These sampled stands were stratified into corresponding PAG vegetation types for analysis.

The stratified structural stage GIS data was derived from the 2016 Proposed Resource Management Plan: Final Environmental Impact Statement (Appendix C Vegetation Modeling) and from the Landfire Biophysical Settings Layer.

Because the Outer Riparian Zones do not substantially differ in overall stand character from the adjacent upland stand, Outer Riparian Zone prescriptions were also run on the Douglas-fir Dry composites. Outer Riparian Zone treatments in the Moist Douglas-fir and White fir plant groups are not proposed under this EA.

3.3.3 Measurement Indicators

Several measures of stand conditions can affect the overall health or forests ability to adjust to changes in periods of irregular or sudden disturbances (forest resilience). Stand density, stand structure, and the overall composition of tree species in a stand are used in this analysis to help gauge the level of resilience in these forest stands. A monitoring report done by Bennett 2014 identifies several objectives and indictors to evaluate the relative success of meeting forest resiliency objectives through a series of treatments done in the Applegate valley of Southern Oregon. One of these objectives, to measure success for forest resiliency, is summarized in the Bennet 2014 monitoring report and in the table below. (Bennet et al, 2014) The following indicators will be used to analyze the proposed Bear Grub silvicultural activities through several different measures of stand conditions: stand density, stand structure, the overall composition of tree species in a stand (Table 3-2).

Table 3-2. Spatial and Temporal Scale of Analysis used to evaluate the effects of Proposed Forest Management Actions

Indicator	Indicator	Metrics	Temporal Scale	Spatial Scale
Forest Resilience (cumulative measure of stand density, stand structure, species composition, and the subsequent ecosystem functions (i.e. Disturbance events) that result from modifications to any of those measurement indicators.)	**Stand Density**	Basal Area (BA), Relative Density (RD) and Canopy Cover (CC)	1-year post treatment (short-term) -AND- 30-year and 50-year post treatment (long-term)	Stand-Level (i.e. treatment units)
	Stand Structure	(Size class distribution of trees)		
	Species Composition	(Proportion of Tree Species)		

3.3.4 Affected Environment

The Bear Grub Project Area is located just south of the city of Jacksonville and east of the town of Ruch in Jackson County, Oregon. These lands are a mix of BLM-administered, Oregon Department of Forestry, and private, or individual company ownership. This area encompasses several 5th field watersheds. In the Bear Grub Planning Area, there are 28,383 acres (58%) in the Middle Applegate watershed, 14,018 acres (29%) in the Little Applegate watershed, and 6,053 acres (13%) in the Bear Creek watershed. The current landscape pattern of the vegetation here is a result of highly dissected topography, fires, wind events, timber harvesting, and forest pathogens. The Bear Grub project area is between 1,700 and 5,500 feet in elevation and lies within the Klamath Mountain Province as described by Franklin and Dyrness (1973). Moisture and temperature gradients will differ between forest zones creating a unique pattern of various vegetation types throughout the project area, which are broadly correlated with elevation.

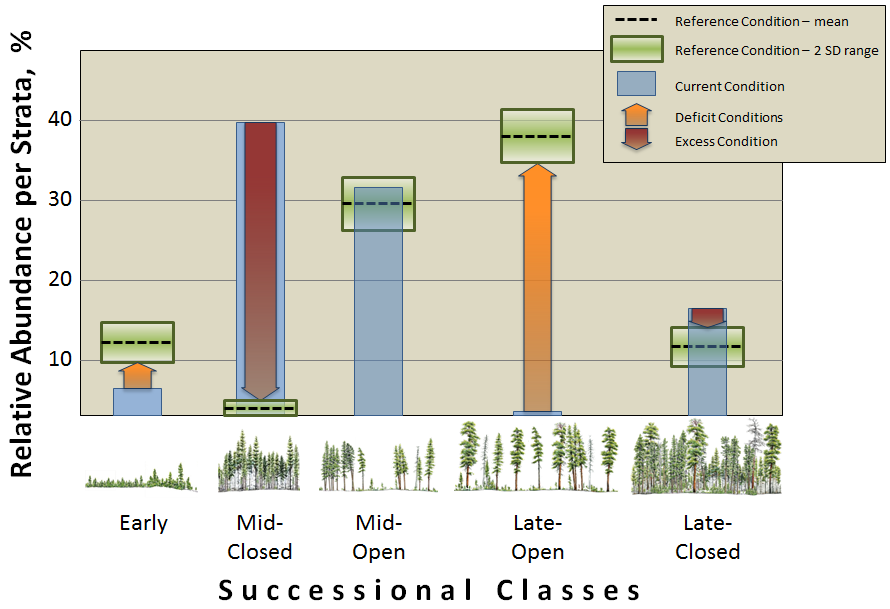
Stand Density

Various scientific methods have been developed over the decades that can predict or identify a threshold when a forest stand will decline in production and health. Curtis's RD (Curtis 1982) is determined mathematically by dividing the stand Basal Area (BA) by the square root of the quadratic mean diameter (QMD). RD is used to describe the level of competition among trees or site occupancy in a stand, relative to a theoretical maximum based on tree density, size, and species composition. Drew and Flewelling (1979) concluded that the correlative density index rating of 0.55 for any given stand marks the initial point of imminent mortality and suppression. The overall average relative density inventoried in the Bear Grub project stands is 0.58, indicating that physiologically the trees have entered the zone of imminent competition-induced suppression and mortality. Over sixty six percent of the forested stands that were inventoried in the analysis area have relative density indices between 0.55 and 0.99, which bounds the zone of imminent competition mortality (Drew & Flewelling 1979). Currently, the relative densities of stands throughout the Project Area are high for both upland and riparian zones. The Applegate Adaptive Management Area Ecosystem Health Assessment (USDA 1994c) recommends 60 to 120 ft^2 (BA/AC) as an acceptable level of basal area on these sites. On these sites the relative density index can be below 0.35 because there is evidence that heavy thinning to a relative density index of 0.25 is necessary for the development of the understory and vertical diversity (Hayes et.al., 1997).

Stand Structure

The Bear Grub Project Area contain forest stands of various structural conditions. Stand structure is measured by the distribution of tree diameters in a stand for this analysis. Since tree diameter and tree height are closely correlated, stand structure can be calculated and used to determine the level of resilience to fire and other forest disturbance agents. Figure 3-1 illustrates the differences in forest structure conditions and its departure of forest structure in the Bear Grub Project Area.

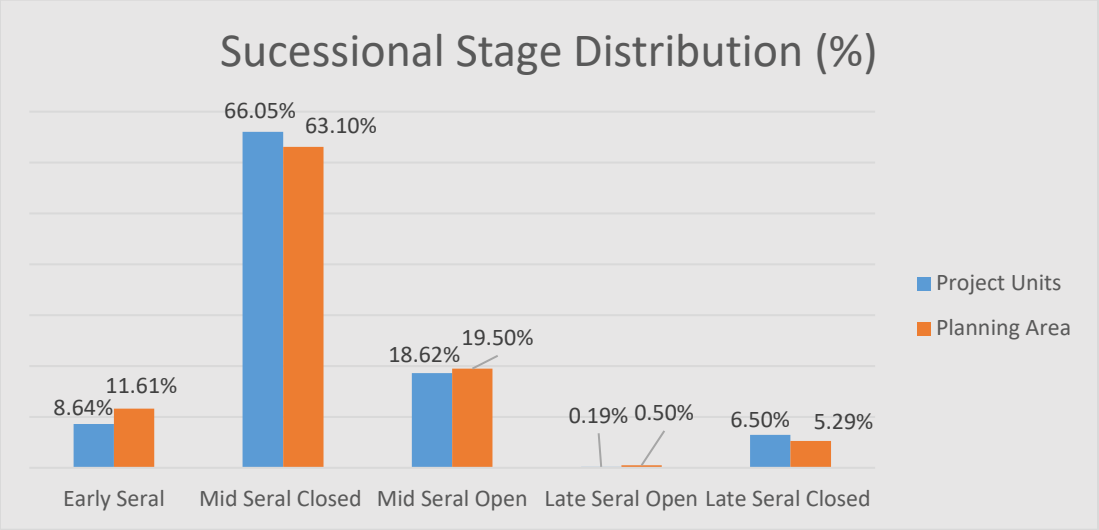
Figure 3-1. Reference Condition Successional Class Distribution in SW Oregon.



Illustrations adapted with permission from Van Pelt 2008

Figure 3-1 shows the historical reference condition distribution of successional stages to have a relative abundance of approximately 10-15% early, less than 10% mid-closed, 25-35% mid-open, 35-45% late-open, and 10-15% late-closed (2016 PRMP/FEIS, p. 1314). Additionally, the 2016 PRMP/FEIS acknowledged that several fire regime classifications exist along with uncertainty around measures and models of departure (2016 PRMP/FEIS, p. 223, Appendix W, p.1899-1900), the assumptions regarding historic fire regimes and departure in the 2016 PRMP/FEIS were based on the LANDFIRE (Barrett et al. 2010) fire regime classification (2016 PRMP/FEIS p. 223). This distribution provides insight into how the historical successional stage distribution, that incorporated disturbance factors and had a relatively high level of resilience to those disturbance factors, compares to the current less resilient successional stage distribution on the landscape today.

Figure 3-2. Current Condition of Successional Classes in the Bear Grub Analysis Area.



The Bear Grub Project Area (indicated in blue) is slightly above the HRV for early seral stands (8%) and is deficit in both late-seral stages with roughly 5% of the acres in late open conditions and <1% in late closed conditions (see Figure 3-2). The current state of structural stage distribution emphasizes that forest stands in the Project Area, including proposed treatment areas, are on a similar departure trajectory as referenced in the 2016 PRMP/FEIS (p. 1314). Even in areas that were not commercially harvested, the impact of fire suppression has changed the forest successional condition. As shown in Figure 3-2, the forest seral stage conditions in the Bear Grub Project Area are comparative to the patterns seen in the 2016 PRMP/FEIS (p. 1314); there is a prominent excess of mid-seral, closed canopy forest, and a deficiency of late seral open canopy forest as well as a shortage of early seral conditions. The harvest actions proposed in Bear Grub are consistent with the 2016 ROD/RMP, such as Selection Harvest and Riparian Reserve Thinning, depending on the land use allocation involved. These actions would, overtime, move the BLM-administered lands towards the suite of desired conditions described for the included land use allocations (2016 ROD/RMP, pp. 3 and 47).

The LSR-dry forest stands that are proposed for treatment in the Bear Grub Project Area have been identified as forest stands that do not meet the definition of structurally complex (2016 PRMP/FEIS, pp. 1080-1081). Structurally complex stands are defined as forests that are over 50 years old, ≥ 12 trees per acre that are ≥ 20 inches diameter at breast height, and ≥ 2.1 trees per acre ≥ 40 inches diameter at breast height. This structural stage is associated with the *Late-Closed* successional class seen in Figure 3-2 and considered to be the most highly suitable habitat type (nesting-roosting habitat-NR) for the northern spotted owl (NSO). BLM resource specialists on the Bear Grub interdisciplinary team analyzed NSO habitat types, plant associations, species composition, and site productivity in these LSR stands. After close field review, data collection, and vegetation modeling it was determined through professional judgement that these LSR stands are not structurally complex based on the definition. In addition, these LSR stands are not classified or typed as current NSO NR habitat. These stands were selected for the reasons described above which are consistent with the 2016 ROD/RMP (pp. 70-75). These stands identified for treatment do not currently support NR habitat and would benefit the NSO by promoting the development of nesting-roosting habitat and/or more complex forest habitat in the future for the NSO. In stands that are not northern spotted owl nesting-roosting habitat, Selection Harvest treatments will be proposed to improve the quality of NSO habitat long term that will not preclude or delay the development of the habitat by 20 years or more compared to development without treatment or a “No Action” (2016

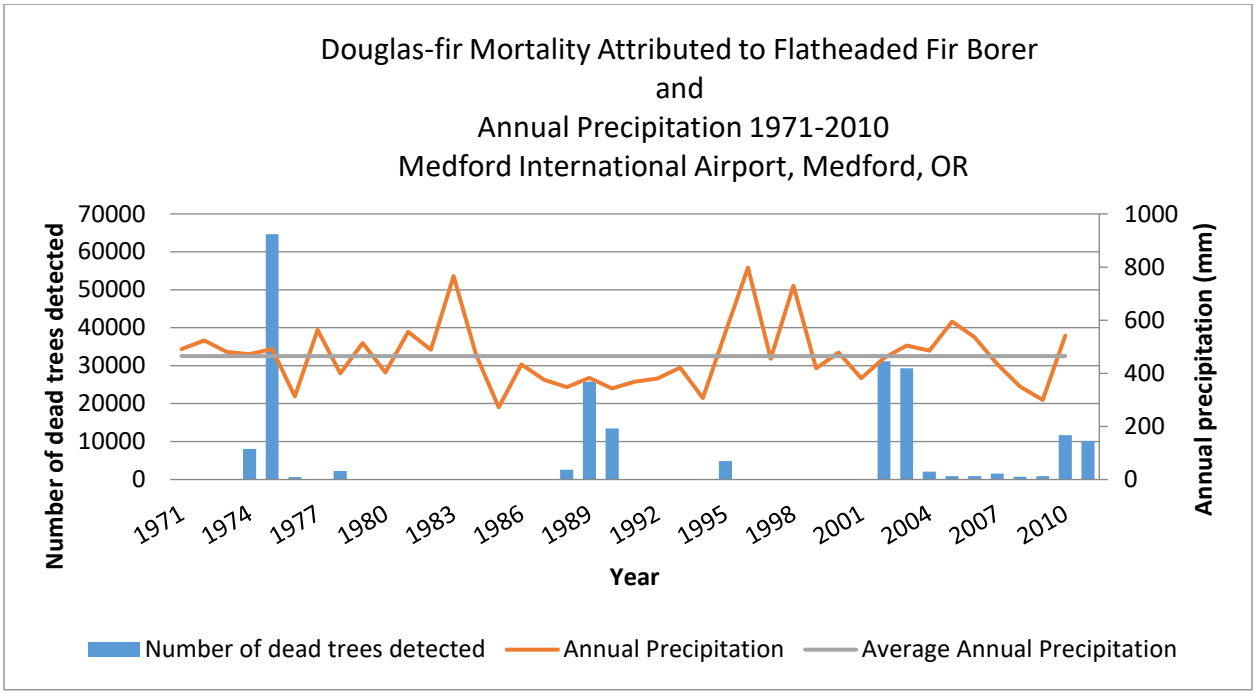
ROD/RMP, pg. 72). Tables 3-3, 3-4, and 3-5 in section 3.3.6 detail Bear Grub LSR-dry stand data that illustrates this long-term benefit.

Species Composition

Due to decades of fire suppression, Douglas-fir trees now dominates most sites in the Bear Grub Project Area because of its ability to grow better than shade intolerant species (i.e. ponderosa pine) in low-light understory conditions. Refer to Appendix C.2 of this EA for the current vegetation types of the Bear Grub Project Area for a description. The replacement of ponderosa pine by Douglas-fir increases the percentage of drought-susceptible trees in a stand; therefore, the risk of beetle infestation and/or wildfire also increases. Douglas-fir thrives for several decades at high densities and, together with an increase of dead material, can easily transmit ground fire to upper canopies. The shift in species composition and stand structure previously discussed in this section is also an important indicator of forest resiliency. As mentioned earlier in this section, the overabundance of mid-closed forests and the relatively high percentage or composition of Douglas-fir trees vs. more shade intolerant species in the Bear Grub Project Area have left these forests in a more vulnerable condition to drought, fire, and insects. Other than wildfire, there are other natural disturbances in the Bear Grub project area of concern. The most prevalent in the last five years is the flatheaded fir borer (*Melanophila drummondi*). The flatheaded fir borer (FFB) attacks Douglas-fir trees in Bear Grub Project Area causing mortality most prevalent among Douglas-firs in the lower elevations.

Figure 3-3 shows the pattern of drought periods and the spike in FFB related mortality within a 40-year period in Southern Oregon. Following a drop in precipitation, Douglas-fir trees experienced a noticeable spike in mortality in parts of the Rogue Basin due to FFB activity, and this was the case in Bear Grub Project Area. Densely stocked stands develop in the absence of disturbance, which has also increased the overall cover of Douglas-fir in all stand layers (top, middle, and bottom). Douglas-fir tends to produce conditions that favor fire because it is self-pruning, often sheds its needles, and tends to increase the rate of fuel buildup and drying (Atzet and Wheeler, 1982; pp. 8-9).

Figure 3-3. Precipitation and Flatheaded Fir Borer Tree Mortality.



Data shown on graph collected from the Annual USFS Aerial Sketch map Surveys 1974-2011.

3.3.5 Environmental Consequences

Alternative 1 – No Action

Direct and Indirect Effects

Stand Density

As discussed earlier in this section, the overabundance of mid-closed forests and the relatively high percentage or composition of Douglas-fir trees compared to more shade intolerant species in the Bear Grub Project Area have left these forests in a more vulnerable condition to drought, fire, and insects. Competition in a stand has been directly correlated with stand density. The more stems (i.e., trees) that exist per acre on a site, the fewer resources are available per stem to sustain it. Each stem draws water and nutrients from the soil and occupies a place in the stand that captures sunlight. Absent disturbance, such as result from fire suppression, these sites become occupied by shade tolerant species capable of out competing and outlasting their shade intolerant neighbor trees. Reducing stand densities in these sites would also promote desirable characteristics of the pre-settlement forest structure and composition for forest stands in low and mixed-severity fire regimes. (Messier 2012). Under the No Action alternative, forest stands in Bear Grub Project Area would remain at the overall average of 0.58 relative density index, allowing density dependent mortality to occur and leaving forested stands more susceptible to insect and disease agents. Stand densities will continue on their current trajectory of stand development and remain overpopulated.

Stand Structure

Figure 3-4 illustrates the differences in stand structure conditions in a mid-seral closed Douglas-fir stand in the Bear Grub Project Area modeled with ORGANON and illustrated using SVS over a 30-year time period. The Stand Visualization System (SVS) illustrates the prescriptions, portraying what existing forest

stands look like today and after application of the proposed prescriptions (USDA and University of Washington, 1995). ORGANON plot data was entered into the SVS program for the simulations. The SVS images below simulate the two modeled scenarios. The figure(s) below show the long-term change in stand condition before and after a Selective Harvest treatment.

Figure 3-4: Comparison of Stand Conditions with and without treatment.

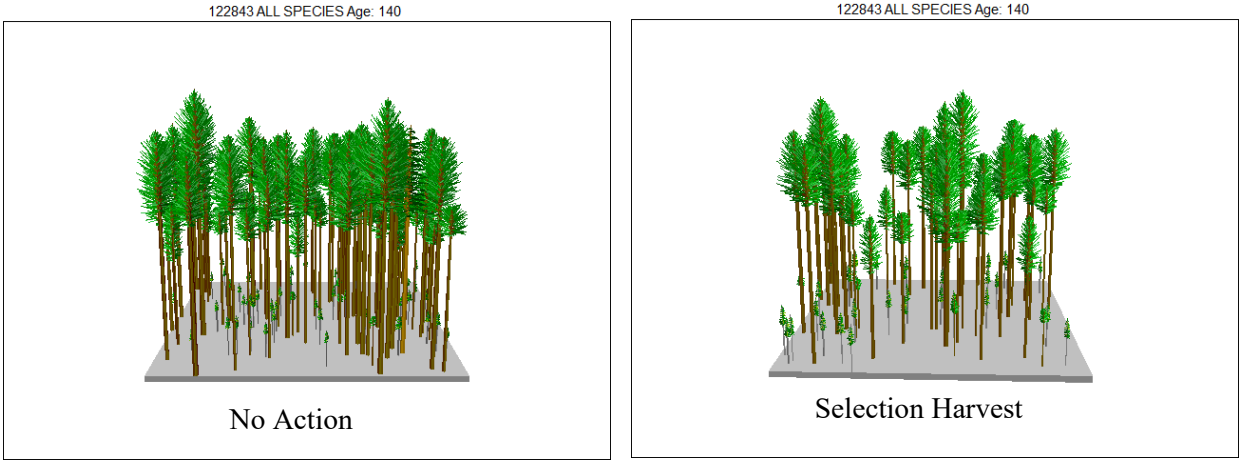
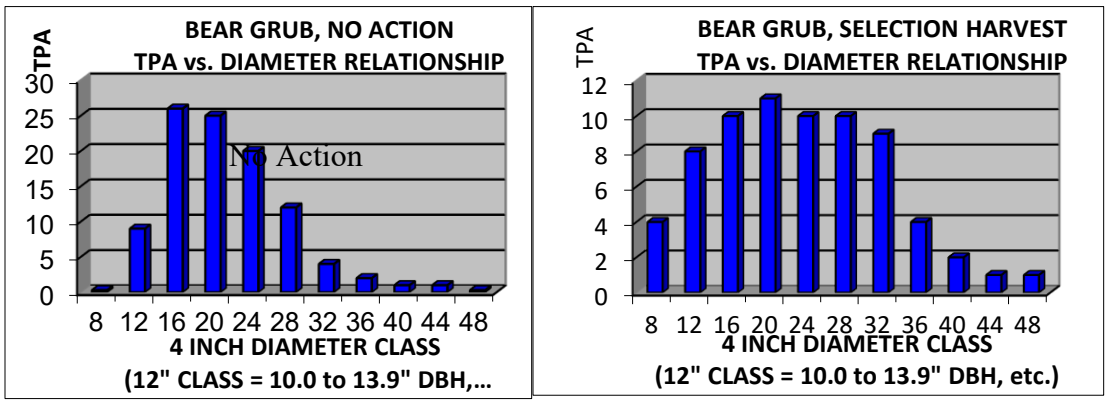


Figure 3-4 and 3-5 correspond with one another and reveal that 30 years following a Selection Harvest treatment (right image) that these stands would have an increase in structural diversity or more of an uneven distribution of age and size classes than a "No Action" (left image) after treatment. The removal and retention of all age and size classes (proportional thinning) helps achieve the stated RMP objectives for the UTA and LSR land use allocation. Alternative 2, 3, and 4 would achieve these uneven age stands over time, however each will have different intensities. A treatment to reduce stand densities now would set the stand on a more desirable stand development trajectory to create a multiple canopy, multi-age stand for the future. These treatments would accelerate the development of forest stand conditions for northern spotted owl habitat and shift stand trajectories to encourage key habitat components for the future. Diameter distributions shown on the left image of Figure 3-5 portrays a stand, in trees per acre (TPA), with an even size class distribution before treatment and the image on the right displays a stand after treatment with a more uneven or increased size class distribution. Stands in which treatments are not applied would maintain a higher relative density and would remain in a homogenous and uniform stand structure of less complexity until a natural disturbance event takes place.

Figure 3-5: Diameter Distribution before and after Selection Harvest over a 30-year period.

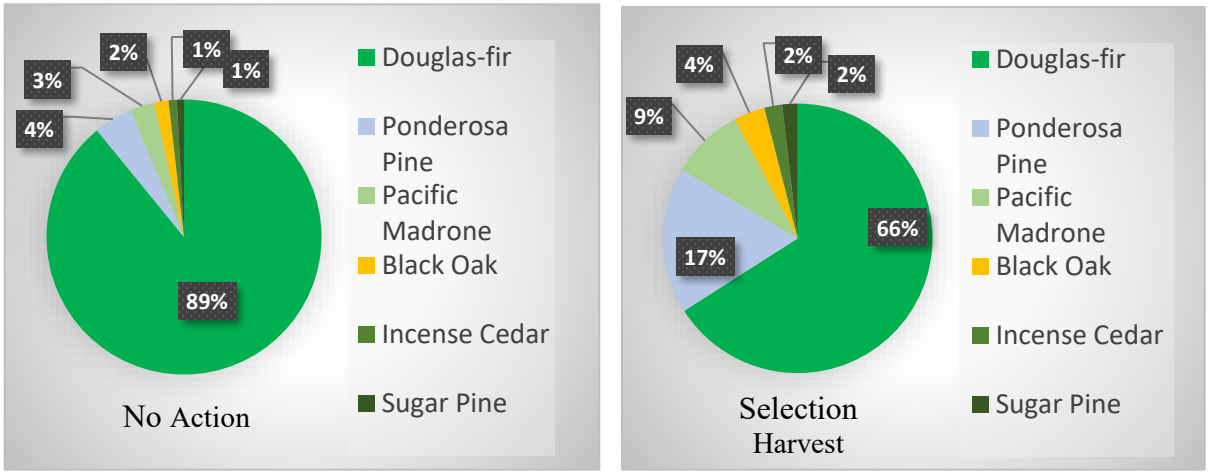


Species Composition

Without management action, shade-intolerant species, like ponderosa pine, and large diameter trees would continue to decline in number from such competition. Tree regeneration would continue to occur from more shade-tolerant species, such as Douglas-fir. Within dense stands, understory vegetation would slowly be shaded out, especially if the vegetation is shade intolerant. Shade-intolerant understory vegetation would likely be replaced by shade-tolerant species, given a seed source is available or the site supports these species. Untreated stands would remain in a homogenous and uniform stand structure of less complexity until a natural disturbance event takes place.

Figure 3-6 reveal that 30 years following a Selection Harvest treatment (right image) that these stands would have an increase in species diversity and a reduction in Douglas-fir trees than a "No Action" (left image) after treatment. The image on the left of Figure 3-6 illustrates the current condition or "No Action" of a forest stand in which Douglas-fir species composition is higher and more vulnerable to FFB attack. These insects exist within the Project Area in endemic populations, but high tree densities place Douglas-fir stands at high risk for epidemic beetle attacks. Effects from this beetle are resulting in the highest level of mortality within the low elevations in the project area.

Figure 3-6 Species Composition before and after Selection Harvest over a 30-year period.



Because Alternative 1 proposes "No Action", there would be no direct effects to forest conditions on BLM-administered lands. Existing stand conditions would change only through natural environmental processes. Stands would grow naturally, influenced only by the environment in which they are developing. Without treatment, stocking densities would continue to increase over time resulting in an increase of competition between individual trees for moisture, nutrients and space. This leads to a loss of tree diameter and height growth. Tree species diversity would continue to decline without treatments to maintain shade intolerant species, such as pine. The "No Action" Alternative would leave forest stands in the Project Area vulnerable to severe drought cycles. The relatively high levels of conifer trees and mortality of untreated forest stands as a result of competition would leave stands more susceptible to disease and insect mortality. Refer to section 3.3.5 to see the difference of forest condition (stand structure, stand density, and species composition) between a "No Action" and when forest treatments are applied.

3.3.6 Cumulative Effects

Under Alternative 1, forest and other vegetative stands would not be treated at this time so there would be no direct effects to forest conditions on BLM-administered lands from the Bear Grub VMP. If the No Action alternative is selected or the project is cancelled the units scheduled for commercial treatment or noncommercial treatment would be placed back into outyear planning as potential units for harvest. (See Appendix C.1)

Alternative 2

Alternative 2 includes the highest intensity of harvest because it prescribes treatments at the lowest end of the post-harvest relative density (RD) range allowed in the RMP (20-25% stand average RD) and prescribes 4-acre group selection openings. As a result, the metrics that indicate stand conditions that are discussed in section 3.3.3 are reduced to lower levels for Alternative 2 more than Alternative 3 and 4.

Table 3-3. Comparison of Current and Future Stand Conditions of Alternative 2 treatments and No Action.

	BA (Sq.Ft.)	**Canopy Cover (%)**	**Relative Density (Curtis)**	**QMD (inches)**
Selection Harvest (*HLB-UTA and LSR-Dry stands*)				
Current Condition	210	64	60	16
Post-Treatment	76	31	22	16
30 years No Action	255	67	62	19
30 Years Post-Treatment	102	36	27	19
Selection Harvest (*LSR-dry stands with high RHS (Relative Habitat Suitability*)				
Current Condition	229	66	64	17
Post-Treatment	77	30	22	17
30 years No Action	275	68	73	20
30 Years Post-Treatment	102	35	27	21
50 Years No Action	293	69	76	21
50 Years Post-Treatment	123	38	31	23

The above stand data was modeled using ORGANON growth and yield simulator (Hann 2013)

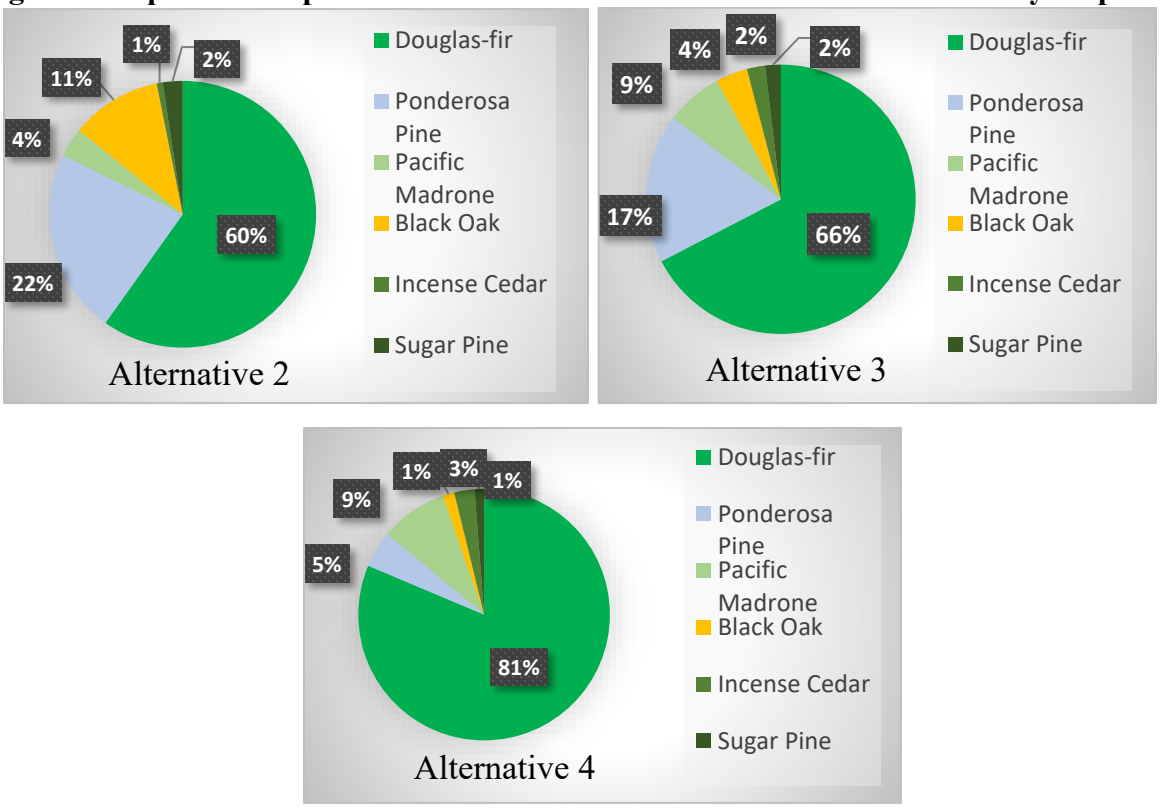
Table 3-3 shows the effects to stand density from timber harvest, compared to a "No Action" (Alternative 1) and displays what the average stand density (BA, RD, Canopy Cover, and QMD) would be post-treatment and 30 years post-treatment across the HLB-UTA and LSR-Dry land use allocations in the Bear Grub project area. Alternative 2 treatments would reduce BA from 210 ft^2/acre to 76 ft^2/acre on average (Table 3-3), which is within the desired BA range the Applegate Adaptive Management Area Ecosystem Health Assessment (USDA 1994c) recommends as an acceptable level (60 to 120 ft^2/ acre). On average, these proposed treatments would retain 31% canopy cover. The average RD post-harvest for these stands

would be 22%, which is within the desired RD range of 20-45% (2016 ROD/RMP, pp. 68 and 78). Alternative 2 treatments would increase the stands' mean tree size (QMD) after 30 years, from 16" to 19" DBH.

Effects to stand structure would vary between Alternative 2, 3, and 4. However, Alternative 2 prescribes no treatment areas or skips on 10% of the treatment unit acres. Group selects would be applied to 30% of the unit acres in HLB-UTA and 25% in LSR-dry to promote multi-age stands (multi-layers). These group select sizes will differ depending on LUA (refer to Table 2-1 in section 2.2 of this EA) to promote diverse stand structure (multi-layers). Because Alternative 2 proposes the highest intensity of harvest, stand conditions will resemble more late-seral open stand structure than the other action alternatives (see Figure 3-2). Selection Harvest under Alternative 2 would reduce the stands' mean tree size and canopy cover more than the other action alternatives and therefore stand structure (see Table 3-3). The effects from this treatment would create more openings in the stand and would result in less trees overall (all diameter classes).

Effects to species composition would vary between Alternative 2, 3, and 4 as well. Because Alternative 2 would result in stand conditions that resemble more late-seral open stand structure, shade intolerant species like ponderosa pine, black oak, and sugar pine would have a higher overall percentage in these stands following treatment than the other action alternatives. Alternative 2 has 44% more shade intolerant trees following treatment than Alternative 3 and 72% more than Alternative 4. Species diversity in the stand will be higher following treatment in Alternative 2 than Alternative 4, but lower than Alternative 3. See Figure 3-7 to see the difference of species composition between each action alternative.

Figure 3-7 Species Composition before and after Selection Harvest over a 30-year period.



Alternative 3

Alternative 3 proposes a more moderate harvest intensity compared to the other action alternatives, because it prescribes treatments that result in a wider range of post-harvest relative density (20-40% stand average RD). It also prescribes a variable size range of group selection openings. As a result, the metrics that indicate stand conditions that are discussed in section 3.3.3 are reduced to moderate or intermediate levels or averages for Alternative 3 compared to Alternative 2 and 4.

Table 3-4. Current and Future Stand Conditions from Alternative 3 treatments and a No Action

	BA (Sq.Ft.)	**Canopy Cover (%)**	**Relative Density (Curtis)**	**QMD (inches)**
Selection Harvest (*HLB-UTA and LSR-Dry stands*)				
Current Condition	210	64	60	16
Post-Treatment	112	41	31	18
30 years No Action	255	67	62	19
30 Years Post-Treatment	145	46	38	20
Selection Harvest (*LSR-dry stands with high RHS (Relative Habitat Suitability*)				
Current Condition	229	66	64	17
Post-Treatment	120	42	32	19
30 years No Action	275	68	73	20
30 Years Post-Treatment	154	47	39	22
50 Years No Action	293	69	76	21
50 Years Post-Treatment	173	49	43	23

The above stand data was modeled using ORGANON growth and yield simulator (Hann 2013)

Table 3-4 shows the effects to stand density from timber harvest, compared to a "No Action" (Alternative 1) and displays what the average stand density (BA, RD, Canopy Cover, and QMD) would be post-treatment and 30 years post-treatment across the HLB-UTA and LSR-Dry land use allocations in the Bear Grub Project Area. Alternative 3 treatments would reduce BA from 210 ft^2/acre to 112 ft^2/acre on average (Table 3-4), which is within the desired BA range to where the Applegate Adaptive Management Area Ecosystem Health Assessment (USDA 1994c) recommends as an acceptable level (60 to 120 ft^2/ acre). On average, these proposed treatments would retain 41% canopy cover. The average RD post-harvest for these stands would be 31%, which is within the desired RD range of 20-45% (2016 ROD/RMP, pp. 68 and 78). Alternative 3 treatments would increase the stands' mean tree size (QMD) after 30 years, from 16" to 20" DBH.

Effects to stand structure would vary between Alternative 2, 3, and 4. However, Alternative 3 prescribes no treatment areas or skips on 10-15% of the treatment unit acres. Group selects would be applied to <30% of the unit acres in HLB-UTA and <25% in LSR-dry to promote multi-age stands (multi-layers).

Group select size would vary from 0.5- to 1.5-acres, and in some cases up to 4 acres. These group select sizes will differ depending on LUA (refer to Table 2-1 in section 2.2 of this EA) to promote diverse stand structure (multi-layers). Alternative 3 proposes a moderate intensity of harvest and therefore stand structure on average will resemble stand conditions more similar to mid-seral and late-seral open stand structure (see Figure 3-2). Selection Harvest under Alternative 3 would alter the stands' mean tree size and canopy cover more than Alternative 4 and less than Alternative 2 (see Table 3-4). The effects from this treatment would create more openings in the stand than Alternative 4 and less than Alternative 2.

Effects to species composition would vary between Alternative 2, 3, and 4 as well. Because Alternative 3 will result in stand conditions that resemble more mid-seral and late-seral open stand structure, shade intolerant species like ponderosa pine, black oak, and sugar pine would have a higher overall percentage following treatment in Alternative 4, but less than Alternative 2. Alternative 3 has 65% more shade intolerant trees following treatment than Alternative 4 and 44% less than Alternative 2. Species diversity in the stand will be higher in Alternative 3 than Alternative 2 and 4. See Figure 3-7 to see the difference of species composition between each action alternative.

Alternative 4

Alternative 4 proposes the lowest intensity of harvest because it prescribes treatments at the highest end of the post-harvest relative density (RD) range allowed in the RMP (40-45% stand average RD) and prescribes a variable size range of group selection openings. As a result, the metrics that indicate stand conditions that are discussed in section 3.3.3 are reduced the least for Alternative 4 compared to Alternative 2 and 3.

Table 3-5. Current and Future Stand Conditions from Alternative 4 treatments and a No Action

	BA (Sq.Ft.)	**Canopy Cover (%)**	**Relative Density (Curtis)**	**QMD (inches)**
Selection Harvest (*HLB-UTA and LSR-Dry stands*)				
Current Condition	210	64	60	16
Post-Treatment	150	52	43	16
30 years No Action	255	67	62	19
30 Years Post-Treatment	191	58	51	19
Selection Harvest (*LSR-dry stands with high RHS (Relative Habitat Suitability*)				
Current Condition	229	66	64	17
Post-Treatment	155	52	44	16
30 years No Action	275	68	73	20
30 Years Post-Treatment	197	58	44	19
50 Years No Action	293	69	76	20
50 Years Post-Treatment	222	60	58	21

The above stand data was modeled using ORGANON growth and yield simulator (Hann 2013)

Table 3-5 shows the effects to stand density from timber harvest, compared to a "No Action" (Alternative 1) and displays what the average stand density (BA, RD, Canopy Cover, and QMD) would be post-treatment and 30 years post-treatment across the HLB-UTA and LSR-Dry land use allocations in the Bear Grub Project Area. Alternative 4 treatments would reduce BA from 210 ft^2/acre to 150 ft^2/acre on average (Table 3-5). On average, these proposed treatments would retain 52% canopy cover. The average RD post-harvest for these stands would be 43%, which is within the desired RD range of 20-45% (2016 ROD/RMP, pp. 68 and 78). Alternative 2 treatments would increase the stands' mean tree size (QMD) after 30 years, from 16" to 19" DBH.

Effects to stand structure would vary between Alternative 2, 3, and 4. However, Alternative 4 prescribes no treatment areas or skips >10% of the treatment unit acres. Group selects would be applied to <30% of the unit acres in HLB-UTA and <25% in LSR-dry to promote multi-age stands (multi-layers). Group select size would be 0.5-1 acre depending on LUA (refer to Table 2-1 in section 2.2 of this EA to promote diverse stand structure (multi-layers). Alternative 4 proposes the lowest intensity of harvest than the other action alternatives and as result stand structure conditions will closely resemble more mid-seral closed and open conditions than the other action alternatives (see Figure 3-2). Selection Harvest under Alternative 4 would reduce the stands' mean tree size and canopy cover the least than the other action alternatives and therefore stand structure (see Table 3-5). The effects from this treatment would create less openings in the stand and would result in more trees retained post-harvest than the other action alternatives.

Effects to species composition would vary between Alternative 2, 3, and 4 as well. Because Alternative 4 will result in stand conditions that resemble more mid-seral closed and open stand structure, shade intolerant species like ponderosa pine, black oak, and sugar pine would have a lower overall percentage following treatment than Alternative(s) 3 and 4. Alternative 4 has 65% less shade intolerant trees following treatment than Alternative 3 and 72% less than Alternative 2. Species diversity in the stand following treatment will be lower in Alternative 2 and 3. See Figure 3-7 to see the difference of species composition between each action alternative.

Cumulative Effects

Forest condition cumulative effects analysis considered past, present, and reasonably foreseeable projects within the proposed commercial treatment units. Forest and fuels management actions have the greatest potential to affect forest resiliency. There are no other current or reasonably foreseeable future forest and fuels management projects proposed within the proposed treatment units outside of this EA other than tree planting. See Appendix C.1 of this EA for future foreseeable actions regarding tree planting.

3.3.7 Summary of Direct and Indirect Effects between action alternatives 2, 3 and 4

Alternative 2 proposes to commercially harvest 1,100 acres in the HLB-UTA, 108 acres in the LSR-Dry, and 6 acres in the Riparian Reserve-Dry LUA's. Alternative 3 proposes to commercially harvest 1,262 acres in the HLB-UTA, 181 acres in the LSR-Dry, and 7 acres in the Riparian Reserve-Dry LUA's. Alternative 4 proposes to commercially harvest 867 acres in the HLB-UTA, 162 acres in the LSR-Dry, and 5 acres in the Riparian Reserve-Dry LUA's. Refer to Table 2-2 in section 2.3 of this EA).

All action alternatives will reduce stand density, accelerate the development of heterogeneous stand structure, increase species diversity, and contribute to overall forest resilience to stands in the Bear Grub Project Area (refer to section 3.3.4). However, each action alternative will have a different intensity and the number of acres treated from one alternative to another. As a result, the effects to forest condition will vary. Table 3-6 describes the average difference between all 64 Bear Grub stands totaled by each action

alternative to show the extent of change before and after harvest throughout all land use allocations in the Project Area.

Table 3-6. Summary comparison of action alternatives for all commercial units before and after treatment.

	BA (Sq.Ft.)	Canopy Cover (%)	Relative Density (Curtis)
HLB-UTA, Riparian Reserves, and LSR-Dry stands (64 total)			
Current Condition	185	63	0.58
Post-Treatment Alt.2	77	31	0.21
% decrease after harvest	58*	51*	64*
Post-Treatment Alt.3	105	40	0.30
% decrease after harvest	43*	37*	48*
Post-Treatment Alt.4	147	52	0.42
% decrease after harvest	21*	17*	28*

* Percent change that is anticipated for removal after harvest from each action alternative. The following stand data was modeled using ORGANON growth and yield simulator (Hann 2013)

Alternative 2 proposes fewer acres to be treated than Alternative 3, but the harvest from Alternative 2 results in 15% more basal area per acre being removed. This percent change is also indicative of the relative average amount of volume per acre between each action alternative. Modeling efforts to determine volume per acre would not be used in this analysis due to the uncertainty of accuracy. Because timber cruising has not been completed actual volumes have not been determined. Timber volumes can only be precise after timber cruising is completed. Based on this assumption, harvest intensity and volume per acre is higher in Alternative 2 than Alternative 3 and 4. There are more acres in Alternative 3 proposed for treatment, resulting in less forest land being treated in Alternative 2. However, Alternative 2 proposes more acres to be treated and produces more volume per acre than Alternative 4. Alternative 3 proposes the most acres to be treated than Alternative 2 and 4, resulting in more forest land being treated proposed than the other action alternatives. Alternative 3 results in 22% more basal area or volume per acre being removed than Alternative 4, therefore harvest intensity and volume per acre is higher. Harvest treatments are least intense in Alternative 4, as a result, the least amount of volume per acre will be harvested compared to Alternative 2 and 3. Alternative 4 treats the least acres compared to the other action alternatives, because some stands in the Bear Grub Project Area currently have relative densities below .40 and/or BA averages below 120 ft^2/acre.

3.4 Issue 3: Would there be changes in erosion rates, sediment transport, and turbidity resulting from timber haul, road maintenance, road building, and other related activities affect water quality and aquatic habitat?

3.4.1 Introduction

Ground disturbing activities have the potential to bare ground, displace soil, break down soils or aggregate, and increase compaction, all of which could result in increased rates of erosion. Increased

erosion in or directly adjacent to stream channels could result in direct inputs of sediment into aquatic habitat, and displaced soils (fine sediment) in upland areas could be indirectly conveyed downslope towards aquatic habitat during precipitation events or when snowpack is rapidly melting off. On compacted surfaces such as roads, run-off capable of transporting fine sediment is much more likely to occur than from undisturbed ground. Where disturbances, and in particular those coupled with bare or compacted ground, are connected to aquatic features (hydrologic connectivity) the probability for fine sediment to be input into aquatic habitat is increased. Sediment transported to aquatic habitats may either settle out into the aquatic substrate or result in increased turbidity, depending on the sediment particle size, stream gradient and flow velocity, and nature and timing of the inputs. Both sediment and turbidity can be detrimental to aquatic organisms and their habitats in excessive amounts or durations (Meehan 1991).

Ground disturbing activities proposed in this project include felling and yarding of timber, follow up slash treatments, hazardous fuels treatments, temporary and permanent new road and landing construction and use, road maintenance, and log haul. Of these activities, road maintenance and log haul would have direct hydrologic connectivity with aquatic habitats. All other disturbance would occur in upland areas outside of or in the outer zones of Riparian Reserves. Fuels treatments would be conducted within middle and inner zones of some Riparian Reserves adjacent to intermittent streams but require buffers around perennial and fish bearing streams to ensure shade is not reduced to these channels.

3.4.2 Methodology

The aquatic analysis area includes all drainages (USGS Hydrologic Unit Code (HUC) 7) where any proposed project related ground disturbing activities, including timber haul, are proposed. Analysis of effects to aquatic habitat and water quality from ground disturbing activities is focused on those activities that have hydrological connectivity to aquatic habitat and estimates the pounds of sediment that could potentially be contributed to aquatic habitat by drainage and sub-watershed, over the life of a typical timber sale contract (3 years) from project activities.

In this project portions of the haul routes and roads proposed for maintenance have direct hydrological connectivity to aquatic habitats and therefore these activities have the greatest potential to contribute sediment to streams. Analysis of sediment from haul utilizes a study conducted in the coast range of Oregon (Luce and Black 2001) which quantified sediment production from winter season haul. Haul routes for this project were identified in GIS, and all paved routes discounted as there is no probability that hauling on paved surfaces would result in increased erosion or sediment/turbidity transport to aquatic environments. The number of stream crossings each unpaved haul route would cross were calculated, and the area of hydrologically connected road and number of truck crossings were then estimated for each stream crossing within each HUC 7 to provide an estimate of the potential volume of sediment contributed to aquatic habitat from haul under each of the action alternatives.

3.4.3 Assumptions

The BLM inventoried streams in the Bear Grub planning area to ensure all areas needing Riparian Reserve protection were identified. The BLM assessed stream duration and location and documented the location of wetland and unstable areas to assure that sensitive areas are excluded from commercial treatment units and would successfully filter sediment from transporting off-site.

This analysis assumes that Riparian Reserves are effective at precluding sediment transport to aquatic habitat from upland sources of disturbance. Rashin et al. (2006) found that sediment delivery to streams is unlikely when erosion features (i.e. yarding corridors) are greater than 10 meters from the channels. In this project, Riparian Reserves ranging in size from 155’ (all streams in the Little and Middle Applegate

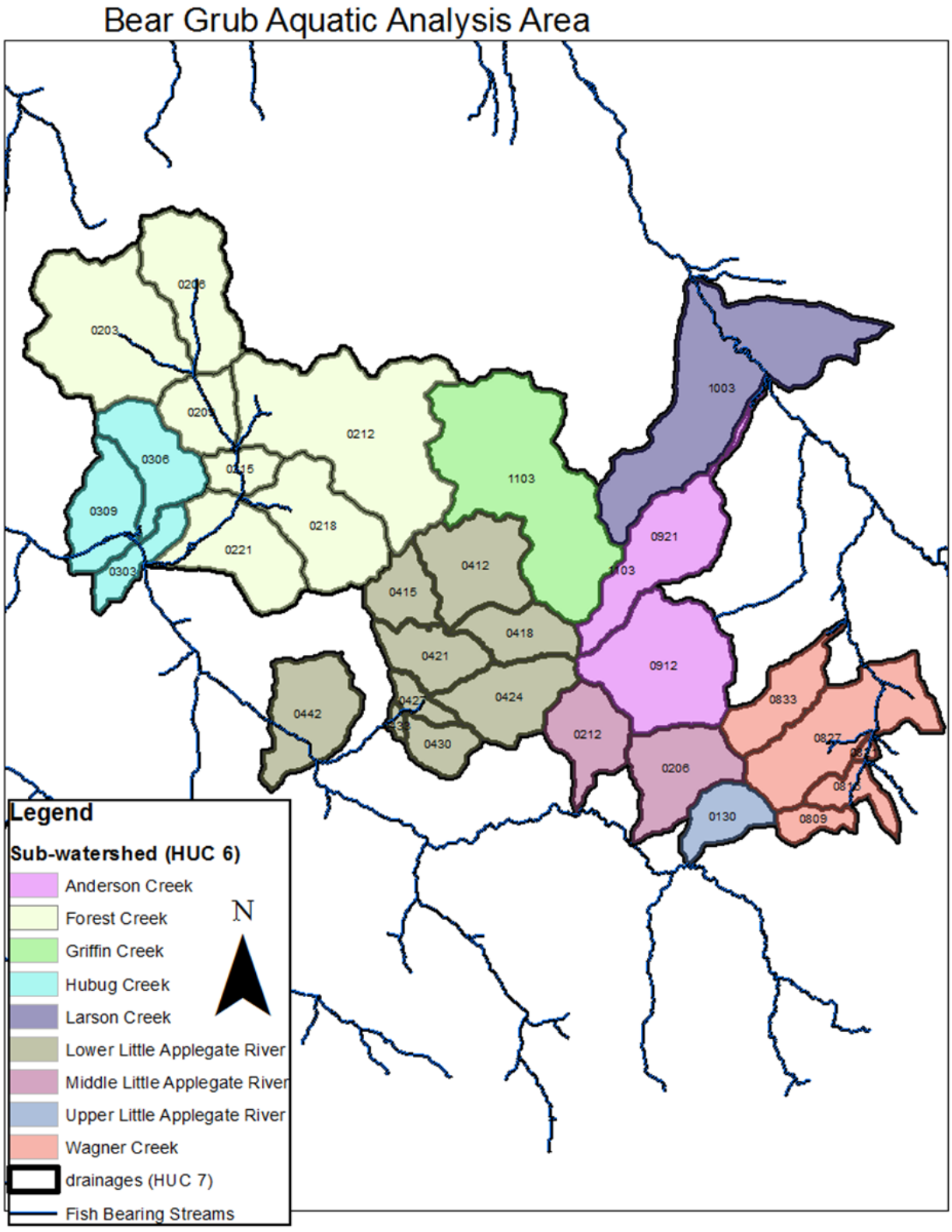
Watersheds) to 160’ (all streams in the Bear Creek Watershed) are present adjacent to all harvest areas. Only log haul, road maintenance, commercial thinning of small portions of the outer zones, and fuel treatments are proposed in Riparian Reserves in this project. The buffer widths incorporated into this project are in excess of the 10 meters reported by Rashin et al. (2006) as being effective at protecting aquatic habitat from sediment inputs, and commercial thinning in outer zones would occur well beyond 10 meters from stream channels.

The analysis of sediment contributed by haul in this EA assumes that all haul would occur during the wet season, that an average log truck load is 4500 board feet of timber, that there is hydrological connectivity at every point the haul route crosses aquatic habitats and that the portion of the road most likely to deliver sediment to the stream is the 150’ of road uphill of and adjacent to the crossing point. It also assumes a constant rate of aggregate break down, and that all sediment generated by haul within 150’ of each crossing is conveyed to the stream. Furthermore, the analysis assumes wet season haul only, and the study which it relies on was conducted in a much wetter climate which will tend to result in overestimation of sediment transport to aquatic habitat. While the above assumptions represent reasonable averages based on experience with similar projects, there is an inherent variability associated with site and project specific conditions. Therefore, the results of this analysis may not provide an accurate prediction for a specific site in absolute terms. However, it does serve to show the relative differences in magnitude between the alternatives.

3.4.4 Affected Environment

The aquatic analysis area for sediment includes 31 drainages (HUC 7) nested within 9 sub-watersheds (HUC 6) where commercial timber harvest and/or through which non-paved haul routes or road maintenance activities are proposed (Map 3-1). These drainages are within the Middle Applegate, Little Applegate, and Bear Creek fifth field Watersheds. Most project activities would be concentrated in two large sub-watersheds; Forest Creek in the Middle Applegate and Sterling Creek (Lower Little Applegate sub-watershed) in the Little Applegate Watershed which each include 8 analysis drainages. The remaining drainages are dispersed over

Map 3-1: Aquatic Analysis Area drainages, sub-watersheds, and fish bearing streams.



a large spatial scale and include 4 small frontal drainages to the Little Applegate, 2 small frontals to the mainstem Applegate, and 9 drainages in the Bear Creek Watershed, including headwater areas of Wagner, Anderson, Coleman, and Griffin Creeks.

In the aquatic analysis area there 22.3 miles of fish bearing streams (Table 3-7) including Forest Creek and its main tributaries, Bishop and Poormans Creek, and China Gulch in the Middle Applegate Watershed; Sterling Creek and the Little Applegate River in the Little Applegate Watershed; and Wagner and Coleman Creeks in the Bear Creek Watershed. The mainstems of the Applegate River and Bear Creek are also included within boundaries of some of the analysis area frontal drainages, but no project activities would occur in proximity to these main channels, and they will not be discussed further. Other analysis area drainages are located upstream of fish bearing reaches including Anderson and Griffin Creeks (Bear Creek Watershed). Forest Creek is Coho Critical Habitat (CCH) for threatened Coho salmon (from its mouth to near the Poormans Creek confluence) and is also spawning and rearing habitat for steelhead and resident trout. Bishop Creek and China Gulch both have limited habitat for steelhead and resident trout. The Little Applegate and Sterling Creek provide habitat for steelhead and resident trout, and lamprey are also found far up the Little Applegate mainstem. Coho are only present in the lower ~ 1 mile of the Little Applegate, where a barrier falls precludes access to upstream reaches. Wagner and Griffin Creeks include habitat for steelhead and resident trout.

Table 3-7: miles of fish bearing streams within the aquatic analysis area. Trout miles are inclusive of steelhead and Coho, and steelhead miles are inclusive of Coho, as these species all overlap in lower stream reaches.

	Fish Miles		
Stream	Coho	Steelhead	Trout
Forest Cr	4.8	6.2	13.1
L Applegate R	0	1.4	1.4
Sterling Cr	0	1.1	1.1
Wagner Cr	0	3.3	5.9
Coleman Cr	0	0.8	0.8
Total	**4.8**	**12.8**	**22.3**

No streams within the Analysis Area are listed as water quality limited for sediment on the Oregon Department of Environmental Quality (DEQ) 303(d) list (DEQ 2012). The nearest 303(d) sediment listed stream to the Project Area is Beaver Creek, a tributary to the Applegate River, that is hydrologically disconnected from any project activities.

Aquatic habitat in the analysis area varies considerably between the drainages. In general, the streams can be characterized as having moderate to high gradient channels constrained by topography. Many of the streams have very low to no flow, at least in large portions of the fish bearing reaches, during the dry summer months, except for the Little Applegate and Wagner Creek, where water is more plentiful during the summer. Streams that drain areas of erodible soils (decomposed granitics), though not designated as water quality limited do generally have higher levels of fine sediment (sand) in their substrate and include many of the analysis area drainages in Forest Creek, the Little Applegate River, and Wagner and

Anderson Creeks. These streams have fine sediment levels that are above desirable, and this limits available spawning and rearing habitat for salmonids, and reduces macroinvertebrate diversity, which in turn may limit feeding opportunities for other aquatic organisms, including salmonids. The other drainages, including those found in Sterling Creek, generally are not impacted by fine sediment to the same degree. Water quantity tends to be more of a limiting factor for aquatic organisms in Sterling Creek and China Gulch, and conversion of land to urban, rural residential, and agriculture have impacted aquatic habitat in lower reaches of Forest, Sterling, Wagner, Anderson, Coleman, and Griffin Creeks.

High sediment loading in Forest and Wagner Creeks and the Little Applegate River is from both natural sources (geology which includes easily erodible soils), and from unnatural sources, including hydrologically connected road networks, episodic ditch failures in the Little Applegate River, the legacy of historic placer mining, and past logging practices which left no riparian buffers. The un-paved Wagner Creek road closely parallels Wagner Creek and is a chronic source of sediment to the stream during storm events.

3.4.5 Environmental Consequences

Alternative 1 – No Action

Direct and Indirect Effects

Under the No Action Alternative, there would be no direct or indirect effects to aquatic habitat from increased erosion rates, sediment transport, or turbidity resulting from haul, road building, or any related timber sale activities, as there would be no associated ground disturbing activities. Therefore, there would be no causal mechanism to increase erosion rates. Aquatic habitat would continue to be impacted from non-natural sediment and turbidity inputs from past and ongoing disturbances, notably from hydrologically connected roads and periodic ditch failures, maintaining the current state of sediment input into aquatic habitats as described in the affected environment.

Cumulative Effects

Because there would be no direct or indirect effects to erosion and sediment/turbidity transport rates, selection of the No Action Alternative would not result in cumulative effects to aquatic habitat.

3.4.6 Common to All Action Alternatives

Direct and Indirect Effects

Haul routes would be the same under alternatives 2 and 3, while under Alternative 4, which proposes the least amount of harvest and would treat the least acres, haul routes would be slightly (5.7 miles) shorter. All action alternatives propose varying levels of harvest across varying acres of project units, post-harvest treatment activities, non-commercial vegetative treatments, yarding of timber, log haul, construction / use / decommissioning of new temporary spur roads and one short permanent road spur (Alts 2 and 3 only) road maintenance, long term road closures, and use and construction of existing and new skid trails and landings as described in section 2 of this EA. All harvest and yarding; new spur road construction, use, and decommissioning; and construction and use of landings would occur outside of or in the outer portions only of Riparian Reserves; these activities would be hydrologically disconnected from aquatic habitats. For this reason, sediment mobilization to aquatic habitat is unlikely to occur from these project activities. Fuels treatments would be allowed within Riparian Reserves but would require 60’ buffers adjacent to perennial and fish streams; intermittent streams could be treated throughout the entire Riparian Reserve. Fuels treatments typically are implemented during the wet winter and spring months, when live fuels are still moist, resulting in a mosaic of burned and unburned areas. The riparian areas are usually the wettest areas within any given fuels unit and therefore are the areas likely to burn with the least intensity,

resulting in higher percentages of unburned areas. Unburned live vegetation and litter would remain in the riparian areas following treatments. For these reasons, it is unlikely that fuels treatments would result in detectable inputs of sediment or ash to aquatic habitats.

Project elements proposed under all alternatives with potential hydrological connectivity with aquatic habitats include road maintenance, and log haul.

Road Maintenance

Road maintenance is proposed to occur on certain road segments to be utilized for haul, as described in section 2. Ground disturbing road maintenance activities would be restricted to the dry season and all activities would be suspended during precipitation events (i.e. rare thunderstorms).

There is no probability that opening and closing roads would contribute sediment to streams. Roads proposed for this type of treatment are in upland areas and hydrologically disconnected from the stream system, and all disturbed surfaces would be stabilized prior to the wet season. There is no probability that spot rocking road surfaces would contribute sediment to streams. Addition of rock to roads should reduce the potential for erosion stemming from haul, thereby resulting in less sediment production. There is no probability that adding additional rock and repairing potholes for general maintenance to upkeep roads used for haul would contribute sediment to streams, as these activities would not generate additional sediment.

There is little probability that repairing drainage of existing roads would contribute sediment to streams. Though reshaping the road surfaces (installation of water bars or rolling dips, or creating outslopes or crowns) would involve disturbance to the road surface, the intent of these activities is to disconnect the road from the stream system, yielding a reduction in sediment transport to streams.

Grading has potential to increase sediment production, because grading can break up armor layers on the road surface, temporarily increasing road surface erosion. However, Luce and Black (1999) noted that blading of only the travel-way yielded no increase in sediment production whereas blading of ditches, which often occurs during grading operations, substantially increased sediment yield. BLM is proposing only spot treatments in ditchlines as necessary to improve drainage, and ditch approaches to stream crossings would not be treated. Furthermore, this work would occur during the dry season, and disturbed ground would be stabilized prior to the onset of the wet season. For these reasons, road maintenance activities as proposed are not likely to result in detectable inputs of sediment to aquatic habitats. These activities should, as indicated, result in less sediment input to streams as the roads are improved in regard to increased armoring and capacity to shed water.

Log Haul

Haul is known to accelerate erosion rates on roads through the breakdown of surface material and creation of erosion features, such as ruts. Roads are more susceptible to disturbance when they become saturated. During such periods, they are more likely to develop ruts which can expose the subgrade. Dry-season use is less damaging, as ruts are unlikely to result, but heavy use (even in the dry season) would result in increased erosion of the road surface through the breakdown of aggregate or native surfaces. Because haul increases erosion rates, portions of haul routes with connectivity to streams would be expected to contribute some amount of sediment to the aquatic system.

Weathering of road surfaces can lead to chronic sediment and turbidity contributions to aquatic habitats, and haul can accelerate rates of erosion, particularly during the wet season (Luce and Black 1999; Reid and Dunne 1984). Where roads are hydrologically connected to streams, eroded sediment from road surfaces can be input directly to the channel. Hydrological connectivity is present at any point where

roads and streams interface. Connectivity changes in response to climatic conditions, with the greatest road-stream hydrological connectivity occurring during the wettest period of the year, when soil moisture contents are high, groundwater tables elevated, and runoff more likely (Furniss et al. 2000). For this reason, wet season use of a given road system has a much higher potential to contribute impacts to aquatic habitat than dry season use.

The heavier the haul volume, the greater the potential for breakdown of the road surfaces to occur. Small direct contributions of fine sediment could occur if dust mobilized by haul should settle out in perennial stream channels crossing or adjacent to the haul route. Project Design Features (PDFs) include the use of dust abatement which would minimize the likelihood of airborne contributions occurring. The more likely method of sediment contribution from haul would be indirectly, as the fine sediment that remains on the road prism would be available to be transported off the road during the first significant rain events following a season of haul. Properly engineered roads are capable of shedding the majority of mobilized sediment off of the road (or road ditch) downslope and into vegetation. However, the road/ditch distance from the last cross drain located on any uphill side of a channel crossing would directly contribute captured water and mobilized sediment into the stream channel. Therefore, use of the roads for haul would increase the risk of road derived sediment transport to stream channels, particularly in the vicinity of road/stream crossings. As discussed above, wet season haul has the highest likelihood of contributing sediment to streams, so the following analysis assumes wet season use. Sediment contributions from haul during the wet season would most likely impact aquatic habitats as elevated turbidity, as heavy truck traffic tends to pulverize aggregate into very fine particles that entrain readily in moving water and which would be un-likely to settle out except in very slow water habitats, which are not typical of the analysis area streams.

Under alternatives 2 and 3, there would be up to 75.8 miles of unpaved haul routes spread amongst the analysis area drainages (Table 3-8), across all ownerships. Haul routes used for this analysis therefore do not match the haul table in Appendix B, which does not include county roads, and does include paved BLM routes. Unpaved haul routes would be the same spatially under these alternatives, and would include crossings over 138 stream channels, most (111) would be over intermittent streams which flow only during the wet season. Nine crossings would occur over fish bearing streams; three over Wagner Creek, five over Forest Creek, and one over Griffin Creek. Alternative 4, would utilize an estimated 70 miles of haul routes, which would include 129 crossings; crossings over fish bearing streams would be the same as described for Alternatives 2 and 3. Sediment delivery potential to aquatic habitat under each of the action alternatives would be concentrated in the Forest and Wagner Creek catchments because haul routes through these areas include more valley bottom and mid-slope roads, which have a higher degree of hydrological connectivity, and estimated haul volume would be higher relative to the other analysis area drainages. Effects from haul would vary in magnitude by alternative, as each alternative proposes different levels of haul in different areas, and therefore different levels of use and correlated erosion of road surfaces.

It is difficult to accurately quantify how much sediment may be generated on any given road surface from haul, as there are many variables that influence erosion rates, transport potential, and subsequent deposition into aquatic habitat. Luce and Black (2001) found that a volume of haul equivalent to 12 daily truck loads per work day for one month (240 total truck loads) on rocked roads during the wet season in the coast range of Oregon increased sediment production from the road surface by ~ 380 kg/km of road. Note that the study did not attempt to quantify how much of this increased sediment production was likely to find its way to aquatic habitat, and that it was conducted in the coast range, which receives ~ 3 times the average annual precipitation as the Analysis Area, and that haul was allowed to continue during

precipitation events. Also note that the authors did not offer a quantitative comparison of wet season vs. dry season haul erosion rates, but they did note that proscription of wet weather haul is an effective Best Management Practices (BMP) for reducing sediment production stemming from haul.

A very rough estimate of the potential magnitude of sediment produced by haul may be obtained by incorporating the erosion rates reported by Luce and Black and calculating the number of truck loads anticipated to result from this sale. Within the aquatic analysis area drainages, assuming 150' of hydrologically connected road from the uphill approach to the crossing, the138 stream crossings would equate to an estimated 20,700 feet, or almost 4 miles, of hydrologically connected routes spread across the entire Analysis Area. Utilizing erosion rates described by Luce and Black, one truck load would equate to ~ 1.6 kg of sediment production per kilometer of road, or 0.16 lbs of sediment per log truck crossing. Each crossing in GIS was assigned an estimated haul volume value (number of truck crossings) based on the estimated unit volume accessed by each crossing by alternative. The result of the analysis estimates pounds of sediment contributed to channels in Analysis Area streams from haul, which in turn can be expressed volumetrically as cubic yards, assuming 2,106 lbs of wet soil = 1 cubic yd. As indicated, these estimates are likely overstated due to assumptions of haul during the wet season only. Inputs were estimated site specifically for each Analysis Area drainage for each alternative. Estimates are a function of both the number of stream crossings, which act as an effect multiplier, and with the estimated haul volume, and are presented by alternative below.

Action Alternative 2

Direct and Indirect Effects

An estimated 3,102 log truck loads would be required to haul off harvested timber as proposed under Alternative 2. This would equate to 5,246 lbs of sediment production within the assumed hydrologically connected portion of the haul routes to the 124 stream crossings bisected by the haul routes, or roughly 2.5 cubic yards of sediment. Roughly a third of this would be input into the Forest Creek (Table 3-8), and upper portions of the Wagner Creek sub-watersheds.

Action Alternative 3

Direct and Indirect Effects

An estimated 3,222 log truck loads would be required to haul off harvested timber as proposed under Alternative 3. Though haul volume would be greater under this alternative, because per unit volume would be less, the routes would include less truck traffic over stream crossings then would occur in Alternative two (i.e. the additional volume is coming from upland routes and units that are not included or are reduced in Alt 2). For this reason, potential sediment contribution to streams would be slightly less, estimated to be 4,873 lbs, or roughly 2.3 cubic yards of sediment. As in Alternative 2, much of this total would be input into the Forest and Wagner Creek sub-watersheds (Table 3-8).

Action Alternative 4

Direct and Indirect Effects

An estimated 1,171 log truck loads would be required to haul off harvested timber as proposed under Alternative 4. Using the methodology described above, this would equate to an estimated 3,424 lbs of sediment production within the assumed hydrologically connected portion of the haul routes to the 113 stream crossings bisected by the haul routes, or roughly 1.6 cubic yards of sediment. As under Alternatives 2 and 3, much of this total would be input into the Forest and Wagner Creek sub-watershed (Table 3-8).

3.4.7 Summary of Direct and Indirect Effects

Selection of any of the action alternatives would result in small inputs of fine sediment/turbidity to aquatic habitats in certain Analysis Area streams resulting from log haul. Effects to aquatic habitat and water quality are similar by alternative; only the magnitude of sediment anticipated to be contributed by haul would vary by alternative. Table 3-8 displays the differences in expected sediment contributions from haul by alternative. Sediment/turbidity inputs would be highest under Alternative 2, and lowest under Alternative 4, reflective of the lower volume of timber harvest and associated hauling proposed under Alternative 4. Under each of the action alternatives, sediment inputs would be concentrated in the Forest Creek and Wagner Creek sub-watersheds due to the higher amounts of hydrologically connected haul routes and haul volume that would occur within these areas.

