BLM

Grants Pass Resource Area

Clean Slate Forest Management Project Revised Environmental Assessment

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Changes to the EA

The following edits were made to the EA. Rewritten text appears in blue in the Revised EA.

Chapter 3: Forest Condition
Section 3.2.3: Environmental Effects

Page 74	The sentence “Alternatives 2 &3 will support a non-declining sustained yield of timber over time” was removed.
Page 74	The number 3 was removed from the sentence “In the development of Alternatives 2 & 3, the Grants Pass field office used some of the assumptions in the FEIS vegetation modeling to assist in the development of the silvicultural approach for this project.”
Pages 74 & 75	The number 3 was removed from the sentence “This silvicultural approach, applied in Alternatives 2 &3, is very similar to the assumptions used to calculate the Medford District’s ASQ in the FEIS, and have therefore been shown to create conditions supporting a non-declining sustained yield of timber through time.”

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Acronyms

ACS	Aquatic Conservation Strategy
AREMP	Aquatic and Riparian Effectiveness Monitoring Program
ARPA	Archaeological Resources Protection Act of 1979
ASQ	Annual Sale Quantity
ASR	Annual Species Review
BA	Biological Assessment
BLM	Bureau of Land Management
BMP	Best Management Practice
BO	Biological Opinion
BSS	Bureau Special Status
CCA	Clean Air Act of 1990
CCH	Coho Critical Habitat
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CHU	Critical Habitat Unit
CWA	Clean Water Act
CWD	Coarse Woody Debris
CX	Categorical Exclusion
DBH	Diameter at Breast Height
DEQ	Department of Environmental Quality
DM	Density Management
EA	Environmental Assessment
ECA	Equivalent Clearcut Area
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
ESA	Endangered Species Act of 1973
ESU	Evolutionarily Significant Unit
FEIS	Final Environmental Impact Statement
FGR	Fragile Gradient Restricted Soils
FLPMA	Federal Land Policy and Management Act of 197
FNR	Fragile Nutrient Restricted Soils
FOI	Forest Operational Inventory
FRCC	Fire Regime Condition Class
FSEIS	Final Supplemental Environmental Impact Statement
FWR	Fragile Groundwater Restricted
GIS	Geographic Information Systems
GPFO	Grants Pass Field Office
HLB	Harvest Land Base
HUC	Hydrological Unit Code

IDT	Interdisciplinary Team
IM	Instruction Memorandum
ISSSSP	Interagency Special Status / Sensitive Species Program
KLE	Klamath East Critical Habitat Unit
KSA	Klamath Study Area
LSR	Late Successional Reserve
LSRA	Late Successional Reserve Assessment
LTC	legacy tree culturing
LUA	Land Use Allocation
LWD	Large Woody Debris
MCWA	Middle Cow Creek Watershed Analysis
MOU	Memorandum of Understanding
NAGPRA	Native American Graves Protection and Repatriation Act of 1990
NAIP	National Agriculture Imagery Program
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act of 1966
NOAA	National Oceanic and Atmospheric Administration
NRCS	Natural Resources Conservation Service
NRF	Nesting, Roosting, and Foraging
NSO	Northern Spotted Owl
NWFP	Northwest Forest Plan
O&C	Oregon and California Railroad Revested Lands
ODF	Oregon Department of Forestry
ODFW	Oregon Department of Fish and Wildlife
OHV	Off-highway Vehicle
OSHA	Occupational Safety and Health Administration
PA	Planning Area
PDF	Project Design Feature
PRPA	The Paleontological Resources Protection Act
RA-10	Recovery Action 10
RA-32	Recovery Action 32
RF	Roosting and Foraging
RD	Relative Density
RMA	Recreation Management Area
RMP	Resource Management Plan
RNV	Range of Natural Variability
ROD	Record of Decision
ROW	Right-of-Way
RR	Riparian Reserve
RROW	Reciprocal Right-of-Way
RSMR	Reforestation Surface Rock Moisture Restricted Soils
RSTR	Reforestation Surface Rock Temperature Restricted Soils

RSW	Reforestation Surface Rock Withdrawn Soils
RT	Restoration Thin
RTR	Reforestation Temperature Restricted Soils
RTV	Red Tree Vole
S&M	Survey and Manage
SDWA	Safe Drinking Water Act of 1974
SEIS	Supplemental Environmental Impact Statement
SHPO	State Historic Preservation Office
SMRA	Special Recreation Management Area
SSS	Special Status Species
SYU	Sustained Yield Unit
T&E	Threatened and Endangered
TMDL	Total Maximum Daily Load
TPCC	Timber Production Capacity Classification
TRS	Township, Range, and Section
WA	Watershed Analysis
UR	Understory Reduction
USDA	United States Department of Agriculture
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
UTA	Uneven-aged Timber Area
WQMP	Water Quality Management Plan
WQRP	Water Quality Restoration Plan
WUI	Wildland Urban Interface

Chapter 1 – Purpose and Need

1.1 Introduction

The Grants Pass Field Office is preparing an Environmental Assessment (EA) to document the analysis of potential site-specific effects on the human environment that may result from the implementation of the Clean Slate Forest Management Project. The EA will provide the BLM's Authorized Officer, the Grants Pass Field Manager, with current information to aid in the decision-making process. It will also determine if there are significant impacts not already analyzed in the 2015 Proposed Resource Management Plan (PRMP)/Final Environmental Impact Statement (FEIS) for Western Oregon and determine whether a supplement to that EIS is needed or if a Finding of No Significant Impact (FONSI) is appropriate. The EA will comply with the Council on Environmental Quality's (CEQ) Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act (40 CFR 1500-1508) and the Department of the Interior's regulations on Implementation of the National Environmental Policy Act of 1969 (43 CFR 46).

1.2 What is the BLM Proposing?

The Bureau of Land Management (BLM) Grants Pass Field Office is proposing forest management activities on approximately 461 acres of BLM-administered lands in the Clean Slate Project Area. Forest management treatments consist of both commercial and non-commercial treatments in the upland and riparian areas and include the use of integrated vegetation management to achieve project objectives. Integrated vegetation management includes a combination of silvicultural or other vegetation treatments. Activities may include vegetation control, planting, snag creation, prescribed fire, biomass removal, thinning, single-tree selection harvest, and group selection harvest. The prescriptions are tailored to the various site conditions (elevation, aspect, soil condition, and stand health) found throughout the Project Area. Fuel loads resulting from silvicultural treatments would be reduced through lop-and-scatter, pile and burn, broadcast burning, or biomass removal. Forest management would be accomplished through a combination of commercial timber sale contracts, service contracts, and/or stewardship contracts.

The BLM may also propose associated management actions which include temporary routes, road reconstruction, road renovation, timber haul, and road decommissioning. During the planning for this project, the BLM may identify roads for wet season haul depending on current road conditions and surface type. A more detailed description of BLM's Proposed Action is included in Chapter 2.

1.3 Where is the Project Located?

The Clean Slate Project is located east of the town of Kerby, and northeast of Cave Junction, within Josephine County. The 9,211-acre Clean Slate Project Area is located within the following watershed:

- Deer Creek watershed - 12.6% of this watershed is within the Project Area (9,211 of 72,605 acres)

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

Table 1-1: Project Area Location*

Township	Range	Sections
38 South	7 West	17, 20, 21, 29, 30, 31, 32, 33
38 South	8 West	13, 23, 24, 25
39 South	7 West	3, 4, 5, 8, 9

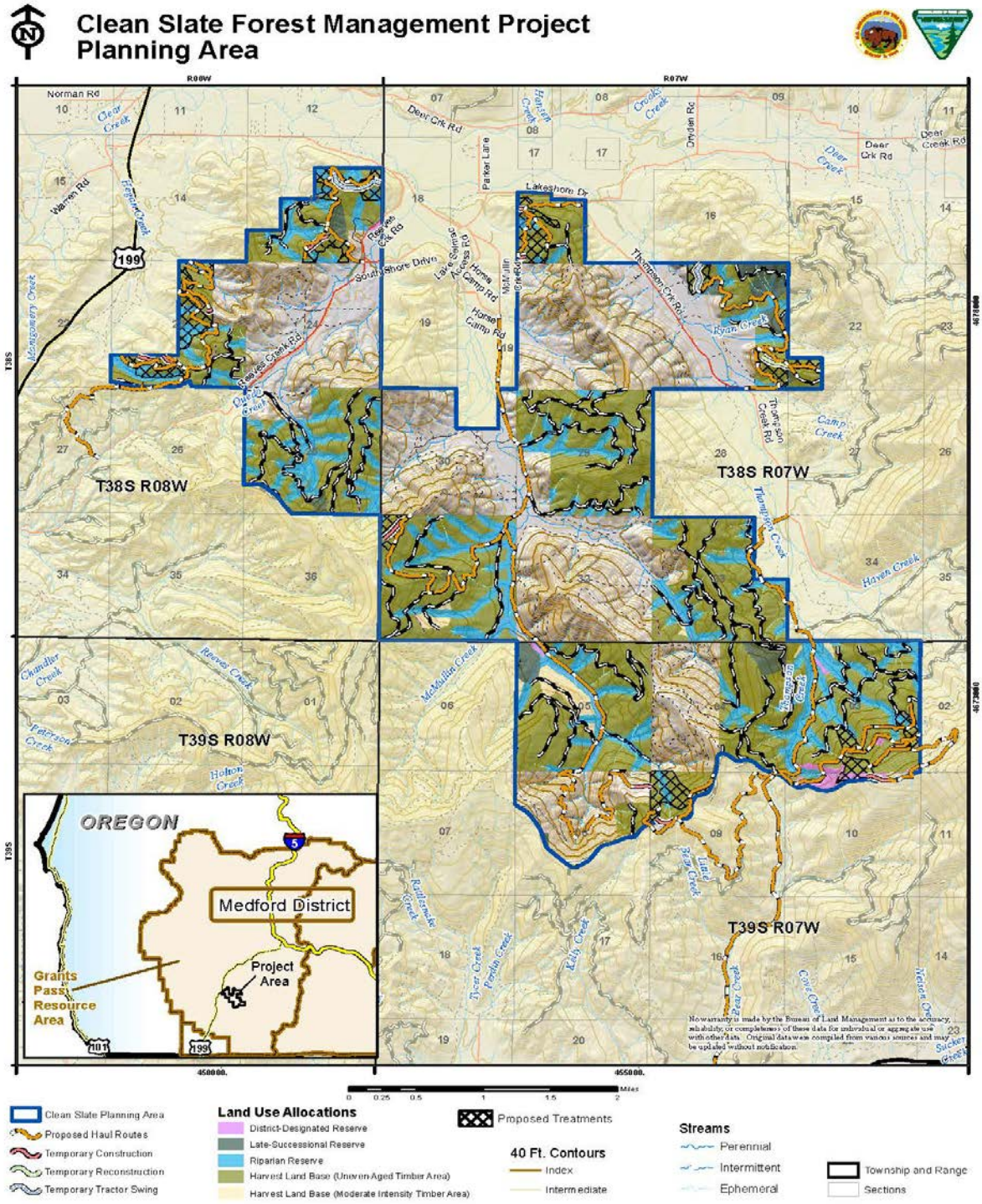
**All locations are based on the Willamette Meridian*

Lands in the Project Area are a mix of BLM-administered, private or individual company, and Josephine County lands (Figure 1-1). The Clean Slate Project proposal only applies to BLM-administered lands within the Project Area. Within the Clean Slate Project Area, Revested Oregon and California Railroad lands comprise 92% (4855 acres) of the BLM-administered lands, and Public Domain lands comprise 8% (444 acres). BLM-administered lands within the Project Area are intermixed with private and state lands, creating a mosaic of ownership patterns often referred to as a "checkerboard". There are no parklands or prime farmlands that would be affected by the Clean Slate proposal.

Table 1-2: Land Ownership in the Clean Slate Project Area

Ownership	Acres	Percent
BLM	5,299	58%
Private or Individual Company	3416	37%
Local Government (Josephine County)	496	5%
Total	**9,211**	

Figure 1-1: Clean Slate Map



The BLM-administered lands in the Project Area include the Harvest Land Base (HLB), Riparian Reserve (RR), District Defined Reserve (DDR), and Late Successional Reserve (LSR) land use

allocations. Treatments are proposed within the HLB and RR; no treatments are proposed within the DDR or LSR.

Table 1-3: Clean Slate Project Area Land Use Allocations

Land Use Allocation	Acres	Percent
Harvest Land Base (Uneven-Aged Timber Area)	3,710	70.0
Riparian Reserve (Dry Forest and Moist Forest)	1,096	20.7
District Defined Reserve	289	5.5%
Late Successional Reserve (Dry Forest)	203	3.8%
Total	**5,299**	

1.4 Why is the BLM Proposing this Project?

1.4.1 Purpose and Need

The Federal Land Policy and Management Act (FLPMA) requires the BLM to create Resource Management Plans (RMPs) which direct the management of BLM-administered lands. The 2016 Southwestern Oregon ROD/RMP provides the objectives, land use allocations, and management direction for managing BLM-administered lands in the Medford District, Grants Pass Field Office. Land use allocations and management directions are designed to accomplish RMP objectives. Management direction guides the site-specific measures intended to achieve the overall management objectives. Management objectives describe the desired future conditions for each land use allocation and resource program.

The need identified in the 2016 ROD/RMP for active forest management in the Harvest Land Base land use allocations is threefold: the BLM is 1) to manage forest stands to achieve continual timber production that can be sustained through a balance of growth and harvest; 2) to contribute to the Medford District's Allowable Sale Quantity (ASQ); and 3) to increase diversity of stocking levels and size classes in the Uneven-Aged Timber Area. (2016 ROD/RMP, pp. 62 & 67). The Clean Slate proposal would ensure the Grants Pass Field Office is able to contribute to the Medford District's Fiscal Year 2018 ASQ. This would be accomplished by considering units for treatment within the Harvest Land Base land use allocation which currently have the necessary clearances and surveys (botanical, archeological, stream/soil surveys, and northern spotted owl site visits and habitat evaluations). The units within the Clean Slate Project Area were recently considered during the Pickett West environmental analysis. Because these units will not be implemented under the Pickett West silvicultural prescriptions or analysis, they are available to be reconsidered under the 2016 ROD/RMP.

The 2016 ROD/RMP also identified a need for some types of active forest management in portions of the Riparian Reserve land use allocation to "maintain and restore…the proper functioning condition of riparian areas, stream channels, and wetlands" (2016 ROD/RMP, p.75), such as thinning and fuels treatments (2016 ROD/RMP, p. 82).

The Clean Slate Project would address the problems and opportunities ("need" for action) identified below by implementing forest, transportation, and fuels reduction actions for the following purposes listed below (in bold).

Forest Management - Harvest Land Base

Conduct silvicultural treatments to contribute volume to the Medford District's (Fiscal Year 2018) Allowable Sale Quantity (ASQ), enhance timber values, and reduce fire risks and insect and disease outbreaks **(RMP, p. 62).**

Harvest Land Base – UTA

Utilize integrated vegetation management to promote the development and retention of large[1], open-grown trees and multi-cohort stands, develop diverse understory plant communities, increase or maintain vegetative species diversity, promote and enhance the development of structural complexity and heterogeneity, and adjust stand composition or dominance **(RMP, p. 68).**

The BLM has a need to harvest timber to provide a sustainable supply of timber and to contribute to Medford District's Fiscal Year 2018 declared ASQ. This would be accomplished by treating stands in the Harvest Land Base (HLB) land use allocation which has all necessary clearances and surveys.

The HLB is comprised of Oregon & California Railroad Revested and Coos Bay Wagon Road (O&C) lands. The management of the O&C lands in the Project Area is governed by a variety of statutes, including the O&C Lands Act. The O&C Lands Act requires the Secretary to manage O&C lands for permanent forest production; however, such management must also be in accord with sustained-yield principles (2016 ROD/RMP, p. 5). Deferring harvest in stands which have needed clearances would forego the opportunity to contribute volume toward the Medford District's Fiscal Year 2018 declared ASQ (2016 ROD/RMP, pp. 5, 62, 64, & 68) and would fail to generate a successive stand of timber for future harvest in accordance with sustained yield timber management as directed by the ROD/RMP.

[1] Large, old trees are defined as dominant Douglas-fir (Pseudotsuga menziesii) and pine (Pinus spp.) trees that are both ≥ 36" 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" DBH.

The BLM used the Forest Operations Inventory (FOI) dataset to identify stands appropriate for management in the Clean Slate Project Area. Stand examinations, LiDar, and field review provided current data on stocking levels, stand health, and species composition in the units proposed for management.

The stands identified for treatment in the HLB land use allocation are experiencing decreasing levels of diversity. The decreasing levels of diversity are a result of overstocked stands which are dominated by shade-tolerant species. These overstocked stands are experiencing declining vigor and growth rates due to high levels of density-related competition that has primarily occurred from lack of disturbance (i.e., fire). As trees compete for limited water, nutrients, and growing space, they become stressed and more susceptible to mortality from insects, forest pathogens, drought, windstorms, and wildfire.

In addition, the species composition in these stands has shifted to favor shade-tolerant trees such as tanoak, incense cedar, and Douglas-fir. There has been a decrease in shade-intolerant species such as oaks and pine. Shade-tolerant species are growing in larger quantities than they did historically and are more prevalent in the mid-story of stands. Fire exclusion had made these species considerably more abundant, especially in mixed-conifer stands, as fire functioned as a removal agent when these species were in the seedling and sapling phase when they are thin-barked and generally killed by moderate heat. To increase shade-intolerant species persistence, diversity, and to promote regeneration of shade-intolerant species; silvicultural prescriptions will be designed to create growing space for hardwood and pine species.

The majority of stands selected for treatment lack structural complexity and heterogeneity. Forest management actions are needed to achieve continual timber production, increase the diversity of species, size classes, structural complexity, heterogeneity, and reduce fire risks and insect and disease outbreaks.

The Grants Pass Field Office manages 5,299 acres (58%) of lands in the Project Area. Harvest Land Base accounts for about 70% of the BLM ownership, with the remainder allocated as Riparian Reserve and Late-Successional Reserve (Tables 1-2 & 1-3). Stands and trees considered for selection harvest exhibit conditions such as high tree densities and trees with low crown ratios. These stands and trees have stalled in growth and would not likely respond to thinning. There is a need to harvest these stands and trees in order to promote growth and increase the diversity of stocking levels and size classes within the stands. There is a need for thinning in portions of stands where the remaining trees would continue to improve in growth and vigor from such treatments.

What will the proposed treatments look like?

In forested stands greater than 10 acres, integrated vegetation management will consist of at least 10% untreated “skips”, 30% of the stand may consist of openings of up to 4 acres each, and the average relative density will vary between 20-45%. See below in Figure 1-2 for an example of this treatment (2016 ROD/RMP, p. 68).

Figure 1-2: Example of Proposed Treatments

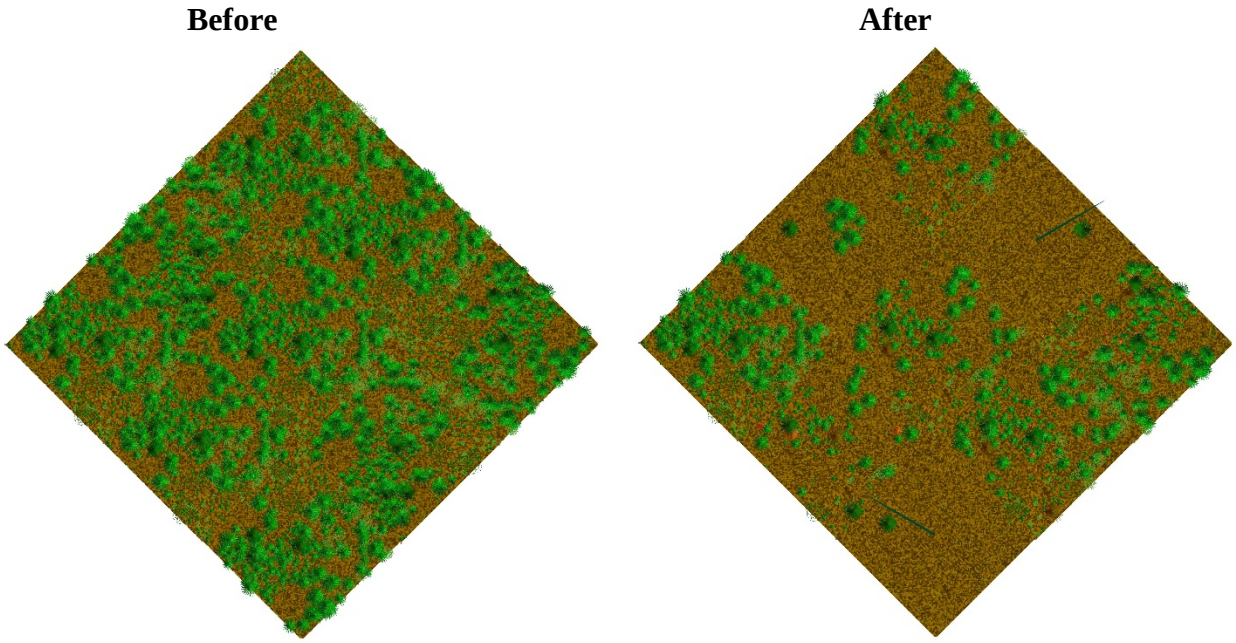


Figure 1-2: A composite of Stand Visualization System (SVS) overhead images, provides an example of a stand treated with Integrated Vegetation Management described by the 2016 ROD/RMP. Prior to treatment, the stand on the left is experiencing imminent competition mortality as growth slows and trees die, resulting in fuel accumulation on the forest floor. The same stand on the right has been managed with a total of 10% being left in untreated “skips”, approximately 30% has been treated with group selection openings, and the remainder has been thinned to variable densities. No trees over 36” DBH have been removed, and the overall diversity of size class distributions have been maintained and increased as new cohorts of shade-intolerant trees are free to establish in open growing conditions. The Relative Density Index (a measure describing the level of competition among trees) has been reduced to 20- 45% with a highly variable spatial distribution while still allowing stand-level growth to occur and multiple degrees of inter-tree competition to persist.

Forest Management – Riparian Reserve - Dry (Class 1 watershed)

Thin stands in the outer riparian zone as needed to ensure that stands are able to provide trees that would function as stable wood in the stream **(RMP, p. 82).**

Apply fuels reduction treatments in the outer riparian zone, including prescribed fire, as needed to reduce the risk of stand-replacing crown fires **(RMP, p. 83).**

Similar to forest stands in the adjacent upland areas, there are stands within Riparian Reserves on tributaries to McMullin, Quedo, and Thompson Creeks that are overstocked and are experiencing declining growth rates and high fuel loads due to high levels of density-related competition. This condition can increase the risk of stand-replacing crown fires in these stands. For the portions of stands experiencing these conditions within the Riparian Reserve, there is a need for silvicultural and fuels treatments to improve forest health and resiliency to fire or insect disturbance including timber harvest, to reduce stand densities, and related competition to increase individual tree growth.

1.5 Decision Framework

The Clean Slate Environmental Assessment (EA) will provide the information needed for the Authorized Officer, the Grants Pass Field Manager, to select a course of action to be implemented for the Clean Slate Project. The Field Manager must decide whether to implement the Action Alternative, select the No Action Alternative, or choose a combination of components found within the alternatives analyzed.

The Field Manager will consider the extent to which each alternative responds to the decision factors listed below. The forthcoming Decision Record will document the Field Manager's rationale for selecting a course of action based on the effects documented in the EA, and the extent to which each alternative responds to the following factors:

- The amount of timber volume produced to contribute to the Medford District's Fiscal Year 2018 Allowable Sale Quantity.

- How well the alternative would achieve the purposes of the project.

- How well the alternative produces an economically viable and operationally feasible timber sale contributing to community and industry stability.

- The nature and intensity of environmental effects that would result from implementation of the proposed projects and how well the alternative resolves the issues identified in Chapter 1.

The decision will also include a determination of whether or not the impacts of the actions are significant to the human environment. If the impacts are determined to be within the range analyzed in the Proposed Resource Management Plan/Final Environmental Impact Statement for Western Oregon (FEIS) (USDI/BLM, 2015a), or otherwise determined to be insignificant, a Finding of No Significant Impact (FONSI) can be issued and the decision implemented. If the analysis within the EA determines that the significance of impacts are unknown or greater than those previously analyzed and disclosed in the RMP/FEIS, then a project-specific EIS must be prepared.

1.6 Land Use Conformance and Legal Requirements

1.6.1 Conformance with Land Use Plans

The BLM signed a Record of Decision approving the Southwestern Oregon Resource Management Plan (2016 SWO ROD/RMP) on August 5, 2016. The Medford District initiated and will design the Clean Slate Project to conform to the 2016 SWO ROD/RMP.

This project is also consistent with:

- *Revised Environmental Assessment for Integrated Invasive Plant Management of the Medford District* (February 2018) and the *Decision Record for Integrated Invasive Plant Management for the Medford District* (February 2018); and

- *The Final Supplemental Environmental Impact Statement: Management of Port-Orford Cedar in Southwest Oregon* (FSEIS, 2004 and ROD, 2004)

1.6.2 Special Status Species Policy

The Clean Slate Forest Management Project will be planned to be consistent with BLM Manual 6840 (USDI/BLM, 2008a). The BLM Manual 6840 provides policy and guidance for the conservation of BLM Special Status Species and the ecosystems upon which they depend. BLM Special Status Species include those species listed or proposed for listing under the ESA, as well as those designated as Bureau Sensitive by the Oregon/Washington State Director. The objectives of the BLM Special Status policy are:

- To conserve and/or recover ESA-listed species and the ecosystems on which they depend so that ESA protections are no longer needed for these species; and

- To initiate proactive conservation measures that reduce, or eliminate threats to Bureau Sensitive species to minimize the likelihood of and need for listing of these species under ESA (USDI/BLM, 2008a, Section .02).

1.6.3 Medford District RMA Frameworks (Lake Selmac Trails SRMA)

As a part of the RMP, the BLM designated portions of the landscape as either Special Recreation Management Areas (SRMAs) or Extensive Recreation Management Areas (ERMAs). Within each of these designated areas, the BLM established recreation and visitor service objectives and identified supporting management actions and allowable uses in the Recreation Management Area (RMA) Frameworks (USDI/BLM, 2016a, p.259 & USDI/BLM, 2016b pp. 100-101).

Each RMA framework includes a description of the recreation values, type of visitor targeted, the outcome objectives, the Recreation Setting Characteristics, the applicable management actions and allowable use restrictions. The BLM manages each SRMA and ERMA according to these descriptions, consistent with the management direction in the 2016 SWO ROD/RMP.

Within the Clean Slate Project Area is the Lake Selmac Trails SRMA, which is 443 acres and co-managed with Josephine County Parks in support of Lake Selmac Recreation Area and recreation opportunities available around the lake. Current use includes hiking, biking, and equestrian trails that have been identified on maps but not officially designated. The RMA framework for the Lake Selmac Trails SRMA identified the opportunity to develop additional recreation facilities or features.

1.6.4 Statutes and Regulations

The Proposed Action is designed to be in conformance with the direction given for the management of public lands on the Medford District and the following:

- **Oregon and California Lands Act of 1937 (O&C Act)**. Requires the BLM to manage O&C lands for permanent forest production. *Timber shall be sold, cut, and removed in accordance with sustained-yield principles for the purpose of providing for a permanent source of timber supply, protecting watersheds, regulating stream flow, contributing to the economic stability of local communities and industries, and providing recreational facilities.*

- **Federal Land Policy and Management Act of 1976 (FLPMA)**. Defines BLM's organization and provides the basic policy guidance for BLM's management of public lands.

- **National Environmental Policy Act of 1969 (NEPA)**. Requires the preparation of environmental impact statements for major federal actions that may have a significant effect on the environment.

- **Endangered Species Act of 1973 (ESA)**. Directs federal agencies to ensure their actions do not jeopardize species listed as "threatened and endangered" or adversely modify designated critical habitat for these listed species.

- **Clean Air Act of 1990 (CAA)**. Provides the principal framework for national, state, and local efforts to protect air quality.

- **National Historic Preservation Act of 1966 as amended (NHPA).** Requires federal agencies to consider the effect of their federal or federally licensed undertakings on historic properties, whether those properties are federally owned or not.

- **Archaeological Resources Protection Act of 1979 (ARPA)**. Protects archaeological resources and sites on federally administered lands. Imposes criminal and civil penalties for removing archaeological items from federal lands without a permit.

- **Safe Drinking Water Act (SDWA) of 1974 (as amended in 1986 and 1996)**. Protects public health by regulating the nation's public drinking water supply

- **Clean Water Act of 1987 (CWA)**. Establishes objectives to restore and maintain the chemical, physical, and biological integrity of the nation's water.

1.7 Scoping and Issues

Scoping is the process the BLM uses to identify issues related to the proposal (40 CFR § 1501.7) and determine the extent of environmental analysis necessary for an informed decision. It is used early in the NEPA process to identify 1) the issues to be addressed, 2) the depth of the analysis, 3) alternatives or refinements to the Proposed Action, and 4) potential environmental impacts of the Proposed Action.

Scoping is not performed to build consensus or achieve agreement on a project proposal, but rather to solicit relevant site-specific comments that could aid in the analysis and final design of the proposal.

The BLM has conducted public outreach for the Clean Slate Forest Management Project. A scoping letter briefly describing the Proposed Action and inviting comments was mailed to adjacent landowners, interested individuals, organizations, and other agencies.

The BLM solicited and received comments during a 44-day period from November 8, 2017, to December 8, 2017. During this time, the BLM received approximately 651 letters. Forty-seven of the letters were unique, and 603 letters were multiple copies of three form letters. BLM received one petition with 98 signatures. Each form letter or identical email was documented and

accounted for separately, but the content of the duplicate letters and emails was compiled into single topics or issues. The remaining letters were received from neighbors or organizations and contained individually unique topics. Below is an explanation of how the content of all scoping comment letters was considered or why the comments were not considered in the proposal development.

Substantive versus Non-Substantive Comments

The National Environmental Policy Act Handbook (Section 6.9.2.1, p. 66) describes substantive comments as doing one or more of the following: 1) question, with reasonable basis, the accuracy of the information contained within the EA, 2) question the adequacy of the methodology for, or assumptions used in the analysis, 3) present new information relevant to the analysis, 4) present reasonable alternatives other than those described in the EA, or 5) cause changes or revisions in one or more of the alternatives.

Comments are considered non-substantive if they 1) express favor for or against the Action Alternative without reasoning, 2) agree or disagree with BLM policy or resource decisions without justification or supporting data, 3) don't pertain to the planning area or the Action Alternatives, or 4) take the form of vague, open-ended questions.

All comments received during the scoping process were read in their entirety and carefully considered. Substantive comments were parsed from the letters and are organized in a comment spreadsheet contained within the Administrative Record. If comments were found to be non-substantive, they might not appear in the comment spreadsheet. The BLM is not required to consider to non-substantive comments as those comments merely express approval or disapproval with the Action Alternatives without reason. The description below explains how substantive comments were considered in the development of the Clean Slate proposal.

Substantive comments were organized in one of the following five ways: 1) incorporated into the Issues Considered but Not Analyzed in Detail, 2) incorporated into the Issues Analyzed in Detail, 3) addressed in Appendix B of this EA, 4) incorporated in Alternatives Analyzed in Detail, and 5) incorporated in the Alternatives Considered but Not Analyzed in Detail.

There was a subset of comments received which supported the Natural Selection Alternative, which is supported by members of the Deer Creek Association. The Natural Selection Alternative was considered but not analyzed in detail.

Below is a discussion of how these alternatives and the other comments were considered in the development of the project.

Incorporated Comments

Comments were incorporated into the analysis for the Clean Slate project if they provided broad direction for the overall planning of resources contained within the PA, as opposed to site-specific comments, which may have been mitigated as described below. The BLM received scoping comments from organizations and individuals which contained discussions of trade-offs for unresolved conflicts concerning alternative uses of resources. Elements of comment letters were considered within a second Action Alternative, to the degree that those elements met the purpose and need for the project. For further details see Section 1.4 Decision Framework and Section 2.3 Action Alternative 3.

Mitigated Issues

There was a subset of comments that were site-specific and did not contain broad direction for overall resource management within the PA. These comments were analyzed by the IDT through the design of Project Design Features (PDFs). The PDFs are measures incorporated into the site-specific design of the project to eliminate or minimize adverse impacts to the human environment. Specific PDFs include the following and are reiterated in Section 2.4:

- Controlling the establishment and spread of noxious weeds by vehicle washing, the use of weed-free straw, and monitoring.
- Implementing actions such as fully decommissioning all temporary routes which include blocking and placing material at the entrance of skid trails and temporary routes to discourage the development of OHV routes.

Appendix Responses

Comments that were not incorporated into the analysis or mitigated during planning may have been responded to in Appendix B of this document. These elements from the comment letters did not warrant incorporation into the analysis because they didn't meet the purpose and need for the project, were technically or economically infeasible, were inconsistent with policy or objectives, or had already been decided upon, making them beyond the scope of this analysis.

Issues and Alternatives Not Analyzed in Detail

Similar to the situation described above, comments that were responded to as Issues and Alternatives Not Analyzed in Detail are technically or economically infeasible, are inconsistent with policy or objectives, or have already been decided upon, making them beyond the scope of this analysis.

As described above, the BLM has encouraged and facilitated public involvement during the NEPA process for this project. The BLM solicited comments through the external scoping process, hosted multiple meetings with the public, and employed a public information specialist to ensure the public was timely engaged. BLM cataloged, parsed, and considered public comment letters and supporting literature in the development of this project.

1.7.1 Issues Identified for Detailed Analysis

All substantive scoping comments, which are received from the public and the BLM interdisciplinary team (IDT), were considered during the development of key issues to be considered for detailed analysis. Key issues are points of dispute or contention and areas of concern or uncertainty. The key issues represent those issues that the decision maker or interdisciplinary team needs to consider in developing, analyzing, and selecting an alternative. Guided by the appropriate management plans, the IDT selected appropriate BMPs from the 2016 ROD/RMP, developed Project Design Features, and alternatives to address the key issues identified during scoping. These key issues will provide the focus of the EA during the Chapter 3 analysis process.

Forest Condition

Issue 1: How would proposed forest management actions (thinning, regeneration of conifer stands, and activity fuels treatments) affect species composition, long-term productivity of stands, and structural characteristics within the HLB-UTA and RR land use allocations?

Terrestrial Wildlife and Special Status Species

Issue 2: How would timber harvest, activity fuels treatments, and new road and landing construction affect habitat used by northern spotted owls and barred owl for nesting, roosting, and foraging?

Issue 3: How would proposed timber harvest and associated tree removal areas affect denning, resting, and foraging within stands used by fisher?

Sedimentation

Issue 4: Would logging activates, maintenance and hauling on existing roads, or temporary road construction and reclamation increase sedimentation downstream and negatively impact aquatic quality?

Fisheries & Aquatic Habitat

Issue 5: How would vegetation management, timber hauling, and road renovation affect federally-listed, native fish species, and their habitat?

Economics

Issue 6: How would the removal of forest products contribute towards the local and regional economy?

1.7.2 Issues Considered but not Analyzed in Further Detail

Issues raised by the public or BLM during scoping for this project that is addressed by the project's design (Chapter 2) or is beyond the scope of this project will be considered but may not be analyzed in further detail in Chapter 3. Requests for information that would not further contribute to making a reasoned and fully informed decision for the project will not be included in the EA. The EA documents how these conclusions were reached in Appendix A.

1.7.3 Scientific Literature Submitted During Scoping

Numerous articles were submitted to the BLM for review during the scoping process. The BLM reviewed these documents and considered the information in developing the final Proposed Action and alternatives. Articles submitted in support of substantive comment were provided to the Interdisciplinary Team for consideration in developing the alternatives and during the analysis. A list of the literature submitted can be found in Chapter 6-References.

The BLM strives to apply the most current, geographically relevant science to its analysis and management considerations that represent actions similar in scale and scope to the BLM project. The BLM considered all relevant, appropriate, and available information for the project development and potential effects. Section 2.6 of the EA (Alternatives and Actions Considered but Not Analyzed in Further Detail) also responds to articles submitted to request actions outside of Alternatives 2 and 3.

Chapter 2 – Alternatives

2.1 Introduction

This chapter describes how the project was developed, describes what is being proposed in detail, and presents the Alternatives. A No Action Alternative is presented and will form the baseline for analysis. Alternative 2 was developed by the BLM to achieve the objectives identified in the Purpose and Need statements in Chapter 1. Alternative 3 was submitted to the BLM during the public scoping period. Project Design Features (PDFs) and Best Management Practices (BMPs) as described in Appendix C of the 2016 ROD/RMP, will be incorporated into the analysis of anticipated environmental impacts described in Chapter 3.

2.2 Development of the Project

2.2.1 Treatment Area Selection

The following describes the rationale for the selection of the Clean Slate Forest Management Project Area and units.

The Clean Slate Forest Management Project Area (9,211 acres) falls entirely inside of the Pickett West Forest Management Project Planning Area (203,458 acres) boundary. There are 13 Clean Slate units (a total of 461 acres) which match the footprints of the 13 Pickett West units within the Clean Slate Project Area. These 13 units from the Pickett West EA are the same units that are now being analyzed in the Clean Slate EA. While those units were analyzed in the Pickett West EA, they were never decided upon and will not be decided upon as analyzed in the Pickett West EA due to the transition from the 1995 ROD/RMP to the 2016 ROD/RMP. The BLM is not precluded from reanalyzing those same units and acres within the Clean Slate Forest Management Project EA.

The Medford District BLM signed a Record of Decision approving the Southwestern Oregon Resource Management Plan (2016 ROD/RMP) on August 5, 2016. Revision of an RMP necessarily involves a transition from the application of the old RMP to the application of the new RMP. The Pickett West Forest Management Project met the criteria for a transition project and was initiated under the direction of the 1995 ROD/RMP. Any decisions issued from transitions projects must be decided upon within two years of the effective date of the 2016 ROD/RMP. The BLM was unable to meet the transition timeline for subsequent decisions from the Pickett West EA.

Preparing for a forest management project generally requires multiple years of surveys and economic investment in those acres. In preparation for the Pickett West environmental analysis, the BLM conducted all necessary clearance surveys which included: stream surveys, soils surveys, northern spotted owl protocol surveys, one or two years of botanical surveys, cadastral

surveys, habitat evaluations, and cultural surveys. To ensure that the investment was not forgone, the BLM chose to reanalyze the former Pickett West units under the direction of the 2016 ROD/RMP within the Clean Slate Forest Management Project EA.