Sediment resulting from this project is not expected to result in measurable impacts to aquatic habitat and water quality for any Analysis Area streams. Sediment inputs are not expected in the Middle and Upper Little Applegate sub-watersheds, because haul routes in these drainages are mostly located on ridge tops and have no hydrological connectivity with aquatic habitats. Inputs to any other single aquatic analysis area drainage are estimated to not exceed a half cubic yard, and would be spread amongst very large spatial and temporal scales (up to 3 years, the typical length of a timber sale contract) and would represent a tiny fraction of these streams annual sediment budgets. 80% of the analysis area streams crossed by the haul routes are seasonally dry during the summer. For this reason, the potential for most haul derived sediment to impact wetted aquatic habitats would occur during the first significant rainstorms of the fall/winter following haul. Sediment input to aquatic habitat would then likely be transported downstream as small particulates entrained in the water column (turbidity). During such flushes, the small amounts of sediment/turbidity contributed by this project would be undetectable behind background turbidity levels that typically occur during high water events, and would have no biologically meaningful impact to aquatic habitat or meaningful impact to water quality.

Table 3-8. Haul Analysis Table. Miles of non-paved haul routes, number of stream crossings, and estimated amount of sediment contributed to aquatic habitat within the Analysis Area sub-watersheds (HUC 6) by each alternative.

Sub-watershed	Haul Routes*		Estimated sediment contributed to streams (lbs)		
	Miles	# Stream Crossings	Alt 2	Alt 3	Alt 4
Anderson	7.7	7	89	77	60
Larson	1.9	7	198	222	157
Forest	15.1	37	1784	1552	1090
Griffin	4.4	20	258	278	207
Humbug	3.6	17	1039	903	693
Lower L Applegate	24.3	14	230	211	32
Middle L Applegate	4.1	0	0	0	0
Upper L Applegate	0.4	0	0	0	0
Wagner Creek	9.8	22	1648	1630	1185
TOTAL	71.3	124	5246	4873	3424

**In Table 3-8 the reported haul miles and stream crossings for Alternatives 2 and 3. Alternative 4 would have 5.7 less miles of haul routes, and 11 fewer stream crossings.*

Water quality would be maintained using PDFs when completing roadwork (renovation and improvement) for access and timber haul. Examples of PDFs to maintain water quality during roadwork include restricting the work to be completed during the dry season, suspending work during forecasted rain events, and stabilizing disturbed areas during work suspension (Appendix B.1).

Given the dry season haul restriction on roads without adequate surfacing, inputs would occur only during a precipitation event following a season of hauling and would be spatially spread over many input locations. Therefore, by following BMPs, it is extremely unlikely that sediment input from these activities would be detectable above background levels. Over the long-term, road renovation on haul routes would reduce road-related sediment inputs where the BLM adds rock to depleted areas and natural surface roads. Improving drainage would also reduce sediment inputs by reducing erosion to the road surface and ditchlines.

Because water quality would be maintained on streams within the planning area, there would be no effect to drinking water (within the range of natural variability for meeting ODEQ water quality standards), ODEQ-designated Source Water Protection watersheds, or 303(d) listed streams.

3.4.8 Cumulative Effects

Under each action alternative, it is assumed that private forest harvest operations, occasional episodic ditch failures, and high road densities will continue to affect aquatic habitat at similar rates as in the past and present, and as reflected in the current conditions described under the affected environment section, resulting in elevated inputs of non-naturally derived sediment and turbidity to Analysis Area streams.

Selection of any of the action alternatives would result in cumulative additions of sediment on top of those currently occurring from all other sources. Inputs resulting from this project would range from 2.5 cubic yards under Alternative 2, to 1.6 cubic yards (Alternative 4). Much of the sediment would be input into the drainages in the Forest and Wagner Creek sub-watersheds. Other contributions would be spread spatially and temporally across the rest of the Analysis Area drainages. These small contributions would be spread across a large landscape and over a period of years and would be undetectable in aquatic habitat beyond background sources beyond the site (e.g. single pool below a haul crossing) scale.

3.4.9 Summary of Water Resources, Fisheries, and Aquatic Habitat

Although the implementation of any of the action alternatives would have a high likelihood of contributing additional sediment to aquatic habitat, given the small overall magnitude and the spatial and temporal distribution of the inputs, and the seasonal timing of inputs, and that the majority of inputs would occur well upstream of fish bearing streams, sediment and turbidity contributed to aquatic habitats and water quality by this project would be undetectable behind background levels in downstream fish habitat, and therefore would not result in adverse effects to fish, fish habitat, or water quality.

3.5 Issue 4: How would the proposed vegetation treatments affect stand fire resistance (i.e. fuel profile and potential fire behavior) in the fire-adapted dry forests, within proposed units?

3.5.1 Background

For this analysis, the BLM evaluated the efficacy of the proposed action alternatives in meeting the purpose to modify fuel profiles and reduce potential fire behavior within the project area.

In the frequent fire-adapted dry forest, there are important stand attributes that improve resistance to stand-replacing fire, reducing "the likelihood of atypical large-scale crown fires (Agee and Skinner 2005, Jain et al. 2012, Franklin et al. 2013). In general, stands with higher fire resistance have reduced surface fuel loading, lower tree density, large diameter trees of fire-resistant species, increased height to live crown (Brown et al. 2004, Peterson et al. 2005, USDI BLM 2008), and discontinuous horizontal and vertical fuels" (2016 FEIS/PRMP, p.243). In these fire-resistant stands, it is more likely that a "wildfire can burn through …. without substantially altering its structure, composition, or function (Franklin et al. 2013)" (2016 PRMP/FEIS p. 242).

3.5.2 Methodology

In this analysis section, the BLM tiers to the assumptions and results from the 2016 PRMP/FEIS (Issue #2 p. 243-252, Appendix H) to assess effects of the Alternatives on the fuel profile continuity and thus the relative resistance to stand-replacement fire rating (i.e. expected fire behavior). The 2016 PRMP/FEIS found that all alternatives, including the Proposed RMP, would reduce the acreage in the low or moderate

resistance to stand-replacement fire categories in the dry forest, from nearly 50% to 30%, across the Medford District after 50 years. After 50 years, the majority (nearly 60%) of acres would be in the Mixed fire resistance category (2016 PRMP/FEIS, p. 249), (2016 PRMP/FEIS, Figure 3-29, p.246).

In the 2016 PRMP/FEIS, the BLM assumed that vegetation structural stage is an important component affecting resistance to stand replacing crown fire; the 2016 PRMP/FEIS assigned forest structural stages (2016 PRMP/FEIS Appendix C) to a relative ranking of resistance to stand-replacement fire (2016 PRMP/FEIS p. 243 Table 3-32). These categories range from Low fire resistance (i.e. greater tendency for a stand-replacement crown fire) to Moderate to High fire resistance (i.e., less probability of a stand-replacement crown fire). The 2016 PRMP/FEIS also identified a Mixed fire resistance category, indicating the potential to exhibit the full range of resistance categories (Low to High; or crown fire to surface fire) (2016 PRMP/FEIS Appendix H p.1320-1321). These categories were based on assumptions regarding horizontal and vertical fuel profile continuity (2016 PRMP/FEIS Table H-6 p.1321), which for the mixed category was assumed to be mixed. That analysis did "not account for the complex interaction among fuels (including vertical and horizontal composition), topography (e.g., slope, topographic position, elevation, and aspect), and weather (e.g., wind, temperature, relative humidity, fuel moisture, and drought) that influence fire behavior, resultant burn severity, and fire effects (Andrews and Rothermel 1982, Scott and Reindhardt 2001) and the specific conditions related to crown fire (stand-replacement fire) initiation and spread (Van Wagner 1977)" (2016 PRMP/FEIS p. 243). The 2016 PRMP/FEIS concluded that "ultimately, fire behavior in the "mixed category" will result from several factors, including weather, fuel moisture, and topographic influences, along with the vertical and horizontal continuity of the fuel profile" (2016 PRMP/FEIS p.1320). In other words, fire behavior is a product of fuels, weather, and topography.

To provide an informative analysis of Alternative effects in the "mixed" relative resistance to stand-replacing fire category, the BLM considered the vertical and horizontal continuity of the wildland fuel profile (i.e. canopy, ladder and surface fuels, and fuel heterogeneity) within proposed commercial units. The BLM then compared fuel profiles among Alternatives within the Nexus 2.1 Crown fire model program (Nexus) under a 90th percentile weather scenario (See Appendix C for more details). Nexus links separate models of surface and crown fire behavior, to calculate indices of relative crown fire potential (e.g. crowning index and torching index). The BLM used a standard approach to derive a relative resistance to stand-replacement fire for Mixed relative resistance to stand-replacing fire categories, based on review of typical wind speeds and crowning index (CI) and torching index (TI). The rating was as follows: CI <20 mph = Low; CI 20-30 mph = Moderate; CI >30 mph = High, unless TI<30 mph, then = Moderate.

In the 2016 PRMP/FEIS, the BLM assumed that non-commercial hazardous fuel reduction would contribute toward improving fire resistance (2016 PRMP/FEIS, p. 243), this is consistent with local Medford BLM monitoring data and a growing body of literature related to proactive treatment effect on moderating fire behavior (2016 PRMP/FEIS p. 228, Omi and Martinson 2013, Prichard et al. 2014, and Lyderson et al. 2017). In the 2016 PRMP/FEIS, the BLM acknowledged that extreme weather could compromise the effectiveness of fuel (canopy, ladder, and surface) reduction treatments and that there is a presumed low instance of wildfires intersecting fuel treatments (2016 PRMP/FESI p.228). Local Medford BLM monitoring data of surface and ladder fuel reduction (and some canopy thinning or fuel reduction) within conifer and non-conifer plant communities has shown treatments to be effective at reducing surface fuel loading and raising canopy base heights, improving resistance to stand-replacing fire.

To analyze effects of surface and ladder fuel reduction (i.e. small diameter thinning and prescribed fire) among Alternatives, the BLM considered the vertical and horizontal continuity of the ladder and surface

fuel components of the wildland fuel profile within proposed non-commercial units. The BLM used a standard approach to derive a relative resistance to stand-replacement fire rating, based on the relationship between canopy base height and surface fire behavior fuel models (Scott and Burgan 2005) (specifically flame length) under a dry fire weather scenario (90th percentile) and 20 mph 20-foot wind speeds. The rating was as follows: IF CBH< FL; OR IF CBH>FL and CBH-FL ≤ 1ft = LOW; IF CBH is > FL and CBH - FL IS < 6ft = MODERATE; IF CBH is > FL and CBH - FL IS > 6ft.

The BLM analyzed effects of relative stand-level resistance to replacement fire within proposed commercial and non-commercial units, the term "stand" used throughout this issue refers to the unit scale.

For cumulative effects, the considered the incremental impact of proposed action alternatives when added to other past, present, and reasonably foreseeable future actions (Appendix C.1) and natural disturbance and climatic factors.

3.5.3 Assumptions

Thinning would be implemented in stands with dense continuous canopy, ladder and surface fuels and/or the presence of suppressed fire tolerant species, to reduce stand densities, improve stand growth and vigor, reduce the susceptibility to disturbances, promote or enhance the development of structural complexity and heterogeneity and/or adjust stand composition or species dominance, including in Riparian Reserves Dry.

Non-commercial surface and ladder fuel reduction would not shift vegetation structural stages.

All commercial actions will occur within Mature structural stages and commercial thinning and group selection openings actions would not shift those structural stages within the moderate-term (<30 years). .

For analytic purposes, the BLM assumed proposed action alternatives would include a mix of handpile burning and underburning. In some instances, underburning may not be needed to meet surface and ladder fuel reduction objectives. However, underburning every acre may be unattainable, due to operationally relevant unit configuration, burn windows, smoke clearance constraints, etc. For example, units less than 10 acres or units that are not bound by containment features present logistic and operational limitations for implementing prescribed underburning.

Fuel Continuity

(Appendix C.3 contains additional supporting information regarding assumptions)

The BLM assumed the following metrics define continuity of the wildland fuel profile (**Error! Reference source not found.**): canopy fuels (canopy connectivity (canopy cover and canopy bulk density) and large trees), ladder fuels (canopy base height), surface fuels (surface fuel models) (Scott and Burgan 2005) and fuel heterogeneity, (prescriptive heterogeneity elements) (see Appendix C.3 for additional details).

Figure 3-8: Forest fuel profile: surface, ladder and canopy fuels. Image from the Idylwild Fire Protection District, Idylwild, CA https://idyllwildfire.com/defensible-space.html)

For the affected environment, the BLM assumed LANDFIRE (LF 2014) data represents canopy base height and PNW QWRA (Gilbertson-Day 2018) surface fire

behavior fuel model calibration data represents surface fuels. For Alternative 1 (No Action), the BLM assumed fuel profile elements would be the same as the current condition.

The BLM assumed canopy base height and standard surface fire behavior fuel models (Scott and Burgan 2005) represent the elements of the wildland fuel profile that inform predicted fire behavior and stand level fire resistance for surface and ladder fuel reduction s (i.e. non-commercial actions). The BLM assumed canopy base height and surface fuel models resulting from proposed action alternatives among the Action Alternative would reflect outcomes indicated by local Medford District monitoring data, literature, assumptions in the Rogue Basin Strategy for post-treatment fuel transitions (Metlen et al. 2017), and LANDFIRE post-disturbance rules.

Canopy fuels (Large trees and canopy connectivity (canopy bulk density and canopy cover)–
For commercial thinning and group selection actions in Mixed relative resistance to stand-replacement category, the BLM derived canopy bulk density from estimated canopy cover (Silviculture Issue 1) using LANDFIRE lookup tables (Metlen et al. 2017 Appendix 7). The BLM assumed existing vegetation height in all stands to be greater than 25m or 75ft.

Ladder fuels (canopy base height)
In areas of only handpile burning, proposed action alternatives would result in relatively low canopy base heights (approximately 8 feet in short-term and 5 feet for moderate-term), while areas that are underburned would be expected to have relatively high canopy base heights (approximately 12 feet in the short-term and 10 feet for moderate-term). Greater vertical and horizonal discontinuity in ladder fuels improves stand resistance to replacement fire.

Surface fuels (Fire Behavior Fuel Model)
Following handpile burning, *moderate* to *very high* load surface fuels would shift to *moderate* load surface fuels in the short-term, (up to 10 years). Following underburning, *moderate* to *very high* load surface fuels would shift to *low* load surface fuels in the short-term (up to 10 years). Low surface fuel loading results in lower flame lengths than *very high* load surface fuels (See **Error! Reference source n ot found.**.3 Figures C-2 and C-3) and reduces the probability of flames traveling into ladder fuels and canopy fuels (VanWagner 1977), thus increasing stand-resistance to crown fire.

The BLM assumed a range of short– term (<10 year) surface fuel models resulting from proposed actions, based on plot data. In stands with <40% canopy cover, the BLM assumed a mix of low grass-shrub and hardwood litter surface fuel models. In stands with >40% canopy cover, the BLM assumed a mix of low timber understory and timber litter surface fuel models.

Activity Fuel Treatments:
The effects of the temporary increase (1-2 years) in risk from residual activity fuels are within the scope of those effects analyzed for in the 2016 PRMP/FEIS (2016 PRMP/FEIS, pp. 260 and 263, *Figure 3-380*). That analysis, which is incorporated here by reference, concluded that immediately following commercial harvest, residual activity fuels left on the forest floor (e.g., tree tops and limbs) would increase surface fuel loadings and have the potential to increase surface fire behavior and pose a risk to the residual stand and other values, if not adequately treated (2016 PRMP/FEIS p. 269, Omi and Martinson 2013, Weatherspoon and Skinner 1995, Fule et al. 2001). The 2016 PRMP/FEIS indicates that residual activity fuel loading depends on harvest type and the amount of material removed (2016 PRMP/FEIS, p. 265-266). The risk these activity fuels pose increases near human values (i.e. WDAs). That analysis concluded that in the interior/south the PRMP would result in an average of approximately 72,000 acres/decade of very high and high risk from activity fuels on dry forest sites (2016 PRMP/FEIS, pp. 268-269) if left untreated. The analysis in the 2016 PRMP/FEIS provided an estimate of potential future work needed to

reduce the risk associated with activity fuels. The 2016 PRMP/FEIS also identified that a variety of follow-up treatments (e.g. prescribed fire, biomass removal, and mechanical manipulation, etc.) can reduce surface fuels and reduce the risk associated with activity fuels (2016 PRMP/FEIS, pp. 266, 269).

Common to all Action Alternatives, the BLM would conduct an assessment to determine the need for treatment of residual activity fuels generated from thinning (Appendix C.3.4) and be treated within 1-2 years, thus any increase in surface fuel loading would be temporary. The BLM assumed that thinned sub-merchantable ladder fuels would be primarily burned in handpiles and burned the following season after enough time to cure and allow for complete consumption of woody material, or otherwise treated, as indicated in Appendix B.3.4.

For all action alternatives, in LSR LUA, fuels greater than 6 inches in diameter would be left on the surface and would contribute to the down woody debris cover. Fuels greater than 3 inches in diameter are not a contributing variable in calculations of surface fire behavior models (e.g. flame length or rate of spread) (Scott and Burgan 2005).

Fuel Heterogeneity
Patchy stand composition in vegetation or fuel patterns representative of frequent-fire dry forest low-mixed fire regime fuel loading contribute toward stand resistance to replacement fire (2016 PRMP/FEIS p.225-226) by disrupting fuel profiles which may inhibit the spread of crown fires, creating variability in litter fall and surface fuel accumulations, and promoting regeneration of diverse species to respond to disturbance (e.g. wildfire, drought and insects). The BLM assumed dry forest stand reconstruction reference sites in low-mixed severity fire regimes provide a guide for vegetation patterning representative of these fire regimes, where gap sizes were historically less than 2 acres and generally less than 1 acre. The alternatives differ in the amount and scale of heterogeneity included in proposed action alternatives. More information is provided in Appendix C.3.

Maintenance
Maintenance would not be needed in the short-term (up to 10 years after initial treatments). Appendix C.3 has further details.

Measurement Indicator
The BLM used the percent distribution of unit acreage in relative resistance to stand replacement fire categories as a measurement indicator to assess environmental effects by Alternative. This rating is based on likely fire behavior, given the structural stage (or fuel continuity), in that a crown fire would result in stand-replacement, where as a surface fire would not (see Methods and Assumptions sections, above).

3.5.4 Affected Environment
Wildfire is still prevalent in the area of proposed actions (see Appendix C.3). As stated in the methodology, a complex interaction among fuels (including amount and vertical and horizontal composition), topography (e.g., slope, topographic position, elevation, and aspect), and weather (e.g., wind, temperature, relative humidity, fuel moisture, and drought) influences specific conditions related to crown fire (stand-replacement fire) initiation and spread (Van Wagner 1977) (2016 PRMP/FEIS p. 243).

Within proposed commercial units, 68% of the acreage has greater than 60% canopy cover and late seral conditions only comprise approximately 7% of the project units (Issue 1). The current canopy base height is less than five feet in 93 percent of proposed commercial harvest units and 91% of proposed non-commercial units. The majority (85%) of proposed commercial units are best represented by *very high* and *moderate* load forest surface fuel models. The proposed non-commercial (i.e. hazardous fuel reduction) units are primarily (60%) represented by *moderate* load grass-shrub fuel models, while *very*

high and *moderate* timber surface fuel loading represents the majority of the remaining 40% of unit acreage. (see Appendix C.3 for additional detail).

3.5.5 Environmental Consequences

Direct and indirect effects are discussed across proposed unit acreage in short-term (up to 10 years), and moderate-term (10-30 years) and long-term (>30 years) timeframes. Cumulative effects are discussed at the landscape scale and over time.

Alternative 1 (No Action)

Near-term to Moderate-term Direct and Indirect Effects (stand-resistance rating)

The No Action Alternative 1 would have no short-term or moderate-term direct effects to current stand level fire resistance (Table 3-9), because the activities comprising the proposed action would not be implemented and would not alter the vertical and horizontal fuel profile continuity (i.e. surface, ladder, or canopy fuels or heterogeneity). In proposed commercial units, canopy fuels (canopy bulk density and connectivity) would remain high, canopy base height would be less than 5 feet for 88% of the acreage, and surface fuels would remain at *very high* load timber understory (TU5) over 30% of the area, and *high* load conifer (TL8) over nearly 50%, and 8% would be *moderate* load grass-shrub (GS2). The relative fire resistance rating would be low for 80% of the area and moderate for nearly 20%.

Table 3-9: No Action Alternative relative resistance to stand replacement fire ratings and percentage distribution across proposed commercial units, per the following relationship between crowning index (CI) and torching index (TI): CI <20 mph = Low; CI 20-30 mph = Moderate; CI >30 mph = High, unless TI<30 mph, then = Moderate. Fire behavior was modeled under 90th percentile fire weather, with 15 mph 20-foot wind speeds and 50% slope. (See Appendix C for additional information).

		Fire Behavior Model Inputs			Fire Behavior Model Outputs			
Timeframe	Estimated Canopy Cover (wind adjustment factor)	Canopy Bulk Density (kg/m3)	Canopy Base Height (ft)	Surface Fuel Model	Crowning Index (mph)	Torching Index (mph)	Relative Resistance Rating	Percentage of Unit Acreage (%)
Short term and Moderate term	> 60% (0.1)	0.12	2/5	TU5	19.9	0	LOW	40
	50-60 (0.1)	0.09	8	TL8	25.5	>50	MODERATE	10
	>60% (0.1)	0.12	5		19.9	45.1	LOW	40
	40-50 (0.15)	0.06	2	GS2	33.1	0	MODERATE	8

In non-commercial only proposed units, the same *very high*, *high*, and *moderate* loading surface fuel models (fire behavior fuel models (FBFM)) would represent the area, as discussed above and all acres would have a canopy base height of less than 5 feet. The relative fire resistance would be low for 80% of the area and moderate for 20% (Table 3-10).

Table 3-10: Short-term and moderate-term resulting relative resistance to "stand-replacement" fire structure ratings (common to all action alternative) in Mature and Structurally Complex structural stages and non-conifer plant communities, given a dry fuel moisture scenario (90th percentile fire weather) and 20 mph 20-foot wind speeds and no slope. IF canopy base height (CBH)< flame length (FL); OR IF CBH>FL and CBH-FL ≤ 1ft = LOW; IF CBH is > FL and CBH - FL IS < 6ft = MODERATE; IF CBH is > FL and CBH - FL IS > 6ft.

CBH (ft)	FBFM	FL (ft)	Relative Stand-level Fire Resistance Rating	Percentage of Unit Acreage (%)
<5	GS2	3.5	LOW	60
<5	TL6	2	MODERATE	20
<5	TU5	6	LOW	20

3.5.6 Cumulative Effects

Based on trends in the last 30 years, humans and lightning will continue to provide ignition sources (2016 PRMP/FEIS, Table 3-22 p. 227), and future trends suggest the suitability for large wildfire growth is expected to increase (2016 PRMP/FEIS, Appendix D. Figure D-8 p.1241 and Davis et al. 2017). Fire suppression efforts are expected to continue; however, these efforts are not 100 percent successful, in fact less than 1% of fires in the recent past account for the majority of acres burned by wildfire (2016 PRMP/FEIS p. 227). These large fires tend to burn during more extreme fire weather conditions, potentially resulting in high fire severity (Long et al. 2017), which can compromise the persistence of fire resistant large trees, threatened by encroaching vegetation and fuels. However, continued successful fire suppression efforts will result in continued exclusion of fire and altered disturbance regimes. Heterogeneity representative of low-mixed severity fire regimes and fire resistant species will continue to decline, and vegetation will continue to accumulate and die, increasing fuel loading; these aspects, coupled with expected climatological changes, such as increased background tree mortality, due to longer periods of hot drought (2016 PRMP/FEIS p. 185), increase the likelihood for larger proportions of high severity fire (Mote et al. 2019) and reduced stand resistance to replacement fire.

Portions of or all of the proposed commercial units under Action Alternatives may be included in a future planning area and may be grouped with other units to create a new project, in as soon as five years. Those proposed actions may have similar effects to the Action Alternative described below.

3.5.7 Direct and indirect effects common to all action alternatives

Natural Hazardous Fuel Reduction *(non-commercial or non-merchantable units)*

Under all alternatives the BLM proposes to apply non-commercial hazardous fuel reduction, including small-diameter thinning and prescribed fire on 3,466 acres, additional differing acreage is proposed under each Action Alternative in conjunction with commercial units. Actions would modify potential fire behavior through the reduction of surface and ladder fuels. These changes to the wildland fuel profile would help to keep flames from ascending into tree crowns and from spreading through the tree canopy. Surface fuel treatments would shift fuel loading to a *low* loading grass-shrub (GS1), hardwood (TL2) and timber understory (TU1) surface fuel models. Average short-term canopy base height would be raised to approximately to 8 feet after handpile burning and 12 feet after underburning. Surface fuel models would shift to moderate grass-shrub (GS2), moderate loading hardwood litter (TL6), and moderate timber understory loading (TU2) in the moderate-term (Table 3-11). Moderate-term canopy base height would be lower to approximately to 5 feet after handpile burning and 10 feet after underburning.

Among all Action Alternatives, the combined direct effects to the fuel profile continuity (surface, ladder, and canopy fuels) resulting from non-commercial thinning and prescribed fire proposed actions would improve resistance to stand-replacement fire in dry forest and non-conifer treatments over the No Action Alternative in the short-term and moderate-term (Table 3-11). In the short term 100% of proposed acres would have high relative fire resistance. In the moderate-term half of the unit acreage would move to moderate relative resistance, while half would remain at high relative resistance.

Table 3-11: Short-term and moderate-term indirect effects to existing resistance to stand-replacement fire structure ratings (common to all action alternative), given a dry fuel moisture scenario (90th percentile fire weather) and 20 mph 20-foot wind speeds and no slope. IF CBH< FL; OR IF CBH>FL and CBH-FL ≤ 1ft = LOW; IF CBH is > FL and CBH - FL IS < 6ft = MODERATE; IF CBH is > FL and CBH - FL IS > 6ft

Timeframe	CBH (ft)	FBFM	FL (ft)	Relative Stand-level Fire Resistance Rating	Percentage of Unit Acreage (%)
Short-term (<10 years)	8	GS1	2.5	HIGH	30
	12			HIGH	30
	8	TL2	0.75	HIGH	10
	12			HIGH	10
	8	TU1	1	HIGH	10
	12			HIGH	10
Moderate-term (10 to <30 years)	5	GS2	3.75	MODERATE	30
	10			HIGH	30
	5	TL6	2	MODERATE	10
	10			HIGH	10
	5	TU2	2	MODERATE	10
	10			HIGH	10

Canopy fuels *(canopy connectivity (canopy cover and canopy bulk density) and large trees)*

Under all Action Alternatives, for commercial units, in addition to the proposed commercial thinning actions would reduce canopy fuels (i.e. canopy bulk density and canopy connectivity). The reduction of canopy fuels (i.e. canopy bulk density and canopy connectivity) would decrease the likelihood of tree-to-tree crown fire spread under typical fire weather indices (Scott and Reinhardt 2001), over the No Action Alternative. Thinning will also increase stand diameter (Issue 2, section 3.3.5), thus improving resistance to stand-replacing fire, as thinned stands with remaining large trees have been shown to have less severe fire effects when intersected by wildfires (2016 PRMP/FEIS p. 228; Martinson and Omi 2013, Lydersen et al. 2014). Proposed commercial thinning actions and prescriptions will retain and promote a cohort of large diameter trees. This will improve resistance to stand-replacing crown fire, as large trees are an important component of fire-resistant stand structure (Martinson and Omi 2013, 2016 PRMP/FEIS, pp. 243, 252). Hood and others (2017) found that a combination of thinning and radial thinning around large trees was most beneficial for increasing diameter growth in large old ponderosa pine, these actions also reduce threat from adjacent fuels. Martinson and Omi (2013) found that treatments resulting in a combined effect of increasing average tree diameter and height to canopy, along with reducing canopy bulk density were most effective at moderating fire behavior and severity. The Alternatives vary in intensity and amount of commercial thinning and effects on stand resistance are discussed below.

Alternative 2

Direct and Indirect Effects (stand-resistance rating)

Proposed actions would modify resistance to stand-replacement fire, through the reduction of surface, ladder, and canopy fuels. Short-term surface fuels would shift to *low* loading grass-shrub (GS1), and hardwood (TL2) surface fuel models; average canopy base height would be raised to approximately to 8 feet after handpile burning and 12 feet after underburning; and canopy bulk density would be approximately 0.03 kg m3. Moderate-term surface fuel models would shift to *moderate* grass-shrub (GS2) and hardwood litter (TL6); canopy base heights would lower to approximately 5 feet or 10 feet; and canopy fuels would increase in bulk density to 0.05 kg/m3 (Table 3-12).

The combined direct effects to the fuel profile continuity (surface, ladder, and canopy fuels) resulting from proposed actions would improve resistance to stand-replacement fire over the No Action Alternative in the short-term and moderate-term in Mature structural stages (Table 3-12). In the short term 65% of proposed acres would have high relative fire resistance, and 35% moderate. In the moderate-term only 30 would have high relative resistance, while 70% would have moderate resistance.

Table 3-12: Alternative 2 relative resistance to stand replacement fire ratings and percentage distribution across proposed commercial units, per the following relationship between crowning index (CI) and torching index (TI): CI <20 mph = Low; CI 20-30 mph = Moderate; CI >30 mph = High, unless TI<30 mph, then = Moderate. Fire behavior was modeled under 90th percentile fire weather, with 15 mph 20-foot wind speeds and 50% slope. (See Appendix C.3 for additional information).

		Fire Behavior Model Inputs			Fire Behavior Outputs			
ALTERNATIVE & Timeframe	Estimated Canopy Cover (wind adjustment factor)	Canopy Bulk Density (kg/m3)	Canopy Base Height (ft)	Surface Fuel Model	Crowning Index (mph)	Torching Index (mph)	Relative Resistance Rating	Percentage of Unit Acreage (%)
Short term	>25% (0.2)	0.03	8	GS1	51.8	23.7	MODERATE	35
			12			41.2	HIGH	65
			8	TL2		>100		
			12					
Moderate term	30-40% (0.15)	0.05	5	GS2	38.2	0	MODERATE	70
			10			23.3		
			5	TL6		38.9	HIGH	30
			10			>50		

Fuel Heterogeneity and Climate

Proposed actions to create openings and leave untreated skips will introduce heterogeneity in uniform stands, disrupting horizontal fuel connectivity, and promoting species diversity and growing space for fire adapted species, such as pine and oak. However, the creation of only 4 acre gaps will not contribute to variable and patchy vegetation patterns and fuel loadings, and arrangements comparable to low and mixed severity fire regimes (Churchill et al. 2013, Hesburg et al. 2015) where gaps were variable in size, typically less than 2 acres and most were less than 1 acre (Appendix C).

Thinning and group selection openings may indirectly increase surface wind gusts. Bigelow and North (2012) found evidence of this, observing moderate increases in average wind gusts in thinned stands (up to 1.5mph) and greater increases in openings (up to 5.6 mph in openings of 2 acres). Openings greater than 2 acres could increase wind speeds to a greater extent, which could result in problematic surface fire behavior. The sheltering effect vegetation has on winds (Albini and Baughmann, 1979, NWCG PMS437),

has been incorporated in the weather inputs for analysis of this issue based on projected post-harvest canopy cover (Appendix C.3).

The area in un-thinned skips, would contribute toward heterogeneity through retention of continuous canopy fuels, low canopy base heights, and existing surface fuel loading. These skips would result in lower relative resistance to group torching of trees during a wildland fire or a prescribed fire. However, these untreated areas, either burned or unburned will contribute toward heterogeneous vegetative patterns at the stand scale.

Alternative 3

Direct and Indirect Effects (stand-resistance rating)

Proposed actions would modify resistance to stand-replacement fire, through the reduction of surface, ladder, and canopy fuels. Short-term surface fuels would shift to *low* loading grass-shrub (GS1), and hardwood (TL2) surface fuel model; canopy base height would be raised to approximately to 8 feet after handpile burning and 12 feet after underburning; canopy bulk density would be approximately 0.05 kg m3. Moderate-term surface fuels would shift to *moderate* grass-shrub (GS2) and hardwood litter (TL6) models; canopy base heights would lower to approximately 5 feet or 10 feet; and canopy fuels would increase in bulk density to 0.06 kg/m3 (Table 3-13).

The combined direct effects to the fuel profile continuity (surface, ladder, and canopy fuels) resulting from proposed actions would improve resistance to stand-replacement fire over the No Action Alternative in the short-term and moderate-term in Mature structural stages (Table 3-13). In the short term all proposed action acres would have high relative fire resistance. In the moderate-term only 30 would have high relative resistance, while 70% would have moderate resistance.

Table 3-13: Alternative 3 relative resistance to stand replacement fire ratings and percentage distribution across proposed commercial units, per the following relationship between crowning index (CI) and torching index (TI): CI <20 mph = Low; CI 20-30 mph = Moderate; CI >30 mph = High, unless TI<30 mph, then = Moderate. Fire behavior was modeled under 90th percentile fire weather, with 15 mph 20-foot wind speeds and 50% slope. (See Appendix C.3 for additional information).

		Fire Behavior Model Inputs			Fire Behavior Outputs			
ALTERNATIVE & Timeframe	Estimated Canopy Cover (wind adjustment factor)	Canopy Bulk Density (kg/m3)	Canopy Base Height (ft)	Surface Fuel Model	Crowning Index (mph)	Torching Index (mph)	Relative Resistance Rating	Percentage of Unit Acreage (%)
Short term	30-40% (0.15)	0.05	8	GS1	38.2	38.4	HIGH	100
			12			>50		
			8	TL2		>100		
			12					
Moderate term	40-50% (0.15)	0.06	5	TU2	33.1	18.2	MODERATE	20
			10			>50	HIGH	80
			5	TL6		38.9		
			10			>50		

Fuel Heterogeneity and Climate

The proposed actions of creating variable sized gaps would introduce heterogeneity in stands more reflective of fuel loadings and arrangements comparable to low and mixed severity fire regimes, (2016 PRMP/FEIS, p.225-226, Churchill et al. 2013, Hesburg et al. 2015) as discussed in Appendix C.3. This disruption of continuous fuel profiles may alter potential fire behavior (Finney 2001, Fule et al. 2004,

Jaine et al. 2012) and improve stand resistance to replacement fire. An increase in variable sized openings could promote species diversity and growing space for fire adapted species, such as pine and oak. Grulke et al. (2020) observed a greater improvement in ponderosa pine vigor two years following a patchy harvest prescription over an even harvest prescription, even amidst a drought period.

Gaps would be variably sized, up to 4 acres, and implemented over slightly less area. Thus, the effects described in alternative 2 regarding effect on surface winds and lack of patterning akin to low-mixed severity fire would be less pronounced. Proposed actions would retain slightly more area in skips and those areas would have similar effects, as discussed in alternative 2.

Alternative 4

Direct and Indirect Effects (stand-resistance rating)

Proposed actions would modify resistance to stand-replacement fire, through the reduction of surface, ladder, and canopy fuels. Short-term surface fuels would be *low* loading timber-understory (TU1), and *moderate* load timber litter (TL3) models; canopy base height would be raised to approximately to 8 feet after handpile burning and 12 feet after underburning; canopy bulk density would be approximately 0.06 kg m3. Moderate-term surface fuels would shift to *moderate* load timber-understory (TU2) and high load conifer litter (TL8); canopy base heights would lower to approximately 5 feet or 10 feet; and canopy fuels would increase in bulk density to 0.09 kg/m3 (Table 3-14).

The combined direct effects to the fuel profile continuity (surface, ladder, and canopy fuels) resulting from proposed actions would improve resistance to stand-replacement fire over the No Action Alternative in the short-term and moderate-term in Mature structural stages (Table 3-14). In the short term 65% of proposed acres would have high relative fire resistance, and 35% moderate. In the moderate-term only 30 would have high relative resistance, while 70% would have moderate resistance.

Table 3-14: Alternative 4 relative resistance to stand replacement fire ratings and percentage distribution across proposed commercial units, per the following relationship between crowning index (CI) and torching index (TI): CI <20 mph = Low; CI 20-30 mph = Moderate; CI >30 mph = High, unless TI<30 mph, then = Moderate. Fire behavior was modeled under 90th percentile fire weather, with 15 mph 20-foot wind speeds and 50% slope. (See Appendix C.3 for additional information).

		Fire Behavior Model Inputs			Fire Behavior Outputs			
ALTERNATIVE & Timeframe	Estimated Canopy Cover (wind adjustment factor)	Canopy Bulk Density (kg/m3)	Canopy Base Height (ft)	Surface Fuel Model	Crowning Index (mph)	Torching Index (mph)	Relative Resistance Rating	Percentage of Unit Acreage (%)
Short term	>45% (0.15)	0.06	8	TU1	33.1	>100	HIGH	100
			12			>50		
			8	TL3		>100		
			12					
Moderate term	50-60% (0.1)	0.09	5	TU2	25.5	35.1	MODERATE	100
			10			>50		
			5	TL8		45.1		
			10			>50		

Fuel Heterogeneity and Climate

The proposed actions would create openings (up to 1 acre) and leave skips in more than 10 percent of individual stand area, which would contribute toward creating heterogeneity in uniform stands and begin to create patchy stand composition. This small-scale heterogeneity would move vegetation patterns,

species composition, and fuel loadings and arrangements toward conditions associated with frequent fire, dry forest low and mixed severity fire regimes (2016 PRMP/FEIS, p.225-226, Churchill et al. 2013, Hesburg et al. 2015) as discussed in measurement indicators.

Long-term (>30 year) Effects

Over the moderate-term and beyond, understory fuels would re-grow, vegetation would die, and surface and ladder fuels would re-accumulate. This accumulation of fuel would reduce stand-level fire resistance and require maintenance actions, such as low intensity prescribed underburning, to maintain *low-moderate* loading surface fuel profiles, remove regrowth of ladder fuels, and raise canopy base height. Ultimately, stand level fire resistance in the frequent-fire adapted dry forest, hinges on frequent low-moderate intensity disturbance.

3.5.8 Summary of Direct and Indirect Effects Comparison of Alternatives

Among all alternatives, the proposed actions would improve resistance to stand-replacement fire in dry forest and non-conifer treatments, compared with the No Action Alternative, by modifying potential fire behavior through the reduction of canopy fuel connectivity, increase of stand diameter, and the reduction of surface and ladder fuels. Alternative 3 would result in the most acres with improved and sustained resistance to stand replacement fire of any of the Action Alternatives. Additionally, Alternative 3 or 4 would create patchy heterogeneous conditions most representative of low-mixed severity fire regimes. Alternative 2 would create the most open conditions and may result in more rapid regeneration of surface fuels, which may necessitate earlier and more frequent maintenance treatments. Under any alternative application of prescribed underburning will result in the highest canopy base heights and lowest surface fuels and maintenance disturbance will be needed to sustain stand-level resistance.

3.5.9 Cumulative and Long-term

The Action Alternatives have various sizes of group selection openings proposed, which would be variably reforested, depending on Land Use Allocation. Moderate-term and long-term surface fuels and ladder fuels accumulation have accounted for re-growth of understory vegetation, including the varied effects of reforestation.

See cumulative effects discussed in Alternative 1 (No Action) regarding continued wildfire activity and trends. Proactive treatments designed to moderate fire behavior, so that a wildfire can burn through a stand without detrimental consequences can help. Other vegetation treatments, which may have beneficial or deleterious effects on fuel loading and conditions, are expected to occur in other projects, on other land jurisdictions and under the Programmatic IVM EA (Appendix C.1). To the extent that these projects seek to create post-treatment conditions that will set stands up to better receive fire (prescribed or wildfire) and are grouped in adjacency, they could provide greater influence to modify fire behavior (e.g. increase resistance to stand-replacement fire) and slow fire spread, increasing resistance to replacement fire, and provide more opportunities to apply underburning as a maintenance action. Wildfires can also provide maintenance of treated areas. In recent years, nearly 4,000 acres of surface and ladder fuel reduction treatments (including some commercial thinning) on Medford BLM-administered lands have been intersected by wildfire. For many of these treated areas (65%), the results have been similar to outcomes desired from prescribed underburning, resulting in low-moderate severity fire effects and surface fuel loading.

3.6 Issue 5: Would forest management treatments in the Late-successional Reserves-Dry speed the development or improve the quality of nesting habitat, and not preclude or delay (by 20 years or more) the development of northern spotted owl nesting/roosting habitat?

3.6.1 Assumptions

Northern spotted owl habitat is categorized into five types: Nesting-Roosting (NR), Foraging (F), Dispersal-Only (DO), Capable, and Non-Habitat. For this analysis, the following habitat definitions are derived from the 2016 ROD/RMP, Medford BLM District habitat evaluations, spotted owl scientific literature, and local GIS modeling:

Nesting-Roosting (NR)

Conifer stands with a multi-layered, multispecies canopy dominated by large (> 30" DBH) conifer overstory trees, an understory of shade-tolerant conifers or hardwoods, ≥ 60 percent canopy cover, substantial decadence in the form of large, live conifer trees with deformities (such as cavities, broken tops, and dwarf mistletoe infections; numerous large snags), ground cover characterized by large accumulations of logs and other woody debris, and a canopy that is open enough to allow northern spotted owls to fly within and beneath it (USDI BLM 2016a). In Southwest Oregon, additional NR metrics include overstory DBH ≥21" DBH, ≥12 20" or greater DBH trees/acre, basal area from180 to 240 ft^2/acre (but is typically greater than 240 ft^2/acre), and a basal area from larger trees of ≥ 30 ft^2 for trees ≥ 26 " DBH.

Foraging (F)

Conifer stands with similar stand attributes to nesting-roosting, such as having canopy cover ≥ 60 percent. However, foraging stands are often single storied (especially lacking middle layer), lack decadent features (snags and coarse woody material), have an overstory tree diameter of 16" DBH, have ≥ 7 trees 26" per acre, and usually have at least 150 ft^2/acre basal area and could range from 150 -240 ft^2 / acre basal area.

Dispersal-Only

A minimum consists of stands with adequate tree size and canopy cover to provide protection from avian predators and at least minimal foraging opportunities. Dispersal habitat may include younger and less diverse forest stands than foraging habitat, such as even-aged, pole-sized stands, but such stands should contain some roosting structures and foraging habitat to allow for temporary resting and feeding for dispersing juveniles (USDI FWS 1992). Dispersal habitat is generally forest stands with an average stand canopy cover of 40 percent or greater and an average diameter at breast height (DBH) of 11 inches or greater.

Capable

For the northern spotted owl is forestland that is currently not habitat but can become NR, F, or dispersal-only habitat in the future, as trees mature, the canopy closes, and additional structural diversity elements develop such as canopy layering, snags, and coarse woody debris.

Non-Habitat

Does not provide habitat for northern spotted owls and will not develop into NR, F, or dispersal-only habitat in the future.

As described in U.S. Fish & Wildlife Service 2011, Relative Habitat Suitability (RHS) is derived from a MaxEnt model for the purpose of predicting habitat conditions on the landscape that would support spotted owl occupancy and nesting. It is based on several variables including habitat structure, habitat

pattern (core and edge), forest species composition, topographic position, elevation and climate. It is not a map of current suitable habitat but instead a map based on a set of variables that contribute to identification of suitable conditions. The RHS map looks at a roving window of approximately 500 acres. An individual pixel may not be suitable habitat but the combination of variables around that pixel could contribute to a high RHS value.

Based on the RHS model [Revised Recovery Plan for the Northern Spotted Owl, USDI FWS 2011], treatments in non-NR habitat and in High RHS would improve nesting function in the future due to the preferred location on the landscape. However, treatments in non-NR habitat and in Low RHS, may improve stand and habitat structure, but the treatments are in a location that would not support spotted owl occupancy and nesting (generally warmer upper third of the slope, ridges, or south facing).

3.6.2 Measurement Indicators

As described above, stand metrics such as canopy cover, basal area, tree size, trees per acre, and canopy layering are used to describe and define spotted owl habitat. However, only the overstory tree dbh, canopy cover, basal area, and large tree dbh metrics will be used to analyze this issue because other metrics, such as snags and coarse woody debris are not available using the Organon model

3.6.3 Effects

These stands identified for treatment are not currently categorized as NR. Treatment would benefit the NSO by promoting the development of nesting-roosting habitat and/or more complex forest habitat in the future. In stands that are not northern spotted owl nesting-roosting habitat, Selection Harvest treatments are proposed to improve the quality of NSO habitat long term that will not preclude or delay the development of the habitat by 20 years or more compared to development without treatment or a "No Action" (2016 ROD/RMP, pg. 72). Detailed analysis of Bear Grub LSR-dry stand data that illustrates this long-term benefit may be referenced in the Silvicultural section. (Tables 3-3, 3-4, and 3-5 in section 3.3.6)

3.6.4 Environmental Consequences

Effects to LSR by Alternative are captured by the following tables:

Table 3-15: Effects of Proposed Treatments in Alternative 2 to LSR in the Bear Grub Wildlife Analysis Area.

Habitat Type	Pre-Project Acres	Treat and Maintain	Removal	Downgrade	Post-Project Acres	Percent Change
NRF	3321	0	26 (Foraging)	18 (Foraging)	3277	-1
Dispersal-only	1153	63.5	5	N/A	1166	+1
Capable	599	127	N/A	N/A	599	0
Non-habitat	39	31	N/A	N/A	39	0

Table 3-16: Effects of Proposed Treatments in Alternative 3 to LSR in the Bear Grub Wildlife Analysis Area.

Habitat Type	Pre-Project Acres	Treat and Maintain	Removal	Downgrade	Post-Project Acres	Percent Change
NRF	3321	0	26 (Foraging)	50 (Foraging)	3245	-2
Dispersal-only	1153	78.5	25	N/A	1178	+2
Capable	599	127	N/A	N/A	599	0
Non-habitat	39	31	N/A	N/A	39	0

Table 3-17: Effects of Proposed Treatments in Alternative 4 to LSR in the Bear Grub Wildlife Analysis Area.

Habitat Type	Pre-Project Acres	Treat and Maintain	Removal	Downgrade	Post-Project Acres	Percent Change
NRF	3321	0	0	61 (Foraging)	3260	-2
Dispersal-only	1153	100	0	N/A	1214	+5
Capable	599	127	N/A	N/A	599	0
Non-habitat	39	31	N/A	N/A	39	0

As the data in these tables illustrates, foraging habitat would be reduced by 2% of current NRF habitat present in LSR within the wildlife analysis area (See Map 3-2 in section 3.7.2 of Issue 6) in Alternatives 3 and 4. Alternative 3 would produce a 2% increase in dispersal only habitat, while Alternative 4 would produce a 5% increase. Alternative 2 would result in a 1% decrease in foraging habitat and a corresponding 1% increase in dispersal habitat. While reductions in foraging habitat would be anticipated to have some negative effects on spotted owls that may be present in the area, the long term improvement of habitat quality and increase in habitat quantity anticipated as a result of these treatments is expected to offset any short term negative consequences. All alternatives would help to move the treated acres of LSR toward the type of complex forest structures desired for this land use allocation without delaying this development by more than 20 years.

3.7 Issue 6: How would vegetation management treatments affect the pacific fisher and its habitat?

3.7.1 Introduction

This section discusses the potential impacts of the Alternatives to the fisher and its ability to persist. This analysis will use the Wildlife Analysis Area shown below in Map 3-2.

Pacific Fisher (Bureau Sensitive)

The Pacific fisher is currently designated a OR/WA BLM State Director Sensitive Species. The fisher was until recently an ESA candidate species, but as of May 15, 2020 this is no longer the case. On May 15, 2020, the U.S. Fish and Wildlife Service ("FWS") published a final rule that found that such listing was unwarranted for fishers in Oregon. 85 Fed. Reg. 29532, 29561-62 (May 15, 2020). FWS found that the Northern California/Southern Oregon distinct population segment of fisher is a "species" under the ESA.

Id. at 29537. But FWS found there is a "widespread distribution" of this species in actively managed landscapes and found that "fishers continue to persist in actively managed landscapes." *Id*.

Fisher occurrence is closely associated with low to mid-elevation (generally less than 4,100 feet) forests with a coniferous component, large snags or decadent live trees and logs for denning and resting, and complex physical structure near the forest floor (Aubry and Lewis 2003). The Bear Grub Analysis Area covers elevations from 2,000 to 5,000 feet. It is known to be inhabited by fishers

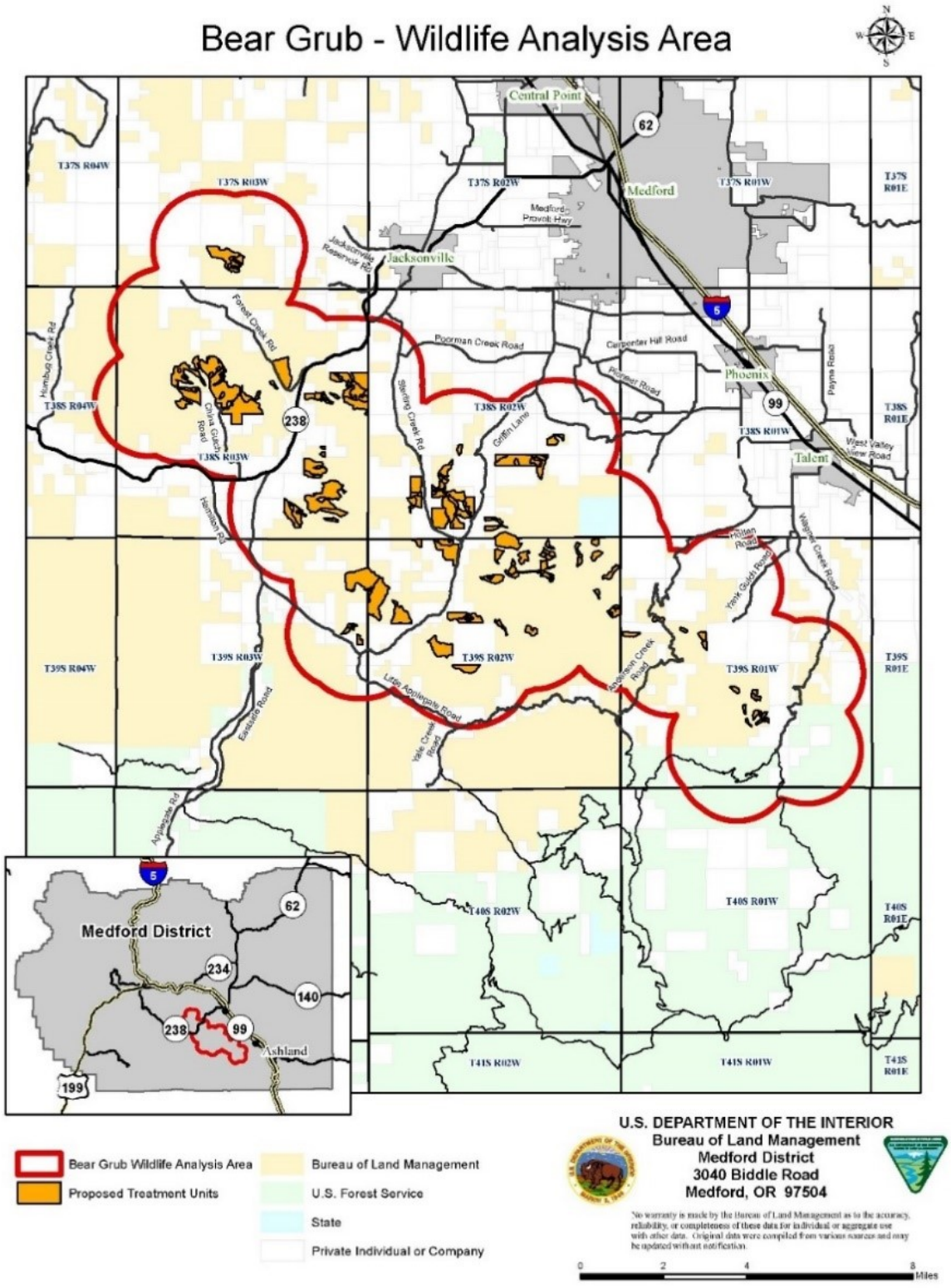
Fishers are known to occupy and reproduce in managed forest landscapes and forest stands not classified as mature or late-successional if those managed forest landscapes provide sufficient amounts of and an adequate distribution of the key habitat and structural components important to fishers (Self and Callas 2006, entire; Reno *et al.* 2008, pp. 9-16; Clayton 2013, pp. 7–8; Garner 2013, p. 41, as cited in USDI FWS 2016a). There is considerable information on the importance of structural elements (e.g. large trees and snags with cavities) for fisher. The strongest and most consistent habitat association observed across all fisher studies in the Northern California and Southern Oregon DPS was the use of cavities in live trees and snags by reproductive females with kits. Natal dens are typically found in the largest trees available in a stand and there is a preference towards hardwood cavities when present on the landscape. These large trees with cavities and platforms are also used extensively by both sexes for resting sites. Naney *et al.* (2012) stated that the reduction in structural elements used for denning and resting distributed across the landscape was the highest ranked and geographically most consistent threat to fishers. Currently, there are no empirical thresholds at which the reduction of structural elements may begin to negatively affect fishers (Naney *et al*. 2012). A considerable amount of research exists describing denning and resting habitat use and landscape-level selection (Lofroth *et al.* 2010), but very little is known regarding how forestry practices affect how fishers continue to use previously untreated areas. Historically, a change in habitat is used as a surrogate to determine the effects of habitat modification in lieu of published research. Younger and mid-seral forests may be suitable for fishers if complex forest structural components such as trees with cavities, large logs, and snags are maintained in numbers sufficient for fulfilling life history requirements (Lewis and Stinson 1998, p. 34). The physical structure of the forest and prey associated with forest structures are thought to be critical features that explain fisher habitat use (Buskirk and Powell 1994, p. 286), and the composition of individual fisher home ranges is usually a mosaic of different forested environments and successional stages (Lofroth *et al.* 2010, p. 94). Thus, a forested landscape that includes sufficient numbers, diversity, and distribution of structural elements suitable for denning, resting, and prey habitat, with moderate to dense overhead canopy for fishers, may be adequate habitat for occupancy.

In the southern Oregon Cascade Mountains the home range of a non-breeding male fisher averages 24 mi^2 (15,320 acres) while home range of a female fisher averages 9.6 mi^2 (6,177 acres) (Aubry and Raley 2006). While located in the Cascade Mountains rather than the Klamath Mountains in which the Bear Grub project is proposed, this study is likely a good approximation of the habitat use scale of fisher in the Klamath Mountains. Based on the overall size of the Wildlife Analysis Area (approximately 78,000 acres), it has the potential to contain up to twelve female home ranges and five male home ranges, depending on their home range juxtaposition on the landscape.

3.7.2 Methodology

The spatial scale for evaluating impacts to fishers includes all areas of habitat within the Wildlife Analysis Area. (See Map 3-2)

Map 3-2: Wildlife Analysis Area



3.7.3 Assumptions

The most applicable data available to the BLM regarding habitat distribution and structural habitat component occurrence across the landscape are the classification of forest stands as northern spotted owl nesting, roosting and foraging (NRF) habitat. Habitat classified as (NRF) by these generally possess the vegetative and structural components important to fishers for their life cycle functions (e.g. denning, resting, foraging, dispersing).

The BLM Field Office wildlife biologist used classifications from the NSO habitat review to categorize habitat in terms of its function for life history support for fisher.

For the purpose of this analysis, the BLM is assuming that fisher denning, and resting habitat is represented by NSO NRF habitat.

Northern spotted owl habitat is specifically rated for suitability for spotted owls. However, NSO NRF habitat has been determined to be a reasonable proxy for fisher habitat. (*KS Wild v. US BLM*, Case No. 06-3076-PA, Order and Judgment 9/10/2007).

A considerable amount of research exists describing denning and resting habitat use and landscape-level selection (Lofroth et al. 2010), but very little is known regarding how forestry practices affect fishers' continued use of treated habitats. As previously mentioned, the best tool for determining fisher habitat, while not implying a level of fitness, is to use spotted owl habitat determinations. Field surveys have shown that spotted owl NRF habitat can contain similar decadent attributes or structural elements that fisher use for denning and rest sites.

The process for conducting biological evaluations and assessments includes a review of existing records, field reconnaissance, field surveys, and analysis of potential impacts. The BLM Field Office wildlife biologist conducted a review of potential fisher habitat using field assessments, maps, aerial photographs, LiDAR, GIS software, wildlife survey data, and stand exam records for the Wildlife Analysis Area.

Forest type is probably not as important to fishers as the vegetative and structural complexity that lead to abundant prey populations and potential den sites (Lofroth et al. 2010). Currently, there is a lack of research regarding fisher habitat use and preferences in the Klamath and Siskiyou Mountains.

Disturbance from treatment activities is anticipated to effect fisher within the Wildlife Analysis Area. However, fishers are highly mobile, and, with large home ranges, they would likely move to another part of their home range while the activity is taking place.

3.7.4 Affected Environment

The Bear Grub Vegetation Management Project is located in southwest Oregon, southwest of the city of Medford. (Figure 1-1).

The total size of the Wildlife Analysis Area is approximately 78,000 acres (approximately 121 square miles). BLM-administered lands comprise approximately 50 percent of this area. Total acres of federal ownership including BLM and USFS is approximately 44,000 acres or 56 percent.

Actual acres of NSO habitat by type is listed in the table below.

Table 3-18: Spotted Owl Habitat Environmental Baseline for the Bear Grub Action Area						
	Total Acres	**NRF Habitat Acres (% Total)**	**Capable Habitat Acres (% Total)**	**Reserved Acres[1] (% Of Total)**	**Non-Reserved Acres (% Of Total)**	**Dispersal[2], Acres (% Of Total)**
OWNERSHIP						
-All Ownerships	78,028	17,669 (23%)	28,358 (36%)	27,211 (35%)	50,817 (65%)	37,783 (48%)
- Non-Federal (Private, State)	34,460	6,774 (20%)	12,094 (35%)	0	34,460 (100%)	17,097 (50%)

The present-day composition and distribution of vegetation in the analysis area is influenced by site characteristics (soil types, aspect, and topography), natural disturbance (wildfires, insects, disease, etc.) historic mining, rural residential development, agricultural activities, timber harvest, fuels reduction projects, fire suppression, and road building. Common forest types include Douglas-fir, ponderosa pine, and mixed conifer forest series.

3.7.5 Environmental Consequences

Alternative 1 – No Action

Direct and Indirect Effects

Under the No Action Alternative, no vegetation management would be implemented and there would be no direct effects to fishers on BLM-administered lands. Habitat conditions would remain generally unchanged at the unit scale in the short-term unless a major disturbance such as a wildfire, wind event, ice storm, insect infestation, or disease induced mortality occurred. In addition, it would likely be the case that these acres would be selected for vegetation management under a new planning document within 5 years given the designation of most of the project footprint as HLB.

Cumulative Effects

Private lands surrounding the Wildlife Analysis Area are made up of early, mid, and late seral forests, agricultural fields, and barren land. Most private forest lands are managed as tree farms for production of wood fiber on relatively short forest rotations. any remaining late seral forests on private timber lands would be converted to early seral forest over the next one or two decades.

3.7.6 Common to All Action Alternatives

Direct and Indirect Effects

The proposed commercial treatments under Alternatives 2, 3, and 4 would remove fisher denning and resting habitat. Additionally, treatments would retain key habitat characteristics such as large snags and coarse woody debris (CWD) to maintain existing and provide for future habitat for fishers. However, in Action Alternatives 2, 3, and 4, between 539 and 740 acres of fisher denning and resting habitat would be reduced in canopy cover and would no longer be considered suitable for use by fisher for these life history activities.

Cumulative Effects

Cumulative effects are environmental changes that are affected by more than one land-use activity and include beneficial changes. Cumulative effects for fishers and their habitat are reviewed at the Wildlife Analysis Area level to capture the varying habitats, species home ranges, and varying degrees of species mobility. Fire suppression, road building, and timber harvest throughout the Wildlife Analysis Area have

resulted in habitat modification and fragmentation and have changed the distribution and abundance of wildlife species surrounding the Wildlife Analysis Area. Timber harvest has occurred on BLM-administered lands in the Wildlife Analysis Area for decades. The associated habitat modification has negatively affected late-successional forest habitat-dependent species by reducing stand seral stage and changing habitat structure. However, species associated with younger forested conditions have benefited from these changes due to the increased availability of young stands within the watershed.

Private lands surrounding the Wildlife Analysis Area are made up of early, mid-, and late seral forests, agricultural land, and barren land. Most private forest lands are managed as tree farms for production of wood fiber on forest rotations. any remaining late seral forests on private timber lands would be converted to early seral forest over the next one or two decades. For those species dependent on early seral habitat, private forest lands do not always provide quality habitat as competing vegetation that includes flowering plants, shrubs and hardwood trees are regularly sprayed to reduce competition with future harvestable trees. The majority of state and private forests in Washington, Oregon, and Northern California are managed for timber production. Historically, non-Federal landowners practiced even-aged management (clear-cutting) of timber over extensive acreages. Private industrial forest lands are managed for timber production and would typically be harvested between 40 and 60 years of age, in accordance with State Forest Practices Act standards. In 2008, during the development of the *Medford BLM District Analysis and 2008 Biological Assessment of Forest Habitat* (USDI BLM 2008), data was requested from Oregon Department of Forestry and the Pacific Northwest Inventory and Analysis team to help determine harvest rates in the past decade on private lands within the Medford district. These records indicated private harvest rates in Jackson and Josephine Counties have never exceeded 1.08 percent of the total private lands per year since 1998. These records did not provide information of pre-treatment habitat conditions. Given that the private lands within the Wildlife Analysis Area contain approximately 6774 acres of NSO NRF habitat we could project that a loss of 1.08% of this habitat per year may occur or 73 acres of fisher habitat lost per year.

The proposed treatments in Alternatives 2, 3, and 4 would remove between 539 and 740 acres of NRF habitat. This would reduce the amount of habitat in the Wildlife Analysis Area available to fishers for denning, resting, and foraging by approximately 5 to 6 percent.

No proposed habitat modifying activities on USFS are known within the Wildlife Analysis Area.

3.8 Issue 7: How will timber harvest, fuels reduction and associated connected actions impact the Recreation Setting Characteristics (RSCs) and recreation opportunities and objectives of the Extensive Recreation Management Areas (ERMAs), and Special Recreation Management Areas (SRMAs) within the project area?

3.8.1 Background

The BLM developed this issue analysis to address the potential changes in the Recreation Setting Characteristics (RSC) and recreation objectives and opportunities of the ERMAs and SRMAs within the planning area. The BLM examined impacts to both the current recreation opportunities and objectives within the ERMAs and SRMAs, as well as impacts to the designated RSC for each ERMA or SRMA.

As part of the RMP, the BLM designated portions of the landscape as either SRMAs or ERMAs. Within each of these designated areas, the BLM established recreation and visitor service objectives and identified supporting management actions and allowable uses (2016 ROD/RMP pg. 259). The Recreation Management Area (RMA) Frameworks are available in Appendix C.4.

Special Recreation Management Areas (SRMAs) are administrative units where the existing or proposed recreation opportunities and recreation setting characteristics are recognized for their unique value, importance, and/or distinctiveness, especially as compared to other areas used for recreation. The BLM manages SRMAs to protect and enhance a targeted set of activities, experiences, benefits, and desired recreation setting characteristics. Within SRMAs, recreation and visitor services management is recognized as the predominant land use plan focus, where specific recreation opportunities and recreation setting characteristics are managed and protected on a long-term basis. (RMP 259)

Extensive Recreation Management Areas (ERMAs) are administrative units that require specific management consideration in order to address recreation use, demand, or recreation and visitor services program investments. The BLM manages ERMAs to support and sustain the principal recreation activities and the associated qualities and conditions of the ERMA. Management of ERMAs is commensurate with the management of other resources and resource uses (RMP 259).

On August 22, 2018, a Plan Maintenance document was authorized by the state director to provide clarification of the role of the guidance in the Recreation Management Area Frameworks for an ERMA in the context of the management direction for the underlying land use allocation. The clarification added the following text to the beginning of the Forest Management section of the Recreation Management Area Frameworks for each ERMA: "Apply the following guidance to the extent it is consistent with the management direction for the underlying Land Use Allocation. Where ERMA designations overlap with the Harvest Land Base, implement actions as directed by the Harvest Land Base management direction and consider project design features that would minimize or avoid adverse effects to the recreational resources identified in the RMP's ERMA Planning Framework to the extent consistent with Harvest Land Base management direction."

3.8.2 Methodologies

Remoteness and Naturalness Characteristics

With the exception of the characteristics of remoteness and naturalness, the BLM discusses effects on all the recreation setting characteristics through analysis of RMAs, recreation opportunities, and recreation demand.

The recreation opportunity spectrum framework describes the mix of possible outdoor recreation settings that produce recreation experiences. The recreation opportunity spectrum is divided into six classes ranging from primitive to urban. The classes are named only to help describe a recreation setting spectrum for recreation management. For example, the ‘primitive’ class is not exclusive to Wilderness, Wilderness Study Areas, or lands with wilderness characteristics and may be used in other recreation management areas.

Table 3-19, below, shows the distance criteria for defining the recreation opportunity spectrum class for remoteness.

‘Remoteness’ is defined by an area’s proximity to human modifications associated with roads or trails. The BLM identified the recreation opportunity spectrum class for remoteness by using its functional road classification system to assign road types by recreation opportunity spectrum class and identifying

distance criteria. The distance criteria used account for the project area's topography, vegetation, and road type. Road types consist of arterial, collector, local, and resource roads (USDI BLM 1996b, updated 2002).

Table 3-19: Distance criteria's for each recreational opportunity spectrum class

Recreation Opportunity Spectrum Class	Distance Criteria
Primitive	Greater than 1 mile from any class of road, excluding those that are permanently closed or decommissioned
Backcountry	0.25 to 1 mile from any class of road, excluding those that are permanently closed or decommissioned
Middle Country	Within 0.25 mile of local* or resource† roads
Front Country	Within 0.25 mile of collector‡ roads
Rural	Within 0.25 mile of arterial roads or highways
Urban	Within 0.25 mile of arterial roads or highways

* **Local roads.** Roads that normally serve smaller areas than collector roads, accommodate fewer uses, have lower traffic volumes, and connect with collector roads or State and County road systems.
† **Resource roads.** Roads that provide point access to public lands, typically exist for a single use, carry very low traffic volumes, and connect with local or collector roads.
‡ **Collector roads.** Roads that primarily provide access to large blocks of public land, accommodate multiple uses, have BLM's highest traffic volumes, and connect with State and County road systems.

'Naturalness' is defined by the level of an area's influence by human modifications other than roads and trails. Human modifications can include areas of development, utilities, rights-of-way, livestock structures, fences, habitat treatments, or landscape alternations. Naturalness considers the presence of human modifications and how these modifications may, or may not, affect the visitor's experience. Management considerations in this planning process would predominately influence landscape alternations through forest and habitat management actions. As such, the BLM's analysis of naturalness uses forest structural stage classes as a proxy to measure changes in recreation opportunity spectrum classes for naturalness. The figure below shows a visual representation of forest structural stage classifications for naturalness for the five recreation opportunity spectrum classes with forest stand proxies.

Figure 3-9: Stand visualizations for recreational setting classifications.