Because the two-year deadline for decisions from transitions projects was not able to be achieved, and the BLM made an investment those acres to aid in the contribution to Medford District's ASQ; BLM management decided not to continue with the Pickett West project. Reanalyzing acres, which had all necessary clearance surveys, ensured that Grants Pass BLM was able to contribute volume to Medford District's 2018 ASQ target.

2.2.2 Policies that Influenced the Development of the Project – 2016 ROD/RMP

After the treatment area was selected, the interdisciplinary team evaluated the selected units with specific direction from the 2016 ROD/RMP.

Timber Production Capability Classification (TPCC) Withdrawn Lands: TPCC is the process for partitioning forestland into major classes indicating relative suitability to produce timber on a sustained yield basis. TPCC withdrawn lands are lands identified as unavailable for planned forest management based on site-specific information. The 2016 ROD/RMP captures TPCC withdrawn lands in the DDR-TPCC land use allocation. The RMP acknowledged that over time, the BLM would add or remove areas from this land use allocation as examinations indicate whether the criteria for reservation are met or not through plan maintenance (2016 ROD/RMP, p. 135). As part of this planning effort, field examinations found one area that would need to be removed from the DDR-TPCC land use allocation. The Clean Slate Forest Management Project does not include timber harvest on any lands within the DDR-TPCC consistent with 2016 ROD/RMP management direction (2016 ROD/RMP, p. 55).

Riparian Reserves (RRs): Riparian Reserves incorporated by the 2016 ROD/RMP are located on BLM-administered lands throughout the Project Area, distances are determined by water feature type. Streams and water features were identified in and adjacent to units using Light Detection and Ranging (LIDAR) and site-specific field review to ensure that all areas needing Riparian Reserve protection were identified. Stream maps were updated with the current information. Where Riparian Reserves are excluded from commercial treatment, the boundaries would clearly be marked on the ground. The hydrologist, fisheries biologist, and silviculturist worked together to identify which riparian areas within or adjacent to proposed treatment units are in need of treatment to meet the purposes identified in Section 1.4.1.

Special Habitat Management: The 2016 ROD/RMP provides management direction to manage special habitats for plants and animals, such as meadows, cliffs, caves, and talus slopes to maintain their ecological function (2016 ROD/RMP, p. 115). The Clean Slate Forest Management Project has incorporated this special habitat management direction and would apply

no-harvest buffers as needed where site-specific circumstances warrant their application to maintain ecological function.

Medford District Recreation Management Area (RMA) Framework: The 2016 ROD/RMP identified areas with established recreation and visitor objectives and identified supporting management actions and allowable uses. Commercial treatments are proposed in areas identified by the RMA Framework they have been designed to be consistent with the management direction for these areas.

Northern Spotted Owl RMP Mitigation: The 2016 ROD/RMP incorporated a mitigation measure that the BLM will not authorize timber sales that would cause the incidental take of northern spotted owls (determined by the U.S. Fish and Wildlife Service (USFWS)) until implementation of a barred owl management program is in place (2016 ROD/RMP, p. 30). At the time of the planning of the Clean Slate Forest Management Project, no barred owl management program is in place; therefore, this project was designed to comply with this RMP mitigation measure. The wildlife biologist and silviculturist worked together to design treatments that would not result in the incidental take of northern spotted owls as determined by USFWS through the ESA Section 7 consultation process.

2.2.3 Treatment of Selected Stands

The timber sale planner and silviculturist assessed the timber harvest potential of the selected stands using the Forest Operations Inventory (FOI) layer and other GIS layers. Identified treatment needs were based on the 2016 ROD/RMP silvicultural management systems for lands in the HLB-UTA and RR land use allocations. The timber planner and silviculturist considered the following criteria when evaluating how to treat a selected stand:

Timber Planner:

- Portions of stands which were grasslands, shrublands, and functioning hardwood/woodlands were not considered for treatment.
- Portions of stands which were too young or did not support commercial entry were dropped from consideration for treatment.

Silviculturist:

- Stands at or below desired relative density threshold (20% to 25%) were not identified for treatment under this project.
- Group Selection Openings as described in the 2016 ROD/RMP (p. 68) were not considered in the following locations: TPCC restricted areas, Visual Resource Management Restricted areas, portions of units where the average tree size is ≥ 36” DBH, areas with large snags/down woody material, the Outer and Middle Riparian Zones/seeps/springs/headwalls, and within cultural sites and botany buffers.

2.2.3 Consideration of Economic and Logistical Feasibility

After the treatments units were selected, they were screened for compliance with the 2016 ROD/RMP. Those potential treatment units were then evaluated by the IDT silviculturist, engineer, and logging systems specialist for economic and logistical feasibility. For example, portions of a unit may have been deferred from treatment because increased logging cost would have made the entire unit economically infeasible to harvest. Other resource specialists, such as the soil scientist, botanist, and archaeologist, reviewed stands for potential issues related to their resources and where needed to protect resources some portions of the unit may have been deferred from treatment.

2.2.4 Project Area Road Inventory and Assessment

The IDT reviewed the transportation system in the Clean Slate Project Area and determine which roads were candidates for some type of management action.

An inventory and review of the existing transportation network were conducted to aid in the assessment of the current condition and to evaluate the transportation system for an appropriate level of management. Roads within the Clean Slate Project Area vary from primitive four-wheel drive roads (non-system roads) to engineer-designed roads with culverts, drainage features, and crushed rock surfacing or bituminous surfacing that receive maintenance by BLM (system roads). The inventory process specifically identified:

- Roads that need maintenance to restore, repair, or improve road surfaces, culverts, and roadside drainage ditches in order to reduce road-related erosion and sedimentation to stream courses;
- Roads under existing agreements for private land access and reciprocal rights-of-way;

Opportunities to improve conditions of the road system were incorporated into the Action Alternatives described in the next section. Road maintenance and other improvement opportunities have been identified to address the needs acknowledged during the assessment process (Appendix E: Road Work and Use Table).

P2.3 Proposed Activities

The Clean Slate Project includes forest management activities on approximately 461 acres of BLM-administered lands. Forest management treatments consist of both commercial and non-commercial treatments in the upland and the Outer and Middle Riparian Zones. To support the proposed treatments, road construction and maintenance activities are also being proposed.

2.3.1 Forest Management Activities

The Clean Slate Forest Management Project will utilize integrated vegetation management to accomplish the management directions from the 2016 ROD/RMP for the land use allocations proposed for treatment within the Project Area.

Volume related objective in the uplands (i.e., Harvest Land Base) includes the management of forest stands to achieve continual timber production that can be sustained through a balance of growth and harvest (2016 ROD/RMP, p. 62). These treatments will contribute to the Medford District's 2018 Allowable Sale Quantity.

Ecological related objectives in the uplands include an increase to the diversity, stocking levels, and size classes within and among stands (2016 ROD/RMP, p. 67) and the promotion, enhancement, and development of structural complexity and heterogeneity (2016 ROD/RMP, p. 68). The use of integrated vegetation management is expected to create growing space for hardwoods and pine and ensure their persistence and regeneration (2016 ROD/RMP, p. 68). Stands are expected to have a reduction in susceptibility to disturbance such as fire, windstorm, disease or insect infestation, (2016 ROD/RMP p. 68) and an increase or maintenance of vegetative species diversity.

Ecological related objectives in the Riparian Reserve land use allocation include to "maintain and restore…the proper functioning condition of riparian areas, stream channels, and wetlands by providing forest shade, sediment filtering, wood recruitment…vegetation diversity" (2016 ROD/RMP, p.75).

Description of Forest Management Treatments

Management activities are proposed within the Harvest Land Base Uneven-Aged Timber Area and the Outer and Middle Zones within the Riparian Reserve. These areas would be treated with integrated vegetation management.

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, biomass removal, thinning, single tree selection harvest, and group selection harvest (2016 ROD/RMP, p. 68).

<u>Uneven-Aged Timber Land Use Allocation</u>

In forested stands greater than 10 acres, commercial treatments may consist of the following (An image of a stand treated with integrated vegetation management which adheres to the prescriptions parameters below can be seen in Figure 1-2):

- The retention of all dominant Douglas-fir and pine trees that are both greater than or equal to 36 inches diameter at breast height and were established prior to 1850, and

- The retention of all madrone, big leaf maple, and oak trees greater than or equal to 24 inches diameter at breast height, and

- At least 10% of the treatment unit would be retained in untreated "skips" to provide structural complexity and refugia, and

- A total of 30% of the stand may consist of openings up to 4 acres each, openings greater than 4 acres would not be created, and

- The average relative density of the stand may vary between 20-45%, and

- Prescribed fire may be used following mechanical treatments to stimulate vegetation, reduce fuel loading, and prepare the site for planting.

Riparian Reserve (RR) Land Use Allocations

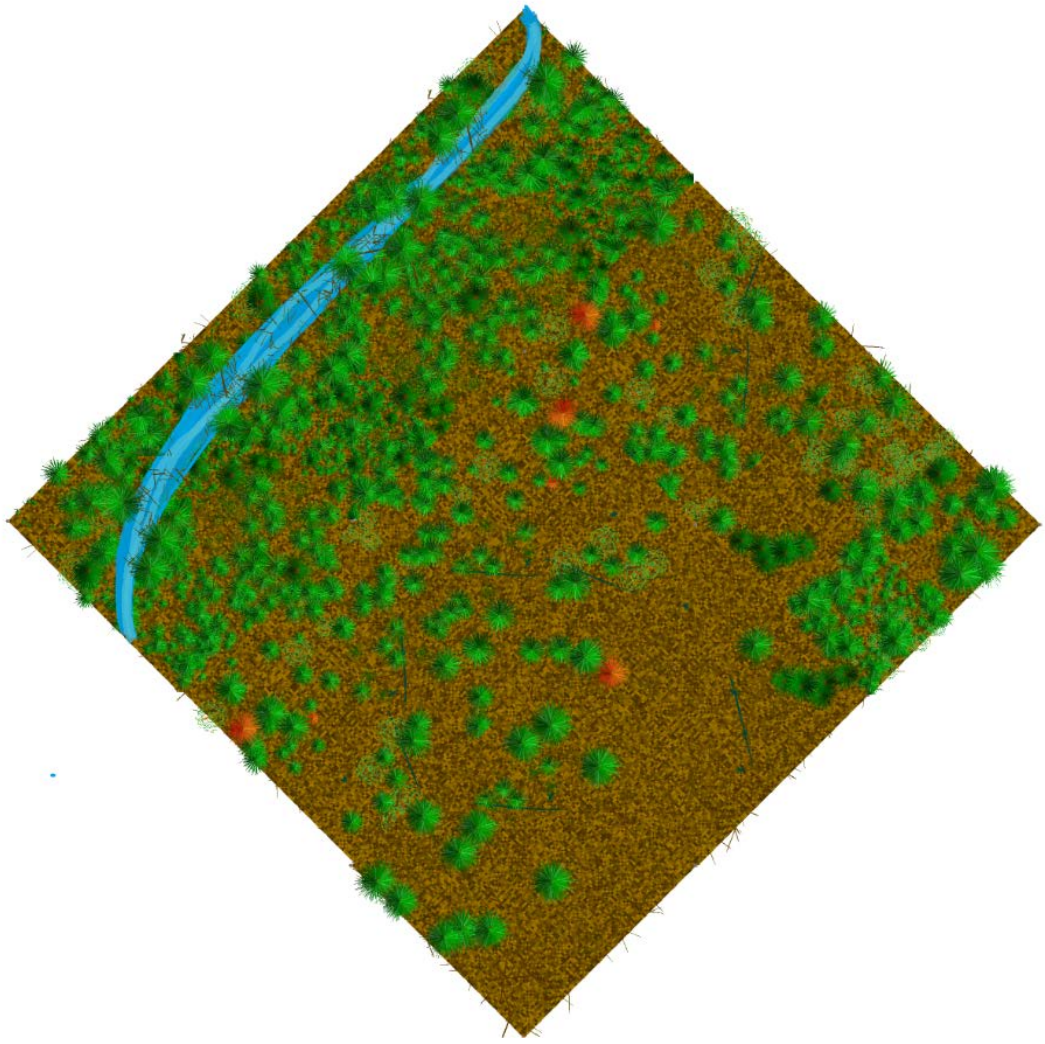
Field surveys revealed that RRs within the proposed units are in need of treatment in order to meet the management direction in the 2016 ROD/RMP for Dry Riparian Reserves within Class 1 subwatersheds (2016 ROD/RMP, pp. 82-84). The Clean Slate project is considering 94 acres of Outer Riparian Zone thinning. Canopy cover in the RR would remain above 30 percent with 60 trees per acre (TPA) on average (2016 ROD/RMP, p. 83). Activities in the RR would be designed to improve habitat conditions in the long-term for the fish habitat, habitat for other aquatic species, wildlife and plant species that use this zone.

The proposed treatments in the RRs are based on field surveys and silvicultural review. Each proposed treatment unit has been visited by a field crew looking specifically at the soil and water resources. Field surveys occurred primarily in the period from June 2016 to March 2017. Typical field crews consist of three people with extensive field experience directed and supervised by a BLM hydrologist and soils specialist. Field crew work has been verified by the IDT hydrologist and soils specialist.

Proposed treatments are designed to help accelerate the development of multiple canopy layers, increased species diversity, and increased conifer and hardwood vigor. No treatments are proposed in riparian stands that have multiple canopy layers and high levels of species diversity or in wetlands, unstable soil areas, springs, or seeps. Stands that exhibit conditions such as overstocking, minimal canopy layering, low species diversity, or low conifer and hardwood vigor was selected for potential treatment. Within these stands, riparian thinning is expected to benefit perennial and intermittent streams, fish habitat, and habitat for other aquatic species by promoting species diversity and resiliency to disturbance in the riparian forest stands. Treatment may help riparian stands better recover from or withstand disturbances by promoting species

diversity and forest health. Below is a visual representation of the expected outcomes of Outer and Middle Zone Riparian thinning.

Figure 2-1: Example of Outer Zone Riparian Reserve Thinning Treatments near a Perennial Stream Channel. Shows Inner Zone buffer (no treatment), Outer Zone thinning retaining 60 TPA, and upland treatments, the view is from the northwest corner to the southeast corner of the figure**.**



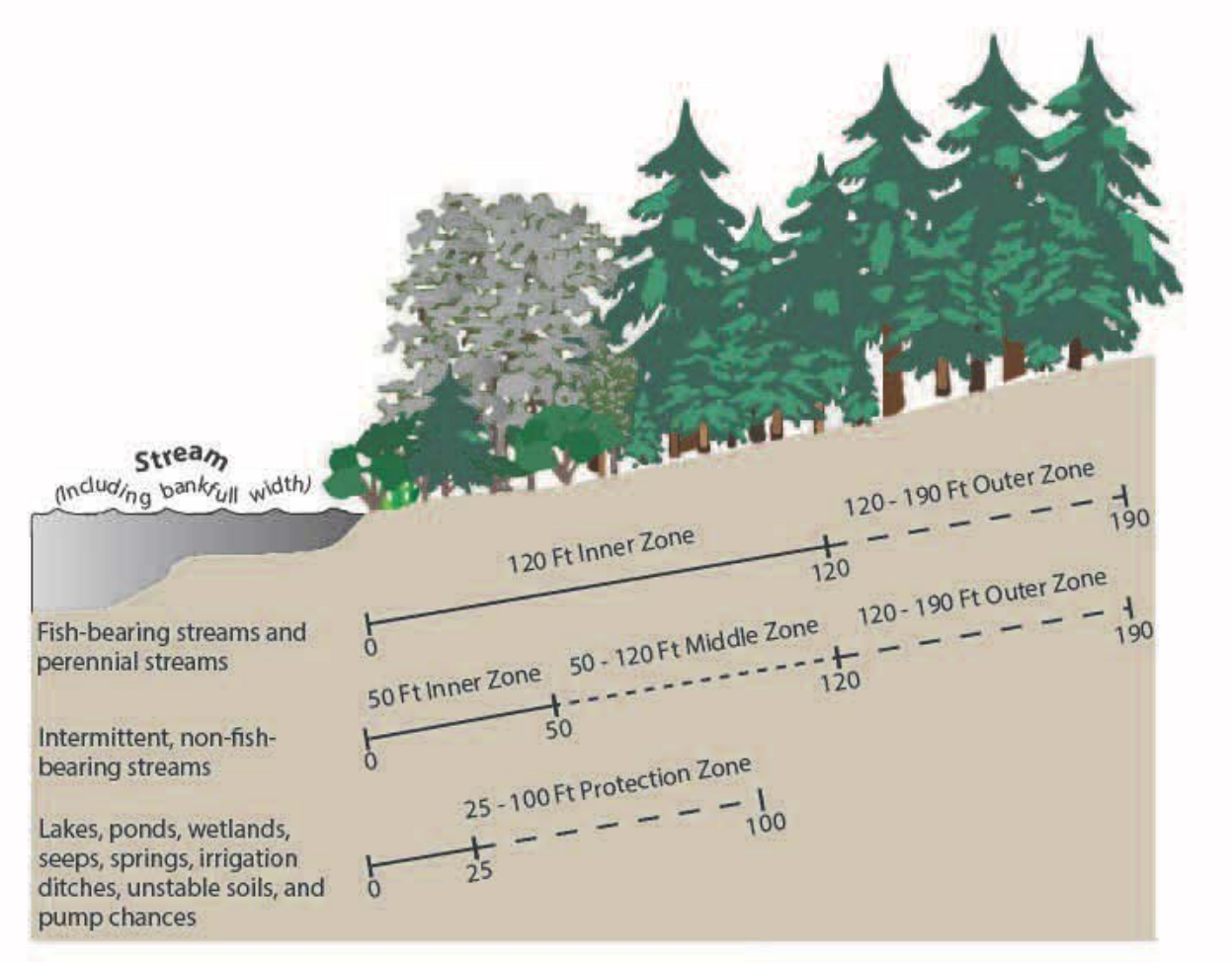
No Treatment Inner Riparian Zones

This portion of the EA describes the no commercial treatment area nearest streams known as the Inner Riparian Zone. For perennial fish-bearing and non-fish bearing streams, there are no commercial thinning treatments proposed to occur within a 120-foot no commercial entry buffer. For intermittent streams, there are no commercial thinning treatments proposed to occur within a 50-foot no-entry buffer.

The 120-foot no commercial treatment buffer for perennial streams is set for the protection of the primary shade zone, as described in the Temperature Total Maximum Daily Load (TMDL) Implementation Strategies (USDA/USFS, USDI/BLM 2012; Table 4). Empirical and modeling studies suggest that stream wood input rates decline with distance from the stream and the majority of in-channel wood recruitment comes from within 120 feet of the stream channel (ICS, 2013, Appendix 3: Item I).

Below is an illustration of stream buffer distances per stream type.

Figure 2-2: Commercial Treatments: Riparian Reserves and No Treatment Buffer Distances



All distances are measured on slope distance not horizontal distance.

Activity Fuel Treatments

Activity fuel treatments refer to the treatment of slash following silvicultural activities. Fuel treatments will not occur within 60 feet of fish-bearing or perennial streams.

Trees to be removed for commercial harvest would be whole-tree yarded or yarded with tops attached to minimize activity slash remaining within the harvest units. It is anticipated that the majority of the activity slash would be extracted from each unit by this process and piled at the landing sites. In areas utilizing ground-based harvest equipment, processing of tops within machine trails may occur and the resulting slash would either be driven over by the ground-based equipment or machine piled along machine trails. Merchantable saw logs would be removed from yarded material, and any remaining debris at the landing sites would be machine and/or hand piled and burned at approved locations, chipped, or removed for biomass utilization. Machine piling may occur on landings and within units that are adjacent to roads.

Activity slash within ground-based units may be machine or hand pile/burned, chipped, lopped and scattered, retained as coarse woody debris (CWD) or underburned. Activity slash within cable and helicopter units may be hand pile/burned, chipped, lopped and scattered, retained as CWD, or underburned. On cable and helicopter units with slopes less than 50%, activity slash may be machine piled. All post-implementation activity slash treatments are based upon a post-harvest assessment of fuel loading.

The purpose of a lop-and-scatter treatment is to break up concentrations of material so that the slash does not increase the fire hazard. The lop portion of "lop-and-scatter" would cut slash so it would not exceed 18 inches in height from the ground and material less than 6 inches in diameter would be cut into pieces, so it would not exceed 8 feet in length. Scattering would arrange slash in a discontinuous pattern across the forest floor, thus reducing postharvest fire hazard.

If the amount of slash remaining in units results in excessive quantities of fuel loading which would appear as a lack of open space to scatter the slash, treatment by chipping or machine/hand pile and burn may be recommended.

Underburning (UB)

BLM fire and fuels management personnel would conduct pre- and post-treatment evaluations to determine the need for maintenance underburning. Underburning provides a low-cost method to prepare a site for planting and reduce activity slash. Maintenance underburning may occur within 15 years from the initial fuels reduction treatments.

Description of the Yarding Systems

Harvest operation systems are comprised of pairing different harvesting mechanisms with various yarding mechanisms. Harvesting mechanisms are comprised of mechanical and manual harvesting methods. Mechanical methods include the use of harvesters or feller-bunchers which cut, fall and/or process logs prior to removal from the treatment unit. Manual harvesting methods include the use of chainsaws in which trees are felled, limbed and bucked within the treatment unit. Mechanical harvesting is generally limited to slopes of 50%. Manual harvesting is utilized

on slopes over 50% and generally paired with skyline yarding (see below). Most resource concerns stem from the yarding system due to the possible effects of removing cut timber from treatment units.

The descriptions below detail the yarding systems proposed for this project. Harvest operation systems are assigned to commercial treatment units based upon methodologies and assumptions defined in BLM manual H-5420-1 Timber Sale Handbook and management direction from the 2016 ROD/RMP. The handbook directs the BLM to explore the lowest cost methods to accomplish the yarding of commercial products while providing for, but not exceeding, the necessary or required level of environmental protection. The average cost of the different types of yarding systems may influence the final decision for this project.

Most often, slope determines whether ground-based or skyline yarding systems would be utilized. However, resource buffers, temporary route feasibility, and harvesting feasibility would determine the final yarding systems. Yarding systems may include the use of skyline cable yarding, conventional ground-based yarding, and helicopter yarding or a combination.

The yarding systems listed below may utilize whole-tree yarding or yarding with tops attached to minimize impacts to retained trees and soils. This means that the trees may be yarded to the landings with tops and limbs attached or with the limbs removed but with the tops attached. The remaining processing of the logs would occur at the landing. Tops and limbs would be removed, and logs would be cut into desired lengths.

Skyline Yarding

Skyline cable yarding systems are in a fixed position, usually attached to a yarder or a tower from which cables, carriages, and winches originate. The yarder, tower, and cables utilized in this system may require the use of tail hold and/or guylines to remain erect. The carriage is a load-carrying device from which logs are suspended and rides into the interior of the unit and returns to the landing along the skyline cable. The tail end of the cable-yarding corridors may be 150 feet apart or closer; cable-yarding corridors may converge near the landing. Landings are generally ¼ acre in size when multiple yarding corridors converge but can be smaller in size if servicing only one yarding corridor. Often no additional disturbance is created if the landing is located on an existing road and services one or two corridors. Landings would generally be located outside of the Inner Riparian Zone.

Some areas will require full suspension yarding across streams, depending on the alternative selected. Under these circumstances, cable yarding corridors would be previously approved to ensure limited impacts to Inner Riparian Zones including shade requirements. Full suspension yarding would require the entire tree to be lifted in complete suspension across the Inner

Riparian Zone. All trees within the Inner Riparian Zone required to be cut for yarding operations would be left on site as course woody debris and not yarded to the landing.

The cost of utilizing skyline cable yarding systems averages approximately $150 to $250 per acre. Costs are dependent upon the external and average yarding distance, the volume of timber being removed per acre, the size of the material being yarded from the unit, and the operator/equipment utilized.

Conventional Ground Based Yarding

Ground-based yarding systems utilize tracked or wheeled tractors to transport logs from the interior of units to landing areas. Trees are either manually or mechanically felled and processed, depending on resource protection concerns. Landing areas are generally ¼ acre in size and are located outside of the Inner Riparian Zone. The equipment utilized with this system operates on designated skid trails or existing skid trails when possible. Skidding operations would generally occur on the ground that is less than 35% slope. Ground-based yarding equipment is required to utilize an integral arch which is able to suspend logs on one end. This minimizes soil disturbance and compaction. Mechanized harvesting operations would occur on slopes up to 50%, only with the use of specialized ground-based equipment (harvesters or feller-bunchers) with self-leveling cabs.

Tractor swing routes enable yarders to "walk" up designated skid trails in which the yarder is set up along the skid trail where corridors are needed to facilitate cable yarding operations. From the location of the yarder along the tractor swing route, a skidder as described in the above paragraph, would skid logs using one end suspension to a landing on an existing road in which logs are loaded onto a log truck and hauled to the mill. Tractor swing routes provide for access to cable-yarding areas where building a temporary road would be infeasible, or full bench construction would be needed. Tractor swing routes are generally located on ridgetops with slopes less than 50% or midslope through units on slopes less than 50% to access steeper slopes for cable yarding operations. Tractor swing routes would be decommissioned similar to skid trails. Dry condition operations limit the impacts of these tractor swing routes, and proper decommissioning measures ensure mitigation of long-term impacts.

The cost of utilizing ground-based yarding systems averages approximately $130 per acre. As discussed above, costs are dependent upon the external and average yarding distance, the volume of timber being removed per acre, the size of the material being yarded from the unit, and the operator/ equipment utilized.

Helicopter Yarding

Helicopter yarding uses a helicopter to transport logs from the interior of a unit to a landing. Trees are cut and usually limbed within the interior of the unit. A mechanized harvester may be

used on slopes less than 50% to process and pre-bunch logs prior to yarding. A person within the unit attaches a cable to a group of trees which are then lifted and transported to a nearby landing location.

The cost of utilizing helicopter-yarding systems are generally the most expensive, averaging approximately $350 to $500 per acre. Because the BLM is directed to explore the lowest cost methods to accomplish yarding, the helicopter method is often not economically feasible.

Landings

All the yarding systems described above require some form of landing. The landing is the area where trees are processed into logs and loaded onto log trucks. For skyline systems and conventional ground-based systems, landings would generally be a ¼ acre in size and placed within or adjacent to the boundary of proposed treatment units. In situations where multiple yarding corridors or skid trails converge at one landing, landing size may be expanded to ½ acre. In skyline units, often no additional disturbance is created if the landing is located on an existing road and services one or two corridors

Helicopter log landings are generally 1 acre in size. Existing disturbance areas would be utilized as the first choice for landings and may need enlargement, but new landings may be needed in some locations. Selected helicopter landings would generally be within ½ mile of treatment units, located where the vegetation is mainly in shrub form or where vegetation is lacking, on or near ridge tops, and at large road junctions. Helicopter landings are typically located near ridges with sparse vegetation and not in Riparian Reserve. These areas would be stormproofed if they are needed for multiple operating seasons and decommissioned (unless within an existing road prism) once operations, including the burning of landing piles, are conducted.

Description of Road Work Activities

Roads throughout the Clean Slate Forest Management Project Area are in need of renovation and maintenance to restore, repair or improve road surfaces, culverts, and roadside drainage ditches to reduce road-related erosion and sedimentation to streams and to support timber haul. Road work activities and road maintenance activities would be designed to improve access and support the management direction for BLM-administered lands in need of resource management.

Some previously decommissioned roads are proposed to be re-opened for the project and would be closed either seasonally or for long-term closure after the project work is complete. These roads may not be needed soon but maybe re-opened when needed for forest management purposes. Temporary route construction would be proposed where there is a need for short-term access. Table 2-2 provides a summary of roadwork proposed for this project.

Temporary Road Construction

The access routes described below would be constructed to minimum low volume road standards that would facilitate safe and efficient timber operations. Construction would include clearing, grubbing, removing, and disposing of vegetation and debris from within established clearing limits. Work would also include the construction of a minimum width subgrade by excavating, leveling, and grading. After treatments are complete, routes would either be closed temporarily/closed seasonally/closed with limited access or decommissioned which could include decompacting, water barring, mulching, blocking, and seeding with native grass (where needed).

Temporary Route Construction

Temporary routes are proposed to allow operators temporary access to harvest or treatment units where no previous routes or access exists. Temporary routes would generally be located on stable areas such as ridges or gentle side slopes.

Temporary Route Reconstruction

Temporary route reconstruction would occur on an existing footprint that had been previously decommissioned under former projects. The location of the existing route footprint is considered by the IDT and routes that do not meet current standards and management direction in the 2016 ROD/RMP may not be reconstructed.

Existing Road Reconstruction

Existing road reconstruction would occur on road prisms that are overgrown and have received no periodic road maintenance. The roads would be made suitable for timber haul by removing encroaching vegetation including trees with greater than 6-inch DBH, repairing and/or widening narrow sections, correcting drainage patterns, and blading the road surface. It may also include the installation of new cross-drain culverts or the replacement of damaged culverts or culverts that have exceeded their lifespan. Reconstruction uses clearing, grubbing, excavation, and grading operations.

Road Maintenance and Timber Hauling

Road maintenance would occur on existing road prisms that have received periodic road maintenance but might have minor inadequacies needing attention. Before roads are used for forest management activities, ditches would be cleared of debris and obstructions where needed; catch basins would be cleaned or enlarged where needed; brush growing within a 4-foot radius of culvert inlets or outlets would be removed where needed; undersized culverts or culverts that have met or exceeded their lifespan would be replaced; vegetation would be removed along

roadways to improve driver sight distance and allow for proper road maintenance; and roads could be surfaced or spot rocked if needed.

Road surfacing involves the placement of crushed rock material over the full width of the running surface and to the desired length of the road identified. Surfacing is accomplished through the preparation of the road running surface via grading and reshaping, proper placement of crushed rock material, and compaction of the new surfacing material on the prepared road.

Spot rocking involves the placement of crushed rock material on the road in smaller areas identified as having inadequate surface material, as well as a need to help control erosion and maintain the roads running surface course. This would restore the road surface and road condition making it suitable for haul and access.

Road Closures

Temporary/Seasonal/Limited access closures are typically resource roads or temporary routes that are closed with a gate or a barricade. The road or route would be closed to public vehicular traffic but may be open for BLM/Permittee commercial activities. The road or route may or may not be closed to BLM administrative uses on a seasonal basis depending upon anticipated impacts to the resources. Drainage structures would be left in place.

Decommissioning

Long-term closures or decommissioning are typically conducted on roads or temporary routes that are not needed at this time but may be used in the future. Prior to closure, the road or route 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. Exposed soils will be treated to reduce sediment delivery to streams. Decommissioning may include water barring, removing culverts, seeding with native grasses, and mulching with weed-free mulch. These roads or routes will be closed with an earthen berm/barrier or its equivalent and would not be maintained in the future.

2.4 Alternatives Analyzed in Detail

2.4.1 Alternative 1 - No Action Alternative

The No Action Alternative serves as a baseline to compare the effects of the actions between the Alternatives and describes the existing conditions and continuing trends within the PA. Under the No Action Alternative, silvicultural treatments would not be applied within the PA. No forest management or fuels reduction activities would be implemented to accomplish project goals in the foreseeable future. The No Action Alternative would not meet the purpose and need of the project.

2.4.2 Alternative 2 – Proposed Action, Uneven Aged Timber Area/Integrated Vegetation Management Alternative

The interdisciplinary team for the Clean Slate Forest Management Project developed the Proposed Action to meet the purpose and need of the project described in Section 1.4.1. Alternative 2 applies forest management and the associated actions described above (2.3 Proposed Activities), to provide a contribution to the Medford District's Fiscal Year 2018 ASQ target and increase the diversity of treated stands. The Proposed Action is designed to balance the requirements of sustain yield timber production on O&C lands while minimizing impacts to Special Status Species and other resources within the Project Area by following the management direction within the 2016 ROD/RMP.

2.4.3 Alternative 3 – Two-step Thin Alternative

During the public scoping period the BLM received an alternative which proposed a two-step thinning strategy which was described as, "more consistent with the Uneven-Aged Timber Area land use allocation because there is no option for regeneration type harvest in the future."

The two-step thinning alternative would retain a much greater proportion of large trees and canopy cover than the maximum logging intensity allowed for the UTA land use allocation. The commenter believes that this method of forest management would ensure that a second viable harvest could be conducted in the near future while achieving the silvicultural objectives, NSO objectives, and 2016 RMP direction for the UTA land use allocation.

The commenter asserts, "It is highly unlikely that maximizing timber harvest in Clean Slate units would generate a successive stand of timber for future harvest in accordance with sustained yield timber management as directed by the ROD/RMP. We assert that maximizing volume under UTA guidelines (e.g., 30% openings, 4-acre regen, 20% relative density) in the Clean Slate units would eliminate the potential for economic thinning harvest for 50 years".

The two-step thinning alternative consists of the following:

- 20% untreated skips, and
- 5% openings (1/8-1/2 acre), and
- Relative Density of 45% with canopy maintained at 40-60%, and
- Skips and gaps accomplished with techniques described in Churchill et al., 2013a and Churchill et al., 2013b *Individuals, Clumps, and Openings.*

The Proposed Action and Alternative 3 propose to treat the same quantity of acres. They differ in the type of silvicultural system that may be implemented. The analysis which details the difference between the Alternatives is located within the Forest Condition analysis in Chapter 3.

Table 2-1: Summary of the Proposed Action and Alternative 3 for the Clean Slate Forest Management Project

Land Use Allocation	Acres	
Forest Management	**Alt 2**	**Alt 3**
Harvest Land Base – Uneven-Aged Timber Area	314	314
Outer and Middle Riparian Zone Thinning	94	94
Inner Riparian Zone (no proposed treatments within this area)	53	53
Total	**461**	**461**
Activity Fuels Treatments	314	314
Yarding Systems		
Ground-based yarding	66	66
Skyline Cable yarding	245	245
Helicopter yarding	0	0
Total	**311**	**311**

Table 2-2: Clean Slate Road Work Summary

Transportation Management	Estimated Miles
Temporary Route Construction	1.5
Temporary Route Reconstruction	0.4
Existing Road Reconstruction	1.6
Road Renovation, Maintenance, and Timber Haul	31.4
Tractor Swing Route Construction	0.3

2.5 Project Design Features

Project Design Features (PDFs) are an integral part of the Action Alternative and are considered in the analysis of project impacts. They are developed to avoid or reduce the potential for

adverse impacts to resources. PDF implementation, in addition to management of Riparian Reserves, would exceed Oregon State Forest Practices Rules. 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 streams and wetland features. They are standard operating procedures that reflect the Management Objectives and Directions in the 2016 ROD/RMP. The PDFs listed below would be carried forward as required specifications into timber harvest contracts. The BLM contract administrators and inspectors monitor operations to ensure that contract specifications are implemented as designed.

Where applicable, PDFs reflect Best Management Practices (BMPs) and are often modified to be site- or project-specific. The applicable BMPs are cited in parentheses; the numbers (e.g., SP- 05, TH-08, etc.) and these citations correspond to the BMP numbers listed in the tables in Appendix C of the 2016 ROD/RMP. The BMPs are designed to prevent and reduce nonpoint source pollution and maintain water quality at the highest practicable level to meet water quality standards and not to exceed Total Maximum Daily Level (TMDL) loads as set by Oregon Department of Environmental Quality (2016 ROD/RMP, pp. 163 & 164). The PDFs would be monitored and, where necessary, modified to ensure compliance with Oregon Water Quality Standards (2016 ROD/RMP, p. 165). A recent comprehensive evaluation of scientific literature found that BMPs based on physical principles continue to be effective in reducing non-point source pollution with the passage of time (Cristan et al., 2016).

2.5.1 Common to All Proposed Projects

Objective 1: Prevent and contain hazardous material spills.

- The Purchaser would be required to be in compliance with OAR 629-605-0130 of the Forest Practices Act. Notification, removal, transport, and disposal of oil, hazardous substances, and hazardous wastes would be accomplished in accordance with OAR 340-142 (OARD, 2018), and the operator will have a Spill Prevention, Control and Countermeasure Plan (SPCC) in place. (SP-01, SP-02, SP-04, SP-05)
- The Purchaser shall not refuel equipment, store, or cause to have stored, any fuel or other petroleum products within 150 feet of streams, springs or wetlands. All petroleum products shall be stored in durable containers and located so that any accidental releases will be contained and not drain into any stream system. Hydraulic fluid and fuel lines on heavy mechanized equipment would be in the proper working condition in order to minimize the potential for leakage into streams. Absorbent materials shall be onsite to allow for immediate containment of any accidental spills. Spilled fuel or oil and any contaminated soil shall be cleaned up and disposed of at an approved disposal site, according to the SPCC. (SP-03, SP-06, SP-07)

Table 2-3: Summary of Seasonal Restrictions and Operational Periods

Resource Concern	Restriction	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
NSO critical nesting time March 1st through June 30th	Activities that produce loud noises above ambient levels 195 feet or up to 0.25 miles of a NSO site for timber harvest.												
Bald eagles	Activities that produce loud noises within ¼ mile, or ½ mile line-of-site												
Water quality and sedimentation – dry condition only	Road building, maintenance, or renovation including culverts												
Water quality and sedimentation – dry condition only	Landing construction & rehabilitation												
Water quality and sedimentation – dry condition only	Ground-based yarding												
Water quality and sedimentation – dry condition only	Hauling												
Fire season, ODF regulated use	Harvest operations												

Key		Operations generally allowed.		Operations restricted, modified or allowed depending on conditions.		Operations generally Restricted		Extended restriction may be applied for rearing/fledging

Objective 2: Implement measures to contribute towards preventing the introduction and spread of non-native invasive plants

- All projects involving heavy equipment use near plant sites require pre-disturbance surveys for non-native invasive plants. Project botanists will prescribe appropriate invasive plant treatments. The Clean Slate PA is proposed for treatment under the Invasive Weed Annual Treatment Plan.
- To prevent the further spread of noxious weeds and reduce soil erosion, native seed, and certified weed-free straw would be used for post-treatment restoration where project activities such as temporary route decommissioning, decommissioning, and other such activities in bare soil. Ensure hay, straw, and mulch are certified as free of prohibited noxious vegetative parts or seeds, per 75 FR 159:51102. 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.
- To prevent the potential spread of noxious weeds into the Medford District BLM, prior to initial move-in of any equipment, and all subsequent move-ins, the operator would be required to clean all harvesting, construction, chipping, grinding, shredding, rock crushing, and transportation equipment prior to entry on BLM-administered lands. Cleaning shall be defined as removal of dirt, grease, plant parts, and material that may carry noxious weed seeds into BLM-administered lands. Require washing of equipment traveling off system roads or temporary routes prior to entry onto federally administered lands. (R-53)
- To prevent the establishment of new noxious weed populations within the planning area, all material, including rock and gravel, utilized in the building, reconstruction, or maintenance of roads (temp, permanent, etc.) must be free of noxious weed seeds and originate from a quarry approved by the project botanist.
- Pre-treat priority non-native invasive plant infestations, conduct two years of post-project monitoring, and re-treat if infestations have reached or exceeded action thresholds.