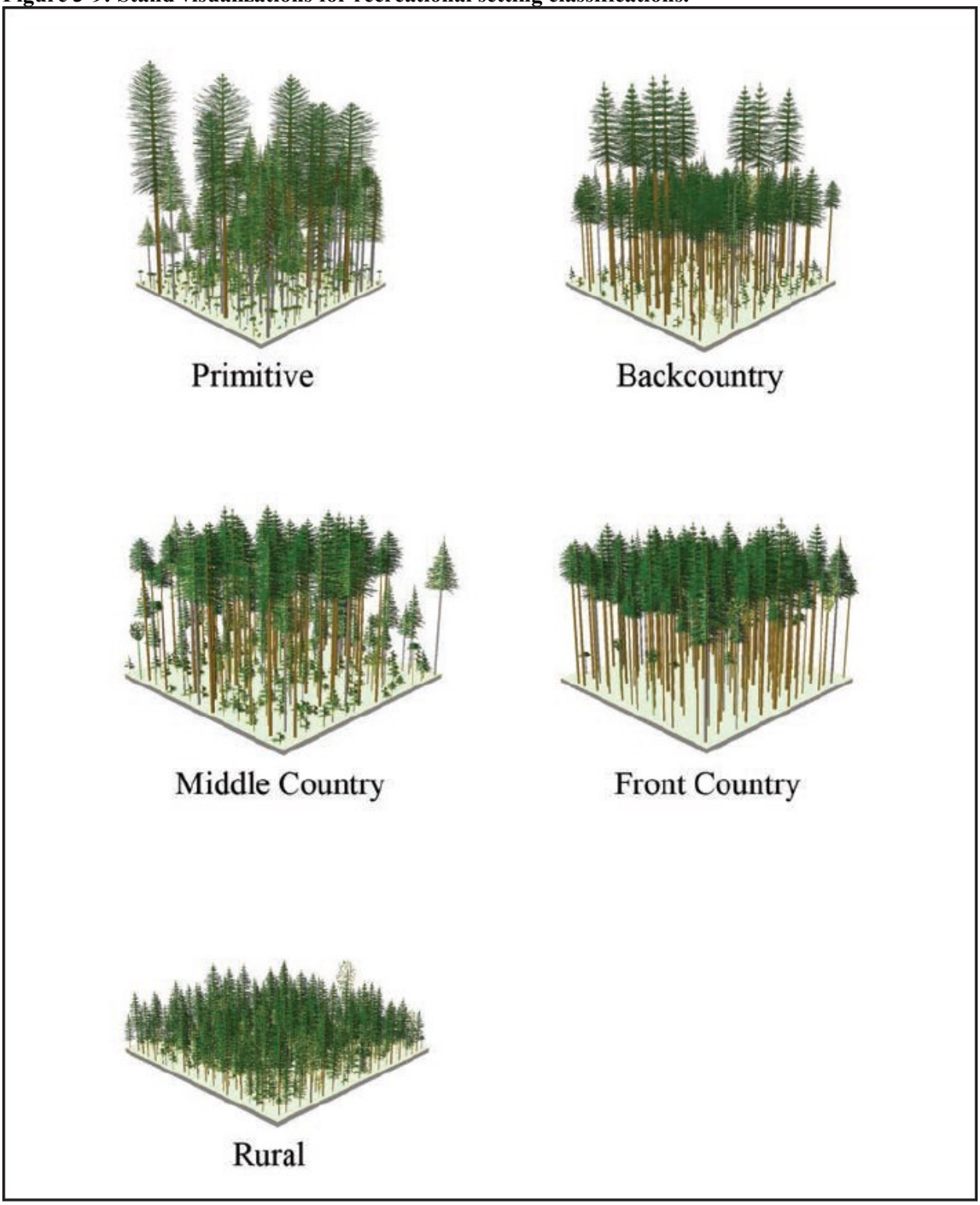


Table 3-20 contains the levels of human modification and forest structural stage classes used as proxies by recreation opportunity spectrum class for naturalness.

Table 3-20: Level of human modification and forest structural stage class proxies by recreation opportunity spectrum class for naturalness.

Recreation Opportunity Spectrum Class	Level of Human Modification and BLM Forest Structural Stage Class Proxies
Primitive	• Undisturbed natural landscape • Structurally-complex with Existing Old or Very Old Forest
Backcountry	• Natural-appearing landscape having modifications not readily noticeable • Mature Single- or Multi-layered Canopy
Middle Country	• Natural-appearing landscape having modifications that do not overpower natural features • Young High Density with Structural Legacies, or Young Low Density with or without Structural Legacies
Front Country	• Partially modified landscape with more noticeable modifications • Young High Density without Structural Legacies
Rural	• Substantially modified natural landscape • Stand Establishment with or without Structural Legacies
Urban	• Urbanized developments dominate the landscape

The BLM used the amount of timber harvest by type and acres that would occur over the next 10 years to analyze the effects to recreation opportunity spectrum classes for naturalness. For example, timber harvest that involves thinning dense, young stands would shift the naturalness of an area from the Front Country to the Middle Country setting. In contrast, the regeneration harvesting of older stands would modify the naturalness of an area from Primitive to Rural. These actions would influence the distribution of recreation for visitors who prefer these different settings.

3.8.3 Assumptions

In preparing this analysis, the BLM has made several analytical assumptions that provide the framework to the analysis of the issue below:

• The analysis area for recreation objectives and opportunities is related to the RMAs only where the proposed treatment units are within an RMA. (See Figure 3-10)

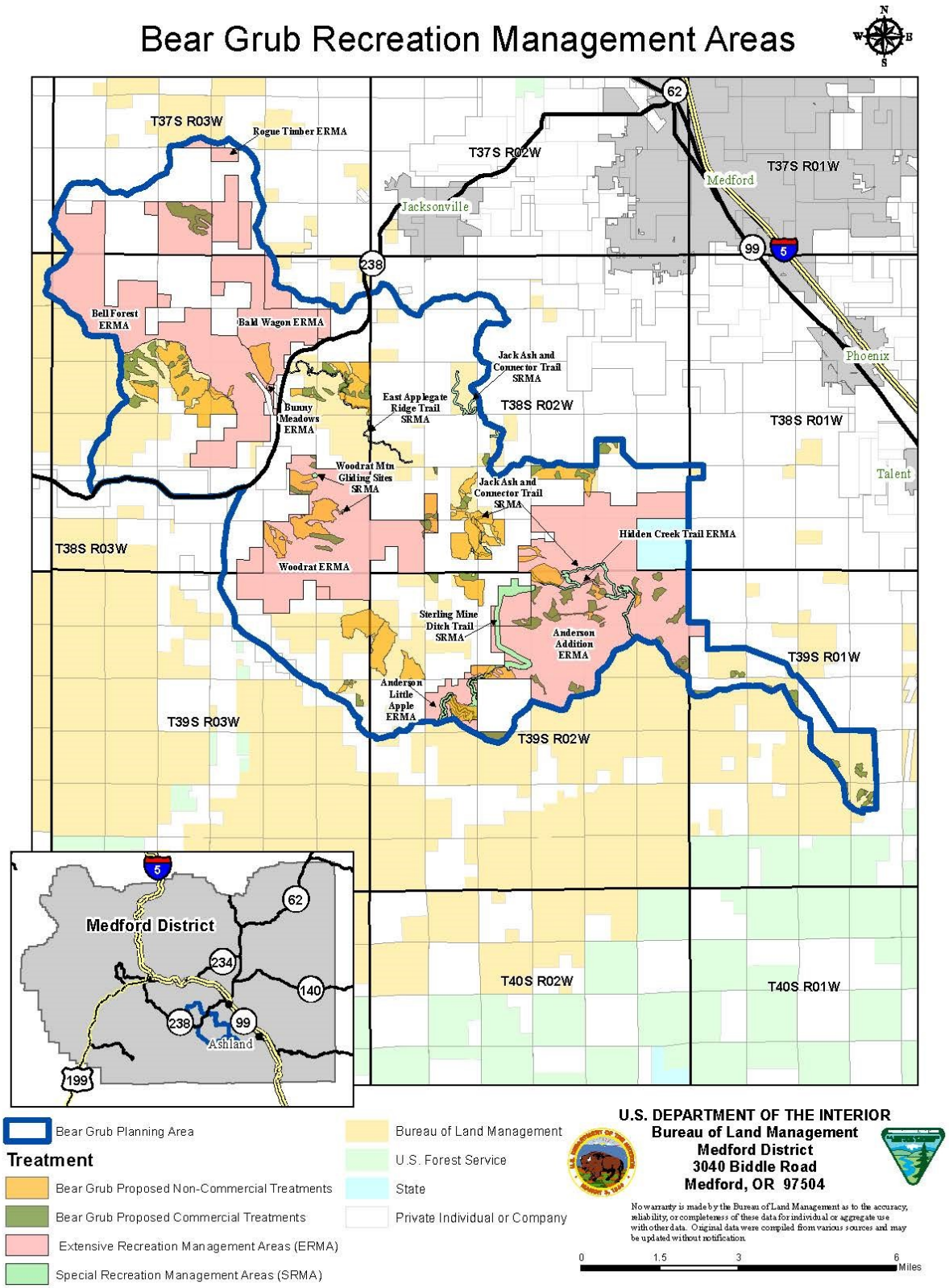
• The RMAs would be developed in the future based on the objectives of the Recreation Planning Framework and any plan maintenance to that framework. (Appendix C.4.)

• Forest stand structural stage classes are utilized as a proxy to determine effects to Naturalness, similar to the analysis completed in the 2016 PRMP/FEIS (p. 557).

• Single Tree Selection and Group Select Harvest (Appendix B.3.3) are the two harvest types used across all alternatives within RMA's.

• The PDFs included in the EA (Appendix B.1.1) would be adhered to during the implementation of the proposed project.

Figure 3-10: Recreation Management Areas with Treatment Units Overlaid.



• Linear, or trail based RMAs such as the East Applegate Ridge Trail, Jack Ash and Connector Trails, and Sterling Mine Ditch Trail will be analyzed for the trail segments that are designated for trail uses and not existing road segments which are used to connect trail segments.

3.8.4 Affected Environment

Sterling Mine Ditch Trail SRMA is 1,278 acres located in the Ashland Field Office. The SMDT was the first trail in southern Oregon designated as a State Scenic Trail in 2015. After the final connector trails were built, the total length of the trail is 26 miles. A no harvest buffer of 200 feet (off of centerline) for all linear trails in this SRMA will be adhered to as part of this project in order to maintain Back Country recreation setting characteristics consistent with the SRMA. Unit 3-3 is the only commercial harvest unit in the vicinity of the SRMA, however all of the planned harvest as well as the unit boundary are located outside of the 200 ft no harvest buffer distance.

Woodrat Mtn. Gliding Sites SRMA consists of two established gliding launch sites (Upper and Mid Launch) which have established parking areas located within the Ashland Field Office. The upper launch site has a restroom facility and barricades to separate pilots from automobiles.

Woodrat SRMA: The Woodrat SRMA is 3,875 acres and is located within the Ashland Field Office. The area was identified for possible future non-motorized trail development. No designated trails in the SRMA existed or have been developed since the signing of the 2016 ROD/RMP. Located within the SRMA is the Woodrat Mtn. Gliding Sites SRMA.

Bald Wagon ERMA is 3,124 acres and is located within the Ashland Field Office. Important recreation values for the Bald-Wagon ERMA are OHV use, hiking, biking, and equestrian trails.

Bell Forest ERMA is 3,800 acres and is located within the Ashland Field Office. The ERMA offers an extensive trail network that is utilized by OHV users.

Bunny Meadows ERMA Bunny Meadows ERMA is 8 acres and is located in the Ashland Field Office. The ERMA serves as a staging area for multi-use trail opportunities. There are developed interpretive panels, kiosks, picnic tables, and fencing to manage use in sensitive habitat. There is a developed parking opportunity for users. Bunny Meadows is within the Planning Area but not the Project Area. No proposed treatments occur within the Bunny Meadows ERMA.

East Applegate Ridge Trail ERMA The 5.6 mile predominantly upland/ridgetop layout is 44 total acres and is located in the Ashland Field Office. The ERMA offers stunning views and great opportunities for photography, hiking, and solitude.

Hidden Creek Trail ERMA is just under 1 mile in length, is a total of 7 acres, and is located within the Ashland Field Office. The ERMA provides a stunning trail experience, as well as interpretive opportunities. The trail follows the headwater of Grub Gulch. Hidden Creek Trail is within the Planning Area but not the Project Area. No proposed treatments occur within the Hidden Creek Trail ERMA.

Jack Ash and Connector Trail ERMA is a citizen/partner proposal trail which ultimately hopes to connect the cities of Jacksonville and Ashland. The trail is broken into multiple phases for project implementation. The total acreage for all phases totals 203 acres and is located within the Ashland Field Office. Phase one of the project, which added about 5 miles of trail and

utilized an existing network of roads to connect trail segments was completed in 2017. In the spring of 2020, an environmental assessment was released for public comment which proposed adding several miles to the trail system (ePlanning, DOI-BLM-ORWA-M060-2019-0007-EA).

The Anderson Addition ERMA is 7,482 acres and is located in the Ashland Field Office. The ERMA offers opportunities for diverse recreation opportunities including OHV and mountain biking opportunities. The Dakubetede ACEC overlaps with the Anderson addition ERMA creating a recreation management zone. Project planning in this recreation management zone requires attention to the special management needed to maintain and restore the ACEC's relevant and important values; however, the entirety of the ACEC is outside of the planning area so for this analysis we only discuss the portions of the ERMA that overlap the project area.

3.8.5 Environmental Consequences

Sterling Mine Ditch Trail SRMA – There are no commercial harvest units proposed within the Sterling Mine Ditch Trail SRMA. Under Alternatives 2 and 3 commercial harvest unit 3-3 would be obscured by 200 ft of vegetation in between the trail user and the unit boundary. The Recreation Management Framework for the Sterling Mine Ditch Trail allows timber harvest activity within the buffer to protect/maintain recreation-setting characteristics and/or to achieve recreation objectives (Appendix C.4). The proposed harvest is in conformance with the management direction for the Harvest Land Base LUA and would not change the RSCs of the SRMA as proposed. Fuel treatments will be allowed within the SRMA as the treatments will be consistent with maintaining recreation setting characteristics, meeting recreation objectives and not interfering with recreation opportunities. For the protection of cultural resources a no disturbance buffer on either side of the trail will serve as a visual break to obscure any changes to the SRMA that overlap Hazardous fuels units NC 9-5, NC 9-6, and NC 17-8. Short duration closures of the portion of trail that that coincide with these units could be needed in order to protect public safety while work is being conducted in the area, however these impacts are expected to be minimal.

No Action: Under the No Action Alternative, no timber harvest fuel treatments, or connected actions would occur. The No Action Alternative would leave the Sterling Mine Ditch Trail SRMA in its current state in regard to the RSCs.

Cumulative Impacts: The Sterling Mine Ditch Trail SRMA has potential to draw non-motorized trail users at the local and regional scales. It is anticipated that timber harvest would continue to occur within the Harvest Land Base LUA as well as on adjacent privately owned timber lands. The recreation related PDFs would continue to be used for timber harvest activities within the SRMA (Appendix C.1.1).

Woodrat Mtn. Gliding Sites SRMA
Across all action alternatives the upper launch site is adjacent to the hazardous fuels unit NC 35-3, and the lower launch site is adjacent to NC 26-4. The Recreation Management Framework for the Woodrat Mtn. Gliding Sites allows fuel treatments or other vegetation modifications if compatible with meeting recreation objectives, not interfering with recreation opportunities, and maintaining setting characteristics (Appendix C.4). Neither of the launch sites are expected to be impacted by the fuel reduction activities in the area due to the seasonal nature pilots use the

gliding launch. Fuel reduction activities typically occur outside of the high use summer season the pilots use the area. The proposed activities are consistent with maintaining the front country recreation setting characteristics, meeting recreation objectives and not interfering with recreation opportunities for this SRMA.

No Action: Under the No Action Alternative, no fuel treatments, or connected actions would occur. The No Action Alternative would leave the Woodrat Mtn. Gliding Sites SRMA in its current state in regard to the RSCs.

Cumulative Impacts: Woodrat Mtn. Gliding Sites SRMA has potential to draw local, regional, and national hang gliders and para-gliders. It is anticipated that timber harvest would continue to occur within the Harvest Land Base LUA as well as on adjacent privately owned timber lands. The recreation related PDFs would continue to be used for timber harvest activities within the SRMA (EA Appendix B.1.1)

Bald Wagon ERMA

Across all action alternatives approximately 5000 feet of transportation linear features exist in commercial harvest unit 33-6. A transportation linear feature is a linear ground disturbance that results from travel across or immediately over the surface of BLM-administered public lands. These features include engineered roads and trails, as well as user-defined, non-engineered routes, created as a result of public or unauthorized use (USDI, BLM (2016) Travel and Transportation Management Manual). These features will be buffered from harvest 50 feet off of centerline except in locations where harvest will maintain the front country recreation setting characteristic identified in the RMA framework (Appendix C.4). The Bald Wagon Recreation Management Framework allows timber harvest activity within the buffer to protect/maintain recreation setting characteristics and/or to achieve recreation objectives (Appendix C.4). Hazardous fuels reduction unit NC15-8 also occurs in the Bald Wagon ERMA. The proposed activities in the ERMA are consistent with maintaining front country recreation setting characteristics, meeting recreation objectives, and not interfering with recreation opportunities for this ERMA.

No Action: Under the No Action Alternative, no timber harvest, hazardous fuels reduction, or connected actions would occur. The No Action Alternative would leave the Bald Wagon ERMA in its current state in regard to the RSCs.

Cumulative Impacts: The Bald-Wagon ERMA has potential to draw local and regional trail users. It is anticipated that timber harvest would continue to occur within the Harvest Land Base LUA as well as on adjacent privately owned timber lands. The recreation related PDFs would continue to be used for timber harvest activities within the SRMA (Appendix B.1.1).

Bell Forest ERMA

Across all action alternatives commercial harvest unit 15-1 and hazardous fuels units NC15-4, NC15-7 are located within this ERMA. The recreation management framework for the Bell Forest ERMA allows for timber harvest and fuels treatments if compatible with meeting recreation objectives, not interfering with recreational objectives, and maintaining setting characteristics (Appendix C.4). There are no designated trails or transportation linear features that coincide with the units in this ERMA. The proposed activities in the ERMA are consistent

with maintaining front country recreation setting characteristics, meeting recreation objectives and not interfering with recreation opportunities for this ERMA.

No Action: Under the No Action Alternative, no timber harvest, hazardous fuels reduction, or connected actions would occur. The No Action Alternative would leave the Bell Forrest ERMA in its current state in regard to the RSCs.

Cumulative Impacts: The Bell-Forest ERMA has potential to draw motorized and non-motorized users It is anticipated that timber harvest would continue to occur within the Harvest Land Base LUA as well as on adjacent privately owned timber lands. The recreation related PDFs would continue to be used for timber harvest activities within the SRMA (Appendix B.1.1).

East Applegate Ridge Trail ERMA

The East Applegate Ridge Trail recreation management framework allows for timber harvest and fuels treatments if compatible with meeting recreation objectives, not interfering with recreation opportunities, and maintaining site characteristics (Appendix C.4). To protect the trail segments that coincide with commercial harvest units 13-1 (Alternative 3 and 4) and 13-6 (Alternatives 2 and 3), trees will not be felled on top of, skid along, or across the trail. Hazardous fuel reduction units NC13-1, NC13-6, NC13-11 are also located in the ERMA, the proposed activities in the ERMA are consistent with maintaining middle country recreation setting characteristics, meeting recreation objectives and not interfering with recreation opportunities for this ERMA.

No Action: Under the No Action Alternative, no timber harvest, hazardous fuels reduction, or connected actions would occur. The No Action Alternative would leave the East Applegate Ridge Trail ERMA in its current state in regard to the RSCs.

Cumulative Impacts: The East Applegate Ridge Trail ERMA provides hiking, biking, and equestrian opportunities in an upland setting and has the potential to draw local and regional visitors seeking nonmotorized trail opportunities. It is anticipated that timber harvest would continue to occur within the Harvest Land Base LUA as well as on adjacent privately owned timber lands. The recreation related PDFs would continue to be used for timber harvest activities within the SRMA (Appendix B.1.1)

Jack Ash and Connector Trail ERMA

All segments of the Jack Ash Trail project, both the implemented Phase 1 and proposed phase 2, are considered here. The Jack Ash recreation management framework allows for timber harvest if compatible with meeting recreation objectives, not interfering with recreation opportunities, and maintaining setting characteristics (Appendix C.4). Across all action alternatives, only commercial harvest unit 29-5 coincides with a trail segment of the ERMA, where a no harvest buffer of 100 feet (off of centerline) for this trail will be implemented in this unit except in locations where harvest will maintain the middle country recreation setting characteristic. The Jack Ash recreation management framework allows for timber harvest within the buffer to protect/maintain recreation setting characteristics and/or to achieve recreation objectives (Appendix C.4).

No Action: Under the No Action Alternative, no timber harvest, hazardous fuels reduction, or connected actions would occur. The No Action Alternative would leave the Jack Ash and Connector Trail ERMA in its current state in regard to the RSCs.

Cumulative Impacts: The Jack Ash and Connector Trail ERMA provides hiking, biking, and equestrian opportunities in an upland setting and has the potential to draw local and regional visitors seeking nonmotorized trail opportunities. It is anticipated that timber harvest would continue to occur within the Harvest Land Base LUA as well as on adjacent privately owned timber lands. The recreation related PDFs would continue to be used for timber harvest activities within the SRMA (Appendix B.1.1)

The Anderson Addition ERMA

The Anderson Addition recreation management framework allows for timber harvest and fuels treatments if compatible with meeting recreation objectives, not interfering with recreation opportunities, and maintaining setting characteristics (Appendix C.4). Under alternative 3 the following commercial units 1-1A, 1-2, 1-3, 2-1, 2-2A, 2-2B, 2-3A 3-1, 3-2, 3-4, 3-5, 3-6, 3-7, 12-1, 12-2 and hazardous fuels units NC2-1, NC2-2, NC2-3, NC2-4, NC2-5, NC3-7, NC33-1, NC33-2 are proposed within the ERMA. Under alternative 2 commercial units 1-1A, 1-2, 1-3, 3-2, 3-4, 3-5, 3-6, 3-7, and hazardous fuels unit NC2-1, NC2-2, NC2-3, NC2-5, NC3-7, NC33-1, NC33-2 are proposed within the ERMA. Under alternative 4, commercial units 1-1A, 1-2, 1-3, 2-2A, 3-5, 3-6, 3-7, and hazardous fuels unit NC2-1, NC2-2, NC2-3, NC2-5, NC3-7, NC33-1, NC33-2 are proposed within the ERMA. The proposed activities within the ERMA are consistent with maintaining middle country recreation setting characteristics, meeting recreation objectives and not interfering with recreation opportunities for this ERMA.

No Action: Under the No Action Alternative, no timber harvest, hazardous fuels reduction, or connected actions would occur. The No Action Alternative would leave Anderson Addition ERMA in its current state in regard to the RSCs.

Cumulative Impacts: The Anderson Addition ERMA provides offers hiking, mountain biking, OHV, and equestrian trails with diverse characteristics. and has the potential to draw local and regional visitors seeking a variety of recreation opportunities. It is anticipated that timber harvest would continue to occur within the Harvest Land Base LUA as well as on adjacent privately owned timber lands. The recreation related PDFs would continue to be used for timber harvest activities within the SRMA (Appendix B.1.1)

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4 Consultation and Coordination

4.1.1 Endangered Species Act Consultation

Section 7 of the ESA requires the BLM to work with the USFWS (for plant and wildlife species) and NOAA Fisheries (for fish species) for actions the BLM funds, authorizes, or proposes to ensure the project is not likely to jeopardize the continued existence of listed plant, wildlife, or fish species, or destroy or adversely modify their designated critical habitat.

Before requesting consultation, the BLM determines whether the project may affect the listed species or critical habitat. If the project would affect the species, but the effect would be relatively minor, consultation is informal, and the BLM submits a written request for informal consultation. If U.S. Fish and Wildlife Service or NOAA Fisheries agrees with the BLM's determination, then informal consultation concludes with the U.S. Fish and Wildlife Service or NOAA Fisheries issuing a letter of concurrence.

If the BLM determines a project is likely to adversely affect a listed species or critical habitat, then formal consultation is required and the BLM submits a written request, or biological assessment (BA), for formal consultation to USFWS or NOAA Fisheries. During formal consultation, the USFWS or NOAA Fisheries reviews the project to determine if the project is likely to jeopardize the continued existence of a listed species or destroy or adversely modify designated critical habitat. The agencies submit the results of the review to the BLM in a biological opinion (BO).

4.1.2 ESA Plants

Gentner's fritillary (Fritillaria gentneri), the only Federally listed plant species known to grow in the Ashland Resource Area. BLM manages Gentner's fritillary under the 2013 Biological Assessment of Activities that May Affect the Federally Listed Plant Species, Gentner's Fritillary, Cook's Lomatium, and Large-flowered Woolly Meadowfoam, on Bureau of Land Management, Medford District and Cascade Siskiyou National Monument, and corresponding 2014 Letter of Concurrence from the USFWS. (USDI BLM 2013 and USFWS 2014) The consultation led to the development of the 2015 USFWS/BLM Conservation Agreement for Gentner's Fritillary in Southwestern Oregon (USFWS and USDI BLM, 2015)

The BLM will treat the five identified fuels units (see Appendix A, section A1.1, Issue 2) using PDFs in accordance with the 2015 Conservation Agreement for Gentner's Fritillary in Southwestern Oregon and the 2013 Biological Assessment.

4.1.3 ESA Fish

The Bear Grub VMP is within the range of the federally-listed Southern Oregon Northern California Coast Coho (SONCC) Salmon. The BLM consulted on a mixture of actions proposed under the action alternatives that would have a greater likelihood of affecting listed fish species and their habitat. The BLM Fisheries Biologist determined that the project would be a *"May affect/Not Likely to Adversely Affect*" SONCC Coho Salmon, Coho Critical Habitat (CCH), and Essential Fish Habitat (EFH) in the planning area. The anticipated effects are within those consulted on with the National Marine Fisheries Service (NMFS) in the Programmatic Biological Assessment/Opinion for the BLM's Forest Management Program for Western Oregon (WCR 2017-7574). Formal consultation on this project was initiated on March 23, 2020 with the submittal of the required pre-project notification form that was developed under the Programmatic Forest Management Biological Opinion (BO). A verification letter confirming that the proposed actions are consistent with the effects analysis and conclusions of the NMFS BO was received on March 25, 2020.

4.1.4 Terrestrial Wildlife

The federally threatened northern spotted owl (NSO) is the only ESA-listed wildlife species known to be within or near the Bear Grub VMP planning area.

The BLM has determined that the Bear Grub is likely to adversely affect the NSO. The Medford District BLM met with the Level 1 consultation team in March 2020 for a meeting and field trip to provide an overview of the project and discuss potential effects to NSOs. Formal consultation with the USFWS for the NSO began when the Medford District BLM sent the BA (FY 20 Batch BA**)** to the USFWS in May 2020 (USDI 2020). A BO from the USFWS is expected in July 2020. No Decision will be made until the BLM receives the BO.

4.1.5 Tribal Consultation

The Cow Creek Band of Umpqua Tribe Indians, the Confederated Tribes of the Grand Ronde Community of Oregon, and the Confederated Tribes of the Siletz Indians of Oregon were notified of the project by

letter with an email to Tribal staff in October of 2019 and invited to provide input or formally consult with the BLM. The Tribes were provided an update on the EA process via letter and email on March 11, 2020. The Tribes did not provide any comments or concerns, or request consultation. The BLM will send a copy of this EA to the Tribes and provide the them a copy of the cultural resources report, once completed.

4.1.6 State Historic Preservation Office Consultation

Consultation with the State Historic Preservation Office (SHPO) was not needed as the BLM determined that the project would have "no effect" to cultural resources (State Protocol VI.C.(9):2015:13).

4.1.7 List of Preparers

Ted Benson	Assistant Field Manager Resources
Luke Brandy	Forester
Joel Brumm	Assistant Field Manager CS Monument and Recreation
Cheryl Foster-Curley	Archeologist
Forest Gauna	Botanist
Steve Godwin	Wildlife Biologist
Nate Goodwine	Forester (Silviculture)
Quinn Kawamoto	Forester
Matt McClintock	Soil Scientist
Tim Montfort	Hydrologic Technician
Tye Morgan	Planning and Environmental Specialist
Ray Pease	Assistant Field Manager
Lisa Rice	Archeologist
Josh Robeson	Engineering Technician (Civil)
John Schumacher	Planning and Environmental Specialist
Jerry Serabia	Forestry Technician (Fire)
Eric Siemer	Forestry Technician
Ryan Snider	Geographic Information System Specialist
Jason Tarrant	Forester (Silviculture)
Chris Volpe	Fish Biologist
Jena Volpe	Ecologist (Fire Ecologist)
Jameson Whitehead	Outdoor Recreation Planner

5 Attached Appendices (with Table of Contents)

Table of Contents to Appendices

A. Appendix: Appendices to Chapter 1

A.1 Issues Considered but not Analyzed in Detail

The following issues were also identified (either internally or externally) during the scoping phase of this project. They have been considered but eliminated from detailed analysis since the BLM determined that there would be negligible effects from the proposed action alternatives, thus no potential for significant impacts.

A.1.1 Botany

Issue 1: How would the proposed activities affect the risk of invasive plant introduction and spread?

Background: Invasive plants are nonnative plants with the potential to cause ecological damage or economic loss. Noxious weeds are a subset of invasive plants designated by a county, state, or federal agency as injurious to public health, agriculture, recreation, wildlife, or property. In this assessment, the term "invasive plants" includes noxious weeds.

Proposed ground-disturbing forest management activities can promote early successional plant species including many non-native and invasive species that are adapted to take rapid advantage of increased resource availability including sunlight, water, soil minerals, and nutrients, potentially altering native plant communities, establishing invasive plant seedbanks, and dispersing invasive plant propagules (e.g., seeds) to new sites.

In this project, the Ashland Resource Area is primarily concerned with non-native plant species that have been listed as noxious weeds by the State of Oregon for persistence, rate of spread, and ecological impacts. Agency botanist categorized the potential ecological impacts of Oregon State-listed noxious weeds that are known to occur within units and along proposed haul routes in the Project Area (Table 1 and 2) based on the Oregon Department of Agriculture's Noxious Weed Policy and Classification System (ODA 2018), California Invasive Plant Inventory Database ratings (Cal-IPC 2006-2020), and professional experience, resulting in three ratings:

High: These species have severe ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes result in moderate to high rates of dispersal and establishment.

Moderate: These species have observable, but generally not severe, ecological impacts on physical processes, plant and animal communities, and vegetation structure. They have moderate to high rates of dispersal, but their establishment generally follows disturbance events. Their distribution and ability to colonize a variety of habitats ranges from limited to widespread.

Limited: These species are invasive, but their ecological impacts are minor and/or transitory. They have low to moderate rates of invasiveness and tend to be only locally persistent, often as a result of recurring disturbance. Their distribution and ability to colonize a variety of habitats is limited.

Table A-1: Invasive of Concern from Project Units

Species	Effects Rating	ODA Status	Unit(s)	Gross Acres	Concern Level Rationale
Centaurea x moncktonii Meadow Knapweed	High	B	NC15-4, NC16-5	0.48	Found in disturbed open sites, forest openings, roadsides and logged areas. Easily spread by vehicles, spreads rapidly.
Centaurea solstitialis Yellow Starthistle	High	B	13-1, 13-3, 13-5, 13-6, 13-9, 15-1 to 15-3, 16-3, 21-3, 2-2A, 2-2B, 2-5, 27-5 to 27-7, 29-5, 3-1, 32-1, 32-2, 3-3, 33-6B, 3-4, 3-6, 36-2, 3-8, 3-9, 5-2, NC13-11, NC13-12, NC13-6, NC14-3, NC15-4, NC15-5 to NC15-8, NC16-4, NC16-5, NC17-8, NC2-2, NC2-5, NC26-1, NC26-4, NC27-1, NC28-1, NC29-1, NC29-8, NC32-3, NC33-1, NC35-1 to NC35-3, NC3-7, NC7-2, NC7-3, NC9-4 to NC9-6	150.42	Inhabits openings open woodlands, fields, and roadsides. Disturbance created by road building and maintenance favor this rapid colonizer. Propagates rapidly by seed, a large plant can produce nearly 75,000 seeds.
Centaurea stoebe spp. micranthos Spotted Knapweed	High	B	NC2-2, NC13-12	0.43	Found in disturbed open sites, roadsides and logged areas. Easily spread by vehicles, seldom persists in shady places.
Species	**Effects Rating**	**ODA Status**	**Unit(s)**	**Gross Acres**	**Concern Level Rationale**
Cytisus scoparius Scotch Broom	High	B	NC15-4, NC16-5	0.10	Readily invades disturbed sites such as roadsides,

					shrublands, oak woodlands, forest margins, riparian corridors, burned areas and cleared forests.
Dipsacus laciniatus Cutleaf Teasel	Moderate	B	16.3, NC15-5 to NC15-8, NC16-4, NC9-4,	41.16	Cutleaf teasel can form large stands that inhibit the growth of desirable plant species especially in riparian areas. Limited ecological impact. Cutleaf teasel can form large stands that inhibit the growth of desirable plant species especially in riparian areas.
Potentilla recta Sulphur Cinquefoil	Limited	B	15-1, NC15-6, NC35-1, NC35-2	8.63	An aggressive invader of meadows and forest openings.
Rubus bifrons Himalayan Blackberry	High	B	36-1, NC15-5, NC17-8, NC28-1, NC29-1, NC32-3, NC35-2, NC35-3	5.0	Riparian areas, roadsides, disturbed areas.

Table A-2: Non-Native Species of Concern from Haul Routes.

Invasive Plant Species	Effects Rating	ODA Status	Road Number	Gross Acres	Concern Level Rationale
Acroptilon repens Russian Knapweed	Moderate	B	39-2-12.0	0.03	Adverse ecological impacts, found on roadsides, ditch banks and waste places. Once established, extremely drought tolerant and prefers dry

					sites with full sun.
Centaurea x moncktonii Meadow Knapweed	High	B	39-2-8.0, 38-2-24.0	4.0	Detrimental ecological impacts, found in disturbed open sites, forest openings, roadsides and logged areas. Easily spread by vehicles, spreads rapidly.
Centaurea solstitialis Yellow Starthistle	High	B	38-2-18.0 38-2-21.0 38-2-24.0 38-2-26.0 38-2-27.2 38-2-29.0 38-2-31.0 38-3-10.0 38-3-13.1 38-3-13.2 38-3-14.0 38-3-16.0 38-3-16.1 38-3-23.0 38-3-23.1 38-3-23.2 38-3-26.1 38-3-5.0 38-3-5.1 39-1-18.0 39-2-15.0 39-2-17.0 39-2-3.2 39-2-8.0 39-3-13.0	91.33	Severe ecological impacts, inhabits openings open woodlands, fields, and roadsides. Disturbance created by road building and maintenance favor this rapid colonizer. Propagates rapidly by seed, a large plant can produce nearly 75,000 seeds.
Chondrilla juncea Rush Skeletonweed	High	B&T	38-2-26.0, 38-3-13.2	0.03	Detrimental ecological impacts, found in disturbed soils and roadsides.

Dipsacus laciniatus Cutleaf Teasel	Limited	B	38-3-14.0, 38-3-16.0, 38-3-5.1	7.32	Limited ecological impact. Cutleaf teasel can form large stands that inhibit the growth of desirable plant species especially in riparian areas.
Lathyrus latifolius Perennial Pea	High	B	38-3-14.0	0.04	Detrimental ecological impacts, roadsides, forested areas, open areas.
Potentilla recta Sulphur Cinquefoil	Limited	B	38-3-14.0, 39-1-18.0	2.48	Limited ecological impact. An aggressive invader of meadows and forest openings.
Rubus bifrons Himalayan Blackberry	High	B	38-3-23.1, 38-3-26.1, 38-3-5.1, 39-2-17.0	2.09	Detrimental ecological impacts, riparian areas, roadsides, disturbed areas.

Assuming no major changes in the typical types and extent of natural disturbances in the Project Area, it is assumed that under the No Action Alternative, noxious weeds would continue to spread, on average, at 12% annually (USDI 2010, pp. 135-137) by wind, waterways, animals, and humans through vehicle, recreation and foot traffic. Most of the spread would occur along roadsides, riparian areas, and forest openings.

Proposed activities in Action Alternatives would disturb vegetation and soil in ways that could stimulate existing invasive plant seed banks, reduce barriers to invasive seed dispersal, and improve site conditions for invasive plant establishment and growth. The rate of invasive plant spread could exceed the average baseline rate. Areas that would be particularly vulnerable to weed invasions include newly disturbed soil, such as in skid trails, landings, newly constructed roads, decommissioned roads, and burn pile scars. Invasive plants could invade these disturbed areas by seeds transported by vehicles, equipment, or individuals during management actions; by the public or landowners using roads and lands within the

Project Area; or by animals, wind, or water. These invasive plant infestations could persist and become sources for further invasive plant spread.

Shiny Geranium: Shiny geranium is an annual, aggressive invader moving southward from the Pacific Northwest (Willamette Valley), where it is most widespread and naturalized within its range (California to British Columbia, Canada) (Dennehy, 2011). Fuels treatments overlapping shiny geranium infestations were considered in the early development of the project. These units have since been dropped from the project as part of ongoing shiny geranium containment measures.

Rationale: All action alternatives include Project Design Features (PDFs) to prevent the introduction and spread of new and existing invasive or noxious plant species: see Appendix B.1.5. These PDFs include equipment washing, the use of certified weed-free materials such as mulching with weed-free straw, seeding disturbed areas with native species, treatment of sites within the units beginning prior to project implementation in 2020 and continuing through project completion, and post-project monitoring and treatment, if necessary. Seeding and mulching would aid the establishment of desirable vegetation that would then compete with invasive plants. An adaptive management approach would include evaluation of existing and new infestations to determine the need for further treatment.

These PDFs conform to Executive Order 13112, 2016 ROD/RMP direction for invasive species, and the 2018 *Integrated Invasive Plant Management for the Medford District Revised Environmental Assessment*. Implementing these preventative measures for the action alternatives would reduce the risk of increasing invasive species throughout the project area and surroundings.

Beginning in 2020 treatment of sites within the units would occur and are expected to continue through project completion. Monitoring post-project implementation would guide necessary treatments following the completion of the project.

The invasive weed species known from the Project Area are found in the greater Ruch/Applegate area with the relative frequency and densities exhibited in the above tables. They are not new or uncommon, and therefore any potential increase would not significantly impact the issue of invasive species in the Applegate in general. Introductions of new invaders would be of significant impact, therefore effective and timely implementation of PDFs, monitoring, and treatment are requisite.

Agency botanists evaluate and monitor infestations and disturbed areas to determine when and where to take management action, and select invasive plant control methods that are most effective for the target species and appropriate for the infested site, in conformity with the 2018 Integrated Invasive Plant Management for the Medford District Revised Environmental Assessment.

To improve long-term success and reduce the chance of secondary invasion (the colonization of a second invasive plant species after treatment of the primary infestation), control treatments could be coupled with competitive seeding. Additionally, areas of bare soil resulting from project activities, such as landings and skid trails, would be seeded and mulched upon the completion of project activities. The objective of competitive seeding would provide a desirable native vegetative component to compete with invasive plants in treatment areas. When revegetating disturbed sites in the Project Area, Agency botanist would select locally adapted native grass and forbs seeds that are genetically appropriate for each revegetation site, thereby increasing the probability of successful and persistent establishment of native plant communities that will be resistant to invasive plants.

Conclusion:
The BLM measured the risks of timber harvest, road management activities, and public motorized access designations on the introduction and spread of invasive plant species in the Western Oregon PRMP FEIS (ppg. 419--437). That analysis is incorporated here by reference.

This issue was considered but was not analyzed in further detail because the implementation of PDFs and invasive plant control treatments along with monitoring after project implementation eliminates the potential for significant effects. Given implantation of PDFs, effects of the proposed project on invasive plant species would not exceed those already disclosed in the PRMP FEIS, to which this EA tiers. Since potential effects would be minimized through the addition of PDFs to project activities and the changes from this project cannot be differentiated from background activities, further analysis would not inform the choice between alternatives.

Issue 2: What will be the potential impacts from the proposed activities to Gentner's Fritillary and its habitat?

Background: Some proposed activities overlap with some known sites of Gentner's fritillary (*Fritillaria gentneri*), the only Federally listed plant species known to grow in the Ashland Resource Area. The Western Oregon PRMP FEIS (pg. 520) explains that potential effects of timber harvest and other vegetation management (such as fuel treatments) are dependent on project- and site-specific factors that must be evaluated at the project-level scale of analysis, which is presented below.

Rationale: Eight units of proposed fuels treatments include Gentner's fritillary populations. According to best management practices derived from the 2015 *USFWS/BLM Conservation Agreement for Gentner's Fritillary in Southwestern Oregon* (hereinafter "2015 FRGE CA", ppg. 39--40), fuels treatments in these units have been designed to promote the health of populations and habitat for this endangered species, which is rarely found under dense conifer canopy (2013 *Biological Assessment of Activities that May Affect the Federally Listed Plant Species, Gentner's Fritillary, Cook's Lomatium, and Large-flowered Woolly Meadowfoam, on Bureau of Land Management, Medford District and Cascade Siskiyou National Monument,* and corresponding *Biological Opinion* --- hereinafter "2013 Medford Programmatic Botany BA" --- pg. 38) but rather appears to prefer open habitats where fires occur with some regularity, contributing to soil nutrients (2015 FRGE CA, pg. 4).

Fuels treatment implementation may adversely affect some individuals as activities are carried out (e.g., bulb leaves persisting into the dormant period could be stepped on and damaged). However, since the fuels units in question have been surveyed and *F. gentneri* populations identified, and since protection measures are in place to protect known populations from excessive damage due to fuels reduction activities, overall, these treatments would have a beneficial effect upon the affected *F. gentneri* populations over a longer term.

One *F. gentneri* site is known from within a proposed commercial unit, 26-4 (Alts. 2, 3). If either of those alternatives be selected for implementation, then relevant Project Design Criteria from the 2013 Medford Programmatic Botany BA, listed in Appendix B.1.1, pg. 32 would be implemented. Those project design features were created to avoid significant impacts to listed plant species.

Conclusion: On page 534 of the Western Oregon PRMP FEIS, the BLM notes that "species-specific protections for these [ESA-listed] plant species would avoid adverse effects from timber harvest [and other vegetation management]." This EA tiers to this PRMP FEIS analysis because the EA proposed action, including PDFs, conforms to SWO ROD/RMP direction for rare plant management, namely, to "[m]anage ESA-listed species consistent with recovery plans, conservation agreements . . . and . . .

project-specific conservation measures developed with the U.S. Fish and Wildlife Service. . . " as well as to "[m]anage habitat to maintain populations of ESA-listed . . . plant species." (pg. 106). Conformity with this direction is shown above by adapting and applying relevant conservation design features/design criteria/best management practices from the 2013 Medford Programmatic Botany BA and 2015 FRGE CA. Given the implementation of these PDFs, derived from the sources directed by the SWO ROD/RMP, there is no potential for significant impacts.

Issue 3: How would the proposed project impact Bureau Sensitive plant species Entosthodon fascicularis, Cypripedium fasciculatum, Diplacus congdonii, Rafinesquia californica, or Solanum parishii?

Background: These are Bureau Sensitive plant species recorded within proposed units, where habitat disturbance to these species may take place. After surveys, no other Bureau Sensitive botanical species are known to exist in the project units or other areas potentially affected by the project (e.g. temp roads), nor can impacts due to implementation of any action alternative be foreseen to take place outside the boundaries of proposed treatments.

Rationale: During the planning process, silvicultural "skips" meant to promote forest heterogeneity following a timber harvest were strategically placed to include most special status botanical sites, with the collaboration of the Resource Area botanist to ensure that botanical sites were adequately buffered to avert negative impacts resulting from harvest activities, thereby leaving the rare plant sites in the same condition as would be expected under the No Action alternative.

In a few instances (one to three, depending on the alternative chosen), some special status plant sites were left within harvest unit boundaries, but not enclosed by silvicultural skips. These special instances have been accounted for in project design features by requiring flagged special status plant site avoidance buffers, as explained in Appendix B.1.1, pg. 32.

Some fuels reduction treatment units contain one to several special status plant sites. These sites are to be flagged for special treatment according to species-specific project design features, as specified in Appendix B.1.3, pg. 33-34 Project design features would permit some fuels reduction activities to take place, that would either leave each special status population and habitat functionally unaltered, or potentially benefit the population and habitat. These design features have been crafted by the resource area botanist, based on species-specific literature, research, and local past experience managing these species in similar circumstances, to ensure compliance with 2016 ROD/RMP direction.

Conclusion: The project design takes measures to ensure that Bureau Sensitive plant occurrences either remain unaffected by project activities, such that they remain in the state that would be expected under the No Action alternative, or would benefit the rare plant populations (such as burning through populations of fire-adapted species) despite potential up-front damage to individuals of the population (such as would happen when burning populations of fire-adapted species). This conforms to 2016 ROD/RMP Rare Plants direction to "[m]aintain or restore natural processes, native species composition, and vegetation structure in natural communities through actions such as applying prescribed fire, thinning, removing encroaching vegetation . . ." (2016 PRMP/FEIS, pg. 106). Therefore, this EA may tier to the relevant analysis in the 2016 PRMP/FEIS, pg. 534: ". . . the BLM would conduct pre-disturbance surveys and apply conservation measures. These conservation measures would be sufficient to protect sites based on past implementation of these measures."

<u>Issue 4</u>: How would the proposed sale impact the Bureau Sensitive species Calochortus persistens (a Special Status Plant outside the project area)?

Background: The population of this species in Ashland Resource Area marks the furthest known northern extent of the species' range. While the site does not actually occur within any project unit, its proximity to a harvest unit prompted a review.

Resolution: A Project Design Feature to prevent ground-disturbing activities from approaching this site has been included; please see Appendix B.1.1, pg. 32 While logging activities are not permitted beyond sale boundaries to begin with, this PDF adds an additional protection measure to ensure that this Bureau Sensitive species occurrence remains unaltered by project activities. Therefore, given implementation of PDFs, it is concluded that there is no potential for significant effects.

A.1.2 Socioeconomics

<u>Issue 1</u>: What are the effects of proposed project actions on supply, demand, and value goods and economic activity?

The effects of the Bear Grub Vegetation Management Project on the socioeconomics of the region is not analyzed in detail because it is not part of the Purpose and Need for action, and regardless of project-specific or site-specific information, there would be no potential for significant effects beyond those analyzed in the 2016 PRMP/FEIS.

The 2016 ROD/RMP was based on the analysis conducted in the 2016 PRMP/FEIS. The 2016 PRMP/FEIS analyzed the effects of timber harvesting, recreation and visitation, special forest products, energy and minerals production, livestock grazing, and other resource programs on the socioeconomics of local county and western Oregon economies. The 2016 PRMP/FEIS also analyzed the potential impacts major plan objectives would have on the value of goods and services from BLM-administered lands, economic activity, county payments, economic stability, and the capacity and resiliency of communities.

The effects of the Bear Grub VMP's proposed timber harvest on socioeconomics tiers to the analysis in the 2016 PRMP/FEIS. The proposed project is consistent with the 2016 ROD/RMP.

The analysis in the 2016 PRMP/FEIS addressed the effects on socioeconomics of implementing the entire program of work for timber resources based on high quality and detailed information (2016 PRMP/FEIS, pp. 585-738).

Regulation 40 CFR §1508.14 requires the human environment to be "interpreted comprehensively to include the natural and physical environment and the relationship of people with that environment. This means that economic or social effects are not intended by themselves to require preparation of an environmental impact statement."

A.1.3 Fuels:

<u>Issue 1</u>: Will proposed actions result in drying of forest stands, from reduced canopies, or extended fire seasons?

Background: The opening of forest canopy, such as through thinning, directly alters microclimate, allowing more wind and solar radiation (Weatherspoon 1996, Wayman and North 2007). There are numerous examples of treatment effectiveness at moderating fire behavior and reducing the potential for high-intensity crown fire (FEIS p. 228, Stephens et al. 2009, Martinson and Omi 2013. The FEIS, which

this issue tiers to, acknowledges the potential effect that canopy has on increasing or slowing surface winds, drying of fuels, and increasing or moderating potential fire behavior (FEIS Appendix H p. 1320).

Fuel moisture is an important factor contributing toward fire behavior (Rothermel 1972). Fine fuels (litter and sticks <3 inches in diameter) are responsive to small fluctuations in weather (e.g. temperature and humidity), while large fuels (logs >3 inches diameter) are affected by seasonal weather variations (e.g. drought, snowpack, precipitation, etc.) (Bradshaw et al. 1983, Trouet et al. 2009) making them good indicators of "fire season." Broad climatic weather patterns along with general plant phenology influence live fuel moisture content. Many live fuel moisture predictive models are based on seasonal drought indices and satellite measures of green-up (USFS-WFAS), these seasonal trends are also a component in tracking fire season severity (Bradshaw et al. 1983).

Bigelow and North (2011) did not find that thinned openings resulted in increases to ambient air temperature or reduced humidity or fuel moisture, both important factors influencing fuel moisture. Estes and others (2012) found that fuel moisture of dead surface fuels (all size classes) varied slightly in late spring between thinned and un-thinned stands in the Klamath Mountains, prior to the on-set of "fire season." However, these differences in fuel moisture were not statistically detectible during the summer months (i.e. fire season). Additionally, openings in the canopy may allow more precipitation to reach the forest floor, which can lead to higher fuel moisture following precipitation events, for example lightning events accompanied by rain (Estes et al. 2012) or early fall rains, reducing ignition potential and fire spread. Faiella and Bailey (2007) found variable results in fluctuations of live foliar moisture from before to after thinning treatments. They found that seasonal trends in moisture content were similar between controls and treatment. The finding provides no evidence that small-scale micro climatic variation in foliar moisture would have greater influence over fire season trends, than broader climatic weather patterns.

Rationale: The FEIS, which this issue tiers to, acknowledges the potential sheltering effect that canopy has on surface winds, fuel moisture, and potential fire behavior (FEIS Appendix H p. 1320). The difference in fine dead fuel (<0.25 in in diameter) moisture between "shaded" and "unshaded" areas (i.e. greater than 50% canopy cover vs. less than 50% canopy cover) is well established in predictive fire behavior modeling (Rothermel 1983, Nexus2, NWCG PMS 437 – referenced as NWCG 2014 in FEIS). Additionally, the sheltering effect of canopy on surface wind speeds is also well-established in predictive fire behavior modeling (Nexus2, NWCG PMS 437). The BLM accounted for these differences of fine dead fuel moisture between "exposed" and "shaded" conditions and sheltering effect of canopy on surface wind speeds in the fire behavior modeling inputs in detailed analysis of Alternatives on stand-level fire resistance (or fire hazard) (Issue **Error! Reference source not found.** and **Error! Reference source not fo und.**), therefore Alternatives would not result in effects outside of those effects analyzed for in the FEIS. Peer-reviewed scientific literature does not support that thinning trees, creating gaps, opening canopies, or removing commercial sized trees would dry out other size classes of fuels, soil, or vegetation in any way that would extend fire season; thus there is no potential for significant effects related to fire season duration, and therefore this portion of the issue was not analyzed in further detail.

A.1.4 Greenhouse Gas Emissions, Carbon Storage, and Climate Change

<u>Issue 1</u>: How would the Proposed Action affect greenhouse gas emissions, carbon storage, and climate change?

Background Information: The effects of the Bear Grub VMP on greenhouse gas emissions, carbon storage, and climate change were not analyzed in detail because, regardless of project-specific or site-

specific information, there would be no potential for reasonably foreseeable significant effects of the Proposed Action beyond those disclosed in the 2016 PRMP/FEIS.

Rationale: The effects of the alternatives contained within the Bear grub VMP on carbon storage and greenhouse gas emissions tiers to the analysis in the 2016 PRMP/FEIS. As described below, the alternatives are consistent with the RMP. The alternatives are not expected to have significant effects beyond those already analyzed in the 2016 PRMP/FEIS. While analysis of the project-specific and site-specific conditions could give greater specificity to the analysis in the 2016 PRMP/FEIS, there is no potential for reasonably foreseeable significant effects of the alternatives beyond those disclosed in the 2016 PRMP/FEIS. The analysis in the 2016 PRMP/FEIS addressed the effects on carbon storage and greenhouse gas emissions of implementing the entire program of work associated with forest management and other activities based on high quality and detailed information (2016 PRMP/FEIS, pp. 165-180 and 1295-1304). The information available on project-specific and site-specific conditions, while more specific, is not fundamentally different from the information used in the 2016 PRMP/FEIS analysis of effects on carbon storage and greenhouse gas emissions, and thus cannot reveal any fundamentally different effects than that broader analysis.

The 2016 PRMP/FEIS upon which the RMP was based examined the most recent science regarding climate change, carbon storage, and greenhouse gas emissions. The analysis in Volume 1 on Pages 165-211 are relevant to this project and are incorporated by reference.

The 2016 PRMP/FEIS concluded that the approved RMP supports the state of Oregon's interim strategy for reducing greenhouse gas emissions (2016 PRMP/FEIS, p. 173). Both the state of Oregon's strategy and Federal climate change strategies have goals to increase carbon storage on forest lands to partially mitigate greenhouse gas emissions from other sectors of the economy. Neither the state of Oregon nor the federal government have established specific carbon storage goals so quantifying BLM's contribution to that goal is not possible. Assuming no changes in disturbance regimes such as fire and insects (acres affected and severity of impact) from the recent past, timber harvesting is the primary activity affecting carbon storage (2016 PRMP/FEIS, p.169).

The 2016 PRMP/FEIS estimated the effects of implementing actions consistent with the Northwestern and Coastal Oregon and the Southwestern Oregon RMPs as follows:

Table A-3: Table A-1 from the 2016 Final Environmental Impact Statement
Estimation of Carbon and Greenhouse Gas Emissions

	Current	2033	2063
Carbon Storage	336 Tg C	404 Tg C	482 Tg C
Greenhouse Gas Emissions	123,032 Mg CO_2e/yr	256,643 Mg CO_2e/yr	230,759 Mg CO_2e/yr

Tg - Teragram. One million metric tons; Mg – Megagram. Metric ton. Approximately 2,205 pounds; CO_2e – carbon dioxide equivalent

The carbon storage and greenhouse gas emissions analysis was based on assumptions concerning the level of management activity:

- The 2016 PRMP/FEIS assumed an average annual harvest level of 278 MMbf (MMbf = 1 million board feet) per year (205 MMbf from the Harvest Land Base and 73 MMbf from non-ASQ related harvest) over the entire decision area (2016 PRMP/FEIS, p. 307). The expected average annual harvest for the Medford District is 51 MMbf (37 MMbf from the Harvest Land Base and 14 MMbf

from non-ASQ related harvest). Projected harvest levels from the Bear Grub VMP, when added to projected harvest levels from other projects on the Medford District, fall within the FEIS analysis.

- Activity fuels treatments are aligned with the harvest program with estimated acres of prescribed fire treatment type provided by the Woodstock model (2016 PRMP/FEIS, p. 1300). The decadal average of activity fuels prescribed burning for the first 20 years of the RMP would be an estimated 64,806 acres over the entire decision area (2016 PRMP/FEIS, p. 362). Slash and scatter treatments are estimated to be an additional 28,109 acres. Proposed treatment of harvest related activity fuels within the Bear Grub VMP falls within FEIS analysis.

There is no new information or changed circumstances that would substantially change the effects anticipated in the 2016 PRMP/FEIS. This is because:

1. The harvest levels remain within the range of that analyzed in the 2016 PRMP/FEIS,
2. The acres of activity fuels prescribed burning and expected tonnage consumed remains within the range analyzed in the 2016 PRMP/FEIS.

A.1.5 Hydrology

***Issue 1*: How will the proposed activities impact water yield from springs?**

Background: Water quantity in the Bear Grub planning area is a function of natural and human-caused factors. Natural site factors include climate, geology, and geographic location. Natural processes that have influenced water quantity include floods, wildfires, and drought. Past human activities that have altered water quantity in the planning area include land clearing (for agricultural and residential use), timber harvest, road construction, water withdrawals, and fire suppression. Surface water in the planning area includes streams, springs, wetlands, natural lakes and ponds, and constructed ponds and reservoirs.

Rationale: The effect of timber harvest on annual (surface) water yield was not analyzed in detail in the 2016 PRMP/FEIS, because none of the alternatives or the Proposed RMP would have a substantial effect on annual water yield (p.408). The rationale from the 2016 PRMP/FEIS is incorporated here by reference. According to the discussion in the 2016 PRMP/FEIS, timber harvest can increase annual water yield, albeit not permanently, by reducing evapotranspiration. The changes to annual yield are generally proportional to the amount of vegetation removed. According to studies referenced in the 2016 PRMP/FEIS, clear-cut harvesting of up to 25 percent of small catchments, including Riparian Reserves, showed no substantial change in annual water yield. In the 2016 PRMP/FEIS none of the alternatives or the proposed PRMP would regenerate harvest more than 25 percent of a watershed in a single decade. Harvest at this intensity is not proposed under any of the alternatives in the Bear Grub project, nor is regeneration harvest. Riparian Reserves will avoid or reduce any effect of upland timber harvest on annual water yield, intercepting any additional flow of water before it could reach the stream. No commercial harvest is proposed in the inner zone of the Riparian Reserve under all alternatives (where all documented springs in the project area are located). Fuels treatments would be conducted within middle and inner zones of some Riparian Reserves adjacent to intermittent streams but require buffers around perennial and fish bearing streams. Under any of the alternatives in the Bear Grub EA, commercial and non-commercial treatments will not produce a measurable effect in annual water yield in springs (and streams) in the project area.

A.1.6 Visual Resources:

<u>Issue 1</u>: How would proposed vegetation management treatments affect Visual Resources within the Project Area?

Background Information: For the purposes of visual resource management, the 2016 ROD/RMP designated BLM-administered lands into four Visual Resource Management (VRM) Classes: Class I, II, III, and IV. The Bear Grub VMP area includes VRM Class II and IV lands. See the descriptions below for allowable levels of modification within these classes (2016 ROD/RMP, p. 114).

• VRM Class II – manage areas for low levels of change to the characteristic landscape. Management activities will be seen but will not attract the attention of the casual observer.

• VRM Class IV – management activities may dominate the view and would be the major focus of viewer attention.

There are approximately 76 acres of VRM Class II within the Project Area. All other lands are located in the VRM Class IV landscape.

Rationale: This issue was considered but not analyzed in further detail because the proposed forest management actions would not hinder attainment of VRM Class II or IV objectives. The Bear Grub VMP only proposes timber harvest in VRM Class IV. Proposed fuels treatments in VRM Class II would be seen from the Sterling Mine Ditch Trail but would only attract the attention of casual users of the trail for a short period of time, during active fuels reduction and then when the piles are burned. All projects proposed in the VRM Class II and IV landscape would meet all visual objectives for their respective VRM Class.

A.1.7 Roads:

<u>Issue 1</u>: How will the proposed activities, specifically logging trucks, impact traffic?

The 2016 PRMP/FEIS, to which this EA tiers, presented a comparison of the amount of road use that would occur throughout the planning area if BLM managed lands were managed for maximum timber harvest as compared to commercial lands. The comparison showed that under the RMP there would be 28 percent increase on rocked roads and a 133 percent increase on paved roads. When this was compared to the commercial lands, rocked roads increased by 120 percent and paved roads increased by 577 percent.(2016 PRMP/FEIS, pp. 793-794) This was a comparison developed for western Oregon and was not site specific.

For the Bear Grub VMP, the distance between units would reduce the amount of traffic that would occur in any one area thus reducing the potential for an effect on public safety. There are 5 exit points from BLM roads onto the paved county roads where timber haul from units would occur. These exits are China Gulch Road, Forest Creek Road, Griffin Creek Road, Sterling Creek Road and Wagner Creek Road.

Use of multiple exit points would not be all at once but occur as the timber harvest moved into each group of units. The exit point and accesses would thus reduce the number of haul vehicles at any one point and minimize impacts to public safety. Traffic would be impacted only while the removal of lumber is occurring, and would only cause a temporary increase.

The contract awarded would require the purchaser to follow requirements in the *Manual on Uniform Traffic Control Devices* published by the federal Highway Administration, such as placing signs at junctions where the BLM roads enter county roads.

The distance between units, the multiple exit points and the requirements for traffic control contribute to a determination of no potential for the increased traffic from haul to have significant effects on public safety.

A.1.8 Soils:

***Issue 1*: What would be the impact of proposed timber harvest and yarding, fuels reduction treatments, and road/route/landing construction, renovation, reconstruction, and decommissioning on fragile soils classified under the TPCC?**

Background:
The Timber Production Capability Classification system (TPCC) is designed to document land capable of supporting commercial forests on a sustainable basis. It incorporates factors such as soil depth, available moisture, slope, aspect, drainage, and slope stability to evaluate the suitability of timber management on a site by site basis. The O&C Act of 1937 specifies that timber harvests will be planned and carried out only on lands which can be managed without the loss of the potential productivity of a site. The TPCC Handbook (BLM Manual 5251 – Timber Production Capability Classification; USDI BLM 1984) provides the standards for the TPCC Classification. If lands designated for timber harvest are categorized as fragile and suitable, special harvest or restricted measures are used in the form of PDFs to maintain the productivity of the site. Fragile non-suitable lands are transferred to the woodland category, which are not included in the commercial forest land allowable cut base.

There are soils classified as fragile under the TPCC Manual in the proposed Bear Grub Project Area. Fragile soils were identified using Medford District's current corporate GIS layer for fragile soils. Other resources used to make an informed decision are the Oregon Department of Geology and Mineral Industries (DOGAMI) geology maps, aerial imagery, LiDAR imagery, and site-specific field review. Data from site-specific field reviews ultimately determined the presence of fragile soils.

Within the project area the only identified fragile soils category was for slope gradient soils (FG). FG soils consist of steep slopes that have a high potential for surface ravel. Gradients are generally over 65% and not of granitic origin with gravel lag greater than 6 inches thick (TPCC 1988, pp. 48-51). FG soils are placed into two categories based on site-specific visits: suitable for timber harvest activities or non-suitable for timber harvest activities. Aside from non-commercial fuels treatments, no timber harvest treatments are proposed at non-suitable fragile sites. Treatments are proposed at fragile sites identified as suitable for timber harvest activities (See unit maps in Appendix B.4.5).

Rationale:
This issue was considered but not analyzed in further detail because the design of the timber sale, through the use of helicopter, cable yarding, and temporary road placement, greatly reduces the potential for surface erosion and impacts to slope stability. PDFs in Appendix B.1.1 also address slope stability and erosion issues associated with FG soils. The BLM deferred or incorporated as no-treatment, areas that were identified during field review as having the potential for excessive surface erosion or other issues associated with steep slope gradient FG soils. For these reasons, the Bear Grub Project would meet the required management direction on TPCC soils.

<u>Issue 2</u>: How would proposed timber harvest and associated activities, and fuels reduction treatments affect soil productivity (compaction, displacement, burning, and change in organic matter and soil chemistry) in the treatment areas?

Background:
Many factors can affect soil productivity such as compaction, displacement, erosion, organic matter loss and more. The 2016 ROD/RMP provides management direction to apply BMPs as needed to maintain or restore soil functions and soil quality and limit detrimental soil disturbance (2016 ROD/RMP, p. 109). The RMP also provides direction to limit detrimental soil disturbance from forest management operations to a total of <20% of the harvest unit area (Id.). Where the combined detrimental soil disturbance from implementation of current forest management operations and detrimental soil disturbance from past management operations exceeds 20 percent of the unit area, apply mitigation or amelioration to reduce the total detrimental soil disturbance to <20% of the harvest unit area (Id.). Detrimental soil disturbance can occur from erosion, loss of organic matter, severe heating to seeds or microbes, soil displacement, or compaction (Id.). Additionally, soil moisture during activities, slope, and activities that remove or influence nutrients (FN soils) have effects on soil productivity. The BLM incorporated the applicable BMPs from the RMP (2016 ROD/RMP, Table C-2, pp. 183-185) as PDFs for the Bear Grub Project.

Proposed actions that affect soil productivity and have the potential of creating detrimental disturbance close to the 20% of the harvest unit area threshold include timber harvest and yarding, burning of activity and natural hazardous fuels, and new road/route and landing construction. The remainder of proposed actions would not have the potential to impact soil productivity and were not evaluated further.

Timber harvest has the potential to affect soil productivity by causing compaction, displacement and erosion during both ground-based yarding (skid trails) and skyline-cable yarding (corridors). Burning of material (hand piles and underburning) has the potential for detrimental heating of the soil and increased erosion. The construction of new roads and landings has a direct effect on soil productivity on that site. The soils in these locations would be bladed and compacted. The impacts from road and landing construction vary depending on whether the road/route/landing would be temporary or permanent. Whether the road is located within or outside of a treatment unit also affects how soil disturbance is calculated. Decommissioning of roads would help soil return to a productive state, but the effectiveness of the decommissioning is variable, and would be checked by a qualified specialist.

Rationale:
This issue was considered but not analyzed in further detail because there is no potential for significant impacts to soil productivity beyond what was analyzed in the Final Environmental Impact Statement (2016 PRMP/FEIS, pp. 746 - 752) for the Western Oregon RMPs. In the FEIS, the BLM incorporated an assumption of 10 percent growth loss in the vegetation modeling of future stand growth over the length of the next rotation in stands with 20% detrimental soil disturbance levels (FEIS, p. 752). Management direction in the SWO RMP limits the increase of detrimental soil disturbance to 20% of any given harvest unit and includes all types of disturbances including those resulting from treatments as well as new road and landing areas (RMP, p. 109, FEIS, p. 752).

An evaluation of the proposed treatment areas, in the field and via office review, determined that the detrimental soil disturbance does not currently exceed 20% in the proposed treatment areas. The BLM will also apply BMPs and site-specific PDFs that will reduce the future acreage of detrimental soil disturbance from timber harvest, road construction, and fuels treatments to stay below the required 20% detrimental soil disturbance level.

An evaluation to determine existing and potential future soil disturbance consisted of field visits to a sub-sample of treatment units and verifying office review estimates of soil disturbance. Sub-sampled units

chosen for field verification were all proposed ground-based units because of the historically increased amount of detrimental disturbance relative to cable yarded or helicopter yarded units. Office review estimates of existing sources of detrimental soil disturbance consisted of identifying existing LiDAR features that are known sources of disturbance and adding those acreage totals together.

Based on current levels of detrimental soil disturbance, planned temporary infrastructure, and PDFs to be implemented on this project the allowable 20% threshold for detrimental soil disturbance will not be exceeded and analysis beyond what is contained in the 2016 PRMP/FEIS is not needed.

Issue 3: Do commercial harvests or thinning treatments in forested landscapes dry soils beyond their natural variability?

Background: Various thinning and harvest treatments in forested landscapes have direct effects on soil moisture. In soils, water content is constantly in flux. Factors that influence water content in soil are numerous and creating an exhaustive list would be difficult. Real world experiments can incorporate all variables while controlling for different amounts of thinning. A literature review reveals that real-world thinning experiments that monitor soil moisture show an increase in soil moisture post-thinning. Zhu et al. (2017) found that thinning in a semi-arid environment (15 inches of precipitation) created an overall net gain in water content within the soil profile. In Lassen National Forest, Hood et al. (2018) found that soil moisture was higher elevated relative to a control plot for at least 5 years after post-stand thinning of Ponderosa and Jeffery pine forests. Gray et al. (2002) concludes that soil moisture was more abundant in gaps than controls in a coastal Douglas-fir forest. In that same study, Gray et al. discusses a variety of other studies that have found similar results in soil moisture response to thinning:

"Studies in a wide variety of forest types have found increases in soil moisture in response to canopy gaps, including temperate hardwoods (Minckler and Woerhide 1965; Moore and Vankat 1986), pine forests (Ziemer 1964; Brockway and Outcalt 1998), tropical forest (Denslow et al. 1998), and temperate conifer forest (Wright et al. 1998). Despite greater exposure to evaporation, moisture is also initially more abundant in clearcuts than in uncut controls (Adams et al. 1991)."

Rationale: Peer-reviewed scientific literature strongly supports that thinning trees, creating gaps, and removing commercial sized trees does not dry out soil. Instead, a combination of decreased water demand from trees and less canopy to intercept precipitation causes soil moisture to increase. Because this issue has had extensive scientific review supporting the conclusion that there will be no significant effects to diminishing soil moisture, this issue was not analyzed in further detail.

A.1.9 Wildlife:

Issue 1: How would vegetation management treatments affect the Northern Spotted Owl and its habitat?

Northern Spotted Owl: This project is located within the range of the northern spotted owl (NSO) which is listed as threatened under the Endangered Species Act. NSOs prefer coniferous forest with multiple vertical layers of vegetation; a variety of tree species and age classes; and the presence of large down, woody material (to serve as habitat for prey species) and large diameter live and dead trees (snags) for nesting-roosting habitat. Nesting-roosting habitat in southwest Oregon is typified by mixed-conifer habitats with recurrent fire history, patchy habitat components, and higher incidences of woodrats. NSOs may also be found in younger stands with closed canopies for foraging and dispersing. Based on studies of owl habitat selection, including habitat structure and use, and prey preference throughout the range of the owl, NSO habitat consists of three components: nesting-roosting, foraging, and dispersal (Thomas *et al.* 1990). (*Table A-4*).

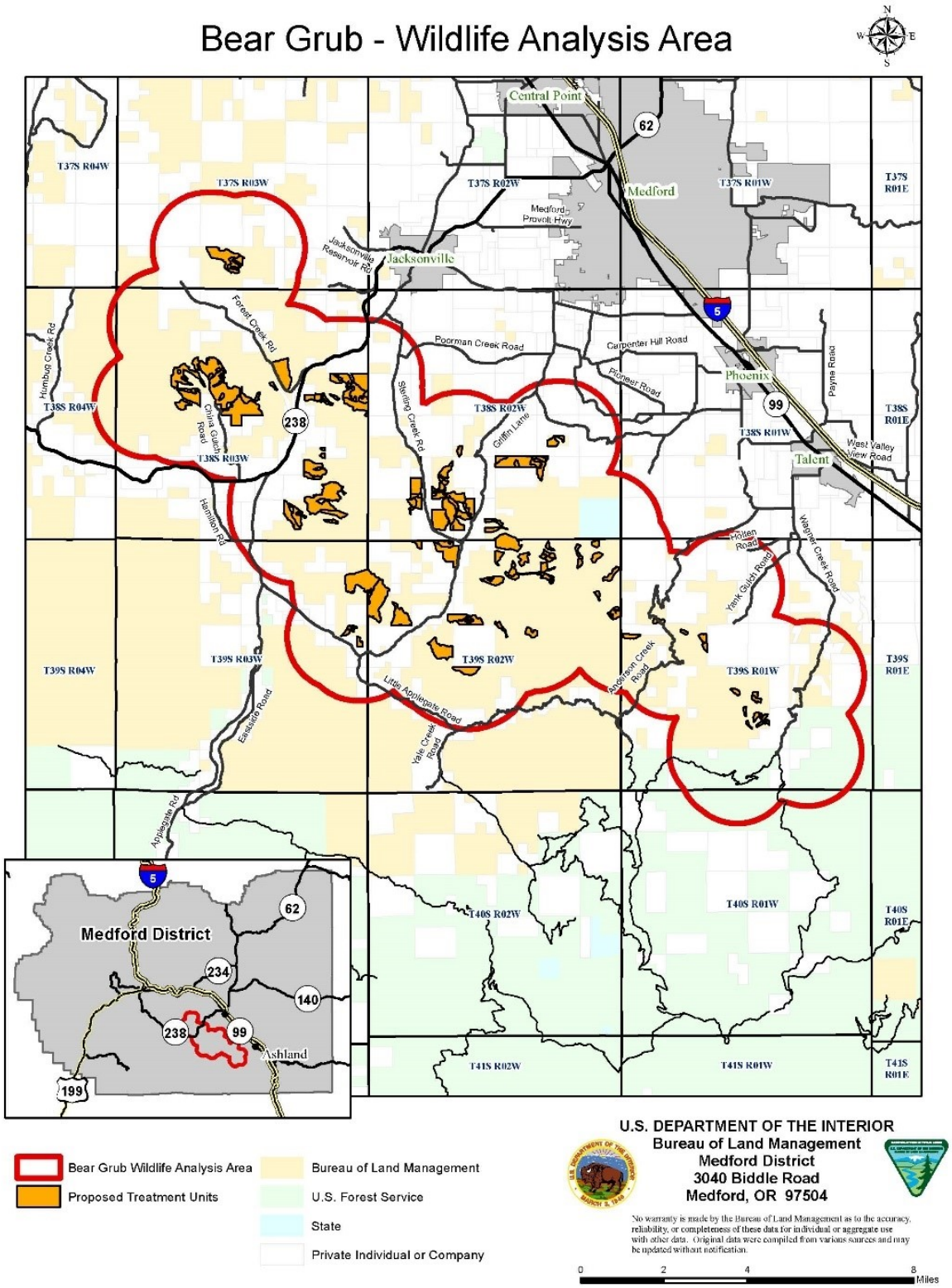
Table A-4: Medford District NSO Habitat Types

Habitat Type	Description
High-Quality Habitat (RA 32), A Subset of Nesting-Roosting Habitat	Older, multilayered, structurally-complex forests characterized as having overstory trees greater than 17 to 21 inches in diameter (depending on annual precipitation), high canopy cover (greater than 60%), large trees present (at least 30" DBH), and quantifiable decadence components such as broken-topped live trees, mistletoe, cavities, large snags, and fallen trees (Figure 12). RA 32 habitat may vary due to climatic gradients across the range. Also functions as dispersal habitat.
Nesting-Roosting	These forests have a high canopy cover (greater than 60%), a multilayered structure, and large overstory trees greater than 21 inches in diameter. Deformed, diseased, and broken-top trees, as well as large snags and down woody material, are also present. Nesting-roosting habitat meets all NSO life requirements. Also functions as dispersal habitat.
Foraging	Canopy cover greater than 60% and canopy structure generally single layered. Overstory trees are generally greater than 16 inches in diameter. Snags and down wood not considered a requirement. Also functions as dispersal habitat.
Dispersal	This habitat is not for nesting, but provides requirements believed important for NSO dispersal. Canopy cover is generally between 40 and 60%. In stands with greater than 60% canopy cover, overstory tree diameters are generally between 11 and 16 inches DBH. The area has the capability of becoming nesting-roosting, or foraging habitat. Deformed trees, snags, and down wood are absent or less prevalent than in nesting-roosting habitat.

For the purpose of evaluating potential impacts to NSOs, the BLM considered how the proposed alternatives would 1) affect NSO nesting-roosting and foraging habitat, and 2) affect the ability of NSOs to disperse across the landscape

The BLM looked at the amount of NSO habitat on federal lands (BLM and Forest Service) within the home range circles (1.3 miles) for the 25 known owl sites affected by the proposed treatment units, and within 1.3 miles (provincial home range radius) of proposed treatment units, hereby referred to as the Analysis Area (*Figure A-1*).

Figure A-1*: *Analysis Area



Background: The following actions have the potential to affect NSOs and its habitat by modifying, downgrading, or removing habitat: timber harvest and road/route and landing construction. **Modifying habitat** means when an action removes some trees, or reduces the availability of other habitat components, but does not change the current function of the habitat because the conditions classifying it would remain post-treatment. **Downgrading** alters the condition of NSO habitat, so it no longer contains the variables associated with nesting-roosting and foraging. Downgraded units would contain trees >11 inches in diameter and enough tree cover to support NSO dispersal. **Removal** alters NSO habitat so that it no longer functions as nesting-roosting, foraging, or dispersal habitat.

Rationale: The BLM did not analyze this issue in further detail because there is no potential for significant effects beyond those already analyzed in the 2016 Proposed RMP/Final EIS, to which this EA is tiered. The BLM designed this project to follow the management direction from the SWO ROD/RMP for each LUA. In the FEIS, the BLM modeled for selection harvest in the UTA (USDI 2016b, *Table C-13*, p. 1186). The alternatives proposed in the Bear Grub project would apply various amounts of selection harvest, hazardous fuels reduction, and riparian reserve thinning. By the allocation of the HLB, the BLM made all lands in this allocation to be available for timber harvest and planned that all HLB lands over time would be harvested, consistent with the management direction (USDI 2016c, p. 126). The BLM, in the FEIS, analyzed the effect of allocating the planning area to the HLB on NSO nesting-roosting habitat (USDI 2016b, pp. 346-347; 928-947). That analysis acknowledged that the BLM will not authorize timber sales that would cause the incidental take of NSO territorial pairs or resident singles from timber harvest until implementation of a barred owl management program, consistent with the assumptions contained in the BO on the RMP has begun. However, that analysis identified that, during this period of take avoidance, the BLM will implement timber harvest within NSO habitat in the HLB where the harvest would not cause the incidental take of NSO territorial pairs or resident singles, including harvesting in habitat outside of occupied NSO sites, and harvesting in habitat within occupied NSO sites with sufficient habitat above threshold amounts (USDI 2016b, pp. 346-347). The BLM, in the FEIS, analyzed the effect of this harvest of NSO habitat together with the effects of other RMP decisions and concluded that implementation of the RMP as a whole would contribute to a landscape that supports large blocks of NSO habitat that are capable of supporting clusters of reproducing owls, distributed across a variety of ecological conditions and spaced to facilitate owl movement between the blocks (USDI 2016b, pp. 932-941). Those analyses are incorporated here by reference. The USFWS confirmed in their BO on the RMPs that these analyses are a reasonable approach to assessing NSO habitat change in the planning area resulting from timber harvest, ingrowth, and wildfire because it reflects the application of best available science and the acreages of land that will be subject to the range of management activities in the land use allocations in the RMP (USDI FWS 2016a, p. 603).

In addition, the BLM analyzed in the FEIS an alternative that would protect all NSO nesting-roosting habitat and concluded that it would contribute negligible added benefits to NSO conservation when compared to some other alternatives and actually performed less well with respect to owl conservation than did some other alternatives (USDI 2016b, pp. 70, 928, 1,986). That analysis is incorporated here by reference. An alternative that would avoid timber harvest in NSO nesting-roosting habitat does not need to be analyzed in detail, because that alternative was considered in the FEIS, to which this EA is tiered (see also *Section 2.8*, *Alternatives Considered but Not Analyzed in Detail*).

Because the project implements only a portion of the projected annual and decadal timber harvest within the HLB, the project presents no potential of exceeding the effects of implementing the SYU's timber harvest program of work, which were already disclosed in the FEIS (USDI 2016b, pp. 350-361, 1215-1217). With the incorporation of PDFs to align the project with the RMP's required management

direction, this project presents no new or unique facts or circumstances that deviate from the modeling assumptions used in the FEIS or would cause the SYU to harvest in excess of the projections or owl effects analysis of the FEIS.

The BLM is following guidance from the USFWS and is conducting surveys to protocol in the Analysis Area to determine occupancy and nesting status (USDI FWS 2012b Revision). While survey visits to historic NSO sites have been conducted periodically in the Analysis Area for the past 30 years, two years (2018 and 2019) of protocol surveys in the Analysis Area are completed, and three more years would be conducted to complete the survey protocol in areas where survey protocol spot checks surveys would be tripped (USDI FWS 2012b Revision).

The BLM prioritized the NSO sites within the Analysis Area in occupied and unoccupied categories based on occupancy and reproductive success data. The proposed project is located within the provincial home ranges of 25 known NSO sites. In the past 2 years (2018 and 2019), none of the known sites in the Analysis Area had a pair of NSOs. None of the sites had resident or pair status within the last two to 10 years.

Table A-5. Effects of the Action Alternatives on NSO Nesting-Roosting and Foraging Habitat in the Analysis Area.

	Alternative 2				Alternative 3				Alternative 4			
NSO Habitat Type	NRF	Dispersal	Capable	Non-Habitat	NRF	Dispersal	Capable	Non-Habitat	NRF	Dispersal	Capable	Non-Habitat
HFR	587	874	1,193	815	587	874	1,193	815	587	874	1,193	815
Selection Harvest	584	595	22	7	740	656	40	7	539	478	7	6
RRT	4	2	0	0	5	2	0	0	4	2	0	0
Total	1,175	1,471	1,215	822	1,332	1,532	1,233	822	1,130	1,354	1,200	821

Table A-6: Effects of Proposed Treatments in Alternative 2 to NSO Habitat in the Wildlife Analysis Area.

Habitat Type	Pre-Project Acres	Treat and Maintain Acres	Removal Acres	Downgrade Acres	Post-Project Acres	Percent Change
NRF	10,897	0	575	13 (Foraging LSR)	10,309	-5
Dispersal-only	20,686	64.2 (LSR)	533	NA	20,166	-2.5

Table A-7: Effects of Proposed Treatments Alternative 3 to NSO Habitat in the Wildlife Analysis Area.

Habitat Type	Pre-Project Acres	Treat and Maintain Acres	Removal Acres	Downgrade Acres	Post-Project Acres	Percent Change
NRF	10,897	0	682	58 (Foraging LSR)	10,157	-6
Dispersal-only	20,686	79 (LSR)/114 UTA	463	NA	20,281	-2

Table A-8: Effects of Proposed Treatments in Alternative 4 to NSO Habitat in the Wildlife Analysis Area.

Habitat Type	Pre-Project Acres	Treat and Maintain Acres	Removal Acres	Downgrade Acres	Post-Project Acres	Percent Change
NRF	10,897	0	0	58 (Foraging LSR)/ 481(UTA, RRT)	10,358	-5
Dispersal-only	20,686	79 (LSR)/ 478 (UTA,RRT)	0	NA	21,225	+3

The amount of habitat modified, downgraded, or removed varies by alternative and is presented in *Table A-6*. Overall, Alternatives 2, 3, and 4 would reduce the amount of nesting-roosting and foraging in the Analysis Area by 5%, 6%, and 5% respectively. (*Tables A-7, A-8, and A-9*).

The BLM would modify treatments and follow guidance from the U.S. Fish and Wildlife Service (USFWS) if future protocol surveys determine NSO occupancy status within 1.3 miles of treatments in habitat. Additionally, the 2016 RMP gives guidance in Appendix A regarding NSO sites that have been occupied within the last 10 years within the HLB. BLM managers have the option to maintain existing habitat conditions in the nest patch and maintaining existing nesting-roosting habitat in the 500-acre core-use area, or promoting the protection and development of nesting-roosting habitat in the nest patch and 500-acre core-use area, to the extent consistent with the management objectives and management direction for the HLB (USDI 2016c, p 130).

Recent studies do not present new information that would create new effects to spotted owl populations since the PRMP/FEIS. The BLM's analysis in the FEIS of the effects of management actions on spotted owl populations included population simulations. The BLM acknowledged that spotted owl populations in the Western Cascades and Klamath Provinces would continue to decline and did not show discernable differences among the alternatives when compared to the No Timber Harvest reference analysis (USDI 2016b, pp. 961, 962, 969). The PRMP/FEIS studies in spotted owl demographic study areas have demonstrated the population decline predicted in the PRMP/FEIS. There is one spotted owl demographic study area associated with the Analysis Area: the South Cascade Demography Study Area (SCS) (approximately 20 miles to the east of the Analysis Area), which represents the West Cascades province. The last two years of annual reports for this study area indicated a decline in the spotted owl population and an increase in barred owl detections (Dugger *et al.*, 2019, Dugger *et al.*, 2020, Lesmeister *et al.*, 2019, Lesmeister *et al.*, 2020), which supports the overall spotted owl population decline predicted in the PRMP/FEIS.

In conclusion, there is no potential for significant effects beyond those already elucidated in the FEIS. The reduction in nesting-roosting and foraging habitat (5-6%) would occur outside currently occupied owl sites, and if any new sites were to become occupied, the BLM would modify treatments and follow guidance from the USFWS if future protocol surveys determine NSO occupancy status within 1.3 miles of treatments in habitat. Therefore, this project does not have the potential to cause incidental take of spotted owls from timber harvest. In addition, this project would not result in substantially different effects than what was analyzed for in the FEIS, to which this EA tiers, and there is no new information that would substantially change the conclusion reached in the FEIS.

<u>Issue 2:</u> What will be the impacts of significant canopy removal, from logging activities, on edge effect (on forest growth and structure, on wildlife habitat)?

Removal of canopy would cause an increase in the development of early successional plant communities. Shrubs, small trees, forbs, and grasses would benefit a variety of wildlife species/guilds. Habitat for pollinators would be expected to increase as would forage for deer, and other herbivores that feed on these increasing habitat components. Remaining conifers, in and on the periphery of these "openings" created by canopy removal, would generally exhibit increased growth and develop denser foliage profiles. This in turn can provide better nesting and hiding cover for many bird species—including year-round residents and neotropical migrants. Some species that favor contiguous conifer forest stands may avoid these newly opened areas. However, these openings often result in a corresponding increase in small rodent populations which in turn may attract predatory species which feed on them. There is often a push and pull between these various factors. The quantification of these effects is difficult to impossible due to the small scale of these canopy removal locations and the complexity of possible responses by wildlife species under protection as BLM Special Status Species. Due to these variables, the detailed analyses of the proposed alternatives would not provide a demonstrably different effects scenario for each alternative. This examination leads to the conclusion that there is no potential for significant effects.

<u>Issue 3:</u> What would be the potential impacts of conifer thinning operations and brush removal on neotropical bird population trends.

Conifer thinning and brush removal may impact individuals of various neotropical migratory bird species through the destruction of their nests during spring or direct mortality to individuals present during vegetation removal activities. The appropriate scale at which to assess effects to neotropical migratory bird species is regional and not local. (Cal PIF, 2002) For this reason, detailed analysis of impacts from proposed actions on neotropical migratory bird species is not appropriate at the project scale. The various proposed alternatives would not yield different outcomes in terms of impacts to neotropical migratory bird species at the regional scale. This examination leads to the conclusion that there is no potential for significant effects.

<u>Issue 4:</u> How will the timing of prescribed fire impact spring nesting bird species, and native pollinator species?

Timing of prescribed fire implementation will have corresponding impacts on spring nesting bird species, and native pollinator species. Spring nesting bird species may experience direct mortality or nest destruction if prescribed fire actions are implemented during the spring nesting period (~April-June). If prescribed fire implementation was carried out in the fall or winter rather than during the spring nesting period, this effect could be avoided.

Similarly, effects on native pollinators would be lessened by implementation of prescribed fire activities in pollinator habitat during fall or winter rather than during the spring colony rebuilding period.

A PDF recommending prescribed fire treatments be carried out in fall or winter, rather than spring to avoid disturbance or mortality to spring nesting birds and native pollinators was added to the EA.

BLM concludes that there is no potential for significant effects.

<u>Issue 5:</u> What will be the impacts from the proposed activities on pollinator habitat?

Effects to pollinators in areas of fuels treatment may materialize as a decline in numbers due to direct mortality if pollinator nest sites are burned (e.g. bees nesting in small trees/shrubs) or in-direct mortality if

resources (e.g. flowers) are removed at a critical time of phenological development (e.g spring, when bumblebee colonies are in need of floral resources to successfully rebuild their numbers). The addition of the PDF mentioned in Wildlife, Issue 2 may reduce impacts to pollinators and their habitat.

Removal of canopy in conifer forest stands often allows for greater sunlight penetration to the forest floor. This stimulates increased growth of grasses, forbs, and shrubs which tend to provide greater resources for pollinator species (bees, wasps, hummingbirds, moths, etc). Populations of pollinators are expected to increase on sites where this cascade of effects takes place.

There is no potential for significant effects.

B. Appendix: Appendices to Chapter 2

B.1 Project Design Features

Project Design Features **(**PDFs) are an integral part of the action alternatives (Alternatives 2, 3, and 4) and considered in the analysis of project impacts in Chapter 3. They are developed to avoid or reduce the potential for adverse impacts to resources. PDFs include seasonal restrictions on many activities that help minimize erosion and reduce disturbance to wildlife. PDFs also outline protective buffers for sensitive species, mandate the retention of snags, and delineate many measures for protecting Riparian Reserves throughout the project. Where applicable, PDFs reflect Best Management Practices (BMPs) and standard operating procedures. The applicable BMPs are cited in parentheses; the numbers (e.g., SP 05, TH 08, etc.) correspond to the BMP numbers listed in the tables in Appendix C of the 2016 ROD/RMP (pp. 167-206).

The PDFs listed below would be carried forward into contracts as required contract specifications. BLM contract administrators and inspectors monitor the operations of contractors to ensure that contract specifications are implemented as designed.

B.1.1 Timber Harvest Activities

Objective 1: Protect Riparian Reserves.

- Riparian Reserves distances are one site-potential tree height (155 feet in the Middle Applegate and Little Applegate Watersheds, and 160 feet in the Bear Creek Watershed) distance either side of fish-bearing, perennial, intermittent, and non-fish-bearing streams. Commercial harvest activities would only be conducted in the outer zones of the Riparian Reserve and non-commercial treatments would only be conducted in the Inner, Middle, and Outer zones of the Riparian Reserve in accordance with Riparian Reserve Management directives (2016 ROD/RMP pp 82-86) for class I and II streams in the dry forest (TH 04).
- Vegetation would not be cut within 25 feet of natural ponds less than one acre (including seeps and springs), and constructed water impoundments (e.g., canal ditches and pump chances of any size) (2016 ROD/RMP, p. 77)
- Trees would be directionally felled away from adjacent Riparian Reserves (TH 02).
- Fuel treatments would retain 60’ no-touch buffers adjacent to fish-bearing and perennial streams where no thinning or direct application of fire would occur.

Objective 2: Minimize impacts to water quality and soil productivity from timber harvest activities such as skidding operations, timber hauling, road construction, road maintenance, road decommissioning and landing construction.

- Maintain pre-logging levels of coarse woody debris where operationally feasible by reducing disturbance to it. Methods may include:
  - Locate skid trails to minimize disturbance to down woody material.
  - Where skid trails encounter large down woody material, buck out a section for equipment access.
- Restrict the amount of total areal detrimental soil disturbance defined as compaction detectable at a depth greater than 20cm, topsoil displacement to lower soil horizons, forest floor displacement exposing bare ground, signs of erosion in the form of pedestaling, rills, or gullies, rutting to a depth of greater than 5cm, burns intense enough to oxidized upper mineral soil horizons, to below 20 percent in a timber harvest unit using practices including but not limited to those found in this document and:

  - Suspending leading ends of logs when skidding
  - Having mechanized felling equipment capable of reaching at least 20 feet
  - Using low ground pressure equipment off designated trails.

- Where practical, directionally fall trees away from streams. Fall trees to the lead in relation to and direction of skid trails (TH 2)
- Incorporate existing skid trails and landings as a priority over creating new trails and landings where feasible, into a designated trail network for ground-based harvesting equipment. When new skid trails are needed, limit total (existing and new) designated skid trails to less than 15 percent of the harvest unit area to reduce displacement or compaction to acceptable limits. Consider proper spacing, skid trail direction, and location relative to terrain (TH 8 and TH 12).
- Skid trails are to be located by operators and approved by a BLM Contract Administrator prior to falling timber tributary to the skid trails. The intent is to minimize areas affected by tractors and other mechanical equipment (disturbance, particle displacement, deflection, and compaction) and thus minimize soil productivity loss.
- Restrict ground-based yarding; road and landing construction; road renovation: road closure and decommissioning work; and soil de-compaction operations from October 15th to May 15th, or when soil moisture exceeds 25 percent. Keep erosion control measures concurrent with ground disturbance to allow immediate stormproofing. Variations in these dates are dependent upon weather, soil texture, and soil moisture conditions as determined by the Authorized Officer in consultation with aquatic and/or soils scientists.
- When evaluating whether soil moisture exceeds the 25 percent by weight threshold, BLM will collect and analyze a minimum of four gravimetric water content samples using the oven dry method. Soil samples must be collected between depths of 4-6 inches. Collected samples will be in the areas likely to have the highest water content.
- Block skid trails, to prevent public motorized vehicle and other unauthorized use, by October 15th of the year of harvest unless a waiver is in place for ground-based yarding to extend the dry season (TH 19).
- Decompact skid trails as necessary, where the width of the trail permits and no damage to residual trees would occur, to a depth of at least 12 to 18 inches, to a point where stones 10 inches or larger diameter are the dominant substrate, or to bedrock (whichever is shallower) as determined by the BLM soil scientist. Decompacting may be intermittently skipped, where the Authorized Officer determines that decompacting skid trails would cause unacceptable damage to the root systems of residual trees or cause more detrimental soil disturbance along a majority of the skid trail, such as where new skid trails are constructed within the dripline of leave trees, or shallow soils, perpetually saturated soils, rocky soils, or soils that were not detrimentally compacted from harvest activities. Equipment must be able to avoid rocky areas and adapt to changes in rock depth.
- Decompact skid trails, landings, or temporary roads, where needed to achieve no more than 20 percent detrimental soil conditions, and minimize surface runoff, improve soil structure and water movement through the roadbed or skid trail (TH 18).
- Apply erosion control measures to skid trails, cable yarding corridors and other disturbed areas with potential for erosion and subsequent sediment delivery to waterbodies, floodplains, or wetlands. These practices may include seeding, mulching, water barring, tillage, and woody debris placement (TH 6, 16). Use Table C-6 in the 2016 ROD/RMP (p. 191) as a guide for constructing waterbars on skid trails where potential for soil erosion or delivery to waterbodies exist (TH 17).
- Allow harvesting operations (cutting and transporting logs) when ground is frozen or adequate snow cover exists to prevent soil compaction and displacement (TH 20).
- Ensure the leading ends of logs are suspended during skidding (TH 10).

- Restrict tractor and mechanical operations to slopes generally less than 35 percent (TH 13), except when using short trails over steeper pitches.
- Minimize the area where more than half of the depth of the organically-enriched upper horizon (topsoil) is removed when conducting forest management operations (TH 21).
- If operators are using feller-bunchers or cut-to-length harvesters off of designated skid trails:
    - Allow mechanized equipment capable of creating and walking on slash (such as a cut-to-length system) to work off designated skid trails for one or two passes on at least eight inches of slash and under dry soil conditions (less than 25 percent soil moisture content).
    - Allow mechanized equipment (feller-buncher systems) to work off designated skid trails during the dry season (soil moisture content less than 20 percent) for one or two passes only (one round-trip);
    - ~~o~~ Restrict all other use of ground-based equipment to designated skid trails
    - Suspend harvest activities if detrimental soil disturbance, (e.g., surface erosion, soil displacement, loss of soil structure, platiness), is observed. Harvest activities may resume once soil strength is sufficient (by way of further drying or adding thickness to a slash mat) to resist detrimental compactive forces as determined by an Authorized Officer.
- As needed, revegetate disturbed soils with site-specific, locally adapted native seeds and plant materials prescribed by the resource area botanist. Need would be determined by the resource area botanist, based on level of disturbance and the presence of priority non-native invasive plants. Planting would occur between September 1st to October 31st, or February 1st to March 31st.
- Suspend ground-disturbing activity (ex. timber hauling and landing operations) on native surface or inadequately rocked roads if forecasted precipitation would saturate soils to the extent that there would be potential for movement of sediment from the road to wetlands, floodplains, and waters of the state. Cover or temporarily stabilize exposed soils during work suspension. Upon completion of ground-disturbing activities, immediately stabilize fill material over stream crossing structures. Measures could include, but are not limited to, erosion control blankets and mats, soil binders, soil tackifiers, and slash placement
(R 66, R 93).
- On active haul roads, during the wet season, use durable rock surfacing and sufficient surface depth to resist rutting or development of sediment on road surfaces that drain directly to wetlands, floodplains and waters of the state (R 93).
- Prior to winter hauling activities, implement structural road treatments such as: increasing the frequency of cross drains, installing sediment barriers or catch basins, applying gravel lifts or asphalt road surfacing at stream crossing approaches, and armoring ditch lines (R 94).
- Hauling could occur during the wet season (October 16th to May 14th) on roads determined to have adequate surfacing as identified in Appendix B.2.6, Table B-3. In addition, a selection of roads have been identified as too thin for winter haul would be available for wet season haul if adequate rock is added to the roadbed (Appendix B.2.6, Table B-3). If the Authorized Officer, in consultation with field office watershed specialists and engineers, determines that hauling would not result in road damage or the transport of sediment to nearby stream channels based on soil moisture conditions or rain events, a conditional waiver for hauling may be granted. The conditional waiver may be suspended or revoked if conditions become unacceptable (where the road surface is deteriorating due to vehicular rutting or standing water, or where turbid runoff is likely to reach stream channels) as determined by the Authorized Officer (RMP BMP pg 181 R 93, R 94, and R 97).
- Remove snow on haul roads in a manner that would protect roads and adjacent resources. Retain a minimum layer (4 inches) of compacted snow on the road surface. Provide drainage through the snowbank at periodic intervals to allow for snow melt to drain off the road surface (R 95).

- Maintain road surface by applying appropriate gradation of aggregate and suitable particle hardness to protect road surfaces from rutting and erosion under active haul where runoff drains to wetlands, riparian reserve, floodplains and waters of the state (R 97).
- Install protective features such as certified weed-free straw bales, silt fences, geo-fabric rolls, wattles, and waterbars where there is potential for haul-related road sediment to enter the aquatic system. Maintain protective features by removing accumulated sediment and placing sediment in stable location where it cannot enter the aquatic system (R 13, R 64, and R 94).
- Do not apply dust abatement materials, such as lignin sulfonate, during or just before wet weather, and at stream crossings or other locations that could result in direct delivery to a water body (typically not within 25 feet of a water body or stream channel) (R 68).
- Do not use petroleum-based dust abatement products.
- Do not apply lignin sulfonate at rates exceeding 0.5 gallons per square yard of road surface, assuming a 50-50 solution of lignin-sulfonate to water (R 68).
- Limit landings to 0.5 acre or less for tractor yarding.
- Temporary roads and landings would be located on stable locations, such as ridge tops, stable benches, or flats where topographically feasible. Use existing jeep roads, skid trails, and landing footprints where possible. Locate roads and landings away from slide areas, headwalls, seeps, springs, high landslide hazards locations, and Riparian Reserves, unless there is no practicable alternative. Locations are to be approved by the Authorized Officer before construction (R 01, R 02, and R 03).
- Place waste stockpile and borrow sites resulting from temporary road construction in a location where sediment-laden runoff can be confined (M 01).
- Following proposed treatments, roads identified for long-term closure would be effectively blocked and winterized prior to the wet season.
    - Blockage at the entrance would consist of placing logs, slash, boulders, earthen berms, other material or a combination of materials so the entrance is camouflaged for a minimum distance of 100 feet and vehicle use is precluded (R 84).
    - Prior to closure, the road would be left in an erosion-resistant condition (R 85).
    - If harvest activities are not completed in the same year as the road is opened, these roads would be storm-proofed and blocked by October 15th of each year or when soil moisture exceeds 25 percent (R 84).

Objective 3: Prevent unauthorized motorized and OHV use.

- Camouflage and block skid trails leading off system roads or radiating from landings by placing woody debris or other appropriate barriers (e.g., rocks, logs, and slash) on the first 100 feet of the skid trail in all ground-based yarding units upon completion of yarding to block and discourage unauthorized vehicle use (TH 19). Also, where material such as logs and other organic debris exists, this material would be placed along the length of skid trails as determined by the Contract Administrator. The intent is to minimize erosion and routing of overland flow to streams and to protect site productivity to ensure successful reforestation by decreasing disturbance (e.g., unauthorized use by OHVs) (R 84).

Objective 4: Avert negative impacts to the known population of Fritillaria gentneri (in Unit 26-3). All relevant Project Design Criteria prescribed by the 2013 Programmatic Botanical Biological Assessment (Wender 2013) must be implemented (RMP, p. 106). Relevant items are reproduced here.

- For all projects involving the use of heavy equipment, plant sites must be protected by a 100-foot radius buffer. The use of heavy equipment is not permitted within this buffer. Heavy equipment includes tractors, dozers, loaders, graders, excavators, cranes, skid steers, and similar equipment.
- Exclude harvest activities, including falling, skidding, and yarding, from within 25 feet of plant sites.
- For Gentner's fritillary, retain 40% combined canopy coverage of trees and shrubs within 25-foot plant site buffers.
- Do not locate anchor trees within plant sites.
- Do not burn landing slash within 100 feet of plant sites.
- Construct landings at least 300 feet from plant sites. Permit use of previously existing landings when more than 100 feet away from plant sites.
- Realign new proposed logging road corridors, truck turn-arounds, and staging areas to maintain 100-foot buffers. Permit use of existing roads, even when located less than 100 feet from plant sites.

Objective 5: Avoid timber harvest activities, including road and landing construction, that would impact known Bureau Sensitive plant species sites. (2016 ROD/RMP, p. 106)

- A Bureau Sensitive plant is known to grow a few hundred feet directly north of proposed sale unit 27-4. The northern boundary of this sale unit will be flagged by the BLM with orange "Plant Buffer" flagging. No equipment or disturbance of any kind shall be permitted to take place beyond this boundary, in order to protect the Bureau Sensitive plant.
- Cypripedium fasciculatum (CYFA), a Bureau Sensitive orchid, is known to exist within proposed sale units 33-6A (all action alternative), 21-3 (alts. 2, 3) and 12-1 (alt. 3). Depending on the alternative chosen, each site within a unit that is to be harvested, is to be buffered and flagged for avoidance with orange "Plant Buffer" flagging. CYFA sale buffers are to be approximately 3/4 acre and elliptically shaped in such a way as to maximally shade the rare plant site from afternoon sun.

Objective 6: Minimize harvest impacts to designated recreational trails.

- Fell trees away from the trail to avoid ground damage to the trail from impact. Avoid skidding trees across or along trails to avoid damage to the trail tread surface (TH 02).
- For public safety, remove down woody material from the trail tread surface, making the trail safely passable after harvest operations have been completed (2016 ROD/RMP, p. 71).
- Construct slash piles no less than 15 feet away from the trail centerline in either direction.
- Where harvest operations are present, signs will be placed at access points indicating temporary closure for public safety and removed upon completion (2016 ROD/RMP, p. 279).

B.1.2 Silvicultural Activities**:**

Objective 1: Protect residual leave trees.

- White fir is extremely susceptible to fungal attacks and root rots. Avoid damage to white fir along haul roads, planned skid roads, or adjacent to major landings where heavy mechanical injury can occur during harvest operations.
- Reserve Pacific yew where operationally feasible.

Objective 2: Limit residual stand damage from ground-based yarding activities.

- Fell and skid trees 21 inches DBH and smaller designated for cutting to an approved landing location as either whole trees or log segments. If excessive stand damage occurs from whole tree yarding, as determined by the Authorized Officer, bucking, limbing, or both would be required.
- Fell trees over 21 inches DBH designated for cutting would be cut into log lengths not to exceed 44 feet and completely limbed prior to skidding.

B.1.3 Fuels Management and/or Pre-Commercial Thinning

Objective 1: Minimize amount of surface fuel loading from harvest/pre-commercial thin activities.

- Conduct a pre-activity fuels assessment in proposed treatment areas. Modifications or additional treatment recommendations would be based on post-activity fuels assessment and the amount of slash created during harvest activities. Treatments including, but not limited to, hand or machine slash piling, slash pile burning, underburning, broadcast burning and biomass removal may be needed to further reduce the fuels hazard to an appropriate level within all units (F 1 to F 17).
- To reduce the amount of surface fuel loadings and emissions from prescribed burning, remove slash from the site, when feasible, by using whole tree harvesting, chipping limb slash in the harvest unit, or a combination of both methods. Where whole tree harvesting is permitted, landing slash would be chipped, burned, or moved off site.

Objective 2: When fuels treatments occur within units NC7-2, NC7-3, NC15-8, NC16-5, NC27-1, NC35-1, NC35-2, and NC35-3, conduct fuels treatments that will not negatively impact Gentner's Fritillary habitat restoration, in accordance with the 2015 Conservation Agreement for Gentner's Fritillary in Southwestern Oregon and the 2013 Programmatic Botany BA.

- Within the identified units treatments will be conducted with coordination with the field office botanist in order to reduce negative impacts to habitat restoration.
- Prior to beginning rare plant habitat-disturbing projects in the identified units, identify and mark sensitive areas with flagging.
- Within the identified units conduct non-commercial vegetation management work primarily when F. gentneri is dormant, generally between July 1 and February 15.
- Within the identified units and when treatment occurs during the growing season retain approximately 40% average canopy cover (shrubs and trees combined) and within the identified 25 foot no treatment buffer around plant sites.
- Do not manually treat more than 75% of the identified fuel treatment units within a 5-year period.
- Do not understory burn more than 50% of the identified fuel treatment units within a 5-year period.
- In identified areas use manual techniques, rather than mechanical, to thin, scatter, and pile vegetation.

- Minimize accumulation of slash in occupied areas and adjacent suitable habitat.
- Disperse burn piles across treatment areas and outside of F. gentneri populations.
- Conduct understory burns only during the F. gentneri dormant season and when a light to moderate burn can be achieved (when soil and duff are moist).
- Monitor response of F. gentneri populations and other vegetation to habitat restoration treatments.
- The BLM botanist will conduct surveys for non-native invasive plant establishment the season after the completion of work.
- Within identified units no mechanized equipment will be authorized to construct new firelines.
- When improving roads to use as firelines, restrict disturbance to within the existing road tread and take precautions to protect roadside F. gentneri plants.
- Rehabilitate and reseed firelines constructed in suitable habitat. Use only native seeds and genotypes appropriate for the site.
- In units containing non-native invasive plants, seed burn-pile scars and broadcast burned areas with site-specific native plant species.
- Fuels will notify botany three months prior to underburning, or broadcast burning in identified fuel treatment units to determine if invasive plant treatments are necessary.
- Refuel equipment away from F. gentneri populations, using secondary containment where feasible.
- Maintain a visual screen to discourage vehicular access, to non-system roads or trails.
- Pile material at least 25 feet away from identified plant sites.
- Rehabilitate pile burn scars with native seed and mulch when adjacent to listed plant sites or in critical habitat.
- Maintain 25-foot no-treatment buffers around plant sites during the growing season.

Objective 3: Implement measures to avoid impacts to Bureau Sensitive Plant Species.

- *Entosthodon fascicularis* (ENFA2) is a Bureau Sensitive soil-dwelling moss. A site is known from fuels reduction unit NC15-8. A 25-foot buffer surrounding the perimeter of the site is to be flagged with orange "Plant Buffer" flagging. Within the ENFA2 buffer, no work may take place while the ground is wet or muddy. When conditions permit, loose, dead fuels, or pruned dead tree or shrub branches may be removed by hand from within the buffer. No fuels may be piled within the ENFA2 buffer.
- *C. fasciculatum* is also known from within fuels reduction units NC3-7, NC13-11, and NC25-5. Like CYFA sale buffers, CYFA fuel buffers are to cover about 3/4 acre, and are to be flagged prior to activities by the Resource Area botanist. Only loose, dead fuels are to be removed from within these buffers; pruning of dead tree or shrub branches may also take place. Fuels shall be removed by hand. No fuels may be piled within CYFA fuel buffers.
- *Diplacus congdonii* (DICO21), a Bureau Sensitive monkeyflower, occurs in fuel reduction unit NC16-4. A 25-foot buffer surrounding the perimeter of the site is to be flagged with orange "Plant Buffer" flagging. Within the DICO21 buffer, no work may take place while the ground is wet or muddy. When conditions permit, fuels treatment may take place within the buffer, but fuels must be hand-removed from within the buffer and no fuels may be piled or burnt within the buffer.
- *Rafinesquia californica* (RACA), a Bureau Sensitive chicory, is known from fuels reduction units NC7-2, NC7-3, and NC35-2. Sites are to be flagged prior to activities. Fuel piling is not permitted within RACA sites. Wherever possible, burning through sites is encouraged.
- *Solanum parishii* (SOPA), a Bureau Sensitive nightshade, occurs in fuels reduction unit NC7-2. Sites are to be flagged prior to activities. Fuel piling is not permitted within SOPA sites. Wherever possible, burning through sites is encouraged.

Objective 4: Implement measures to contribute towards preventing the introduction and spread of non-native invasive plants.

- When post-harvest slash is piled and burned on landings located along main roads, native, site-specific seed and certified weed-free straw would be applied to the burn pile scars between September 1st and March 30th.

Objective 5: Protect Riparian Reserves

- Allow treatment in the Riparian Reserve System as outlined in the 2016 ROD/RMP (pp. 82-87).
- Avoid hand piling or pile burning in bottom of draws.

Objective 6: Conduct fuels reduction to minimize impacts to other resources.

- Provide an approved prescribed fire plan prior to ignition of all prescribed burn units in compliance with the 2017 Interagency Prescribed Fire Planning and Implementation Procedures Guide (PMS 484, NWCG 2017). The prescribed burn plan would contain measurable objectives, a predetermined prescription, and an escape fire plan to be implemented in the event of an escape.
- To prevent fire escape and to minimize damage to residual vegetation and trees, schedule burning to occur when weather and fuel conditions allow for lower fire intensities (typically late fall through spring).
- Conduct prescribed burning in compliance with Oregon Department of Forestry's Smoke Management Plan. Smoke emission control could also include conducting mop-up as soon as possible after ignition is complete, covering hand piles to permit burning during the rainy season, and burning small diameter fuels with lower fuel moistures to facilitate rapid and complete combustion, while burning larger fuels with higher moisture levels to minimize consumption.
- Disperse slash piles across the treatment areas. Burn slash piles when soil and duff moisture content is high.
- In underburning units, consume only the upper horizon organic materials and allow no more than 15 percent of the burned area mineral soil surface to change to a reddish color (F 06).
- Hand pile smaller materials (1-6 inches in diameter) and leave larger pieces of slash within the unit. Pile size shall be a maximum of 8 feet in diameter and 8 feet in height, and minimum sized of 6 feet in diameter and 5 feet in height. Reduce burn time and smoldering of piles by extinguishment with water and tool use (F 08).
- Machine constructed piles should be created on already disturbed soils, i.e. temp roads, heavily trafficked skid trails, and landings. Machine piles should generally be constructed such that organic material would be consumed within the disturbed soils and not spread to the adjacent harvest unit.
- Avoid placement of firelines where water would be directed into waterbodies, floodplains, wetlands, headwalls, or areas of instability (F 05).
- Use erosion control techniques such as tilling, waterbarring, or debris placement on hand or tractor firelines when there is potential for soil erosion and delivery to streams, waterbodies, and wetlands (F 05).
- Any containment lines constructed for fuels projects shall be sufficiently blocked to preclude use by motorized vehicles or OHVs. This would include such measures as placing logs and slash, falling trees less than 8 inches DBH or other actions as necessary.

Objective 7: Minimize fuels treatment impacts to designated recreational trails.

- Trees must be felled away from the trail to avoid damage from impact
- Debris must not be left covering the trail tread surface and made passable after fuels treatments have been completed.
- Handpiles must be constructed no less than 15 feet away from the trail centerline in either direction.

B.1.4 Terrestrial Wildlife

Objective 1: Minimize impacts to wildlife species and special habitat elements.

- Maintain existing snags greater than 20 inches DBH and snags 6-20 inches DBH in decay classes III, IV, and V (see USDI BLM 2010a) except those that need to be felled for safety reasons or for logging systems to minimize impacts to cavity-dependent species. Retain snags felled for safety reasons on site, unless they would also pose a safety hazard as down woody material (2016 ROD/RMP, p. 63).
- Within commercial harvest stands in the Harvest Land Base, retain existing large down woody material greater than 20 inches in diameter at the large end and greater than 20 feet in length; and down woody material 6-20 inches in diameter at the large end and greater than 20 feet in length in decay classes III, IV, and V (2016 ROD/RMP, pp. 62-63).
- Restrict the use of motorized equipment and vehicles to existing roads within the following naturally occurring special habitats to maintain their ecological function: seeps, springs, wetlands, natural ponds, and natural meadows. Construct new roads and landings outside of these naturally occurring special habitats (2016 ROD/RMP, p. 115).
- When practicable, prescribed fire treatments should be carried out in fall or winter, rather than spring, to avoid disturbance or mortality to spring nesting birds and native pollinators.

Objective 2: Protect Bureau Special Status terrestrial wildlife species.

- Implement conservation measures to minimize specific threats to known Bureau Special Status terrestrial wildlife species in the Project Area. Conservation measures are determined based on species, proposed treatment, site-specific environmental conditions, and available management recommendations. (Table 1) No yarding through buffered wildlife sites.

Table B-1: Conservation Measures for Known Bureau Special Status Terrestrial Wildlife Species in the Bear Grub Project Area. (2016 ROD/RMP, pp. 116 - 121).

Wildlife Species	Status	Protection Measures	Known-Site Seasonal Restrictions
Bats	BS	Retain Snags	None
Cavity Nesting Birds	BS	Retain Snags. Create snags in LSR	None
Northern Spotted Owl	FT	300-Meter Nest Patches	0.25-Mile, March 1 – September 30
Fisher	BS	Retain Large Down Wood and Snags* Maintain Habitat within Stands Used for Denning. Retain 80 percent canopy cover within 50 feet of known den sites (USDI BLM 2016b, p. 117).	None†

* Snags felled for safety reasons or for logging systems (skyline corridors, etc.) would be left on site.

† The original EA said 500 feet in between March 1-June 15. This has been changed as above because the 2016 ROD/RMP directs BLM to protect documented natal and maternal dens with a 50 foot buffer and does not specify a date range (USDI BLM 2016b, p. 117).

Status:

FE – Federally Endangered (ESA) BS – Bureau Sensitive

FT – Federally Threatened (ESA) EPA – Bald and Golden Eagle Protection Act

- There are no known NSO sites within 0.25 miles of proposed harvest units. If discovery of any new owls occurs within 0.25 miles of harvest units following the sale date, seasonally restrict harvest activities from March 1st to September 30th within 0.25 mile of new NSO sites.
- Seasonally restrict timber harvest activities from March 1 to June 30 but may be extended up to September 30 if late nesting or nesting re-attempts are confirmed, within 0.25-mile of known active NSO sites or within 0.5-mile for helicopter operations and blasting. The seasonal restriction could be waived if non-nesting status is determined. If any new owls are discovered in harvest units following the sale date, activities would be halted until mitigation options are determined. Follow USFWS recommended noise disturbance distances for activities other than timber harvest to avoid disturbance to NSOs.

Table B-2: USFWS noise disturbance distances for proposed treatments.

Activity	Buffer Distance Around Owl Site
Light maintenance (*e.g.*, road brushing and grading) at campgrounds, administrative facilities, and heavily used roads	0.25 mile
Burning (prescribed fires, pile burning)	
Log hauling on heavily used roads (FS maintenance levels 3, 4, and 5)	
Chainsaws (includes felling hazard/danger trees)	200 feet
Heavy equipment for road construction, road repairs, bridge construction, culvert replacements, etc.	
Blasting	0.5 mile
Helicopter	
Pile-driving (steel H piles, pipe piles) Rock Crushing and Screening Equipment	400 feet
Tree Climbing	100 feet

- Debris piles associated with logging activity (slash and/or cull material piles) adjacent to roads or on landings would not be burned, chipped or made available for firewood cutting between February 1st and

September 30th when the pile is mixed with various sized logs (multiple diameters) and there is some open space within the piled logs (not compact). Spring burning, chipping or firewood cutting could take place if a BLM wildlife biologist reviews the pile and determines it is not compatible with fisher denning/resting use.

B.1.5 Noxious Weed

Objective 1: Implement measures to contribute towards preventing the introduction and spread of non-native invasive plants.

- Inspect and clean heavy equipment as necessary prior to moving on to the project site, in order to remove oil and grease, non-native invasive plants, including noxious weeds, and excessive soil (SP 03).
- Ensure hay, straw, and mulch are certified as free of prohibited noxious vegetative parts or seeds, per 75 FR (Federal Register) 159 (Federal Register 2010, p. 51102). Straw or hay must be obtained from the BLM or purchased from growers certified by the Oregon Department of Agriculture's Weed Free Forage and Mulch Program. If hay is used, it must be from native grasses only.
- Areas of high traffic within project units (e.g., landings) would be monitored for invasive plant introductions for two years following the cessation of harvest activities. Infestations of priority invasive species (those listed in the above table and any new invaders) would be treated for three years following the cessation of project activities or until the infestation is eliminated, whichever comes first, as funding and other resource considerations permit.
- In order to limit the introduction of noxious weeds onto BLM lands when importing off site material such as aggregate, rip rap or borrow material use measures such as:
  - Inspection of material prior to moving.
  - Treat material that is suspected of having noxious weeds with a herbicide.
  - Obtain material from an accredited, weed free quarry, or
  - Obtain material crushed between November 1st and June 15th immediately prior to application.

B.1.6 Spill Prevention and Abatement

Objective 1: Prevent and contain hazardous material spills.

- All operators shall develop a Spill Prevention, Control, and Countermeasure (SPCC) plan prior to initiating project work if there is a potential risk of chemical or petroleum spills near waterbodies. The SPCC plan would include the appropriate containers and design of material transfer locations as required under Oregon Administrative Rules (OAR)-340-0030-DEQ (SP 05).
- All operators shall have a Spill Containment Kit (SCK) as described in the SPCC plan on-site during any operation with potential for run-off to adjacent waterbodies. The SCK would be appropriate in size and type for the oil and hazardous material carried by the operator as required under OAR-340-0030-DEQ (SP 06).
- Operators shall be responsible for the clean-up, removal, and proper disposal of contaminated materials from the site (SP 07) (OAR-340-102-DEQ, and OAR-340-122-DEQ).
- Maintain and refuel heavy equipment a minimum of 150 feet from streams, ponds, or other wet areas. Store equipment containing reportable quantities of toxic fluids outside of the Riparian Reserve. (SP 01 and SP 03).

- Check equipment for leaks prior to starting work. Ensure hydraulic fluid and fuel lines are in proper working condition in order to minimize leakage into streams. Do not allow equipment use until leaks are repaired or leaking equipment is removed from the project area. (SP 03)

B.1.7 Cultural and Paleontological Resources

Objective 1: Protect known and newly identified cultural and paleontological resources.

- Place no-entry buffers around significant cultural resources and paleontological sites located within the Area of Potential Effect (APE). BLM archaeologists would establish buffers sufficient to protect sites from impacts of any proposed management activities. Design buffers to take into account all elements of cultural sites that contribute to the National Register of Historic Places (NRHP) eligibility of those sites. No treatments within this buffer. No fire line construction, prescribed burning, or hand piling and burning within the flagged boundaries of the recorded cultural resources. Fall timber, identified for removal next to a buffer, directionally away from buffers for one site-potential tree length.
- In the event unrecorded paleontological, archaeological, or historical sites or artifacts are discovered during project implementation, stop all work immediately in the area and notify the Contracting Officer's Representative of the finding. The project may be redesigned to protect the cultural and/or paleontological resource values present, or evaluation and mitigation procedures would be implemented based on recommendations from the Field Office cultural specialist and concurrence by the Field Manager and State Historic Preservation Office. Written or verbal start work orders would be given to the contractor by the Contracting Officer's Representative after approval by the District Archaeologist. Cultural sites or objects include historic or prehistoric ruins, graves, grave markers, and prehistoric and historic artifacts and features. Paleontological remains are defined as the fossilized remains or imprints of past organisms.

B.2 Description of Proposed Road Activities Common to All Action Alternatives

B.2.1 Road Maintenance and Renovation

Before roads are used for forest management activities, they would be surfaced or spot rocked if needed; ditches would be cleaned where needed; catch basins would be cleaned or enlarged; brush growing near culvert inlets or outlets would be removed; undersized or culverts that have met or exceeded their lifespan would be replaced; and brush, limbs, and trees would be removed along roadways to improve sight distance and allow for proper road maintenance.

Road surfacing is placing rock the full width and desired length of the road. Surfacing is accomplished through grading and reshaping the road subgrade, then hauling, placing, and compacting the new surfacing material on the prepared subgrade.

Spot rocking involves placing rock on the road in areas as needed to help control erosion and maintain the road surface. This restores the road surface and road condition making it suitable for driving and hauling. Crushed aggregate material is placed on sections of inadequately surfaced roads that would be used for hauling timber.

Roads that have not received periodic road maintenance would be made suitable for timber hauling by removing encroaching vegetation including trees greater than 6 inches DBH, repairing and/or widening narrow sections, correcting drainage patterns, and blading the road surface. It may include installation of cross-drain culverts. Reconstruction uses clearing, grubbing, excavating, and grading operations.

Large vegetation and trees that have grown along haul roads prevent maintenance equipment from creating, maintaining, and improving proper road drainage patterns. The large vegetation and trees create berms on the outside shoulder of the road, which causes water to flow down the road in a concentrated flow instead of allowing water to disperse off the road at the earliest possible point.

The BLM is proposing roadside vegetation maintenance under all Action Alternatives (includes commercial and non-commercial treatments). Tree and vegetation (up to 36 inches DBH) removal would occur up to six feet horizontally from the centerline of ditches and up to six feet horizontally from the outside shoulder of the road prism. Tree and vegetation cutting would occur rather than uprooting, unless otherwise approved. Remaining brush and stumps that would interfere with road grading and maintenance operations would be removed or ground down to a depth of six inches below the road surface or ditch line. A BLM fuels specialist would assess debris and trees that are not merchantable or desired for firewood cutting then it would be hand piled and burned, clipped, or lopped and scattered, depending on the location. Within 90 days after the completion of the vegetation maintenance project, fuel reduction would begin.

B.2.2 Temporary Road Construction

The BLM proposes to construct temporary roads to allow operators temporary access to treatment units where no previous roads exist. Where topography allows, roads would be located on stable areas such as ridges, stable benches, and gentle to moderate slopes. An access route would be constructed to standards that would facilitate safe and efficient operations. Construction would include clearing, grubbing, removing, and disposing of vegetation and debris from within and adjacent to the temporary road. Work could also include the construction of a minimum-width subgrade by excavating, leveling, grading, and outsloping.

Since the construction of temporary roads would only occur to access timber harvest units that the BLM would not go back into for 40 years, full decommissioning of temporary roads would occur at the completion of timber harvest related activities. Fully decommissioning would include subsoiling the surface to a depth of 12 to 18 inches or to a point where 10 inches diameter stones are the dominant substrate (whichever is shallower). Where it is determined by the Authorized Officer that subsoiling the temporary roads would cause unacceptable damage to the root systems of residual trees along a majority of the temporary roads (i.e., within the dripline of trees), subsoiling may be intermittent or scarification may be used instead. Equipment must be able to avoid rocky areas and adapt to changes in rock depth. Placement of slash, boulders, and other debris would occur along each road's entire length as determined by availability of materials to provide ground cover and discourage mechanized use. Blockage at the entrance of each road would consist of placing logs, slash, boulders, earthen berms, and other material so the entrance is camouflaged for a minimum distance of 100 feet and vehicle use is precluded. Seeding with approved native seed species and mulching with weed-free straw or approved native materials would occur within 100 feet of each road entrance. Treatment described may be modified by the Authorized Officer in consultation with appropriate earth scientists or aquatic specialists.

B.2.3 Permanent Road Construction

The BLM proposes to construct a permanent road to allow access to an area for treatment under this project as well as for future forest management. New permanent roads would be added to the road system. Where topography allows, roads would be located on stable areas such as ridges, stable benches, and gentle to moderate slopes. Construction on slopes greater than 60% side slopes would be minimized. On

slopes greater than 60%, end hauling of material would occur and would be disposed of on stable areas outside of riparian areas that would minimize risk of sediment delivery to streams and other waterways.

B.2.4 Road Opening, Renovation and Long-Term Closure (Decommissioning)

The BLM is proposing to open existing roads that were previously and are currently barricaded. The roads would be unbarricaded and renovated (see Road Renovation) to allow for timber haul. Once no longer required for haul, the roads would be placed back into a long-term closure state (decommissioning) by effectively blocking and winterizing the roads prior to the wet season. These roads would be left in an erosion-resistant condition by establishing cross drains, eliminating diversion potential at stream channels, and stabilizing or removing fills on unstable areas. Work may consist of water barring roads, removing culverts (armor, if necessary), seeding with native grasses, and mulching with weed-free mulch. Blockage at the entrance would consist of placing logs, slash, boulders, earthen berms, and other material so the entrance is camouflaged for a minimum distance of 100 feet or as needed to prevent unauthorized vehicle use. These would remain BLM system roads that are in a storage status.

B.2.5 Access to Service Landings

Fuel and service vehicles will access helicopter landings from existing roads. These vehicles are like those used by the public on the existing roads that access the landings. The exact landing locations are not identified to allow the helicopter contractor leeway to identify a safe location for their pilots. Therefore, the roads accessing these landings are not currently identifiable.

B.2.6 Table of Proposed Haul Roads in the Project Area

The table describes the existing surface, if it will be used for haul in each of the alternatives, any seasonal restrictions, and comments on the construction, closure, if it is in the roads system and availability of aggregate roads for winter haul.

Table B-3 - Proposed Haul Roads in the Project Area.

Road Number	Existing Surface	Will Road be Used for Haul? (By Alternative) 2	3	4	Seasonal Restriction (for Log Hauling)	Comments
37-3W-33.00	Nat	Yes	Yes	Yes	1	Reopening and Long-Term Closure
38-2W-18.00 A-B	Agg	Yes	Yes	Yes	1	Rock is too thin for winter haul.
38-2W-18.00 C-D	Agg	Yes	Yes	Yes	1	Rock is too thin for winter haul.
38-2W-21.00	Agg	Yes	Yes	Yes	2	
38-2W-24.00 A-C	BST	Yes	Yes	Yes	0	
38-2W-24.00 D-J	Agg	Yes	Yes	Yes	2	
38-2W-26.00 A-B	Agg	Yes	Yes	Yes	2	
38-2W-26.00 C	Agg	Yes	Yes	Yes	2	
38-2W-27.02	Agg	Yes	Yes	Yes	1	Rock is too thin for winter haul.
38-2W-29.00 A1	BST	Yes	Yes	Yes	0	
38-2W-29.04	Nat	Yes	Yes	Yes	1	Reopening and Long-Term Closure
38-2W-31.00	Agg	Yes	Yes	Yes	1	Rock is too thin for winter haul.
38-3W-10.00	Agg	Yes	Yes	Yes	2	
38-3W-13.00	Nat	Yes	Yes	No	1	Reopening and Long-Term Closure
38-3W-13.01	Nat	Yes	Yes	Yes	1	Reopening and Long-Term Closure

Table B-3 Abbreviations:
Existing Surface: NAT = natural, AGG = Aggregate, BST = Bituminous Surface Treatment

Seasonal Restrictions (for log hauling):
0 = no restrictions
1 = Hauling restricted between 10/15 and 5/15 are based on current surface condition. Restrictions may be waived during extended dry periods, by adding sufficient rock, hauling over snow (R095), or during frozen conditions.
2 = Winter Haul allowed in accordance with 2016 ROD/RMP BMPs (USDI BLM 2016b, p. 181Appendix C): R093, R094, R095, and R097.

Road Number	Existing Surface	Will Road be Used for Haul? (By Alternative)			Seasonal Restriction (for Log Hauling)	Comments
		2	3	4		
38-3W-13.01	Nat	Yes	Yes	Yes	1	Reopening and Long-Term Closure
38-3W-13.02	Nat	Yes	Yes	Yes	1	Reopening and Long-Term Closure
38-3W-13.03	Nat	Yes	Yes	No	1	Reopening and Long-Term Closure
38-3W-14.00	Agg	Yes	Yes	Yes	2	
38-3W-16.00	Agg	Yes	Yes	Yes	2	
38-3W-16.01	Agg	Yes	Yes	Yes	2	
38-3W-23.00	BST	Yes	Yes	Yes	0	
38-3W-23.01	BST	Yes	Yes	Yes	2	
38-3W-26.01A	Agg	Yes	Yes	Yes	2	
39-1W-18.00	Agg	Yes	Yes	Yes	2	
39-1W-21.02	Agg	Yes	Yes	Yes	2	
39-1W-21.03 A1	Agg	Yes	Yes	Yes	1	Rock is too thin for winter haul.
39-1W-21.03 A2-B	Nat	Yes	Yes	Yes	1	
39-1W-22.01	Agg	Yes	Yes	Yes	2	
39-2W-01.00	Nat	Yes	Yes	Yes	1	
39-2W-03.02	Agg	Yes	Yes	Yes	2	
39-2W-08.00 A1	BST	Yes	Yes	Yes	0	
39-2W-08.00 A2-C2	Agg	Yes	Yes	Yes	2	

Table B-3 Abbreviations:
Existing Surface: NAT = natural, AGG = Aggregate, BST = Bituminous Surface Treatment

Seasonal Restrictions (for log hauling):

0 = no restrictions

1 = Hauling restricted between 10/15 and 5/15 are based on current surface condition. Restrictions may be waived during extended dry periods, by adding sufficient rock, hauling over snow (R095), or during frozen conditions.

2 = Winter Haul allowed in accordance with 2016 ROD/RMP BMPs (USDI BLM 2016b, p. 181Appendix C): R093, R094, R095, and R097.

Road Number	Existing Surface	Will Road be Used for Haul? (By Alternative)			Seasonal Restriction (for Log Hauling)	Comments
		2	3	4		
39-2W-12.00	Nat	Yes	Yes	Yes	1	
39-2W-12.01	Nat	No	Yes	No	1	
39-2W-15.00	Agg	Yes	Yes	Yes	2	
39-2W-17.00	Agg	Yes	Yes	No	2	
39-3W-13.00	Agg	Yes	Yes	No	1	Rock is too thin for winter haul.
NS38-2W-23.00	Nat	Yes	Yes	Yes	1	Non-System Road
NC38-2W-23.01	Nat	Yes	Yes	No	1	Proposed for Permanent Construction
TR 17-7	Nat	No	Yes	No	1	Proposed for Temporary Construction
TR 12-1	Nat	No	Yes	No	1	Proposed for Temporary Construction
TR 27-5	Nat	Yes	Yes	No	1	Proposed for Temporary Construction

Table B-3 Abbreviations:
Existing Surface: NAT = natural, AGG = Aggregate, BST = Bituminous Surface Treatment

Seasonal Restrictions (for log hauling):

0 = no restrictions

1 = Hauling restricted between 10/15 and 5/15 are based on current surface condition. Restrictions may be waived during extended dry periods, by adding sufficient rock, hauling over snow (R095), or during frozen conditions.

2 = Winter Haul allowed in accordance with 2016 ROD/RMP BMPs (USDI BLM 2016b, p. 181Appendix C): R093, R094, R095, and R097.

Note: Prior to the wet season, October 15th – May 15th, if purchaser elects to furnish and place additional rock as per BLM specifications, road specific seasonal haul restrictions may be modified as approved by the Authorized Officer.

B.3 Detailed Descriptions of Proposed Vegetation Management Activities

B.3.1 Proposed Treatment Types by Land Use Allocation for Action Alternatives

B.3.1.1 Uneven-Aged Timber Areas

Within the Uneven-aged Timber Areas, integrated vegetation management includes the use of a combination of vegetation treatments and fuels management activities. Activities include, commercial thinning, selection harvest, group selection harvest, vegetation control, and prescribed fire (2016 ROD/RMP, p. 68-69).

B.3.1.2 Late-Successional Reserve-Dry

Lands designated as Late-Successional Reserve-Dry LUA would have the same treatment activities identified in Uneven-Aged Timber Areas. All treatments would retain the required trees per acre, ground cover, snags and canopy cover metrics listed in the 2016 ROD/RMP (2016 ROD/RMP, pp. 70-75).

B.3.1.3 Riparian Reserve-Dry

Within Lands Designated as Riparian Reserve-Dry, commercial treatments would only occur in the outer portions of Class I subwatersheds. Noncommercial treatments would occur in the inner, middle and outer zone of Class I and outer zone of Class II subwatersheds for fish-bearing, perennial, intermittent, and non-fish-bearing streams. A discussion of the disposal of the treated material is in the *Hazardous Fuels Reduction* section. All treatments would retain the required trees per acre and canopy cover metrics listed in the 2016 ROD/RMP (2016 ROD/RMP, pp. 82-84).

B.3.2 Timber Harvest Practices and Design Features

The BLM would incorporate the following timber harvest practices and design features under all the action alternatives.

Harvest contractors may fell trees with chainsaws (manual) or with specialized equipment (mechanized). Typically, manually felled trees are de-limbed and bucked into log form prior to skidding or yarding. Optionally, the contractor may whole tree yard or yard the trees with their tops attached, usually this depends on the harvesting method and equipment used. Mechanized felling uses a hotsaw or feller-buncher which cuts and bundles whole trees to prepare them for skidding. In some cases, trees are cut and processed into log form using a harvester prior to skidding. Mechanical harvesting can only occur on slopes less than 35% while manual felling would occur on slopes greater than 35%.

Log landings are areas where trees are processed into logs, then stacked and loaded onto trucks. Existing landings are used when available, if unavailable construction of new landings to support the timber harvest would be necessary. Ground-based and skyline landings are 0.5-acre or less, and are located on stable locations, such as roads, ridgetops, benches, or flat areas, in accordance with Project Design Features B.1.1. Approval by the BLM Contract Administrator is required prior to construction of any new landings.

The machines used for ground-based skidding are diverse and can be wheeled or tracked. Skidding patterns within a harvest unit are selected by the operator and approved by the BLM Contract Administrator. During skidding operations, equipment drives along skid trails to the felled logs or trees and skids them to the landing. Existing skid trails are used whenever operationally feasible. Winches or grapples are used to obtain one-end suspension on the leading end of the logs. Ground-based skidding is limited to slopes of 35% or less and limited to time periods when soils are dry and resistant to compaction and displacement. Skid trails vary in length and are typically 12-15 feet wide, except where they

converge. After harvest is complete, skid trails and landings may be water-barred, de-compacted, barricaded, and camouflaged.

Cable yarding is a system that partially suspends and pulls logs to a landing using a stationary machine, or yarder. The operator selects the yarder settings and the BLM Contractor Administrator approves them. They are typically located on roads and extend downhill into the harvest unit. Cable yarding is usually proposed where the ground is too steep for ground-based skidding (generally >35% slope) but may be authorized on slopes <35%. Cable corridors are 12-15 feet wide except where multiple settings converge on one landing.

Helicopter yarding is a system that lifts bundles of cut and processed logs vertically out of a harvest unit and flies them to a landing. Due to the complexity of this logging system, helicopter landings range in size from 0.5-1.0 acre in size. These landings are located as close to the harvest unit as possible and less than 1 mile to reduce flight time. Helicopters may also require a separate service landing where maintenance and refueling occurs.

Snag Creation would be conducted in accordance with management direction in LUAs designated as Late-Successional Reserve and Riparian Reserve. (2016 ROD/RMP pg. 73). A detailed description is in Appendix B.3.3.

B.3.3 Commercial Treatment Prescriptions

Selection Harvest (SH)- Harvest Land Base Uneven-aged Timber Area and Late-Successional Reserve-Dry.

This prescription would be applied within the Harvest Land Base Uneven-aged Timber Area and Late-Successional Reserve-Dry. Selection harvest would be the removal of single trees from stands (single-tree selection) and/or in groups (group selection), without harvesting the entire stand at any one time. This stand prescription would generally target low vigor trees over healthy trees for removal to encourage a diversity of stocking levels and size classes within and among stands. Stands harvested or treated will have a wide range of basal area or density targets across a forest stand. This prescription would contain one or all of the following components.

Single Tree Selection (STS): Removes individual trees from all size classes present in the stand.

- This treatment would be employed by itself or outside the group selection (GS) and Skips prescribed for the units. Retention trees would be left in a variable pattern, with an overall average density (residual basal area) varying depending on the vegetation type and conservation measures identified for the treated stand. Relative density and basal area targets will depend on the action alternative (refer to Table 2-1.)
- A preference for individual tree retention would be given to the best-formed trees that are insect/disease/damage free, with full crowns.

Group Selection (GS): Synonymous with gaps. Defined as an area of the stand with density equaling relatively little to no remaining over-story trees and associated canopy cover.