Objective 3: Protect Threatened and Endangered, Bureau Special Status plants, and fungi species

- Road # 38-8-27.0 is an existing road and traverses through LOCO critical habitat within section 27 of T38S-R8W. Any equipment should remain on the road surface at all times to avoid impacts to LOCO critical habitat.

Objective 4: Protect Newly Identified Cultural Resources.

- If cultural resources are discovered during project implementation, the project would be redesigned to protect the cultural resource values present, or evaluation or mitigation procedures would be implemented based on recommendations from the Resource Area Archaeologist with input from federally recognized Tribes, approval from the Field Manager, and concurrence from the State Historic Preservation Office.

Objective 5: 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 would be determined based on species, proposed treatment, site-specific environmental conditions, and available management recommendations (Tables 2-3, 2-4). No yarding would be allowed through spotted owl nest patches. Follow USFWS recommended noise disturbance distances for activities to avoid disturbance to northern spotted owls and bald eagles (Table 2-5).

Table 2-4: Conservation Measures for Known Bureau Special Status Terrestrial Wildlife Species in the Project Area.

Wildlife Species	Status	Protection Measures	Known-Site Seasonal Disturbance Restrictions
Bald Eagles	**BS/EPA**	330-foot No-Harvest Nest Tree Buffer, no disturbance within ¼ mile of nest tree during restriction period and within ½ mile line-of-site	0.5-Mile, February 1 – August 15
Bats	**BS**	Retain Snags*;	None
Cavity Nesting Birds	**BS**	Retain Snags*. Snags will be created in Riparian Reserve	None
Northern Spotted Owl	**FT**	No proposed treatment in 300-Meter (70- acre) Nest Patches.	195 feet up to 0.25-Mile, March 1 – June 30, extendable up to August 31; ¼ mile for prescribed burning.

Wildlife Species	Status	Protection Measures	Known-Site Seasonal Disturbance Restrictions
Fisher	**BS**	Retain Large Down Wood and Snags* and live trees with cavities >24", and hardwoods, within Stands Used for resting and denning. Within 5th field-watersheds (HUC 10) where fishers are documented by the BLM to occur, favor retaining trees that have structures (e.g., cavities, mistletoe, and rust brooms) that are typically used as denning or resting sites by fisher. If, for safety concerns, it is necessary to fall such snags or live trees with cavities, retain those cut trees or snags in the stand as additional down woody material.	50-feet of Known Den Sites (No known den sites), March 1-June 15; Seasonal restriction for suitable denning units
Other Raptor Species	**BS**	Retain nest trees with visible raptor nests	0.25-Mile, March 1 – July 15

*** Snags felled for safety reasons or for logging systems (skyline corridors, etc.) would be left on site.**
Status:
FE – Federally Endangered (ESA) **BS – Bureau Sensitive**
FT – Federally Threatened (ESA) **EPA – Bald and Golden Eagle Protection Act** **BOCC-Birds of Conservation Concern**

Table 2-5: Mandatory USFWS Restriction Distances to Avoid Disturbance to Spotted Owl Sites

Activity	Buffer Distance Around Owl Site
Heavy Equipment (including non-blasting quarry operations)	105 feet
Chainsaws	195 feet
Commercial Timber Harvest	0.25 miles
Prescribed fire/Activity fuels burning	0.25 miles
Impact pile driver, jackhammer, rock drill	195 feet
Small helicopter or plane	360 feet*
Type 1 or Type 2 helicopter	0.25 mile*
Blasting; 2 lbs. of explosive or less	360 feet
Blasting; more than 2 lbs. of explosives	1 mile

* If below 1,500 feet above ground level

All Project Actions

- All existing snags which are ≥ 20 inches DBH would be retained from cutting unless they pose a safety hazard, in which case they would be left on the ground as coarse woody debris (CWD) in the unit.

- CWD ≥ 20 inches DBH within decay classes III, IV, and V would be retained and protected from disturbance to the greatest extent possible during harvest operations, burning and other project activities.

Raptors

- Protect any raptor nests or centers of activity as necessary to maintain the integrity of the site. Activities that produce noise above ambient levels that may disturb or interfere with nesting would be prohibited within one-quarter mile of active nesting areas between approximately March 1 and July 15.

Northern Spotted Owl

- Any of the following measures may be waived in a particular year if nesting or reproductive success surveys conducted according to the USFWS survey guidelines reveal that NSOs are non-nesting or that no young are present that year. Waivers are valid only until March 1 of the following year. Previously known well-established sites/activity centers are assumed occupied unless protocol surveys indicate otherwise.
- No treatments would occur within any northern spotted owl nest patch.
- Activities (such as tree felling, yarding, temporary route construction and re-construction, hauling on roads not generally used by the public, prescribed fire, and muffled blasting) that produce loud noises above ambient levels would not occur within specified distances (Table 2-5) of any documented owl site between March 1 and June 30 (or until two weeks after the fledging period, typically up to August 31) – unless protocol surveys have determined the activity center to be not occupied, non-nesting, or failed in their nesting attempt. The distances may be shortened if significant topographical breaks or blast blankets (or other devices) muffle sound traveling between the work location and nest sites.
- The action agency has the option to extend the restricted season until September 30 during the year of harvest, based on site-specific knowledge (such as a late or recycle nesting attempt) if the project would cause a nesting NSO to flush (See Table 2-5) for disturbance distance.
- The buffer distance to the prescribed area may be modified by the action agency biologist using topographic features or other site-specific information. Buffer distance for prescribed fire may be reduced if substantial smoke from prescribed fire would not enter the nest stand March 1 - June 30. The restricted area is calculated as a radius from the assumed nest site (tree).

Bald Eagle

- Work activities that cause disturbance above ambient noise levels (hauling, chainsaws, and helicopters) would not take place within ¼ mile (½ mile line-of-site) from an

active bald eagle nest between February 1 and August 31. This applies to commercial harvest units: 13-3, 13-4, and 17-2.

- The following measures could be waived in a particular year if surveys indicate the site is unoccupied or nesting attempts failed or until 2 weeks after the young have fledged. Waivers would only be valid until January 1 of the following year.

2.5.2 Commercial Harvest in the Harvest Land Base and Riparian Reserve

Objective 1: Protect Bureau Special Status plants and fungi species

- Bureau Special Status plants and fungi sites are buffered appropriately, the buffer sizes are variable and based on the type of species which is being protected. No activities such as tree falling, yarding, anchoring, slash burning, landing construction, route construction, route realignment, truck turnarounds, and staging areas would be located within buffered sites within units 13-4, 31-11, 22-5, and 13-3.

Objective 2: Minimize impacts to wildlife species using snags and down wood.

- Maintain existing snags (> 20" DBH; snags 6-20" DBH in decay classes III, IV,V) except those that need to be felled for safety reasons or fuels reduction reasons or for logging systems (e.g., skyline corridors) to minimize impacts to cavity-dependent species. Snags felled for safety reasons would be left on site unless they would also pose a safety hazard as down woody material.
- Create two snags per acre (1 snag >20 inches DBH and 1 snag >10 inches DBH) in LSR and Riparian Reserve treatment areas (2016 ROD/RMP, p. 73).
- Retain existing large coarse woody debris in the stands. (>20" diameter at the large end and >20' length, and 6-20" diameter at the large end and >20' length in decay classes III, IV, V).
- Locate skid trails to minimize disturbance to coarse woody debris. Where skid trails encounter large coarse woody debris, a section would be bucked out for equipment access. The remainder would be left in place and would not be disturbed. Snags and down wood in landings would be moved adjacent to the landing.

Objective 3: Minimize impacts to water quality and soil productivity from timber yarding operations, hauling, and road and landing construction.

<u>All Harvest Operations</u>

- When soil disturbance occurs during forest management operations (e.g., culvert replacements, along haul routes, and within treatment units) place slash or weed-free straw on more than half of the exposed surface area to maintain the minimum percent

of effective ground cover needed to control surface erosion. Slash or weed-free straw would be placed after the completion of operations and prior to the next wet season. (R-06, R-13, R-62, R-63, R-66, R-80, R-82, R-84, TH-06, TH-16, TH-21, TH-22, F-12, F-18)

- In general, the average size for landings shall be cable landings ¼ acre, ground-based landings ½ acre, and helicopter landings 1 acre. All landings shall be located along existing roads, temporary routes, and/or cable-tractor swing routes where possible. Landing locations would be approved by the Authorized Officer. (R-04)
- Limit road and landing construction, reconstruction, or renovation activities to the dry conditions (October 15th to May 15th, generally). Suspend ground-disturbing activity if projected forecasted rain will saturate soils to the extent that there is potential for movement of sediment to wetlands, floodplains, and waters of the State. (R-62)
- Cover or temporarily stabilize exposed soils during work suspension. Upon completion of ground-disturbing activities, immediately stabilize cut-and-fill slopes, soil storage piles, and new fill material. Measures to stabilize these areas could include but are not limited to erosion control blankets and mats, soil binders, applying seed, soil tackifiers, and/or placement of slash. (R-66)
- Apply erosion control measures to constructed landings with potential for erosion and subsequent sediment delivery to waterbodies, floodplains, or wetlands or hydrologically connected to perennial streams (Units 3-9, 9-5, 17-2, and 23-4). Temporary sediment control measures include check dams, silt fencing, bark bags, filter strips, or mulch to slow runoff and contain sediment and should drain into vegetated stable areas. (R-38)

Skyline-Cable Yarding Operations

- Space corridors as far apart as is practicable, corridors would be 12–15-foot maximum widths. Cable yarding corridors would be located approximately 150 feet apart at the tail end. Design the logging system to prevent converging yarding trails from intersecting the stream network. (TH-01, TH-04)
- Directionally fall trees to lead for skidding and skyline yarding to minimize ground disturbance when moving logs to skid trails and skyline corridors. (TH-02)
- The Authorized Officer may direct large cull material that is yarded to the landing be redistributed back into the unit.
- Prior to October 15 of the same operating season, hydrologically-connected cable yarding corridors within Riparian Reserves by water-barring and placing slash to protect water quality and minimize soil erosion. This requirement is specific to Units 3-9, 9-5, 17-2, and 23-4 or as directed by the Authorized Officer. (TH 06)

Ground-based Harvest Operations

- Incorporate existing skid trails and landings as a priority over creating new trails and landings. When designing a skid trail network for ground-based harvesting equipment, consider proper spacing, skid trail direction, and location relative to terrain and water resources such as wetlands, stream channels, springs, and other water features. New skid trails shall be placed at least 150 feet apart where topography will allow. New skid trails will be located on ground generally less than 35 percent slope. (TH-12)
- Use erosion-control techniques on skid trails (e.g., equipment with low tire pressures, water bars, apply native, site-specific grass seed, weed-free straw mulch, scatter chipped material, or scatter limbs and other fine material), forwarder trails, and landings to minimize sediment movement off site. Allow mechanized equipment capable of creating or walking on slash (such as a harvester or feller-buncher) to work off designated skid trails for one or two passes on at least eight inches of slash or under dry soil conditions (less than 25% soil moisture content).
- Restrict ground-based yarding and soil ripping operations from October 15th to May 15th, or when soil moisture exceeds 25%. Restrict non-road, in unit, ground-based equipment used for harvesting operations in areas with hydric soils. High soil moisture varies by texture and is based on site-specific considerations. Waivers to this restriction would not be approved when soil moisture at a depth of 4-6 inches is wet enough to maintain form when compressed (typically 15-25 percent soil moisture), or when soil at the surface would readily displace, causing ribbons and ruts along equipment tracks. (TH-07, TH-11)
- Limit non-specialized skidders or tracked equipment to slopes less than 35 percent, except when using previously constructed trails or accessing isolated ground-based harvest areas requiring short trails over steeper pitches. Harvest equipment used off of designated skid trails would walk on a mat of existing or created slash, operate on ground less than 35 percent slope, have an arm capable of reaching at least 20 feet, and minimize turning. If these criteria are exceeded, the Authorized Officer can immediately suspend operations until another approach or route can be determined. (TH-13)
- Limit the use of specialized ground-based mechanized equipment (those machines specifically designed to operate on slopes greater than 35 percent) to slopes less than 50 percent, except when using previously constructed trails or accessing isolated ground-based harvesting areas requiring short trails over steeper pitches. Also, limit the use of this equipment when surface displacement creates trenches, depressions, excessive removal of organic horizons, or when disturbance would channel water and sediment as overland flow. If these criteria are exceeded, the Authorized Officer can immediately suspend operations until another approach or route can be determined. (TH-14)

- When using conventional ground-based yarding systems, whole tree yarding with tops attached is the preferred harvest method as long as the contractor can operate without causing bark slippage, girdling, broken tops, or damage to live crowns. If it is determined by the Authorized Officer that an unacceptable amount of damage is occurring, tree bucking and limbing would be required as directed by the Authorized Officer. Delivered log length would not exceed 41 feet. Equipment use may be restricted depending on soil type, soil moisture, ground pressure of the equipment, and presences of slash to operate on.
- Ensure leading-end of logs is suspended when skidding. Tractors would be equipped with an integral arch to minimize soils disturbance and compaction. (TH-10)
- Upon completion of harvest, block, rehabilitate and apply erosion control measures to skid trails and landings within RRs hydrologically connected to perennial streams (Units 3-9, 9-5, 17-2, and 23-4) before October 15th unless a waiver is in place for ground-based yarding to extend the dry season. Rehabilitated skid trails and landings would be subsoiled, scarified, seeded, water-barred, and mulched using guidelines from the road decommissioning section. Where the Authorized Officer determines that subsoiling skid trails would cause unacceptable damage to the root systems of trees, where soils are shallower than 12 inches or are too rocky to effectively subsoil, the skid trails would be decompacted with an excavator, backhoe, or other approved machinery (i.e., pitted). (TH-16, TH-17, TH-18, TH-19)
- In upland units, allow harvesting operations (cutting and transporting logs) when the ground is frozen or adequate snow cover exists to prevent soil compaction and displacement. The Authorized Officer would consult with a watershed specialist (hydrologist, soils scientist, or fisheries biologist) to determine appropriate conditions. If conditions change during operations where detrimental soil compaction and displacement is occurring, operations would be stopped immediately. (TH-20)

Objective 3: Prohibit unauthorized OHV use

- Place woody debris or other appropriate barriers (e.g., rocks, logs, and slash) on the first 100 feet of skid trails leading off system roads in all ground-based yarding units upon completion of yarding to block and discourage unauthorized vehicle use. (TH-19)

Objective 4: Reserve non-commercial hardwood and conifer tree species.

- Reserve Pacific yew and preferred hardwoods, where operationally feasible, to contribute to monitoring desired stand conditions.

Objective 5: Protect Riparian Reserves

- Riparian Reserves distances are one site-potential tree (190 feet in the Deer Creek Watershed) of fish-bearing streams, perennial, and intermittent streams. Extend the Riparian Reserves to include stable areas between such an unstable area where there is potential for the failure to reach the stream (2016 ROD/RMP, pp. 75-77). The project area is in the dry zone west of highway 97, and therefore, stands thinned in the middle or outer riparian zones may be made available for sale (2016 ROD/RMP, pp. 82-84).
- On all units, commercial extraction would not occur within the inner riparian zone buffer which is a minimum of 50 feet from bankfull width on all intermittent streams and 120 feet from bankfull width on all fish-bearing and perennial streams (2016 ROD/RMP, pp. 82-83).
- In the inner riparian zone, where trees are cut for yarding corridors, skid trails, road construction, maintenance, and improvement, retain cut trees in adjacent stands as down woody material or move cut trees for placement in streams for fish habitat restoration, at the discretion of the BLM (2016 ROD/RMP, pp. 75-76).
- Slumps, intermittent seeps, irrigation ditches, wetlands, ponds and other features would be buffered (no treatment) by leaving one row of overstory trees or a 25-foot diameter buffer (whichever is greatest), from the outer edge of instability, around these areas for soil stabilization (2016 ROD/RMP, p. 77).
- Create two snags per acre, via girdling with a chainsaw or other practice, (1 >20 inches DBH and 1 >10 inches DBH) in Riparian Reserve treatment areas (2016 ROD/RMP, p. 73).
- During silvicultural treatment of stands, retain existing snags and down woody material ≥ 6" and > than 20 feet in length (Measured as DBH for snags and at the large end), except for safety, operational, or fuel reduction reasons (2016 ROD/RMP, p. 76).
- Locate waste disposal areas outside wetlands, Riparian Reserve, floodplains, and unstable areas to minimize the risk of sediment delivery to waters of the State. Apply surface erosion control prior to the wet season. Prevent overloading areas, which may become unstable. (R-11)

Objective 6: Limit residual stand damage from yarding activities

<u>Ground-based yarding</u>

- The Authorized Officer may require logs to be bucked to a specified length to minimize or avoid stand damage.

2.5.3 Road Maintenance, Temporary Route and Landing Construction, and Decommissioning

Objective 1: Prevent off-site soil erosion and soil productivity loss.

Road Maintenance and Landing Construction

- Restrict timber hauling on native surface or rocked roads with insufficient rock depth when soil moisture conditions or rain events could result in road damage or the transport of sediment to nearby stream channels, generally October 15th to May 15th. The Authorized Officer, in consultation with resource area hydrologist and engineers, determines that use would not result in road damage or the transport of sediment to nearby stream channels. A conditional waiver for hauling may be granted for operations from October 15th to May 15th and can be suspended or revoked if conditions become unacceptable as determined by the Authorized Officer. (R-93)
- Hauling on natural surface or rocked roads with insufficient rock depth, that received a ½ inch or more precipitation within a 24-hour period, would not resume for a minimum of 48 hours following any storm event, or until road surface is sufficiently dry, and as approved by the Authorized Officer.
- In preparation for winter hauling activities, during the dry season (generally between May 15 and Oct 15), blade and shape the road surface of haul routes, clean culverts, and ditches, apply aggregate, and other non-emergency road maintenance to protect road surfaces from rutting and erosion under active haul. Ensure culvert openings are free from debris and that culvert outlets daylight into vegetated, stable areas and not to wetlands or streams. (R-94, R-97)
- Sediment control measures would be evaluated and implemented where ditchline maintenance is required within 200 feet of perennial streams. Construct permanent sediment basins or install temporary protective features such as certified weed-free straw bales, silt fences, geo-fabric rolls, and water bars where there is potential for haul-related road sediment to enter the aquatic system on hydrologically connected natural or aggregate surfaced roads (38-7-21.2, 38-7-31, 38-8-13, 39-7-3.4, and 39-8-3.0). Maintain protective features by removing accumulated sediment and placing sediment in a stable location where it cannot enter the aquatic system. Cover or temporarily stabilize exposed soils during work suspension. (R-64, R 69, R 71, R 76, and R-94)
- Haul would not occur on hydrologically connected aggregate or natural surface roads (38-7-21.2, 38-7-31, 38-8-13, 39-7-3.4, and 39-8-3.0) when water is flowing in the ditchlines due to precipitation or during any conditions that would result in any of the following: surface displacement such as rutting or ribbons, continuous mud splash or tire slide, fines being pumped through road surfacing from the subgrade, resulting in a layer of surface sludge.

- No ditch maintenance would occur during the wet season unless for safety or resource protection. Certain other activities (blading of aggregate roads, rocking, cross drain installation) may be permitted during the wet season (from Oct 15 - May 15) when conditions are dry. If these activities occur within 200 feet of perennial streams, sediment control devices would be placed and maintained as necessary. Work would be suspended during precipitation events or when observations indicate that saturated soils exist that includes visible runoff or might cause elevated stream turbidity and sedimentation. (R-69, R-71, and R 94)
- Retain ground cover in ditch lines, except where sediment deposition or obstructions require maintenance. In Riparian Reserves, do not sidecast loose ditch or surface material, do not undercut the fill slope, and seed and mulch cleaned ditch lines after maintenance. (R-70, R-72, R-73, R 74)
- Remove snow on surfaced roads in a manner that will protect the road and adjacent resources. Retain a minimum layer (4") of compacted snow on the road surface. Provide drainage through the snow bank at periodic intervals to allow snowmelt to drain off the road surface. Avoid removing snow from unsurfaced roads where runoff drains to water of the State. (R 95 and R 96)
- Where necessary, apply road surface stabilizers/dust control additives to reduce surfacing material loss and buildup of fine sediment that can enter into wetlands, floodplains, and waters of the State. Prevent entry of road surface stabilizers/dust control additives into waters of the State. (R-68)

Temporary Route Construction and Re-Construction

- Prior to October 15 of the same operating season, stormproof temporary routes, and landings which are not already reclaimed or decommissioned, as directed by the Authorized Officer. Stormproofing would be done by properly installing water bars and/or applying slash or mulch. Stormproofing reduces sediment runoff and diverts runoff water away from stream channels, headwalls, slide areas, high landslide hazard locations or steep erodible fill slopes. After all treatment activities are complete (e.g., harvest and activity fuels treatments) more than 50% of the surface area of all temporary routes and landings would be covered by slash or mulch. (R-80, R-81)
- All temporary routes constructed or reconstructed on BLM-administered lands would be decommissioned immediately after use or before October 15th. If hauling on a temporary route is not complete in the same year the route is constructed, the route would be stormproofed and blocked by October 15th or when soil moisture exceeds 25%. (R-81, R-83, R-91)
- The temporary route into unit 13-3 would be partially decommissioned. This may include pitting one side of the temporary route, covering with mulch or slash, and seeding, and planting. Planting would occur between September 1 to October 31, or from February 1 to March 31. (REC 22)

- Decommission all of temporary routes and associated landings by physically blocking them, tilled (ripping or pitting to an effective depth), water barred, seeded, mulched, pulling back unstable road fill, ditches and cross drain culverts removed and converted to long-term maintenance-free drainage configuration such as an outsloped road surface and waterbars, reestablish stream crossings to the natural stream gradient, seed and/or plant to reestablish vegetation in the same season of use, when possible. Seeds and plants must be native species, site-specific, and approved by the resource area botanist. (R-63, R-83, R-84, R-85, R-88, and R-91)

Culvert Maintenance and Installation

- Cleaning culvert inlets and replacing culverts which have flowing water would occur during the low flow period (generally July 1 to September 15) in accordance with Oregon Department of Fish and Wildlife (ODFW) in-stream work period guidelines. (R-17)
- When present, flowing water would be diverted around each culvert installation site. Diverted water would be returned to the channel immediately downstream of the work site. At all times during installation, effective erosion control measures would be in place and would be removed from the channel prior to October 15th of the same calendar year. Seepage water from the de-watered work area would be pumped to a temporary storage and treatment site or into upland areas and allowed to filter through vegetation prior to reentering the stream channel. (R 23)
- Install downspout structures and/or energy dissipaters (e.g., rock material) at newly installed cross drain outlets or drain dips where water is discharged on unprotected fill-slopes to reduce the potential for soil erosion. (R-18)
- During roadside brushing, remove vegetation by cutting rather than uprooting. If uprooting is necessary within 200 feet of a perennial stream crossing, sediment control devices will be installed, properly maintained, and removed when the site stabilizes. (R-61)
- Sediment reduction techniques would be implemented to reduce sedimentation into streams containing Bureau Sensitive Species. Sediment reduction techniques include settling basins, brush filters, sediment fences and/or check dams to prevent or minimize sediment conveyance to streams. Specifically, these sediment barriers would be installed at perennial stream crossings on BLM roads 38-7-31.0 (three locations on McMullin Creek), 38-7-21.2 (Ryan Creek), and 38-8-13.0 (Quedo Creek).

Objective 3: Implement measures to contribute towards preventing the introduction and spread of non-native invasive plants

- Aggregate, including riprap, from a commercial source, would be from an accredited, weed-free quarry. Aggregate stockpiled between June 16th and October 31st of the previous year would not be accepted.
- As needed, revegetate disturbed soils with site-specific, locally adapted native seeds prescribed by the resource area botanist. The need would be determined by the resource area botanist, based on the level of disturbance and the presence of priority non-native invasive plants. Seeding would occur between September 1 to October 31, or from February 1 to March 31.

2.5.4 Treatment of Activity Slash and Prescribed Fire

Objective 1: Conduct fuels reduction to minimize impacts to other resources.

- Avoid creating piles greater than 16 feet in height or diameter. Pile smaller materials and leave pieces < 12" diameter within the unit. Reduce burn time and smoldering of piles by extinguishment with water and tool use. (F-8)
- Landing piles located adjacent haul routes, temporary routes, skid trails, forwarder trails, or landings would be burned, chipped, or otherwise removed from these sites within 24 months of unit harvest completion.
- Hand piles would not be allowed on roadways, turnouts, shoulders, or on the cut bank unless authorized by the Authorized Officer.
- Merchantable sawlogs (including pole decks) would be removed from yarded material and may be hauled off site for processing. Debris at the landing sites would be piled and burned on the immediate downhill side of existing roads, or chipped.
- The Authorized Officer will determine the location of pole/hardwood decks.
- Activity slash remaining in units could be lopped-and-scattered, chipped, or hand piled and burned to prevent an increase in fire hazard.
- For prescribed burning operations, firelines would be constructed by hand.
- In units that aren't broadcast burned, activity slash within twenty (20) feet of each finished landing pile will be added to the pile. Construct a fireline approximately eighteen (18) inches wide and down to mineral soil within twenty (20) feet of each finished landing pile to prevent escaped fire. Each landing pile would be covered with a large enough piece of four-millimeter-thick black plastic to ensure a dry ignition spot (generally 10 feet x 10 feet or large enough to cover 80 percent of the pile).
- Landing piles would not be placed adjacent to or within 15 feet of leave trees to minimize scorch and mortality. Landing piles would be as free of dirt as reasonably possible to facilitate desired consumption.

- Landing and hand piles would be burned in the fall to spring season after 1 or more inches of precipitation has occurred. Patrol and mop-up of burning piles would occur when needed to prevent treated areas from re-burning or becoming an escaped fire.
- Prescribed fire burn plans would be completed before ignition, as would smoke clearance to minimize impacts on air quality.
- Each hand pile would be covered with a large enough piece of 4-millimeter-thick black plastic to ensure a dry ignition spot (generally 5 feet x 5 feet or large enough to cover 80 percent of the pile). Hand piles would not be placed adjacent to or within 10 feet of leave trees or large woody debris to minimize scorch and mortality.
- Local residents would be advised of prescribed burning through news releases.
- Prescribed burning would occur under atmospheric conditions that allow for the mixing of air to lessen the impact on air quality. All prescribed burning would be administered in a manner consistent with the requirements of the Oregon Smoke Management Plan administered by the Oregon Department of Forestry and the regulations established by the Air Quality Division of the Oregon Department of Environmental Quality.
- Burning of slash piles would occur after a sufficient period of curing (generally over a year) and adequate seasonal moisture to ensure desired consumption of material and to minimize the risk of fire escape. Smoke clearance(s) would be obtained prior to ignition to minimize impacts on air quality.

Objective 3: Protect Bureau Special Status plants and fungi species

- Bureau Special Status species would be protected by the no treatment buffers to minimize adverse impacts from project activities. The minimum buffer size is determined by habitat requirements and existing habitat conditions on a case-by-case basis.
- Trees would be directionally felled away from all no disturbance buffers.
- Do not create or burn landing piles within 100 feet of plant sites
- For units which contain Special Status Species prescribed burning (including underburning and handpile burning) would occur as determined by the project botanist and ideally during the dormant season in the fall and winter.

Objective 4: Minimize effects to riparian areas

- Apply low or moderate-severity prescribed burns where needed to invigorate native deciduous tree species. Moderate severity prescribed burns will be limited to no more than 20 percent of the area of Riparian Reserve subwatershed (HUC 12) each year. (2016 ROD/RMP, p. 82)

- Do not conduct fuels treatments within 60 feet of fish-bearing or perennial streams. (2016 ROD/RMP, p. 82)
- When conducting fuels or prescribed fire treatments, retain at least 50 percent canopy cover per acre in the inner zone, do not cut trees > 12" DBH in the inner riparian zone, retain down woody material at greater than 2 percent of pieces > 4 inches in the treatment area, and maintain 30 percent canopy and 60 trees per acre in the middle and outer riparian zones. (2016 ROD/RMP, p. 82)
- Avoid delivery of chemical retardant foam or additives to waterbodies and wetlands. Store and dispose of ignition devices/materials (e.g., flares and plastic spheres) outside Riparian Reserve or a minimum of 150 feet from water bodies, floodplains, and wetlands. Maintain and refuel equipment (e.g., drip torches and chainsaws) a minimum of 100 feet from water bodies, floodplains, and wetlands. Portable pumps can be refueled on-site within a spill containment system. (F-04)
- Limit fire lines inside Riparian Reserve. Construct fire lines by hand on all slopes greater than 35 percent and inside the Riparian Reserve inner zone. Use erosion control techniques such as tilling, waterbarring, or debris placement on fire lines when there is potential for soil erosion and delivery to waterbodies, floodplains, and wetlands. Space the waterbars as shown in Table C-6. Avoid placement of fire lines where water would be directed into waterbodies, floodplains, wetlands, headwalls, or areas of instability. (F-05)

Objective 5: Prevent off-site soil erosion and soil productivity loss.

- On all units with fuel maintenance and where underburning may occur, do not have ignition points within a minimum 25 feet from bank full width of intermittent streams and 60 feet for perennial streams to protect streambank stability and riparian vegetation. (2016 ROD/RMP, pp. 82-83)

Objective 6: Non-Motorized Trail Construction and Implementation

- Trail construction and maintenance of existing systems would occur after the harvest to minimize the potential for impacts to recreationists from timber harvest.
- Trail construction and maintenance would be suspended when erosion and runoff would deliver sediment to water bodies.
- Seeps, springs, and wet areas would be avoided or rerouted where current trail exists.
- Dry draw and channel crossings would be rocked, or stepping stones would be placed at strategic locations to reduce the amount of fine sediment entering channels.

- Trail grade would be less than 8% and rolling, if possible, and tread would be out-sloped 3 to 5% to promote drainage, minimize erosion, and to reduce trail maintenance needs.
- Switchback placement would be designed to prevent erosion down and across trails where needed.
- No trees > 12" DBH would be cut during trail construction or maintenance.
- Roads used for access to the trail would not be widened beyond the current road prism.
- In areas that are determined to have unstable soils, retaining walls would be utilized in order to prevent small-scale soil movement.
- As needed, revegetate disturbed soils with site-specific, locally adapted native seeds and plant materials prescribed by the resource area botanist. The need would be determined by the resource area botanist, based on the level of disturbance and the presence of priority non-native invasive plants.

2.6 Alternatives and Actions Considered but not Analyzed in Further Detail

During the development of the Proposed Action, the BLM considered numerous ways to meet the Purpose and Need. The Proposed Action reflects what the interdisciplinary team determined to be the best balance and integration of resource conditions, resource potential, completing management objectives, and expressed interests of the various communities that have a stake in the project. Public requests integrated into the design of the Proposed Action are not discussed further in this section. Requests, 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 below.

1. Maximizing Treatments within the Uneven-Aged Timber Area.

During the public scoping period the BLM received an alternative which proposed the creation of the minimum amount of "skips" (10%) and the maximum amount of group selects "gaps" (30%) in the Uneven-Aged Timber Area (UTA) treatment units. This alternative also requested treatments in the UTA to retain the lowest Relative Density allowed by the 2016 ROD/RMP (20%).

The rationale for this alternative was developed with the following supporting information: The development of prescriptions in the UTA should be based on the entire BLM-administered land base in proper proportion parameters. The commenter suggests that because the BLM has 77% (822,235 acres) of the west side lands of the 2016 ROD/RMP in some type of reserve land use allocation where sustainable timber production is not permitted; the 822,235 acres should be considered "skips." The remaining 23% is in lands designated for either even-aged or uneven-aged timber management. The commenter states "In light of these disproportionate numbers, we

urge the Grants Pass Resource Area to develop an alternative that maximizes treatments in the harvest land base."

Rationale for Elimination from Detailed Analysis: The Purpose and Need to contribute volume to the FY 2018 ASQ described above was a driving consideration to the prescriptions found in the Proposed Action. This proposed alternative is substantially similar to the Proposed Action because it allows for the full range of group selection/site prep options within the 2016 ROD/RMP. The Proposed Action would allow for the establishment of new cohorts of trees, and it would not propose a "thin from below approach" by retaining a greater proportion of larger trees.

2. Natural Selection Alternative

The Deer Creek Association submitted the Natural Selection Alternative (NSA) for consideration during the scoping period for the Clean Slate Project. The NSA was supported by public comments through the submission of unique letters, form letters, and a petition. The Natural Selection Alternative has been previously submitted for consideration under the South Deer Landscape Management Project (EA# OR 110-05-10), the Deer North Vegetation Management Project (DOI-BLM-OR-M070-2009-0010-EA), the Pickett West Forest Management Project (DOI-BLM-ORWA-M070-2016-0006-EA), and the 2015 Proposed Resource Management Plan/Final Environmental Impact Statement (PRMP/FEIS).

The South Deer Landscape Management Project considered the Natural Selection Alternative as Alternative 4. The South Deer Landscape Management Project EA analyzed the NSA and determined that the level of commercial timber removal for Alternative 4 was minute, and the cumulative impacts to vegetation would be the same as those described for the No Action Alternative.

The NSA was subsequently submitted for consideration within the Deer North Landscape Management Project. The NSA is not compatible with projects when the primary purpose and need are to produce a sustainable supply of timber from lands allocated for timber production. All of the treatments proposed within Clean Slate occur on the Harvest Land Base land use allocation which is intended to achieve continual timber production (2016 ROD/RMP, p. 62). The Deer North Landscape Management Project did not select the NSA, and the decision was appealed to the Interior Board of Land Appeals (IBLA). The BLM prevailed with the IBLA, arguing that the extent of timber harvest under the NSA was inconsequential and that the alternative was virtually the equivalent of the No Action Alternative. (*Deer Creek Valley Natural Resources Conservation Association, et al.*, IBLA 2012-131, 2012-164, & 2012-173). Another lawsuit was filed, and again, the BLM prevailed in court (*Deer Creek Valley Natural Resources*

Conservation Association v. BLM, 1:12-cv-1596-CL). That decision was appealed to the 9th Circuit Court, but the appeal was voluntarily dismissed.

The NSA was then submitted for consideration during the planning efforts for the 2015 Proposed Resource Management Plan/Final Environmental Impact Statement. In that EIS, the NSA was an Alternative Considered but not Analyzed in Detail. The EIS concluded that the NSA does not meet the purpose and need, and basic policy objectives described for developing the Alternatives because it would not make a substantial and meaningful contribution to providing a sustained yield of timber. Limiting harvest to dead and dying trees would not reflect the annual productive capacity for O&C Lands. Additionally, volume from dead and dying trees from year to year is inherently unpredictable, thus would not support sustained-yield timber production due to the fluctuation and unpredictability of supply which would vary based on annual conditions. Limiting the harvest of timber to dead and dying trees would not be consistent with the requirements of the O&C Act and would not respond to the purpose for the action (USDI/BLM, 2015b, p. 103).

In summary, the NSA was considered but not analyzed in detail for the Clean Slate project because 1) it is substantially like the No Action Alternative, and 2) it does not meet the purpose and need to produce a sustainable supply of timber from O&C Lands.

2.7 Monitoring

Much of implementation monitoring is accomplished in the day-to-day work by BLM employees. Project supervisors, contract inspectors, and timber sale administrators review the work being done and assure compliance with the regulations and stipulations in the applicable administrative documents. The majority of actions described under the alternatives are implemented through a timber sale, service, or stewardship contract. In the case of contracts, implementation monitoring is accomplished through BLM's contract administration process. PDFs included in the project description are carried forward into contracts as required contract specifications. BLM contract administrators and inspectors monitor the daily operations of contractors to ensure that contract specifications are implemented as designed. The inspection reports would be shared with the Field Manager, and Project lead and the ID team would be notified when inspection reports are available. 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 spotted owl habitat affected by the proposed Clean Slate Project to ensure that the effects are consistent with the analysis in the EA and in the relevant consultation documents. The Medford District has developed a Guide for Planning and

Implementing Vegetation Management Projects (2015) to establish six steps and five checkpoints to ensure that projects are consistent with National Environmental Policy Act (NEPA) documents and with Endangered Species Act (ESA) Section 7 consultation requirements. Included in these steps are habitat evaluations and northern spotted owl surveys. Silviculturists work with wildlife biologists to develop forest treatment prescriptions. The Biological Assessment and Biological Opinion are reviewed by the planning team, and the interdisciplinary team and the Marking Crew Lead are informed of the consultation requirements prior to the on-the-ground delineation of treatment units and tree marking. The silviculturist, in consultation with the wildlife biologist and other specialists, monitors the mark as it is completed to ensure it meets the consultation requirements and stand management objectives. Modifications to the mark would be applied as needed. The Contract Administrator monitors harvesting activities and ensures contract stipulations are met. Lastly, the wildlife biologist monitors a subset of units, post-treatment, to evaluate consistency between implementation, NEPA analysis, and ESA consultation requirements; this includes evaluating canopy cover and stand elements such as layering and heterogeneity. The BLM would report the results to the Service through annual monitoring reporting requirements. Implementation of Project Design Criteria (PDC) is monitored through the BLM sale-contracting program in coordination with the Resource Area wildlife biologist.