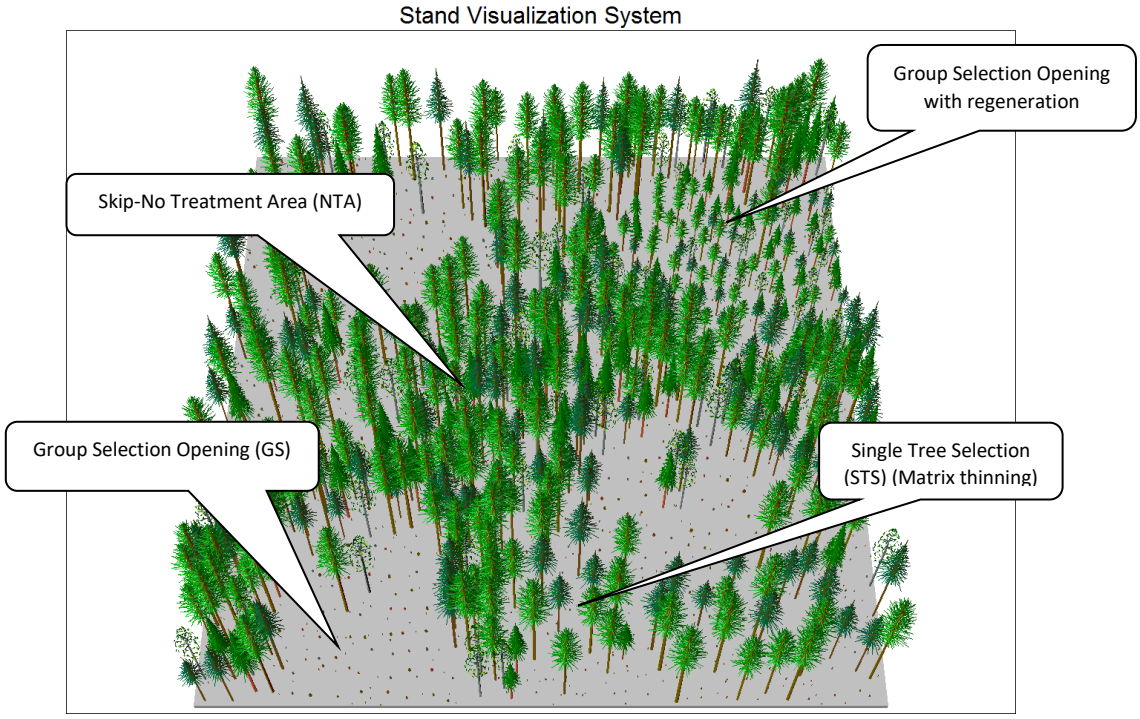
- GS opening size and percent allowed in a stand are dependent on the action alternative being described (refer to Table 2-1.) These areas can be irregular in shape following the variability of the stand biotic and abiotic conditions.
- A post-harvest assessment will occur in commercial units to determine if tree planting and scalping will be needed in Group Selection Openings. Tree Planting and scalping is not being

proposed under this EA. These potential treatments will be addressed in future foreseeable actions (Chapter 3).

Skips-No Treatment Areas (NTA)**:** Defined as portions of the stand left untreated with no prescribed timber harvest.

- No treatment areas would be applied on at least 10% of the treatment unit acres but do not require a defined size. Skip size and percent allowed to each stand differ between the action alternatives (refer to Table 2-1).

Figure B-1 Visual of Selection Harvest prescription



Riparian Reserve Thinning (RRT)-*Riparian Reserve Land Use Allocation*
Riparian Reserve thinning is prescribed in stands with high relative densities. This treatment will maintain at least 30% canopy cover and 60 trees per acre across the treated portion of the Riparian Reserve through single tree selection. For fish-bearing, perennial, and intermittent streams, the Outer Riparian Zone buffer occurs 120 feet from the stream outward to the edge of the Riparian Reserve (USDI/BLM 2016a, pp. 82-83). Riparian Reserves widths are one site-potential tree height (155 feet in the Middle Applegate and Little Applegate Watersheds, and 160 feet in the Bear Creek Watershed) distance either side of fish-bearing, perennial, intermittent, and non-fish-bearing streams. Commercial harvest activities would only be conducted in the outer zones of the Riparian Reserve and non-commercial treatments would be conducted in the Inner, Middle and Outer zones of the Riparian Reserve. Refer to Table 2-1 for a description of the treatment by each action alternative.

Snag Creation - Common to the *Late-Successional Reserve and Riparian Reserve* LUA management direction for snag retention and snag creation (RMP pg. 73) as follows:

When conducting commercial harvest, in stands with less than 64 snags per acre > 10” DBH and less than 19 snags per acre > 20” DBH on average across the harvest unit, create 1 new snag per acre >20’’ DBH and 1 new snag per acre >10” DBH within 1 year of completion of yarding the timber in the timber sale.

If insufficient trees are available in the pre-harvest stand in the size class specified, use trees from the largest size class available. Meet snag creation levels as an average at the scale of the harvest unit; snag creation levels are not required to be attained on every acre. When creating the required number of snags, locate them according to the following criteria:

- Create snags in a variety of spatial patterns, including aggregated groups and individual trees.
- Do not create snags within falling distance of power lines, structures, or roads that will remain open after harvesting activities are complete. If it is not possible to create snags beyond the falling distance of power lines, structures, or roads that will remain open after harvesting activities are complete, cut trees equivalent to the required number of snags and retain as down woody material within the harvest unit.
- Concentrate the creation of snags in areas of the stand where the BLM does not presently anticipate skidding or yarding will occur within 20 years.
- Meet snag creation levels with trees from any species.

B.3.4 Non-Commercial Treatment Prescriptions

Activity Fuel Treatments
Activity fuel treatments refer to the reduction of slash following commercial harvest. Trees which are removed for commercial harvest would be whole-tree yarded or yarded with tops attached to minimize activity slash remaining within the harvest units. Activity slash within ground-based units, may be machine or hand pile/burned, chipped, lopped and scattered, retained as coarse woody debris or underburned. Activity slash within cable and helicopter units may be machine piled and burned (on slopes up to 50 percent when utilizing specialized ground-based equipment), hand pile/burned, chipped, lopped and scattered, retained as coarse woody debris, or underburned. The BLM would conduct a fuels assessment within each treatment unit following activity. This assessment would determine the fuel hazard and fire risk based on surface fuel loading, aspect, slope, access, and location of each unit. Most fuels treatments would begin within one year after completion of harvest and thinning activities. The BLM proposes to lop-and-scatter slash (live and dead material 9 inches or less) if less than 11 tons per acre is present in the treatment unit. Trunks 7 inches in diameter or less would be cut to 3-foot lengths and left on the ground. The depth of the slash would not exceed 18 inches.

The BLM proposes to hand-pile and burn slash if more than 11 tons per acre is present in the treatment unit. Material between 1 and 7 inches in diameter and longer than two feet would be piled by hand. The piles would be a minimum of 4 feet high and 6 feet in diameter. Piles would be burned in the fall, winter, or spring. All piles would be covered with four mil polyethylene plastic sheeting to facilitate rapid and efficient ignition and consumption of fuels to minimize residual smoke (Aurell et al, 2016).

Whole trees or tree-tops yarded to landings and limbs removed and piled at the landings may be hauled away as biomass or sold as firewood.

Natural Hazardous Fuels Reduction (Non-commercial or non-merchantable thinning outside of Commercial Harvest Units)
Hazardous fuels reduction is designed to accomplish forest health thinning and fuels reduction treatments in conifer forests, hardwood woodlands, and shrublands. This treatment consists of cutting small trees (generally less than 8 inches diameter) and vegetation with chainsaws and disposing of the material by hand-piling and burning or use of a lop and scatter method in lighter fuels. These treatments would improve stand-level residual tree growth, reduce the fire hazard (reduction in surface fuels and ladder fuels), and decreasing the risk of wildfire climbing into the crowns of trees. These treatments are being considered in all land use allocations in forested and non-forested sites to improve and/or maintain existing desired conditions. Conifers would likely be spaced 16-25 feet apart while hardwoods would be

spaced 25-45 feet apart. No trees greater than 8 inches in diameter would be cut unless joined with another silvicultural prescription. Small diameter thinning treatments are proposed to reduce ladder fuels and would target removing conifer and hardwood trees more than one foot tall and less than 8 inches in diameter at breast height (DBH) to approximately 25-foot by 25-foot spacing. Conifers between 6 and 14 inches DBH would be pruned up to 10 feet above ground level. Shrub species more than one foot tall and less than 12 inches in diameter (at one foot above ground level) would be cut to a 45-foot by 45-foot spacing or less. No removal of single stem manzanita >12" diameter (single stem) at 1 foot above ground level.

Hand piling and burning would be utilized, as described in the Activity Fuel Treatments section above, to modify fuel profiles (reduce surface, ladder, and activity fuels and raise canopy base heights). Underburning would be used to remove at least 60% of slash less than 3 inches in diameter and a lesser amount of larger fuel size classes. Underburning would be implemented when weather and fuel conditions allow for lower fire intensities (typically late fall through spring). Underburning would involve the application of fire to understory vegetation and downed woody material when fuel moisture, soil moisture, weather, and atmospheric conditions allow for the fire to be confined to a predetermined area at a prescribed intensity to achieve the planned resource objectives. Underburning would occur within 15 years from the initial or follow-up maintenance fuels reduction treatments.

Understory Reduction (Non-commercial treatment within Commercial Harvest units)

Understory Reduction is designed to accomplish forest health thinning and fuels reduction treatments in conifer forests only. These treatments would occur in commercial harvest units that need understory thinning and fuels reduction. These areas would be treated using manual techniques (cutting with saws) to achieve desired tree densities. The objective is to maintain a multi-layered mix of conifer, hardwood and shrub species appropriate to the site. Conifer, hardwood, and shrub spacing widths and retention will vary depending on site conditions. Conifer, hardwood, and shrub spacing is similar in description to the prescribed thinning and the management of cut material for the Hazardous Fuels Reduction treatment described above.

Non-Commercial treatment in the Riparian Reserve-Dry LUA

Both natural and activity fuels treatments may occur within the Middle and Outer Riparian Zones. For intermittent, non-fish bearing streams the Middle Riparian Zone occurs from 50 to 120 feet (USDI/BLM 2016a, pp. 82-83). Each area would be assessed by a fuels specialist to determine the need for treatment to reduce the risk of stand replacing crown fires. All treatments would retain the required trees per acre and canopy cover metrics listed in the RMP (USDI/BLM 2016a, pp. 82-84). Refer to the Hazardous Fuels Reduction treatment description above.

B.3.5 General Guidance Applicable to all Silvicultural Prescriptions (Commercial and Non-Commercial)

- The preference is to retain all "legacy" structures within stands that contain these structures, except where falling is necessary for safety or operational reasons. Retain existing snags > 20 inches DBH; Snags 6–20 inches DBH in decay classes III, IV, and V (see USDI BLM 2010a); down woody material > 20 inches in diameter at the large end and > 20 feet in length; and down woody material 6–20 inches in diameter at the large end and > 20 feet in length in decay classes III, IV, and V (see USDI BLM 2010a) (RMP, p. 62).
- Retain dominant Douglas-fir (*Pseudotsuga menziesii*) and pine (*Pinus spp.)* trees that are both ≥ 36 inches DBH and that the BLM identifies were established prior to 1850 and madrone (*Arbutus menziesii*), bigleaf maple (*Acer macrophyllum*), and oak (*Quercus spp.)* trees > 24 inches DBH, except where falling is necessary for safety or operational reasons and no alternative harvesting

method is economically viable or practically feasible. If such trees need to be cut for safety or operational reasons, retain cut trees in the stand.

- To encourage the maintenance and establishment of drought tolerant and fire resilient species, **always** favor leaving, in order of preference: sugar pine, ponderosa pine, incense cedar, Douglas-fir, and white fir.
- Do NOT try to create uniformity/evenness in stand conditions in marking; DO try to encourage creation of spatial heterogeneity. Retain clusters of trees where appropriate; do NOT feel imperative to thin clustered tree stems.
- Strive to maintain or create diverse vertical and horizontal stand structure by leaving trees of all crown classes with crown ratios of ≥ 30%. Strive for stand diversity as it relates to diameter classes, species composition, tree heights (crown classes), trees per acre, and the vigor of individual trees. See section B-3.5.1 for characteristics of low vigor trees.
- Retain all hardwood trees and snags of all species. There may be situations where trees or snags may be cut if determined by OSHA health and safety guidelines to present a risk to people or if required to meet prescribed logging systems.
- Favor highest live crown ratios and lowest height to diameter ratios when selecting trees to retain, It is encouraged to retain all tree sizes (diameters) when meeting basal area targets. Avoid evenly spacing trees when marking; cluster leave trees.
- Always try to reduce competing vegetation from around healthy pines, oak, and incense cedar to ensure their survival without compromising the prescribed canopy cover and/or basal area targets for the stand.
- Leave conifers that have their crown entangled in a hardwood tree or pose a threat from potential damage from timber falling. Unless determined to be a safety hazard by OSHA health and safety guidelines, all hardwoods greater than 12 inches DBH should be reserved.
- Do not mark seed trees. Do not mark any tree, that if felled, would endanger a seed tree.

B.3.5.1 Characteristics of Low Vigor Trees

Trees meeting the following criteria:

- Crown ratios <30%
- Crowns are ragged and thin (thin appearance when viewed against the sky).
- Crown top is rounded, and the crown width is narrow or flat on one or more sides.
- Needle color very poor, yellowish.

B.4 Proposed Forest Management Treatment Alternatives Identified by Unit

B.4.1 Table B-4. Alternative 2-Proposed Forest Management Treatment Units

Unit	T-R	Section	Commercial Treatment	Acres	Harvest Method	LUA	Associated Non-Commercial Treatment
1-1a	39S-2W	1	SH	27	CABLE	UTA/LSR	Activity, UR
1-1b	39S-2W	1	RRT	1*	CABLE	RR	Activity, UR
1-2	39S-2W	1	SH	23	HELICOPTER	UTA	Activity, UR
1-3	39S-2W	1	SH	14	HELICOPTER	UTA	Activity, UR
NC2-1	39S-2W	1,2	N/A	12	N/A	UTA/LSR	HFR
NC2-2	39S-2W	2	N/A	8	N/A	UTA/LSR	HFR
NC2-3	39S-2W	2	N/A	3	N/A	LSR	HFR
2-4	39S-2W	2	SH	8	CABLE	LSR	Activity, UR
2-5	39S-2W	2	SH	9	CABLE	UTA	Activity, UR
NC2-5	39S-2W	2	N/A	20	N/A	UTA/LSR/DDR-TPCC	HFR
NC2-6	39S-2W	2	N/A	3	N/A	DDR-TPCC	HFR
3-2	39S-2W	3,4,9	SH	47	HELICOPTER	UTA/LSR	Activity, UR
3-3	39S-2W	3	SH	19	CABLE	UTA	Activity, UR
3-4	39S-2W	3	SH	33	CABLE	UTA	Activity, UR
3-5	39S-2W	3	SH	6	CABLE	UTA	Activity, UR
3-6	39S-2W	3	SH	18	CABLE	UTA	Activity, UR
3-7	39S-2W	3	SH	20	CABLE	UTA	Activity, UR
NC3-7	39S-2W	3	N/A	114	N/A	UTA/LSR/DDR-TPCC/RR	HFR
3-8	39S-2W	3	SH	8	CABLE	UTA	Activity, UR
3-9	39S-2W	3	SH	3	CABLE	UTA	Activity, UR
5-2	39S-2W	5	SH	29	CABLE	UTA	Activity, UR
5-3	39S-2W	5	SH	16	CABLE	UTA	Activity, UR
NC5-4	39S-2W	5	N/A	108	N/A	UTA/DDR-TPCC/RR	HFR
NC7-2	39S-2W	7	N/A	194	N/A	UTA/DDR-TPCC/RR	HFR
NC7-3	39S-2W	6,7	N/A	180	N/A	UTA/LSR/DDR-TPCC/RR	HFR
NC7-4	39S-2W	7	N/A	94	N/A	UTA/LSR/DDR-TPCC/RR	HFR

SH = Selection Harvest **UR** = Understory Reduction **LSR**=Late-Successional Reserves-Dry
UTA=Uneven-aged Timber Area **RR** =Riparian Reserve-Dry **RRT** = Riparian Reserve Thin
Activity = pile & burn tree tops and limbs to reduce fuels **HFR**=Hazardous Fuels Reduction
DDR-TPCC-District Designated Reserve **NC**-Non-Commercial only *Treatment area less than 1 acre.

Table B-4: Alternative 2-Proposed Forest Management Treatment Units (cont.)							
Unit	**T-R**	**Section**	**Commercial Treatment**	**Acres**	**Harvest Method**	**LUA**	**Associated Non-Commercial Treatment**
8-1	38S-3W	8	SH	21	GROUNDBASE	UTA	Activity, UR
8-2	38S-3W	8,17	SH	115	HELICOPTER	UTA	Activity, UR
9-1	38S-3W	9	SH	5	HELICOPTER	UTA	Activity, UR
9-2	38S-3W	9	SH	2	HELICOPTER	UTA	Activity, UR
9-3	38S-3W	9	SH	2	HELICOPTER	UTA	Activity, UR
NC9-4	38S-3W	9,16	N/A	101	N/A	UTA/RR	HFR
NC9-5	38S-3W	9	N/A	52	N/A	UTA/DDR-TPCC	HFR
NC9-6	39S-2W	8,9	N/A	43	N/A	UTA/DDR-TPCC/RR	HFR
12-2	39S-2W	12	SH	9	GROUNDBASE	LSR	Activity, UR
13-3	38S-3W	13	SH	7	CABLE	UTA	Activity, UR
13-4	38S-3W	13,14	SH	8	CABLE	UTA	Activity, UR
13-5	38S-3W	13,14	SH	9	CABLE	UTA	Activity, UR
13-6	38S-3W	13	SH	38	GROUNDBASE	UTA	Activity, UR
NC13-6	38S-3W	13	N/A	130	N/A	UTA/LSR/DDR-TPCC/RR	HFR
13-7	38S-3W	13	SH	18	GROUNDBASE	UTA	Activity, UR
13-8	39S-3W	13	SH	7	GROUNDBASE	UTA	Activity, UR
NC13-8	39S-3W	15	N/A	15	N/A	UTA	HFR
13-9	39S-3W	13	SH	15	GROUNDBASE	UTA	Activity, UR
13-10a	38S-3W	13	SH	8	GROUNDBASE	UTA	Activity, UR
13-10b	38S-3W	13	RRT	1*	GROUNDBASE	RR	Activity, UR
NC13-11	38S-3W	13	N/A	40	N/A	UTA/RR	HFR
NC13-12	38S-3W	13	N/A	76	N/A	UTA/DDR-TPCC/RR	HFR
14-2	38S-3W	14	SH	15	CABLE	UTA	Activity, UR
NC14-3	38S-3W	14	N/A	22	N/A	UTA	HFR
15-1	38S-3W	15	SH	8	CABLE	UTA	Activity, UR
15-2	39S-2W	10,15	SH	15	CABLE	UTA	Activity, UR
15-3	39S-2W	15	SH	28	CABLE	UTA	Activity, UR

SH = Selection Harvest **UR** = Understory Reduction **LSR**=Late-Successional Reserves-Dry
UTA=Uneven-aged Timber Area **RR** =Riparian Reserve-Dry **RRT** = Riparian Reserve Thin
Activity = pile & burn tree tops and limbs to reduce fuels **HFR**=Hazardous Fuels Reduction
DDR-TPCC-District Designated Reserve **NC**-Non-Commercial only *Treatment area less than 1 acre.

Table B-4: Alternative 2-Proposed Forest Management Treatment Units (cont.)							
Unit	**T-R**	**Section**	**Commercial Treatment**	**Acres**	**Harvest Method**	**LUA**	**Associated Non-Commercial Treatment**
NC15-4	38S-3W	15	N/A	27	N/A	UTA/DDR-TPCC/RR	HFR
NC15-5	38S-3W	15,22	N/A	210	N/A	UTA/DDR-TPCC/RR	HFR
NC15-6	38S-3W	15	N/A	89	N/A	UTA/DDR-TPCC/RR	HFR
NC15-7	38S-3W	15	N/A	8	N/A	UTA	HFR
NC15-8	38S-2W	15	N/A	134	N/A	UTA/DDR-TPCC/RR	HFR
16-1	38S-3W	16	SH	7	HELICOPTER	UTA	Activity, UR
16-2a	38S-3W	16	SH	2	HELICOPTER	UTA	Activity, UR
16-2b	38S-3W	16	SH	9	HELICOPTER	UTA	Activity, UR
16-2c	38S-3W	16	SH	1*	HELICOPTER	RR	Activity, UR
16-2d	38S-3W	16	SH	1*	HELICOPTER	RR	Activity, UR
16-3	38S-3W	16	SH	7	GROUNDBASE	UTA	Activity, UR
NC16-4	38S-3W	16	N/A	219	N/A	UTA/DDR-TPCC/RR	HFR
NC16-5	38S-3W	16	N/A	207	N/A	UTA/DDR-TPCC/RR	HFR
17-1	38S-3W	17	SH	19	GROUNDBASE/HELI	UTA	Activity, UR
NC17-2	38S-3W	17	N/A	72	N/A	UTA/DDR-TPCC	HFR
17-3	38S-3W	17	SH	31	HELICOPTER	UTA	Activity, UR
17-8	39S-1W	17	SH	8	HELICOPTER	UTA	Activity, UR
NC17-8	39S-2W	17	N/A	107	N/A	UTA/LSR/DDR-TPCC/RR	HFR
21-2	39S-1W	21	SH	13	HELICOPTER	UTA	Activity, UR
21-3	39S-2W	21	SH	56	HELICOPTER	UTA	Activity, UR
22-3	39S-1W	22	SH	22	CABLE/HELICOPTER	UTA	Activity, UR
23-1	38S-3W	23	SH	4	HELICOPTER	LSR	Activity, UR
23-2	38S-3W	23	SH	6	HELICOPTER	UTA	Activity, UR
23-3a	38S-2W	23	SH	36	CABLE	UTA	Activity, UR
23-3b	38S-2W	23	RRT	1*	CABLE	RR	Activity, UR
NC26-1	38S-2W	26,27	N/A	44	N/A	UTA/LSR/DDR-TPCC/RR	HFR
NC26-4	38S-3W	26	N/A	89	N/A	UTA/LSR/DDR-TPCC/RR	HFR

SH = Selection Harvest **UR** = Understory Reduction **LSR**=Late-Successional Reserves-Dry
UTA=Uneven-aged Timber Area **RR** =Riparian Reserve-Dry **RRT** = Riparian Reserve Thin
Activity = pile & burn tree tops and limbs to reduce fuels **HFR**=Hazardous Fuels Reduction
DDR-TPCC-District Designated Reserve **NC**-Non-Commercial only *Treatment area less than 1 acre.

Table B-4: Alternative 2-Proposed Forest Management Treatment Units (cont.)							
Unit	**T-R**	**Section**	**Commercial Treatment**	**Acres**	**Harvest Method**	**LUA**	**Associated Non-Commercial Treatment**
27-1a	39S-1W	27	SH	2	CABLE	UTA	Activity, UR
27-1b	39S-1W	27	RRT	1*	CABLE	RR	Activity, UR
NC27-1	38S-2W	27	N/A	117	N/A	UTA/DDR-TPCC/RR	HFR
27-3	39S-1W	27	SH	7	CABLE	UTA	Activity, UR
27-4	39S-1W	27	SH	8	CABLE	UTA	Activity, UR
27-5	38S-2W	27	SH	18	CABLE	UTA	Activity, UR
27-6	38S-2W	27	SH	8	CABLE	UTA	Activity, UR
27-7	38S-2W	27	SH	34	HELICOPTER	UTA	Activity, UR
27-8	39S-1W	27	SH	5	CABLE	UTA	Activity, UR
27-9	39S-1W	27	SH	13	CABLE	UTA	Activity, UR
NC28-1	38S-2W	28,33	N/A	60	N/A	UTA/LSR/DDR-TPCC/RR	HFR
NC29-1	38S-2W	29	N/A	36	N/A	UTA/LSR/DDR-TPCC/RR	HFR
NC29-2	38S-2W	29	N/A	7	N/A	UTA/DDR-TPCC	HFR
NC29-3	38S-2W	29	N/A	4	N/A	UTA	HFR
29-4	38S-2W	29	SH	3	CABLE	UTA	Activity, UR
NC29-4	38S-2W	29	N/A	2	N/A	RR	HFR
29-5	38S-2W	29	SH	21	GROUNDBASE/CABLE	UTA/LSR	Activity, UR
NC29-5	38S-2W	29	N/A	6	N/A	UTA/LSR/RR	HFR
NC29-6	38S-2W	29	N/A	5	N/A	UTA/DDR-TPCC	HFR
NC29-7	38S-2W	29	N/A	23	N/A	DDR-TPCC/RR	HFR
NC29-8	38S-2W	29	N/A	62	N/A	UTA/DDR-TPCC/RR	HFR
32-1	38S-2W	29,32	SH	3	CABLE	UTA	Activity, UR
NC32-1	38S-2W	29,32	N/A	81	N/A	UTA/LSR/DDR-TPCC/RR	HFR
32-2	38S-2W	29,32	SH	33	GROUNDBASE/CABLE	UTA	Activity, UR
NC32-2	38S-2W	29,32	N/A	24	N/A	UTA/RR	HFR
NC32-3	38S-2W	29,32	N/A	19	N/A	UTA/DDR-TPCC/RR	HFR
NC32-4	38S-2W	32	N/A	29	N/A	UTA/LSR/DDR-TPCC/RR	HFR

SH = Selection Harvest **UR** = Understory Reduction **LSR**=Late-Successional Reserves-Dry
UTA=Uneven-aged Timber Area **RR** =Riparian Reserve-Dry **RRT** = Riparian Reserve Thin
Activity = pile & burn tree tops and limbs to reduce fuels **HFR**=Hazardous Fuels Reduction
DDR-TPCC-District Designated Reserve **NC**-Non-Commercial only *Treatment area less than 1 acre.

Table B-4: Alternative 2-Proposed Forest Management Treatment Units (cont.)							
Unit	**T-R**	**Section**	**Commercial Treatment**	**Acres**	**Harvest Method**	**LUA**	**Associated Non-Commercial Treatment**
NC32-5	38S-2W	29,32	N/A	3	N/A	DDR-TPCC	HFR
NC33-1	38S-2W	33	N/A	20	N/A	UTA/DDR-TPCC	HFR
NC33-2	38S-2W	33	N/A	20	N/A	UTA/ DDR-TPCC/RR	HFR
NC33-3	38S-2W	33	N/A	45	N/A	UTA/LSR/DDR-TPCC/RR	HFR
NC33-4	38S-2W	33	N/A	106	N/A	UTA/LSR/DDR-TPCC/RR	HFR
NC33-5	38S-2W	33	N/A	38	N/A	UTA/LSR/DDR-TPCC/RR	HFR
33-6a	37S-3W	33	SH	114	HELICOPTER	UTA	Activity, UR
33-6b	37S-3W	33	SH	53	CABLE	LSR	Activity, UR
33-6c	37S-3W	33	RRT	3	CABLE	RR-Dry	Activity, UR
NC35-1	38S-3W	35	N/A	56	N/A	UTA/DDR-TPCC/RR	HFR
NC35-2	38S-3W	35	N/A	49	N/A	UTA/DDR-TPCC/RR	HFR
NC35-3	38S-3W	35	N/A	232	N/A	UTA/DDR-TPCC/RR	HFR
36-1	38S-3W	36	SH	12	HELICOPTER	UTA	Activity, UR
36-2	38S-3W	36	SH	39	HELICOPTER	UTA	Activity, UR

SH = Selection Harvest **UR** = Understory Reduction **LSR**=Late-Successional Reserves-Dry
UTA=Uneven-aged Timber Area **RR** =Riparian Reserve-Dry **RRT** = Riparian Reserve Thin
Activity = pile & burn tree tops and limbs to reduce fuels **HFR**=Hazardous Fuels Reduction
DDR-TPCC-District Designated Reserve **NC**-Non-Commercial only *Treatment area less than 1 acre.

B.4.2 Table B-5. Alternative 3-Proposed Forest Management Treatment Units

Unit	T-R	Section	Commercial Treatment	Acres	Harvest Method	LUA	Associated Non-Commercial Treatment
1-1a	39S-2W	1	SH	27	CABLE	UTA/LSR	Activity, UR
1-1b	39S-2W	1	RRT	1*	CABLE	RR	Activity, UR
1-2	39S-2W	1	SH	23	HELICOPTER	UTA	Activity, UR
1-3	39S-2W	1	SH	14	HELICOPTER	UTA	Activity, UR
2-1	39S-2W	1,2	SH	15	CABLE	LSR	Activity, UR
NC2-1	39S-2W	1,2	N/A	12	N/A	UTA/LSR	HFR
2-2a	39S-2W	2	SH	12	CABLE	LSR	Activity, UR
2-2b	39S-2W	2	SH	3	CABLE	LSR	Activity, UR
2-2c	39S-2W	2	RRT	1*	CABLE	RR	Activity, UR
2-2d	39S-2W	2	RRT	1*	CABLE	RR	Activity, UR
NC2-2	39S-2W	2	N/A	8	N/A	UTA/LSR	HFR
2-3a	39S-2W	2	SH	7	HELICOPTER	UTA/LSR	Activity, UR
2-3b	39S-2W	2	RRT	1*	HELICOPTER	RR	Activity, UR
NC2-3	39S-2W	2	N/A	3	N/A	LSR	HFR
2-4	39S-2W	2	SH	8	CABLE	LSR	Activity, UR
2-5	39S-2W	2	SH	9	CABLE	UTA	Activity, UR
NC2-5	39S-2W	2	N/A	20	N/A	UTA/LSR/DDR-TPCC	HFR
NC2-6	39S-2W	2	N/A	3	N/A	DDR-TPCC	HFR
3-1	39S-2W	3	SH	17	HELICOPTER	UTA	Activity, UR
3-2	39S-2W	3,4,9	SH	47	HELICOPTER	UTA/LSR	Activity, UR
3-3	39S-2W	3	SH	19	CABLE	UTA	Activity, UR
3-4	39S-2W	3	SH	33	CABLE	UTA	Activity, UR
3-5	39S-2W	3	SH	6	CABLE	UTA	Activity, UR
3-6	39S-2W	3	SH	18	CABLE	UTA	Activity, UR
3-7	39S-2W	3	SH	20	CABLE	UTA	Activity, UR
NC3-7	39S-2W	3	N/A	114	N/A	UTA/LSR/DDR-TPCC/RR	HFR
3-8	39S-2W	3	SH	8	CABLE	UTA	Activity, UR

SH = Selection Harvest **UR** = Understory Reduction **LSR**=Late-Successional Reserves-Dry
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Activity = pile & burn tree tops and limbs to reduce fuels **HFR**=Hazardous Fuels Reduction
DDR-TPCC-District Designated Reserve **NC**-Non-Commercial only *Treatment area less than 1 acre.

Table B-5: Alternative 3-Proposed Forest Management Treatment Units (cont.)							
Unit	**T-R**	**Section**	**Commercial Treatment**	**Acres**	**Harvest Method**	**LUA**	**Associated Non-Commercial Treatment**
3-9	39S-2W	3	SH	3	CABLE	UTA	Activity, UR
5-2	39S-2W	5	SH	29	CABLE	UTA	Activity, UR
5-3	39S-2W	5	SH	16	CABLE	UTA	Activity, UR
NC5-4	39S-2W	5	N/A	108	N/A	UTA/DDR-TPCC/RR	HFR
7-1	39S-1W	7	SH	16	CABLE/HELICOPTER	LSR	Activity, UR
NC7-2	39S-2W	7	N/A	194	N/A	UTA/DDR-TPCC/RR	HFR
NC7-3	39S-2W	6,7	N/A	180	N/A	UTA/LSR/DDR-TPCC/RR	HFR
NC7-4	39S-2W	7	N/A	94	N/A	UTA/LSR/DDR-TPCC/RR	HFR
8-1	38S-3W	8	SH	21	GROUNDBASE	UTA	Activity, UR
8-2	38S-3W	8,17	SH	115	HELICOPTER	UTA	Activity, UR
9-1	38S-3W	9	SH	5	HELICOPTER	UTA	Activity, UR
9-2	38S-3W	9	SH	2	HELICOPTER	UTA	Activity, UR
9-3	38S-3W	9	SH	2	HELICOPTER	UTA	Activity, UR
NC9-4	38S-3W	9,16	N/A	101	N/A	UTA/RR	HFR
NC9-5	38S-3W	9	N/A	52	N/A	UTA/DDR-TPCC	HFR
NC9-6	39S-2W	8,9	N/A	43	N/A	UTA/DDR-TPCC/RR	HFR
12-1	39S-2W	12	SH	38	GROUNDBASE/CABLE	UTA	Activity, UR
12-2	39S-2W	12	SH	9	GROUNDBASE	LSR	Activity, UR
13-1	38S-3W	13	SH	23	CABLE	UTA	Activity, UR
13-3	38S-3W	13	SH	7	CABLE	UTA	Activity, UR
13-4	38S-3W	13,14	SH	8	CABLE	UTA	Activity, UR
13-5	38S-3W	13,14	SH	9	CABLE	UTA	Activity, UR
13-6	38S-3W	13	SH	38	GROUNDBASE	UTA	Activity, UR
NC13-6	38S-3W	13	N/A	130	N/A	UTA/LSR/DDR-TPCC/RR	HFR
13-7	38S-3W	13	SH	18	GROUNDBASE	UTA	Activity, UR
13-8	39S-3W	13	SH	7	GROUNDBASE	UTA	Activity, UR
NC13-8	39S-3W	15	N/A	15	N/A	UTA	HFR

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DDR-TPCC-District Designated Reserve **NC**-Non-Commercial only *Treatment area less than 1 acre.

Table B-5: Alternative 3-Proposed Forest Management Treatment Units (cont.)							
Unit	**T-R**	**Section**	**Commercial Treatment**	**Acres**	**Harvest Method**	**LUA**	**Associated Non-Commercial Treatment**
13-9	39S-3W	13	SH	15	GROUNDBASE	UTA	Activity, UR
13-10a	38S-3W	13	SH	8	GROUNDBASE	UTA	Activity, UR
13-10b	38S-3W	13	RRT	1*	GROUNDBASE	RR	Activity, UR
NC13-11	38S-3W	13	N/A	40	N/A	UTA/RR	HFR
NC13-12	38S-3W	13	N/A	76	N/A	UTA/DDR-TPCC/RR	HFR
14-2	38S-3W	14	SH	15	CABLE	UTA	Activity, UR
NC14-3	38S-3W	14	N/A	22	N/A	UTA	HFR
15-1	38S-3W	15	SH	8	CABLE	UTA	Activity, UR
15-2	39S-2W	10,15	SH	15	CABLE	UTA	Activity, UR
15-3	39S-2W	15	SH	28	CABLE	UTA	Activity, UR
NC15-4	38S-3W	15	N/A	27	N/A	UTA/DDR-TPCC/RR	HFR
NC15-5	38S-3W	15,22	N/A	210	N/A	UTA/DDR-TPCC/RR	HFR
NC15-6	38S-3W	15	N/A	89	N/A	UTA/DDR-TPCC/RR	HFR
NC15-7	38S-3W	15	N/A	8	N/A	UTA	HFR
NC15-8	38S-2W	15	N/A	134	N/A	UTA/DDR-TPCC/RR	HFR
16-1	38S-3W	16	SH	7	HELICOPTER	UTA	Activity, UR
16-2a	38S-3W	16	SH	2	HELICOPTER	UTA	Activity, UR
16-2b	38S-3W	16	SH	9	HELICOPTER	UTA	Activity, UR
16-2c	38S-3W	16	SH	1*	HELICOPTER	RR	Activity, UR
16-2d	38S-3W	16	SH	1*	HELICOPTER	RR	Activity, UR
16-3	38S-3W	16	SH	7	GROUNDBASE	UTA	Activity, UR
NC16-4	38S-3W	16	N/A	219	N/A	UTA/DDR-TPCC/RR	HFR
NC16-5	38S-3W	16	N/A	207	N/A	UTA/DDR-TPCC/RR	HFR
17-1	38S-3W	17	SH	19	GROUNDBASE/HELI	UTA	Activity, UR
NC17-2	38S-3W	17	N/A	72	N/A	UTA/DDR-TPCC	HFR
17-3	38S-3W	17	SH	31	HELICOPTER	UTA	Activity, UR
17-7	39S-1W	17	SH	30	CABLE/HELICOPTER	UTA	Activity, UR

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DDR-TPCC-District Designated Reserve **NC**-Non-Commercial only *Treatment area less than 1 acre.

Table B-5: Alternative 3-Proposed Forest Management Treatment Units (cont.)							
Unit	**T-R**	**Section**	**Commercial Treatment**	**Acres**	**Harvest Method**	**LUA**	**Associated Non-Commercial Treatment**
17-8	39S-1W	17	SH	8	HELICOPTER	UTA	Activity, UR
NC17-8	39S-2W	17	N/A	107	N/A	UTA/LSR/DDR-TPCC/RR	HFR
18-1	39S-1W	18	SH	24	CABLE	LSR	Activity, UR
21-1	38S-2W	21	SH	13	CABLE	UTA	Activity, UR
21-2	39S-1W	21	SH	13	HELICOPTER	UTA	Activity, UR
21-3	39S-2W	21	SH	56	HELICOPTER	UTA	Activity, UR
22-3	39S-1W	22	SH	22	CABLE/HELICOPTER	UTA	Activity, UR
23-1	38S-3W	23	SH	4	HELICOPTER	LSR	Activity, UR
23-2	38S-3W	23	SH	6	HELICOPTER	UTA	Activity, UR
23-3a	38S-2W	23	SH	36	CABLE	UTA	Activity, UR
23-3b	38S-2W	23	RRT	1*	CABLE	RR	Activity, UR
NC26-1	38S-2W	26,27	N/A	44	N/A	UTA/LSR/DDR-TPCC/RR	HFR
26-3	38S-3W	26	SH	23	CABLE/HELICOPTER	UTA	Activity, UR
NC26-4	38S-3W	26	N/A	89	N/A	UTA/LSR/DDR-TPCC/RR	HFR
27-1a	39S-1W	27	SH	2	CABLE	UTA	Activity, UR
27-1b	39S-1W	27	RRT	1*	CABLE	RR	Activity, UR
NC27-1	38S-2W	27	N/A	117	N/A	UTA/DDR-TPCC/RR	HFR
27-2a	39S-1W	27	SH	14	CABLE	UTA	Activity, UR
27-2b	39S-1W	27	RRT	1*	CABLE	RR	Activity, UR
27-3	39S-1W	27	SH	7	CABLE	UTA	Activity, UR
27-4	39S-1W	27	SH	8	CABLE	UTA	Activity, UR
27-5	38S-2W	27	SH	18	CABLE	UTA	Activity, UR
27-6	38S-2W	27	SH	8	CABLE	UTA	Activity, UR
27-7	38S-2W	27	SH	34	HELICOPTER	UTA	Activity, UR
27-8	39S-1W	27	SH	5	CABLE	UTA	Activity, UR
27-9	39S-1W	27	SH	13	CABLE	UTA	Activity, UR
NC28-1	38S-2W	28,33	N/A	60	N/A	UTA/LSR/DDR-TPCC/RR	HFR

SH = Selection Harvest **UR** = Understory Reduction **LSR**=Late-Successional Reserves-Dry
UTA=Uneven-aged Timber Area **RR** =Riparian Reserve-Dry **RRT** = Riparian Reserve Thin
Activity = pile & burn tree tops and limbs to reduce fuels **HFR**=Hazardous Fuels Reduction
DDR-TPCC-District Designated Reserve **NC**-Non-Commercial only *Treatment area less than 1 acre.

Table B-5: Alternative 3-Proposed Forest Management Treatment Units (cont.)							
Unit	**T-R**	**Section**	**Commercial Treatment**	**Acres**	**Harvest Method**	**LUA**	**Associated Non-Commercial Treatment**
NC29-1	38S-2W	29	N/A	36	N/A	UTA/LSR/DDR-TPCC/RR	HFR
NC29-2	38S-2W	29	N/A	7	N/A	UTA/DDR-TPCC	HFR
NC29-3	38S-2W	29	N/A	4	N/A	UTA	HFR
29-4	38S-2W	29	SH	3	CABLE	UTA	Activity, UR
NC29-4	38S-2W	29	N/A	2	N/A	RR	HFR
29-5	38S-2W	29	SH	21	GROUNDBASE/CABLE	UTA/LSR	Activity, UR
NC29-5	38S-2W	29	N/A	6	N/A	UTA/LSR/RR	HFR
NC29-6	38S-2W	29	N/A	5	N/A	UTA/DDR-TPCC	HFR
NC29-7	38S-2W	29	N/A	23	N/A	DDR-TPCC/RR	HFR
NC29-8	38S-2W	29	N/A	62	N/A	UTA/DDR-TPCC/RR	HFR
32-1	38S-2W	29,32	SH	3	CABLE	UTA	Activity, UR
NC32-1	38S-2W	29,32	N/A	81	N/A	UTA/LSR/DDR-TPCC/RR	HFR
32-2	38S-2W	29,32	SH	33	GROUNDBASE/CABLE	UTA	Activity, UR
NC32-2	38S-2W	29,32	N/A	24	N/A	UTA/RR	HFR
NC32-3	38S-2W	29,32	N/A	19	N/A	UTA/DDR-TPCC/RR	HFR
NC32-4	38S-2W	32	N/A	29	N/A	UTA/LSR/DDR-TPCC/RR	HFR
NC32-5	38S-2W	29,32	N/A	3	N/A	DDR-TPCC	HFR
NC33-1	38S-2W	33	N/A	20	N/A	UTA/DDR-TPCC	HFR
NC33-2	38S-2W	33	N/A	20	N/A	UTA/ DDR-TPCC/RR	HFR
NC33-3	38S-2W	33	N/A	45	N/A	UTA/LSR/DDR-TPCC/RR	HFR
NC33-4	38S-2W	33	N/A	106	N/A	UTA/LSR/DDR-TPCC/RR	HFR
NC33-5	38S-2W	33	N/A	38	N/A	UTA/LSR/DDR-TPCC/RR	HFR
33-6a	37S-3W	33	SH	114	HELICOPTER	UTA	Activity, UR
33-6b	37S-3W	33	SH	53	CABLE	LSR	Activity, UR
33-6c	37S-3W	33	RRT	3	CABLE	RR-Dry	Activity, UR

SH = Selection Harvest **UR** = Understory Reduction **LSR**=Late-Successional Reserves-Dry
UTA=Uneven-aged Timber Area **RR** =Riparian Reserve-Dry **RRT** = Riparian Reserve Thin
Activity = pile & burn tree tops and limbs to reduce fuels **HFR**=Hazardous Fuels Reduction
DDR-TPCC-District Designated Reserve **NC**-Non-Commercial only *Treatment area less than 1 acre.

Table B-5: Alternative 3-Proposed Forest Management Treatment Units (cont.)							
Unit	**T-R**	**Section**	**Commercial Treatment**	**Acres**	**Harvest Method**	**LUA**	**Associated Non-Commercial Treatment**
NC35-1	38S-3W	35	N/A	56	N/A	UTA/DDR-TPCC/RR	HFR
NC35-2	38S-3W	35	N/A	49	N/A	UTA/DDR-TPCC/RR	HFR
NC35-3	38S-3W	35	N/A	232	N/A	UTA/DDR-TPCC/RR	HFR
36-1	38S-3W	36	SH	12	HELICOPTER	UTA	Activity, UR
36-2	38S-3W	36	SH	39	HELICOPTER	UTA	Activity, UR

SH = Selection Harvest **UR** = Understory Reduction **LSR**=Late-Successional Reserves-Dry
UTA=Uneven-aged Timber Area **RR** =Riparian Reserve-Dry **RRT** = Riparian Reserve Thin
Activity = pile & burn tree tops and limbs to reduce fuels **HFR**=Hazardous Fuels Reduction
DDR-TPCC-District Designated Reserve **NC**-Non-Commercial only *Treatment area less than 1 acre.

B.4.3 Table B-6. Alternative 4-Proposed Forest Management Treatment Units

Unit	T-R	Section	Commercial Treatment	Acres	Harvest Method	LUA	Associated Non-Commercial Treatment
1-1a	39S-2W	1	SH	27	CABLE	UTA/LSR	Activity, UR
1-1b	39S-2W	1	RRT	1*	CABLE	RR	Activity, UR
1-2	39S-2W	1	SH	23	HELICOPTER	UTA	Activity, UR
1-3	39S-2W	1	SH	14	HELICOPTER	UTA	Activity, UR
2-1	39S-2W	1,2	SH	15	CABLE	LSR	Activity, UR
NC2-1	39S-2W	1,2	N/A	12	N/A	UTA/LSR	HFR
2-2a	39S-2W	2	SH	12	CABLE	LSR	Activity, UR
2-2b	39S-2W	2	SH	3	CABLE	LSR	Activity, UR
2-2c	39S-2W	2	RRT	1*	CABLE	RR	Activity, UR
2-2d	39S-2W	2	RRT	1*	CABLE	RR	Activity, UR
NC2-2	39S-2W	2	N/A	8	N/A	UTA/LSR	HFR
2-3a	39S-2W	2	SH	7	HELICOPTER	UTA/LSR	Activity, UR
2-3b	39S-2W	2	RRT	1*	HELICOPTER	RR	Activity, UR
NC2-3	39S-2W	2	N/A	3	N/A	LSR	HFR
2-4	39S-2W	2	SH	8	CABLE	LSR	Activity, UR
2-5	39S-2W	2	SH	9	CABLE	UTA	Activity, UR
NC2-5	39S-2W	2	N/A	20	N/A	UTA/LSR/DDR-TPCC	HFR
NC2-6	39S-2W	2	N/A	3	N/A	DDR-TPCC	HFR
3-5	39S-2W	3	SH	6	CABLE	UTA	Activity, UR
3-6	39S-2W	3	SH	18	CABLE	UTA	Activity, UR
3-7	39S-2W	3	SH	20	CABLE	UTA	Activity, UR
NC3-7	39S-2W	3	N/A	114	N/A	UTA/LSR/DDR-TPCC/RR	HFR
3-8	39S-2W	3	SH	8	CABLE	UTA	Activity, UR
3-9	39S-2W	3	SH	3	CABLE	UTA	Activity, UR
NC5-4	39S-2W	5	N/A	108	N/A	UTA/DDR-TPCC/RR	HFR
7-1	39S-1W	7	SH	16	CABLE/HELICOPTER	LSR	Activity, UR
NC7-2	39S-2W	7	N/A	194	N/A	UTA/DDR-TPCC/RR	HFR

SH = Selection Harvest **UR** = Understory Reduction **LSR**=Late-Successional Reserves-Dry
UTA=Uneven-aged Timber Area **RR** =Riparian Reserve-Dry **RRT** = Riparian Reserve Thin
Activity = pile & burn tree tops and limbs to reduce fuels **HFR**=Hazardous Fuels Reduction
DDR-TPCC-District Designated Reserve **NC**-Non-Commercial only *Treatment area less than 1 acre.

Table B-6: Alternative 4-Proposed Forest Management Treatment Units (cont.)							
Unit	**T-R**	**Section**	**Commercial Treatment**	**Acres**	**Harvest Method**	**LUA**	**Associated Non-Commercial Treatment**
NC7-3	39S-2W	6,7	N/A	180	N/A	UTA/LSR/DDR-TPCC/RR	HFR
NC7-4	39S-2W	7	N/A	94	N/A	UTA/LSR/DDR-TPCC/RR	HFR
8-1	38S-3W	8	SH	21	GROUNDBASE	UTA	Activity, UR
8-2	38S-3W	8,17	SH	115	HELICOPTER	UTA	Activity, UR
9-1	38S-3W	9	SH	5	HELICOPTER	UTA	Activity, UR
NC9-4	38S-3W	9,16	N/A	101	N/A	UTA/RR	HFR
NC9-5	38S-3W	9	N/A	52	N/A	UTA/DDR-TPCC	HFR
NC9-6	39S-2W	8,9	N/A	43	N/A	UTA/DDR-TPCC/RR	HFR
12-2	39S-2W	12	SH	9	GROUNDBASE	LSR	Activity, UR
13-1	38S-3W	13	SH	23	CABLE	UTA	Activity, UR
13-3	38S-3W	13	SH	7	CABLE	UTA	Activity, UR
NC13-6	38S-3W	13	N/A	130	N/A	UTA/LSR/DDR-TPCC/RR	HFR
NC13-8	39S-3W	15	N/A	15	N/A	UTA	HFR
NC13-11	38S-3W	13	N/A	40	N/A	UTA/RR	HFR
NC13-12	38S-3W	13	N/A	76	N/A	UTA/DDR-TPCC/RR	HFR
14-2	38S-3W	14	SH	15	CABLE	UTA	Activity, UR
NC14-3	38S-3W	14	N/A	22	N/A	UTA	HFR
15-1	38S-3W	15	SH	8	CABLE	UTA	Activity, UR
15-2	39S-2W	10,15	SH	15	CABLE	UTA	Activity, UR
15-3	39S-2W	15	SH	28	CABLE	UTA	Activity, UR
NC15-4	38S-3W	15	N/A	27	N/A	UTA/DDR-TPCC/RR	HFR
NC15-5	38S-3W	15,22	N/A	210	N/A	UTA/DDR-TPCC/RR	HFR
NC15-6	38S-3W	15	N/A	89	N/A	UTA/DDR-TPCC/RR	HFR
NC15-7	38S-3W	15	N/A	8	N/A	UTA	HFR
NC15-8	38S-2W	15	N/A	134	N/A	UTA/DDR-TPCC/RR	HFR
16-2a	38S-3W	16	SH	2	HELICOPTER	UTA	Activity, UR
16-2b	38S-3W	16	SH	9	HELICOPTER	UTA	Activity, UR

SH = Selection Harvest **UR** = Understory Reduction **LSR**=Late-Successional Reserves-Dry
UTA=Uneven-aged Timber Area **RR** =Riparian Reserve-Dry **RRT** = Riparian Reserve Thin
Activity = pile & burn tree tops and limbs to reduce fuels **HFR**=Hazardous Fuels Reduction
DDR-TPCC-District Designated Reserve **NC**-Non-Commercial only *Treatment area less than 1 acre.

Table B-6: Alternative 4-Proposed Forest Management Treatment Units (cont.)							
Unit	**T-R**	**Section**	**Commercial Treatment**	**Acres**	**Harvest Method**	**LUA**	**Associated Non-Commercial Treatment**
16-2a	38S-3W	16	SH	2	HELICOPTER	UTA	Activity, UR
16-2b	38S-3W	16	SH	9	HELICOPTER	UTA	Activity, UR
16-2c	38S-3W	16	SH	1*	HELICOPTER	RR	Activity, UR
16-2d	38S-3W	16	SH	1*	HELICOPTER	RR	Activity, UR
16-3	38S-3W	16	SH	7	GROUNDBASE	UTA	Activity, UR
NC16-4	38S-3W	16	N/A	219	N/A	UTA/DDR-TPCC/RR	HFR
NC16-5	38S-3W	16	N/A	207	N/A	UTA/DDR-TPCC/RR	HFR
17-1	38S-3W	17	SH	19	GROUNDBASE/HELI	UTA	Activity, UR
NC17-2	38S-3W	17	N/A	72	N/A	UTA/DDR-TPCC	HFR
17-3	38S-3W	17	SH	31	HELICOPTER	UTA	Activity, UR
17-7	39S-1W	17	SH	30	CABLE/HELICOPTER	UTA	Activity, UR
17-8	39S-1W	17	SH	8	HELICOPTER	UTA	Activity, UR
NC17-8	39S-2W	17	N/A	107	N/A	UTA/LSR/DDR-TPCC/RR	HFR
18-1	39S-1W	18	SH	24	CABLE	LSR	Activity, UR
21-1	38S-2W	21	SH	13	CABLE	UTA	Activity, UR
22-3	39S-1W	22	SH	22	CABLE/HELICOPTER	UTA	Activity, UR
23-1	38S-3W	23	SH	4	HELICOPTER	LSR	Activity, UR
23-2	38S-3W	23	SH	6	HELICOPTER	UTA	Activity, UR
23-3a	38S-2W	23	SH	36	CABLE	UTA	Activity, UR
23-3b	38S-2W	23	RRT	1*	CABLE	RR	Activity, UR
NC26-1	38S-2W	26,27	N/A	44	N/A	UTA/LSR/DDR-TPCC/RR	HFR
26-3	38S-3W	26	SH	23	CABLE/HELICOPTER	UTA	Activity, UR
NC26-4	38S-3W	26	N/A	89	N/A	UTA/LSR/DDR-TPCC/RR	HFR
NC27-1	38S-2W	27	N/A	117	N/A	UTA/DDR-TPCC/RR	HFR
27-3	39S-1W	27	SH	7	CABLE	UTA	Activity, UR
27-4	39S-1W	27	SH	8	CABLE	UTA	Activity, UR
27-5	38S-2W	27	SH	18	CABLE	UTA	Activity, UR
27-7	38S-2W	27	SH	34	HELICOPTER	UTA	Activity, UR
27-8	39S-1W	27	SH	5	CABLE	UTA	Activity, UR

SH = Selection Harvest **UR** = Understory Reduction **LSR**=Late-Successional Reserves-Dry
UTA=Uneven-aged Timber Area **RR** =Riparian Reserve-Dry **RRT** = Riparian Reserve Thin
Activity = pile & burn tree tops and limbs to reduce fuels **HFR**=Hazardous Fuels Reduction
DDR-TPCC-District Designated Reserve **NC**-Non-Commercial only *Treatment area less than 1 acre.

Table B-6: Alternative 4-Proposed Forest Management Treatment Units (cont.)							
Unit	**T-R**	**Section**	**Commercial Treatment**	**Acres**	**Harvest Method**	**LUA**	**Associated Non-Commercial Treatment**
27-9	39S-1W	27	SH	13	CABLE	UTA	Activity, UR
NC28-1	38S-2W	28,33	N/A	60	N/A	UTA/LSR/DDR-TPCC/RR	HFR
NC29-1	38S-2W	29	N/A	36	N/A	UTA/LSR/DDR-TPCC/RR	HFR
NC29-2	38S-2W	29	N/A	7	N/A	UTA/DDR-TPCC	HFR
NC29-3	38S-2W	29	N/A	4	N/A	UTA	HFR
29-4	38S-2W	29	SH	3	CABLE	UTA	Activity, UR
NC29-4	38S-2W	29	N/A	2	N/A	RR	HFR
29-5	38S-2W	29	SH	21	GROUNDBASE/CABLE	UTA/LSR	Activity, UR
NC29-5	38S-2W	29	N/A	6	N/A	UTA/LSR/RR	HFR
NC29-6	38S-2W	29	N/A	5	N/A	UTA/DDR-TPCC	HFR
NC29-7	38S-2W	29	N/A	23	N/A	DDR-TPCC/RR	HFR
NC29-8	38S-2W	29	N/A	62	N/A	UTA/DDR-TPCC/RR	HFR
NC32-1	38S-2W	29,32	N/A	81	N/A	UTA/LSR/DDR-TPCC/RR	HFR
32-2	38S-2W	29,32	SH	33	GROUNDBASE/CABLE	UTA	Activity, UR
NC32-2	38S-2W	29,32	N/A	24	N/A	UTA/RR	HFR
NC32-3	38S-2W	29,32	N/A	19	N/A	UTA/DDR-TPCC/RR	HFR
NC32-4	38S-2W	32	N/A	29	N/A	UTA/LSR/DDR-TPCC/RR	HFR
NC32-5	38S-2W	29,32	N/A	3	N/A	DDR-TPCC	HFR
NC33-1	38S-2W	33	N/A	20	N/A	UTA/DDR-TPCC	HFR
NC33-2	38S-2W	33	N/A	20	N/A	UTA/ DDR-TPCC/RR	HFR
NC33-3	38S-2W	33	N/A	45	N/A	UTA/LSR/DDR-TPCC/RR	HFR
NC33-4	38S-2W	33	N/A	106	N/A	UTA/LSR/DDR-TPCC/RR	HFR
NC33-5	38S-2W	33	N/A	38	N/A	UTA/LSR/DDR-TPCC/RR	HFR
33-6a	37S-3W	33	SH	114	HELICOPTER	UTA	Activity, UR
33-6b	37S-3W	33	SH	53	CABLE	LSR	Activity, UR
33-6c	37S-3W	33	RRT	3	CABLE	RR-Dry	Activity, UR
NC35-1	38S-3W	35	N/A	56	N/A	UTA/DDR-TPCC/RR	HFR

SH = Selection Harvest **UR** = Understory Reduction **LSR**=Late-Successional Reserves-Dry
UTA=Uneven-aged Timber Area **RR** =Riparian Reserve-Dry **RRT** = Riparian Reserve Thin
Activity = pile & burn tree tops and limbs to reduce fuels **HFR**=Hazardous Fuels Reduction
DDR-TPCC-District Designated Reserve **NC**-Non-Commercial only *Treatment area less than 1 acre.

Table B-6: Alternative 4-Proposed Forest Management Treatment Units (cont.)							
Unit	**T-R**	**Section**	**Commercial Treatment**	**Acres**	**Harvest Method**	**LUA**	**Associated Non-Commercial Treatment**
NC35-2	38S-3W	35	N/A	49	N/A	UTA/DDR-TPCC/RR	HFR
NC35-3	38S-3W	35	N/A	232	N/A	UTA/DDR-TPCC/RR	HFR
36-1	38S-3W	36	SH	12	HELICOPTER	UTA	Activity, UR
36-2	38S-3W	36	SH	39	HELICOPTER	UTA	Activity, UR

SH = Selection Harvest **UR** = Understory Reduction **LSR**=Late-Successional Reserves-Dry
UTA=Uneven-aged Timber Area **RR** =Riparian Reserve-Dry **RRT** = Riparian Reserve Thin
Activity = pile & burn tree tops and limbs to reduce fuels **HFR**=Hazardous Fuels Reduction
DDR-TPCC-District Designated Reserve **NC**-Non-Commercial only *Treatment area less than 1 acre.

B.4.4 Action Alternatives for Commercial Units with identified Acres, Land Use Allotment, Logging System, Commercial Treatment, Target Relative Density, Target Basal Area, Canopy Cover, and Associated Non-Commercial Treatment.

B.4.4.1 Table B-7: Alternative 2

Unit	Acres	LUA	Logging System	Commercial Treatment	Target Relative Density %	Target Basal Area	Canopy Cover %	Associated Non-Commercial Treatment
1-1a	27	UTA/LSR	C	SH	20-25	70	>25	Activity, UR
1-1b	1*	RR-Dry	C	RRT	20-25	70	>30	Activity, UR
1-2	23	UTA	H	SH/GS	20-25	80	>25	Activity, UR
1-3	14	UTA	H	SH	20-25	80	>25	Activity, UR
2-4	8	LSR	C	SH	20-25	80	>25	Activity, UR
2-5	9	UTA	C	SH	20-25	80	>25	Activity, UR
3-2	47	UTA/LSR	H	SH/GS	20-25	70	>25	Activity, UR
3-3	19	UTA	C	SH/GS	20-25	80	>25	Activity, UR
3-4	33	UTA	C	SH	20-25	80	>25	Activity, UR
3-5	6	UTA	C	SH	20-25	80	>25	Activity, UR
3-6	18	UTA	C	SH	20-25	80	>25	Activity, UR
3-7	20	UTA	C	SH	20-25	80	>25	Activity, UR
3-8	8	UTA	C	SH	20-25	80	>25	Activity, UR

SH = Selection Harvest **SH/GS** = SH with Group Select **UR** = Understory Reduction
LSR=Late-Successional Reserves-Dry **UTA**=Uneven-aged Timber Area **RR-Dry**=Riparian Reserve-Dry **RRT** = Riparian Reserve Thin **Activity** = pile & burn tree tops and limbs to reduce fuels
H-Helicopter **C**-Cable **G**-Groundbase *Treatment area less than 1 acre.

Unit	Acres	LUA	Logging System	Commercial Treatment	Target Relative Density %	Target Basal Area	Canopy Cover %	Associated Non-Commercial Treatment
3-9	3	UTA	C	SH	20-25	80	>25	Activity, UR
5-2	29	UTA	C	SH/GS	20-25	60	>25	Activity, UR
5-3	16	UTA	C	SH/GS	20-25	60	>25	Activity, UR
8-1	21	UTA	G	SH	20-25	80	>25	Activity, UR
8-2	115	UTA	H	SH/GS	20-25	80	>25	Activity, UR
9-1	5	UTA	H	SH	20-25	80	>25	Activity, UR
9-2	2	UTA	H	SH	20-25	70	>25	Activity, UR
9-3	2	UTA	H	SH	20-25	70	>25	Activity, UR
12-2	9	LSR	G	SH	20-25	80	>25	Activity, UR
13-3	7	UTA	C	SH	20-25	80	>25	Activity, UR
13-4	8	UTA	C	SH	20-25	80	>25	Activity, UR
13-5	9	UTA	C	SH/GS	20-25	80	>25	Activity, UR
13-6	38	UTA	G	SH/GS	20-25	80	>25	Activity, UR
13-7	18	UTA	G	SH/GS	20-25	80	>25	Activity, UR
13-8	7	UTA	G	SH/GS	20-25	80	>25	Activity, UR
13-9	15	LSR	G	SH/GS	20-25	80	>25	Activity, UR
13-10a	8	UTA	G	SH	20-25	80	>25	Activity, UR
13-10b	1*	RR-Dry	G	RRT	20-25	80	>30	Activity, UR
14-2	15	UTA	C	SH/GS	20-25	100	>25	Activity, UR
15-1	8	UTA	C	SH	20-25	90	>25	Activity, UR
15-2	15	UTA	C	SH/GS	20-25	70	>25	Activity, UR
15-3	28	UTA	C	SH/GS	20-25	70	>25	Activity, UR
16-1	7	UTA	H	SH	20-25	80	>25	Activity, UR
16-2a	2	UTA	H	SH	20-25	80	>25	Activity, UR
16-2b	9	UTA	H	SH	20-25	80	>25	Activity, UR
16-2c	1*	RR-Dry	H	SH	20-25	80	>30	Activity, UR
16-2d	1*	RR-Dry	H	SH	20-25	70	>30	Activity, UR
16-3	7	UTA	G	SH	20-25	80	>25	Activity, UR
17-1	19	UTA	G/H	SH/GS	20-25	80	>25	Activity, UR
17-3	31	UTA	H	SH/GS	20-25	80	>25	Activity, UR
17-8	8	UTA	H	SH	20-25	80	>25	Activity, UR
21-2	13	UTA	H	SH	20-25	80	>25	Activity, UR
21-3	56	UTA	H	SH/GS	20-25	80	>25	Activity, UR
22-3	22	UTA	C/H	SH	20-25	70	>25	Activity, UR
23-1	4	LSR	H	SH/GS	20-25	70	>25	Activity, UR

SH = Selection Harvest **SH/GS** = SH with Group Select **UR** = Understory Reduction
LSR=Late-Successional Reserves-Dry **UTA**=Uneven-aged Timber Area **RR-Dry**=Riparian Reserve-Dry **RRT** = Riparian Reserve Thin **Activity** = pile & burn tree tops and limbs to reduce fuels
H-Helicopter **C**-Cable **G**-Groundbase *Treatment area less than 1 acre.

Unit	Acres	LUA	Logging System	Commercial Treatment	Target Relative Density %	Target Basal Area	Canopy Cover %	Associated Non-Commercial Treatment
23-2	6	UTA	H	SH/GS	20-25	70	>25	Activity, UR
23-3a	36	UTA	C	SH	20-25	70	>25	Activity, UR
23-3b	1*	RR-Dry	C	RRT	20-25	70	>30	Activity, UR
27-1a	2	UTA	C	SH	20-25	80	>25	Activity, UR
27-1b	1*	RR-Dry	C	RRT	20-25	80	>30	Activity, UR
27-3	7	UTA	C	SH	20-25	70	>25	Activity, UR
27-4	8	UTA	C	SH	20-25	80	>25	Activity, UR
27-5	18	UTA	C	SH	20-25	70	>25	Activity, UR
27-6	8	UTA	C	SH/GS	20-25	60	>25	Activity, UR
27-7	34	UTA	H	SH	20-25	80	>25	Activity, UR
27-8	5	UTA	C	SH	20-25	80	>25	Activity, UR
27-9	13	UTA	C	SH/GS	20-25	80	>25	Activity, UR
29-4	3	UTA	C	SH	20-25	70	>25	Activity, UR
29-5	21	UTA/LSR	G/C	SH	20-25	80	>25	Activity, UR
32-1	3	UTA	C	SH	20-25	70	>25	Activity, UR
32-2	33	UTA	G/C	SH	20-25	70	>25	Activity, UR
33-6a	114	UTA	H	SH/GS	30-40	70	>25	Activity, UR
33-6b	53	LSR	C	SH	30-40	70	>25	Activity, UR
33-6c	3	RR-Dry	C	RRT	30-35	70	>30	Activity, UR
36-1	12	UTA	H	SH/GS	30-35	60	>25	Activity, UR
36-2	39	UTA	H	SH/GS	30-35	80	>25	Activity, UR

SH = Selection Harvest **SH/GS** = SH with Group Select **UR** = Understory Reduction
LSR=Late-Successional Reserves-Dry **UTA**=Uneven-aged Timber Area **RR-Dry**=Riparian Reserve-Dry **RRT** = Riparian Reserve Thin **Activity** = pile & burn tree tops and limbs to reduce fuels
H-Helicopter **C**-Cable **G**-Groundbase *Treatment area less than 1 acre.

B.4.4.2 Table B-8: Alternative 3

Unit	Acres	LUA	Logging System	Commercial Treatment	Target Relative Density %	Target Basal Area	Canopy Cover %	Associated Non-Commercial Treatment
1-1a	27	UTA/LSR	C	SH	30-35	100-120	>40	Activity, UR
1-1b	1*	RR-Dry	C	RRT	30-35	100-120	>40	Activity, UR
1-2	23	UTA	H	SH/GS	30-40	100-120	>35	Activity, UR
1-3	14	UTA	H	SH	30-35	100-120	>35	Activity, UR

SH = Selection Harvest **SH/GS** = SH with Group Select **UR** = Understory Reduction
LSR=Late-Successional Reserves-Dry **UTA**=Uneven-aged Timber Area **RR-Dry**=Riparian Reserve-Dry **RRT** = Riparian Reserve Thin **Activity** = pile & burn tree tops and limbs to reduce fuels
H-Helicopter **C**-Cable **G**-Groundbase *Treatment area less than 1 acre.

Unit	Acres	LUA	Logging System	Commercial Treatment	Target Relative Density %	Target Basal Area	Canopy Cover %	Associated Non-Commercial Treatment
2-1	15	LSR	C	SH	30-40	120-140	>40	Activity, UR
2-2a	12	LSR	C	SH	30-40	100-120	>40	Activity, UR
2-2b	3	LSR	C	SH	30-40	100-120	>40	Activity, UR
2-2c	1*	RR-Dry	C	RRT	30-40	100-120	>40	Activity, UR
2-2d	1*	RR-Dry	C	RRT	30-40	100-120	>40	Activity, UR
2-3a	7	UTA/LSR	H	SH	30-40	120-140	>40	Activity, UR
2-3b	1*	RR-Dry	H	RRT	30-40	120-140	>40	Activity, UR
2-4	8	LSR	C	SH	30-40	120-140	>40	Activity, UR
2-5	9	UTA	C	SH	25-35	80-120	>30	Activity, UR
3-1	17	UTA	H	SH/GS	25-35	100-120	>30	Activity, UR
3-2	47	UTA/LSR	H	SH/GS	30-40	100-120	>35	Activity, UR
3-3	19	UTA	C	SH/GS	25-35	100-120	>30	Activity, UR
3-4	33	UTA	C	SH	25-35	80-100	>30	Activity, UR
3-5	6	UTA	C	SH	30-35	100-120	>35	Activity, UR
3-6	18	UTA	C	SH	25-35	60-80	>30	Activity, UR
3-7	20	UTA	C	SH	25-35	60-80	>30	Activity, UR
3-8	8	UTA	C	SH	25-35	60-80	>30	Activity, UR
3-9	3	UTA	C	SH	25-35	60-80	>30	Activity, UR
5-2	29	UTA	C	SH/GS	25-35	80-100	>30	Activity, UR
5-3	16	UTA	C	SH/GS	25-35	80-100	>30	Activity, UR
7-1	16	LSR	C/H	SH	30-40	120-140	>40	Activity, UR
8-1	21	UTA	G	SH	30-40	100-120	>35	Activity, UR
8-2	115	UTA	H	SH/GS	30-40	100-120	>35	Activity, UR
9-1	5	UTA	H	SH	20-25	80-100	>30	Activity, UR
9-2	2	UTA	H	SH	20-25	80-100	>30	Activity, UR
9-3	2	UTA	H	SH	20-25	80-100	>30	Activity, UR
12-1	38	UTA	G/C	SH	25-35	100-120	>35	Activity, UR
12-2	9	LSR	G	SH	30-35	100-120	>35	Activity, UR
13-1	23	UTA	C	SH	30-35	100-120	>35	Activity, UR
13-3	7	UTA	C	SH	25-35	100-120	>30	Activity, UR
13-4	8	UTA	C	SH	25-35	100-120	>35	Activity, UR
13-5	9	UTA	C	SH/GS	25-35	100-120	>35	Activity, UR
13-6	38	UTA	G	SH/GS	25-35	100-120	>35	Activity, UR
13-7	18	UTA	C	SH/GS	25-35	100-120	>35	Activity, UR
13-8	7	UTA	G	SH/GS	25-30	100-120	>35	Activity, UR

SH = Selection Harvest **SH/GS** = SH with Group Select **UR** = Understory Reduction
LSR=Late-Successional Reserves-Dry **UTA**=Uneven-aged Timber Area **RR-Dry**=Riparian Reserve-Dry
RRT = Riparian Reserve Thin **Activity** = pile & burn tree tops and limbs to reduce fuels
H-Helicopter **C**-Cable **G**-Groundbase *Treatment area less than 1 acre.