Chapter 3 – Affected Environment and Environmental Consequences

3.1 Introduction

This chapter describes the present conditions of each affected resource, followed by a comparison of the estimated environmental effects of implementing the No Action Alternative, Alternative 2, and an Alternative 3. The Affected Environment portion of each resource describes the current conditions in the Clean Slate project PA of the relevant resource. The Environmental Effects portion of each resource provides the analytical basis for the comparisons of the alternatives (40 CFR § 1502.16) and the reasonably foreseeable environmental consequences to the human environment of each alternative on the relevant resources. Impacts can be beneficial, neutral, or detrimental. The affected environment is described to the level of detail needed to determine the significance of impacts to the environment of implementing the Proposed Action. The analysis of the direct, indirect, and cumulative effects is organized by Issue, and the Analysis Areas for actions proposed under this EA vary by resource. Analyses for all resources include the Treatment Area, which encompasses the areas where actions are proposed for the Clean Slate Forest Management Project.

Chapter 3 describes the environmental effects of resources from implementation of the Alternatives. Methodologies, assumptions, and the scale of analysis of resources are disclosed. A description of existing conditions is provided. Effects of the Alternatives are described based on the proposal contained within the No Action Alternative, Alternative 2, and Alternative 3.

3.1.1 Cumulative Effects

Council on Environmental Quality (CEQ) guidance issued on June 24, 2005, points out that the "Environmental Analysis required under NEPA is forward-looking." Review of past actions is required only "to the extent that this review informs agency decision-making regarding the Proposed Action." A description of current conditions includes the effects of past actions and serves as a more accurate and useful starting point for a Cumulative Effects analysis than by "adding up" the effects of individual past actions. "Generally, agencies can conduct an adequate Cumulative Effects analysis by focusing on the current aggregate effects of past actions without delving into the historical details of individual past actions" (CEQ Memorandum "Guidance on the Consideration of Past Actions in Cumulative Effects Analysis," June 24, 2005). The use of information regarding the effects of past actions may be useful in two ways according to CEQ guidance: 1) consideration of the Action Alternatives' Cumulative Effects and 2) as the basis for identifying the Action Alternatives' direct and indirect effects.

When encountering a gap in information, the question implicit in the CEQ regulations on incomplete and unavailable information was posed: is this information "essential to a reasoned choice among the Alternatives?" (40 CFR § 1502.22(a)). While additional information would often add precision to estimates or better specify a relationship, the basic data and central

relationships are sufficiently well-established that any new information would not likely reverse or nullify understood relationships. Although new information would be welcome, no missing information was determined as essential for the decision maker to make a reasoned choice among Alternatives.

The IDT weighed the scientific evidence offered through public comments, as well as that gathered individually. Scoping for this project did not identify any need to exhaustively list individual past actions or analyze, compare, or describe their environmental effects in order to complete a useful analysis for illuminating or predicting the effects of the Action Alternatives. Projects considered for the Cumulative Effects analysis for each resource can be found in Appendix C: Projects for Cumulative Effects Consideration.

3.2 Forest Condition

Issue: How would proposed forest management actions (thinning, regeneration of conifer stands, and activity fuels treatments) affect species composition, long-term productivity of stands, and structural characteristics within the HLB-UTA and RR land use allocations?

3.2.1 Methodology and Assumptions

Methods for this analysis included project area reconnaissance, stand exams, and multiple Geographic Information System (GIS) datasets including: US Forest Service Region 6 insect and disease aerial surveys, aerial photos, Medford District Forest Operations Inventory (FOI) and BLM MicroStorms (activity tracking databases), Gradient Nearest Neighbor (GNN) data from the Southern Oregon Forest Restoration Collaborative (SOFRC), Rogue Basin 2012 Light Detection and Ranging (LiDAR) data products, as well as the analyses, direction and conclusions found in the Southwest Oregon ROD/RMP (2016) and the supporting Proposed Resource Management Plan/Final Environmental Impact Statement. Stand trajectories were modeled using the Forest Vegetation Simulator (FVS), the Southwest Oregon "Organon" FVS variant was used over a 50-year time horizon starting in 2018 to model anticipated treatment outcomes. Stand exams were performed on all units in the Clean Slate project, and Rogue Valley Lidar 2012 was also used to support the analysis.

Refer to the following for information on the ORGANON growth model (accessed 2-27-2018): http://www.cof.orst.edu/cof/fr/research/organon/orginf.htm which states that:

> *ORGANON has had more refereed publications written about its equations and architecture than any growth and yield model (public or private) available in the western United States. The refereed publication process is a critical element in the scientific process, which involves review by anonymous experts in the topic that examine and, if accepted for publication, approve of the data collection procedures, the statistical modeling procedures, and the equation forms used by the modeler/author. The resulting*

certification/verification of the model(s) is a substantial benefit that one gains by using ideas/models that have survived the crucible of that process.

Direct/Indirect Effects and Cumulative Effects Boundaries

The spatial extent for the silviculture direct and indirect effects analysis to forested vegetation is the treated area proposed in this project. The cumulative effects are described by the past actions in the proposed treatment units which have resulted in the current condition of these stands, as well as the reasonably foreseeable actions in these stands. The timeframe considered for short-term direct and indirect impacts to stand structure, composition, forest health risk, and appearance is the time needed to complete the proposed silvicultural treatments, approximately three to ten years. The timeframe for long-term direct and indirect impacts to forested vegetation is 50 years in order to better model long-term growth and change in species composition.

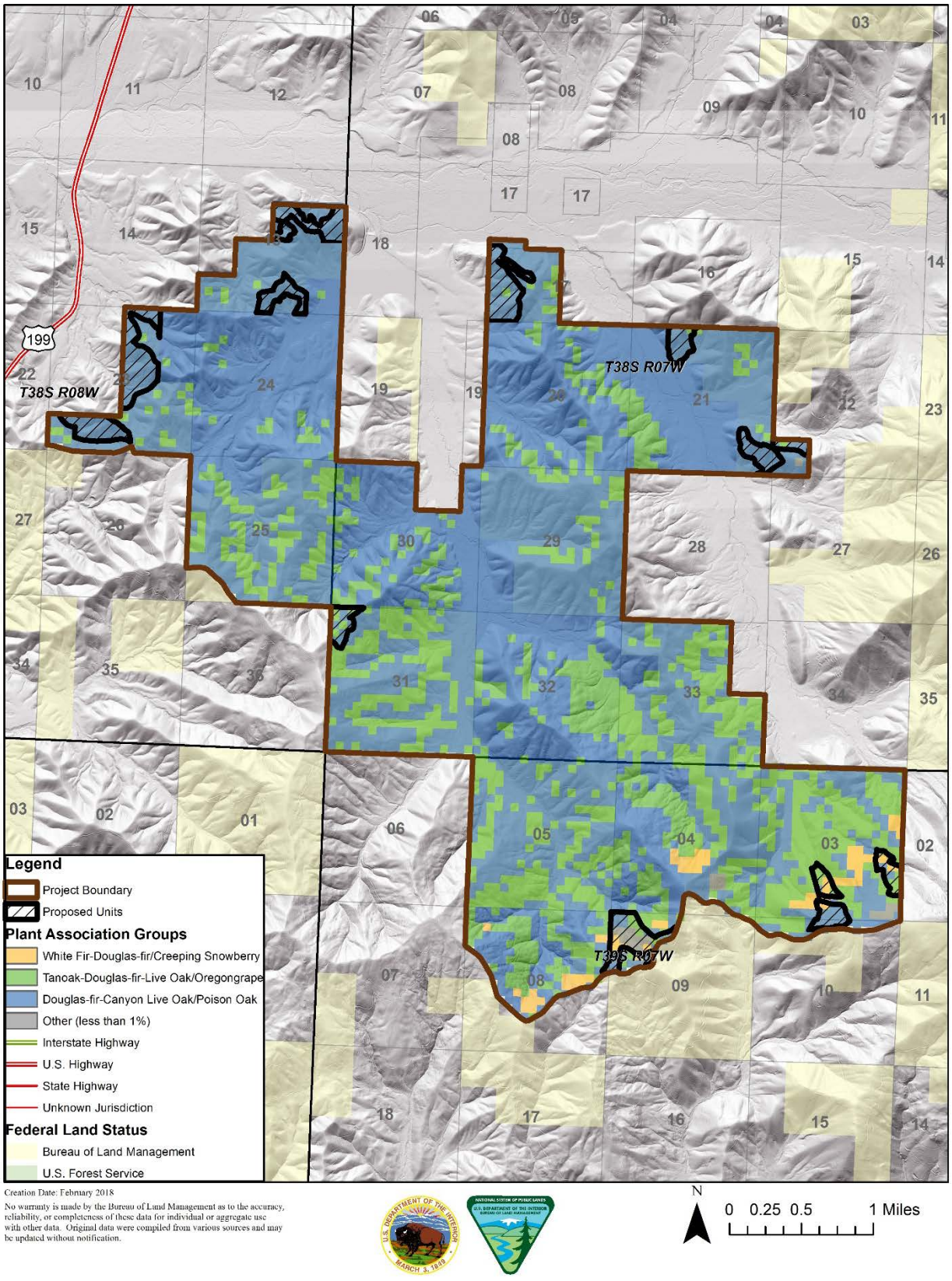
3.2.2 Affected Environment

The Clean Slate planning area is within the Deer Creek watersheds, totaling about 9,211 acres, of which approximately half is managed by the BLM. As shown in Figure 3-1 and the associated table, these forests are made up primarily of the Douglas fir-Dry Potential Vegetation Types (PVT), that support diverse stand compositions of conifers such as Douglas Fir, Ponderosa Pine, Sugar Pine, and Incense Cedar, as well as hardwoods such as Black Oak and Pacific Madrone. These PVTs exhibit a wide variety of conditions, differing by slope, aspect, elevation, and soil transitions. South and west aspects exhibit more cover in Sugar pine, Ponderosa pine, California black oak, and seldom white oak, while northern and eastern slopes, as well as more productive soil types, display more tanoak, white fir, and golden chinquapin. While watershed analyses that were required under the Northwest Forest Plan are no longer required under the 2016 ROD/RMP, the vegetation, fire regimes, and historical conditions are described in detail in the Deer Creek watershed analysis (USDI/BLM, 1997). Before the fire suppression and intensive management practices of the twentieth century, this 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 (LANDFIRE, 2012; USDI/BLM, 1997, p. 6). Under the active disturbance regime described, stands would have been dominated by drought-tolerant pines and oaks, as well as Douglas-fir that develop fire resistant, complex forms in open growing conditions following these frequent low to mixed-severity fires. After missing several fire return cycles, the likelihood of uncharacteristic fire behavior and high-severity fire increases due to the buildup of fuels (USDI/BLM, 1997; Brown et al., 2004; Hessberg et al., 2005; Kauffman, 2004; Reinhardt et al., 2008; Ryan et al., 2013). While there has been some debate about the efficacy and need for mechanical forest management in forests such as those proposed for treatment in Clean Slate, many scientists who study ecological processes in the inland Pacific Northwest support the need for active management (Hessberg et al. 2016, pp. 227-228).

Plant Association Group	Dry Forest	Approximate BLM and Private Acres *(Percent of Total Area)*	Approximate BLM Only Acres *(Percent of Total BLM)*	Approximate Acres in Proposed Units *(Percent of Commercial Units)*
Douglas-fir-Canyon Live Oak/Poison Oak *PSME-QUCH2/RHDI6*	Yes	6610 (71.8%)	3525 (66.5%)	375 (81.3%)
Tanoak-Douglas-fir-Live Oak/Oregongrape *LIDE3-PSME-QUCH2/BENE2*	Yes	2429 (26.4%)	1637 (30.9%)	35 (7.5%)
White Fir-Douglas-fir/Creeping Snowberry-Baldhip Rose/Western Starflower *ABCO-PSME/SYMO-ROGY/TRLA6*	Yes	132 (1.4%)	97 (1.8%)	30 (6.5%)
Other		40 (<1%)	40 (<1%)	22 (4.7%)
TOTAL		**9211 acres**	**5299 acres**	**461**

Figure 3-1: This large diameter stump in unit 21-12 of the Clean Slate Project resulted from selection harvest practices in the early half of the 20th century, as shown by the "springboard" cuts on the right-hand side. The large fire scar on the uphill side of the tree confirms that it had survived frequent low severity fires for several centuries prior to being harvested. The combination of past harvest practices and fire exclusion has drastically altered the current condition of the forested landscape.

Figure 2-2: Map of Plant Association Groups (PAGs), also known as Potential Vegetation Types (PVTs) in the Clean Slate area



As shown below in Table 3-1, nearly all of the BLM-administered lands contained in the Clean Slate planning area have had some form of commercial timber management in the last eight decades. About half has undergone some form of clear-cut or regeneration harvest. These practices were most prominent in the 1960s, and again in the 1980s. Selection harvest has been the most prominent management approach observed in the planning area, accounting for about 80% of the BLM-administered lands, and while this approach can take on a variety of forms, generally it refers to the overstory removal of some of the dominant trees in a stand to release the understory trees. It is important to note that the same acre may have been treated in different years with different techniques, so the total percentage may exceed 100%. In Clean Slate, these practices, along with fire suppression, effectively shifted the tree species diversity towards more dominance of shade tolerant Douglas-fir over pine and oak species. This change converted late seral open and closed canopy forests into mid-seral closed canopy forest as average tree diameters decreased and the lack of regular disturbance allowed dense regeneration to persist in light-limited settings.

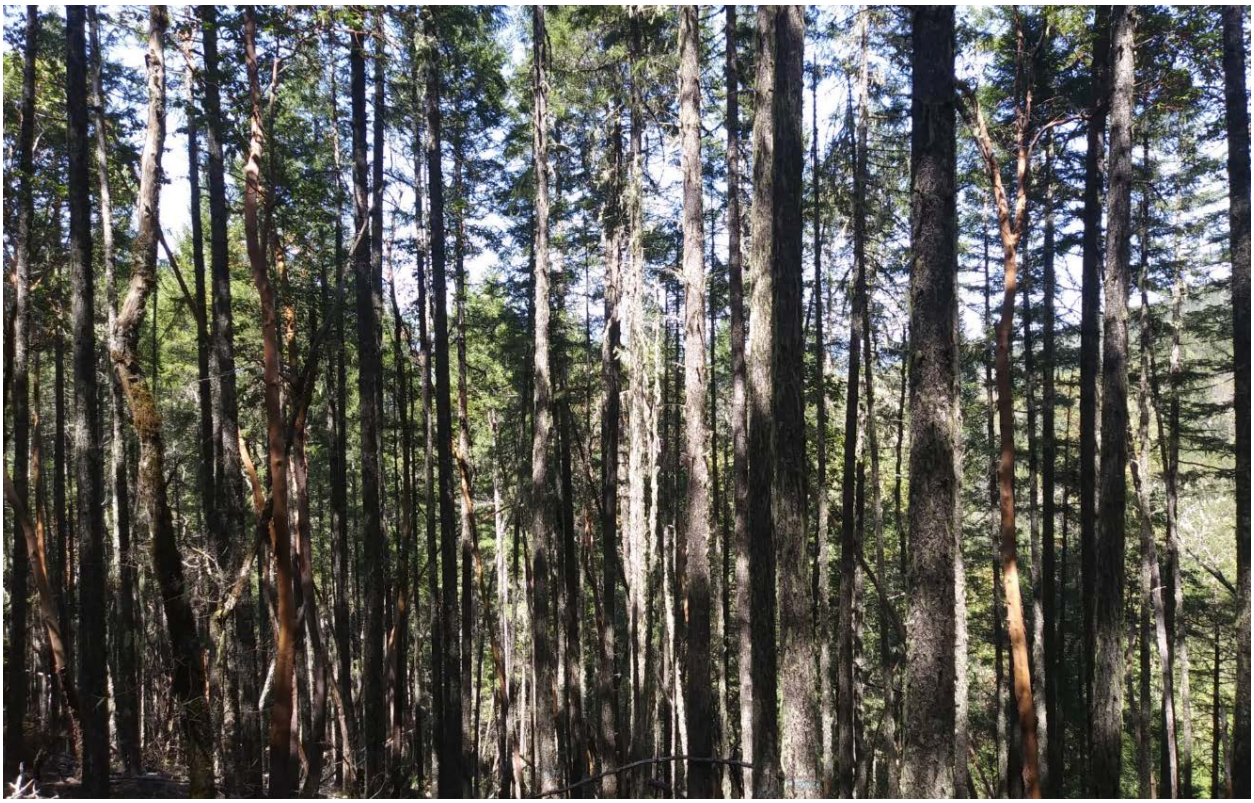


Figure 3-3: Compared to the large diameter, open-grown tree pictured above in Figure 3-1, many stands in the Clean Slate area are growing in the absence of regular disturbance as shown here. These high density, mid-seral Douglas fir stands exhibit reduced tree species diversity over time, provide little to no understory brush or forage, develop high height to diameter ratios and small live crown ratios.

Table 3-1: History of commercial silvicultural practices in the Clean Slate planning area

	Silvicultural Management				
Decade	**Clearcut[2]**	**Regeneration[3]**	**Selective Cut[4]**	**Thinning[5]**	**Total by Decade**
1940-1949	0	0	79	0	79
1950-1959	0	134	337	0	471
1960-1969	529	34	644	0	1207
1970-1979	8	145	3065	0	3218
1980-1989	424	876	149	19	1468
1990-1999	492	241	0	398	1131
2000-2009	0	0	0	0	0
2010-Present	0	0	0	0	0
Total by Type	***1453***	***1430***	***4195***	***417***	
% of Area	***15.8%***	***15.5%***	***45.5***	***4.5%***	
% BLM Lands	***27.4%***	***27.0%***	***79.2%***	***7.9%***	

[2] Clearcut refers to the removal of all trees on a site, and is followed up by planting a new cohort, leading to an even aged stand

[3] Regeneration refers to a timber harvest resulting in a new cohort of trees, often overstory trees are left on site to act as a seed source and provide shade as the new stand develops. These overstory trees may or may not be removed once a new cohort is established leading to an even aged or two aged stand.

[4] Selective cut refers to the removal of only some trees, generally the largest in a stand or the dead and dying to redistribute resources and stimulate growth in the remaining trees

[5] Thinning refers to the partial harvest of a stand, intending to redistribute resources to residual trees.

Figure 3-4: Map of Past Commercial Timber Harvest in the Clean Slate planning area, 1940-present

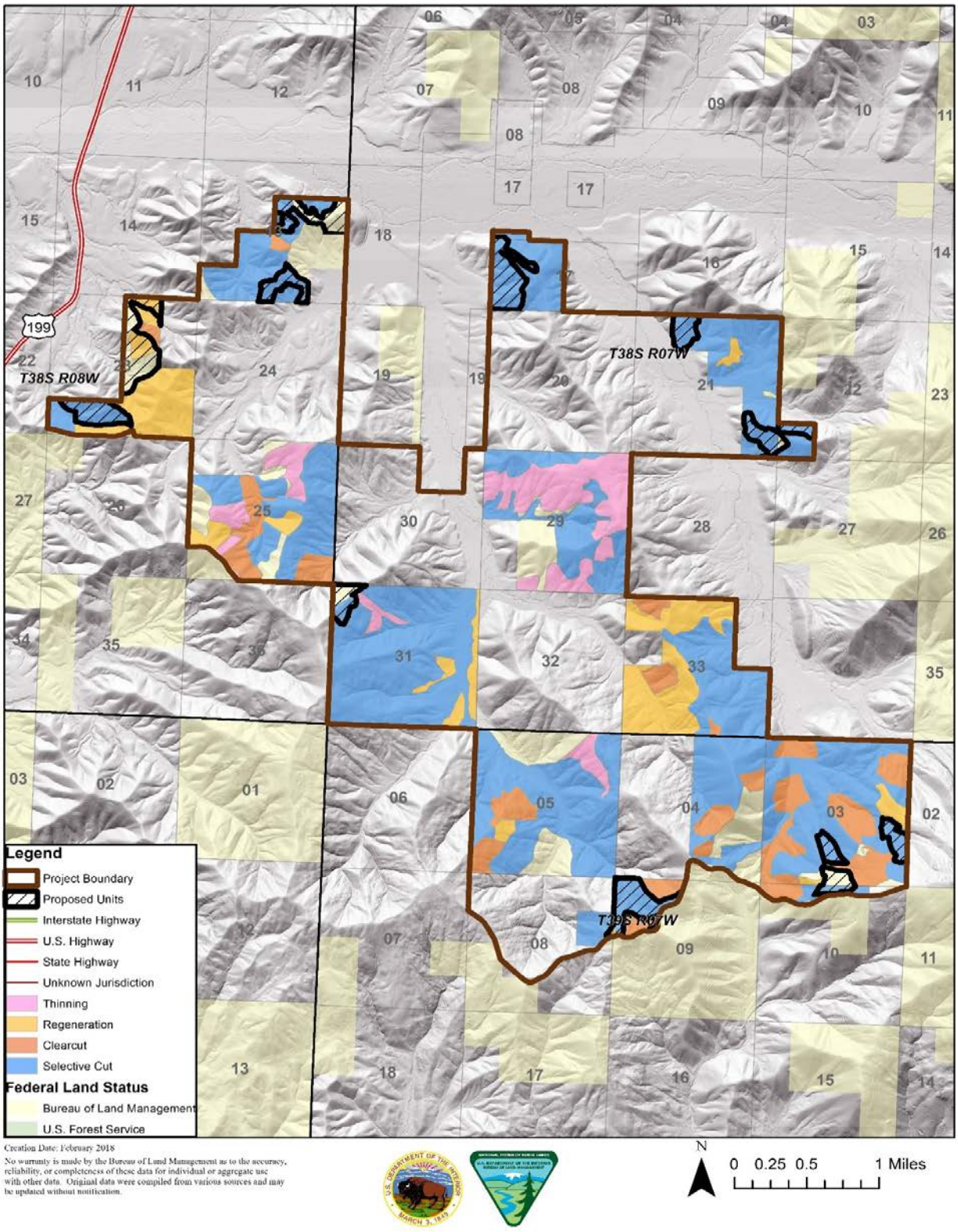


Table 3-2: Current seral condition and departure from historical condition

Seral Condition	Historical Range of Variation (HRV) for Douglas Fir-Dry: SW Oregon [6]	Approximate BLM and Private Acres *(Percent of Total Area)*	Approximate BLM Only Acres *(Percent of Total BLM)*	Approximate Acres in Proposed Units *(Percent of Commercial Units)*
Early Seral	7-11%	579 (6.3%)	603 (6.5%)	5 (0.1%)
Mid Seral Closed Canopy	5-8%	6,649 (72.2%)	3,946 (74.5%)	317 (68.9%)
Mid Seral Open Canopy	18-22%	*537 (5.8%)*	222 (4.2%)	21 (4.5%)
Late Seral Open Canopy	40-45%	75 (0.8%)	27 (0.5%)	5 (0.1%)
Late Seral Closed Canopy	20-25%	1371 (14.9%)	756 (14.3)	96 (20.8%)
TOTAL		**9,211 acres**	**5,299 acres**	**461 acres**

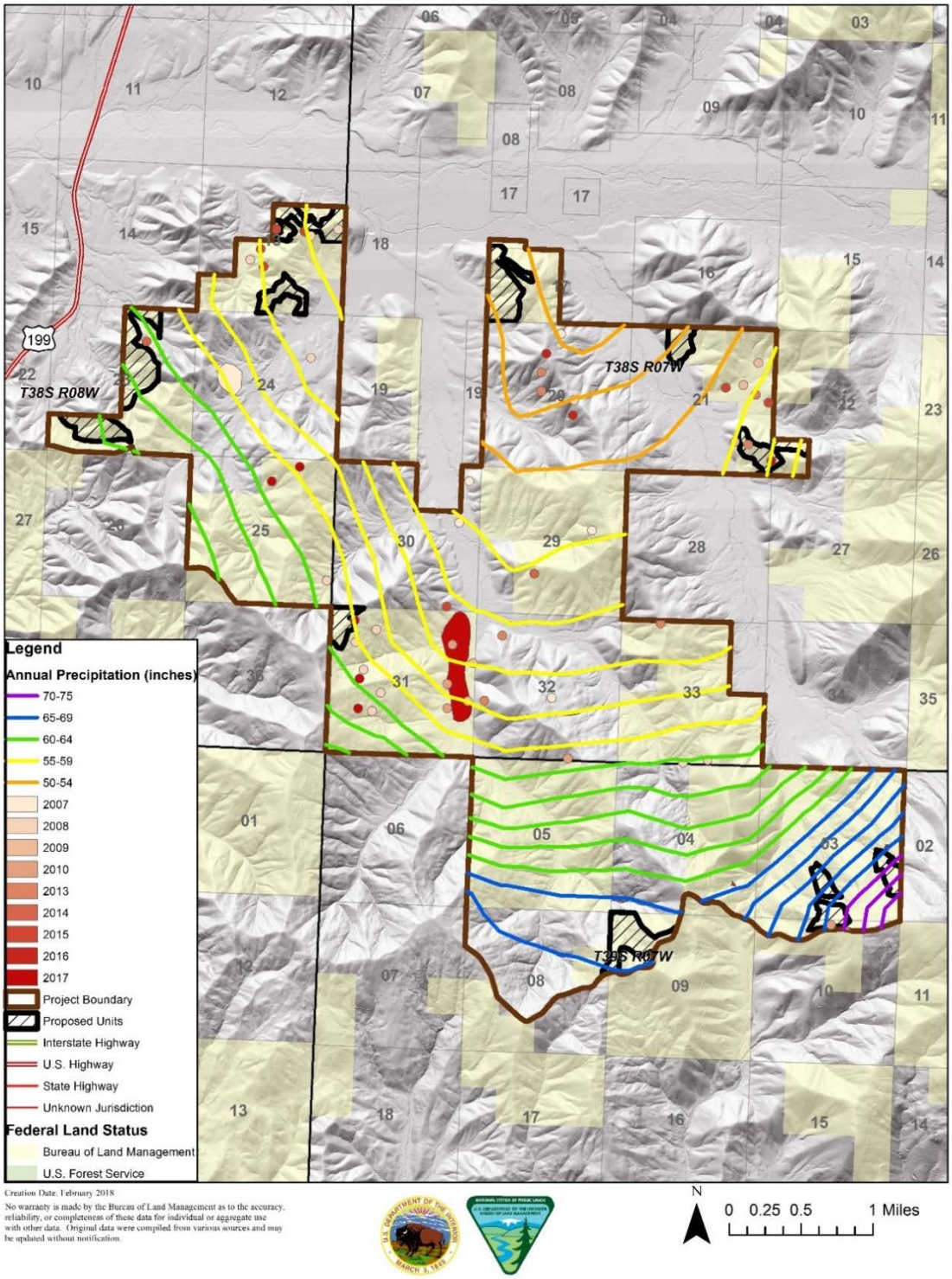
As shown in Table 3-2, the forest seral stage conditions in the Clean Slate project track with the same patterns seen in the FEIS supporting the 2016 ROD/RMP (USDI/RLM 2015a, Vol. 3, p. 1314); there is a dramatic excess of mid-seral, closed canopy forest, and a deficiency of late seral open canopy forest. Actions consistent with the 2016 ROD/RMP, such as those proposed here in the Clean Slate project, like uneven-aged timber management, protection of riparian reserve areas etc. will, over time, move the BLM-administered lands towards the suite of desired conditions for the Harvest Land Base and Riparian Reserves (2016 ROD/RMP, pp. 3 & 47).

While Douglas-fir trees experienced a noticeable spike in mortality from 2015-2016 in parts of the Rogue Basin due to Flathead Fir Borer activity, this was not a prominent mortality agent in the Clean Slate area of the Deer Creek watershed, though one large occurrence in section 6 did impact an estimated 5 trees per acre (see below, Figure 3-5). Of the other mortality observations, about 40% were Douglas-fir mortality, and 20% were attributed to bear damage on any tree species, 30% were incidence of pine mortality. Considering that pine trees are a minority component of the stand species diversity, these figures show that a disproportionate amount of tree mortality has been occurring in pine trees in the Clean Slate area (USDA/USFS, WDNR/RPD, ODF/FHM; 2007-2017). 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 1984, pp. 8-9). Subsequently, this substantial shift in species composition has

[6] Historical Range of Variation (HRV) is derived for the Douglas Fir-Dry vegetation type, the dominant classification in the Planning Area, from Haugo et al. (2015) Appendix A. The dataset used to calculate current seral classification was provided by The Nature Conservancy (TNC) and was used in the planning of the Rogue Basin Cohesive Forest Restoration Strategy (2015) from Gradient Nearest Neighbor (GNN) data.

heightened the competitive advantage of shade-tolerant trees, increasing its absolute cover and relative density (USDI/BLM 1996, p. 36), thereby increasing the overall fire hazard. The now minor conifer species, such as Ponderosa and Sugar pine appear most frequently in the top layer, making up a very small legacy component of stands. This conversion and simplification of stands into closed canopy, shade grown, mid-seral conditions is an undesirable shift in terms of stand-level tree species diversity.

Figure 3-5: Map indicating a decade of insect and disease occurrence from 2007-2017 and average annual precipitation. The insect and disease data should be used only as an indicator of insect and disease activity. Polygons indicate areas of tree mortality and/or defoliation; the intensity of damage is variable, and not all trees indicated by polygons are dead or defoliated. Source: USDA Forest Service, Forest Health Protection; Washington Department of Natural Resources, Resource Protection Division, Forest Health; and Oregon Department of Forestry, Forest Health Management



3.2.3 Environmental Effects

No Action Alternative (Alternative 1)

Direct/Indirect and Cumulative Effects

The cumulative effect of past management practices including timber harvest and fire suppression at the project boundary, BLM-administered, and proposed treatment unit scales is an over representation of closed canopy, mid-seral stand conditions as discussed below in Table 3-3. Because trees growing in dense conditions grow in height, but very little in diameter (Oliver and Larson 1996, p. 75). Overall stand growth would remain stagnant as stands would be left in overly dense conditions (Tappeiner et al. 2007, p. 124). Alternative 1 would ensure declining individual tree and stand vigor because if a stand is allowed to grow for many years within the zone of imminent competition mortality, mortality will occur (Drew and Flewelling, 1979). In dense stands, non-vigorous large trees will likely not persist, and a non-vigorous stand would likely not develop large woody structure. The No Action Alternative would prevent stands from attaining vigorous conifer growth because all stands proposed for management are already within the zone of competition mortality. As a result of the limited resources for tree growth in the stand, diameter growth will lag behind height growth (O'Hara, 2014, p. 100), and the risk for windthrow will increase over time as height to diameter ratios continue to increase, and crown ratios decrease. Forest floors would continue accumulating fuel from branches and limbs as trees continue to self-prune. Current densities threaten the persistence of minor species composition both directly by fire risk and indirectly by the effects of competition mortality from Douglas-fir as shade intolerant pine and oak species continue to decline.

Young stand management in the planning area, such as tree planting, brush cutting, pre-commercial thinning, plantation maintenance, and protection treatments would continue. Reduced biological and structural diversity is expected in private industrial forestland which can continue long-term if planted with single crop tree species. Forest operations on private land were anticipated in the development of the 2016ROD/RMP. Fire suppression activities would continue on Federal and non-Federally administered lands in accordance with the fire protection contract the BLM holds with the Oregon Department of Forestry (ODF).

In summary, the No Action Alternative would not promote the development of uneven-aged, multi-cohort stands and open-grown trees, would not produce timber to contribute to the declared Allowable Sale Quantity (ASQ), would not increase or maintain vegetative species diversity or create growing space for hardwood or pine persistence and regeneration. There would be a cumulative adverse effect of reduced conifer growth/vigor, and the economic value in timber stands would not be enhanced as directed by the 2016 ROD/RMP.

Alternative 2 and 3

Direct and Indirect Effects

Management Direction for the Harvest Land Base instructs the BLM to conduct silvicultural treatments to contribute timber volume to the Allowable Sale Quantity, enhance timber values and to reduce fire risks and insect and disease outbreaks. Additionally in the UTA, the Direction includes many potential treatment goals such as: development and retention of large, open-grown trees and multi-cohort stands, diverse understory plant communities, structural complexity and heterogeneity, reduction of stand susceptibility to disturbances, and the creation of growing space for hardwood and pine persistence and regeneration (2016 ROD/RMP, pp. 62 & 68). In the outer and middle zones of dry Riparian Reserves, the direction is to thin stands as needed to provide trees that would function as stable wood in the stream and reduce the risk of stand-replacing, crown fires (2016 ROD/RMP, pp. 82-83). The units proposed for treatment under both Alternative 2 and 3 are situated on the Harvest Land Base, and outer/middle zone Dry Riparian Reserves, and no lands proposed for management are within NSO Critical Habitat.

The effects of active management, as opposed to the No Action Alternative, are:

- A reduction in stand densities that promote growth and vigor; living vegetation must expand in size, and a tree cannot grow larger unless its growing space is increased; residual trees are expected to increase in diameter growth, including the diameter of the largest trees (Oliver and Larson, 1996, p. 36; Tappeiner et al., 2007, p.127).
- Tree species diversity would be increased, ensuring that RMP species diversity goals could be met (2016 RMP/ROD, p. 68). This diversity in tree species and sizes is important for ecosystem function (Franklin et al., 2002).
- A short-term increase of fine fuels deposited on the forest floor could result in an immediate increase in fire hazard until activity fuels are treated. Activity fuels treatments are proposed that would reduce this immediate deposition of fuels as described in Section 2.5: Project Design Features.
- Risk of windthrow could be increased in the short term when opening up a stand. However, windthrow occurs in both managed and unmanaged stands, and low levels of windthrow may be desirable for wildlife habitat and stand complexity. Silvicultural prescriptions proposed are designed to remove trees that are most susceptible, such as those with low vigor, poor crown ratios and those with high height to diameter ratios. Often 80:1 is used as a threshold, for example a 12” DBH tree at 85’ tall is more likely to fall over than a 12” DBH tree at 55’ tall (Worthington and Staebler, 1961, p. 21; Moore et al., 2003; Wonn and O’Hara, p. 92; Tappeiner et al. 2007, p. 129-130; O’Hara, 2014). This is important because trees allocate resources to height growth before diameter growth, so in the absence of disturbance (harvest, fire, etc.) resources become limited in a stand and the risk for windthrow increases as stability decreases (O’Hara 2014, p. 100).

Direct/Indirect and Cumulative Effects differences between Alternative 2 and Alternative 3
The Role of Relative Density

The 2016 ROD/RMP (p. 311) defines Relative Density as "*A means of describing the level of competition among trees or site occupancy in a stand, relative to some theoretical maximum based on tree density, size, and species composition. Relative density percent is calculated by expressing Stand Density Index (SDI) (Reineke 1933) as a percentage of the theoretical maximum SDI, which varies by tree species and range. Curtis's relative density (Curtis 1982) is determined mathematically by dividing the stand basal area by the square root of the quadratic mean diameter.*" The onset of competition is at 25%, 35% is the lower limit of full site occupancy, and 60% is associated with the lower limit of self-thinning, which is tree mortality (Long and Daniel, 1990). For the purposes of this analysis, 20-45% Relative Density Index (ROD/RMP 2016, p. 68) is considered desirable in that trees would occupy the site, and self-thinning would not yet have occurred at the stand level.

"Low Thinning" versus "Selection/Free Thinning" Methods

Classical thinning regimes are intermediate operations that are usually associated with even-aged systems and applicable to uneven-aged management. Two classical thinning methods and their effects on stand development are of interest in this analysis: low thinning/thinning from below which cuts mostly smaller trees to reduce densities while retaining a higher proportion of large trees, and selection harvest/free thinning which allows for tree removal of various sizes to reduce densities. The former removes entire cohorts of trees and simplifies stand structure, while the latter allows for greater structural diversity, and adjustments of species composition over time. In addition to the stand tending operations such as thinning, uneven-aged management systems must consider regeneration or else the system cannot be sustained over time (O'Hara, 2014, pp. 84-97). Gap dynamics account for this.

Gap Dynamics and Regeneration in Uneven Aged Systems

York et al. (2004) and York and Battles (2008) studied the effect of various created gap sizes on the residual stand growth and the new cohorts of trees that were established post-harvest. The results indicated that group selection needed to be larger than 0.6 hectares (about 1.5 acres) to avoid severe height suppression in the newly established seedlings and that 1 hectare (about 2.5 acres) and larger maximized growth potential of seedlings. They also suggest that to maximize the availability of resources to the residual trees, thinning should also occur throughout the stand, rather than implementing group selection only. Group selections smaller than ½ an acre (0.2 ha) are associated with extremely stunted growth, particularly in pine species; such a management approach would inhibit tree regeneration and is unlikely to promote the development of multi-cohort stands, open-grown trees or allow for pine persistence.

Vegetation Modeling Assumptions from the PRMP Final EIS

Appendix C of the Final Environmental Impact Statement (USDI/BLM, 2015a, pp. 1163-1227) describes the methodology and assumptions used for vegetation modelling in the 2016 ROD/RMP. The vegetation modeling was used in the analysis to simulate the application of the land use allocations, management actions, and forest development 100+ years into the future. The model was also used to determine sustainable harvest levels (ASQ) from the Harvest Land Base, and to provide a relative basis for comparing and evaluating each action alternative, including the PRMP. Unequivocally, the modeling assumptions used for analytical purposes in the FEIS NEPA analysis and setting ASQ in the RMP are not management direction that BLM is required to follow and do not constitute "terms, conditions, and decisions" of the RMP (43 CFR 1601.0-5(b)) or other rules or restrictions the BLM is required to follow. As such, the modeling assumptions or modeling results, in and of themselves, have no weight in evaluating the conformance of an action with the RMP. The models created a 'strategic' rather than 'site specific' sustained-yield calculation. This strategic nature and the broad scale of the modeling eliminates the possibility of any project-specific adherence to the vegetation modeling for the RMP. However, the model and resulting harvest schedule is *one* approach that has been shown to result in non-declining sustain yield of timber over time, and therefore contains information that can be helpful in project planning and design.

In the development of Alternative 2, the Grants Pass field office used some of the assumptions in the FEIS vegetation modeling to assist in the development of the silvicultural approach for this project. For example, page 1196 describes the modeled treatment return interval for the Uneven-aged Timber Area (UTA) as 40-50 years. While this is not a required interval, and the management direction for the UTA allows for considerable variation depending on site specific considerations and a project's Purpose and Need, there is no assumption that subsequent commercial re-treatment occur within 20 years or less in a given stand. Another assumption applied in the model was that if a stand's initial relative density was too low to allow for economically viable commercial thinning, or if the stand was older than 80-90 years, 30% of the stand would be harvested through group selections and commercial thinning would occur elsewhere (USDI/BLM, 2015a, p. 1196).