Unit	Acres	LUA	Logging System	Commercial Treatment	Target Relative Density %	Target Basal Area	Canopy Cover %	Associated Non-Commercial Treatment
13-9	15	LSR	G	SH/GS	25-30	100-120	>35	Activity, UR
13-10a	8	UTA	G	SH	30-35	100-120	>35	Activity, UR
13-10b	1*	RR-Dry	G	RRT	30-35	100-120	>35	Activity, UR
14-2	15	UTA	C	SH/GS	25-35	100-120	>35	Activity, UR
15-1	8	UTA	C	SH	30-35	100-120	>35	Activity, UR
15-2	15	UTA	C	SH/GS	25-30	80-100	>35	Activity, UR
15-3	28	UTA	C	SH/GS	30-35	100-120	>35	Activity, UR
16-1	7	UTA	H	SH	20-25	80-100	>30	Activity, UR
16-2a	2	UTA	H	SH	30-35	100-120	>35	Activity, UR
16-2b	9	UTA	H	SH	30-35	100-120	>35	Activity, UR
16-2c	1*	RR-Dry	H	SH	30-35	100-120	>35	Activity, UR
16-2d	1*	RR-Dry	H	SH	30-35	100-120	>35	Activity, UR
16-3	7	UTA	G	SH	20-25	80-100	>30	Activity, UR
17-1	19	UTA	G/H	SH/GS	30-35	100-120	>35	Activity, UR
17-3	31	UTA	H	SH/GS	30-35	100-120	>35	Activity, UR
17-7	30	UTA	C/H	SH	30-40	120-140	>35	Activity, UR
17-8	8	UTA	H	SH	30-35	100-120	>35	Activity, UR
18-1	24	LSR	C	SH	30-40	100-120	>35	Activity, UR
21-1	13	UTA	C	SH/GS	30-40	120-140	>35	Activity, UR
21-2	13	UTA	H	SH	30-40	120-140	>35	Activity, UR
21-3	56	UTA	H	SH/GS	20-30	100-120	>30	Activity, UR
22-3	22	UTA	C/H	SH	30-40	120-140	>35	Activity, UR
23-1	4	LSR	H	SH/GS	30-35	100-120	>35	Activity, UR
23-2	6	UTA	H	SH/GS	30-35	100-120	>35	Activity, UR
23-3a	36	UTA	C	SH	30-35	100-120	>35	Activity, UR
23-3b	1*	RR-Dry	C	RRT	30-35	100-120	>35	Activity, UR
26-3	23	UTA	C/H	SH/GS	30-35	100-120	>35	Activity, UR
27-1a	2	UTA	C	SH	30-40	120-140	>35	Activity, UR
27-1b	1*	RR-Dry	C	RRT	30-40	120-140	>35	Activity, UR
27-2a	14	UTA	C	SH	25-35	100-120	>35	Activity, UR
27-2b	1*	RR-Dry	C	RRT	25-35	100-120	>35	Activity, UR
27-3	7	UTA	C	SH	30-35	100-120	>35	Activity, UR
27-4	8	UTA	C	SH	30-40	120-140	>35	Activity, UR

SH = Selection Harvest **SH/GS** = SH with Group Select **UR** = Understory Reduction
LSR=Late-Successional Reserves-Dry **UTA**=Uneven-aged Timber Area **RR-Dry**=Riparian Reserve-Dry
RRT = Riparian Reserve Thin **Activity** = pile & burn tree tops and limbs to reduce fuels
H-Helicopter **C**-Cable **G**-Groundbase *Treatment area less than 1 acre.

Unit	Acres	LUA	Logging System	Commercial Treatment	Target Relative Density %	Target Basal Area	Canopy Cover %	Associated Non-Commercial Treatment
27-3	7	UTA	C	SH	30-35	100-120	>35	Activity, UR
27-4	8	UTA	C	SH	30-40	120-140	>35	Activity, UR
27-5	18	UTA	C	SH	30-35	100-120	>35	Activity, UR
27-6	8	UTA	C	SH/GS	25-35	100-120	>35	Activity, UR
27-7	34	UTA	H	SH	25-35	80-100	>35	Activity, UR
27-8	5	UTA	C	SH	30-40	120-140	>35	Activity, UR
27-9	13	UTA	C	SH/GS	30-40	120-140	>35	Activity, UR
29-4	3	UTA	C	SH	25-35	100-120	>35	Activity, UR
29-5	21	UTA/LSR	G/C	SH	30-35	80-100	>35	Activity, UR
32-1	3	UTA	C	SH	25-35	80-100	>35	Activity, UR
32-2	33	UTA	G/C	SH	25-35	80-100	>35	Activity, UR
33-6a	114	UTA	H	SH/GS	30-40	100-120	>40	Activity, UR
33-6b	53	LSR	C	SH	30-40	100-120	>40	Activity, UR
33-6c	3	RR-Dry	C	RRT	30-35	100-120	>40	Activity, UR
36-1	12	UTA	H	SH/GS	30-35	100-120	>35	Activity, UR
36-2	39	UTA	H	SH/GS	30-35	100-120	>35	Activity, UR

SH = Selection Harvest **SH/GS** = SH with Group Select **UR** = Understory Reduction
LSR=Late-Successional Reserves-Dry **UTA**=Uneven-aged Timber Area **RR-Dry**=Riparian Reserve-Dry
RRT = Riparian Reserve Thin **Activity** = pile & burn tree tops and limbs to reduce fuels
H-Helicopter **C**-Cable **G**-Groundbase *Treatment area less than 1 acre.

B.4.4.3 Table B-9: Alternative 4

Unit	Acres	LUA	Logging System	Commercial Treatment	Target Relative Density %	Target Basal Area	Canopy Cover %	Associated Non-Commercial Treatment
1-1a	27	UTA/LSR	C	SH	40-45	150	>45	Activity, UR
1-1b	1*	RR-Dry	C	RRT	40-45	150	>45	Activity, UR
1-2	23	UTA	H	SH/GS	40-45	140	>45	Activity, UR
1-3	14	UTA	H	SH	40-45	140	>45	Activity, UR
2-1	15	LSR	C	SH	40-45	160	>45	Activity, UR
2-2a	12	LSR	C	SH	40-45	150	>45	Activity, UR
2-2b	3	LSR	C	SH	40-45	150	>45	Activity, UR
2-2c	1*	RR-Dry	C	RRT	40-45	150	>45	Activity, UR

SH = Selection Harvest **SH/GS** = SH with Group Select **UR** = Understory Reduction
LSR=Late-Successional Reserves-Dry **UTA**=Uneven-aged Timber Area **RR-Dry**=Riparian Reserve-Dry
RRT = Riparian Reserve Thin **Activity** = pile & burn tree tops and limbs to reduce fuels
H-Helicopter **C**-Cable **G**-Groundbase *Treatment area less than 1 acre.

Unit	Acres	LUA	Logging System	Commercial Treatment	Target Relative Density %	Target Basal Area	Canopy Cover %	Associated Non-Commercial Treatment
2-2d	1*	RR-Dry	C	RRT	40-45	150	>45	Activity, UR
2-3a	7	UTA/LSR	H	SH	40-45	160	>45	Activity, UR
2-3b	1*	RR-Dry	H	RRT	40-45	160	>45	Activity, UR
2-4	8	LSR	C	SH	40-45	160	>45	Activity, UR
2-5	9	UTA	C	SH	40-45	140	>45	Activity, UR
3-5	6	UTA	C	SH	40-45	140	>45	Activity, UR
3-6	18	UTA	C	SH	40-45	140	>45	Activity, UR
3-7	20	UTA	C	SH	40-45	140	>45	Activity, UR
3-8	8	UTA	C	SH	40-45	140	>45	Activity, UR
3-9	3	UTA	C	SH	40-45	140	>45	Activity, UR
7-1	16	LSR	C/H	SH	40-45	160	>45	Activity, UR
8-1	21	UTA	G	SH	40-45	160	>45	Activity, UR
8-2	115	UTA	H	SH/GS	40-45	140	>45	Activity, UR
9-1	5	UTA	H	SH	40-45	140	>45	Activity, UR
12-2	9	LSR	G	SH	40-45	140	>45	Activity, UR
13-1	23	UTA	C	SH	40-45	150	>45	Activity, UR
13-3	7	UTA	C	SH	40-45	150	>45	Activity, UR
14-2	15	UTA	C	SH	40-45	160	>45	Activity, UR
15-1	8	UTA	C	SH	40-45	160	>45	Activity, UR
15-2	15	UTA	C	SH	40-45	140	>45	Activity, UR
15-3	28	UTA	C	SH	40-45	140	>45	Activity, UR
16-2a	2	UTA	H	SH	40-45	140	>45	Activity, UR
16-2b	9	UTA	H	SH	40-45	140	>45	Activity, UR
16-2c	1*	RR-Dry	H	SH	40-45	140	>45	Activity, UR
16-2d	1*	RR-Dry	H	SH	40-45	140	>45	Activity, UR
16-3	7	UTA	G	SH	40-45	130	>45	Activity, UR
17-1	19	UTA	G/H	SH/GS	40-45	140	>45	Activity, UR
17-3	31	UTA	H	SH/GS	40-45	160	>45	Activity, UR
17-7	30	UTA	C/H	SH	40-45	160	>45	Activity, UR
17-8	8	UTA	H	SH	40-45	160	>45	Activity, UR
18-1	24	LSR	C	SH	40-45	160	>45	Activity, UR
21-1	13	UTA	C	SH/GS	40-45	160	>45	Activity, UR
22-3	22	UTA	C/H	SH	40-45	160	>45	Activity, UR
23-1	4	LSR	H	SH/GS	40-45	120	>45	Activity, UR
23-2	6	UTA	H	SH/GS	40-45	140	>45	Activity, UR

SH = Selection Harvest **SH/GS** = SH with Group Select **UR** = Understory Reduction
LSR=Late-Successional Reserves-Dry **UTA**=Uneven-aged Timber Area **RR-Dry**=Riparian Reserve-Dry
RRT = Riparian Reserve Thin **Activity** = pile & burn tree tops and limbs to reduce fuels
H-Helicopter **C**-Cable **G**-Groundbase *Treatment area less than 1 acre.

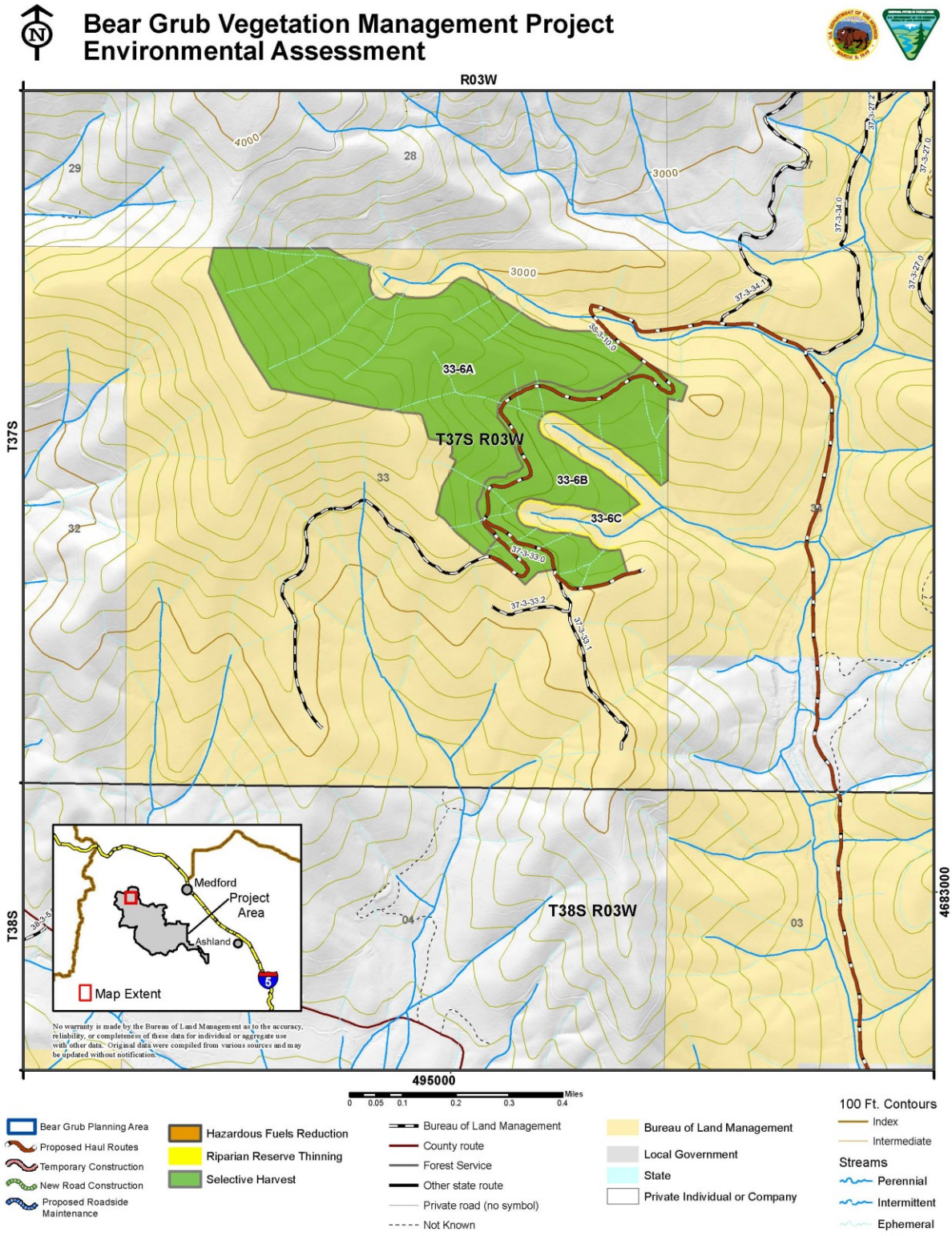
Unit	Acres	LUA	Logging System	Commercial Treatment	Target Relative Density %	Target Basal Area	Canopy Cover %	Associated Non-Commercial Treatment
23-3a	36	UTA	C	SH	40-45	140	>45	Activity, UR
23-3b	1*	RR-Dry	C	RRT	40-45	140	>45	Activity, UR
26-3	23	UTA	C/H	SH/GS	40-45	130	>45	Activity, UR
27-3	7	UTA	C	SH	40-45	140	>45	Activity, UR
27-4	8	UTA	C	SH	40-45	140	>45	Activity, UR
27-5	18	UTA	C	SH	40-45	150	>45	Activity, UR
27-7	34	UTA	H	SH	40-45	150	>45	Activity, UR
27-8	5	UTA	C	SH	40-45	150	>45	Activity, UR
27-9	13	UTA	C	SH/GS	40-45	180	>45	Activity, UR
29-4	3	UTA	C	SH	40-45	140	>45	Activity, UR
29-5	21	UTA/LSR	G/C	SH	40-45	130	>45	Activity, UR
32-2	33	UTA	G/C	SH	40-45	140	>45	Activity, UR
33-6a	114	UTA	H	SH/GS	40-45	150	>45	Activity, UR
33-6b	53	LSR	C	SH	40-45	150	>45	Activity, UR
33-6c	3	RR-Dry	C	RRT	40-45	150	>45	Activity, UR
36-1	12	UTA	H	SH/GS	40-45	130	>45	Activity, UR
36-2	39	UTA	H	SH/GS	40-45	160	>45	Activity, UR

SH = Selection Harvest **SH/GS** = SH with Group Select **UR** = Understory Reduction
LSR=Late-Successional Reserves-Dry **UTA**=Uneven-aged Timber Area **RR-Dry**=Riparian Reserve-Dry
RRT = Riparian Reserve Thin **Activity** = pile & burn tree tops and limbs to reduce fuels
H-Helicopter **C**-Cable **G**-Groundbase *Treatment area less than 1 acre.

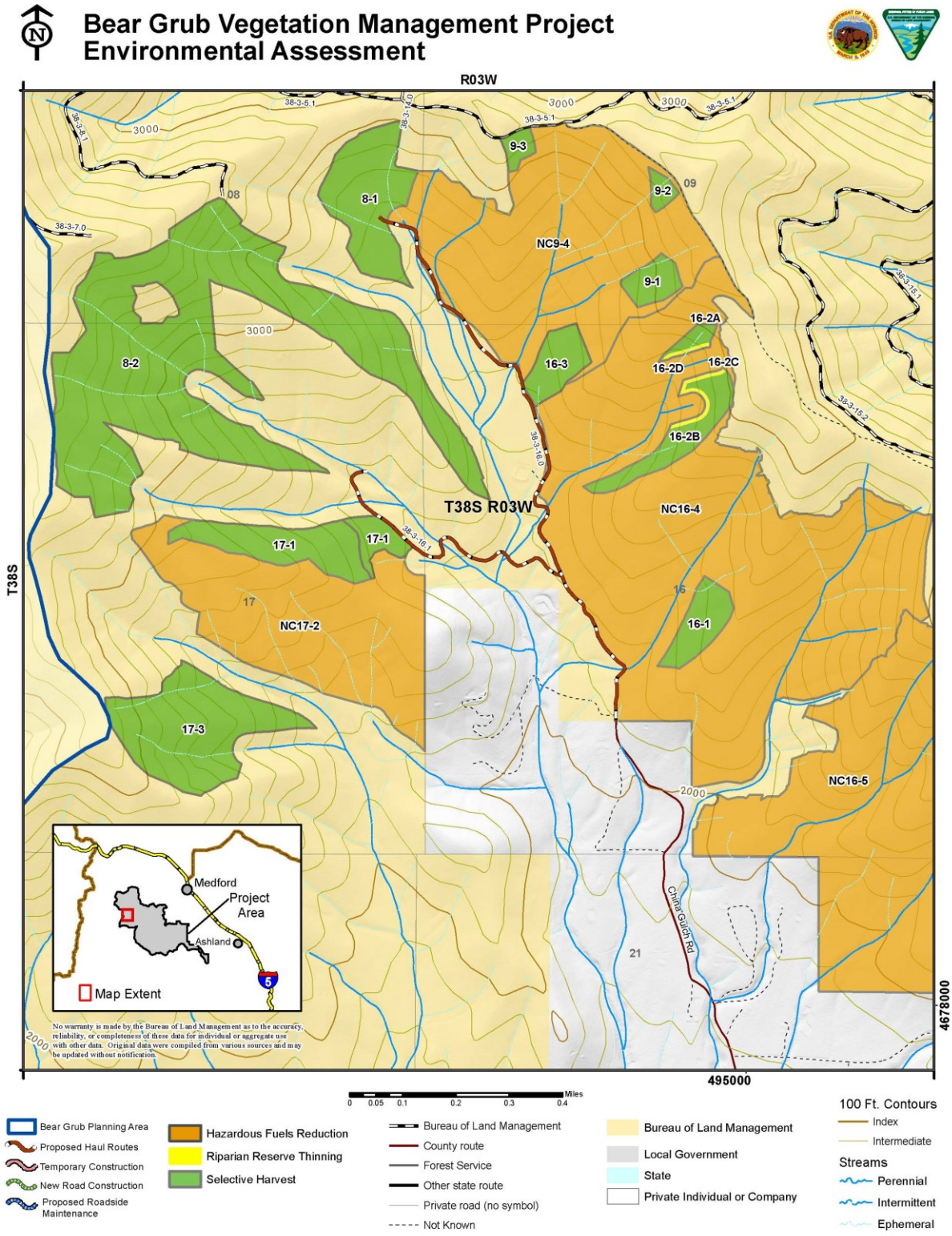
B.4.5 Unit Maps

The following maps are a closer view of the units within the Bear Grub VMP planning area. There are 16 maps that show one to multiple units within an identified area on the inset map. Each unit has a unit name and the color of the unit identifies the type of treatment the unit will receive.

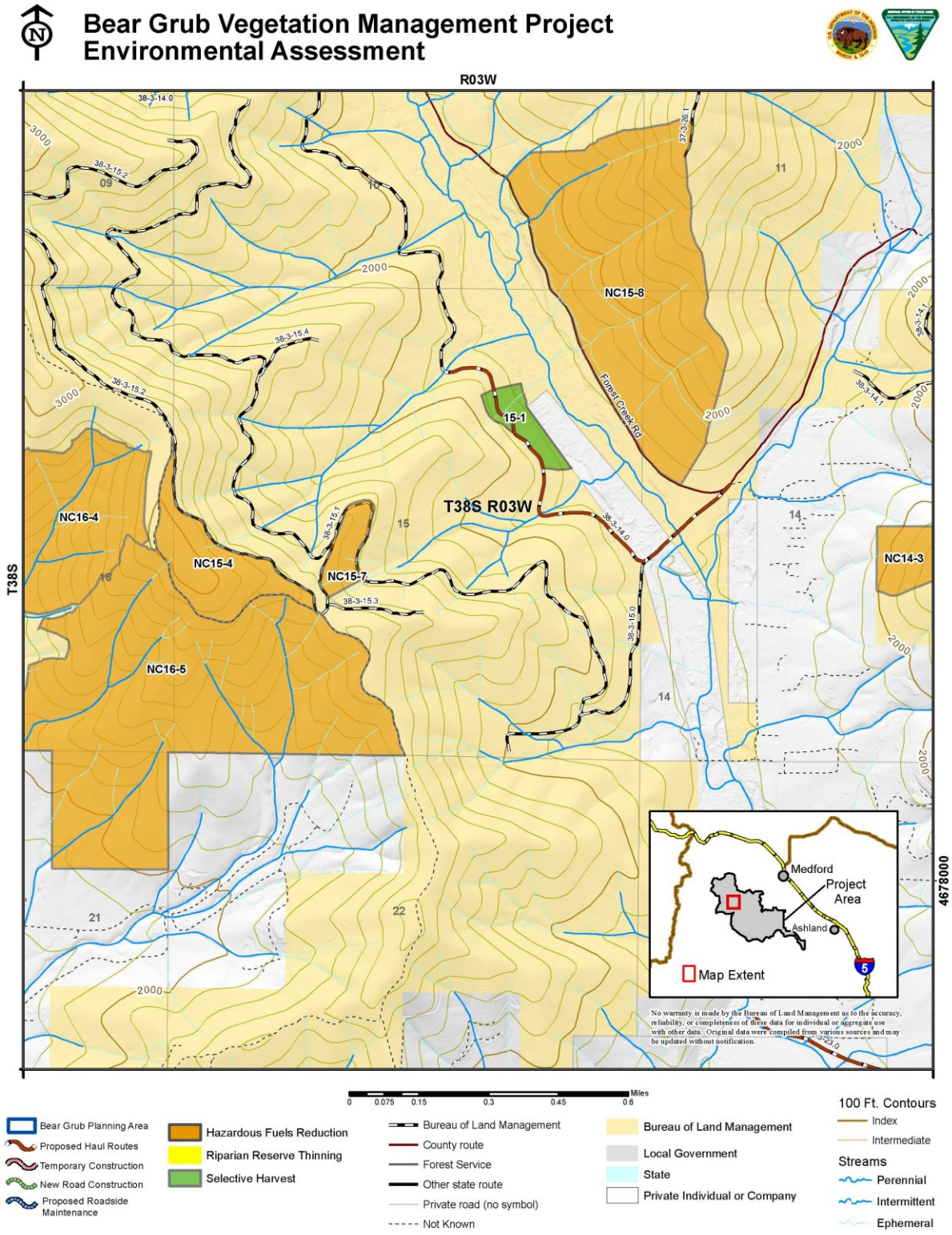
Map 1


Bear Grub Vegetation Management Project
Environmental Assessment
R03W
T37S
T38S
T37S R03W
T38S R03W
33-6A
33-6B
33-6C
Medford
Project Area
Ashland
Map Extent
495000
4683000
Miles
0 0.05 0.1 0.2 0.3 0.4
Bear Grub Planning Area
Proposed Haul Routes
Temporary Construction
New Road Construction
Proposed Roadside Maintenance
Hazardous Fuels Reduction
Riparian Reserve Thinning
Selective Harvest
Bureau of Land Management
County route
Forest Service
Other state route
Private road (no symbol)
Not Known
Bureau of Land Management
Local Government
State
Private Individual or Company
100 Ft. Contours
Index
Intermediate
Streams
Perennial
Intermittent
Ephemeral

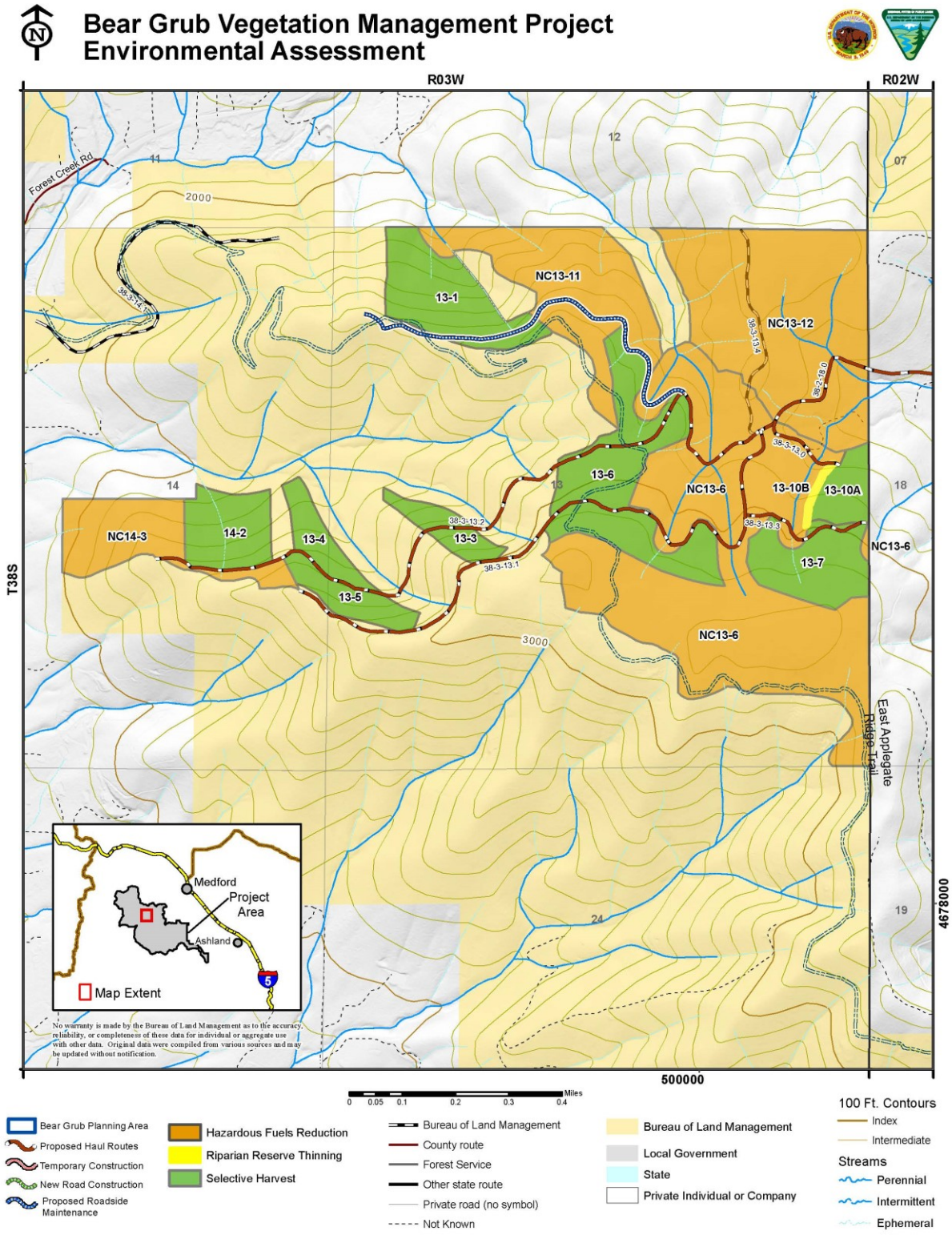
Map 2


Bear Grub Vegetation Management Project
Environmental Assessment
R03W
T38S R03W
T38S
9-3
9-2
8-1
NC9-4
9-1
16-2A
16-3
16-2D
16-2C
8-2
16-2B
NC16-4
17-1
17-1
NC17-2
16-1
17-3
NC16-5
Medford
Project Area
Ashland
Map Extent
China Gulch Rd
495000
4678000
Miles
0 0.05 0.1 0.2 0.3 0.4
Bear Grub Planning Area
Proposed Haul Routes
Temporary Construction
New Road Construction
Proposed Roadside Maintenance
Hazardous Fuels Reduction
Riparian Reserve Thinning
Selective Harvest
Bureau of Land Management
County route
Forest Service
Other state route
Private road (no symbol)
Not Known
Bureau of Land Management
Local Government
State
Private Individual or Company
100 Ft. Contours
Index
Intermediate
Streams
Perennial
Intermittent
Ephemeral

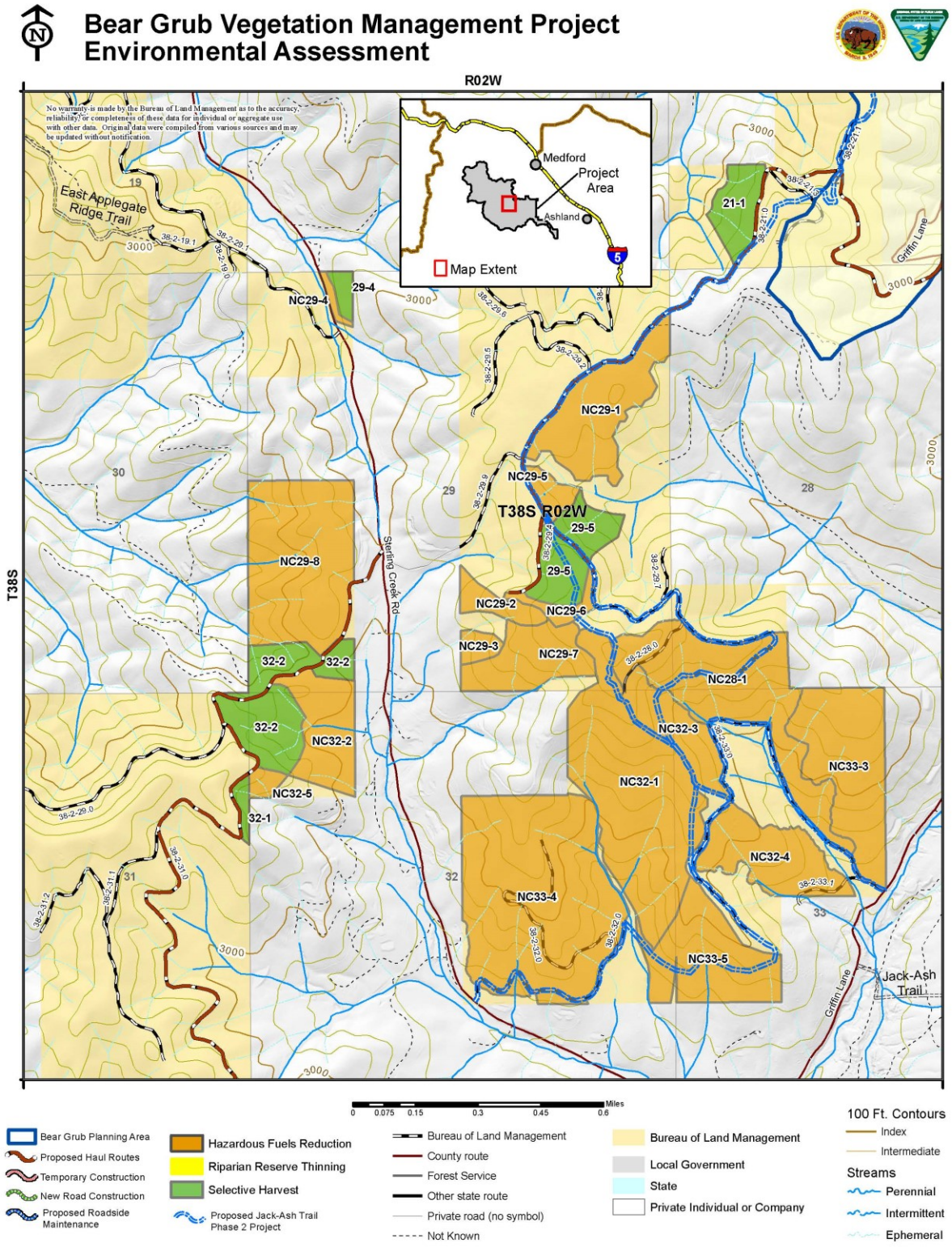
Map 3


Bear Grub Vegetation Management Project
Environmental Assessment
R03W
T38S
T38S R03W
NC15-8
15-1
NC16-4
NC15-4
NC15-7
NC16-5
NC14-3
Forest Creek Rd
Medford
Project Area
Ashland
Map Extent
No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources and may be updated without notification.
Miles
0 0.075 0.15 0.3 0.45 0.6
Bear Grub Planning Area
Proposed Haul Routes
Temporary Construction
New Road Construction
Proposed Roadside Maintenance
Hazardous Fuels Reduction
Riparian Reserve Thinning
Selective Harvest
Bureau of Land Management
County route
Forest Service
Other state route
Private road (no symbol)
Not Known
Bureau of Land Management
Local Government
State
Private Individual or Company
100 Ft. Contours
Index
Intermediate
Streams
Perennial
Intermittent
Ephemeral

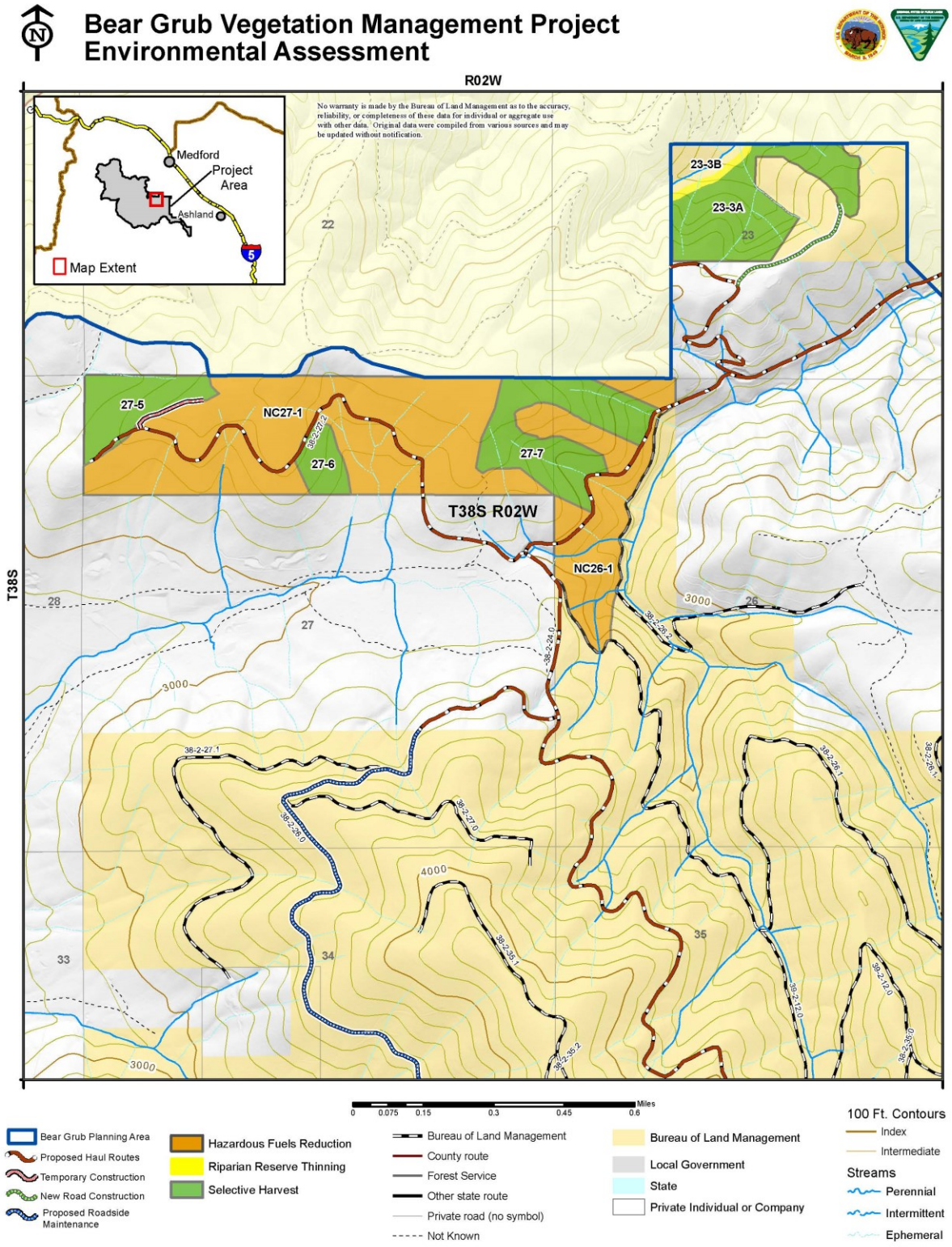
Map 4


Bear Grub Vegetation Management Project
Environmental Assessment
R03W
R02W
T38S
Forest Creek Rd
2000
3000
NC13-11
13-1
NC13-12
38-3-13.4
38-2-18.0
38-3-13.0
13-6
NC13-6
13-10B
13-10A
38-3-13.2
38-3-13.3
13-3
13-4
14-2
NC14-3
13-5
38-3-13.1
13-7
NC13-6
NC13-6
East Applegate Ridge Trail
Medford
Project Area
Ashland
Map Extent
No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources and may be updated without notification.
500000
4678000
Miles
0 0.05 0.1 0.2 0.3 0.4
Bear Grub Planning Area
Proposed Haul Routes
Temporary Construction
New Road Construction
Proposed Roadside Maintenance
Hazardous Fuels Reduction
Riparian Reserve Thinning
Selective Harvest
Bureau of Land Management
County route
Forest Service
Other state route
Private road (no symbol)
Not Known
Bureau of Land Management
Local Government
State
Private Individual or Company
100 Ft. Contours
Index
Intermediate
Streams
Perennial
Intermittent
Ephemeral

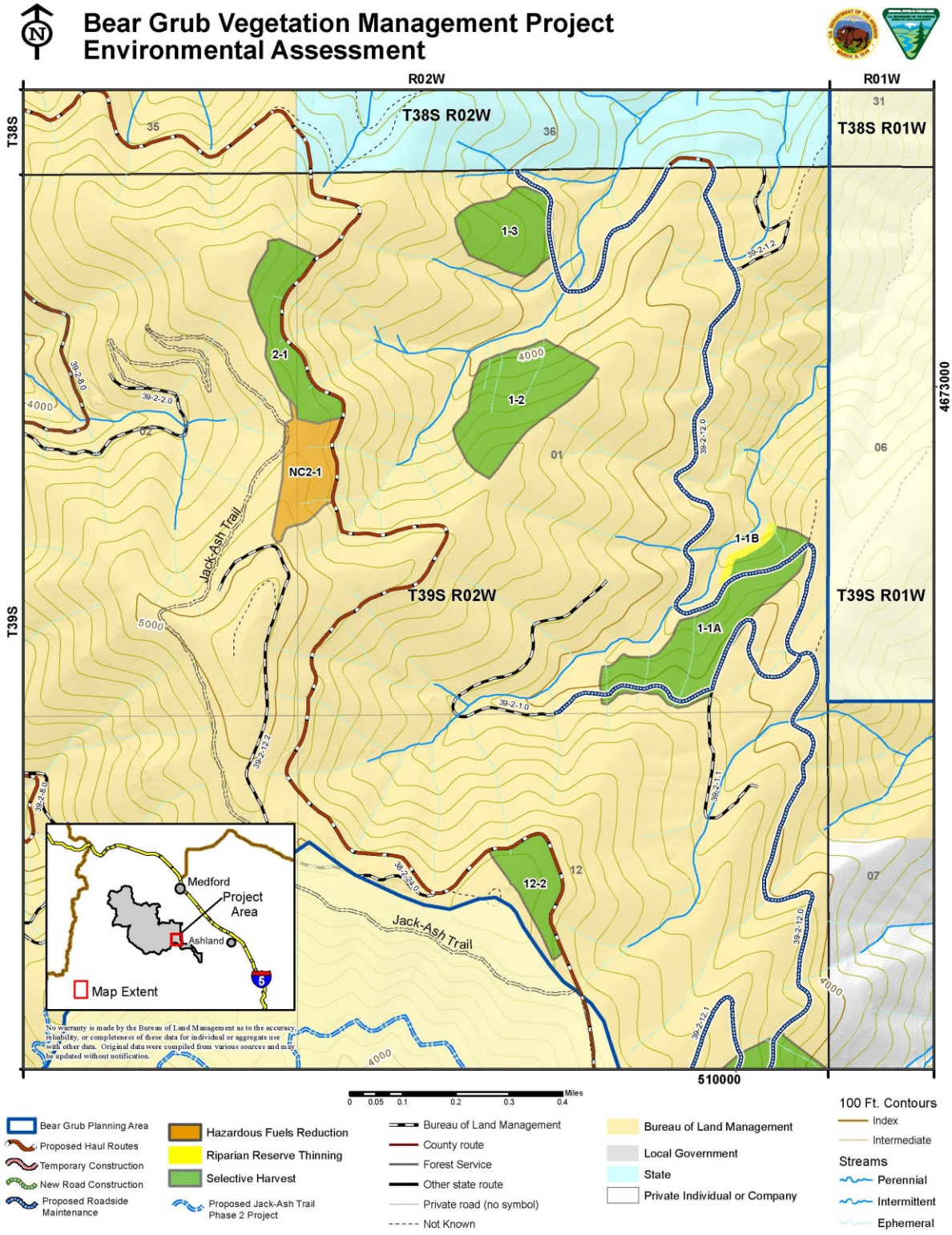
Map 5


Bear Grub Vegetation Management Project
Environmental Assessment
R02W
T38S
T38S R02W
Medford
Project Area
Ashland
Map Extent
East Applegate Ridge Trail
Griffin Lane
Sterling Creek Rd
Jack-Ash Trail
NC29-4
29-4
NC29-1
NC29-5
29-5
NC29-8
NC29-2
NC29-6
NC29-3
NC29-7
NC28-1
32-2
NC32-2
NC32-5
32-1
NC32-3
NC32-1
NC33-3
NC32-4
NC33-4
NC33-5
21-1
Miles
0 0.075 0.15 0.3 0.45 0.6
Bear Grub Planning Area
Proposed Haul Routes
Temporary Construction
New Road Construction
Proposed Roadside Maintenance
Hazardous Fuels Reduction
Riparian Reserve Thinning
Selective Harvest
Proposed Jack-Ash Trail Phase 2 Project
Bureau of Land Management
County route
Forest Service
Other state route
Private road (no symbol)
Not Known
Bureau of Land Management
Local Government
State
Private Individual or Company
100 Ft. Contours
Index
Intermediate
Streams
Perennial
Intermittent
Ephemeral

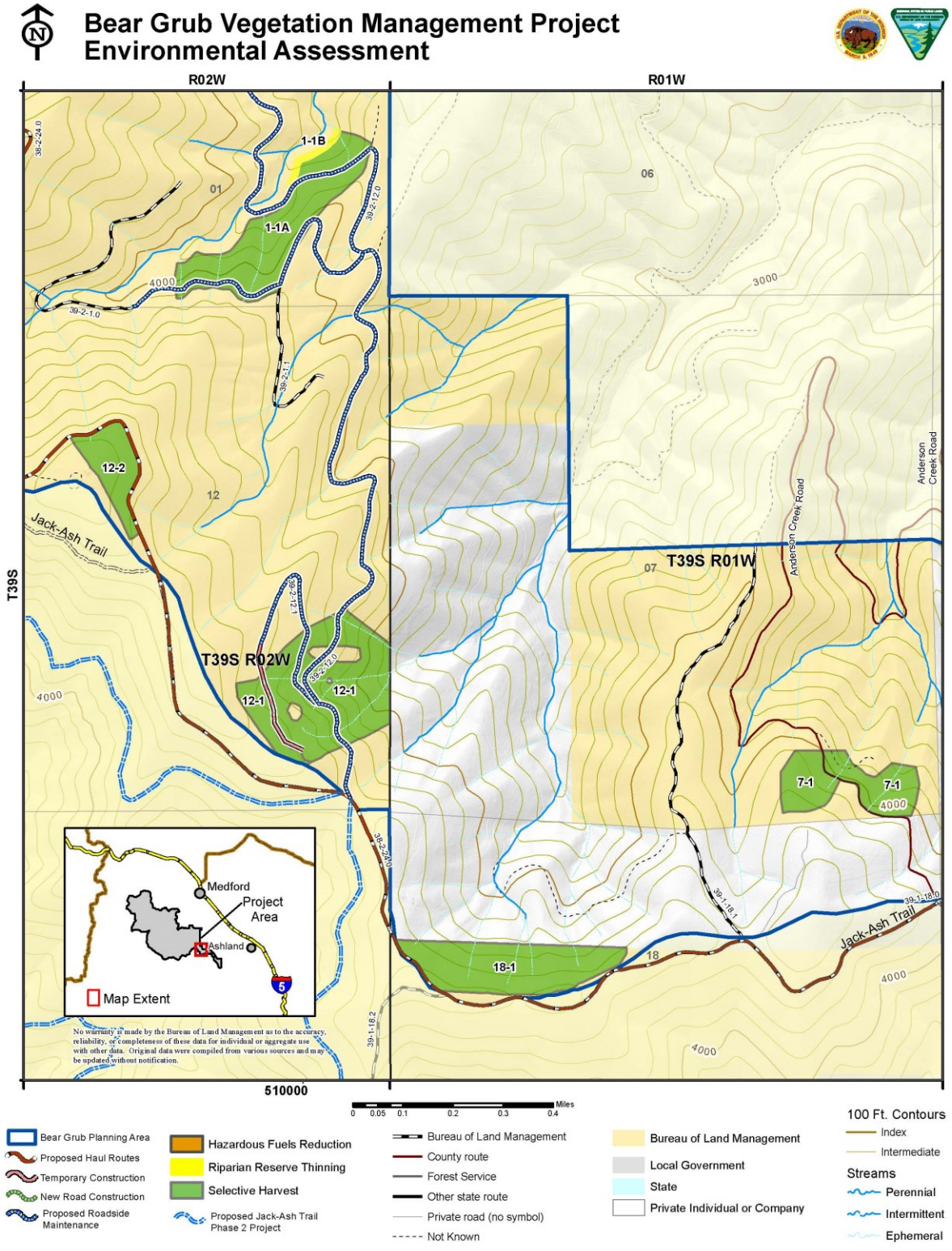
Map 6


Bear Grub Vegetation Management Project
Environmental Assessment
R02W
T38S
T38S R02W
Medford
Project Area
Ashland
Map Extent
No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources and may be updated without notification.
23-3B
23-3A
27-5
NC27-1
27-6
27-7
NC26-1
22
23
26
27
28
33
34
35
3000
4000
38-2-27.2
38-2-24.0
38-2-25.4
38-2-27.1
38-2-28.0
38-2-27.0
38-2-26.1
38-2-26.4
38-2-35.1
38-2-35.2
38-2-12.0
38-2-36.0
0 0.075 0.15 0.3 0.45 0.6 Miles
Bear Grub Planning Area
Proposed Haul Routes
Temporary Construction
New Road Construction
Proposed Roadside Maintenance
Hazardous Fuels Reduction
Riparian Reserve Thinning
Selective Harvest
Bureau of Land Management
County route
Forest Service
Other state route
Private road (no symbol)
Not Known
Bureau of Land Management
Local Government
State
Private Individual or Company
100 Ft. Contours
Index
Intermediate
Streams
Perennial
Intermittent
Ephemeral

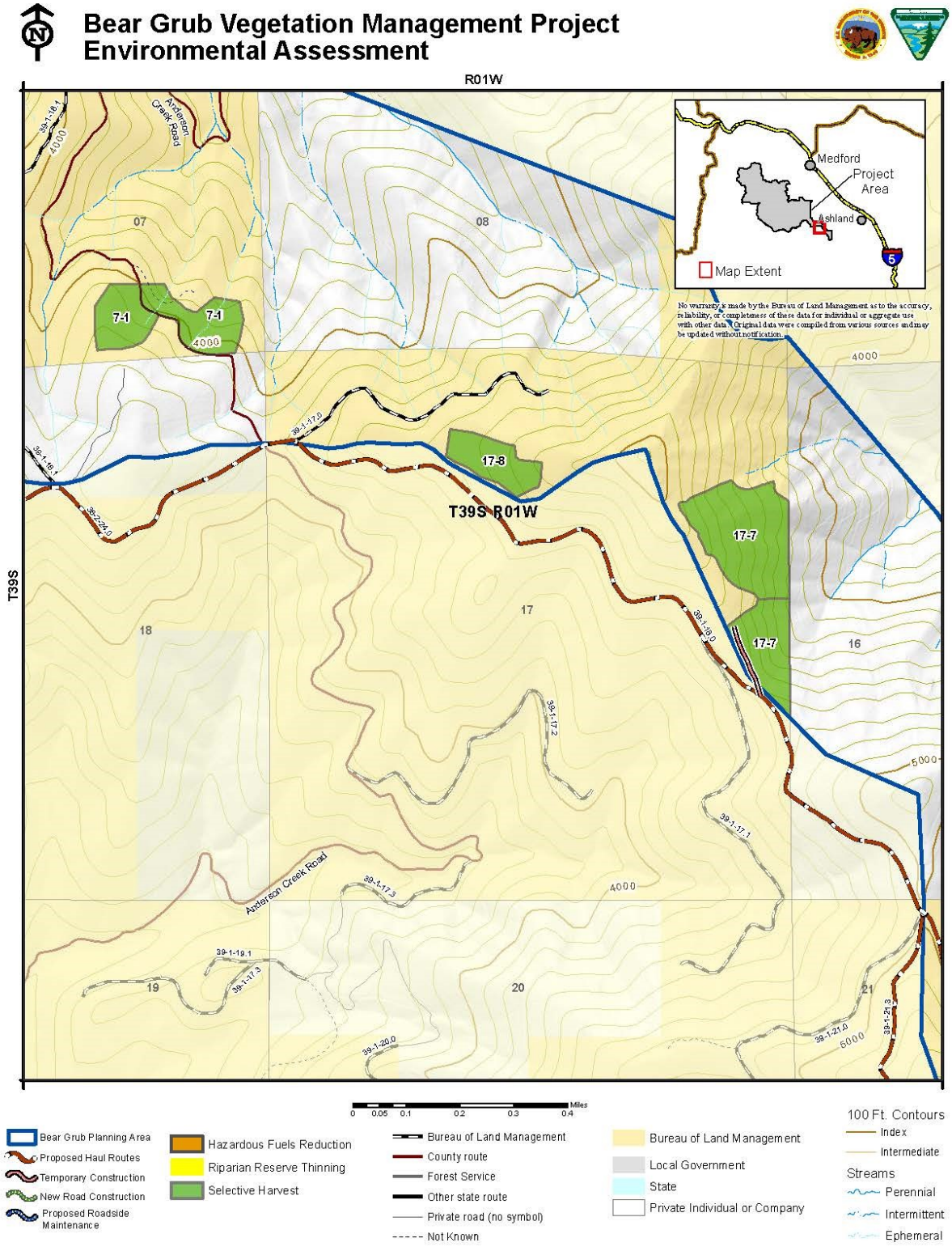
Map 7


Bear Grub Vegetation Management Project
Environmental Assessment
R02W
R01W
T38S R02W
T38S R01W
T39S R02W
T39S R01W
T38S
T39S
1-3
2-1
1-2
NC2-1
1-1B
1-1A
12-2
Jack-Ash Trail
Medford
Project Area
Ashland
Map Extent
510000
4673000
Miles
Bear Grub Planning Area
Proposed Haul Routes
Temporary Construction
New Road Construction
Proposed Roadside Maintenance
Hazardous Fuels Reduction
Riparian Reserve Thinning
Selective Harvest
Proposed Jack-Ash Trail Phase 2 Project
Bureau of Land Management
County route
Forest Service
Other state route
Private road (no symbol)
Not Known
Bureau of Land Management
Local Government
State
Private Individual or Company
100 Ft. Contours
Index
Intermediate
Streams
Perennial
Intermittent
Ephemeral

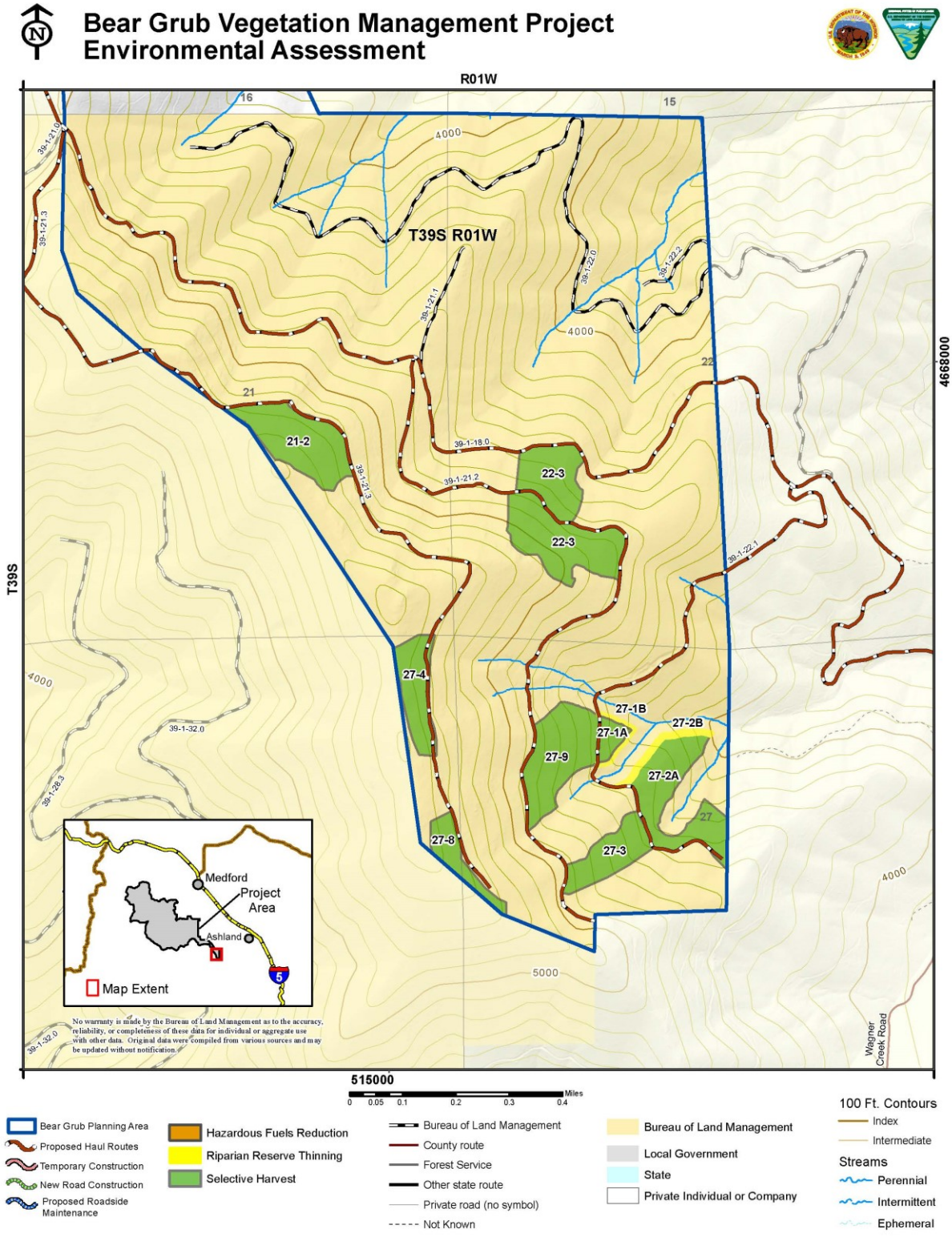
Map 8


Bear Grub Vegetation Management Project
Environmental Assessment
R02W
R01W
T39S
T39S R02W
T39S R01W
1-1B
1-1A
12-2
12-1
7-1
18-1
Jack-Ash Trail
Anderson Creek Road
Medford
Project Area
Ashland
Map Extent
No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources and may be updated without notification.
510000
Miles
Bear Grub Planning Area
Proposed Haul Routes
Temporary Construction
New Road Construction
Proposed Roadside Maintenance
Hazardous Fuels Reduction
Riparian Reserve Thinning
Selective Harvest
Proposed Jack-Ash Trail Phase 2 Project
Bureau of Land Management
County route
Forest Service
Other state route
Private road (no symbol)
Not Known
Bureau of Land Management
Local Government
State
Private Individual or Company
100 Ft. Contours
Index
Intermediate
Streams
Perennial
Intermittent
Ephemeral

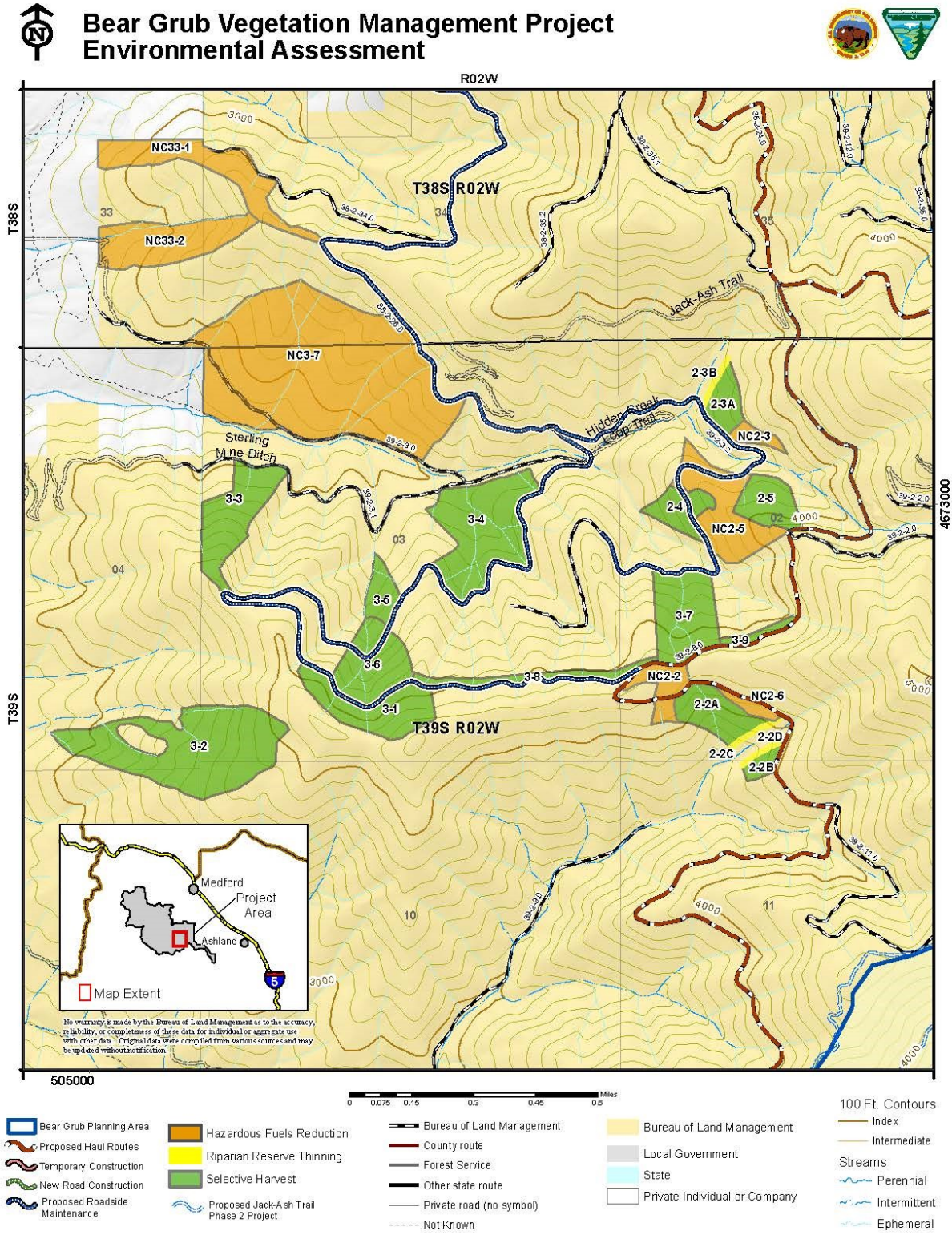
Map 9


Bear Grub Vegetation Management Project
Environmental Assessment
R01W
T39S R01W
T39S
Medford
Project Area
Ashland
Map Extent
No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources and may be updated without notification.
Anderson Creek Road
07
08
17
18
19
20
21
16
7-1
17-8
17-7
4000
5000
39-1-18.1
39-1-17.0
39-2-24.0
39-1-18.0
39-1-17.2
39-1-17.1
39-1-17.3
39-1-19.1
39-1-20.0
39-1-21.0
39-1-21.3
0 0.05 0.1 0.2 0.3 0.4 Miles
Bear Grub Planning Area
Proposed Haul Routes
Temporary Construction
New Road Construction
Proposed Roadside Maintenance
Hazardous Fuels Reduction
Riparian Reserve Thinning
Selective Harvest
Bureau of Land Management
County route
Forest Service
Other state route
Private road (no symbol)
Not Known
Bureau of Land Management
Local Government
State
Private Individual or Company
100 Ft. Contours
Index
Intermediate
Streams
Perennial
Intermittent
Ephemeral

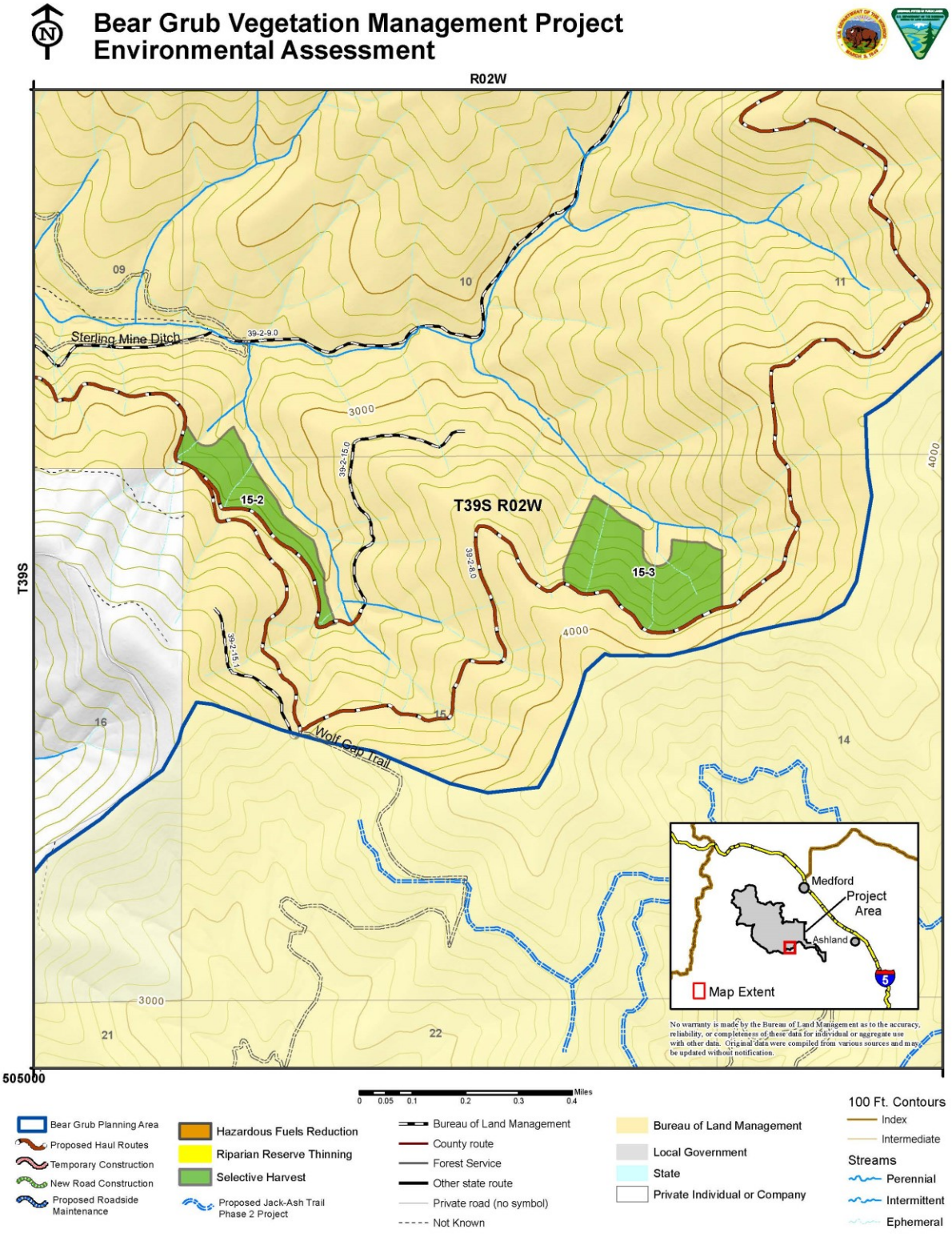
Map 10


Bear Grub Vegetation Management Project
Environmental Assessment
R01W
T39S R01W
T39S
21-2
22-3
22-3
27-4
27-1B
27-2B
27-1A
27-9
27-2A
27-8
27-3
Medford
Project Area
Ashland
Map Extent
No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources and may be updated without notification.
515000
4668000
Miles
Bear Grub Planning Area
Proposed Haul Routes
Temporary Construction
New Road Construction
Proposed Roadside Maintenance
Hazardous Fuels Reduction
Riparian Reserve Thinning
Selective Harvest
Bureau of Land Management
County route
Forest Service
Other state route
Private road (no symbol)
Not Known
Bureau of Land Management
Local Government
State
Private Individual or Company
100 Ft. Contours
Index
Intermediate
Streams
Perennial
Intermittent
Ephemeral

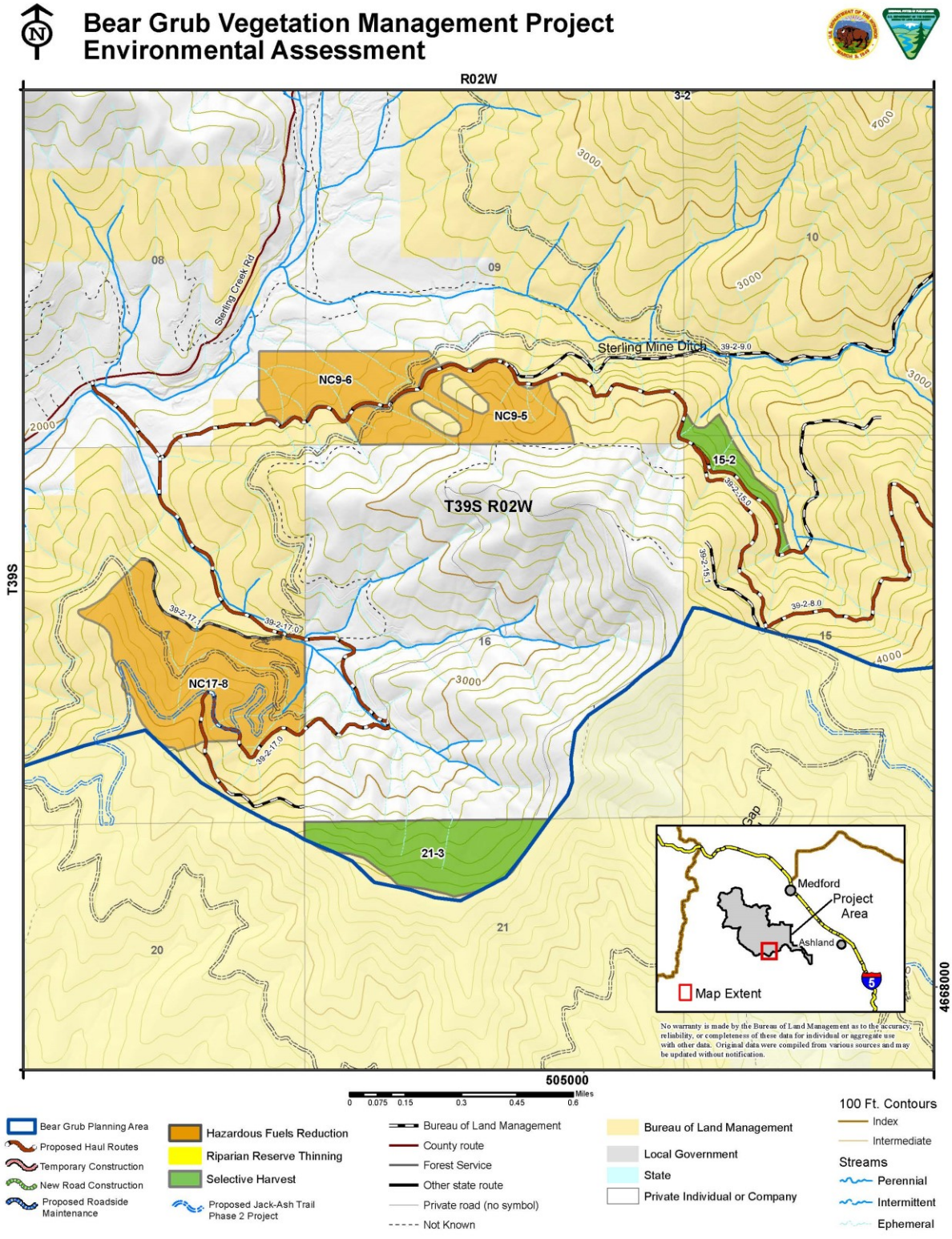
Map 11


Bear Grub Vegetation Management Project
Environmental Assessment
R02W
T38S R02W
T39S R02W
T38S
T39S
NC33-1
NC33-2
NC3-7
Jack-Ash Trail
Hidden Creek Loop Trail
Sterling Mine Ditch
2-3B
2-3A
NC2-3
2-5
2-4
NC2-5
3-3
3-4
3-5
3-6
3-1
3-2
3-7
3-9
3-8
NC2-2
NC2-6
2-2A
2-2D
2-2C
2-2B
4673000
505000
Medford
Project Area
Ashland
Map Extent
No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources and may be updated without notification.
Miles
0 0.075 0.15 0.3 0.45 0.6
Bear Grub Planning Area
Proposed Haul Routes
Temporary Construction
New Road Construction
Proposed Roadside Maintenance
Hazardous Fuels Reduction
Riparian Reserve Thinning
Selective Harvest
Proposed Jack-Ash Trail Phase 2 Project
Bureau of Land Management
County route
Forest Service
Other state route
Private road (no symbol)
Not Known
Bureau of Land Management
Local Government
State
Private Individual or Company
100 Ft. Contours
Index
Intermediate
Streams
Perennial
Intermittent
Ephemeral

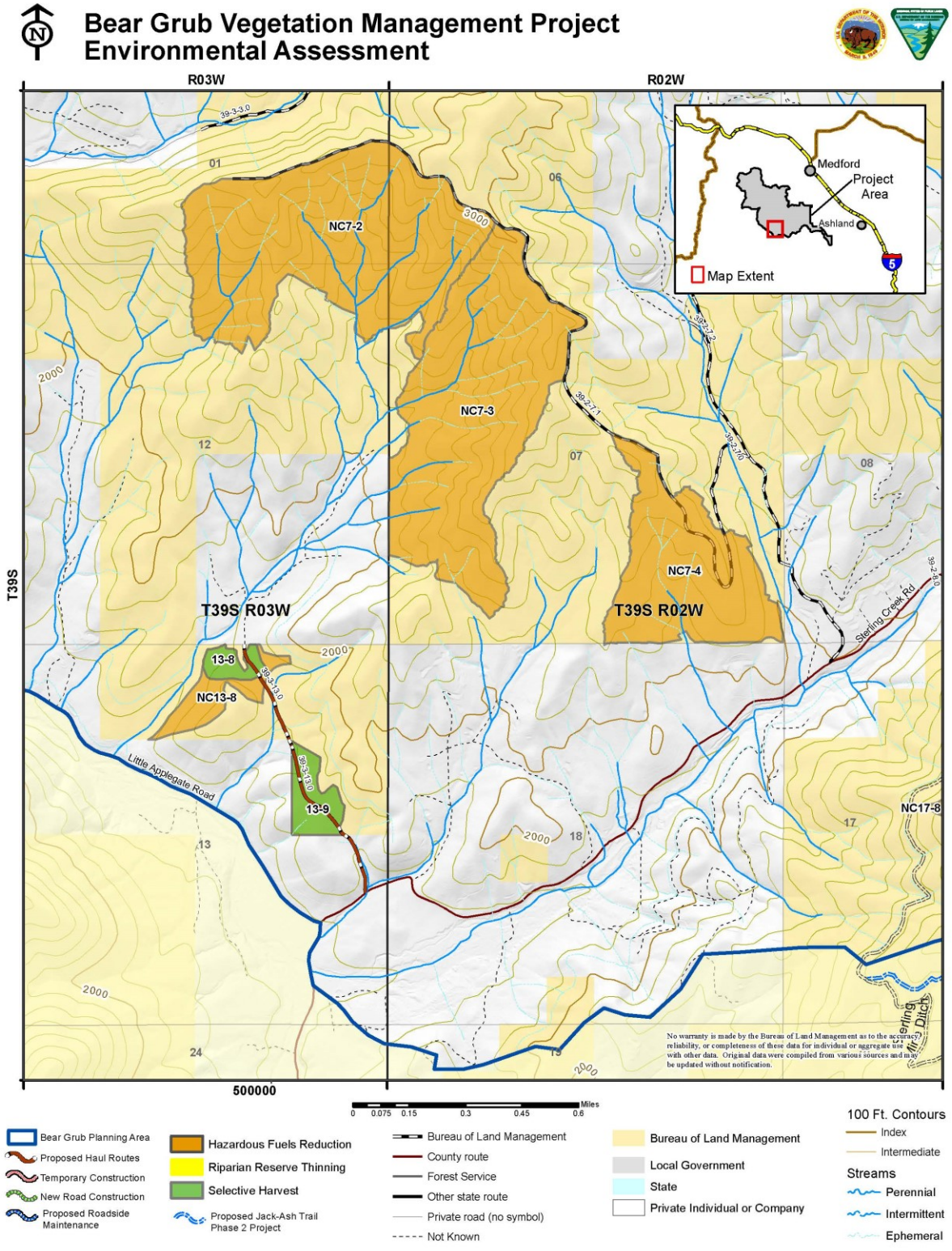
Map 12


Bear Grub Vegetation Management Project
Environmental Assessment
R02W
T39S
T39S R02W
Sterling Mine Ditch
39-2-9.0
39-2-15.0
39-2-8.0
39-2-15.1
Wolf Gap Trail
15-2
15-3
09
10
11
14
15
16
21
22
3000
4000
505000
Medford
Project Area
Ashland
Map Extent
No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources and may be updated without notification.
0 0.05 0.1 0.2 0.3 0.4 Miles
Bear Grub Planning Area
Proposed Haul Routes
Temporary Construction
New Road Construction
Proposed Roadside Maintenance
Hazardous Fuels Reduction
Riparian Reserve Thinning
Selective Harvest
Proposed Jack-Ash Trail Phase 2 Project
Bureau of Land Management
County route
Forest Service
Other state route
Private road (no symbol)
Not Known
Bureau of Land Management
Local Government
State
Private Individual or Company
100 Ft. Contours
Index
Intermediate
Streams
Perennial
Intermittent
Ephemeral

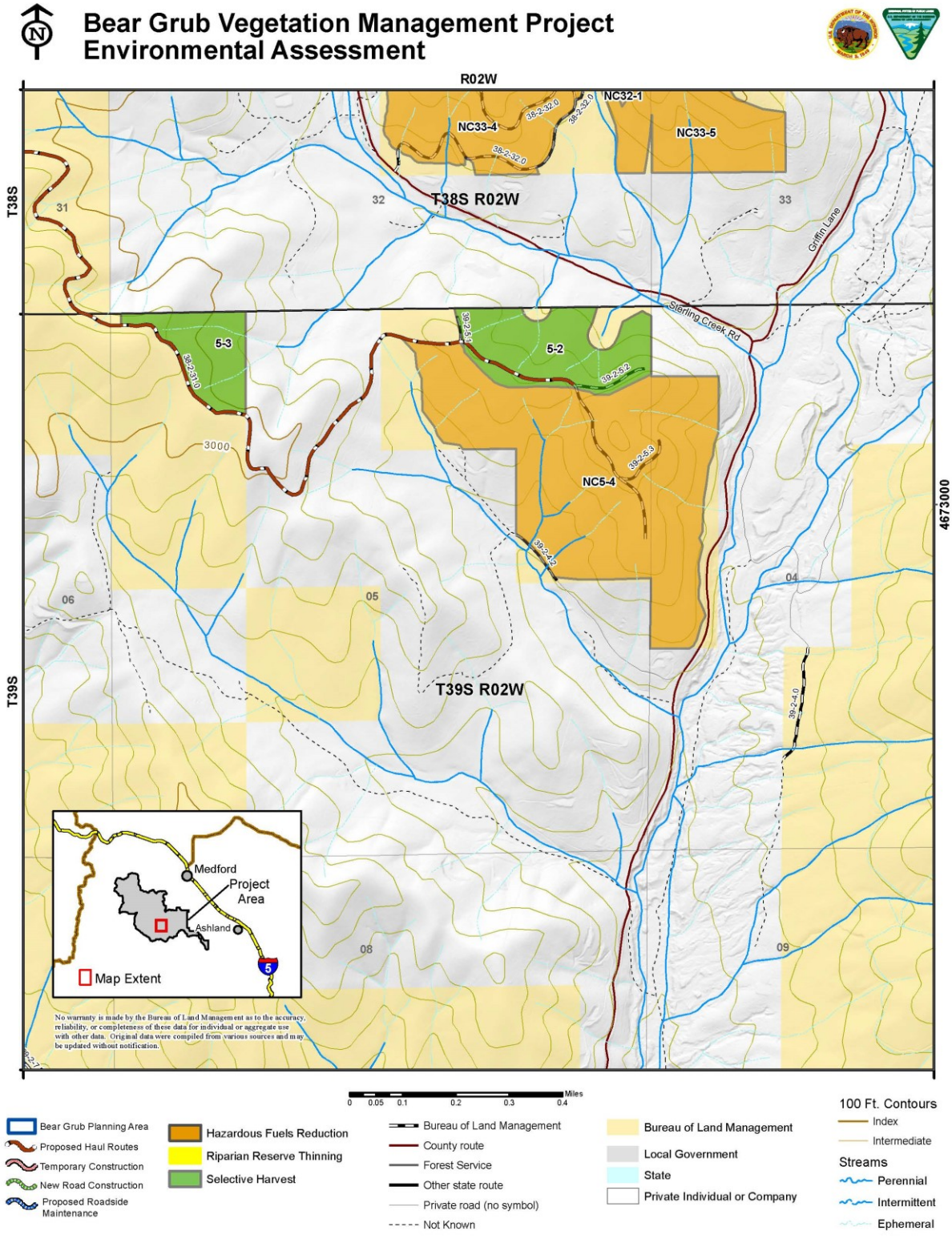
Map 13


Bear Grub Vegetation Management Project
Environmental Assessment
R02W
T39S R02W
T39S
Sterling Creek Rd
Sterling Mine Ditch
NC9-6
NC9-5
NC17-8
15-2
21-3
39-2-9.0
39-2-15.0
39-2-15.1
39-2-8.0
39-2-17.1
39-2-17.0
39-2-17.0
Medford
Project Area
Ashland
Map Extent
No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources and may be updated without notification.
505000
4668000
Miles
0 0.075 0.15 0.3 0.45 0.6
Bear Grub Planning Area
Proposed Haul Routes
Temporary Construction
New Road Construction
Proposed Roadside Maintenance
Hazardous Fuels Reduction
Riparian Reserve Thinning
Selective Harvest
Proposed Jack-Ash Trail Phase 2 Project
Bureau of Land Management
County route
Forest Service
Other state route
Private road (no symbol)
Not Known
Bureau of Land Management
Local Government
State
Private Individual or Company
100 Ft. Contours
Index
Intermediate
Streams
Perennial
Intermittent
Ephemeral

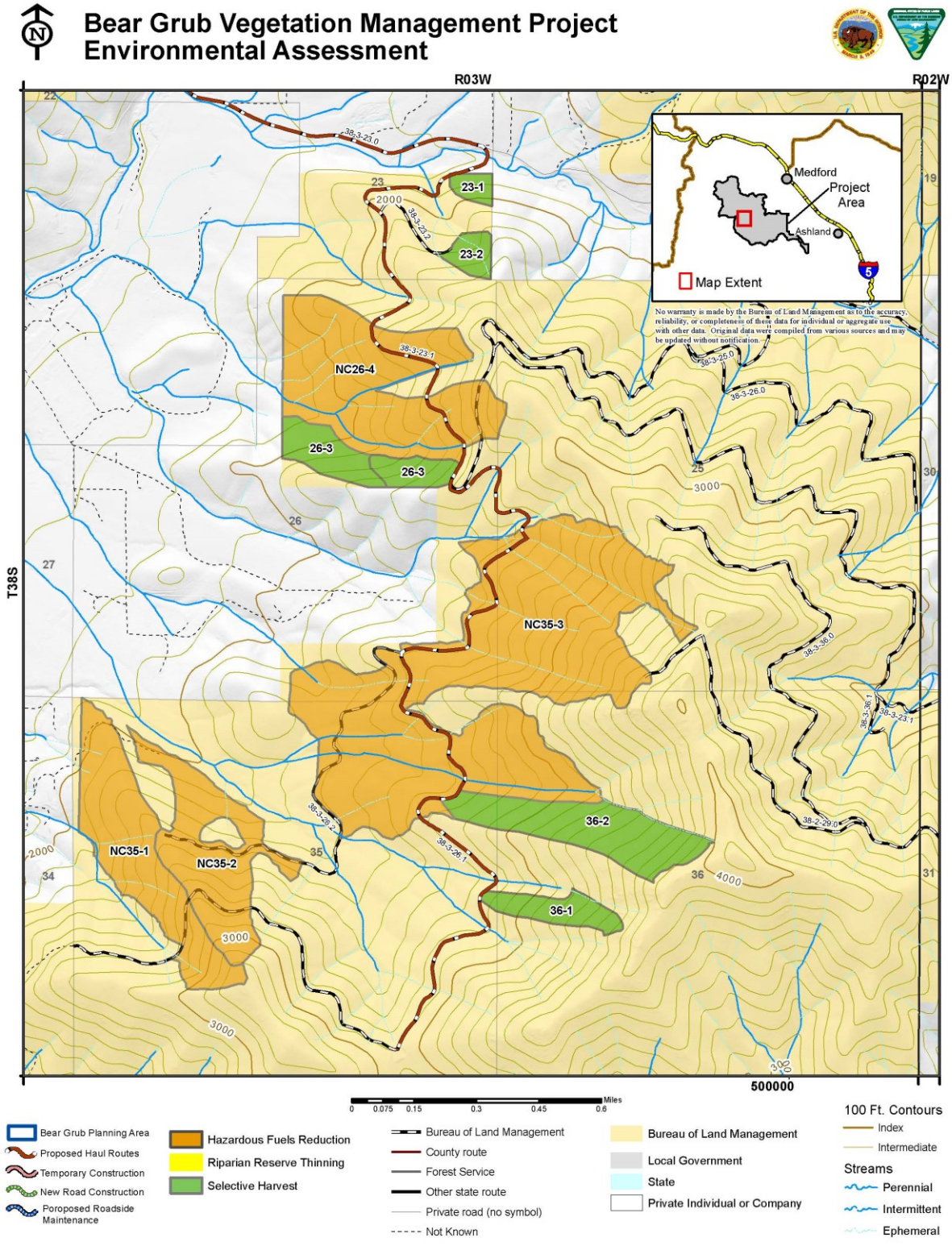
Map 14


Bear Grub Vegetation Management Project
Environmental Assessment
R03W
R02W
T39S
T39S R03W
T39S R02W
NC7-2
NC7-3
NC7-4
NC13-8
13-8
13-9
NC17-8
Medford
Project Area
Ashland
Map Extent
Sterling Creek Rd
Little Applegate Road
Sterling Mine Ditch
500000
Miles
0 0.075 0.15 0.3 0.45 0.6
No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources and may be updated without notification.
Bear Grub Planning Area
Proposed Haul Routes
Temporary Construction
New Road Construction
Proposed Roadside Maintenance
Hazardous Fuels Reduction
Riparian Reserve Thinning
Selective Harvest
Proposed Jack-Ash Trail Phase 2 Project
Bureau of Land Management
County route
Forest Service
Other state route
Private road (no symbol)
Not Known
Bureau of Land Management
Local Government
State
Private Individual or Company
100 Ft. Contours
Index
Intermediate
Streams
Perennial
Intermittent
Ephemeral

Map 15


Bear Grub Vegetation Management Project
Environmental Assessment
R02W
T38S
T39S
T38S R02W
T39S R02W
NC32-1
NC33-4
NC33-5
NC5-4
5-2
5-3
38-2-32.0
38-2-31.0
39-2-5.1
39-2-5.2
39-2-5.3
39-2-4.2
39-2-4.0
Griffin Lane
Sterling Creek Rd
3000
4673000
31
32
33
04
05
06
08
09
Medford
Project Area
Ashland
Map Extent
No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources and may be updated without notification.
Miles
0 0.05 0.1 0.2 0.3 0.4
Bear Grub Planning Area
Proposed Haul Routes
Temporary Construction
New Road Construction
Proposed Roadside Maintenance
Hazardous Fuels Reduction
Riparian Reserve Thinning
Selective Harvest
Bureau of Land Management
County route
Forest Service
Other state route
Private road (no symbol)
Not Known
Bureau of Land Management
Local Government
State
Private Individual or Company
100 Ft. Contours
Index
Intermediate
Streams
Perennial
Intermittent
Ephemeral

Map 16


Bear Grub Vegetation Management Project
Environmental Assessment
R03W
R02W
T38S
Medford
Project Area
Ashland
Map Extent
No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources and may be updated without notification.
23-1
23-2
NC26-4
26-3
26-3
NC35-3
36-2
36-1
NC35-1
NC35-2
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38-3-26.0
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38-3-36.1
38-3-23.1
38-2-29.0
38-3-26.2
38-3-26.1
2000
3000
4000
500000
Miles
0 0.075 0.15 0.3 0.45 0.6
Bear Grub Planning Area
Proposed Haul Routes
Temporary Construction
New Road Construction
Poroposed Roadside Maintenance
Hazardous Fuels Reduction
Riparian Reserve Thinning
Selective Harvest
Bureau of Land Management
County route
Forest Service
Other state route
Private road (no symbol)
Not Known
Bureau of Land Management
Local Government
State
Private Individual or Company
100 Ft. Contours
Index
Intermediate
Streams
Perennial
Intermittent
Ephemeral

B.5 Implementation Monitoring

The accomplishment of much of implementation monitoring is in the day-to-day work by BLM employees. Project supervisors, contract inspectors, and timber sale administrators review the work and assure compliance with the regulations and stipulations in the applicable administrative documents. The implementation of most of these actions described under the alternatives are through a timber sale, service contract or stewardship agreement. In the case of contracts, the accomplishment of implementation monitoring is through BLM's contract administration process. PDFs from the project description in the EA are incorporated into contracts as required contract specifications. BLM contract administrators and inspectors monitor the daily operations of contractors to ensure the implementation of the contract specifications are as designed. The inspection reports would be shared with the Field Manager and Project Lead. If work is not being implemented according to contract specifications, contractors are ordered to correct any deficiencies. If unacceptable work continues, suspension of contracts and/or monetary penalties can be applied. Coordination with resource specialists to develop workable solutions would occur when site-specific difficulties arise.

The BLM would monitor the extent of NSO habitat affected by the proposed Bear Grub Project to ensure that those effects were consistent with the analysis in this EA and in relevant consultation documents. The Medford District developed a *Guide for Planning and Implementing Vegetation Management Projects* (USDI BLM 2015b) to establish six steps and five checkpoints to ensure that projects are consistent with National Environmental Policy Act (NEPA) documents and with the Endangered Species Act (ESA) Section 7 consultation requirements. The silviculturist and wildlife biologist would develop forest treatment prescriptions which are passed onto the marking crew which will delineate the treatment units and tree marking. The silviculturist, in consultation with the wildlife biologist and other specialists, monitors the marking process to ensure it meets the consultation requirements and stand management objectives. Modifications to tree marking may occur as needed. The Contract Administrator monitors the harvesting activities and ensures operator compliance with the contract stipulations. Lastly, the wildlife biologist monitors a sub-set of units post-treatment to evaluate consistency between implementation, NEPA analysis, and ESA consultation requirements; this includes evaluating canopy cover. The BLM would report the results to the Service through annual monitoring reporting requirements. Monitoring of the implementation of Project Design Criteria (PDC) is through the BLM sale-contracting program in coordination with the field office wildlife biologist.

At a broader level, the BLM has an approved implementation monitoring plan outlined in the 2016 ROD/RMP (2016 ROD/MP, pp. 137-162) and the BLM will continue to rely on the existing interagency effectiveness monitoring modules to address key questions about whether implementing actions consistent with the RMP is effectively meeting RMP objectives (2016 ROD/RMP, p. 137). Sampling at the administrative unit level (e.g., Medford District) will occur and management actions proposed under this project may be included in the sampling. For example, under the RMP monitoring plan, monitoring question M14 requires that at least one completed timber sale per field office shall be evaluated to answer whether the number of snags have been created in the appropriate size classes as described in the management direction (2016 ROD/ RMP, p. 145). The monitoring plan includes a wide range of monitoring questions to address management direction for land use allocations and resources. Refer to Appendix B of the 2016 ROD/RMP for more information (2016 ROD/RMP, pp. 137-162).

B.6 Alternatives Considered but Eliminated from Detailed Analysis

B.6.1 Reduce Road Density.

Background: An action alternative submitted by the public during scoping included a request for the BLM to reduce road density in the planning area. The BLM evaluated opportunities to decommission roads within the planning area to reduce the road density. Two roads previously decommissioned will be reopened for use as access to timber harvest units. Once the units are harvested the roads will again be

decommissioned (long term closure) until needed for future actions such as subsequent timber sales. Very few additional opportunities for road decommissioning remain as many roads in the planning area are encumbered with right-of-way agreements for access to private timber lands and/or are identified for use to support timber harvest under this project.

Rationale: The BLM took a hard look for opportunities to reduce road density, while still providing a transportation system that can support harvest that would produce timber to contribute towards the Medford District's ASQ, which is the BLM's purpose and need for this project (*Section 1.3*). The BLM did not identify any opportunities to reduce road density without compromising the ability to produce timber from the selected stands to contribute to the attainment of the declared ASQ for the Medford SYU.

While Alternative 4, analyzed in this EA, would not reduce road densities in the planning area, it presents an alternative where no new or temporary roads would be constructed.

B.6.2 Provide nearby rock pits.

Background: We received an alternative to allow the contract holder to develop nearby rock quarries for the processing and supply of crushed rock to allow for timber haul during wet or snowy conditions (winter or wet season haul).

- Current Condition of Roads, Aggregate roads identified in Appendix B, Table B-3 as "thin" could have rock added and then would be available for winter haul.
- Currently there are a few stock piles available along the haul roads but not enough to rock all the roads requiring it.
- There are approximately 20 miles of roads that would require rock.
- If the they were rocked, the roads could be used in wet weather and a snow permit could be issued if there is enough snow on the ground, over 4", and freezing conditions. Timber hauling on muddy roads would not be permitted because once in a muddy condition it would be too late to add. Once road conditions dried out and rock was added then haul may be permitted.

Rationale: The development of rock quarries on BLM managed land was considered but not analyzed because of the availability of nearby rock quarries and the cost the timber contract holder would have to pay for developing the quarries for the rocking of the Bear Grub VMP project roads.

Private Pits. Private pits are available in the area, Blue Mountain Rock and Jonny Cat are the closest. The cost of rock from the commercial rock pits generally cost $60,000 per mile, mostly due to haul costs. The benefit to the timber purchaser would be that there would be no mobilization, set up or demobilization fees.

Development of Rock Quarry on BLM. Mobilization and development of a rock crushing operation is expensive and because of the long distances between units may require more than one rock pit, to reduce haul costs. Processing the rock would require multiple rock crushing plants or one rock crushing plant that mobilized and demobilized multiple times as the units were harvested in each location. The rock quarries on BLM lands require quarry boring which has not occurred and would have to be completed prior to quarry authorization and development. Cost of material is still at the contractor's expense as determined by the minerals department. The development of a quarry would require one or more quarry plans. There is no centralized Quarry so the cost would be higher than if there were one quarry, such as the private quarries.

B.6.3 Use only roads to access and harvest units.

Background: The BLM received comments about whether the exclusive use of roads would place a lesser burden of cost on the prospective purchaser of the commercial contract.

Rationale: The roads and forestry specialists took a hard look at the ability to access units, and once near the units what method would be required to harvest the timber. Areas that were deemed too steep, over 20%, were identified as being unavailable for road construction.

Construction of new roads must meet established BLM engineering design standards (2016 ROD/RMP, **Appendix C, p. 95**). In addition to BLM design standards in the 2016 ROD/RMP directs the BLM to "Avoid road construction and timber harvest on unstable slopes where there is a high probability to cause a shallow, rapidly moving landslide that would likely damage infrastructure (e.g., BLM or privately owned roads, State highways, or residences) or threaten public safety" (2016 ROD/RMP, pp. 109, 110). Best Management Practices (BMPs)in the 2016 ROD/ RMP direct the BLM to locate roads and landings to reduce total transportation system mileage. Renovate or improve existing roads or landings when it would cause less adverse environmental impact than new construction (2016 ROD/RMP, 167).

The 2016 ROD/ RMP BMPs (R 1, p. 167) directs the BLM to minimize road construction on slopes over 60%. Roads to some units could be built as full bench roads, roughly two miles, but if constructed to BLM guidelines the cost to the potential bid winner would have been over $100,000 per mile. Any road design that is on grades over 8% requires ditch and relief culvert construction. These would then be permanent roads on steep slopes that would require continual maintenance to keep them up to BLM guidelines. In the proposed action there are approximately 70 miles worth of road that need maintenance. Construction and maintenance costs of more roads would potentially make a deficit timber sale.

Under Alternative 3, the alternative with the most acres, there were 30 units or parts of units proposed for helicopter treatment (Appendix B, Table B-5). These units equated to approximately 640 acres. Due to the lack of road access, ability to build roads on excessive slopes, or the economic costs, 26 of the units identified for helicopter harvest would have been dropped. If helicopter harvest were not used, approximately 240 acres would be left untreated. Four of the units would be open to endline harvest from existing roads, leaving the majority of the 51 acres within the units untreated.

The all roads alternative, when considered, would not meet the purpose and need.

B.6.4 Retain mature forests and large diameter trees (>20 inches DBH).

Rationale: The modeling supporting the declared ASQ did not limit harvests to less than 20 inches but, for UTA, the size and age limit was less than 36 inches and established prior to 1850. Eventually most trees would grow larger than 20 inches, the harvest limit for this alternative, and the shade cast by them would not allow for the regrowth of trees less than 20 inches. Also, The 2016 ROD/RMP (p. 127) states that *"the BLM will not defer or forego timber harvest of stands in the HLB for reasons not described in the management direction and this appendix [Appendix A, Guidance for Use of the RMP]."*harvesting trees less than 20 inches would leave behind a relative density of trees greater than 45% after harvest, which would exceed the maximum retention called for in the RMPs management direction for the UTA LUA.

Since this alternative would not be consistent with management direction in the 2016 ROD/RMP, the BLM did not analyze this alternative in detail.

C. Appendix: Appendices to Chapter 3

C.1 Ongoing and Foreseeable Actions

Medford District Integrated Vegetation Management: The Medford District is in the early stages of preparing a programmatic environmental assessment to address a range of integrated vegetation management activities, generally focused on fuels reduction, restoration and forest health, and threatened and endangered species recovery using a suite of non-commercial (such as mechanical treatment or prescribed fire) and commercial vegetation treatments. Activities under this EA may occur in all land use allocations, including Riparian Reserves, and would be consistent with the 2016 ROD/RMP. Acres of treatment under this environmental assessment may vary from year to year depending on funding availability. Specific treatment acreage limits have not yet been proposed for this environmental assessment.

Development of Future Phases of existing Trail and New Trails: There are currently three designated hiking trails (East Applegate Ridge Trail, Jack-Ash Trail, Sterling Mine Ditch Trail) located next to or go through the treatment units. The EA for the hiking trail Jack-Ash Trail, Phase II, is in the final stages of completion and a decision may be issued prior to the completion of this project. Future phases of the Jack-Ash Trail are proposed to connect Jacksonville to Ashland. Included in the development of the trail are trail heads with kiosks and room for parking.

Ongoing Maintenance of Recreational Sites and Trails: The districts conduct routine maintenance activities at existing designated and dispersed recreation sites (including campgrounds) and recreation trails. Activities include routine repair or replacement of existing facilities or features damaged through natural or human causes; grounds maintenance; hazard tree felling; tread construction or repair within trail corridors; installation of or repair to trail drainage structures, retaining walls, signs, bridges; short trail reroutes; and trail obliteration.

Future Harvest of the Same Units if the No Action Alternative is Chosen: If the No Action alternative is selected or the project is cancelled the units scheduled for commercial treatment would be placed back into outyear planning as potential units for harvest. The units may be selected as part of the same treatment units as Bear Grub or be grouped with other units to create a new project area. The analysis of the units as part of a future timber harvest may be as soon as five years.

Timber Harvests on Private Lands: Throughout the checkerboard ownership within the districts, the BLM assumes that late-seral forest stands on private land have been or will be converted to early-seral conditions and large industrial landowners will continue to manage those lands primarily for timber production on a 40 to 60 year basis (2016 PRMP/FEIS, p. 173). The BLM assumes intensive timber management on private lands will include the use of herbicides to control competing vegetation, resulting in highly simplified vegetative communities. The BLM assumes that industrial harvesting will follow the Oregon Forest Practices Act and other such requirements. The actual timing of any timber harvest on private lands is dependent on many factors, including valuations based on supply/demand and ownership.

Upper Applegate Watershed Restoration Project: The project area is located to the south west of the Bear Grub VMP primarily on U.S. Forest Service managed lands but incorporates a small portion of BLM managed lands. The Forest Service is proposing to decrease the vegetation density in treated areas using prescribed fire, thinning, and a combination of these actions in managed and unmanaged stands. These density reduction actions are proposed in order to lower the probability of tree mortality from pine bark beetles both directly by creating more open habitats less favorable to bark beetle success and indirectly by improving host vigor through reduced competition for light and nutrients.

Tree Planting: A post-harvest assessment will occur in commercial units to determine if there is a need for tree planting and scalping in Group Selection Openings. Openings that require tree planting and scalping would be reforested to at least 150 trees per acre (UTA) and 75 trees per acre (LSR), with a mixture of tree species appropriate to the site, within five years of harvest (2016 PRMP/FEIS, p. 68, 73). The BLM would complete a categorical exclusion for sites that require tree planting and scalping actions. Tree planting and scalping is not part of a proposed action under this EA.

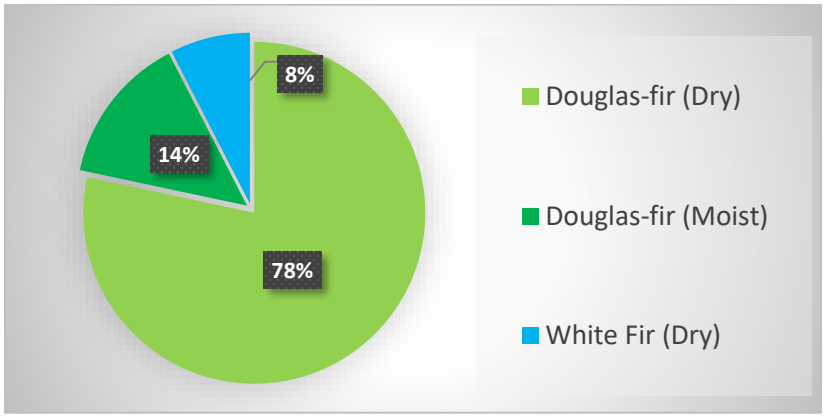
Fuels Reduction Treatments: Approximately 150 acres of non-commercial fuels treatments remain to be completed under the Nedsbar EA Project.

Medford District Routine Road and Water Source Maintenance: This project authorizes regular and periodic maintenance of BLM-administered roads within the road right-of-way, including emergency maintenance and hazard tree removal as authorized under the Medford District Road and Pump Chance Routine Maintenance Categorical Exclusion and Decision Record (DOI-BLM-ORWA-M000-2017-0003-CX).

C.2 Current Vegetation Type in the Bear Grub Project Area

The Project Area is comprised of three forested plant association groups: Douglas-fir-Dry, Douglas-fir-moist, and white fir-dry (Figure C-1). Plant association, defined as a stand or group of stands made up of plants characterized by a definite floristic composition consisting of uniformity in physiognomy and structure and uniform habitat conditions descriptions within these series can be found in the Field Guide to the Forested Plant Associations of Southwestern Oregon (Atzet 1996). Douglas-fir plant associations comprise 92 percent of forestland in the project area. These associations are predominantly found in warm and dry site conditions. The three most prevalent in the Project Area are the PSME-PIPO/RHDI6, PSME-CADE27/BEPI2, and PSME-ABCO/SYMO plant associations according to the Field Guide to the Forested Plant Associations of Southwestern Oregon. California black oak, ponderosa pine, and Pacific madrone are commonly present with Douglas fir dominating the overstory. In the higher elevations of the Project Area Incense cedar, sugar pine, and white fir are more prevalent in the overstory and understory.

Figure C-1. Plant Associations Groups in the Bear Grub Project Area



C.3 Fire and Fuels Supporting Information

C.3.1 Methodology

The NEXUS 2.1 crown fire hazard assessment software developed by Scott and Reinhardt and available from Pyrologix http://pyrologix.com/downloads/, is a useful tool to compare crown fire potential for different forest stands, and was used to compare the effects of alternative proposed actions for combined commercial, small-diameter, and prescribed fire actions on crown fire potential. Nexus links separate models of surface and crown fire behavior, to calculate indices of relative crown fire potential (e.g. crowning index and torching index). The BLM used a standard approach to derive a relative resistance to stand-replacement fire for Mixed relative resistance to stand-replacing fire categories, based on review of typical wind speeds (see weather discussion below) and crowning index (CI) and torching index (TI). The rating was as follows: CI <20 mph = Low; CI 20-30 mph = Moderate; CI >30 mph = High, unless TI<30 mph, then = Moderate. A crowning index greater than a torching index, indicates that the stand would support a crown fire entering from adjacent areas at the given CI, however crown fire initiation within the stand is not likely, until TI wind speed occurs.

Crowning index (mph): "The open (20 foot) wind speed at which active crown fire is possible for the specified fire environment" (Scott and Reinhardt 2001). Crowning index can be used to compare relative susceptibility of stands to crown fire. An increase in the crowning index corresponds to a decreased likelihood of an active crown fire moving through a stand, particularly one impacting a given stand from an adjacent area. Crowning index provides an index for relative comparison-Fule et al. (2004) note, "…it would be unrealistic to expect that crowning index values are precise estimates of the exact windspeed at which any real crownfire will be sustained. However, it is reasonable to compare crowning index values across space and time to assess crown fire susceptibility in relative terms."

Torching index (mph): "The open (20-foot) wind speed at which crown fire activity can initiate for the specified fire environment" (Scott and Reinhardt 2001). An increased torching index would result in a decreased likelihood of torching initiating within the stand. Torching events within a stand can lead to an active crown fire depending on weather, surface, and canopy fuel conditions. As with crowning index, torching index may be interpreted as the relative susceptibility forests may have to tree torching also called "passive crown fire".

C.3.2 Analytic Assumptions and Fire Behavior Inputs

Wildland Fuel Profile Continuity
Canopy base height and surface fire intensity are key variables (along with the moisture content of leaves and branches) in determining the transition between surface fire to torching or passive crown fire. Canopy bulk density (or connectivity) then differentiates between passive and active crown fire (VanWagner 1977).

Canopy Fuels (canopy connectivity (canopy cover and canopy bulk density) and large trees)
Canopy fuels consist of live and dead tree branches and crowns. Tree crowns can be separated or interlocking (i.e. canopy connectivity) and dense or sparse. Large trees, particularly of fire-resistant species, are an important component of fire-resistant stand structure (Martinson and Omi 2013, USDI BLM 2016b, pp. 243, 252).

A necessary input into NEXUS is available canopy fuel. The BLM used a value of 6 tons/acre for all model runs, based on estimates for Douglas-fir and Sierra Nevada mixed conifer, as presented by Scott and Reinhard (2002).

Ladder Fuels (canopy base height)

Ladder fuels typically consist of small trees and tall shrubs that span from the forest floor to the overstory canopy. The vertical arrangement of fuels refers to the continuity of fuels from the ground up through the overstory canopy, termed as canopy base height. Low vertical separation between surface and canopy fuels, or low canopy base height, is the most common vector for surface fire to transition into crown fire and is commonly identified as the ladder fuel component of the Wildland fuel profile. Canopy base height supplies information used in fire behavior models, to determine the point at which a surface fire will transition to a crown fire. This critical canopy base height (CBH) describes the lowest point in a stand where there is sufficient available fuel (>0.25 in diameter) to propagate fire vertically through the canopy. Specifically, CBH is defined as the lowest point at which the canopy bulk density is 0.012 kg m-3.

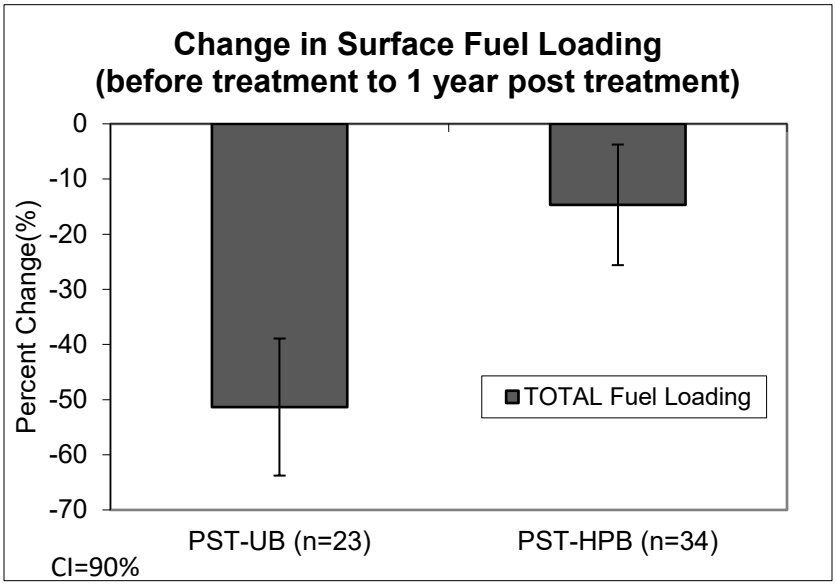
Removal of ladder fuels increases vertical and horizontal separation or discontinuity in the fuel profile and reduces the probability of surface fire flames ascending into and igniting tree crowns and subsequently decrease the likelihood of tree torching and crown fire initiation (Scott and Reinhard 2001, Van Wagner 1977, Pilot Joe Monitoring results). Application of prescribed fire, via underburning, can further raise canopy base height and reduce ladder fuels.

Surface Fuels (surface fire behavior fuel models)

Surface fuels consist of grasses, shrubs, small trees, litter and woody material on the forest floor and up to six feet from the surface (Scott and Burgan 2005) and are usually measured in tons per acre. Fine surface fuels consist of small diameter surface fuels (<3”), litter, grass, and shrubs and will ignite easily and burn rapidly at times producing high rates of spread and high flame lengths. Wildfires in light surface fuels react quickly to diurnal changes in relative humidity and wind. Large surface fuels consist of larger (>3" in diameter) limbs, down woody debris, logs and stumps that ignite and burn more slowly. Large surface fuels are more influenced by seasonal weather patterns and less influenced by changes in daily wind and moisture. Fire Behavior Fuel Models (FBFM) (Scott and Burgan 2005) are used to represent surface fuels and estimate potential surface fire behavior flame lengths and rates of spread under various environmental conditions (fuel moisture and wind scenarios). Surface fire behavior has a direct effect on fire severity, mortality, suppression tactics, and the initiation of crown fire. Rates of spread and flame lengths are key components affecting fire size and resistance to control. Surface fire behavior has a direct effect on fire severity, mortality, suppression tactics, and the initiation of crown fire, lower surface fuel loading produces lower flame lengths.

Handpile burning primarily reduces ladder fuels and does not reduce surface fuel loading as much as underburning (**Error! Reference source not found.**), thus changes to surface fuels are not pronounced. H owever, the very high load surface fire behavior fuel model Prescribed underburning is the most effective treatment at reducing surface fuels (Prichard et al. 2010, **Error! Reference source not found.**). In areas with high crown fire potential, or low resistance to replacement fire and high fuel loading, it is necessary to reduce ladder fuels, prior to introducing prescribed fire (i.e. underburning), in order to minimize mortality to the residual stand (Martinson and Omi 2013). Reducing ladder fuels would make it possible to use prescribed fire as a tool to reduce surface fuels (underburning) and increase canopy base height in these stands.

Figure C-2: Average percent change in total surface fuel loading from pre-treatment to one year after underburning (PST-UB) and one year after handpile burning (PST-HPB). Error bars indicate confidence interval of 90 percent and n indicates number of plots sampled. Data was collected on Medford District BLM-administered lands.



Figures C-2 and C-3 below illustrate predicted flame length and rate of spread for common standard fire behavior fuel models (See Affected Environment details in **Error! Reference source not found.**)

Figure C-2 Comparison of flame length (FL) and Rate of Spread (ROS) under dry fuel moisture scenario (Fine fuels – 1hr@6%, 10hr@7%, and 100hr@8%; herbaceous@60%; and woody @90%) for common mixed-conifer woodland and non-conifer fuel models from low to high load with 30-50% canopy cover using CompareModel495 spreadsheet available from [http://pyrologix.com/.](http://pyrologix.com/)

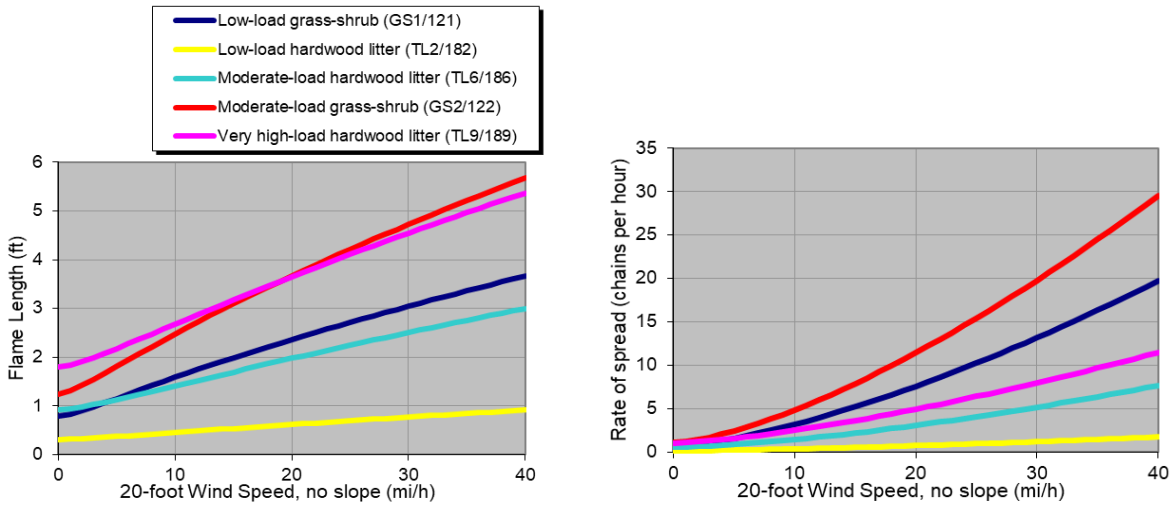
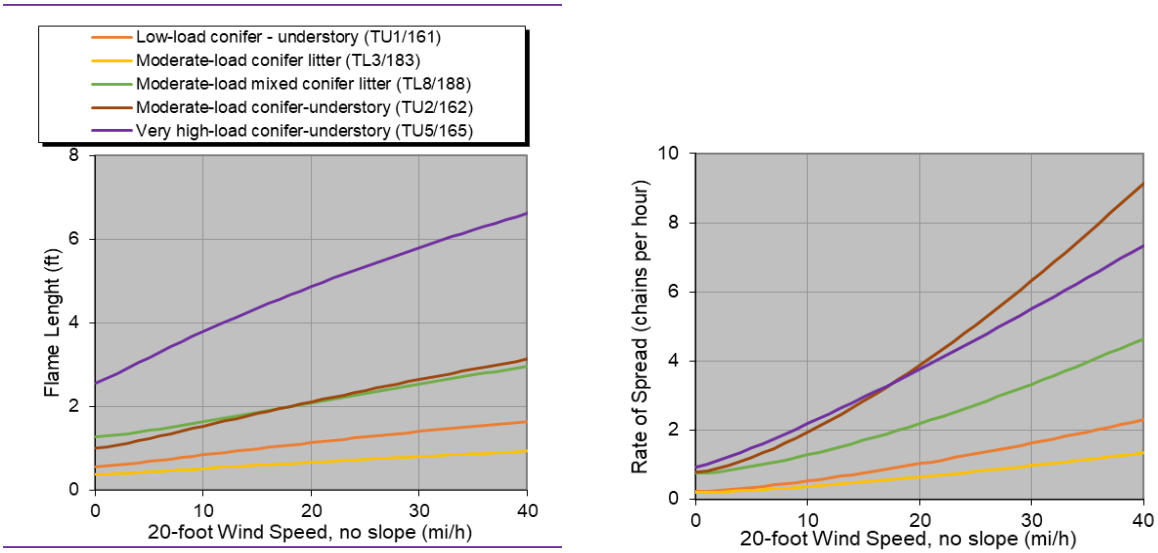


Figure C-4 Comparison of flame length (FL) and Rate of Spread (ROS) under dry fuel moisture scenario (Fine fuels – 1hr@6%, 10hr@7%, and 100hr@8%; herbaceous@60%; and woody @90%) for common conifer forested fuel models from low to high loading. with 30-50% canopy cover using CompareModel495 spreadsheet available from http://pyrologix.com/.



Fuel heterogeneity

There is considerable evidence that many historic frequent-fire dry forests were comprised of a fine-scale patchy composition of openings and clumps (Churchill et al. 2013, Hessburg et al. 2015, Larson and Churchill 2008, Taylor 2010, Larson and Churchill 2012, Lydersen et al. 2013, Churchill et al. 2017, Pawlikowski et al. 2019), creating vegetation or fuel patterns representative of frequent-fire dry forest low-mixed fire regime fuel loading (2016 PRMP/FEIS p.225-226). Among the many ways that variable and complex fine-scale heterogeneous patterning contributes toward stand resistance to replacement fire are heterogenous fuel profiles which may inhibit the spread of crown fires, patchy regeneration of diverse species to respond to disturbance, and variability in litter fall and surface fuel accumulations.

Reference conditions provide a robust guide for management targets related to fine-scale spatial pattering attributed to frequent low-mixed severity fire dry forest. As Churchill and other (2017) eloquently explained "the rationale for using reference conditions to guide management targets in dry forests is that historical forest conditions persisted through centuries of frequent disturbances and significant climatic fluctuation while sustaining native biodiversity and other ecosystem services."

Reference conditions from western sites with low-mixed severity fire regimes provide valuable context for southwest Oregon to inform ecological relevant fine-scale patterning of forests functioning under a frequent low- mixed severity wildfire disturbance regime. At a mixed ponderosa pine-California black oak (*Quercus kelloggii*) forest in southern Cascades, California, akin to the drier gradients of southwest OR, Pawlikowski and others (2019) found that gaps comprised less than 30 percent of the 1 hectare plots (approximately 2.5 acres), in other words the maximum area in gaps was approximately 0.75 acres. Gaps were identified using an inter-tree distance algorithm for empty space greater than 9 meters (approximately 30 feet). Taylor (2010) quantified spatial patterning at the same site and found average gap size to be 585m^2 (0.14 acres), with a range in sizes from 100 to 2400 m^2 (0.02 – 0.6 acres), similar to results from six other ponderosa pine forest examinations, where gaps were between 0.02-0.64 ha (0.05 - 1.6 acres). Gaps were defined as areas with contiguous canopy cover less than 33%.

An examination of historic (1929) stand structure by Lydersen and others (2013) at a mixed-conifer site in central Sierra Nevada, California, representing the more productive end of gradients in southwest Oregon, found that at the 4 hectare plot scale (approximately 10 acres) gaps occupied approximately 35% of plot areas. In the 1929 forest, gaps were commonly smaller than 0.05 hectares (0.12 acres) and ranged from 0.01 – 0.4 ha (0.02 – 1 acres). Canopy cover averaged 45 percent for trees greater than 10cm (4 in dbh) and 36% for trees greater than 25 cm (10 in dbh).

Taylor (1995) examined aerial photos from 1944 three north -western Siskiyou County, California mixed evergreen forested watersheds, representing similar climate and vegetation as southwest Oregon. In 1944, these watersheds had had minimal human disturbance, with the exception of fire suppression, which became effective on a large scale in the region around 1941 (Atzet 1996). Taylor estimated that in 1944 openings occupied approximately 26 percent of the area. The openings were defined as 0.1 hectares or larger occupied by vegetation no greater than 1/3 of the surrounding stand and the mean size was 0.48 ha (or approximately 1.2 acres), while the median was 0.71 ha (1.75 acres)

In a report to OWEB Metlen and others (2013) found that gaps capable of regenerating pine have disappeared, based on four 3-ha stem maps in the Ashland watershed. In the stand reconstructions (to 1865), they found that regenerating patch sizes averaged between 0.1-0.3 acres in the four plots in the Ashland watershed. Metlen and others (2013) also found the distribution of tree cluster sizes to be very similar as compared to patterns found throughout the pacific northwest by Churchill and others (2017, Appendix 3a.2), and markedly different from contemporary cluster size distributions.

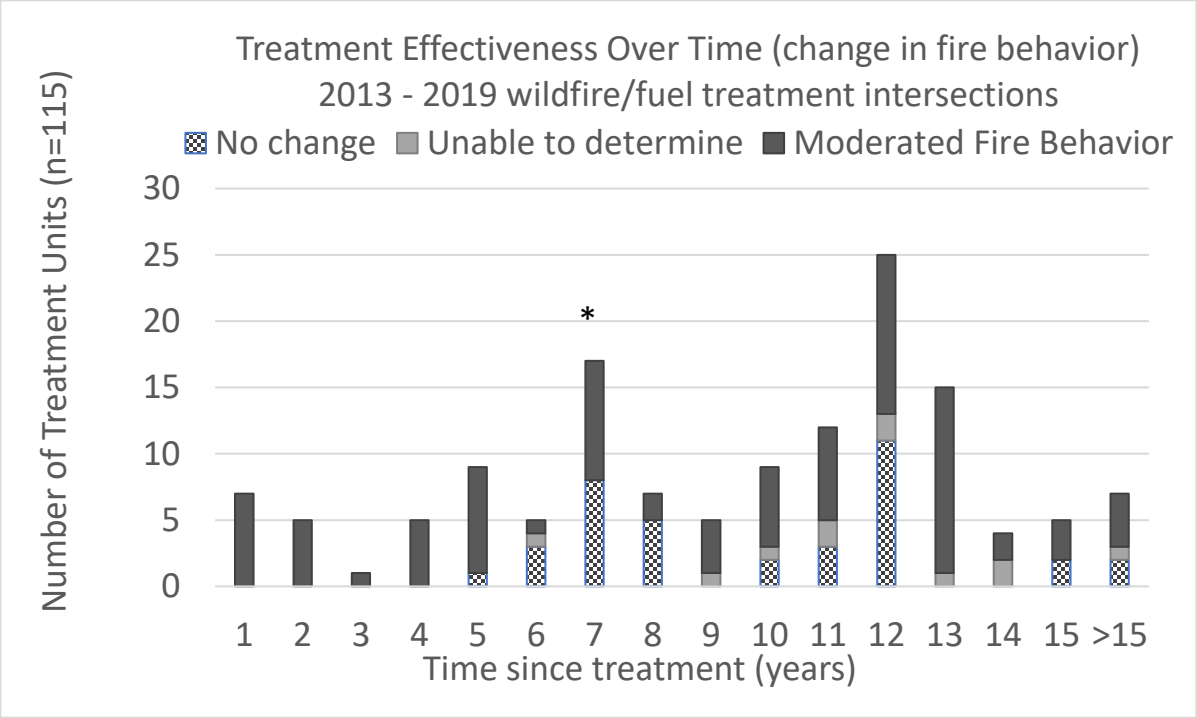
In summary, gap sizes from reference conditions reflective of low to mixed severity fire regimes were less than 2 acres and generally less than 1 acre.

C.3.3 Maintenance

Maintenance would not be needed in the short-term (up to 10 years after initial treatments). This is supported by local plot data and fuel treatment effectiveness monitoring of recent wildfire/treatment interactions where treatments were found to be effective at less than 14 years (**Error! Reference source not found.**) on over 2,000 acres of previously treated areas that have been burned in a wildfire. Between 2013 to 2018, 137 previously treated units on the Medford District BLM, were intersected by wildfire. Surface fire was the predominant fire type in 65% of all previously treated units, and less than 30% of treatments were not found to moderate fire behavior. In these treatments intersected by recent wildfires (2013-2018), it took multiple days for fire to travel through 58 percent of treated units, average unit size was 35 acres. This slowed rate of fire spread illustrates moderated fire behavior (i.e. no stand replacement fire) which presents favorable conditions for wildfire containment (Finney et al. 2009). Fuel reduction has also been found to be effective in some cases for up to 22 years as found by Lydersen and others (2014).

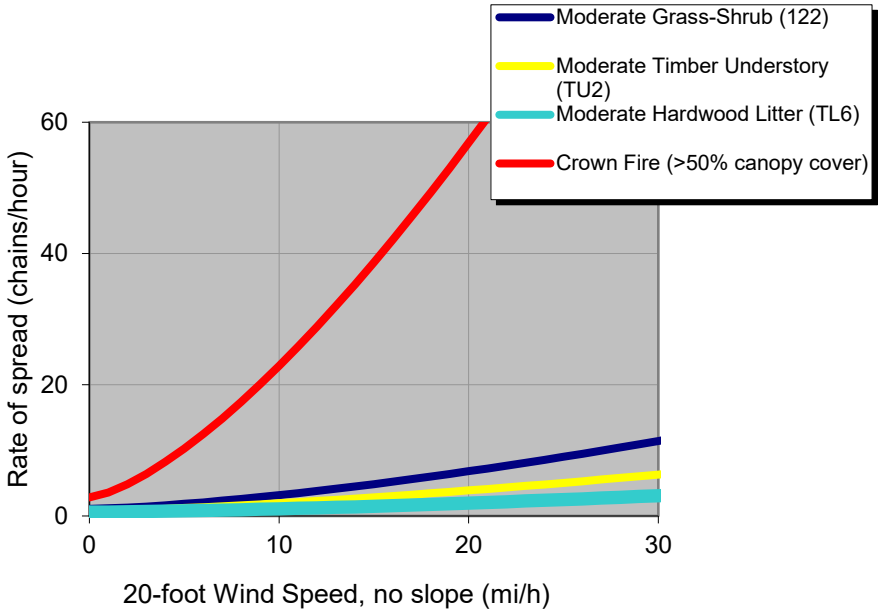
Most treated areas would require maintenance every 10 to 30 years to maintain *low-moderate* load surface fuel profiles and raised canopy base heights. This maintenance timeframe is consistent with estimates of local historic fire-intervals. Metlen and others (2018) found 90% of historic fire return intervals to be between 3 and 30 years, with median return intervals of 8 years. (Figure C-4)

Figure C-5: Fuel treatment and wildfire intersections on the Medford District (2013-2019) and time since treatment influence on moderated fire behavior. Dark gray indicates number of treatments intersected by wildfires that effectively moderated fire behavior. Crosshatched bars indicate those treatments intersected by wildfires that did not moderate fire behavior, while light gray bars represent treatments where effect was unable to be determined. * Five of the "no change" treatments burned in the Douglas Complex (2013) between 7/26-7/29 under extreme fire weather conditions exceeding 97th percentile fire danger indices with average wind gusts of 17mph.



Vegetation growth is dependent on a variety of factors including variables such as, but not limited to, available sunlight and moisture, which can be influenced by large climatic patterns, and soil nutrient and structure. In areas thinned to open canopy conditions, regeneration of a diverse understory is expected (Wayman and North 2007) and could contribute toward more rapid live fuel loading accumulation or shift fuel models from moderate timber litter to moderate timber understory or grass-shrub in the moderate-term (<30 years) (local BLM monitoring data, Agee et al. 2000). While this shift in surface fuel type could result in more rapid rates of surface fire spread in surface fuel models, these rates of spread would be approximately 5.75 times less than those presented by crown fires in stands with greater than 50% cover under 10 mph 20 foot windspeeds (Figure C-5).

Figure C-6: Comparison of fire rates of spread (ROS) under dry fuel moisture scenarios (Fine fuels – 1hr@6%, 10hr@7%, and 100hr@8%; herbaceous@60%; and woody @90%) for low load timber litter surface fuel model (turquoise), moderate load surface fuel models (grass-shrub (dark blue) and moderate load timber-understory (yellow)) and crown fire (red) in stands with greater than 50% canopy cover using CompareModel495 spreadsheet available from http://pyrologix.com/.



Weather

Wind influences a variety of fire behavior aspects, including surface fire intensity, flame length, scorch height, and probability of passive or active crown fire (Scott and Reinhardt, 2001).Fire behavior was modeled under 90th percentile fire weather fuel moisture conditions (Table C-1). Fuel moisture and other weather values were determined from analysis SQUAW Remote Auto-mated Weather Station (RAWS) data representing eight fire seasons (July to October 2000-2008). Based on analysis of the RAWS data, approximately 90% of the recorded 10 minute average 20 ft winds and wind gusts are less than 15mph. SQUAW RAWS is notorious for capturing high wind speeds in the Applegate and in the Rogue Basin, in general. During this analysis period, approximately 10% of average windspeeds and gusts exceeded 20 mph, reaching up to 36 mph and 53 mph, respectively. For this analysis, a 20 foot windspeed of 15 mph was used for modeling A standard wind adjustment factor of 0.1 was applied to canopy cover greater than 50%, and 0.15 for canopy cover of 30-50%, and 0.2 for canopy cover 20-30%, per NEXUS recommendations and guidance for estimating wind speeds in the Fire Behavior Field Reference Guide (NWCG PMS437). For canopy cover >50% fine dead fuel moisture was adjusted to 7% to reflect sheltering effect on fine dead fuel moisture (Rothermel 1983, NWCG PMS437, Nexus).

Table C-1: Dry (90th percentile) fuel moisture scenario inputs for dead and live fuels. These values are consistent with 80 ºF day.

Fuel Type	Dead fuel Size class/ Live Fuel Type	Percent Moisture
Dead Fuels	0 – 0.25 in. (1 hr.)	5*
	0.25 – 1.0 in. (10 hr.)	6
	1.0 – 3.0 in. (100 hr.)	8
Live Fuels	Live Woody	75
	Live Herbaceous	35

For canopy cover >50% fine dead fuel moisture was adjusted to 7% to reflect sheltering effect on fine dead fuel moisture.

Topography

Slope is an important input for fire behavior predictions. Slopes across the proposed commercial units vary from 3 to 51 percent, averaging 28%. For this analysis, the maximum slope of 50% was used in model predictions.

C.3.4 Affected Environment

"Historically, frequent low- to mixed- severity fire interacted with the complex landscape, vegetation, and climate to create and maintain patchy, mixed seral stages of shrubland, woodland, and mixed conifer/hardwood forests, in both open and closed conditions" (FEIS p. 225). "Currently, many of the dry forest stands are overly dense, are missing large fire-resistant trees, or are at risk from tree encroachment, or fire-induced mortality ….. surface, ladder, and canopy fuels have increased in loading and continuity, increasing the potential for larger scale crown and stand-replacing fires" (FEIS p.226).

Fire Activity *– current and historic*

The BLM selected locally developed (2017) Potential Wildfire Operational Delineations (PODs), as described by Thompson and others (2016) and Stratton (2020), that contain proposed units under Bear Grub to define the analytic extent for the fire activity affected environment . PODs are intended to "compartmentalize" the landscape and represent features that *could* aid in wildfire containment and limit large fire growth, such as: along major topographical breaks (ridgelines), road systems, rivers and waterbodies, barren areas, prior treatments, major fuel changes, etc. The POD boundaries in no way establish a committal for fire management to use or implement PODs and the boundaries themselves do not dictate future actions, nor do they account for specific circumstances (i.e. weather, wind, and fuel moisture, etc.) that may require deviation from a POD boundary in actual wildfire management. In this context, PODs are used as an operationally relevant analytic extent.

Recently (1980 – 2018), most (70%) wildfire ignitions within the analytic area for this issue, have been human caused. A third of all wildfire starts were caused by lightning. There have been a total of 493 wildfire ignitions in the area, since 1980. (Table C-2)

Table C-2: Wildfire ignitions (1980-2018) by cause and jurisdictional ownership in the analytic area for affected environment. Data is from Oregon Department of Forestry (ODF).

	Human		Lightning	
Ownership and Fire Size Class	**Number of Fires**	**% of Total**	**Number of Fires**	**% of Total**
BLM	**70**	**14%**	**87**	**18%**
PV	**272**	**55%**	**62**	**13%**
Grand Total	**343**	**70%**	**150**	**30%**

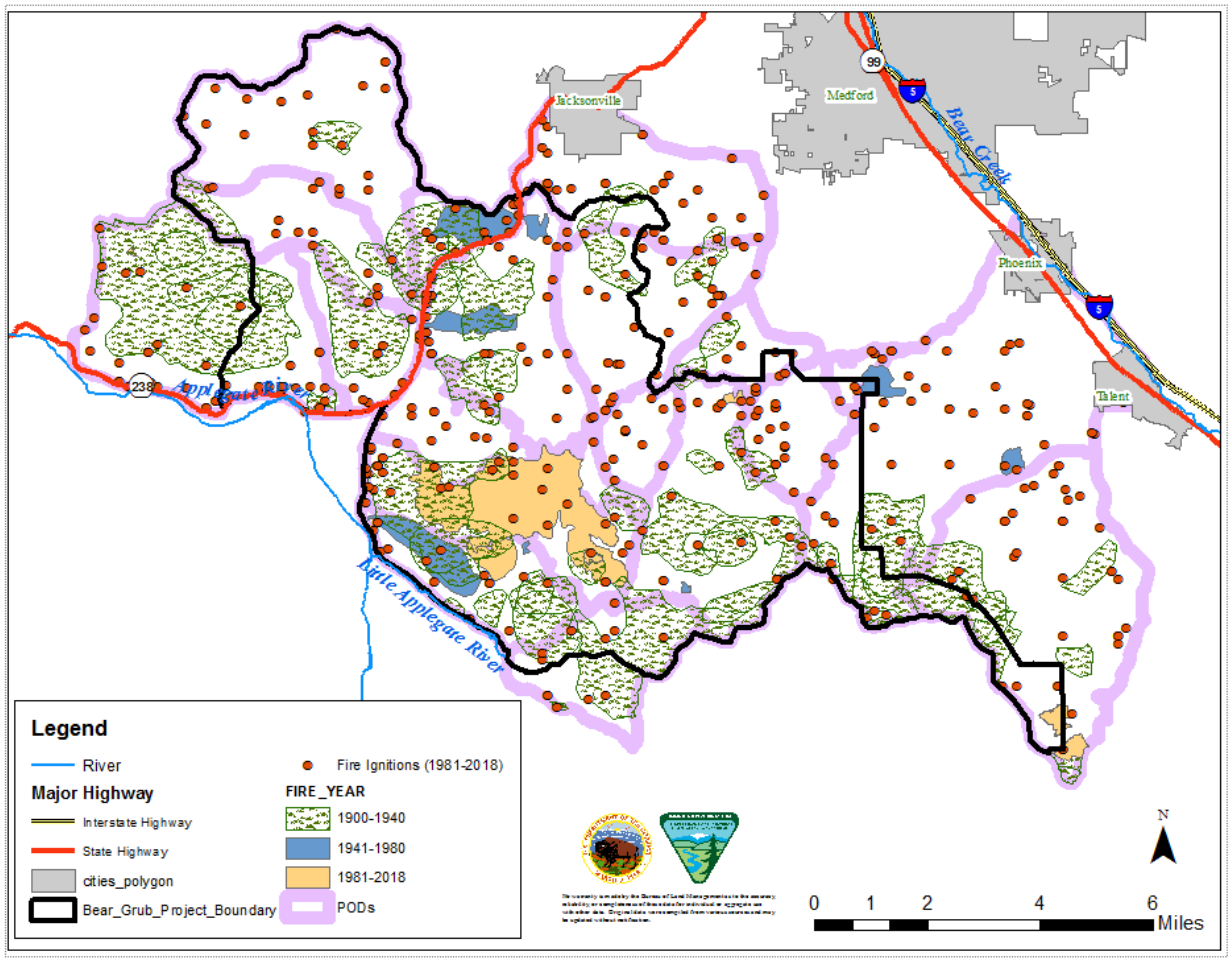
Before the fire suppression and intensive management practices of the twentieth century, the analytic area was characterized by high frequency, low severity fires that would have reduced fuel loadings and maintained a mosaic of open stand conditions different from what is seen today. "Historically, frequent low- to mixed- severity fire interacted with the complex landscape, vegetation, and climate to create and maintain patchy, mixed seral stages of shrubland, woodland, and mixed conifer/hardwood forests, in both open and closed conditions" (FEIS p. 225).