As described above, uneven aged management systems must consider regeneration or else the system cannot sustain a non-declining flow of timber harvest through time (O'Hara, 2014, pp. 84-97). The application of group selection openings is an efficient way to provide for the regeneration of less shade tolerant species like Douglas-fir and ponderosa pine (York et al., 2004; York and Battles, 2008). The creation of group selection openings would allow for a vigorous, young cohort of trees to establish, while thinning other portions of the stand would allow for enhanced growth of residual trees that could also be available for harvest in the future. This silvicultural approach, applied in Alternative 2, is very similar to the assumptions

used to calculate the Medford District's ASQ in the FEIS, and have therefore been shown to create conditions supporting a non-declining sustained yield of timber through time.

Methods for Comparison of Alternatives and Results:

Stand exams were conducted in late 2017 on every proposed treatment stand for this analysis. These exams were used to model treatment outcomes in the Forest Vegetation Simulator (FVS), Southwest ORGANON variant. Maximum stand density indexes (SDI) and target SDI values were sourced from the ORGANON model, 530.2 for Douglas fir and 501.2 for Ponderosa Pine. A multi-stand report was generated to show a composite of existing conditions in all 13 proposed stands, and the variation in stand conditions that would result from the implementation of the 2016 ROD/RMP Uneven-Aged Timber Area prescriptions. The vegetation modeling included a site preparation burn and tree planting in Alternative 2 following harvest to generate a new cohort of trees. No site prep burning or planting was modeled for Alternative 3 because the stand retained high stocking and there were no group selections able to successfully and effectively generate a new cohort of trees, however activity fuels were piled and burned. As shown below, Alternative 2 generates about 20% more volume in the initial harvest than Alternative 3. Alternative 2 also maintains conifer dominance over time, while the lighter thinning from below without planting allowed for hardwoods, particularly madrone, to become more dominant in the understory. While there is about 20% more standing volume post-harvest in Alternative 3 than Alternative 2, this proportion decreases over time to only 12% more standing volume in 50 years. This indicates that Alternative 2 is more effective at producing timber volume in the current proposed entry, and over time additional volume is growing more rapidly. The Canopy Bulk Density and Canopy Base Height are reduced to comparable levels in both Alternative 2 and 3. Compared to the no Action, wind speeds needed to cause crown fire are three times higher in Alternative 2, and four times higher in Alternative 3. Compared to the No Action alternative, the Torching Index (the 20-ft wind speed required to cause torching of some trees under severe conditions) is four times greater in Alternative 2, and two times greater in Alternative 3.

Table 3-3: Summary comparison of alternatives, changes in forested conditions post-treatment and in 50 years

	Alt 1: No Action	Alt 2: UTA: IVM	Alt 3: 2 Step Thinning
RDI			
Current / Post Treatment	99% (Maximum)	32.5% (+/- 12.5%)	45%
50 years Post Treatment	92% (Maximum)	40% (+/- 15%)	46% (+/- 15%)
Basal Area			
Current / Post Treatment	Approx. 280 ft^2/ac	Approx. 90ft^2/ac	Approx. 135 ft^2/ac

	Alt 1: No Action	Alt 2: UTA: IVM	Alt 3: 2 Step Thinning
50 years Post Treatment	Approx. 320 ft^2/ac	Approx. 120 ft^2/ac	Approx. 145 ft^2/ac
Species Diversity:			
Current / Post Treatment	Ponderosa Pine 1% Douglas Fir 75% Sugar Pine 10% Oak Spp. 2% Tanoak 4% Madrone 7%	Ponderosa Pine 1% Douglas Fir 83% Sugar Pine 12% Oak Spp. 2% Tanoak 1% Madrone 3%	Ponderosa Pine 1% Douglas Fir 46% Sugar Pine 21% Oak Spp. 6% Tanoak 5% Madrone 17%
50 Years Post Treatment	Ponderosa Pine 0% Douglas Fir 85% Sugar Pine 2% Oak Spp. 1% Tanoak 3% Madrone 7%	Ponderosa Pine 4% Douglas Fir 84% Sugar Pine 5% Oak Spp. 1% Tanoak 1% Madrone 5%	Ponderosa Pine 2% Douglas Fir 55% Sugar Pine 8% Oak Spp. 6% Tanoak 4% Madrone 22%
Harvest Volume (mbf/ac):[7]			
Available 2018	0	44	35
Standing Volume (mbf/ac)			
Current / Post Treatment	80	36	45
50 Years Post Treatment:	105	46	52
Canopy Cover[8]	Alt 1: No Action	Alt 2: IVM	Alt 3: 2 Step Thinning
Current / Post Treatment	Approx. 80-90%	Approx. 25-35%	Approx. 40-50%
50 Years Post Treatment:	Approx. 80-90%	Approx. 35-45%	Approx. 45-55%

[7] Volumes presented in this analysis are from the forest vegetation simulator, they are intended to be used as a relative comparison between alternatives only, not as an actual predictor of generated volume. The actual volume would be established through timber cruising, not modelling efforts in this analysis.

[8] This is a very general estimate based on Forest Vegetation Simulator outputs, substantial variation within and between stands would exist under both action alternatives. Canopy cover is not a metric for compliance under the 2016 ROD/RMP.

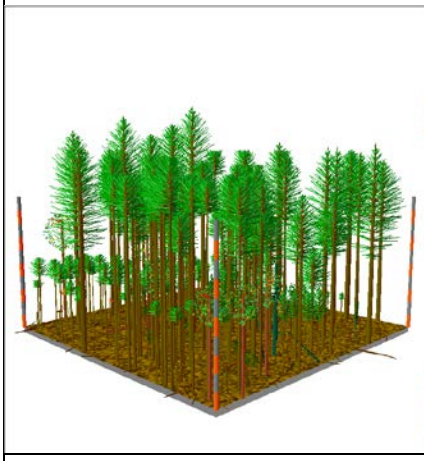
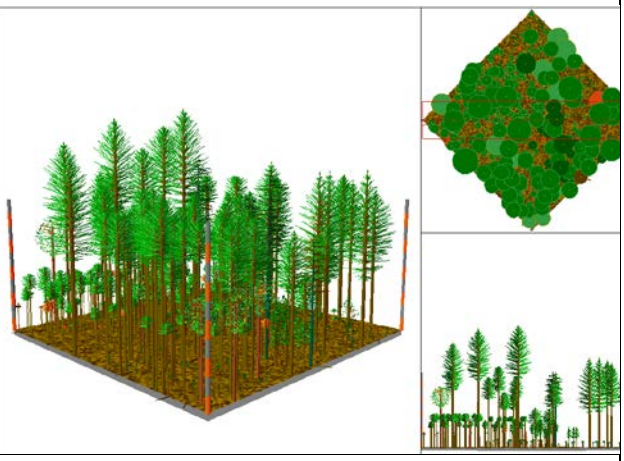
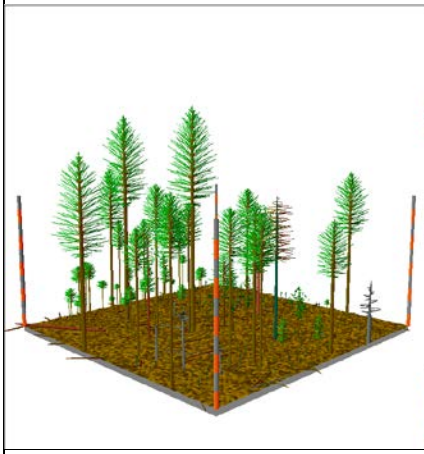
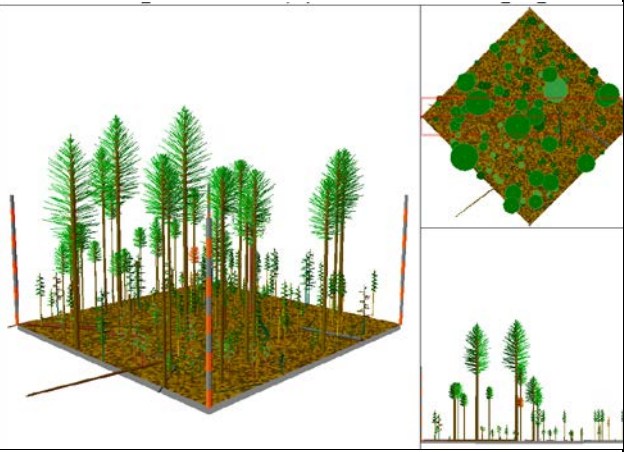
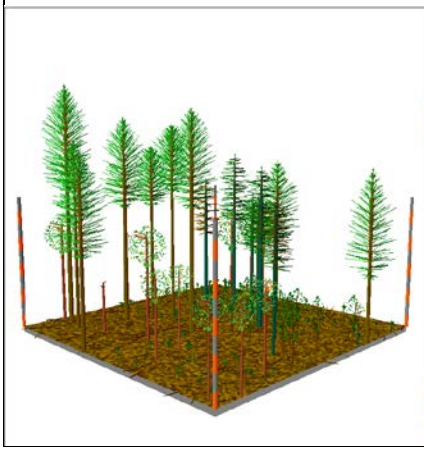
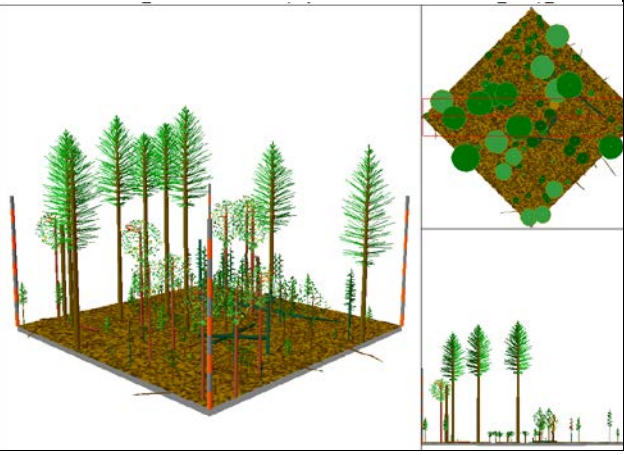
	Alt 1: No Action	Alt 2: UTA: IVM	Alt 3: 2 Step Thinning
Canopy Bulk Density (kg/m^2)[9]			
Current / Post Treatment	0.1	0.03	0.02
50 Years Post Treatment:	0.12	0.03	0.02
Canopy Base Height (feet)[10]			
Current / Post Treatment	20	65	48
50 Years Post Treatment:	34	57	57
Crowning Index (mph)[11]			
Current / Post Treatment	21	59	84
50 Years Post Treatment:	17	46	97
Torching Index (mph)[12]			
Current / Post Treatment	104	448	195
50 Years Post Treatment:	115	366	237

[9] This is a measure of the mass of available canopy fuel volume. It is a bulk property of a stand, not a tree. The Fire and Fuels Extension does not include measurements of hardwoods, which has caused a lower bulk density estimate in Alternative 3 than Alternative 2 due to the higher proportion of hardwoods in the understory.

[10] The height (ft) of the base of the canopy calculated by The Fire and Fuels Extension

[11] The 20-ft wind speed (miles/hour) required to cause an active crown fire under severe conditions. Calculated by The Fire and Fuels Extension

[12] The 20-ft wind speed (miles/hour) required to cause torching of some trees under severe conditions. Calculated by The Fire and Fuels Extension

Current Condition/No Treatment	*No Treatment 2068*
	
Alternative 2: IVM Post Treatment	***Alternative 2: IVM 2068***
	
Alternative 3: 2 Step Thin Post Treatment	***Alternative 3: 2 Step Thin 2068***
	

3.3 Terrestrial Wildlife and Special Status Species

Issue 2: How would timber harvest, activity fuels treatments, and new road and landing construction affect habitat used by northern spotted owls and barred owl for nesting, roosting, and foraging, and by fisher for foraging, resting and denning?

This Section analyzes the potential impacts of the proposed forest management activities on northern spotted owl (NSO), fishers, and their habitat.

3.3.1 Methodology and Assumptions

Methodology

- The NSO Habitat Analysis Area includes all areas of suitable NSO habitat on federal lands (BLM) within the home range circles (1.3 miles) for the 6 historically known owl sites affected by the proposed project and 2 owls within the project area not affected. It includes all areas of suitable NSO habitat on federal lands within the provincial home range radius (1.3 miles) of proposed treatment units. Figure 3-6 below illustrates the Analysis Area in relation to the Project Area.
- The process for conducting biological evaluations and assessments includes a review of existing records, field reconnaissance, field surveys, and analysis of potential impacts. The project wildlife biologist conducted a review of potential wildlife habitat using field assessments, maps, aerial photographs, Lidar, GIS software, wildlife survey data, and stand exam records for the Analysis Area.
- The BLM wildlife biologist classified NSO habitat in the Analysis Area by habitat type (Table 3- 4) using, FOI Geographical Information System data, (Forest Operations Inventory), TPCC GIS (Timber Production Capability Classification), LIDAR, aerial photo imagery, and on-site habitat analysis. The FOI gives a more detailed description of age classes on BLM-administered lands because it is based on field data as well as aerial photo inventories. The combined data allows the vegetation to be grouped into the early, mid-, and late seral age classes for comparison purposes, although these data sources have differing degrees of detail and resolution. The TPCC refers to the suitability of the soil to produce timber.
- Approximately 203 acres of complex habitat within Late Successional Reserve (LSR) land allocation occur in the project area and deferred based on the 2016 ROD/RMP LSR LUA. Field units were reviewed by the wildlife biologist and silviculturist, and none of the proposed units were identified as RA32 habitat.
- Using 2016 RMP Appendix A (Guidance for use of the Resource Management Plan-known sites located inside and outside of harvest land base) and NSO occupancy results from surveys, known NSO sites within the Analysis Area were identified and considered

for habitat maintenance or implementation of Harvest Land Base objective and management direction (see Chapter 2, Section 2.2, Development of the Project).

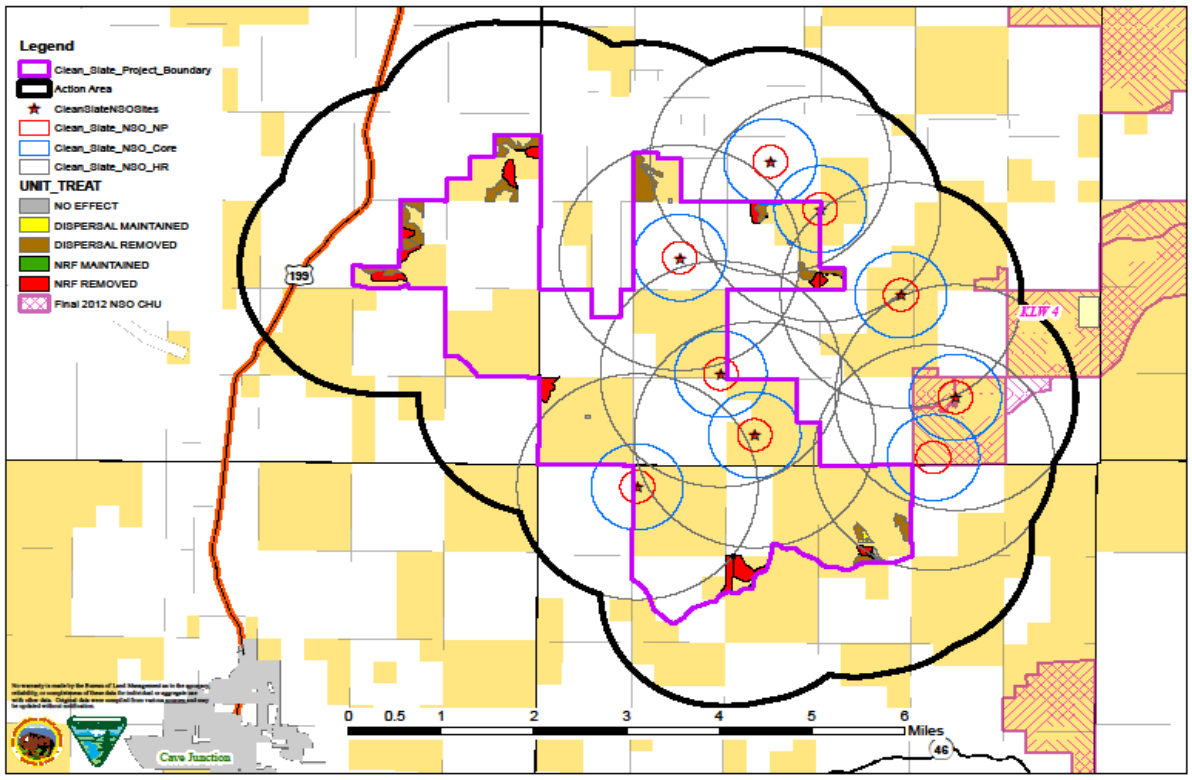
- The BLM is conducting strategic NSO surveys following the 2011 Protocol for Surveying Proposed Management Activities that May Impact Northern Spotted Owls (USDI/FWS, 2012).
- For the analysis of effects to NSO habitat, where proposed transportation management actions and yarding/service landings overlap with unit forest management actions, the acres of habitat removal are included in unit treatment effects to avoid duplication of acres and may not be consistent with the values listed separately in Chapter 2.

Assumptions

Late-successional forest habitat is 80 years or older. Late-successional forest generally, but not always, provides suitable dispersal, foraging, and/or nesting habitat for NSOs. Suitable NSO nesting habitat is usually 80 years and older, but also contains other attributes, such as closed canopy cover, multiple larger remnants with large platform area or cavities, multiple tree layers, snags, and decaying logs. NSO habitat is specifically rated for its suitability for NSOs, while late-successional forest (not always rated as suitable NSO habitat) may provide habitat for other wildlife species.

Private land harvesting occurs on a 40-60-year rotation, and private land is subject to intensive harvesting. Adjacent private lands have removed or could remove potential Nesting/Roosting/Foraging habitat (NRF) and dispersal habitat on their lands within spotted owl home ranges or core areas. Therefore, private lands are not likely contributing to any meaningful extent to spotted owl recovery and provide short-term benefits until harvested.

Figure 3-6: The NSO Analysis Area and the Clean Slate Project Area Boundary



3.3.2 Affected Environment

Northern Spotted Owl Habitat

The northern spotted owl (NSO), listed as threatened under the Endangered Species Act, is associated with the existing habitats found within the Analysis Area. NSOs prefer coniferous forest with multiple vertical layers of vegetation; a variety of tree species and age classes; and the presence of large logs and large diameter live and dead trees (snags) for NRF habitat. They may also be found in younger stands with multilayered, closed canopies, large diameter trees, and abundance of dead and down woody material. 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 four components: nesting, roosting, foraging, and dispersal (Thomas et al., 1990) (Table 3-4).

Table 3-4. Medford District Northern Spotted Owl Habitat Types

Habitat Type	Description
High-quality habitat (RA 32) Subset of NRF habitat	Older, multilayered, structurally complex forests characterized as having average diameter of large trees greater than 17 to 21 inches in diameter (depending on annual precipitation), high canopy cover (greater than 60%), and quantifiable decadence components such as broken-topped live trees, mistletoe, cavities, large snags, and large >21" diameter fallen trees/coarse wood. RA 32 habitat may vary due to climatic gradients across the range.
Suitable nesting/roosting/ foraging (NRF)	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 logs, are also present. NRF habitat meets all NSO life requirements.
Roosting/Foraging (RF)	Canopy cover greater than or equal to 60% and canopy structure generally single layered or two stories layered but lacking abundant larger >21DBH trees with suitable nesting structure of cavities and platforms. Overstory trees are generally greater than 16 inches in diameter. Snags and down wood not considered a requirement.
Dispersal	This habitat is not suitable 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, and lack consistent differentiation of heights and diameters, and are typical of managed plantations. The area has the capability of becoming foraging or nesting habitat. Deformed large trees, snags, and down wood are absent or less prevalent than in RA32, NRF, or RF habitat. Dispersal habitat may contain spotted owl prey but is not expected to provide foraging at levels to support consistent foraging to support resident owls.
Capable	Does not presently meet NSO needs but has the potential to grow into habitat Types listed above
Non-habitat	Does not have the potential to develop into late-successional forest or supporting old-growth dependent species.

Suitable NRF habitat in southwest Oregon is typified by mixed-conifer habitats with recurrent fire history, patchy habitat components, and higher incidences of woodrats. A review of current habitat ratings of 11,704 acres of federal lands (BLM) within the NSO Analysis Area indicates that 36% (4,242 acres) of federal lands provide NRF/RF habitat; 20% (2,382 acres) provide dispersal-only functional habitat, and when added with NRF/RF, 6,624 acres (57%) provide dispersal function; 42% (4,860 acres) provide capable habitat; and 2% (220 acres) is non-habitat (Table 3-5).

Table 3-5: Percentage of Habitat Types in the Analysis Area

Habitat Type	NRF/RF	Dispersal-only (NRF/RF+Dispersal)	Capable	Non-Habitat
Analysis Area	36%	20% (57%)	42%	2%

Critical Habitat

No action is proposed in designated critical habitat and therefore no effects to critical habitat. In December 2012, the USFWS released the *Designation of Revised Critical Habitat for the Northern Spotted Owl, Final Rule*, which designated NSO critical habitat on federal lands. A critical habitat unit (CHU) identifies geographic areas that contain features essential for the conservation of the NSO and may require special management considerations. For the NSO, these features include particular forest types of sufficient area, quality, and configuration distributed across the range of the species that will support the needs of territorial owl pairs throughout the year, including NRF and dispersal habitat.

Northern Spotted Owl Recovery Plan

The 2011 *Revised Recovery Plan for the Northern Spotted Owl* recommends retaining or enhancing all known NSO sites as well as retaining high-quality habitat (Section 3.3.1). The Recovery Plan is not a regulatory document; it provides guidance to bring about recovery through prescribed management actions and supplies criteria to determine when recovery has been achieved. The BLM works with the USFWS to incorporate the Recovery Goals and Actions in the Recovery Plan consistent with BLM laws and regulations.

Management direction and land use allocations in the 2016 ROD/RMP are intended to constitute the BLM contributions to the recovery of the NSO (2016/ROD/RMP). Using the 2016 ROD/RMP Appendix A (Guidance for the use of the Resource Management Plan- known sites located inside and outside of harvest land base). The 2016 ROD/RMP provides a network of late-successional reserves and connecting riparian corridors.

The BLM integrated Recovery Action 10 (RA 10) into project planning to minimize effects to NSOs and their habitat within known, active home ranges. BLM incorporated RA 10 to the extent it was compatible with the primary purpose and need of the project to provide for a sustainable supply of timber, help meet the Medford BLM's annual timber volume target, and improve forest health. The BLM followed the Guidance in the 2016 ROD/RMP Appendix D to reduce impacts to sites with known occupation within the last 10 years, within the Analysis Area. Where adequate survey history did not occur within the last 10 years, the analysis is based on best available information and recent protocol survey from 2016-2017 and continued protocol surveys.

The project's wildlife biologist prioritized the NSO sites within the Analysis Area based on occupancy data (2016 ROD/RMP Appendix D). Surveys detected one occupied site during protocol surveys in the past two years (2016-17) which is also the only site known to have occupation within the past five years. An additional two sites have had a detected resident single or pair of NSOs six to ten years ago, but with no detections from protocol surveys in 2016-17. Three sites have no detections within the last ten years, and no detections from protocol surveys in 2016-17, or were not surveyed by BLM to protocol because the sites occur mostly on private land.

The objective at the recently occupied sites within the last five years is to avoid adverse effects by not removing or downgrading NRF habitat, and maintaining habitat, within the core and home range. A core team consisting of the project's wildlife biologist, silviculturist, and forester worked together to identify areas to conserve NSO core and home range areas within recently occupied sites, and within the core area of sites occupied six to ten years ago. The 0.5-mile core area recently occupied owl sites are the area that provides the important habitat elements of nest sites, roost sites, and access to prey that benefit NSO survival and reproduction (Bingham & Noon, 1997). Avoiding harvest that removes NRF/RF habitat outside the core area but within the homerange avoid adverse effects where habitat levels are already below levels to support spotted owl fitness.

Provincial Home Range and Core Area

The home range is a circular area around a NSO center of activity. The size of the home range is based on the geographic province in which it is located. The Clean Slate Project is located within the Klamath Mountains and the West Cascades provinces. The provincial home range for the Klamath Mountains province is a 1.3-mile radius from known spotted owl site centers. Proposed projects are located within the provincial home ranges of six known NSO sites. A known NSO site is defined as a location with evidence of historic or current use by NSOs. Evidence includes breeding, the repeated location of a pair or single bird during a single season or over several years, the presence of young before dispersal, or some other strong indication of occupation. Each of the owl sites is a mixture of private and public lands.

Based on studies, suitable (NRF) habitat coverage of at least 40% or higher at the home range scale (Bart and Forsman, 1992; Bart, 1995) and 50% or higher at the 0.5-mile radius core area scale (Dugger, et al., 2005) is likely necessary for maintaining NSO life history functions. As the amount of suitable habitat in an owl's home range decreases, so does site occupancy, reproduction, and survival. All six home ranges located within the Clean Slate Analysis Area currently contain less than the 40% (ranging from 9% to 32%) NRF/RF habitat, which the best available information indicates is the habitat amount important to support NSO fitness at the home range scale. Five of the six affected sites have core areas with less than the 50% NRF/RF

habitat on BLM land (ranging from 0% to 44%) that the best available information indicates is the habitat amount important to support NSO fitness at the home range scale.

Late-Successional Reserves/ Other Reserves

No action is proposed in Late-Successional Reserve or District Defined Reserve (Table 1-3).

Riparian Reserves

Riparian Reserves provide for the conservation of Bureau Special Status riparian-associated species. Approximately 21% (1,096 acres) of the project area is Riparian Reserve. Treatment of approximately 94 acres of riparian reserves is proposed in the outer and middle zones in stands that do not have late-successional characteristics (see section 3.6 Fisheries and Aquatic Habitat). The thinning would treat approximately 10% of riparian reserves on BLM-administered land in the project area to enhance long-term structural forest development benefitting and terrestrial riparian related species. The treatment would remove NSO RF/Dispersal functioning habitat by reducing canopy cover, and basal area is an area with simple stand structure, creating open conditions avoided by spotted owls in large treatment areas. Within the RR system, treatment areas, which exclude the inner zone, would not impede movement or dispersal of mammals or birds listed as threatened or endangered or sensitive. The riparian thinning avoids core and nest patch areas of known owl sites. The treatment areas do not include NSO nesting habitat or complex forest stands.

Northern Spotted Owl Population Trends

NSO reproduction, or productivity, varies widely year-to-year, depending on how spring weather conditions affect prey availability (Franklin et al., 2000). Eleven demographic study areas have been established to represent owl status across the range of the NSO (Forsman et al., 2011). Owl sites and productivity are monitored annually within these areas to:

- Assess changes in population trend and demographic performance of NSOs on federal forest lands within the range of the owl; and
- Assess changes in the amount and distribution of NRF and dispersal habitat for NSOs on federal forestlands.

The Grants Pass Resource Area shares the Klamath Demographic Study Area with Roseburg BLM and the Rogue River-Siskiyou National Forest. The Klamath Study Area is one of eight long-term study areas that were established before the NSO was listed and before the NWFP was developed. The Klamath Study Area is located approximately 26 miles north of the Clean Slate Analysis Area.

Metadata analysis evaluates population statistics of the owls in the demographic study areas. Recent metadata analyses (Forsman, 2011) which found that fecundity, the number of female young produced per adult female, is declining. Forsman et al. (2011) concluded that fecundity,

apparent survival, or populations were declining on most study areas and that increasing numbers of barred owls and habitat loss were partly responsible for these declines.

The most recent metadata analysis, published in 2016 (Dugger et al., 2016), found that fecundity, the number of female young produced per adult female, is declining. Dugger et al. (2016) concluded that fecundity, apparent survival, and/or populations were declining in most study areas and that increasing numbers of barred owls and loss of habitat were partly responsible for these declines. The 2016 metadata analysis found these declines are occurring in more study areas than indicated in the last 2011 metadata analysis (Forsman et al., 2011). The 2016 data indicates that competition with barred owls may now be the primary cause of northern spotted owl population declines across their range. These reports listed above did not find a direct correlation between habitat conditions and changes in NSO populations, and they were inconclusive as to the cause of the declines. Even though some risk factors had declined (such as habitat loss due to harvesting), other factors had continued, such as habitat loss due to wildfire, potential competition with the barred owl, West Nile virus, and sudden oak death (USDI/USFWS, 2004; Lint, 2005). The barred owl is present throughout the range of the NSO, so the likelihood of competitive interactions between the species raises concerns as to the future of the NSO (Lint, 2005).

On June 30, 2011, the USFWS released the Revised Recovery Plan for the Northern Spotted Owl (USDI/USFWS, 2011). This Revised Recovery Plan recommends achieving recovery of the spotted owl through 1. The retention of more occupied and high-quality habitat, 2. Active management using ecological forestry techniques, both inside and outside of reserves, 3. Increased conservation of spotted owls on State and private lands, and 4. The removal of barred owls in areas with spotted owls. The Revised Recovery Plan also included several "Recovery Actions" that are near-term recommendations to guide the activities needed to accomplish the recovery objectives and achieve the recovery criteria included in the Revised Recovery Plan. Of the 33 Recovery Actions (RA) included in the Revised Recovery Plan, two were specifically considered and applied to the Clean Slate project: RA10 and RA32. Approximately 203 acres of structurally complex forest within the LSR allocation was identified within the project. Management Direction in the 2016 ROD/RMP directs "protection" of structurally complex forests specifically identified in the stand level mapped LSR land use allocation.

Northern Spotted Owl Prey Species

The composition of the spotted owl's diet varies geographically and by forest type. In southwest Oregon, dusky-footed woodrats along with flying squirrels are a primary prey species for spotted owls (Forsman et al., 2004). Woodrats are typically found in high densities in early-seral or edge habitat (Sakai & Noon, 1993; Bingham & Noon 1997), but are also abundant in old growth and complex forests (Carey et al., 1999). In general, two forest conditions support high numbers of flying squirrels, high-stem-density closed-canopy forest (old or young), and classic multi-layered

old growth forest, with the latter generally providing the highest abundances (Wilson, 2010). In general, small mammals such as red tree voles, deer mice, and red-backed voles along with birds and insects comprise a small proportion of the overall diet (biomass and composition) for spotted owls across southwest Oregon (Forsman et al., 2004). Although for some portions of the action area, red tree voles may account for approximately 20 percent composition of the spotted owl diet (Forsman et al., 2004). None of the prey items for spotted owls are on federal endangered, threatened, or sensitive lists. The red tree vole was on the Survey and Manage list species under the 1994 Northwest Forest Plan, but the 2016 ROD/RMP provides direction for this project, and the red tree vole has no federal management status.

Barred Owls

Barred owls (*Strix varia*) are native to eastern North America but have moved west into NSO habitat. The barred owl's range now completely overlaps that of the NSO (Courtney et al., 2004). Barred owls are considered generalists and make use of a variety of vegetation and forage species (Wiens et al., 2014). Existing evidence suggests barred owls compete with NSOs for habitat and prey with near total niche overlap. Interference competition (Dugger et al., 2011; Van Lanen et al., 2011) is resulting in increased NSO site abandonment, reduced colonization rates, and likely reduced reproduction (Dugger et al., 2011; Forsman et al., 2011; Wiens et al., 2014), ultimately resulting in probable range-wide population reductions (Forsman et al., 2011). Barred owl effects on NSO survival and colonization appear to be substantial and additive to effects of reduction and fragmentation of habitat in NSO home ranges. The magnitude of the barred owl effect may increase somewhat as habitat quantity decreases and fragmentation increases (Dugger et al., 2011).

Activities that reduce the quantity of older forests adjacent to NSO site centers reduce the probability of continued occupancy, survival, and reproduction (Franklin et al., 2000; Olson et al., 2004; Dugger et al., 2005; Dugger et al., 2011; Schilling et al., 2013). When barred owls are present, the effect of such activities on NSO pair survival (estimated as the probability of extinction of a single territory and termed "extinction probability") may be exacerbated by 2 to 3 times (Dugger et al., 2011). Some NSOs appear able to successfully defend territories and reproduce when barred owls are present, (Dugger et al., 2011; Wiens et al., 2014), but the mechanism that allows them to persist is currently unknown.

Barred owls have been detected within 5 different NSO home ranges, and at 5 additional separate locations outside of NSO home ranges, between 2010 and 2017 and are well distributed within the Analysis Area. While the BLM did not specifically survey for barred owls, a study in the Oregon Coast range suggests that over the course of a season, NSO surveys to protocol (> 3 visits) allow approximately 85% of the barred owls present in the area to be detected (Wiens et al., 2011). Additionally, the USFWS's *Protocol for Surveying Proposed Management Activities That May Impact Northern Spotted Owls* (2011 NSO Survey Protocol) allows for a reasonable

assurance that NSOs in an area will be detected, even where barred owls are present. The USFWS and cooperators conducted analyses of historical NSO survey data, leading to estimates of detection rates for NSOs that account for the effects of barred owl presence. These detection rates, along with data on NSO site colonization and extinction probabilities, and empirical analysis of NSO site occupancy, were employed in developing the survey protocol used by the BLM in the Analysis Area.

Use of the 2011 Protocol serves two primary purposes: (1) provide a methodology that results in adequate coverage and assessment of an area for the presence of NSOs, and (2) ensure a high probability of locating resident NSOs and identifying owl territories that may be affected by a proposed management activity, thereby minimizing the potential for unauthorized incidental take (USDI/USFWS, 2011, p. 4).

The intent of Recovery Action 32 is to maintain the older and more structurally complex multi-layered conifer forests on federal lands in order to not further exacerbate the competitive interactions between spotted owls and barred owls (USDI/USFWS, 2011). The 2016 ROD/RMP identified approximately 203 acres of structurally complex forest within LSR land use allocation stands within the project. Management Direction in the 2016 ROD/RMP directs "protection" of structurally complex forests specifically identified in the stand level mapped LSR land use allocation. The land use allocations, management direction, and the guidance in the RMP provide contributions toward Recovery Action 32.

It is also not known if NRF habitat removal or thinning directly results in a range expansion of barred owls (USDI/USFWS, 2013). However, they are already established throughout the analysis area. While barred owls are habitat generalists, they do select for older, more structurally complex forest stands, similar to spotted owls. The proposed action includes the removal and downgrade of spotted owl NRF/RF habitat. However, none of the removal or downgrade is proposed within mapped LSR LUA (i.e., Recovery Action 32 habitat).

3.3.3 Environmental Consequences

Alternative 1 - No Action

Under Alternative 1, no forest management activities would occur. Stands providing suitable NSO habitat (RA32, NRF or RF) would remain owl habitat. Stands providing dispersal habitat would continue to develop into RF habitat. Events such as fire, disease, drought and insect stress, and blowdown may occur and alter or impede stand development. Without forest management actions, simplified stands such as dispersal habitat or plantations would take longer to develop heterogeneity and multiple tree layers, and stands would remain overstocked and at a higher risk of stand-replacement fire and more susceptible to stress from disease, drought, and insects. Simplified stands would remain as dispersal or roosting/foraging habitat longer than if they were

opened up with light to moderate thinning, variable density tree spacing, and allowed to develop lower tree layers or structural variability. Stand-replacing fires would remove habitat until it can recover in approximately 80 years for foraging habitat.

Harvest activities on state and private lands can be expected to impact spotted owls located within adjacent federal lands by removing and fragmenting habitat and through disturbance activities adjacent to occupied sites during sensitive periods. Historically, non-federal landowners practiced even-aged management (clear-cutting) of timber over extensive acreages. Private industrial forestlands are managed for timber production and will typically be harvested between 40 and 60 years of age, in accordance with State Forest Practices Act Standards. The Oregon Forest Practices Act Rules (OAR 629-665-0210) protects spotted owl nest sites (70-acre core areas) for at least three years after the last year of occupation.

Changes to NSO habitat may occur on the landscape in the PA regardless of the Clean Slate Project. Recent and current large-scale private timber harvesting and road building is observable within the PA. The BLM parcels in mixed O&C/private ownership will continue to become more fragmented and isolated with hard edge vegetation boundaries. NSO sites within majority privately managed parcels are at risk of no longer being able to support NSOs as private harvesting removes NR/RF and dispersal habitat. It is expected that any remaining late-seral forests on private timberlands will be converted to early-seral forests. For those species dependent on early-seral habitat, private forest lands are not expected to provide quality early successional habitat as competing vegetation that includes flowering plants, shrubs, and hardwood trees are regularly treated with herbicides to reduce competition with future harvestable trees.

The total number of barred owls in the area is unknown; however, barred owl range completely overlaps that of the NSO. The population of barred owls is likely to continue to increase with negative impacts on spotted owls.

Alternative 2 - Proposed Action

Direct and Indirect Effects

Northern Spotted Owl Habitat

Forest management actions are proposed on 461 acres in harvest land base and riparian reserves. Additionally, road construction and, ground-based landings on the edge or outside of units would remove approximately two acres of owl foraging habitat for multiple landings (approximately ¼ to ½ acre in size) and narrow road construction.

A seasonal restriction would be implemented for projects that could cause a noise disturbance to nesting NSOs (Table 2-3).

Before project implementation, owls would be surveyed as required by protocol where adverse effects from NRF and RF maintain, downgrade or removal would occur, to avoid Incidental Take. If NSOs shift to new areas or new owl sites are located, the project would be modified to avoid negative affects owls, or the BLM would reinitiate consultation with the USFWS.

Logging activity disrupts ground-level shrub and coarse woody debris habitat for NSO prey species; however, the shrub layer in some units are so dense that substantial cover would remain unless burned, would fill back in within approximately 2 - 5 years and current, large coarse woody debris would be left on-site. In habitat removal unit treatments (NRF/RF removal), habitat suitability for NSO use and prey habitat development is not expected until reforestation occurs and depends on the retained relative density and basal area stocking and size and amount of patch removals (gaps) but is likely to be 50 years to regain moderate levels of canopy cover (45%). At that time commercial harvest may occur again. Therefore closed canopy conditions (>60%) within the harvest land base are not expected to be regained in the forseeable future. The impacted prey species less dependent on overstory and mid-story canopy cover such as deer mice, woodrats, rabbits and some voles would rebound within 1 to 2 years and may increase rapidly in response to increased shrub and forb growth as result of increased sunlight. Other favored prey species such as red tree voles or flying squirrels that favor closed canopy forest and multilayer stands, would decrease, and may not regain former prey densities in the long term, as canopy cover in approximately 50 years may still be well below 60% and not provide sufficient structural cover or crown connectivity for suitability. In light to moderately thinned areas (NRF/RF Maintain) where 60% or more canopy cover is retained (Table 3-8), and some mid-story or understory layering is retained, prey levels may be slightly reduced, but canopy cover and crowns are expected development to return higher levels (70-80%) within approximately 10-20 years to near pre-treatment levels if no other management actions occur. However, only approximately 2 acres in the proposed action occur in this category.