Within this analytic area, landscape patterns of wildfire size distribution and occurrence have shifted overtime (Figure C-6, Table C-3). Despite frequent fire activity effectively ending in 1850 in southwest Oregon (Metlen et al. 2018), fire records from 1900 to 1939, still display considerable fire activity, relative to more recent time periods. Between 1900 and 1939, the total number of recorded fires greater than 10 acres, was approximately four times greater than the period between 1940 to 1979 or 1980 - 2018 (Figure C-6, Table C-3). The total wildfire acres between 1940 and 1979 was about 3.5% of acres burned between 1900 and 1939, and wildfire acres between 1980 and 2018 account for approximately 6% of the acres between 1900 and 1939. For wildfires greater than 10 acres, average wildfire size has also decreased (Table C-3).

Table C-3: Total number of wildfires, total wildfire acres, and average wildfire size for wildfires greater than 10 acres, within the analytic area for various fire eras: 1900-1939 (prior to widespread use of mechanized equipment and establishment of Cave Junction Smoke Jumper Base in 1940 (Atzet 1996)); 1940 – 1979 (fuel conditions conducive to effective fire suppression and during a relatively cooler climatic period than in recent years); 1980 – 2018 (fuels accumulated from years of missed fire cycles, intensely managed landscapes, and under warming climatic conditions (Westerling et al. 2006)).

Fire Era (Years)	Total Wildfires	Total Wildfire Acres	Average Wildfire Size
1900 - 1939	42	52,801	1,257
1940 - 1979	8	1,882	235
1980 - 2018	11	3,363	306

Figure C-7: Wildfire activity within the analytic area for various fire eras: 1900-1939 (green patterning) (prior to widespread use of mechanized equipment and establishment of Cave Junction Smoke Jumper Base in 1940 (Atzet 1996)); 1940 – 1979 (blue) (fuel conditions conducive to effective fire suppression and during a relatively cooler climatic period than in recent years); 1980 – 2018 (orange) (fuels accumulated from years of missed fire cycles, intensely managed landscapes, and under warming climatic conditions (Westerling et al. 2006)). All ODF ignitions (1980 – 2018) (red dots). POD boundaries (lavendar lines).



C.3.5 Wildland Fuel Profile Continuity

Canopy fuels (canopy connectivity (canopy cover and canopy bulk density) and large trees)
Within proposed commercial units, the majority 68 percent of all acres have a canopy bulk density greater than 0.12 kg/m^3 (e.g. greater than 60 percent canopy cover), while 23 percent of the acreage is between 0.06-0.09 kg/m^3 (approximately 40-60% canopy cover). Canopy bulk density data was derived from current condition canopy cover data collected in stand exams. The deficit of late seral forest and abundance of mid-seral forest (FEIS p. 235, Figure 3-24) and current condition quadratic mean diameter (Silv section) indicate the lack of large trees within the proposed commercial units.

Table C-4: Estimated Canopy Bulk Density (kgm3) and approximate canopy cover distribution across proposed commercial units.

Canopy Bulk Density (kgm3)	Approximate Canopy Cover (%)	Acres	Percent Distribution (%)
0.06	40 to <50	214	15%
0.09	50 to <60	246	17%
>0.12	> 60	978	68%

C.3.6 Ladder fuels (canopy base height)

The current canopy base height is less than five feet in 93 percent of proposed commercial harvest units (Table C-5) Ninety one percent of proposed non-commercial units have a canopy base height less than five feet (Table C-5). Canopy base height data was acquired from LANDFIRE (LF 2014).

Table C-5: Current distribution of canopy base height across commercial and non-commercial units. Canopy base height data acquired from LANDFIRE (LF 2014).

	Commercial Units		Non-commercial Units	
Canopy Base Height (feet)	Acres	Percent Distribution	Acres	Percent Distribution
0 to 2	527	36%	2,384	69%
3 to 5	819	57%	753	22%
6 to 12	11	1%	95	3%
12+	91	6%	234	7%

C.3.7 Surface fuels (Fire Behavior Fuel Model)

The majority (85%) of proposed commercial units are best represented by *very high* and *moderate* load forest surface fuel models. The proposed non-commercial (i.e. hazardous fuel reduction) units are primarily (60%) represented by *moderate* load grass-shrub fuel models, while *very high* and *moderate* timber surface fuel loading represents nearly the remaining 40% (Table C-6) of unit acreage. The fuel bed characteristics of these surface fuel models exhibit potentially more extreme fire behavior, simply due to the greater amount of available fuel, and present a higher resistance to control as they burn longer and with greater Fireline intensity, impacting stand resistance to fire

***Table C-6: Approximate acres of surface fuel fire behavior models grouped by loading category descriptions, and corresponding Standard Fire Behavior Fuel Models codes (in parentheses, bold indicates majority fuel model)(Scott & Burgan 2005) across the extent of units proposed for commercial harvest and non-commercial surface and ladder fuel reduction. Data is from the PNW QWRA* (Gilbertson-Day 2018) surface fire behavior fuel model calibration effort.**

	Commercial		Non-commercial	
Surface Fuel Loading Description Categories (FBFM code)	Acres	Percent	Acres	Percent
Non-burnable	3	0%	40	1%
Low load grass (GR1, GR2)	3	0%	210	6%
Low load grass - shrub (GS1,SH2)	20	1%	40	1%
Low load conifer understory (161)	0	0%	10	0%
Moderate load grass-shrub (GS2,SH2)	105	8%	1,710	51%
Moderate load mixed conifer - hardwood (TU2,TL3, TL6, **TL8**)	610	45%	640	19%
High load conifer(TL4,**TL5**,TL7)	80	6%	60	2%
Very High load timber -understory or hardwood (**TU5**,TL9)	545	40%	670	20%
Grand Total	1,370	100%	3,370	100%

Anderson Addition
Extensive Recreation Management Area

Status:

Existing – Development Needed.

- Proposed for Development-Dispersed Use Occurring.
- Develop Recreation facilities and features: motorized and non-motorized trail development, potential trailhead development
- Develop Implementation level Recreation Area Management Plan
- Develop implementation level Travel Management Plan (including completing route designations for motorized access and non-motorized use) during district-wide TMP

RMA Description

The Anderson Addition ERMA is 7,482 acres and is located in the Ashland Resource Area. The ERMA offer opportunities for diverse recreation opportunities including wilderness characteristics, and OHV and mountain biking opportunity outside of the identified LWC area.

Important Recreation Values

The Anderson Addition ERMA offers hiking, mountaining biking, OHV, and equestrian trails with diverse botany and wilderness characteristics.

Type of Visitors

The Anderson Addition ERMA has potential to draw local and regional visitors seeking a variety of recreation opportunities.

Outcome Objectives

Participants in visitor assessments report an average 4.0 realization of the targeted experience and benefit outcomes listed below. (4.0 on a probability scale where: 1 = Not at all realized to 5 = Fully realized).

Visitor Activities	Visitor Experiences	Visitor Benefits
• Mountain biking • Hiking • Equestrian • Camping • Day use • Driving for pleasure • Environmental Education • Snow shoeing/cross country skiing • OHV • Wildlife viewing • Botanical viewing	• Enjoying getting some needed physical exercise • Enjoying strenuous physical exercise • Enjoying having access to outdoor amenities close to home • Enjoying being able to frequently participate in desired activities in the settings I like • Feeling good about solitude, being isolated and independent • Enjoying teaching others about the outdoors	**Personal Benefits:** • Better mental health and health maintenance • Stronger ties with my family and friends, Enhanced awareness and understanding of nature • Greater sense of adventure • Greater freedom from urban living • Improved capacity for outdoor physical exercise • Improved physical capacity to do my favorite outdoor recreation activity **Community/Social Benefits:** • Lifestyle improvement or maintenance • More informed citizenry about where to go for different kinds of recreation experiences and

Visitor Activities	Visitor Experiences	Visitor Benefits
	• Enjoying risk-taking adventure • Enjoying having access to hands on environmental learning • Enjoying having access to natural landscapes	benefits • Enlarged sense of community dependency on public lands **Environmental Benefits:** • Improved maintenance of physical facilities • Reduced negative human impacts such as litter and unplanned trails • Increased ecologically friendly tourism operations **Economic Benefits:** • Increased desirability as a place to live or retire • Increased local tourism revenue • Maintenance of community's distinctive recreation-tourism market niche or setting character • Enhanced ability for visitors to find areas providing wanted recreation experiences and benefits

Supporting Management Actions and Allowable Use Decisions

Proposed Recreation Setting Characteristics Designation: Middle Country

Management Actions and Allowable Use Restrictions:

Camping Restrictions:
- Open to overnight use

Special Recreation Permits:
- Allow SRPs within RMA boundaries

Trails and Travel Management:
- Open to biking
- Open to Equestrian
- Open to hiking
- Designate area as *limited to existing* for OHV

Firearm Use Restriction:
- Open to target shooting
- Buffer trail corridors and trailheads to provide for public safety

ACEC Management

ACEC Management
The Dakubetede ACEC overlaps with the Anderson addition ERMA creating a recreation management zone. Project planning in this recreation management zone requires attention to the special management needed to maintain and restore the ACEC's relevant and important values. See Appendix F – Areas of Critical Environmental Concern and the ACEC management plan.

Lands and Realty
• ROW avoidance area • Allow land use authorizations through leases, permits, and easements (such as FLPMA ROW grants, MLA ROW grants, and Recreation Public Purposes Leases) if compatible with meeting recreation objectives, not interfering with recreation opportunities, and maintaining setting characteristics.

Forest Management
• Allow timber harvest to address catastrophic events. • Allow timber harvest if compatible with meeting recreation objectives, not interfering with recreation opportunities, and maintaining setting characteristics. • Allow firewood cutting and special forest product harvest if compatible with meeting recreation objectives, not interfering with recreation opportunities, and maintaining setting characteristics. • Allow sale of hazard trees if compatible with meeting recreation objectives, not interfering with recreation opportunities, and maintaining setting characteristics. • Allow fuel treatments or other vegetation modifications if compatible with meeting recreation objectives, not interfering with recreation opportunities, and maintaining setting characteristics. • Follow ACEC vegetation management guidelines in ACEC portion of the RMA

Mineral Management

• Leasable: Open NSO
• Area open to mineral entry except within ACEC portion in RMA:
  ○ Salable: Closed within ACEC portion
  ○ Locatable: Recommend for withdrawal within ACEC portion.

Bald-Wagon
Extensive Recreation Management Area

Status:

Existing – Development Needed.

- Proposed for Development-Dispersed Use Occurring.
- Develop Recreation facilities and features: motorized and non-motorized trail development, potential trailhead development
- Develop Implementation level Recreation Area Management Plan
- Develop implementation level Travel Management Plan (including completing route designations for motorized access and non-motorized use) during district-wide TMP

RMA Description

The Bald-Wagon ERMA is ? acres and is located within the Ashland Resource Area. The ERMA has two annual motorized SRP events.

Important Recreation Values

The Bald-Wagon ERMA offers OHV, hiking, biking, and equestrian trails.

Type of Visitors

The Bald-Wagon ERMA has potential to draw local and regional trail users.

Outcome Objectives

Participants in visitor assessments report an average 4.0 realization of the targeted experience and benefit outcomes listed below. (4.0 on a probability scale where: 1 = Not at all realized to 5 = Fully realized).

Visitor Activities	Visitor Experiences	Visitor Benefits
• Mountain biking • Hiking • Equestrian • Camping • Environmental education • Frisbee golf	• Enjoying getting some needed physical exercise • Enjoying strenuous physical exercise • Enjoying having access to outdoor amenities close to home • Enjoying being able to frequently participate in desired activities in the settings I like • Developing your skills and abilities • Enjoying risk-taking adventure • Enjoying in participating in group outdoor events • Enjoying having access to natural landscapes	**Personal Benefits:** • Improved skills for outdoor enjoyment • Stronger ties with my family and friends • Improved physical fitness and health maintenance • Improved capacity for outdoor physical exercise • Improved physical capacity to do my favorite outdoor recreation activity **Community/Social Benefits:** • Greater community involvement in recreation and other land use decisions • Improved community integrations • More informed citizenry about where to go for different kinds of recreation experiences and benefits • Enlarged sense of community dependency on public lands **Environmental Benefits:**

Visitor Activities	Visitor Experiences	Visitor Benefits
		• Improved maintenance of physical facilities • Greater community ownership and stewardship of park, recreation, and natural resources • Reduced negative human impacts such as litter and unplanned trails • Improved respect for privately owned lands • Increased ecologically friendly tourism operations **Economic Benefits:** • More positive contributions to local-regional economy • Increased desirability as a place to live or retire • Increased local tourism revenue • Maintenance of community's distinctive recreation-tourism market niche or setting character • Reduced health maintenance costs • Enhanced ability for visitors to find areas providing wanted recreation experiences and benefits

Supporting Management Actions and Allowable Use Decisions

Proposed Recreation Setting Characteristics Designation: Front Country

Management Actions and Allowable Use Restrictions:

Camping Restrictions:
- Open to overnight use

Special Recreation Permits:
- Allow SRPs within RMA boundaries

Trails and Travel Management:
- Open to biking
- Open to equestrian use
- Open to hiking
- Designate area as *limited to existing* OHV

Firearm Use Restriction:
- Open to shooting
- Buffer trails to provide for public safety

Lands and Realty
• ROW avoidance area. • Allow land use authorizations through leases, permits, and easements (such as FLPMA ROW grants, MLA ROW grants, and Recreation Public Purpose Leases) if compatible with meeting recreation objectives, not interfering with recreation opportunities, and maintaining setting characteristics.

Forest Management
• Allow timber harvest to address catastrophic events. • Allow timber harvest if compatible with meeting recreation objectives, not interfering with recreation

Forest Management
opportunities, and maintaining setting characteristics. • Allow firewood cutting and special forest product harvest if compatible with meeting recreation objectives, not interfering with recreation opportunities, and maintaining setting characteristics. • Allow sale of hazard trees if compatible with meeting recreation objectives, not interfering with recreation opportunities, and maintaining setting characteristics. • Allow fuel treatments or other vegetation modifications if compatible with meeting recreation objectives, not interfering with recreation opportunities, and maintaining setting characteristics. • Establish a no harvest buffer of 50 feet (off of centerline) for all linear trails. Allow timber harvest activity within buffer to protect/maintain recreation-setting characteristics and/or to achieve recreation objectives.
Mineral Management
• Leasable: Open NSO • Salable: Open to existing quarries • Locatable: Low potential, recommend for withdrawal not necessary

Bell-Forest
Extensive Recreation Management Area

Status:

Existing – Development Needed.

- Proposed for Development-Dispersed Use Occurring.
- Develop Recreation facilities and features: motorized trail development, potential trailhead development
- Develop Implementation level Recreation Area Management Plan
- Develop implementation level Travel Management Plan (including completing route designations for motorized access and non-motorized use) during district-wide TMP

RMA Description

The Bell-Forest ERMA is 3,800 acres and is located within the Ashland Resource Area. The ERMA offers an extensive trail network that is utilized by OHV users. Two annual motorized SRP events occur in the ERMA.

Important Recreation Values

The Bell-Forest ERMA provides an extensive trail network.

Type of Visitors

The Bell-Forest ERMA has potential to draw motorized and non-motorized users.

Outcome Objectives

Participants in visitor assessments report an average 4.0 realization of the targeted experience and benefit outcomes listed below. (4.0 on a probability scale where: 1 = Not at all realized to 5 = Fully realized).

Visitor Activities	Visitor Experiences	Visitor Benefits
• Mountain biking • Hiking • Equestrian • Camping • Picnicking • Day use • Driving for pleasure • Hang gliding • OHV • Wildlife viewing	• Enjoying getting some needed physical exercise • Enjoying having access to outdoor amenities close to home • Enjoying being able to frequently participate in desired activities in the settings I like • Escaping everyday responsibilities for awhile • Feeling good about solitude, being isolated and independent • Enjoying risk-taking adventure • Enjoying in participating	**Personal Benefits:** • Better mental health and health maintenance • Restored mind from unwanted stress • Stronger ties with my family and friends • Enhanced awareness and understanding of nature • Greater freedom from urban living • Improved physical capacity to do my favorite outdoor recreation activity **Community/Social Benefits:** • Lifestyle improvement or maintenance • Greater community involvement in recreation and other land use decisions • Heightened sense of satisfaction with community • More informed citizenry about where to go for different kinds of recreation experiences and benefits

Visitor Activities	Visitor Experiences	Visitor Benefits
	in group outdoor events • Enjoying having access to natural landscapes	**Economic Benefits:** • More positive contributions to local-regional economy • Increased local tourism revenue • Maintenance of community's distinctive recreation-tourism market niche or setting character • Reduced health maintenance costs

Supporting Management Actions and Allowable Use Decisions

Proposed Recreation Setting Characteristics Designation: Front Country

Management Actions and Allowable Use Restrictions:
Camping Restrictions:
- Open to overnight use

Special Recreation Permits:
- Allow SRPs within RMA boundaries

Trails and Travel Management:
- Open to all non-motorized trail uses (hike/bike/equestrian)
- Limited to existing OHV

Firearm Use Restriction:
- Open to shooting
- No shooting across roadways or within developed rec sites

Lands and Realty
• ROW avoidance area. • Allow land use authorizations through leases, permits, and easements (such as FLPMA ROW grants, MLA ROW grants, and Recreation Public Purposes Leases) if compatible with meeting recreation objectives, not interfering with recreation opportunities, and maintaining setting characteristics.

Forest Management
• Allow timber harvest if compatible with meeting recreation objectives, not interfering with recreation opportunities, and maintaining setting characteristics. • Allow firewood cutting and special forest product harvest if compatible with meeting recreation objectives, not interfering with recreation opportunities, and maintaining setting characteristics. • Allow sale of hazard trees if compatible with meeting recreation objectives, not interfering with recreation opportunities, and maintaining setting characteristics. • Allow fuel treatments or other vegetation modifications if compatible with meeting recreation objectives, not interfering with recreation opportunities, and maintaining setting characteristics. • Establish a no harvest buffer of 100 feet (off of centerline) for all linear trails. Allow timber harvest activity within buffer to protect/maintain recreation-setting characteristics and/or to achieve recreation objectives.

Mineral Management
• Leasable: Open NSO • Salable: Open to existing quarries • Locatable: Low potential; recommend for withdrawal not necessary

Bunny Meadows
Extensive Recreation Management Area

Status:

Existing – Development Needed.

- Proposed for Development-Dispersed Use Occurring. Improve staging area access and trailhead.
- Develop Recreation facilities and features: motorized trail development, potential trailhead development
- Develop Implementation level Recreation Area Management Plan
- Develop implementation level Travel Management Plan (including completing route designations for motorized access and non-motorized use) during district-wide TMP

RMA Description

Bunny Meadows ERMA is 8 acres and is located in the Ashland Resource Area. The ERMA serves as a staging area for multi-use trail opportunities. There are developed interpretive panels, kiosks, picnic tables, and fencing to manage use in sensitive habitat. There is a developed parking opportunity for users.

Important Recreation Values

The Bunny Meadows ERMA provides access to multi-use trail opportunities.

Type of Visitors

The Bunny Meadows ERMA has potential to draw motorized trail users at the local and regional scale.

Outcome Objectives

Participants in visitor assessments report an average 4.0 realization of the targeted experience and benefit outcomes listed below. (4.0 on a probability scale where: 1 = Not at all realized to 5 = Fully realized).

Visitor Activities	Visitor Experiences	Visitor Benefits
• Mountain biking • Hiking • Equestrian • Picnicking • Day use • Access to multi-use trail (motorized and non-motorized) network	• Enjoying getting some needed physical exercise • Enjoying strenuous physical exercise • Enjoying having access to outdoor amenities close to home • Enjoying being able to frequently participate in desired activities in the settings I like • Enjoying risk-taking adventure • Enjoying having access to natural landscapes	**Personal Benefits:** • Improved skills for outdoor enjoyment • Stronger ties with my family and friends • Greater sense of adventure • Improved physical capacity to do my favorite outdoor recreation activity **Community/Social Benefits:** • Lifestyle improvement or maintenance • Greater community involvement in recreation and other land use decisions • Enlarged sense of community dependency on public lands **Environmental Benefits:** • Improved maintenance of physical facilities • Reduced negative human impacts such as litter and unplanned trails

Visitor Activities	Visitor Experiences	Visitor Benefits
		• Improved respect for privately owned lands **Economic Benefits:** • More positive contributions to local-regional economy • Increased desirability as a place to live or retire • Increased local tourism revenue • Maintenance of community's distinctive recreation-tourism market niche or setting character • Enhanced ability for visitors to find areas providing wanted recreation experiences and benefits

Supporting Management Actions and Allowable Use Decisions

Proposed Recreation Setting Characteristics Designation: Front Country

Management Actions and Allowable Use Restrictions:

Camping Restrictions:
- Open to overnight use

Special Recreation Permits:
- Allow SRPs within RMA boundaries

Trails and Travel Management:
- Open to all non-motorized trail uses (hike/bike/equestrian)
- Designate area as *limited to existing* for OHV
- Closed seasonally to OHV use, to manage for aquatic resources

Firearm Use Restriction:
- Closed to shooting

Lands and Realty
• ROW avoidance area • Allow land use authorizations through leases, permits, and easements (such as FLPMA ROW grants, MLA ROW grants, and Recreation Public Purposes Leases) if compatible with meeting recreation objectives, not interfering with recreation opportunities, and maintaining setting characteristics.

Forest Management
• Open to timber harvest. • Close to firewood cutting and special forest product harvest

Mineral Management
• Leasable: Open NSO • Salable: Open to existing quarries • Locatable: Low potential; recommend for withdrawal not necessary

East Applegate Ridge Trail
Extensive Recreation Management Area

Status:

Existing – Development Needed.

- Proposed for Development-Dispersed Use Occurring.
- Develop Recreation facilities and features: non-motorized trail development (East Applegate Ridge Trail), potential trailhead development at each end of proposed trail
- Develop Implementation level Recreation Area Management Plan
- Develop implementation level Travel Management Plan (including completing route designations for motorized access and non-motorized use) during district-wide TMP

RMA Description

The East Applegate Ridge Trail ERMA is a citizen/partner group proposal. The 5.6 mile predominantly upland/ridgetop layout is 44 total acres and is located in the Ashland Resource Area. The ERMA offers stunning views and great opportunities for photography, hiking, and solitude.

Important Recreation Values

The East Applegate Ridge Trail ERMA provides hiking, biking, and equestrian opportunities in an upland setting.

Type of Visitors

The East Applegate Ridge Trail ERMA has potential to draw local and regional visitors seeking non-motorized trail opportunities.

Outcome Objectives

Participants in visitor assessments report an average 4.0 realization of the targeted experience and benefit outcomes listed below. (4.0 on a probability scale where: 1 = Not at all realized to 5 = Fully realized).

Visitor Activities	Visitor Experiences	Visitor Benefits
• Mountain Biking • Hiking • Equestrian • Environmental Education • Wildlife viewing • Botanical viewing	• Enjoying getting some needed physical exercise • Enjoying being able to frequently participate in desired activities in the settings I like • Enjoying teaching others about the outdoors • Enjoying in participating in group outdoor events • Enjoying having access to natural landscapes	**Personal Benefits:** • Better mental health and health maintenance • Stronger ties with my family and friends • Improved physical fitness and health maintenance, Improved capacity for outdoor physical exercise • Improved physical capacity to do my favorite outdoor recreation activity **Community/Social Benefits:** • Lifestyle improvement or maintenance • More informed citizenry about where to go for different kinds of recreation experiences and benefits • Enlarged sense of community

Visitor Activities	Visitor Experiences	Visitor Benefits
		dependency on public lands **Environmental Benefits:** • Improved maintenance of physical facilities • Improved respect for privately owned lands • Increased ecologically friendly tourism operations **Economic Benefits:** • Increased desirability as a place to live or retire • Maintenance of community's distinctive recreation-tourism market niche or setting character • Enhanced ability for visitors to find areas providing wanted recreation experiences and benefits

Supporting Management Actions and Allowable Use Decisions

Proposed Recreation Setting Characteristics Designation: Middle Country

Management Actions and Allowable Use Restrictions:

Camping Restrictions:
- Closed to overnight use

Special Recreation Permits:
- Allow SRPs within RMA boundaries

Trails and Travel Management:
- Closed seasonally to equestrian use
- Open to all non-motorized trail uses (hike/bike/equestrian)
- Designate area as *closed* for OHV

Firearm Use Restriction:
- Closed to shooting

Lands and Realty
• ROW avoidance area. • Allow land use authorizations through leases, permits, and easements (such as FLPMA ROW grants, MLA ROW grants, and Recreation Public Purposes Leases) if compatible with meeting recreation objectives, not interfering with recreation opportunities, and maintaining setting characteristics.

Forest Management

Forest Management
• Close to firewood cutting and special forest product harvest • Allow timber harvest to address catastrophic events. • Allow timber harvest if compatible with meeting recreation objectives, not interfering with recreation opportunities, and maintaining setting characteristics. • Allow fuel treatments or other vegetation modifications if compatible with meeting recreation objectives, not interfering with recreation opportunities, and maintaining setting characteristics. • Establish timber harvest Best Management Practices (BMPs)-Do not skid across trail, directional falling required to protect trail based resources.

Mineral Management
• Leasable: Open NSO • Salable: Open to existing quarries • Locatable: Low potential; recommend for withdrawal not necessary

Hidden Creek Trail
Extensive Recreation Management Area

Status:

Existing - Complete.

- Develop implementation level Travel Management Plan (including completing route designations for motorized access and non-motorized use) during district-wide TMP

RMA Description

The Hidden Creek Trail ERMA is just under 1 mile in length, is a total of 7 acres, and is located within the Ashland Resource Area. The ERMA provides a stunning multi use trail experience, as well as interpretive opportunities. The trail follows the head water of Grub Gulch, and is located in a late successional reserve forest of cedar, fir, and pacific yew.

Important Recreation Values

The Hidden Creek Trail ERMA is a non-motorized interpretive trail located in late-successional forest. It provides an education experience in a setting that is easy to reach from nearby schools.

Type of Visitors

The Hidden Creek Trail ERMA has potential to draw hikers, equestrians, and mountain bikers into a backcountry setting.

Outcome Objectives

Participants in visitor assessments report an average 4.0 realization of the targeted experience and benefit outcomes listed below. (4.0 on a probability scale where: 1 = Not at all realized to 5 = Fully realized).

Visitor Activities	Visitor Experiences	Visitor Benefits
• Mountain biking • Hiking • Equestrian • Environmental education	• Enjoying getting some needed physical exercise • Enjoying strenuous physical exercise • Enjoying being able to frequently participate in desired activities in the settings I like • Enjoying teaching others about the outdoors • Enjoying having access to natural landscapes	**Personal Benefits:** • Improved skills for outdoor enjoyment • Improved physical fitness and health maintenance • Improved physical capacity to do my favorite outdoor recreation activity **Community/Social Benefits:** • Lifestyle improvement or maintenance • More informed citizenry about where to go for different kinds of recreation experiences and benefits • Enlarged sense of community dependency on public lands **Environmental Benefits:** • Reduced negative human impacts such as litter and unplanned trails • Increased ecologically friendly tourism operations

Visitor Activities	Visitor Experiences	Visitor Benefits
		Economic Benefits: • Increased desirability as a place to live or retire • Increased local tourism revenue • Enhanced ability for visitors to find areas providing wanted recreation experiences and benefits

Supporting Management Actions and Allowable Use Decisions

Proposed Recreation Setting Characteristics Designation: Back Country

Management Actions and Allowable Use Restrictions:

Camping Restrictions:
- Closed to overnight use

Special Recreation Permits:
- Allow SRPs within RMA boundaries

Trails and Travel Management:
- Open to biking
- Open to equestrian use with seasonal restrictions
- Open to hiking
- Designate area as *closed* for OHV

Firearm Use Restriction:
- Closed to shooting

Lands and Realty
• ROW Avoidance area • Allow land use authorizations through leases, permits, and easements (such as FLPMA ROW grants, MLA ROW grants, and Recreation Public Purposes Leases) if compatible with meeting recreation objectives, not interfering with recreation opportunities, and maintaining setting characteristics.

Forest Management
• Close to firewood cutting and special forest product harvest. • Allow timber harvest to address catastrophic events. • Allow timber harvest if compatible with meeting recreation objectives, not interfering with recreation opportunities, and maintaining setting characteristics. • Allow sale of hazard trees if compatible with meeting recreation objectives, not interfering with recreation opportunities, and maintaining setting characteristics. • Allow fuel treatments or other vegetation modifications if compatible with meeting recreation objectives, not interfering with recreation opportunities, and maintaining setting characteristics. • Establish a no harvest buffer of 100 feet (off of centerline) for all linear trails. • Allow timber harvest activity within buffer to protect/maintain recreation-setting characteristics and/or to achieve recreation objectives.

Mineral Management
• Leasable: Open NSO • Salable: Open to existing quarries. • Locatable: Low potential; Recommend for withdrawal not necessary

Jack Ash Trail and Connector Trail Extensive Recreation Management Area

Status:

Existing – Development Needed.

- Proposed for Development-Dispersed Use Occurring.
- Develop Recreation facilities and features: non-motorized trail development (Jack Ash Trail), potential trailhead development and facilities such as kiosks and informational signs
- Develop Implementation level Recreation Area Management Plan
- Develop implementation level Travel Management Plan (including completing route designations for motorized access and non-motorized use) during district-wide TMP

RMA Description

The Jack Ash Trail and Connector Trail ERMA is a citizen/partner proposal trail, which is broken into multiple phases for project implementation. The total acreage for all phases totals 203 acres and is located within the Ashland Resource Area. The Dakubetede ACEC overlaps with the Jack Ash Trail and Connector Trail ERMA cre.ating a recreation management zone.

Important Recreation Values

The Jack Ash Trail and Connector Trail ERMA is a long-distance non-motorized trail that provides hiking opportunities between the cities of Jacksonville and Ashland.

Type of Visitors

The Jack Ash Trail and Connector Trail ERMA has potential to draw local and regional visitors seeking non-motorized long distance trail opportunities

Outcome Objectives

Participants in visitor assessments report an average 4.0 realization of the targeted experience and benefit outcomes listed below. (4.0 on a probability scale where: 1 = Not at all realized to 5 = Fully realized).

Visitor Activities	Visitor Experiences	Visitor Benefits
• Mountain biking • Hiking • Equestrian • Environmental education • Trail running	• Enjoying getting some needed physical exercise • Enjoying strenuous physical exercise • Enjoying being able to frequently participate in desired activities in the settings I like • Feeling good about solitude, being isolated and independent • Experiencing a greater sense of independence • Enjoying having access to natural landscapes	**Personal Benefits:** • Better mental health and health maintenance • Improved skills for outdoor enjoyment • Enhanced awareness and understanding of nature • Improved physical fitness and health maintenance • Improved capacity for outdoor physical exercise • Improved physical capacity to do my favorite outdoor recreation activity **Community/Social Benefits:** • Lifestyle improvement or maintenance • Greater community involvement in recreation and other land use decisions • More informed citizenry about where to go for different kinds of recreation experiences and benefits

Visitor Activities	Visitor Experiences	Visitor Benefits
		• Enlarged sense of community dependency on public lands **Environmental Benefits:** • Reduced negative human impacts such as litter and unplanned trails • Improved respect for privately owned lands • Increased ecologically friendly tourism operations **Economic Benefits:** • More positive contributions to local-regional economy • Increased desirability as a place to live or retire • Increased local tourism revenue • Maintenance of community's distinctive recreation-tourism market niche or setting character • Enhanced ability for visitors to find areas providing wanted recreation experiences and benefits

Supporting Management Actions and Allowable Use Decisions

Proposed Recreation Setting Characteristics Designation: Middle Country

Management Actions and Allowable Use Restrictions:

Camping Restrictions:
- Open to overnight use

Special Recreation Permits:
- Allow SRPs within RMA boundaries

Trails and Travel Management:
- Close seasonally to equestrian use
- Open to all non-motorized trail uses (hike/bike/equestrian)
- Close to OHVs

Firearm Use Restriction:
- Closed to shooting

ACEC Management
The Dakubetede ACEC overlaps with the Jack Ash Trail and Connector Trail ERMA creating a recreation management zone. Project planning in this recreation management zone requires attention to the special management needed to maintain and restore the ACEC's relevant and important values. See Appendix F – Areas of Critical Environmental Concern and the ACEC management plan.

Lands and Realty
• ROW avoidance area • Allow land use authorizations through leases, permits, and easements (such as FLPMA ROW grants, MLA ROW grants, Recreation Public Purposes Leases) if compatible with meeting recreation objectives, not interfering with recreation opportunities, and maintaining setting characteristics.

Forest Management
• Follow vegetation management guidelines in ACEC portion of RMA • Close to firewood cutting and special forest product harvest. • Allow timber harvest to address catastrophic events. • Allow timber harvest if compatible with meeting recreation objectives, not interfering with recreation opportunities, and maintaining setting characteristics. • Allow sale of hazard trees if compatible with meeting recreation objectives, not interfering with recreation opportunities, and maintaining setting characteristics. • Allow fuel treatments or other vegetation modifications if compatible with meeting recreation objectives, not interfering with recreation opportunities, and maintaining setting characteristics. • Establish a no harvest buffer of 100 feet (off of centerline) for all linear trails. • Allow timber harvest activity within buffer to protect/maintain recreation setting characteristics and/or to achieve recreation objectives.

Mineral Management
• Leasable: Open NSO • Salable: Open to existing quarries • Locatable: Recommend for withdrawal in ACEC portion of RMA

Sterling Mine Ditch Trail
Special Recreation Management Area

Status:

Existing - Complete.

- Develop Recreation facilities and features: potential trailhead development
- Develop implementation level Travel Management Plan (including completing route designations for motorized access and non-motorized use) during district-wide TMP

RMA Description

The Sterling Mine Ditch Trail SRMA is 1,278 acres and is located in the Ashland Resource Area. The Dakutebede ACEC overlaps with the Sterling Mine Ditch Trail SRMA creating a recreation management zone. The trailheads are Armstrong-Deming, Wolf Gap, Grub Gulch, Bear Gulch, Tunnel Ridge, and Little Applegate; each one is developed with parking access and signs. The SMDT was the first trail in southern Oregon designated as a State Scenic Trail in 2015. We have a firmly established partnership with Siskiyou Uplands Trails Association to maintain and promote the trail. After the final connector trails were built, the total length of the trail is 26 miles. Federal Register Volume 45, No. 191, dated September 30, 1980 established a permanent closure to OHV use (ORV in 1980) "The trails and all public lands within 100 feet on either side of the system comprised of the Sterling Mine Ditch Trail, Bear Gulch Trail, Tunnel Ridge Trail, and the Wolf Gap Trail" On usual years, there are two SRP foot races that occur on the Sterling Mine Ditch Trail.

Important Recreation Values

The Sterling Mine Ditch Trail SRMA has the potential to provide hiking, equestrian, and mountain biking opportunities on a secluded, long-distance trail (Oregon State Scenic Trail designation). The SRMA includes Armstrong Gulch and Bear Gulch Trailheads.

Type of Visitors

The Sterling Mine Ditch Trail SRMA has potential to draw non-motorized trail users at the local and regional scales.

Outcome Objectives

Participants in visitor assessments report an average 4.0 realization of the targeted experience and benefit outcomes listed below. (4.0 on a probability scale where: 1 = Not at all realized to 5 = Fully realized).

Visitor Activities	Visitor Experiences	Visitor Benefits
• Mountain biking • Hiking • Equestrian • Day use • Environmental education • Wildlife viewing • Botanical viewing	• Enjoying getting some needed physical exercise • Enjoying strenuous physical exercise • Enjoying having access to outdoor amenities close to home • Enjoying being able to frequently participate in desired activities in the settings I like • Enjoying teaching others about the outdoors • Enjoying in participating in group	**Personal Benefits:** • Better mental health and health maintenance • Improved mental well being • Enhanced awareness and understanding of nature • Greater sense of adventure • Improved physical fitness and health maintenance • Improved capacity for outdoor physical exercise

Visitor Activities	Visitor Experiences	Visitor Benefits
	outdoor events • Enjoying having access to hands on environmental learning • Enjoying having access to natural landscapes • Reflecting on my own character and personal values	• Improved physical capacity to do my favorite outdoor recreation activity **Community/Social Benefits:** • Lifestyle improvement or maintenance • Greater community involvement in recreation and other land use decisions • More informed citizenry about where to go for different kinds of recreation experiences and benefits • Enlarged sense of community dependency on public lands **Environmental Benefits:** • Greater community ownership and stewardship of park, recreation, and natural resources • Reduced negative human impacts such as litter and unplanned trails • Increased ecologically friendly tourism operations **Economic Benefits:** • Increased desirability as a place to live or retire • Increased local tourism revenue • Enhanced ability for visitors to find areas providing wanted recreation experiences and benefits

Supporting Management Actions and Allowable Use Decisions

Proposed Recreation Setting Characteristics Designation: Back Country

Management Actions and Allowable Use Restrictions:

Camping Restrictions:
- Open to overnight use

Special Recreation Permits:
- Allow SRPs within RMA boundaries

Trails and Travel Management:
- Open to biking
- Closed seasonally to equestrian use
- Open to hiking
- Designated as *closed* for OHV

- OHV trails are closed within 100 ft of Bear Gulch TH, Tunnel Ridge TH, Wolf Gap TH, and within 100 ft of either side of the Sterling Mine Ditch Trail.

Firearm Use Restriction:

- Closed to shooting

ACEC Management
The Dakutebede ACEC overlaps with the Sterling Mine Ditch Trail SRMA creating a recreation management zone. Project planning in this recreation management zone requires attention to the special management needed to maintain and restore the ACEC's relevant and important values. See Appendix F – Areas of Critical Environmental Concern and the ACEC management plan.

Lands and Realty
• ROW avoidance area • Allow land use authorizations through leases, permits and easements (such as FLPMA ROW grants, MLA ROW grants, and Recreation Public Purposes Leases) if compatible with meeting recreation objectives, not interfering with recreation opportunities, and maintaining setting characteristics.

Forest Management
• Follow vegetation management guidelines in ACEC portion of RMA • Close to firewood cutting and special forest product harvest. • Allow timber harvest to address catastrophic events. • Allow timber harvest if compatible with meeting recreation objectives, not interfering with recreation opportunities, and maintaining setting characteristics. • Allow fuel treatments or other vegetation modifications if compatible with meeting recreation objectives, not interfering with recreation opportunities, and maintaining setting characteristics. • Establish a no harvest buffer of 200 feet (off of centerline) for all linear trails. • Allow timber harvest activity within buffer to protect/maintain recreation-setting characteristics and/or to achieve recreation objectives.

Mineral Management
• Leasable: Open NSO • Salable: Open to existing quarries, except for within ACEC, which is closed. • Locatable: Recommend for withdrawal

Woodrat
Special Recreation Management Area

Status:

Existing – Development Needed.

- Exisiting infrastructure is present including a vault restroom, parking area, and signs. Further development of the flight areas would result in adhanced recreation opportunities.
- Develop Recreation facilities and features: Potential trailhead development
- Develop Implementation level Recreation Area Management Plan
- Develop implementation level Travel Management Plan (including completing route designations for motorized access and non-motorized use) during district-wide TMP

RMA Description

The Woodrat SRMA is 3,875 acres and is located within the Ashland Resource Area. The SRMA offers access to hiking trail opportunities and serves as a premiere hang gliding and paragliding destination. Target shooting and OHV activity has led to user conflicts over the years.

Important Recreation Values

The Woodrat Mtn. Gliding Sites SRMA and Woodrat SRMA offer access to hiking, and internationally recognized hang gliding opportunities.

Type of Visitors

The Woodrat Mtn Gliding Sites SRMA and Woodrat SRMA have potential to draw local, regional, and national hang gliders and para-gliders as well as non-motorized trail users seeking a close-to-home recreation opportunity.

Outcome Objectives

Participants in visitor assessments report an average 4.0 realization of the targeted experience and benefit outcomes listed below. (4.0 on a probability scale where: 1 = Not at all realized to 5 = Fully realized).

Visitor Activities	Visitor Experiences	Visitor Benefits
• Mountain biking • Hiking • Day use • Hang gliding • Paragliding	• Enjoying getting some needed physical exercise • Enjoying being able to frequently participate in desired activities in the settings I like • Enjoying risk-taking adventure • Enjoying having access to natural landscapes	**Personal Benefits:** • Better mental health and health maintenance • Improved skills for outdoor enjoyment • Improved capacity for outdoor physical exercise • Improved physical capacity to do my favorite outdoor recreation activity **Community/Social Benefits:** • Greater community involvement in recreation and other land use decisions • Improved community integrations • Enlarged sense of community dependency on public lands

Visitor Activities	Visitor Experiences	Visitor Benefits
		Environmental Benefits: • Improved maintenance of physical facilities • Reduced negative human impacts such as litter and unplanned trails • Improved respect for privately owned lands • Increased ecologically friendly tourism operations **Economic Benefits:** • More positive contributions to local-regional economy • Increased desirability as a place to live or retire • Increased local tourism revenue • Maintenance of community's distinctive recreation-tourism market niche or setting character • Enhanced ability for visitors to find areas providing wanted recreation experiences and benefits

Supporting Management Actions and Allowable Use Decisions

Proposed Recreation Setting Characteristics Designation: Front Country

Management Actions and Allowable Use Restrictions:

Camping Restrictions:
- Close to overnight use

Special Recreation Permits:
- Allow SRPs within RMA boundaries

Trails and Travel Management:
- Open to all non-motorized trail uses (hike/bike/equestrian)
- Designate area as *closed* for OHV

Firearm Use Restriction:
- Close to shooting

Lands and Realty
• ROW avoidance area. • Allow land use authorizations through leases, permits, and easements (such as FLPMA ROWs, MLA ROWs, and Recreation Public Purposes Leases) if compatible with meeting recreation objectives, not interfering with recreation opportunities, and maintaining setting characteristics.

Forest Management
• Allow sale of hazard trees if compatible with meeting recreation objectives, not interfering with recreation opportunities, and maintaining setting characteristics.

Forest Management
• Allow fuel treatments or other vegetation modifications if compatible with meeting recreation objectives, not interfering with recreation opportunities, and maintaining setting characteristics. • Establish timber harvest Best Management Practices (BMPs)-Do not skid across trail, directional falling required to protect trail based resources.

Mineral Management
• Leasable: Open NSO • Saleable: Open, limited to existing quarries • Locatable: Recommend for withdrawal

Woodrat Mtn. Gliding Sites Special Recreation Management Area

Status:

Existing - Complete.

- Continue upgrades to the two established launch sites.

RMA Description

The two established gliding launch sites (Upper and Mid Launch) have established parking areas, and the Upper site has a restroom facility and barricades to separate pilots from automobiles. Both of these launch sites have multiple SRPs associated with them in the form of pilot instruction and competitive flights.

Important Recreation Values

The Woodrat Mtn. Gliding Sites SRMA and Woodrat SRMA offer access to hiking, and internationally recognized hang gliding opportunities.

Type of Visitors

The Woodrat Mtn Gliding Sites SRMA and Woodrat SRMA have potential to draw local, regional, and national hang gliders and para-gliders as well as non-motorized trail users seeking a close-to-home recreation opportunity.

Outcome Objectives

Participants in visitor assessments report an average 4.0 realization of the targeted experience and benefit outcomes listed below. (4.0 on a probability scale where: 1 = Not at all realized to 5 = Fully realized).

Visitor Activities	Visitor Experiences	Visitor Benefits
• Mountain biking • Hiking • Day use • Hang gliding • Paragliding	• Enjoying getting some needed physical exercise • Enjoying being able to frequently participate in desired activities in the settings I like • Enjoying risk-taking adventure • Enjoying having access to natural landscapes	**Personal Benefits:** • Better mental health and health maintenance • Improved skills for outdoor enjoyment • Improved capacity for outdoor physical exercise • Improved physical capacity to do my favorite outdoor recreation activity **Community/Social Benefits:** • Greater community involvement in recreation and other land use decisions • Improved community integrations • Enlarged sense of community dependency on public lands **Environmental Benefits:** • Improved maintenance of physical facilities • Reduced negative human impacts such as litter and unplanned trails • Improved respect for privately owned lands

Visitor Activities	Visitor Experiences	Visitor Benefits
		• Increased ecologically friendly tourism operations **Economic Benefits:** • More positive contributions to local-regional economy • Increased desirability as a place to live or retire • Increased local tourism revenue • Maintenance of community's distinctive recreation-tourism market niche or setting character • Enhanced ability for visitors to find areas providing wanted recreation experiences and benefits

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Mineral Management
• Leasable: Open NSO • Saleable: Open, limited to existing quarries • Locatable: Recommend for withdrawal

D. Acronyms, Glossary & References

D.1 Acronyms

ARPA – Archaeological Resources Protection Act

ASQ – Allowable Sale Quantity

BA – Basal Area

BA – Biological Assessment

BCC – Bird Species of Conservation Concern

BCR – Bird Conservation Region

BLM – Bureau of Land Management

BMP – Best Management Practice

BSS – Bureau Special Status

CAA – Clean Air Act

CC – Canopy cover

CCH – Coho Critical Habitat

CEQ – Council on Environmental Quality

CFR – Code of Federal Regulations

CHU – Critical habitat unit

CS – Cascade-Siskiyou

CT – Commercial Thinning

CWA – Clean Water Act

CWD – Coarse woody debris

DBH – Diameter at breast height

DDR – District Designated Reserve

DEQ – Department of Environmental Quality

DR – Decision Record

EA – Environmental Assessment

EFH – Essential Fish Habitat

EIS – Environmental Impact Statement

ERMA – Extensive Recreation Management Area

ESA – Endangered Species Act

ESU – Evolutionarily Significant Unit

EO – Executive Order

FBFM- Fire Behavior Fuel Model

FEIS – Final Environmental Impact Statement

FERC – Federal Energy Regulatory Commission

FG – Fragile for slope gradient

FL – Flame length

FLPMA – Federal Land Policy Management Act

FMP – Fire Management Plan

FOI – Forest Operations Inventory

FONSI – Finding of No Significant Impact

FP – Fragile for mass movement

FW – Fragile for ground water

G – Ground-based logging system

GBBDC – Game Birds Below Desired Condition

GIS – Geographic Information System

GS – Group Selection

GTRN – Ground Transportation Network

H – Helicopter logging system

HLB – Harvest Land Base

HUC – Hydrologic unit code

IDT/ ID Team – interdisciplinary team

IM – Instructional Memorandum

IVMP – Interagency Vegetation Mapping Project

KOP – Known observation point

KSA – Klamath Study Area

LAA – Likely to adversely affect

LiDAR – Light Detection and Ranging

LSR – Late Successional Reserve

LUA – Land Use Allocation

Mbf – thousand board feet

MMbf – million board feet

MOA – memorandum of agreement

MOU – memorandum of understanding

NAAQS – National Ambient Air Quality Standards

NAID – Not analyzed in detail

N/A – Not Applicable

NEPA – National Environmental Policy Act

NISIMS – National Invasive Species Information Management System

NLAA – not likely to adversely affect

NMFS – National Marine Fisheries Service

NOAA – National Oceanic and Atmospheric Administration

NRCS – National Resource Conservation Service

NRF – Nesting, roosting, and foraging habitat

NRHP – National Register of Historic Places

NSO – Northern spotted owl

OAR – Oregon Administrative Rules

O&C – Oregon and California Act, 1938

ODA – Oregon Department of Agriculture

ODEQ – Oregon Department of Environmental Quality

ODF – Oregon Department of Forestry

ODFW – Oregon Department of Fish and Wildlife

OHV – Off-highway vehicle

ORS – Oregon Revised Statutes

OSHA – Occupational Safety and Health Administration

OWR – Oak Woodland Restoration

OSMP – Oregon Smoke Management Plan

PCE – Primary constituent element

PAG – Plant Association Group

PCT – Pre-commercial thinning

PD – Public Domain

PDF – Project Design Features

PRMP – Proposed Resource Management Plan

QMD – quadratic mean diameter

RA 10 – Recovery Action 10

RA 32 – Recovery Action 32

RCT – Riparian Commercial Thinning

RD – relative density

RDI – relative density index

RMP – Resource Management Plan

RNCT – Riparian Non-Commercial Thinning

ROD – Record of Decision

ROW – Rights-of-way

RR – Riparian Reserve

S – Skyline-cable logging system

SDI – Stand Density Index

SDWA – Safe Water Drinking Act

SEIS – Supplemental Environmental Impact Statement

SH – Selection Harvest

SRMA – Special Recreation Management Area

SSP – Special Status Plants

SSS – Special Status Species

STS – Single Tree Selection

SVS – Stand Visualization System

SWO – Southwest Oregon

SYU – Sustained Yield Unit

T&E – Threatened and endangered

TMDL – Total maximum daily load

TPA – Trees per acre

TPCC – Timber Production Capability Class

TSZ – Transient snow zone

UB – Underburn

USDA – United States Department of Agriculture

USDI – United States Department of the Interior

USFS – United States Forest Service

USFWS – United States Fish and Wildlife Service

UTA – Uneven-aged Timber Area

VRM – Visual resource management

WA – Watershed Analysis

WQMP – Water Quality Management Plan

WUI – Wildland Urban Interface

WQRP – Water Quality Restoration Plan

D.2 Glossary of Terms

A

Abiotic: Non-living elements of an environment.

Activity Fuel: The combustible material resulting from or altered by forestry practices such as timber harvest or thinning, as opposed to naturally created fuels.

Affected Environment: The area impacted by the Proposed Action.

Allowable Sale Quantity (ASQ): The timber volume that a forest can produce continuously under the intensity of management described in the RMP for lands allocated for permanent timber production (USDI 2016c, p. 299).

Alternative: Other options to the proposed action by which the BLM can meet its purpose and need.

Analysis Areas: Varies by resource and include areas that could potentially be affected by the action alternatives. In some cases, the Analysis Area is confined to the Treatment Area and in others, the Analysis Area extends beyond the Project Area.

Animal Unit Month (AUM): The amount of forage required to sustain the equivalent of one cow and a calf for one month.

Anthropogenic: Of human origin or influence.

Aquatic: Living or growing in or near the water.

Authorized Officer: The Federal employee who has the delegated authority to make a specific decision.

Available Water Capacity: That portion of soil water that plants can extract.

B

Basal Area (BA): The cross-sectional area of a single stem including the bark, measured at breast height (4.5 ft. above the ground); the cross-sectional area of all stems of a species or all stems in a stand measured at breast height and expressed per unit of land area.

Baseline: The starting point for analysis of environmental consequences.

Best Management Practices (BMPs): Methods, measures, or practices designed to prevent or reduce water pollution (USDI 2016, p. 300).

Biotic: Living elements of an environment.

Brush: To remove shrubby undergrowth.

Bryophyte: A type of nonvascular plant including mosses, liverworts, and hornworts.

Bureau Special Status species: A compilation of species listed or proposed for listing under the Endangered Species Act (ESA) and Bureau Sensitive species; plant or animal species eligible for ESA-listed or candidate, state listed, or state candidate (plant) status.

C

Canopy Class: The position of the canopy of an individual tree relative to the canopies of other trees in a stand. Classes are defined by relative height and the amount of sunlight a canopy receives.

Canopy Cover: A measure of the percent of ground covered by a vertical projection of the tree crowns (USDI 2016, p. 301).

Coarse woody debris/down woody material: The portion of a tree that has fallen or been cut and left in the woods. Usually refers to pieces at least 20 inches in diameter (USDI 2016, p. 304).

Codominant Trees: Trees with crowns forming the general level of the crown canopy and receiving full light above but comparatively little from the side.

Crown base height: The distance from ground surface to the lowest live branch within a tree crown (Scott and Reinhardt 2001).

Crowing index: The open (6.1-m) windspeed at which active crown fire is possible for the specified fire environment (Scott and Reinhardt 2001).

Crown Ratio: The ratio between the length of the green crown of a tree and its total height expressed as a percentage.

Cultural Resources: Those resources of historical and archaeological significance.

Cumulative Effects: Those effects on the environment that result from the incremental effect of the action when added to past, present, and reasonably foreseeable future actions regardless of what agency or person(s) undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time.

D

Detrimental soil disturbance: The limit where the naturally occurring soil properties change to a reduced state and the inherent soil capacity to sustain growth of desired vegetation is reduced. Detrimental soil disturbance generally represents any one or all of the following; unacceptable levels of erosion (i.e., formation of rills, gullies, pedestals, or soil deposition), loss of organic matter (removal of more than half the organically enriched upper horizon), soil compaction (increase in natural bulk density that restricts root growth or wheel (or track) ruts >2 inches deep), soil heating (physical and biological changes to the soil resulting from elevated temperatures of long duration), or soil displacement (removal of ≥1 inches of any surface horizon from a contiguous area greater than 100 sq. ft.) (USDI 2016, p. 303).

Dispersal: The movement of an individual from their origin to a new site.

Dispersal Habitat: Forest stands with average tree diameters of greater than 11 inches, and conifer overstory trees having closed canopies (greater than 40% canopy cover) with open space beneath the canopy to allow owls to fly (USDI 2016, p. 303).

Diversity: The aggregate of species assemblages (communities), individual species, the genetic variation within species, and the processes by which these components interact within and among themselves. The elements of diversity are 1) community diversity (habitat, ecosystem), 2) species diversity, and 3) genetic diversity within a species. All three change over time.

Dominant Trees: Trees with crowns extending above the general level of the crown canopy and receiving full light from above and partly from the side

Dripline: The line extending vertically from the exterior edge of a tree's live crown to the ground.

Duff: The partially decomposed organic material of the forest floor beneath the litter of freshly fallen twigs, needles, and leaves.

E

Ecosystem: A system made up of a community of animals, plants, and micro-organisms and its interrelated physical and chemical environment.

Edge Effect: The modified environmental conditions or habitat along the margins of forest stands or patches.

Effects Analysis: Predicts the degree to which the environment would be affected by an action.

Endangered Species: Any animal or plant species in danger of extinction throughout all of a significant portion of its range. The U.S. Fish and Wildlife Service list these species.

Endemic: A species that is unique to a specific locality.

Environmental Assessment (EA): A concise, public document containing a federal agency's analysis of the significance of potential environmental consequences of a proposed action. The EA need not contain the level of analysis contained in an Environmental Impact

Statement (EIS). An EA is used to determine whether an EIS is needed or a "finding of no significant impact" (FONSI) is warranted.

Environmental Impact Statement (EIS): A detailed statement of a federal project's environmental consequences, including adverse environmental effects that cannot be avoided, alternatives to the proposed action, the relationship between local short-term uses and long-term productivity, and any irreversible or irretrievable commitment of resources.

Ephemeral Stream: A stream that flows only in direct response to precipitation, and whose channel is at all times above the water table.

Erosion: The detachment and movement of soil or rock fragments by water, wind, ice, or gravity.

F

Fauna: The animals of a specified region or time.

Finding of No Significant Impact (FONSI): A finding that explains that an action will not have a significant effect on the environment and, therefore, an EIS will not be required.

Fire Regime: The characteristic frequency, extent, intensity, severity, and seasonality of fires within an ecosystem.

Flora: The plants of a specified region or time.

Fuel load: the oven-dry weight of fuel per unit area.

Fully Decommission: The road surface would be decompacted so that the former compacted surface would be rendered loose and friable to a depth of 12 to18 inches or to a point where 10-inch diameter stones are the dominant substrate (whichever is shallower). Slash, boulders, and other debris would be placed along the roads "entire length" as determined by availability of materials to provide ground cover and discourage mechanized use. Blockage at the entrance would consist of placing logs, slash, boulders, berms, and other material so the entrance is camouflaged for a minimum distance of 100 feet and vehicle access is precluded. Seeding with approved native seed species and mulching with weed-free straw or approved native materials would occur within Riparian Reserves and within 100 feet of the roads entrance. All drainage structures would be removed.

G

GPS (Global Positioning System): A satellite navigation system used to determine the ground position of an object.

Ground Water: Water in the ground that is in the zone of saturation; water in the ground that exists at or below the water table.

GTRN (Ground Transportation Road Network): Roads over which the BLM has jurisdiction and maintenance responsibilities.

H

Habitat: A specific set of physical conditions in a geographic area(s) that surrounds a single species, a group of species, or a large community. In wildlife management, the major components of habitat are food, water, cover, and living space.

Habitat Fragmentation: The breakup of extensive habitat into small, isolated patches that are too limited to maintain their species stocks into the indefinite future.

Harvest Land Base (HBL): Those lands on which the determination and declaration of the Annual Productive Capacity/ASQ is based.

HUC5: Fifth field hydrologic unit code, or watershed.

HUC6: Sixth field hydrologic unit code, or sub-watershed.

HUC7: Seventh field hydrologic unit code or tributary to a sub-watershed.

Hydrology: The science dealing with the properties, distribution, and circulation of water.

I

Impact: Synonymous with "effects." Includes ecological, aesthetic, historic, cultural, economic, social, or health, whether direct, indirect, or cumulative. Impacts may also include those resulting from actions which may have both beneficial and detrimental (adverse) effects. Impacts may be considered as direct, indirect, or cumulative.

Implementation Action: An action that implements land use plan decisions.

Indicators: Parameters of ecosystem function that are observed, assessed, measured, or monitored directly or indirectly to determine attainment of a standard(s).

Infiltration: The downward entry of water into the soil.

Infiltration Rate: The rate at which water enters the soil.

Intermediate Trees: Trees shorter than dominant or codominant trees with crowns below or barely reaching into the main canopy.

Intermittent Stream: Seasonal stream; a stream that flows only at certain times of the year when it receives water from springs or from some surface source, such as melting snow in mountainous areas.

Invasibility: the susceptibility of the recipient ecosystem to the establishment and spread of introduced species.

Invertebrate Species: Any animal without a backbone or spinal column.

L

Landing: A cleared area in the forest to which logs are yarded or skidded for loading onto trucks for transport.

Late-successional Forest: Forest seral stages which include mature and old-growth age classes.

Lichen: A composite organism formed from the symbiotic association of a fungus and an alga.

LiDAR: remote sensing method that uses light in the form of a pulsed laser to measure ranges (variable distances) to the Earth. These light pulses—combined with other data recorded by the airborne system— generate precise, three-dimensional information about the shape of the Earth and its surface characteristics.

Long-Term Closure: The road would be effectively blocked and winterized prior to the wet season. Blockage at the entrance would consist of placing logs, slash, boulders, earthen berms, and other material so the entrance is camouflaged for a minimum distance of 100 feet and vehicle use is precluded. Prior to closure the road will be left in an erosion-resistant condition.

M

Mass Movement: Soil and rock movement downslope (e.g. slumps, earth flows).

Mitigating Measures: Constraints, requirements, or conditions imposed to reduce the significance of or eliminate an anticipated impact to environmental, socioeconomic, or other resource value from a proposed land use.

Mixed-Conifer Forest: A mix of tree species that include Douglas-fir, ponderosa pine, sugar pine, incense cedar, and white fir.

Monitoring: A process of collecting information to evaluate if objective and anticipated or assumed results of a management activity or plan are being realized, or if implementation is proceeding as planned.

Morphology: The study of the form and structure of organisms and their specific structure features, internal and external.

N

Nonpoint Source Pollution: Pollution that arises from an ill-defined and diffuse source, such as runoff from cultivated fields, agricultural lands, urban areas, or forests and wildlands.

Nonvascular: Plants with specialized methods of transporting water and nutrients without xylem or phloem (e.g. mosses, hornworts, liverworts, algae).

Noxious Plants: Those plants which are injurious to public health, agriculture, recreation, wildlife, or any public or private property.

O

O&C Lands: Public lands managed by the BLM under the O&C Act of 1937 for permanent forest production, in accord with the principle of sustained yield. Lands administered under the O&C Act must also be managed in accordance with other environmental laws.

Off-Highway Vehicles (OHV): Any motorized vehicle designed for or capable of cross-country travel over land, water, sand, snow, ice, marsh, swampland, or other terrain.

Organic Matter: Plant and animal residues accumulated or deposited at the soil surface; the organic fraction of the soil that includes plant and animal residues at various stages of decomposition; cells and tissues of soil organisms, and the substances synthesized by the soil population.

ORGANON: An individual tree growth computer model developed at Oregon State University, College of Forestry for areas of the Pacific Northwest.

P

Perennial Stream: A stream that flows continuously. Perennial streams are generally associated with the water table in the localities through which they flow.

Permeability: The ease with which gases, liquids, or plant roots penetrate or pass through bulk mass of soil or a layer of soil.

Plant Association Group: Potential natural vegetation for a site under climax conditions (i.e. undisturbed by fire, insects, disease, flood, wind, erosion, or humans). The associations are primarily described by the presence and abundance of plant species. Environmental variables such as soil are used to classify and often reflect the pattern of vegetation.

Plant Community: An association of plants of various species found growing together in different areas with similar site characteristics.

Point Source Pollution: Pollution that arises from a well-defined origin, such as discharge from an industrial plant or runoff from a feedlot.

Preferred Alternative: The alternative BLM believes would reasonably accomplish the purpose and need for the proposed action while fulfilling its statutory mission and responsibilities, giving consideration to economic, environmental, technical, and other factors. This alternative may or may not be the same as the proposed action.

Prescribed Fire: Controlled application of fire to natural fuels under conditions of weather, fuel moisture, and soil moisture that will allow confinement of the fire to a predetermined area and, at the same time, will produce the intensity of heat and rate of spread required to accomplish certain planned benefits to one or more objectives for wildlife, livestock, and watershed values. The overall objectives are to employ fire scientifically to realize maximum net benefits at minimum environmental damage and acceptable cost.

Prey species: An animal taken by a predator as food.

Project Area: Overall area of consideration that was reviewed for the development of the Elk Camel Forest Management Project.

Proposed Action: A proposal for BLM to authorize, recommend, or implement an action to address a clear purpose and need.

Public Lands: Any lands administered by a public entity, including (but not limited to) the Bureau of Land Management and the US Forest Service.

Pyroclastic: Composed chiefly of fragments of volcanic origin.

Q

Quadratic Mean Diameter (QMD): The diameter of the tree of average basal area in a stand at breast height.

R

Ravel: Loose rock material on a hillslope, usually of gravel or cobble size.

Record of Decision (ROD): The decision document associated with an environmental impact statement.

Refugia: Locations and habitats that support populations of organisms that are limited to small fragments of their previous geographic range.

Relative Density (RD): The degree of crowding in a forest stand. When two stands result in the same relative density they can be thought of as being at the same degree of crowding, although they may differ in age, tree size, or site quality.

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 (FLPMA).

Resource Road: Roads that provide a point of access to public lands and connect with local or collector roads (USDI 2016, p. 311).

Right-Of-Way (ROW): Federal land authorized to be used or occupied for the construction, operation, maintenance, and termination of a project, pursuant to a ROW authorization.

Riparian Area: An area containing an aquatic ecosystem and adjacent upland areas that directly affect it.

Riparian Habitat: The living space for plants, animals, and insects provided by the unique character of a riparian area.

Riparian Reserve (RR): A federally designated buffer around streams, springs, ponds, lakes, reservoirs, fens, wetlands, and areas prone to slumping, on federal lands only. The Northwest Forest Plan's Aquatic Conservation Strategy defines riparian reserve widths for the above water bodies.

S

Scope: The extent of an analysis in a NEPA document.

Scoping: The process by which BLM solicits internal and external input on the issues and effects that will be addressed in planning, as well as the degree to which those issues and effects will be analyzed in the NEPA document.

Sediment Yield: The quantity of soil, rock particles, organic matter, or other dissolved or suspended debris that is transported through a cross-section of stream during a given period.

Seed Tree: A tree of favorable genetic traits and healthy condition that is identified for protection in order to promote the continuation of its genetics.

Sensitive Species: Those species that (1) have appeared in the Federal Register as proposed for classification and are under consideration for official listing as endangered or threatened species or (2) are on an official state list, or (3) are recognized by a land management agency as needing special management to prevent their being placed on Federal or state lists.

Seral Stage: A temporal or intermediate stage in the process of succession.

Silviculture: The science of controlling the establishment, growth, composition, health, and

quality of forests and woodlands to meet diverse needs.

Silvicultural System: A planned sequence of treatments or prescriptions over the entire life of a forest stand needed to meet management objectives.

Skid: To drag a log from within a harvest unit to a collection point (landing).

Slash: The residual vegetation (e.g. 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″ DBH (diameter at breast height) and at least 6 feet tall (USDI 1995, p. 114).

Soil Productivity: The inherent capacity or potential of a soil to produce vegetation, and the fundamental measure of soil productivity is the site's carrying capacity for plant growth. The key properties directly affected by management are site organic matter (OM) and soil porosity.

Soil Series: The lowest or most basic category of the U.S. system of soil classification.

Species: A group of related plants or animals that can interbreed to produce offspring.

Special Status Species (SSS) include:

Proposed species – species that have been officially proposed for listing as threatened or endangered by the Secretary of the Interior. A proposed rule has been published in the Federal Register.

Listed Species – species officially listed as threatened or endangered by the Secretary of the Interior under the provisions of the ESA. A final rule for the listing has been published in the Federal Register.

Endangered Species – any species which is in danger of extinction throughout all or a significant portion of its range.

Threatened Species – any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

Candidate Species – species designated as candidates for listing as threatened or endangered by the FWS and/or NMFS. A list has been published in the Federal Register.

Stand Density Index (SDI): Measures density of the stand from the number of trees and the quadratic mean diameter of the stand.

State Listed Species: Species listed by a state in a category implying but not limited to potential endangerment or extinction. Listing is by either legislation or regulation.

Sub-watershed: The sixth level in the hydrologic unit hierarchy. A sub-watershed is a subdivision within a fifth level watershed.

Succession: A series of dynamic changes by which one group of organisms succeeds another through stages leading to potential natural community or climax.

Suppressed Trees: Trees with crowns entirely below the general canopy receiving no direct light from either above or from the side.

Sustained Yield Forestry: The yield that a forest can produce continuously at a given intensity of management; the achievement and maintenance in perpetuity of a high-level annual or regular periodic output of the various renewable resources without impairment of the productivity of the land.

T

Tiering: Using the coverage of general matters in broader NEPA documents in subsequent, narrower NEPA documents, allowing the tiered NEPA document to narrow the range of alternatives and concentrate solely on the issues not already addressed.

Topography: The configuration of a surface area including its relief, or relative elevations,

and position of its natural and anthropogenic features.

Torching index: The open (6.1-m) windspeed at which crown fire activity can imitate for the specified fire environment (Scott and Reinhardt 2001).

Total Maximum Daily Loads (TMDLs): Pollution load limits calculated by DEQ for each pollutant entering a water body. TMDLs describe the amount of each pollutant a waterway can receive and still not violate water quality standards. Both point and non-point source pollution are accounted for in TMDLs as well as a safety margin for uncertainty and growth that allows for future discharges to a water body without exceeding water quality standards.

Transient Snow Zone (TSZ): The area where a mixture of snow and rain occurs, sometimes referred to as the rain-on-snow zone. The snow level in this zone fluctuates throughout the winter in response to alternating warm and cold fronts. Rain-on-snow events originate in the transient snow zone.

Treatment Area: Describes where action is proposed, such as units where forest thinning is proposed and where road construction or road improvements are proposed.

Turbidity: The cloudy condition caused by suspended solids, dissolved solids, natural or human-developed chemicals, algae, etc. in a liquid; a measurement of suspended solids in a liquid.

U

Understory: That portion of trees or other woody vegetation which forms the lower layer in a forest stand which consists of more than one distinct layer.

V

Vascular: Plants having phloem- and xylem-conducting elements that facilitate the moving of water and nutrients.

Vertebrate Species: Any animal with a backbone or spinal column.

W

Watershed: All land and water within the confines of a drainage divide.

Watershed Analysis: A systematic procedure for characterizing watershed and ecological processes to meet specific management and social objectives. Watershed analysis provides a basis for ecosystem management planning.

Wetlands: Lands including swamps, marshes, bogs, and similar areas, such as wet meadows, river overflows, mud flats, and natural ponds.

Wildland-Urban Interface (WUI): The area where structures and other human development meet or intermingle with undeveloped wildland.

Windthrow: A tree or trees uprooted or felled by the wind.

Y

Yarding: The act or process of conveying logs or whole trees to a landing, particularly by cable, tractor, or helicopter.

D.3 Bear Grub References

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