Ground-based yarding landings, helicopter landings and ROW construction outside of treatment units are analyzed as habitat removal areas and are not expected to be reforested by planting but may reseed naturally. Skyline cable yarding, and activity fuels treatments would work in conjunction with the commercial prescriptions described below and would not increase the effects to owl habitat described below.

Approximately 2 acres of IVM treatment proposed in the in UTA Harvest Land Base would maintain NSO NRF habitat function by:

- Canopy cover would retain at least 60% and stand structure including tree species and diameters, canopy layering, and coarse wood quantities within the area post-treatment

would resemble pretreatment structure, with slight reductions in canopy, layering, and basal area as result of thinning or removal from corridors or landings.

- Decadent woody material, such as large snags and coarse woody debris, would remain post-treatment;
- Multiple canopy, uneven-aged tree structure if present prior to treatment would remain post-treatment; and
- Heterogeneity in tree structure and species diversity and forest health would be retained

Approximately 275 acres of IVM treatment proposed in the in UTA Harvest Land Base and 3 acres from ROW and landing construction would remove NSO Dispersal habitat function by:

- Canopy cover within treated stands functioning as roosting/foraging habitat would be below and 40% post-treatment and likely too open and exposed for safe foraging and dispersing, however, some beneficial habitat elements would be retained:
  - Decadent woody material, such as large snags and coarse woody debris, would remain post-treatment;
  - Multiple canopy, uneven-aged tree structure if present prior to treatment would remain post-treatment; and
  - Heterogeneity in tree structure and species diversity would be retained if present prior to treatment

Approximately 6 acres of IVM treatment proposed in the in UTA Harvest Land Base would maintain NSO Dispersal habitat function by:

- Canopy cover within treated stands functioning as roosting/foraging habitat would remain at 40% post-treatment and beneficial habitat elements would be retained:
  - Decadent woody material, such as large snags and coarse woody debris, would remain post-treatment;
  - Multiple canopy, uneven-aged tree structure if present prior to treatment would remain post-treatment; and
  - Heterogeneity in tree structure and species diversity if present prior to treatment would be retained.

Approximately 175 acres (60 NRF acres and 115 RF acres) of IVM treatment proposed in the in UTA Harvest Land Base would remove NRF habitat, and approximately 1 acre of RF habitat would be removed for construction for ground-based landings construction:

- Canopy cover within treated stands functioning as nesting habitat or roosting/foraging habitat would be reduced below 40% post-treatment and likely too open and exposed for safe foraging and dispersing; however, some beneficial habitat elements would be retained:

- Decadent woody material, such as large snags and coarse woody debris, would remain post-treatment;
- Multiple canopy, uneven-aged tree structure if present prior to treatment would remain post-treatment; and
- Heterogeneity in tree structure and spacing and species diversity would be retained if present prior to treatment.

Approximately 3 acres of IVM treatment proposed in the in UTA Harvest Land Base would maintain NSO NRF habitat function by skipping a patch of NRF habitat.

Table 3-6: Alternative 2: Proposed Projects and the Potential Impact to NSO Habitat

Treatments Within Proposed Project Units			
Treatment Effect	**Acres**	**Proposed Project**	**Additional Acres**
NRF Removed	60	IVM UTA	
RF Removed	115	IVM UTA	
RF Removed		Log Landings	0.5
NRF Maintained	2	IVM HLB UTA	
Dispersal Removed	275	IVM HLB UTA	
Dispersal Removed		Log Landings	0.5
Dispersal Removed		Temp Route Construction	0.5
Dispersal Maintained	6	IVM HLB UTA	
No Effect		Helicopter Landings	3
No Effect		Temp Route Construction	0.25
No Effect	3	IVM NRF skip area	
Total	**461**		**4.75**

Harvest Land Base - Uneven-Aged Timber Area (UTA)
(Integrated Vegetation Management) (314 acres) (See also Section 3.2 for detailed prescriptions): Overall stand average canopy cover post-harvest would be retained based on conservation measures identified for the stand and would be approximately 30% with a combination of skips, gaps, and intensive adjacent thinning. In forest stands $\geq$ 10 acres, at least 10% of the treatment unit would be retained in untreated “skips” to provide structural complexity and refugia, a total of 30% of the stand may consist of openings up to 4 acres each, and the stand average relative density would be between 20% and 45% after harvest, with prescriptions intended for the lower end of the spectrum. However, unit variability is expected with higher retention where a greater number of large conifers >36” DBH and hardwoods >24” DBH occur, and lower retention where fewer large conifers and hardwoods occur. Prescriptions would result in removing NSO habitat, except for 2 acres of NRF habitat in unit 3-11 where at least 60% canopy cover and habitat function would be retained.

Following proposed harvest, the amount current amount of 4,242 acres of NRF/RF habitat would decrease by 175 acres (4% of the NRF/RF habitat in the analysis area) and reduce the proportion of NRF/RF in the analysis area to 35%. Dispersal functioning habitat (6,624 acres of NRF/RF+ Dispersal-only habitat) would be reduced by 475 acres and reduce the proportion of dispersal functioning habitat in the analysis area from 57 to 53%.), (Table 3-7). NSOs can still use the remaining NRF, roosting/foraging, and dispersal habitat for dispersing through the landscape. NSOs can disperse across a fragmented mosaic of non-forested areas and a variety of forest age classes (Forsman et al., 2002).

Riparian Zone Thinning

Commercial thinning (approximately 94 acres) would occur within the middle and outer riparian zone, and no treatment is proposed within the 48 acres occurring in the inner zone. Canopy cover in the treated RR would remain above approximately 30 percent with 60 trees per acre on average retained. Not all middle and outer zones will be thinned, as some riparian areas extend beyond unit boundaries, leaving untreated areas on one side of the creek, and some areas have sufficient forest structure and would be skipped. Proposed treatments are designed to help accelerate the development of multiple canopy layers, increased species diversity, and increased conifer and hardwood vigor. No treatments are proposed in riparian stands that have multiple canopy layers and elevated levels of species diversity or in wetlands, unstable soil areas, springs, or seeps. Treatment areas function as RF or Dispersal habitat and are considered as part of the proposed unit treatments resulting in Removal or Downgrade of RF or Dispersal habitat within the units. Stands that exhibit conditions such as overstocking, minimal canopy layers, low species diversity, or low conifer and hardwood vigor were selected for potential treatment.

Timber Hauling

Timber hauling and road/route renovation, reconstruction, new construction would have no effect on NSO NRF/RF habitat because those locations are not currently functioning as NRF/RF habitat. Seasonal restrictions would be applied, where appropriate, to avoid disturbance to nesting owls (Table 2-3). Approximately 0.5 acres of dispersal habitat would be removed for temporary road construction. About 57% of the analysis area currently functions as dispersal habitat, and narrow construction would not impede NSO dispersal.

Table 3-7: Percentage Northern Spotted Owl Habitat Types Pre-& Post Treatment in the Analysis Area

Habitat Type	NRF/RF	Dispersal-only	Dispersal +NRF/RF	Capable	Non-Habitat
Analysis Area (Current)	36%	20%	57%	42%	2%
Analysis Area (Post-Treatment)	35%	18%	53%	46%	2%

Timber harvest proposed in Alternative 2 would have short-term adverse impacts to NSO habitat because NRF and roosting/foraging habitat would be removed, reducing habitat available within the analysis area for NSO nesting, foraging, and dispersal. Although NSO surveys have confirmed occupancy at only one site, re-occupancy at other sites could occur in the future, and the reduced habitat levels at sites already below habitat thresholds, would likely negatively affect the sustainability of the site and occupation or reproduction fitness of resident owls. In addition, 1 acre of roosting/foraging habitat, and 1 acre of dispersal habitat would be removed for landings and temporary road construction outside of timber harvest units. The landings and temporary routes would be decommissioned following harvest and allowed reforest naturally but are not expected to become reforested and may be used in the future for forest management activities.

Northern Spotted Owl Prey Species

In Southwest Oregon, woodrats and flying squirrels are the primary sources of food for NSOs. Sakai and Noon (1993) found the highest number of dusky-footed woodrats in sapling and brushy pole timber (20 to 30 years old). Although these young stands are not typically used for foraging by NSOs, these areas are a good source of woodrats dispersing into older stands that are more frequented by and accessible to foraging NSOs that hunt along the edges where the old forest meets young. Flying squirrels prefer multi-layered, structured stands, preferably with tree crowns that extend down most of the bole of the trees. However, a consistent mid-layer can make up for crowns that do not extend that far down.

Stands with such structure provide cover from predation. Flying squirrels nest predominantly in cavities of live trees but will also nest in stick nests near the bole of a tree. Woodrats and flying squirrels rely on a shrub layer near the forest floor for cover and foraging.

Proposed treatments on approximately 60 acres of NRF habitat are stands that currently have well established middle and top layer structures. Some units have ground and understory cover. These stands may have populations of flying squirrels, red tree voles, and woodrats because of the increased structure such as cavities, platforms, and layered vegetation providing cover from predators. These stands would be heavily thinned with canopy cover approximately 30% with a clumped skips and gaps and thinned prescription, with open harvest areas ranging from 1- 4 acres on 30% of the stand, and untreated skip areas on 10% of the stand, but are not expected to be suitable to maintain stable populations of flying squirrels or red tree voles, or may have reduced density levels, and may not function as secure foraging habitat for spotted owls due to lower canopy cover levels. Woodrats and other small mammal prey may continue to occupy these stands and benefit from early successional plant growth and reforestation. However, spotted owls forage on the edges of openings and may prey on small mammals benefitting from the disturbance. Moderately closed canopy conditions (45%) on the unit average may take 50 years to regain NSO dispersal habitat suitability, and depends on other factors such as fire,

drought stress, bug kill, blowdown and future forest management prescriptions that alter stand development. Stand heterogeny would be increased, with more diversity in tree heights, diameters, and species composition.

Proposed treatments on approximately 115 acres are within stands that currently lack a consistent middle and understory tree layer and trees with old-growth characteristics, but provide some ground cover from coarse wood, shrubs and other vegetative plant to provide habitat for small rodents, and canopy cover and connectivity for some arboreal rodents such as red tree voles or flying squirrels, but less than NRF habitat. These stands would also be heavily thinned with canopy cover approximately 30%, with clumped skips and gaps and adjacent heavy thinning, and with open harvest areas ranging from 1- 4 acres on 30% of the stand, and untreated skip areas on 10% of the stand. These stands are not expected to be suitable to maintain stable populations of flying squirrels or red tree voles, or may have reduced density levels, and may not function as secure foraging habitat for spotted owls due to lower canopy cover levels. Woodrats and other small mammal prey may continue to occupy these stands and benefit from early successional plant growth and reforestation. However, spotted owls forage on the edges of openings and may prey on small mammals benefitting from the disturbance. Moderately closed canopy conditions (45%) may take 50 years to regain NSO dispersal habitat suitability, and depends on other factors such as fire, drought stress, bug kill, and future forest management prescriptions that alter stand development. Stand heterogeny would be increased, with more diversity in tree heights, diameters, and species composition.

In the southern portion of the NSO range, where woodrats are a major component of their diet, northern spotted owls are more likely to use a variety of stands, including younger stands, brushy openings in older stands, and edges between forest types in response to higher prey density in some of these areas (Forsman et al., 1984, pp. 24-29). The harvested NRF/RF stands, therefore, may still be a source of woodrat habitat and prey source for NSOs.

For prey species such as red tree voles, flying squirrels and woodrats that use late-successional habitat, are also found in younger stands and other habitat types. Approximately 175 acres of late-successional habitat (approximately 80 years old and older) that is not structurally complex (RA32) habitat, would be removed within the analysis area and reduce habitat from about 36% to 35% of the analysis area. Reserves habitat (7,130 acres or 60%) within the NSO analysis area is Reserves (RR, DDR, LSR) set aside in the 2016 ROD/RMP from intensive timber harvest, which also provide or contribute to habitat and long-term persistence for these species.

Effects to NSO by Provincial Home Range

The 6 effected NSO home ranges within the Analysis Area overlap one another with core areas being more distinct. Treatments that would downgrade or remove existing NRF and roosting/foraging habitat occur within low priority unoccupied owl sites and occur almost

exclusively outside of core areas. Habitat functioning as owl habitat would be removed and reduce future landscape habitat availability for spotted owls.

Within provincial home ranges that have had occupied status in the last 5 years, no forest treatments are proposed within the core area. No treatments are proposed within nest patches or core areas of NSO sites with activity centers (core areas) on BLM. Approximately 37 acres of dispersal habitat and four acres of foraging habitat would be harvested on the outer edge of the home range of one occupied owl site for ecological restoration. (Table 3-17). The removal of foraging habitat would adversely affect the owl site by reducing for foraging habitat levels in the home range which are already below the 40% habitat level considered adequate for NSO fitness. However, this site is analyzed as having 2 overlapping core areas and home ranges, providing more habitat than a singular core and home range, lessening the negative effects by effectively increasing available habitat within the extended territory. See Table 3-8 for a breakdown of treatments and effects within owl home ranges.

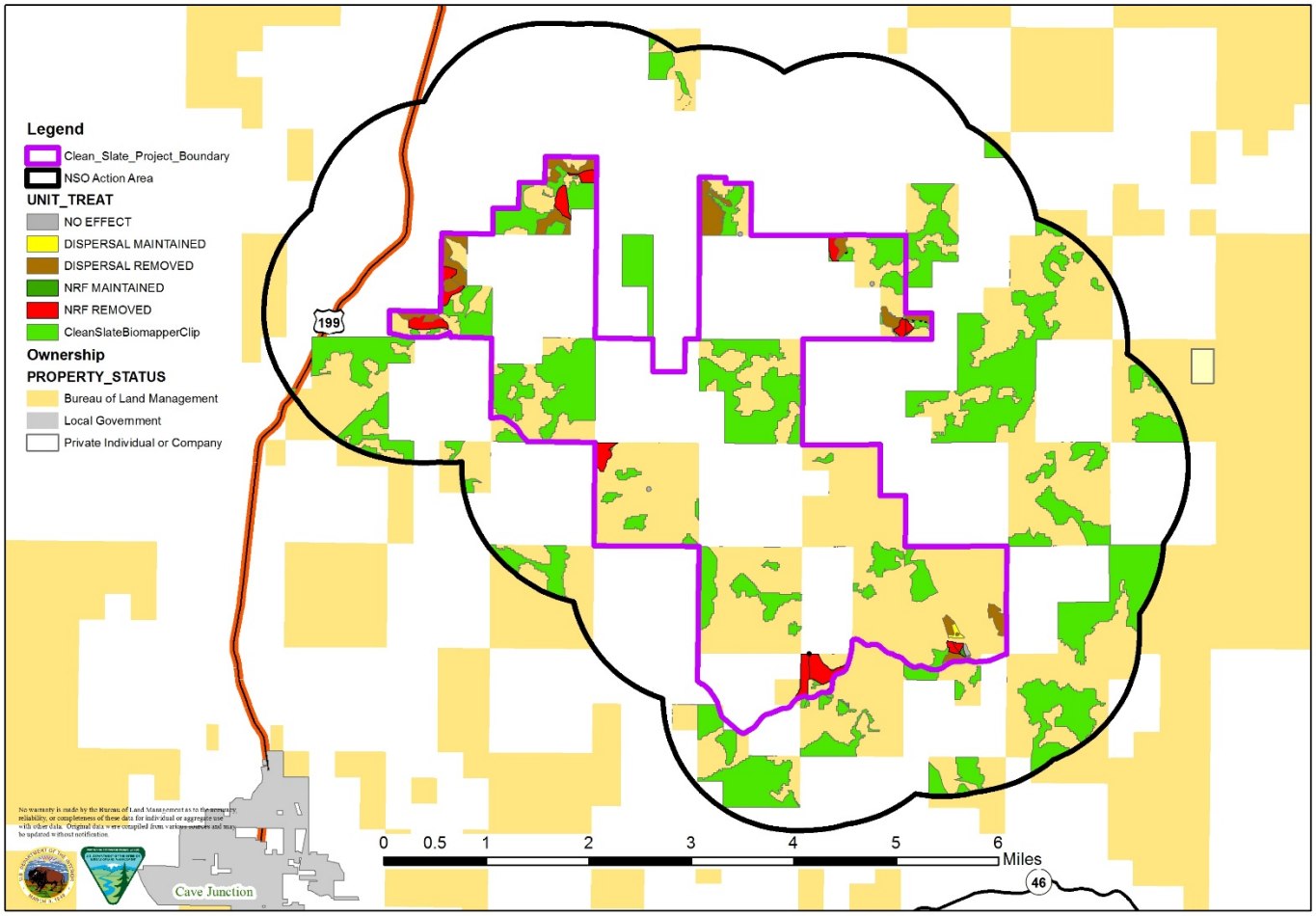
Table 3-8: Alternative 2 Anticipated Impacts within 1.3-mile radius Owl Home Ranges

Current Habitat	Treatment Effect	Unoccupied NSO Sites Only		Occupied NSO Sites Only	
		Treatments	Est. Acres*	Treatments	Est. Acres*
NRF	NRF Maintain	UTA IVM Commercial treatment		UTA IVM Commercial treatment	2
NRF	NRF Remove	UTA IVM Commercial treatment			
RF	RF Remove	UTA IVM Commercial treatment- Landings-	25 1	UTA IVM Commercial treatment	4
Dispersal	Dispersal Maintain	UTA IVM Commercial treatment		UTA IVM Commercial treatment	6
Dispersal	Dispersal Remove	UTA IVM Commercial treatment- Landings -	104 1	UTA IVM Commercial treatment	37
Capable	No Effect	Helicopter Landings	3		
Total		**134**		**49**	

*Numbers do not duplicate acres where home-range overlap occurs, or acres outside of owl home ranges

Within the Analysis Area, late-successional forest, RA 32 habitat, and other northern spotted owl habitat would remain post-harvest, allowing opportunities for future dispersal, foraging, and nesting (see Figure 3-6).

Figure 3-6: Proposed Units and NRF/RF Habitat in the Action Area



Cumulative Effects

Cumulative effects are 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. Technical issues that complicate the analysis of cumulative effects include the large spatial and temporal scales involved, the wide variety of processes and interactions that influence

cumulative effects, and the lengthy lag-times that often separate a land-use activity and the landscape's response to that activity.

Wildfires, fire suppression, road building, windstorms, and timber harvest throughout the Analysis Area have resulted in habitat modification and fragmentation and have changed the distribution and abundance of wildlife species surrounding the Analysis Area. The associated habitat loss has negatively affected late-successional forest habitat dependent species by reducing stand seral stage and changing habitat structure. Species associated with younger forested conditions, however, have benefited from these changes due to the increased acres of young stands. The change in habitat was included in the basin-wide update of the baseline situation and was used to calculate the current habitat condition within the Analysis Area.

Private lands surrounding the Analysis Area are made up of early-, mid-, and late-seral forests, agricultural, and shrub/oak lands. Most private forestlands are managed as tree farms for the production of wood fiber on forest rotations. It is expected that any remaining late-seral forests on private timberlands will be converted to early-seral forest over the next one or two decades. For those species dependent on early-seral habitat, private forestlands 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.

Ongoing and foreseeable management actions that are occurring on NSO habitat in the Clean Slate spotted owl Analysis Area include:

Pickett West Fuels: 994 acres of Fuels Maintenance Treatments in previously treated fuels units will ensure investments into the landscape are beneficial over time. Fuels treatments would not simplify stands or change NSO habitat function. No downgrade or removal of NSO habitat would occur. Seasonal and distance restrictions avoid potential disturbance to nesting owls from noise or activity fuels burning.

Young Stand Management Treatments – (2017-2022 Categorical Exclusion): 679 acres of pre-commercial thinning and/or brushing and 38 acres of pruning sugar pine to reduce the risk of blister rust, would maintain dispersal habitat in its current function. No adverse effect to dispersal or RF habitat is expected, and increased health, stand growth and development into RF/ NRF is expected. Seasonal and distance restrictions avoid potential disturbance to nesting owls from noise or activity fuels burning.

Young Stand Management Treatments and Hand Piling and Burning analyzed by the District Integrated Vegetation Management EA: 232 acres Selective slashing (16x16 spacing) of material less than 8 inches DBH followed by brushing and hand pilling and burning of the cut material are expected to increase the vigor and growth of the retained trees in young stands, and

would not downgrade or remove NSO habitat or change habitat function. Hand piling and burning the activity slash is expected to decrease surface fuels.

Josephine County Forestry: Clear-cut of 73 acres removes most to all of the vegetation within an area. It would remove dispersal and foraging habitat on county land.

The current baseline includes updates to habitat from all past activities. These actions have determined the existing current habitat condition for the Affected Environment within the NSO Analysis Area. Specific to NSOs, ongoing and foreseeable management actions coupled with other past and present and future management activities ongoing within the Analysis Area would not preclude the NSO from dispersing, foraging, or nesting within the Analysis Area. Nor would these projects increase adverse effects to occupied owl sites and the overall amount of suitable habitat found within the Analysis Area (Table 3-9).

Table 3-9: Northern Spotted Owl Habitat Pre- and Post-Treatment and Cumulative Effects

Habitat Type	NRF/RF	Dispersal-only	Dispersal+NRF/RF	Capable	Non-Habitat
Analysis Area (Current)	36%	20%	57%	42%	2%
Analysis Area (Post-Treatment)	35%	18%	53%	46%	2%
Analysis Area Post-Treatment with Cumulative Effects	35%	18%	53%	46%	2%

Some private lands within the Analysis Area may be subject to intensive timber harvest, but the timing and magnitude of such harvest are unknown. Even when considering potential treatments on private lands, up to 4,067 acres of NRF/RF habitat (35% of analysis area) and 6,149 acres of NRF/RF and dispersal habitat (53% of analysis area) within the Analysis Area would remain functional and provide adequate habitat for NSOs to nest, roost and forage, disperse, and reproduce within the Analysis Area.

Barred Owls

BO effects on NSO survival and colonization appear to be substantial and additive to effects of reduction and fragmentation of habitat in NSO home ranges. The magnitude of the BO effect may increase somewhat as habitat quantity decreases and fragmentation increases (Dugger et al. 2011). Available evidence suggests that the presence and distribution of barred owls may affect habitat quality for spotted owls (Wiens, 2012; Yackulic et al., 2013). Additionally, many studies suggest that the two species compete for resources and that maintaining older, high-quality forest habitat may help NSOs persist, at least in the short-term. There are no known forest conditions that give NSOs a competitive advantage over barred owls. While not common, Wiens (2012) did find spotted owls and barred owls occupying the same territories concurrently.

The intent of RA 32, included in the LSR within Clean Slate is to maintain the older and more structurally complex multi-layered conifer forests on federal lands for spotted owls, and also in order to not further exacerbate the competitive interactions between NSOs and barred owls. Approximately 203 acres of RA32 habitat within the LSR was identified through 2016 RMP planning. Riparian reserves also contribute to the development of late-successional habitat. Within the NSO analysis area, 60%, or 7,130 acres, is Reserve land allocations contribute development and retention of late-successional habitat. Approximately only 175 acres of NRF/RF habitat on harvest land base would be removed or degraded, which does not occur in any of the six analyzed NSO core areas. Spotted owl surveys have found NSO occupancy in only one site which has no proposed treatment in or near the core area, and minimal ecological restoration treatment (4 acres) at the edge of the home range of the occupied owl site. Activities that reduce the number of older forests adjacent to NSO activity centers reduce the probability of continued occupancy, survival, and reproduction (Franklin et al., 2000; Olson et al., 2004; Dugger et al., 2005). Some NSOs appear able to successfully defend territories and reproduce when BOs are present (Wiens et al., 2014), but the mechanism that allows them to persist is currently unknown. No NRF habitat in or near the activity center (core) is proposed in this project.

BLM surveyed the project using the current USFWS protocol which includes increased surveys to locate spotted owls due to barred owl presence but does not conduct barred owl surveys. Some competitive interactions are still anticipated to occur since barred owls have been already observed in five owl sites in the Analysis Area and in areas outside of historical NSO sites. Barred owl effects on NSO survival and colonization appear to be substantial and additive to effects of reduction and fragmentation of habitat in NSO home ranges. The magnitude of the BO effect may increase somewhat as habitat quantity decreases and fragmentation increases (Dugger et al., 2011). Even though barred owls are rapidly expanding their range in North America and within the range of the NSO and contributing to the decline of the NSO, disturbance from timber harvest is often offered as an explanation for the cause. However, Courtney et al. (2004) concluded that habitat loss to timber harvest is often postulated to be a major factor in spotted owl decline, but habitat is still present in the study areas, and that some areas where spotted owls are in the worst decline, such as Olympic National Park, have never been harvested. The population of barred owls is likely to continue to increase with negative impacts on spotted owls.

At the local scale, the project is expected to adversely affect spotted owls within the action areas due to combined effects of the removal of approximately 175 acres of NRF/RF habitat (4% of NRF/RF) in the analysis area which provides landscape availability of NSO habitat and prey and could support NSOs. These potential cumulative impacts to the spotted owls from completion for prey and territorial behavior from the influence of barred owls which have already been detected in 5 of the 6 analyzed owl sites and other areas outside of owl sites in the analysis area, is

expected to adverse effects on spotted owl fitness or the ability of historical sites to support spotted owls, and may reduce the potential for reoccupation of sites currently unoccupied. The cumulative effects of habitat removal and barred owl presence and competition at owl sites, which are below habitat thresholds at either core or home ranges (all owl sites) where habitat removal is proposed, further reduces the likelihood of site reoccupancy.

Alternative 3

Direct and Indirect Effects

Northern Spotted Owl Habitat
Alternative 3 proposes to treat the same quantity of acres and distribution and function of NSO habitat. The Alternative differs in the type of structural retention of tree sizes, spacing, and vertical (height) layering. This alternative would retain a much greater proportion of large trees and canopy cover compared to a more proportional removal across most tree diameters in Alternative 2. In alternative 3, the two-step thinning alternative consists of the following:

- Retain larger trees, compared to all dominant Douglas-fir and pine trees that are both greater than or equal to 36 inches in Alternative 2
- Retain all madrone, maple, and oak trees $\geq$ 24 inches diameter (both Alternatives)
- 20% untreated skips compared to 10% untreated skips in Alternative 2
- 5% of each stand in created openings (1/8-1/2 acre), compared to up to 30% in openings of up to 4 acres in Alternative 2
- Relative Density of 45% with canopy maintained at 40-60%, compared to Relative Density of 25% and canopy cover approximately 30% in Alternative 2.

Retaining proportionally more large trees, less and smaller openings, and more untreated skip areas, would on the unit average, retain higher canopy cover post-treatment than Alternative 2, but overall would still result in simplifying stand structures and the removal of NRF/RF habitat, but retain function as dispersal habitat with canopy cover closer to 40%. The increased untreated skip areas may provide more small refuge areas for prey and benefit predators such as owls and fisher but may not to be large enough to have sustainable prey populations with little interior habitat away from edges. The canopy cover growth, mostly from the retained larger trees, would be slow due to closer spacing and higher relative densities, and slower growth of older trees, and canopy cover may reach 45-55% in 50 years. Cover in stands would vary, with the density of large trees in each unit proportional to retained canopy. The treated stands would be more open underneath with removal of understory, midstory, and subdominant trees from the first thinning that comprise vertical layering, which would be removed in favor of retaining more large trees. Small openings (1/8 to 1/2 acre) would no likely be replanted, and may not establish well, as openings less than 1 acre may be well shaded from adjacent tall trees and not receive enough

direct sunlight for maximum growth. These small openings would not likely be replanted and brushed, and most likely would be left to reseed naturally, and compete with brush species.

Comparatively, Alternative 2 would have less relative density, basal area, and less canopy cover post-treatment, but retain more proportional tree diameter classes, and layering and conifer diversity with retention of smaller diameter trees. The low canopy cover retention results in the removal of NRF/RF habitat, as well as dispersal function, with stand canopy averages near 30%. Canopy cover growth and recovery rate are expected to exceed that of Alternative 3, with greater growing space available (vertically and horizontally), and in 50 years, may obtain approximately 45% cover and dispersal habitat function. Larger openings (up to 4 acres) would be replanted and brushed and maintained, and contribute to re-stocking the harvest land base, and in approximately 40-50 years, these openings may function as dispersal habitat, and be able to be thinned to increase future development of habitat. The larger openings in alternative 2 may provide a source of prey growth. In Southwest Oregon, woodrats are one of the primary sources of food for NSOs. Sakai and Noon (1993) found the highest number of dusky-footed woodrats in sapling and brushy pole timber (20 to 30 years old). Although these young stands are seldom used for nesting or foraging by NSOs, these areas are a good source of woodrats dispersing into older stands that may be used by dispersing or foraging NSOs that hunt along the edges where the old forest meets young.

In both Alternatives, the treatment is expected to result in the immediate removal, and long-term loss of NRF/RF habitat, and recruitment of dispersal habitat in approximately 40 to 50 years. NRF/RF habitat is a key factor in the occupation and survival of spotted owls, and in providing landscape habitat to address competitive interactions with the barred owl. Alternative 3 would retain more function as dispersal habitat. The current environmental conditions for dispersal functioning habitat within the NSO analysis area are at 57% (Table 3-9). Alternative 3 would retain higher levels of dispersal functioning habitat to approximately 57%, while Alternative 2 would reduce levels to 53%. No take is authorized by FWS for this project, and Alternative 3 would not reduce the amount of take, and adverse effects from NRF/RF habitat removal from reducing relative densities to approximately 45% in the majority of unit treatment area is functionally similar to alternative 2 in that it removes the long-term nesting, roosting, and foraging function of the stands. Only one occupied owl site under Alternative 2 is negatively affected by NRF/RF habitat removal at the home range, and Alternative 3 would also negatively affect the site by downgrading NRF/RF habitat to dispersal habitat. NSOs can disperse across a fragmented mosaic of non-forested areas and a variety of forest age classes (Forsman et al., 2002), therefore NSO dispersal habitat in the project area is expected to adequately provide for dispersal in both Alternatives.

If other factors, such as drought, bug kill, blowdown, or fire, do not alter future conditions, and no further harvest occurs, Alternative 2 would retain a more structurally diverse stand elements

and recruitment for all tree species, and Alternative 3 would retain more old-growth-like trees, with a simpler stand structure and less recruitment of smaller and variable diameters for all conifer species.

Cumulative Effects

The intent of RA 32, included in the LSR LUA within Clean Slate is to maintain the older and more structurally complex multi-layered conifer forests on federal lands for spotted owls, and also to not further exacerbate the competitive interactions between NSOs and barred owls. Riparian reserves also contribute to the development of late-successional habitat. Within the NSO analysis area, 7,130 acres (60%) is Reserve land allocation. The proposed action is not treating LSR habitat and within the Analysis Area, and approximately only 100 acres of RR treatment (10% of RRs) avoids structurally complex habitat. Approximately only 1% of NRF/RF habitat would be downgraded to dispersal habitat at approximately 40% (compared to removal of NRF/RF in Alternative 2) on the harvest land base throughout the analysis area. Spotted owl surveys have found NSO occupancy in only one site which has no proposed treatment in or near the core area. With canopy covers generally retaining 40% in Alternative 3, habitat structure is simplified with most understory and mid-story conifers removed, and therefore, no expected to function suitably for arboreal mammals such as flying squirrels and red tree voles. Habitat removal from past harvesting activities and natural disturbances have reduced habitat levels within the effected owl sites to below threshold levels which are expected to support spotted owl occupation and reproduction fitness.

Cumulative effects to inter-species competition with the barred owl would be expected to occur at the local scale from prey habitat removal and degradation but is not expected to have substantial adverse effects on spotted owl fitness due low NSO occupation in the analysis area (one out of six surveyed sites) and very limited NRF/RF habitat removal (1%) which occurs outside of core areas. The BLM surveyed the project using the current USFWS protocol which includes increased surveys to locate spotted owls due to barred owl presence. Some competitive interactions are still anticipated to occur since barred owls have been observed in the Analysis Area and reduced foraging habitat may increase completion for prey if vacant owl sites become re-occupied.

3.4 Fisher and Fisher Habitat

Issue 4: How would proposed timber harvest and associated tree removal areas affect denning, resting, and foraging within stands used by fisher?

This Section analyzes the potential impacts from the proposed forest management activities on fisher and habitat.

The U.S. Fish and Wildlife Service determined in April 2016 that the West Coast Distinct Population Segment (DPS) of fisher does not face the risk of extinction now or in the foreseeable future and therefore does not require the protection of the Endangered Species Act (ESA). The Service made its finding after thoroughly evaluating the best available scientific information (Federal Register, 2016).

The fisher is a federally listed Sensitive species for the BLM (USDI/BLM, 2015). Fishers are opportunistic predators that hunt exclusively in forested habitats where prey is abundant and vulnerable to capture. Their diverse diet mostly small and medium-sized mammals, but includes birds, porcupines, snowshoe hare, squirrels, rats, mice, voles. Fishers are associated with forests having moderate to dense forest canopy and complex structure (for example, large amounts of coarse down wood, moderate shrub cover, dead trees and trees with decay elements, and a component of hardwood trees). The physical structure of this type of forest provides the fisher with reduced vulnerability to predation and an abundance of prey. The occurrence of fishers at regional scales is consistently associated with low- to mid-elevation environments of coniferous and mixed conifer and hardwood forests with abundant physical structure. The key aspects and structural components of fisher habitat are best represented in areas that are comprised of forests with diverse successional stages containing a high proportion of mid- and late-successional characteristics. Throughout their range, fishers are obligate users of tree or snag cavities or down logs for dens where they give birth. Fishers select resting sites with characteristics of late-successional forests: large diameter trees, coarse downed wood, and singular features of large snags, tree cavities, or deformed trees or down logs. Fishers also 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 adequate distribution of the key habitat and structural components important to fishers. 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 fulfilling life history requirements. Heavily managed forested landscapes that may contain few stands of mature or late-successional forest, with a mosaic of seral stages with significant older residual components in harvested stands or patches of dense-canopy and dead wood habitat elements, most likely provide the structural complexity required by fishers (USDI/USFWS, 2016).

3.4.1 Methodology and Assumptions

The analysis area used for assessing impacts to fisher is the same analysis area used for northern spotted owls (NSO) (Section 3.3.3). Habitat surveys for spotted owl habitat provide a general assessment of the structural habitat elements and complexity of proposed units. Spotted owls use many of the same habitat elements and forest conditions as fishers (USDI/USFWS, 2016). The analysis area includes all proposed action units and BLM ownership within 1.3 miles of units.

Home range size for fisher is quite variable and depends on many factors, such as latitude, prey availability, habitat type, habitat configuration and availability, and topography.

3.4.2 Affected Environment

There are no published studies with fisher territory sizes in the Klamath Mountains area of southwest Oregon. Lofroth et al. (2010) estimate female home ranges west of the Rocky Mountains to be 7.3 mi^2 (4,600 acres). Home ranges do overlap with other fisher which are territorial, but the overlap is less within the same sex. Core use areas are substantially smaller in the spring. Sweitzer (2015) found in that female core areas in the southern Sierra Nevada were approximately 1/3 of the home range size.

The 11,704-acre habitat analysis area could contain approximately 3 fisher home ranges and yields a reasonable representation of effects to the species. The NSO nesting/roosting/foraging (NRF/RF) habitat-type described in the NSO Affected Environment (Section 3.3.2) adequately describes suitable fisher denning and resting habitat because there is a direct correlation of key habitat features used to assess NSO habitat and fisher habitat (high canopy cover, multi-storied stands, large snags, and large down coarse woody debris on the forest floor, tree and snag cavities, tree, and platforms for nesting or denning or resting).

Currently, there are two populations of fisher in Oregon that appear to be genetically isolated from each other: a small population in the Southern Cascades near Prospect and Butte Falls, and a second population in southwestern Oregon in the Klamath Siskiyou Mountains (Lofroth et al., 2010; Aubrey et al., 2004). The fisher analysis area is in the Klamath Siskiyou Mountains area.

Based on the NSO habitat analysis, approximately 4,424 acres (36%) is suitable fisher denning and resting habitat on federal lands within the analysis area. Selected BLM sections were surveyed for fisher within the area in 2012 and 2017 by BLM wildlife technicians, to gain a better understanding of fisher occurrence, and were not intended for project clearance or watershed inventory. Fishers were detected by BLM surveys in both 2012 and 2017 within the proposed action, and incidental observations by BLM occurred in 2009 and 2016 in the planning area. Surveys are designed to determine presence or absence within a sample area, but are not designed to locate den or rest sites. No den sites are documented in the analysis area.

3.4.3 Environmental Consequences

Alternative 1 - No Action

Under Alternative 1, no forest management activities would occur under this proposed action. Stands providing suitable fisher habitat would remain as mature and late-successional forest. Younger mid-seral or older stands with little diversity in tree species, diameters, and ages, or not

yet in closed-canopy structure would continue to develop into late-successional habitat. Events such as fire, disease, drought and insect stress, and blowdown may occur and alter or impede stand development. Without forest management actions, simplified stands such as dispersal habitat or plantations would take longer to develop heterogeneity and multiple tree layers, and stands would remain overstocked and at a higher risk of stand-replacement fire and more susceptible to stress from disease, drought, and insects. Stands without heterogeneity would remain would likely remain in this condition longer than if they were opened up with light to moderate thinning, variable density tree spacing, and allowed to develop lower tree layers or structural variability. Stand-replacing fires if occurred, would remove habitat until it can recover in approximately 40-80 years for closed-canopy conditions. Conifer and mixed conifer stand with hardwoods would lose hardwood components that provide key denning and resting structure, as conifers outcompete and shade out the hardwoods.

Intensive clear-cut harvesting is likely to occur in mixed BLM/private landscape, removing and fragmenting late-successional habitat and closed-canopy forest, creating large open areas avoided by fisher.

Alternatives 2&3

Direct and Indirect Effects

As described more fully under the NSO analysis, the management activities proposed under Alternatives 2 and 3 would remove or degrade the amount of suitable fisher habitat, which also provides suitable NSO NRF habitat in the analysis area, by 175 acres (4%) from 4,242 acres to 4,067 acres (Table 3-9) and the percentage of the area in suitable habitat from 36% to 35%. Approximately 277 acres of younger or less structurally diverse stands (analyzed as NSO dispersal habitat) may also provide some foraging habitat, and to a lesser extent, some opportunities for resting or den sites. No direct impacts to fishers are easily quantifiable because pre-project clearance surveys and locating den sites are not logistically feasible due to the extent of trapping and tracking required, and fishers are very mobile. Project design features (Chapter 2, Table 2-3 PDFs) with seasonal restrictions for suitable denning stands reduces direct effects to natal denning activities to the extent denning, or resting is predictable in late-successional stands or stands with denning structure. Project design features also retain key structural elements forward into the stands continued development. Habitat removal would occur through reduced stand tree densities from current levels down to 25-45% relative densities, and removal of most or all trees in gaps (openings) from 4 acres down to ¼ acre in size (in Alternatives 2 and 3, respectively). This would remove canopy cover levels down to at least 30% in alternative 2 and 40% in alternative 3, and below the closed canopy conditions used most by fisher. Habitat would be removed, and negatively affect potentially up to 3 fisher sites based on the estimated home range size of 4,600 acres and analysis area of 11,704 acres where past harvest has removed most late-successional habitat and reduced the contiguous nature to smaller blocks. Temporary

losses of habitat from harvesting may impede dispersal and increasing fragmentation of the resident fisher. The reduction of canopy cover, removal or degradation of conditions around denning and resting structures, or loss of prey habitat, may cause fishers to move to other locations and may reduce fisher occupation and viability. Some prey densities such as ground squirrels, chipmunks, rabbits, and voles, may benefit from creating more open stand conditions, small gaps, early successional habitat, and improve foraging opportunities for fisher. Areas such as historic NSO nesting areas, the remaining acres of NRF habitat, and the development of Riparian Reserves, Late-Successional Reserves (LSR), and District Designated Reserves (7,130 acres or 60% of the analysis area), would continue to provide fisher habitat. With 35% of the analysis area currently in late-successional conditions providing for fisher habitat, and a mixture of managed forest conditions and seral stages (Table 3-1), the analysis area is expected to provide the structural complexity required for fishers to persist with both alternative 2 and 3.

Fishers evolved in forests that were subject to wildfire, leading Powell and Zielinski (1994, p. 64) to hypothesize that management regimes mimicking small stand-replacing fires will not harm fisher populations if enough late-successional conifer forest remains available nearby (USDI/USFWS, 2016)

Cumulative Effects

Fuels reduction treatments and young stand management treatments (Appendix C) are not expected to reduce habitat function of late-successional habitat for fisher. Fuel reduction treatments from underburning may degrade some large down logs suitable for denning. Seasonal restrictions (Section 2.5, pp. 39-42) would reduce or avoid direct disturbance from noise and burning. Completion of young stand management activities and associated activity fuels would increase young stand resiliency to low-intensity ground fire, and improve stand resiliency, health, and growth toward the development of mature stands. Forest management actions from the proposed action may cause fisher to shift denning, resting, and foraging areas. Fisher may also shift habitat use away from young stand management or fuels maintenance for a few years if disturbance alters prey abundance or distribution but are likely to return following prey movements.

Sweitzer et al. (2016, p. 221) found no negative association between local colonization or persistence of fishers and fire and also observed a female fisher denning within a patch of forest burned by low severity fire four years earlier. Similar to other findings, these researchers also suggest that 5–10 years of succession in forests disturbed by fire produces conditions suitable for fisher prey species (Sweitzer et al. 2016, p. 222). Garner (2013) reported that fishers may tolerate fuels reduction treatments provided they focus on the reduction of surface and ladder fuels, and care is taken to maintain both canopy cover and sufficient abundance of forest structures, such as large diameter defective and standing dead trees, most likely to provide suitable rest and den sites.

The results of Sweitzer et al. (2016) suggest some similar effects. These researchers report a modest reduction in local habitat use by fishers after disturbance from restorative fuel reduction. Fishers did not completely cease to use those areas. They suggested fishers may have shifted to foraging in adjacent forest habitat with less disturbance on a temporary basis, and most likely would resume using areas that had undergone restorative fuel reduction within a few years. This study also found fishers using previously burned areas, including areas that had been subjected to managed burns. (USDI/USFWS, 2016).

3.5 Hydrology & Sedimentation

Issue: Would logging activates, maintenance and hauling on existing roads, or temporary road construction and reclamation increase sedimentation downstream and negatively impact aquatic habitats

3.5.1 Methodology and Assumptions

Methodology

Sedimentation is the presence and deposition of sediment in downstream aquatic habitat. Stream sediment ranges in size and transportation mechanisms. Large sediment such as rock, boulders, and trees typically move as bed load or in concentrated debris flows. Boulders, cobbles, and gravel move along the bottom of a stream as bedload. Fine sediment made of rock particles and organic material is transported to depositional areas downstream after being suspended in the water column. Most of the fine sediment is transported during peak streamflow events. Fine sediment is of prime concern to aquatic habitats since it increases stream turbidity which can reduce visibility and productivity. There are also impacts from the deposition of fine sediment that can fill the poor space of gravels and cobbles, reducing available oxygen clog interactions between the stream and the alluvial aquifer.

Potential sediment sources from BLM-approved activities that could contribute to sedimentation in downstream aquatic habitats have been evaluated in the RMP. The analysis in the 2016 ROD/RMP, pp. 401-408 Issue 4 addresses sediment from new road construction and decommissioning and is incorporated here by reference. The potential sediment from timber harvest is analyzed in detail as Issue 3 on pages 394-400 in the 2016 ROD/RMP, and this analysis is incorporated here by reference.

Disturbance associated with logging activities, landing construction and the maintenance and use of existing roads for hauling was not considered in the RMP but will be analyzed in detail to account the specific activities proposed in the Clean Slate PA.

This analysis will evaluate if suspended sediment rates from project activities would be outside the natural variation that maintains aquatic biodiversity downstream and water quality for drinking water supplies (2016ROD/RMP, p. 75).

Suspended sediment rates outside the natural variability would be from accelerated erosion. Accelerated erosion is defined as sediment loads that are above natural and/or background levels described for the affected environment. Natural disturbances include fires, beavers, and intense storms among others and are not part of accelerated erosion. Accelerated erosion is by definition a consequence of human activity and outside of natural levels of variation. Accelerated erosion is already occurring in the project area from past activities and other land ownership and is considered in describing background levels for sediment sources as part of the affected environment. Sources of this accelerated erosion from past timber harvest, road building, and timber harvest and development on private lands. This analysis looks at sediment loads that would be from project activities that are above the natural background rates and the existing environment that includes accelerated erosion from road building and land management activities.

This analysis makes use of Geographical Information System (GIS) to quantify values for past disturbance and estimate the potential for future disturbance which can be a source of sediment. Changes in streamflow duration, magnitude and timing change the ability of streams to transport sediment and therefore can have impacts on downstream sedimentation. Quantifying potential changes to stream hydrology such as changes in water yield; the likely occurrence and magnitude of peak flows can help determine the potential for increased sedimentation downstream.

The geographic scale to determine changes to water yield, potential enhancement of peak flows, estimates for road density, roaded areas for proposed haul routes on aggregate roads, maintenance actions, and other surface disturbances is calculated for the 6th field Deer Creek Watershed and combinations of portions of 7th field subwatersheds within the Project Area (Table 3-10).

Table 3-10: Hydrological Unit Code and Analysis Area Boundaries

Subbasin (HUC 08)	Watershed (HUC 10)	Project Area	Hydrology Analysis Area
Illinois HUC#17100311 (633,551 acres)	Deer Creek HUC# 1710031105 (72,605 acres)	Clean Slate Project Area (9,212 acres)	Middle McMullin Creek (2,466 acres)
			Thompson Creek (2,234 acres)
			Upper McMullin Creek (2,647 acres)
			Quedo Creek and Tributaries to Deer Creek (1,865 acres)

The Analysis Areas selected range in size from 1,865 to 9,212 acres. Analysis at the Deer Creek watershed scale is large enough to assess the cumulative effect of actions and potential long-term impacts of action that, taken individually (site scale) may not be significant, but when combined with effects, may have a potential impact. The smaller hydrology analysis areas are appropriate for assessing short-term potential downstream impacts from site-specific proposed actions and quantifying predicted changes in sediment loads.

It is important to recognize climate and other factors at the watershed scale can obscure cause and effect streamflow and sediment relationships. A study of 20 large watersheds found statistically significant changes in climate could obscure streamflow, nutrients, and total suspended solids loads in as much as 30-40% of study watersheds (Johnson et al., 2015). The temporal scale for direct effects for this evaluation is short-term (1-2 years) after the completion of the project and assumes disturbed areas will be successfully stabilized and reclaimed. The long-term temporal scale (50+ years) will be used to discuss indirect effects such as potential changes to suspended sediment loads that would be outside natural and/or background levels. This will be looked at as an indirect and long-term temporal scale since sediment typically moves in pulses and can be stored anywhere along the system in depositional areas and stabilized in place by vegetation.

Sediment must come from a source (erosion) and be transported in a perennial stream downstream to degrade aquatic habitat. This means there needs to be a hydrologic connection between the source of sediment and perennial waters. Intermittent streams typically move sediment in pulses during storm events, but this sediment may not make it to perennial streams. Typically, transportation of deposited sediment from hillslopes and intermittent streams occurs during catastrophic events, slope failures, and debris flows.

Water Quality Standards for the State of Oregon - Water quality standards are set by the State of Oregon DEQ and approved by the EPA to achieve characteristics needed to support beneficial uses such as supporting aquatic life or providing drinking water. Water quality standards can be based on biological or physical properties in addition to chemical properties.

Water Quality Restoration Plans - There are two Water Quality Restoration Plans (WQRPs) that cover the Federal Lands in the PA. They are the McMullin Creek WQRP (USDI/BLM, 2005) and Deer Creek WQRP (USDI/BLM, 2011) (Specific recommendations for Forest Management from these plans where to implement silvicultural treatments designed to promote hardwood and conifers and recommendations to minimize sedimentation with good road management.

Assumptions**:**

- Project related areas of disturbances were estimated based on a 40-foot buffer on proposed new or reconstructed temporary roads, 1 acre for helicopter landings, ¼ acre for cable landings, 20 feet for skid trails for ground-based logging.
- Actions on non-BLM lands will be consistent with the Oregon Forest Practices Act, and all state, federal, and local laws. Land management on non-federal lands in the Analysis Areas will continue to follow current trends for timber harvest and other disturbance (Of the 9,212 acres, 58% is managed by the BLM, 37% is private, and 5% is managed by Josephine County).
- Logging systems described in this analysis would be modified during implementation, but should be similar in magnitude to the methods, amount of disturbance or intensity described.
- The haul routes for commercial timber extraction will use the existing road network with additional road maintenance including removing brush, repairing drainage features such as culverts and cleaning ditches, and improving travel surfaces by blading and/or adding aggregate to bring roads up to haul standards.
- Culvert replacements may occur as a requirement of the timber or stewardship contract, as part of a reciprocal ROW agreement, through a watershed partner, and/or with BLM deferred maintenance funding. Culvert replacements on fish-bearing streams will be done within the in-stream work window and using proper dewatering methods.
- The proper implementation of Best Management Practices (2016 ROD/RMP, Appendix C) and Project Design Features (PDFs) would be implemented to reduce erosion and sedimentation and protect riparian areas.
- Disturbances that change riparian vegetation increase the rate or amount of overland flow, decrease coarse wood, or destabilize a stream bank and may contribute to suspended sediment loads downstream.

3.5.2 Affected Environment

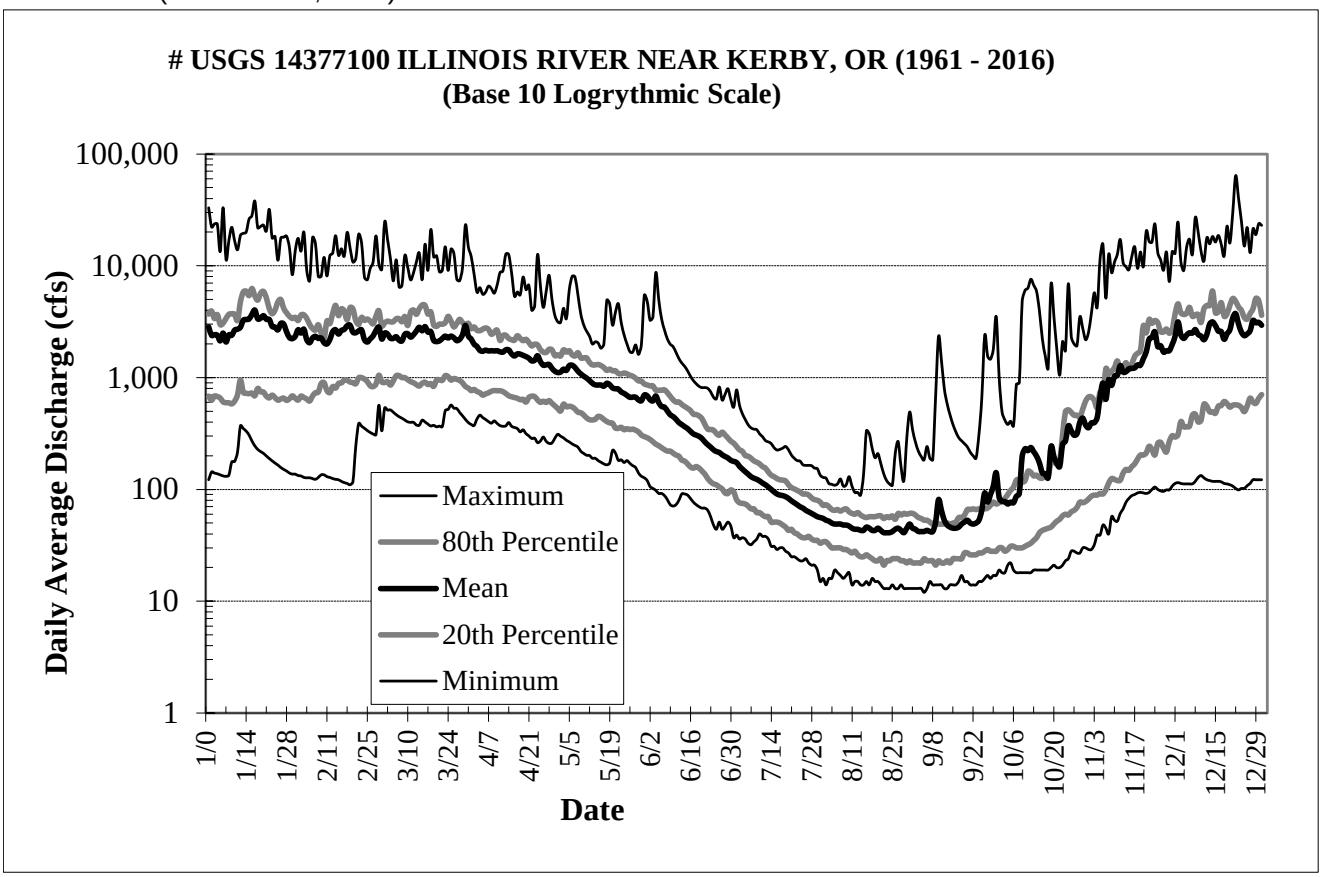
The Project Area (PA) is located in the Illinois River Subbasin. The PA comprises about 9,212 acres; 58% of which is managed by the BLM and 37% is private, with 5% Josephine County or Oregon State lands. For a general description of the Planning Area see Chapter 2: *Planning Area Overview*. The Clean Slate PA is located within the Deer Creek Watershed. Forest lands in the PA is generally recovering from drought conditions. Settlement and a history of fire suppression and timber harvest have impacted the vegetation in the PA, making many of the forest stands less-resilient to landscape disturbance. The watershed analysis for Deer Creek assumed that the probability of stand replacement fires is likely higher than during pre-European settlement (USDI/BLM, 1997).

Deer Creek Watershed (HUC5 #1710031105) –
The Deer Creek watershed is located within the Klamath Mountain Geomorphic Province of southwestern Oregon approximately 15 miles southwest of Grants Pass. This 72,605-acre watershed receives from 51 to 80 inches of precipitation annually, ranges in elevation from near 1,200 feet above sea level to near 5,550 feet, and has over 531 miles of creeks. Deer Creek is a major tributary of the Illinois River and eventually the lower Rogue River (USDI/BLM, 1997).

Conversion of the bottom lands to agriculture has led to the filling of sloughs, backwaters, and areas that once were filled by flooding and subsurface flows from Deer Creek. The riparian zones on private lands typically consist of a narrow band of hardwoods, with some areas lacking riparian vegetation (USDI/BLM, 1997). The general poor condition of riparian areas along the bottom of stream valleys reduces the potential for water and sediment storage and natural channel evolution. Uplands are also valuable for water and sediment storage that can reduce downstream suspended sediment loads. However, this storage in the uplands has likely been reduced by past road building, logging, and mining. This means there is likely a lack of good quality aquatic habitat in the Deer Creek watershed as a result of past and current land use.

Peak Flow Enhancement
Peak flow enhancement refers to a changing response (timing and/or magnitude) in the flow of a stream or river during high flow events. Peak flows have the ability to alter stable stream channels and cause additional stream bank erosion, and higher streamflows are the primary method for sediment transport in stream systems. Peak flows are also the primary transportation mechanism from intermittent streams, although this is typically episodic with landslides and debris flows. Maximum runoff events or peak flows can occur anytime between August and June on the Illinois River streamflow site near Kerby, Oregon (Figure 3-7).

Figure 3-7: Surface Water Stream Daily Average Statistics from USGS Illinois River near Kerby from 1961 – 2016 (USDI/USGS, 2017).



Equivalent Clear-cut Area (ECA) provides an estimation of areas with less than 30% canopy cover using the National Agriculture Imagery Program (NAIP) aerial photography (USDA/NRCS, 2016). Areas that exhibited 30% or less canopy cover were considered bare ground for the purposes of establishing the ECA (Watershed Professional Network, 1999, IV-11). These ECAs may be from recent events such as timber harvest activities, activity fuels treatments, agriculture, or wildfires, but can also be hay fields or other openings.

Grant et al. (2008) suggest that the mean response lines for ECA are a good predictor of enhanced peak flow. Peak flows can be analyzed regarding elevation breaks between the rain, transient snow and the seasonal snow zones for southern Oregon are 2,500 feet, 5,000 feet, and >5,000 feet, respectively (Jefferson, 2011). Ninety-eight percent of the Clean Slate project area is in the Rain Dominated Hydro-region (Table 3-11); therefore, it is unlikely that peak flows are being enhanced by ECAs.

Table 3-11: Analysis Areas based Hydrological Unit Code Boundaries.

Analysis Areas	Rain Zone		Transient Snow		Seasonal Snow		Total Acres*
	Acres	%	Acres	%	Acres	%	
Deer Creek (1710031105)	56,093	77%	2,030	3%	14,428	20%	72,605
Clean Slate Project Area	9,049	98%	163	2%	0	0	9,212
Middle McMullin Creek	2,466	100%	0	0	0	0	2,466
Thompson Creek	2,119	95%	115	5%	0	0	2,234
Upper McMullin Creek	2,599	98%	47	2%	0	0	2,647
Quedo Creek and Tributaries	1,865	0	0	0	0	0	1,865

The ECA was estimated from aerial photography and found to be just over 10,000 acres or about 14 percent of the Deer Creek watershed. The ECA is evaluated regardless of land-ownership on a watershed scale. Forest management practices on private lands and historical practices on BLM managed lands have led to single age, and uniform timber stands known as plantations.

Studies have found enhancement of peak flows can be attributable to changes in flow routing due to roads and in water balance due to treatment effects and vegetation succession (Jones & Grant, 1996; Thomas & Megahan, 1998). Within the PA, there are approximately 1,300 miles of existing system roads with 466 miles on BLM administered land, based on BLM GIS Data. The majority of the Clean Slate PA (98%) is in the rain dominated zone. In the rain dominated zone, the maximum response line reaches the 10-percent detection limit at approximately 29 percent harvested.

The analysis in the 2016 ROD/RMP, pp. 384-394 addresses timber harvest and road construction within the rain-on-snow dominated hydro-region and is incorporated here by reference. This analysis will look at all hydrological zones and evaluate smaller areas to see if the impact would be detectable from the proposed actions. This smaller area analysis includes assuming greater than 2 percent roaded area and a maximum detection limit of 10 percent (Grant et al., 2008).

Peak flow increases in large basins will almost invariably be less than those in small watersheds, suggesting that the response lines for small watersheds represent maximum increases for all size watersheds (Grant et al., 2008). All of the Clean Slate PA was in the Rain-Dominated zone. None of the Clean Slate calculated ECA percentages approach the 29 percent threshold, and therefore no enhancement of peak flows are predicted for this project at the watershed or catchment scale.

Road Density and Roaded Area

The haul routes for commercial timber extraction will use the existing road network when possible. In general, this road system was developed in the 1960s and 70s, and some of the infrastructure is old, was inadequate, or beyond its original design life. It is likely there are

crossing with culverts that are in poor condition. It is assumed that if culverts are failing and beyond load requirements, they will be replaced before hauling during maintenance activities. It is also assumed that haul routes will receive other maintenance, which includes vegetation clearing in the road prism, repairing or replacing drainage features and reshaping and/or resurfacing the road surfaces.

Estimates for the "roaded area" are based on a GIS analysis that assumes a 40-foot buffer from the centerline of existing roads, 30-foot buffer from the centerline of disturbance for temporary route construction, 15 feet from the centerline for skid trails used in ground-based logging systems, and ¼ acre for landing construction. No additional disturbance was assumed for suspension systems that yard timber to existing roads using partial suspension. Landings with multiple yarding corridors were assumed to need a ¼ acre for landing construction. These assumptions are likely to be an over-estimate for effects from surface disturbance.

The Deer Creek Watershed Analysis completed in 1997 calculated average road density by section for specific analysis areas in Table 3-12.

Table 3-12: Road Density and Estimated Road Disturbance (Roaded Area) of the Existing BLM Road System in the Planning Area.

Analysis Area Name^	Analysis Area (Acres)	Analysis Area (mi^2) *	Roads (mi)	Road Density (mi/mi^2)	Road Disturbance+ (Acres)	Percent Roaded Area
Deer Creek (1710031105)	63,886	100	456	4.56	2,211	3.5%
Clean Slate Project Area	9,211	14.4	95.6	6.64	464	5.0%
BLM Lands in the PA	5,299	8.3	59.2	7.13	287	5.4%
Middle McMullin Creek	2,466	3.9	22.2	5.69	108	4.4%
Thompson Creek	2,234	3.5	23.3	5.68	113	4.3%
Upper McMullin Creek	2,647	4.1	32.3	7.88	157	5.9%
Quedo Creek and Deer Creek Tributaries	1,865	2.9	17.8	6.14	86	4.6%
^These are the portions of the 5th level (HUC5) watersheds * miles = mi + Roaded Area, calculated by assuming an average disturbance width of 40 feet						

The percentage of roaded area for each analysis area is estimated at 5% or less, with the exception of Upper McMullin Creek which is 5.9% (Table 3-12), well below 12%; which is the threshold that has been found to result in observable increases of peak flow in most studies (Ziemer, 1981).

Road density in the Deer Creek Watershed is 4.31 mi/mi^{2,} and for the Project Area, it is 6.64 mi/mi^2. The Upper McMullin subwatershed has the highest road density (7.78 mi/mi^2). Roaded area and road density are not expected to be changed significantly by the proposed action, and therefore no enhancement of peak flows is expected from roads.

3.5.3 No Action Alternative

Environmental Effects to Sedimentation

Direct/Indirect Effects to Sedimentation

Under the No Action Alternative, there would be no changes to peak flow, road density or roaded area as described in the Affected Environment. No new maintenance to haul roads would occur under the no-action alternative. However, road use, road maintenance, silvicultural treatments, water source improvement and other activities would be expected to continue on BLM-administered lands and non-BLM-administered lands under the No Action Alternative (Section 2.4.1). It is likely that less road maintenance would occur under this alternative as compared to the action alternatives.

Sedimentation from the Current Road Network

Most of the sediment movement in streams occurs with peak storm events, especially after disturbances such as wildfires or human activities. Often this sediment is stored in the stream channels and floodplains during previous peak events and released downstream in subsequent peak flow events. Primary sediment sources include episodic landslides and slumps usually associated with intense winter storms, hillslope erosion, stream bank erosion, roads, motorized recreation, mining, wildfires, and forest management activities. A primary driver can be the result of poorly designed and/or poorly maintained forest roads (Wemple, 2003).

Sediment sources are generally elevated in the first two years after disturbances such as fire, timber harvest, and/or severe storm events, but tends to diminish as vegetation reestablishes. Buffering the inner-zone and middle-zone of the riparian reserve on streams can be effective in "filtering" any increase in sediment from vegetation treatments upslope.

The PA has an established road system used for accessing private and public land and has resulted in current and past accelerated erosion (see Affected Environment). Even properly maintained roads alter hillslope hydrology, by intersecting slow-moving subsurface groundwater and convert it to more rapid surface flow. Surface runoff can move rapidly through the ditch-culvert systems and if hydrologically connected to a stream can be a primary transportation mechanism for sediment. Roads contribute to stream sedimentation at various levels depending on: road design, surface type, depth and quality road surface aggregate, location of the road, position on the slope, fill material, underlying geology, maintenance frequency, condition near

stream crossings, and moisture levels of road material during use. As road surfaces increase, the potential for sedimentation in a watershed generally increases (Oregon DEQ, 2003).

Elevated precipitation and surface runoff lead to enhanced peak flows and reduction in water storage in the uplands. These factors can interact to cause indirect changes in channel morphology by altering the streamflow timing, volume and sediment loads (Furniss et al., 1991).

The condition of riparian areas, channel morphology, and hydrology can be affected by land use activities such as timber harvest or road use and maintenance. These activities are likely to contribute to baseline conditions with accelerated erosion increasing sedimentation and changes in hydrology related to storm response. Movement and transport of sediment can be complicated by physical features such as large woody debris, climate, and changes in streamflow making downstream water quality and sedimentation function of all activities in a given watershed and nearly impossible to predict accurately or identify causal impacts.

Sedimentation from Landslides and Unstable Soils

The potential sediment from increased risk of landslides is analyzed in detail as Issue 3 on pages 394-400 in the 2016 ROD/RMP, and this analysis is incorporated here by reference. A model was developed to evaluate the risk of landslides and the current and projected landslide density.

On steep slopes or where there is a relatively impermeable substrate or shallow soils, heavy rainfall will trigger a landslide when soils are saturated. Forests generally reduce the risk of landslides since tree roots can be an important component of soil stability. Forest canopies decrease the intensity of precipitation more than other vegetation types, thereby a reduced amount of rainfall and intensity reaching the soil surface (Keim & Skaugset, 2003). Forests also tend to have a high organic matter content and hence have a high infiltration capacity, or ability to absorb and hold water. Undisturbed forested slopes experience fewer landslides, since removing trees can increase instability in susceptible slopes. Landslides on forested slopes can be triggered by road network drainage that can modify hydrological pathways and channel excess water to places where it can increase the risk of both surface erosion and landslides.

Sediment from landslides typically moves as a concentrated debris flow during a single storm event. The bottom of the sediment and debris flow is dictated by the energy available. Often debris flows are deposited in floodplains as alluvial fans and in channel deposits, but they can also be an important episodic source of wood and sediment to streams and rivers. Not all landslides contribute annual sediment loads to streams; it has been observed that few landslides directly deliver sediment and other material to streams (Miller & Burnett, 2008). The material is often deposited in alluvial fans that can be mobilized in later peak events.

The RMP found that portions of the Harvest Land Base would be susceptible to deliver sediment to a channel by shallow slope failures regardless of any forest management activities. Over the next 50 years, the area of increased landslide susceptibility with the potential to deliver to streams would average no more than less than 1 percent of the harvest land base. This project is not planning regeneration harvest, which accounted for most of the modeled increase in landslide susceptibility. Therefore this project is not likely to increase landslide susceptibility. However, extreme storm events, or a landslide or debris flow could occur someplace in the project area. However, these episodic events are not likely to result in a measurable increase in sediment loads downstream of the project area above natural background levels.

Sedimentation from Fuels Treatments and Prescribed Fire

Fuels treatments will be applied in the Riparian Reserve to reduce the risk of stand-replacing crown fires. Fuel treatments and the initiation of fire would not occur in within 60 feet of perennial streams (2016 ROD/RMP, p.82). Proposed fuel treatments would address activity fuels and would be prescribed on a unit specific basis by the BLM fuels specialist. Outside of the riparian zone broadcast, burns may be used to prepare group-select areas for replanting. One recent modeling effort predicted that 9 out of 10 watersheds in the western United States would see a greater than 10 percent increase in sedimentation due to wildfires by 2041, due to increased fire frequency (Sankey et al., 2017). Fuel treatments in the proposed areas should reduce future risk of stand-replacing crown fires.

Crown-replacing crown fires have the largest contribution to sedimentation downstream since most of the canopy cover and vegetation would be consumed. Proposed activities are likely to increase sediment loads for 1-2 years until vegetation re-establishes. It is unlikely that sediment would be transported into surface waters from these activities unless there is as an extreme storm event during the first two years.

No measurable difference in sedimentation is expected beyond what might occur under the no-action alternative. There is a small decrease in stand-replacing crown fires that would be expected for the long-term and corresponding potential for less sedimentation from wildfires. This also is unlikely to be measurable or quantifiable.

Cumulative Effects to Sedimentation

The cumulative effects analysis area for considering effects to water resources are the Deer Creek watershed (HUC10 # 1710031105). Historical and current mining and wildfires can result in impacts that can be cumulative for hydrology and water quality over the long-term. Both can increase surface runoff and lead to long-term water quality issues.

Present actions that contribute to cumulative effects include timber harvest, vegetation treatment projects, some limited mining projects and right-of-way projects for utility corridors and roads

on both BLM and non-BLM lands (Appendix C). Many of these projects may increase ECA or roaded area and may result in peak flow enhancement or erosion. Specific direct and indirect impacts can be cumulative in increased sediment loads through soil disturbance and erosion.

It is reasonable to assume timber harvest on private, and Josephine County timberlands will occur at a similar pace, as is shown in the 2016 aerial photographs. As lands timber harvest lands are replanted there is a point with the new vegetation offsets the contribution to the potential for enhanced peak flows or water yield, this is when the soils are stabilized, and the evapotranspiration rates approximate or exceed the pre-disturbance rates (In general 5 to 15 years after harvest).

The current road density within the PA is approximately 5.0 mi/mi^2 (Table 3-12). This road density is likely to be the same or decrease under the no-action alternative since the basic road network is in place to harvest timber on both private and public lands. As harvest is completed, roads are often storm-proofed and if done properly are unlikely to contribute to peak flows in the future. Any new road construction unrelated to this project is likely to be off-set by decommissioning of unused roads or be so small as to not change the overall road densities in the analysis areas, which are roughly 4 mi/mi^2.

The 2016 ROD/RMP, pages 401-408, described how road construction and decommissioning might affect soil disturbance and create sources of fine sediment that are delivered to stream channels. It is incorporated here by reference. The RMP used a sediment model WARSEM and modeled sediment delivery assuming a 200-foot sediment delivery distance to streams. There are no temporary routes planned for construction or reconstruction within 200 feet of an intermittent or perennial stream. Nearly all the proposed temporary routes are on ridges that will not require much cut and fill to construct. If the RMP modeling method was used for these roads, there would be no estimated sediment from these roads.

When determining effects, it is important to consider that changes to stream conditions may be related to climate changes or may be the result of unrelated actions, making project-specific effects difficult to differentiate from background conditions. Studies have found logging, road construction, and changing forest, and riparian management practices and natural hydrologic events (peak flows and associated mass soil movements) tend to obscure specific cause-and-effect relationships (Beschta & Taylor, 1988). A study of 20 large watersheds found statistically significant changes in climate could obscure streamflow, nutrients, and total suspended solids loads in as much as 30-40% of study watersheds (Johnson et al., 2015).

3.5.4 Alternative 2

Environmental Effects to Sedimentation

Direct/Indirect Effects for Sedimentation

The proposed forest management treatments and prescriptions are described in detail in Chapter 2. The BLM-administered lands in the Project Area include the Harvest Land Base (HLB), Riparian Reserve (RR, Dry – Class I watershed), District Defined Reserve (DDR), and Late Successional Reserve (LSR) land use allocations. Treatments are proposed within the HLB and RR, no treatments are proposed within the DDR or LSR. The project is proposing forest management activities on approximately 461 acres of BLM-administered lands in the Clean Slate Project Area. Both HLB and RR will utilize integrated vegetation management through commercial thinning and fuel treatments to achieve forest health standards as defined in the RMP.

Forest management treatments consist of both commercial and non-commercial treatments in the upland and riparian areas and include the use of integrated vegetation management to achieve project objectives. Integrated vegetation management includes a combination of silvicultural or other vegetation treatments. Activities may include vegetation control, planting, snag creation, prescribed fire, biomass removal, thinning, single-tree selection harvest, and group selection harvest. The prescriptions are tailored to the various site conditions (elevation, aspect, soil condition, and stand health) found throughout the Project Area. Fuel loads resulting from silvicultural treatments would be reduced through lop-and-scatter, pile and burn, broadcast burning, or biomass removal. Forest management would be accomplished through a combination of commercial timber sale contracts, service contracts, and/or stewardship contracts.

Silvicultural and Fuel Management Treatments

The stands identified for treatment in the HLB land use allocation (351 acres) are experiencing decreasing levels of diversity primarily from lack of disturbance (i.e., fire) and have high tree densities and trees with low crown ratios. These stands have also seen a shift in favor of shade-tolerant trees such as tanoak, incense cedar, and Douglas-fir and a decrease in shade-intolerant species such as oaks and pine. As trees compete for limited water, nutrients, and growing space, they become stressed and more susceptible to mortality from insects, forest pathogens, drought, windstorms, and wildfire. Large-scale disturbances can contribute to sediment loads and if these disturbances are outside natural disturbance regimes can contribute to accelerated erosion and downstream sedimentation.

Stands identified for silvicultural treatments in RR land use allocation (94 acres) are also showing high tree density, low crown ratios, and poor species diversity. This condition also has an increased risk of stand-replacing crown fires due to high fuel loads due to high levels of density-related competition. The outer zone of RR will be thinned as needed to ensure that stands are able to provide trees that would function as stable wood in streams by accelerating the development of multiple canopy layers, increased species diversity, and increased conifer and

hardwood vigor (2016 ROD/RMP, p. 83). Objectives for the RR land allocation are to maintain and restore natural channel dynamics, processes, and proper functioning condition of riparian areas by providing forest shade, sediment filtering, wood recruitment, stream bank and channel stability, water storage and release, vegetation diversity and provide quality water and contribute to the restoration of degraded water quality (2016 ROD/RMP, p.75).

Fuel management treatments will be applied as needed to reduce the risk of stand-replacing crown fires (2016 ROD/RMP, p.82). These fuel treatments could include slashing, hand piling, hand pile burning, chipping, lop and scatter, biomass removal, and/or understory burning. Within the RR, material to be hand piled would be limited to six inches on the large end of the log to provide for soil protection and small wood recruitment; treatments could occur within 60 feet of perennial streams, including ignition sources for underburning. These buffers should be protective of bank erosion, reduce potential impacts to hydric soils, and avoid sedimentation.

Commercial Thinning

In forested stands greater than 10 acres, commercial treatments may consist of the retention of dominant Douglas-fir, pine trees, madrone, big leaf maple, and oak trees. At least 10% of the treatment units would be retained in untreated "skips" to provide structural complexity and refugia, and 30% of the stand may consist of openings up to 4 acres each and achieve an average relative density of stands that varies between 20-45%, and prescribed fire may be used to stimulate vegetation, reduce fuel loading, and prepare the site for planting.

Commercial thinning would be done in stands marked under the direction of the BLM to include PDFs (Section 2.5). Streams would be protected with at least a 50-foot no treatment buffer (120-feet for perennial and fish-bearing streams). These buffers are designed to protect the root network of typical trees, reduce erosion, reduce direct impacts to wetlands, reduce potential impacts to hydric soils, and avoid sedimentation. Studies have shown that "vegetation immediately adjacent to the stream channel is most important in maintaining bank integrity" (FEMAT, 1993). One study found that 95% of the erosion features from timber harvest that were at least 32.8 feet from streams channels did not contribute sediment to stream channels (Rashin et al., 2006). In addition to the stabilizing effect of the root network, trees adjacent to streams dissipate stream energy during high or overbank flows, reducing bank erosion.

Impacts form commercial thinning can be differentiated by the type of yarding system. Yarding of the thinned timber would be done with cable suspension systems, helicopter yarding, or ground-based yarding using forwarder trails or traditional skid trails.

Ground-based yarding would require the use of an integral arch system and partial suspension of logs to reduce soil disturbance and compaction. Ground-based yarding systems can use tractor swing routes that enable yarders to "walk" up designated skid trails. In areas utilizing ground-

based harvest equipment, processing of tops within machine trails may occur and the resulting slash would either be driven over by the ground-based equipment or machine piled along machine trails. Inner and middle riparian zone buffers adjacent to and below treated units would capture and filter sediment from reaching ditches and/or streams. Dry condition operations limit the impacts of these tractor swing routes and proper decommissioning measures ensure mitigation of excess impacts. Localized erosion within units would persist on skid trails and forwarder trails until vegetation is re-established.

Table 3-13: Hydrologically Connected Commercial Treatment Units

Units Number	Description of Hydrologically Connected Commercial Harvest Activities to Perennial Surface Waters[+]	Stream System (See Table 1-T)
Unit 9-5	Suspension corridors will cross an unnamed perennial stream as proposed. This will require anchors and lines that cross the stream, but no timber would be yarded across the stream	Upper McMullin Creek
Unit 3-9	Suspension corridors will cross an unnamed perennial stream as proposed. This will require anchors and lines that cross the stream, but no timber would be yarded across the stream	Thompson Creek
Unit 17-2	Suspension corridors will cross an unnamed perennial stream as proposed. This will require anchors and lines that cross the stream, but no timber would be yarded across the stream	Thompson Creek
Unit 23-4	Ground-based harvest with skid trails and drainage that may be connected to perennial surface waters. There are four crossing on perennial streams with connected inside ditches.	Quedo Creek and Deer Creek Tributaries
[+] Hydrologically connected means any commercial timber harvest activity that has a continuous surface flow path to a perennial stream. (Furniss et al., 2013).		

Cable yarded whole-trees or logs yarded with tops attached would minimize activity slash remaining within the harvest units. Merchantable saw logs would be removed from yarded material, and any remaining debris at the landing sites would be machine and/or hand piled and burned at approved locations, chipped, or removed for biomass utilization. Machine piling may occur on landings and within units that are adjacent to roads. Tractor swing routes may be used to enable yarders to "walk" up designated skid trails in which the yarder is set up along the skid trail where corridors are needed to facilitate cable yarding operations. Inner and middle riparian zones buffer adjacent to and below treated units would capture and filter sediment from reaching ditches and/or streams. Localized erosion within units may occur along and adjacent to yarding corridors.

Helicopter yarding uses a helicopter to transport logs from the interior of a unit to a landing. Trees are cut and usually limbed within the interior of the unit, and a person within the unit attaches a cable to a group of trees to be lifted. A mechanized harvester may be used on slopes less than 50% to process and pre-bunch logs prior to yarding. Localized erosion within units would persist on forwarder trails used to bunch logs until vegetation is re-established.

All of the yarding systems described above require some form of landing. Existing landings are used where possible, but new landings would be needed. Landings are used to process logs and loaded onto log trucks. For cable and conventional ground-based systems, landings would generally be a ¼ acre in size, and for helicopter landings would generally be 1 acre in size. The location of helicopter lands would generally be within ½ mile of treatment units, placed where vegetation is sparse, on or near ridge tops, and at large road junctions. All landings would be winterized if they are needed for multiple operating seasons and fully decommissioned once operations, including the burning of landing piles, is completed.

Regardless of yarding systems, temporary routes, landings, hydrologically connected corridors/ skid trails, and other areas of exposed soils that are not already reclaimed or decommissioned would be winterized prior to October 15; skid trails in the riparian reserve would be scarified, seeded, water barred, mulched, and blocked. Any sediment loads generated by project related activities are likely to be deposited in the 60 feet of riparian buffers. Any increase in sediment from treated areas for fuels would be small and indistinguishable from sediment generated from untreated areas.

The percentages of ECA including the anticipated roaded area in the any of the hydrology study areas would not exceed the 19% or 29% thresholds described for rain-on-snow or rain dominated systems with the additional disturbance anticipated. Group selects would create new openings that could change the ECA estimates for analysis areas, although there would be an increase in ECA in some of the analysis areas none of the areas would exceed the thresholds that would predict enhanced peak flows because of project activities (Table 3-14).

Table 3-14: ECA by Catchment Analysis Areas (acres)

Analysis Area Name^	Analysis Area (Acres)	ECA+	% of Analysis Area	Group Selects and Landings	Project ECA
Deer Creek (1710031105)	63,886	10,001	16%	89+85=174	16%
Clean Slate Project Area	9,211	760	8%	89+85=174	10%
BLM Administered Land in PA	5,299	157	3%	89+85=174	6%
Middle McMullin Creek	2,466	158	6%	10+7=17	7%
Thompson Creek	2,233	103	5%	50+28=78	8%
Upper McMullin Creek	2,647	304	12%	13+5=18	12%
Quedo Creek and Tributaries	1,865	38	2%	16+44=60	5%

^These are the portions of the 5th level (HUC5) watersheds and subwatersheds for analysis purposes

+ Existing ECA calculated across all ownerships was analyzed for vegetative cover using the National Agriculture Imagery Program (NAIP) aerial photography (USDA, 2016). Areas that exhibited 30% or less

canopy cover was considered bare ground for the purposes of establishing the ECA **(Furniss et al., 2013).**

All of the Clean Slate PA was in the Rain-Dominated zone. None of the Clean Slate calculated ECA percentages approach the 29% threshold, and therefore no enhancement of peak flows is predicted for this project at the watershed or catchment scale. The proposed activities would also create additional openings for landings and temporary route construction (Table 3-15).

Table 3-15: ECA based on Digitizing Canopy Openings based on 2016 Aerial Photography. Openings include other non-treed areas such as recent burn scars or meadows.

	Analysis Area (Acres)	Landings*	Group Select (Acres)	Temp Routes (mi)	Additional ECA (acres)	Estimated ECA (Acres)	% Total
Alternative 1: No Action	9,211	0		0	0	760	8.3 %
Alternative 2		251 - 22	89	2.27	96	945	10.3 %
* (number of cable and ground landings - number of helicopter landings). The average opening is estimated at ¼ acre for cable and ground and 1 acre for helicopter.							

The likelihood of increases to peak flow as a result of the Proposed Action alternative would be low, since ECA within the PA would be well below the 29% threshold for rain dominated watersheds (Grant et al., 2008), even after considering landings, group select areas, and temp routes.

In summary, commercial harvest would be conducted with PDFs that are designed to reduce or remove the potential for accelerated erosion and any increased sediment production because of actions. Also, there is no expectation of enhancing peak-flows, water yields or changes in other hydrological conditions from commercial thinning that would increase sediment transportation rates above background conditions (Appendix A: Hydrology and Water Quality). Although there may be increased erosion locally and over the short-term; if goals to make forest stands more resilient to catastrophic disturbance such as crown-replacing fires are achieved, long-term sedimentation rates may decrease.

Activity Fuel Management

Activity slash for all forest management treatments will be managed by machine or hand pile/burned, chipped, lopped and scattered, and/or underburned based on a post-logging assessment of fuel loading. Any of the commercial thinning units could have an underburning treatment after the commercial thinning. Underburning (low intensity prescribed burning beneath

the forest canopy) would be considered after mechanical operations have been completed to further reduce fuel loadings, recycle nutrients, and stimulate plant growth.

A post-harvest assessment of fuel loading would be used to determine methods for addressing activity slash. Activity slash within the remainder of units may be hand pile/burned, lopped and scattered, retained as Course Woody Debris, or underburned. Lopping and scattering debris in a discontinuous pattern across the forest floor would reduce postharvest fire hazard. If the amount of slash remaining in units results in excessive quantities of fuel loading, treatment by chipping or machine/hand piling and burning may be recommended.

Activity slash piles would be burned in the winter and would result in soil disturbance at the location of the burn piles. Plastic would typically be placed near the top to keep piles dry while burned under high moisture conditions in the winter. Soil heating under piles would occur, but due to the high soil moisture in the winter and would result in soil disturbance at the location of the burn piles, effects are not likely to persist more than 1-2 years.

BLM fire and fuels management personnel would conduct pre- and post-treatment evaluations to determine the need for maintenance underburning. Maintenance underburning would involve the controlled 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 and would occur within 15 years from the initial or follow-up maintenance fuels reduction treatments.

Roads, Hauling and Temporary Route Impacts on Sediment Loads

With the proposed 2.27 miles of temporary routes, there would be a slight increase in road density and roaded area during harvest (Table A-6). Because these routes would be fully decommissioned after use, the road density and roaded area would return to the no action rates in 1-3 years depending on the success of the reclamation. Therefore, the construction of these routes is not expected to result in any measurable change in effects beyond baseline conditions.

Temporary routes will be built and renovated to allow for timber hauling. Temporary routes are typically outsloped with no drainage ditches, 14 feet wide, with turn-outs for passing and truck turn-around when necessary. The vegetation clearing limit for these temporary routs will be 20 to 45 feet depending on the needs. Drainage features for these routes are minimal but may include culverts on stream crossings. These routes will be weatherized before the end of the dry season by installing water bars. Newly constructed temporary roads and re-opened previously decommissioned roads would be closed either seasonally or for long-term closure after the project work is complete. Road decommissioning would include blocking routes, removing any

culverts, subsoiling (tilling below the compacted route surface area) to allow for water infiltration, installing water bars, and applying seed and mulch (Section 2.5).
Localized erosion within units would persist on temporary routes, skid trails, truck turn-around areas, and landings until vegetation becomes re-established. Efforts are made during implementation to locate new disturbance or current disturbance, reduce the number of passes and avoid steep pitches for ground-based equipment and other activities that may result in erosion. These techniques are applied on a site by site basis to reduce impacts and reclamation techniques (seeding and water bars) where these features cannot be avoided.

Road renovation and/or maintenance would occur on existing road prisms for all haul routes (32.9 miles). Before roads are used for forest management activities, ditches would be cleared of debris and obstructions where needed; catch basins would be cleaned or enlarged where needed; brush growing within a 4 foot radius of culvert inlets or outlets would be removed where needed; undersized culverts or culverts that have met or exceeded their lifespan would be replaced; vegetation would be removed along roadways to improve driver sight distance and allow for proper road maintenance; and roads could be surfaced or spot rocked if needed.

Impacts from the use of these routes and spurs can be expected during hauling and would include erosion and some increase in sedimentation that would decrease once routes are winterized. Minor elevated surface runoff and sedimentation could occur during the short term (1-2 years), but after reclamation takes hold impacts would be indistinguishable from undisturbed areas. Many of these routes and spurs are on ridge tops, and any additional sediment or runoff is unlikely to be transported to surface waters.

About 0.33 mile of tractor swing routes would be constructed (Units 9-5-A and 21-8) provide for access to cable-yarding areas where building a temporary road would be infeasible. Skid trails and tractor swing routes would be decommissioned by deompacting skid trails in units that are identified as being hydrologically connected to surface waters. Localized erosion within units would persist on skid trails and forwarder trails until vegetation is re-established.

Due to vegetation buffers, BMPs and PDFs to address hydrologically connected units or roads elevated runoff is likely to infiltrate and sediment is likely to be deposited in the uplands. Dry condition requirement for ground-based activities, use of temporary routes and tractor swing trails, and/or hauling along with proper decommissioning measures would reduce direct and indirect impacts to sediment loads. No new permanent roads would be built, and all temporary routes would be fully-decommissioned. Therefore, there would be no long-term increase in road density under this alternative. New temporary, renovation of existing temporary, and tractor swing routes would be fully-decommissioned after use.

Table 3-16: Road Density and Estimated Road Disturbance (Roaded Area) of the Existing BLM Road System in the BLM-Administered Lands in the Planning Area.

	(Acres)	(mi^2) *	Roads (mi)	Road Density (mi/mi^2)	Road Disturbance+ (Acres)	Percent Roaded Area
No Action	9,211	14.4	95.6	6.64	464	5.04 %
Action Alternative			97.3	6.76	475	5.16 %
* miles = mi + Roaded Area, calculated by assuming an average disturbance width of 40 feet						

Road density is more likely to impact peak flows on small watersheds than with larger watersheds (Gucinski et al., 2001). Therefore, road density and roaded area were also calculated for all the analysis areas (Table A-6).

There is a potential that reciprocal ROW holders might improve and use these same temporary routes described here for timber harvest, but this would be a potential with or without the using the temporary route for this project. Therefore, it can be assumed that these 2.27 miles would only add to the road densities for 1-2 years during their use and would recover to background conditions after successful reclamation. Haul routes are existing so no increases to road densities would be predicted from timber haul.

Landings and roaded area for this alternative do not add a significant amount of ECA under Action Alternative (Table 3-18). Increases in peak flow have not been found in most paired-watershed studies until roads and other impermeable areas occupied more than 12% of the watershed (Ziemer, 1981). Harvest activities would add an estimated maximum of 96 acres to the ECA for the PA during the short-term (1-3) years, but with successful reclamation, no long-term increase in the ECA area would occur.

There are no new stream crossings that are needed for hauling for this project planned under either of the action alternatives. Many of the culverts on stream crossings needed for hauling have been evaluated, and some may need to be repaired or replaced before hauling begins. Regardless of funding mechanism, culvert replacements in crossings with flowing water will be done during the in-stream work window (June 15 – September 15 for the Deer Creek) (ODFW 2008) and will use techniques to hydrologically isolate the work area and reduce or eliminate sediment inputs to surface waters. Some culvert replacements will require removal of fill or benching to access the correct placement location. Any excess material will be disposed of at a BLM approved location outside the riparian areas.

Properly maintained roads would be expected to have low levels of erosion unless utilized for hauling under wet conditions. Prior approval from the authorized officer would be required for wet season use of rocked roads (generally October 15 – May 15). Hydrologic effects of roads and other disturbance are strongly influenced by landscape condition, road design and construction, and storm history. As discussed in the no-action alternative, the primary effect of the existing road network is the interception of shallow groundwater flow. When drainage ditches have adequate relief culverts, drainage systems, and the road shape if adequate for shedding water road impacts are dramatically less. Maintenance activities on the haul routes would diminish these direct impacts from the haul routes.

Table 3-17: Hydrologically Connected Haul Routes

Units or Haul Routes	Surface	Description of Hydrologically Connected Activities to Perennial Surface Waters[+]	Stream System (See Table 1-T)
38-7-19 McMullin Creek	Paved	There are two crossings on perennial streams with connected inside ditches.	Middle McMullin Creek
38-7-21.2 Harmon Div P	Aggregate	There are two crossings on perennial streams with connected inside ditches.	Lower Thompson Creek
38-8-27.0 Thompson Creek	Paved	There are five crossings on perennial streams with connected inside ditches.	Lower Thompson Creek
38-7-31 East McMullin Creek	2-Aggregate 3-Natural	There are five crossings on perennial streams with connected inside ditches.	Lower Thompson Creek
38-8-13.0 Selmac Fire	Aggregate	There is one crossing on perennial streams above Lake Selmac	Quedo Creek and Tributaries
39-7-21.0 Bear Creek	Paved	There are six crossings on perennial streams with connected inside ditches.	Bear Creek
39-7-3.0 Thompson Creek	Paved	There are six crossings on perennial streams with connected inside ditches.	Thompson Creek
39-7-3.4 Thompson Creek E	Natural	There is one crossing on perennial streams	Thompson Creek
39-8-3.0 Reeves Creek Rdg	Aggregate	There is one crossing on perennial streams above Lake Selmac	Middle McMullin Creek
[+] Hydrologically connected means any road segment that has a continuous surface flow path between any part of the road prism and a natural stream channel. (Furniss et al., 2013).			

Hydrologically-connected disturbance from roads, trails, landings, and logging corridors have the potential for adverse effects, including sedimentation (Furniss et al., 2013). Haul routes have been evaluated to determine which road segments may be hydrologically connected to perennial streams. Of the proposed haul routes, there are 23 perennial stream crossings. Perennial stream crossings would be used to haul timber with the potential for sediment transportation to surface water. Proper road maintenance, BMPs (Section 2.5), and good project administration should reduce the risk of this source being above background conditions for sediment delivery to surface waters.

Hauling timber and other vehicle travel to support commercial thinning activities proposed in this alternative would degrade the road surfaces in some locations. One research study found that

roads contribute sediment at 7.5 times the rate with heavy traffic (defined as more than four loaded logging trucks per day) as days when there is no traffic or little traffic with light vehicles on the weekends (Reid, 1981). On aggregate and natural surface roads hauling may create road fines that can be aerosolized into dust or deposited in drainage ditches. When drainage features on roads fail, erosion can be increased by vehicle travel on poorly maintained roads. Both of these activities can cause sediment to be deposited in inside ditches and along roadways, creating sediment sources that can be transported during rain events.

Small pulses of sediment at stream crossings and hydrologically connected surface disturbances would likely occur during seasonal rain events from area roads in some areas. These sediment pulses have the potential to briefly increase turbidity. Intense localized thunderstorms (micro-bursts) may cause more extensive erosion and even debris flows. If an intense storm event happens to occur 1-2 years after treatments, the magnitude of sediment and timber debris would likely be elevated in treated areas relative to untreated areas. The magnitude of increased peak flows due to forest harvest diminishes as peak flows increase in intensity (Jones & Grant, 1996).

Roads may have adequate drainage features, or they may require maintenance to bring them up to standards (32.9 miles). There are 32.9 miles of existing road that will receive some level of maintenance under this alternative. Typical maintenance may include but is not limited to road blading and reshaping; spot rocking and surface replacement; ditch cleaning; cut-bank sluff removal; culvert inlet and outlet clearing; catch basin cleaning; culvert replacement; and removing vegetation (including trees) along roadsides to improve sight distance for travel. PDFs direct vegetation to be cut rather uprooted, up to 5-8 feet from either edge of the road prism.

Restoring drainage features may include: rolling dip structures, building new rolling dip features, installing culverts for cross drains to drain inside ditches, and culverts for crossing surface flow paths. There are some locations where culverts are failing. In some cases they would be replaced; in other cases, they would not be replaced if hauling is still possible. Culvert failure can cause road damage, erosion, and sedimentation (when the culvert is hydrologically connected to perennial water).

Properly functioning ditch lines with adequate water movement and little scour may have brush removed by cutting and not pulled or mechanically cleaned. Mechanical treatment would include using a backhoe, excavator, or road grader to reshape the ditch. Accumulated sediment would be hauled to a stable location not hydrologically connected to the stream system. These maintenance activities would occur in the dry season (October 15 – May 15). Timber hauling during the wet or dry season would be stopped when road surfaces become saturated and extensive rutting, and ribboning of the road surface occurs. Haul would continue after roads dry out (Section 2.5).

Maintenance activities may include adding cross-drains to inside road ditches to divert surface flow to stable soils and vegetation to re-infiltrate. In some locations, sediment basins may be installed to settle out sediment before important stream crossings. Vegetative buffers adjacent to and below units would capture and filter sediment from reaching ditches and/or streams. In areas where ground-based activities allowed sediment to reach road drainage ditches, site-specific use of PDFs such as placement of sediment detention features would be employed. Any potential increase in sedimentation on a sub-watershed scale is expected to be indistinguishable from background conditions.

Cumulative Effects for Sedimentation

For this project, it was determined that little to no sediment loads would be produced from individual units, landings, or crossings along haul routes that could be measured downstream. No treatment buffers, BMPs, and specific associated PDFs identified in Section 2.5 would result in no direct or long-term sediment input to streams. In other words, no measurable sedimentation downstream would occur above natural background levels described for the no-action alternative. Therefore, water quality and aquatic habitat downstream would not be negatively affected. There would also be no changes to current slope stability, the risk of slope failure and the risk of periodic slope failures are still within the range of natural variability.

Josephine County is anticipating an increase in harvest on County Forest Lands. Therefore, the assumption of harvest at similar levels on these lands in the future is not correct. This acreage on Josephine County managed lands is 73 acres and would be located in the Deer Creek watershed. Recalculating the ECA based on this additional acreage assuming full-harvest on these lands would result in an ECA of 16% for the Deer watershed. This is still well below the 29% threshold for potential enhancement of peak flows (Grant et al., 2008). About 10 culverts will be replaced along Reeves Creek and will probably result in short-term increases in local sediment loads but would not lead to cumulatively measurable or significant sediment load increases.

Some short-term direct and indirect effects to water quality were identified due to pulses in sediment and turbidity from road work, generally during the first significant storm event of the wet season. While these effects from sediment could potentially occur, it would still remain within acceptable water quality limits for turbidity, and sediment loads would occur during peak flows and would be difficult to distinguish from background levels.

Based on the data analyzed, the risk of peak flow enhancement from roads alone would be low. All roads in the PA occupy less than 5.5% of the land base. Statistically significant increases in peak flows have been shown to occur only when roads occupy at least 12% of the watershed, based on an extensive review of the literature of peak flows in western Oregon (Harr, 1976). The Action Alternative would not increase road densities since all temporary roads would be fully decommissioned after use. However, these same routes could be used as part of a reciprocal

ROW agreement, but it is assumed this would be off-set by decommissioning in other locations. Landings constructed in new disturbance would be rehabilitated. Therefore no increase in ECA or road densities and no perceptible increase in peak flows would be expected.

For this Proposed Action, no cumulatively measurable or significant alterations to the hydrologic function or quality of waters in the Deer Creek watershed tributary to the Illinois Subbasin are anticipated.

3.5.5 Alternative 3

Environmental Effects to Sedimentation

This alternative would not include group select openings to plant new stands of trees. This means it can be assumed that there would be no contribution to ECA under this alternative, the broadcast burning described would be less likely since there would not be a need to prepare the sites for planting, and only activity piles would be burned.

Potential enhancement of peak flows would be similar to impacts described for the No-Action Alternative because no additional acres of ECA would be created by harvest methods. Openings created for landings and roads would not increase the percentage of ECA (See Table 3-18).

Table 3-18: ECA by Catchment Analysis Areas (acres)

Analysis Area Name^	Analysis Area (Acres)	ECA+	% of Analysis Area	Proposed Landings	Project ECA
Deer Creek (1710031105)	63,886	10,001	16%	85	16%
Clean Slate Project Area	9,211	760	8%	85	9%
BLM Administered Land in PA	5,299	157	3%	85	5%
Middle McMullin Creek	2,466	158	6%	7	7%
Thompson Creek	2,233	103	5%	28	6%
Upper McMullin Creek	2,647	304	12%	5	12%
Quedo Creek and Tributaries	1,865	38	2%	44	4%

^These are the portions of the 5th level (HUC5) watersheds and subwatersheds for analysis purposes

+ Existing ECA calculated across all ownerships was analyzed for vegetative cover using the National Agriculture Imagery Program (NAIP) aerial photography (USDA, 2016). Areas that exhibited 30% or less canopy cover was considered bare ground for the purposes of establishing the ECA **(Furniss et al., 2013).**

All of the Clean Slate PA was in the Rain-Dominated zone. None of the Clean Slate calculated ECA percentages approach the 29 percent threshold, and therefore no enhancement of peak

flows is predicted for this project at the watershed or catchment scale. The proposed activities would also create additional openings for landings and temporary route construction (Table 3-19).

Table 3-19: ECA based on Digitizing Canopy Openings based on 2016 Aerial Photography. Openings include other non-treed areas such as recent burn scars or meadows.

	Analysis Area (Acres)	Landings*	Temp Routes (mi)	Additional ECA (acres)	Estimated ECA (Acres)	% Total
Alternative 1: No Action	9,211	0	0	0	760	8.3 %
Alternative 2		251 - 22	2.27	11	771	8.4 %
* (number of cable and ground landings - number of helicopter landings). The average opening is estimated at ¼ acre for cable and ground and 1 acre for helicopter.						

The likelihood of increases to peak flow as a result of the Two-Stage Thin Action alternative would be low, since ECA within the PA would well below 29% threshold for rain dominated watersheds (Grant et al., 2008), even after considering landings, group-select areas, and temp routes.

In summary, commercial harvest would be conducted with PDFs that are designed to reduce or remove the potential for accelerated erosion and any increased sediment production because of actions. Also, there is no expectation of enhancing peak-flows, water yields or changes in other hydrological conditions from commercial thinning that would increase sediment transportation rates above background conditions (Appendix A: Hydrology and Water Quality). Although there may be increased erosion locally and over the short-term; if goals to make forest stands more resilient to catastrophic disturbance such as crown-replacing fires are achieved, long-term sedimentation rates may decrease.

Cumulative Effects for Sedimentation

For the Propose Action, it was determined that little to no sediment loads would be produced from individual units, landings, or crossings along haul routes that could be measured downstream. No treatment buffers, BMPs, and specific associated PDFs identified in Section 2.5 would result in no direct or long-term sediment input to streams. In other words, no measurable sedimentation downstream would occur above natural background levels described for the no-action alternative. Therefore, water quality and aquatic habitat downstream would not be negatively affected. There would also be no changes to current slope stability, the risk of slope failure and the risk of periodic slope failures are still within the range of natural variability. This analysis would be the same for the Two-Stage Thin Alternative

Josephine County is anticipating an increase in harvest on County Forest Lands, but it would still result in an ECA well below the 29% threshold for potential enhancement of peak flows (Grant et al., 2008).

Just as with the Propose Action, some short-term direct and indirect effects to water quality were identified due to pulses in sediment and turbidity from road work, generally during the first significant storm event of the wet season. While these effects from sediment could potentially occur, it would still remain within acceptable water quality limits for turbidity, and sediment loads would occur during peak flows and would be difficult to distinguish from background levels.

For the Two-Stage Alternative, no cumulatively measurable or significant alterations to the hydrologic function or quality of waters in the Deer Creek watershed tributary to the Illinois Sub-basin are anticipated.

3.6 Fisheries & Aquatic Habitat

Issue: How would vegetation management, timber hauling, and road renovation affect federally-listed, native fish species, and their habitat?

3.6.1 Methodology and Assumptions

Methodology

- The fisheries analysis utilized data regarding distribution and fish presence/absence from Oregon Department of Fish and Wildlife, BLM Aquatic Resources Information Management System (ARIMS), and StreamNet;
- GIS was utilized to determine the distance from the proposed treatment units to fish-bearing streams;
- Critical habitat was designated in the Federal Register and is the best available information;
- The Deer Creek (USDI/BLM, 1997), and Sucker Creek (USDI/BLM, 2007) Watershed Analyses were used to gather baseline information for historical accounts on fish distribution and environmental conditions;
- Field visits to proposed haul routes, riparian treatments, and other proposed project activities provided site-specific information;
- Perennial and/or fish-bearing streams would be reviewed for tree-tipping projects.
- Middle zones of intermittent streams would be assessed for extraction of trees to stage at landings for future restoration projects. These future restoration projects would be covered under separate programmatic environmental assessment, biological assessment, and decision record;

- The Clean Slate Forest Management Project as proposed and analyzed, using relevant Best Management Practices (BMPs) and Project Design Features (PDFs), will have insignificant effects to SONCC Coho Salmon, its Critical Habitat (CH), and Essential Fish Habitat (EFH), and will be consulted on with NOAA Fisheries under the Programmatic Forest Management Program for Western Oregon.

Assumptions

- Fish distribution and presence/absence data are from Oregon Department of Fish and Wildlife, BLM ARIMS, and StreamNet. This is considered the best and most current available data;
- It is assumed that paved roads do not contribute sediment to streams;
- Coho critical habitat and Essential Fish Habitat are not going to be degraded due to the application of the allocation of Inner, Middle, and Outer Riparian Zones, along with the implementation of Best Management Practices and Project Design Features;
- Not all perennial/fish-bearing streams identified for tree tipping will have trees placed directly into the streams due to current Large Woody Debris (LWD) pieces, and existing infrastructure.
- Not all Middle Zones of Intermittent Streams will have trees extracted for future instream restoration due to limited restoration funding and staffing. Landing decks of logs, for future instream restoration, will be identified and strategically located to minimize damage from firewood cutters or arsonists.
- The 38-8-27.0 proposed haul route (aggregate surface) occurs within the Josephine Creek-Illinois River Fifth Field. Because the haul route and any associated haul activity do not intersect CH or fish-bearing waters, this portion of the project would be considered a “No Effect” and not analyzed in further detail. The 38-8-27.0 connects with Reeves Creek Road (bituminous surface). Reeves Creek Road is within 200 feet from a fish-bearing stream (Reeves Creek Tributary) yet would not affect fisheries because of road surfacing.

3.6.2 Affected Environment

The scale of the analysis for the PA totals 9,211 acres (~14 square miles) and includes portions of the Deer Creek and Sucker Creek Watershed. These two watersheds are considered Class I Watersheds. The area provides habitat for special status species, including Southern Oregon/Northern California Coasts Coho (SONCC) Salmon (*Oncorhynchus kisutch*); Klamath Mountains Province (KMP) Steelhead (*Oncorhynchus mykiss*); Southern Oregon Coast and Northern California Coast Chinook (*Oncorhynchus tshawytscha*), and Pacific Lamprey (*Entosphenus tridentatus*). In addition, resident Coastal Cutthroat Trout (*Oncorhynchus clarki*) are present in streams within the PA (Table 3-20). Non-game species such as speckled dace, sculpin, and redside shiner also inhabit streams in the watersheds listed above. Oregon Coast

(OC) Coho Salmon are present within watersheds on Medford District; however, they are not located within the Rogue watersheds or the PA.

Streams in these watersheds are stocked with hatchery fish from the Cole Rivers Hatchery. This hatchery is operated by the U. S. Army Corps of Engineers as mitigation for habitat loss due to the construction of Lost Creek and Applegate Dam. This hatchery is responsible for the rearing and releasing of spring Chinook salmon, winter steelhead, summer steelhead, coho salmon, and rainbow trout. Also, Lake Selmac supports a warm and cold water recreational fishery. Hatchery trout supplement the fishery and bass were introduced in the 1960's. Information on current fish distribution includes historical surveys from Oregon Department of Fish and Wildlife (ODFW) Aquatic Inventory observations, and StreamNet.

Table 3-20: Fish-bearing streams within the Clean Slate PA

HUC 10	Stream name	Fish Species
Deer Creek	Thompson Creek	SONCC Coho, KMP Steelhead, Cutthroat Trout
	Quedo Creek	Cutthroat Trout
	McMullin Creek	Cutthroat Trout
	Deer Creek	SONCC Chinook, SONCC Coho, KMP Steelhead, Cutthroat Trout

Special Status Species and their Designated Critical Habitat under the Endangered Species Act and Essential Fish Habitat under the Magnuson-Stevens Act

Federally Listed Threatened Fish Species: Salmon are listed under the Endangered Species Act (ESA) by evolutionarily significant units (ESU). An ESU is a stock of Pacific salmon that is 1) substantially reproductively isolated from other specific populations units, and 2) represents an important component in the evolutionary legacy of the species. The northernmost extent of the federally listed threatened SONCC Coho Salmon is the Rogue Basin. See Table 3-21 below for a list of treatment units and their proximity to fish-bearing and Coho Critical Habitat (CCH).

Southern Oregon/Northern California Coast Coho: On June 28, 2005, the National Oceanic and Atmospheric Administration (NOAA) Fisheries Service published a final determination to retain SONCC Coho Salmon as a threatened species under ESA (Federal Register Vol. 70, No. 123). Designation of Critical Habitat became effective on May 5, 1999 (Federal Register Vol. 64, No. 86). SONCC Coho Salmon are present throughout the PA and in proximity to proposed units and haul routes, Table 3-21.

Coho Critical Habitat: CH is found adjacent to 1 unit (21-8) at 1,096 feet from Thompson Creek. All other units are found further away from CH. See Table 3-21 Distance From Proposed Treatment Units to Fish Bearing Streams and CH.

Table 3-21: Distance from Proposed Treatment Units to Fish Bearing Streams and CH

HUC 10	Stream name	Units in proximity	Range to Fish Bearing Stream (Feet)	Range to Coho Critical Habitat (Feet)
Deer Creek	Thompson Creek	3-9	2,828	3,847
	Thompson Creek	3-10	4,391	4,956
	Thompson Creek	3-11	2,671	5,837
	McMullin Creek	9-5	951	29,018
	Quedo Creek (above Lake Selmac)	13-3	670	2,642
	Quedo Creek (above Lake Selmac)	13-4	776	5,307
	Thompson Creek	17-2	2,922	2,922
	Thompson Creek	21-8	1,096	1,096
	Thompson Creek	21-12	2,489	2,489
	Ryan Creek/Thompson Creek	22-5	784	3,819
	Hegan Creek	23-3	9,756	9,756
	Hegan Creek	23-4	8,825	8,825
	McMullin Creek	31-11	7,390	17,227
	Avg Distance:		3,552	7,519

Bureau Sensitive Species: Klamath Mountain Province (KMP) Steelhead and SONCC Chinook are both Bureau Sensitive Species listed as Sensitive Species by the State of Oregon. KMP Steelhead are located throughout the Deer Creek and Sucker Creek Watersheds with habitat preferences similar to those of other salmonids. KMP Steelhead tends to occupy streams with higher gradients than do SONCC Coho Salmon, and their distribution is similar to resident cutthroat trout, where access is not blocked by manmade or natural barriers. SONCC Chinook are found in the mainstem Deer Creek and Sucker Creek within the PA. Pacific lamprey use many of the tributaries of this watershed within the PA and their distribution overlaps with coho and steelhead habitat.

Essential Fish Habitat: Streams and habitat currently or historically accessible to Chinook and coho salmon are considered Essential Fish Habitat (EFH), designated for fish species of commercial importance by the Magnuson-Stevens Fishery Conservation and Management Act of 1996 50 CFR, Part 600, Subsection J, EFH. Streams within the PA designated as EFH include

Deer Creek, Thompson Creek, Sucker Creek, and other streams accessible to coho and Chinook salmon.

Riparian Reserves

Riparian Reserves: The 2016 ROD/RMP established Riparian Reserves as part of the land use allocation designation process. Riparian Reserves are the federally managed lands in which the primary objectives are to maintain and restore riparian functions, maintain water quality, and contribute toward the conservation and recovery of ESA-listed fish species (2016 ROD/RMP, p. 75). Riparian Reserves have differing management objectives and management direction, depending on whether lands are located east or west of Highway 97.

The Clean Slate Forest Management Project is located west of Highway 97. A portion of the proposed forest and transportation management actions are located within Riparian Reserve-Dry sub-allocation (Class 1 and 2 sub-watersheds), and Riparian Reserve-Moist sub-allocation (Class 1 and 2 sub-watersheds). BLM specialists identified stream and water features in and adjacent to proposed treatment areas using Light Detection and Ranging (LiDAR) and conducted site-specific field reviews to ensure that all Riparian Reserves were accurately identified. The BLM updated the corporate stream map data with any new information. Where the Riparian Reserves are excluded from commercial treatment, the boundaries would be clearly marked on the ground.

The Riparian Reserves widths were established using watershed specific site-potential tree heights. The site-potential tree heights were determined by the average maximum height of the tallest dominant tree (200 years or older) for a given site class 190 feet within the Deer Creek Watershed and 185 feet within the Sucker Creek Watershed (2016 ROD/RMP, p. 313). Site-specific widths for each Riparian Reserves are mapped in GIS and would be implemented under this project.

For the Clean Slate Forest Management Project, using the RMP Management Direction, fish-bearing and perennial streams were given a 120-foot buffer, while intermittent streams were given a 50-foot buffer. Four units (13-3, 17-2, 3-9, and 9-5) contained perennial stream buffers and were field verified by the project fish biologist for direct tree-tipping efforts. Two units (23-3 and 23-4) were identified as strategic locations for tree extraction from Middle zones of intermittent streams.

There is one haul route (38-7-27.0) that crosses over CH twice (Thompson Creek); the road surface type is bituminous or paved road. All haul routes that cross over CH are located in the Deer Creek Fifth-Field Watershed. No low water ford crossings in the Riparian Reserves have been identified for usage under the Clean Slate Project. Three discontinuous road segments, totaling 0.5 miles of proposed haul routes, are within 200 feet of listed fish habitat. These three road segments (parts of 38-7-27.0 Road) are all located within the Deer Creek Fifth-Field

Watershed yet are not expected to have impacts on adjacent habitat listed within Thompson Creek because they are all paved roads.

Aquatic Habitat

The topics listed below are elements of fish and aquatic habitat. Below are the elements that make up the habitat.

Spawning Substrate: The availability of spawning substrate is an important factor in fish productivity. The quality of spawning habitat varies according to the amount and quality of the spawning substrate. Gravel and small cobble substrate that is relatively free from embedded fine sediment provide ideal spawning substrate for resident and anadromous salmonids (Bell, 1990). During incubation of eggs and alevins, survival and emergence rates can be reduced when sediment exceeds 15 percent of the area (Bjornn & Reiser, 1991).

According to ODFW Aquatic Habitat Inventory Surveys, sand and fine organics made up a minimal portion of riffle units, as illustrated in Table 3-22. There was an average of 7.2 % riffles comprised of sand and fines with a range from 2.0 to 14.0 %. The percentage of spawning gravel within the PA was moderate. Gravel substrate made up an average of 34.2 % of riffle units, ranging from 13 to 49 %.

Table 3-22: Selected Habitat Index Values for Streams in the Clean Slate Project

HUC 10	Stream Name	Percent Sand and Organics	Percent Gravel	Percent Pool Habitat	Average Key Pieces (per 100m)
Deer Creek	Deer Creek Reach 1	6.0	13.0	30.3	0.6
	Deer Creek Reach 2	2.0	23.0	34.2	3.3
	Deer Creek Reach 3	6.0	20.0	0.0	0.0
	Deer Creek Reach 4	6.0	44.0	20.7	2.7
	Deer Creek Reach 5	11.0	49.0	22.8	5.7
	Deer Creek Reach 6	5.0	47.0	13.9	1.2
	Deer Creek Reach 7	7.0	26.0	1.4	1.1
	Deer Creek Reach 8	5.0	42.0	3.5	8.8
	Deer Creek Reach 9	10.0	33.0	0.8	45.9
	Haven Creek	NA	NA	NA	NA
	Hegan Creek	NA	NA	NA	NA
	Holton Creek	NA	NA	NA	NA
	Lake Selmac	NA	NA	NA	NA

HUC 10	Stream Name	Percent Sand and Organics	Percent Gravel	Percent Pool Habitat	Average Key Pieces (per 100m)
	McMullin Creek Reach 1 (Completed by BLM Staff)	14.0	45.0	16.3	16.0
	Quedo Creek	NA	NA	NA	NA
	Quedo Creek Trib 1	NA	NA	NA	NA
	Reeves Creek	NA	NA	NA	NA
	Ryan Creek	NA	NA	NA	NA
	Thompson Creek	NA	NA	NA	NA
	Deer Creek Subtotals	7.2	34.2	14.4	8.5

**Key pieces of large woody debris are pieces with a minimum diameter of 60 centimeters and a minimum length of 10 meters. These pieces are dead or dying trees, either natural or cut, occurring within the stream channel. Key pieces are typically the anchor pieces around which other material is deposited and trapped.*

Pool quality: Pools are important habitat features for juvenile rearing during summer months when lower water levels and higher stream temperatures add to stress and during high flow events when off-channel habitat provides refuge. Salmonids are typically larger in size and found in greater numbers in deeper pool habitats (Rosenfeld et al., 2000). Surveyed stream reaches (See Table 3-22) had an average of 14.4 % pool habitat by area.

Large Woody Debris: Large woody debris refers to all pieces of wood at least 15 centimeters in diameter and 3.0 meters in length, and larger, including all rootwads. These pieces are found at least partially within the stream's active channel and are both natural or cut dead and dying trees. Large woody debris is important in the formation of deep scour pools and off-channel habitat, and retention of gravel substrate (Bilby & Ward, 1989). The pools and off-channel habitat provide refuge for salmonids during high flow events and reserves of cool water during low flow months when water temperatures may become elevated (Swanston, 1991).

On average, there are 8.5 key pieces per 100 meters of stream. Foster et al. (2001) described key pieces as those greater than 10 meters in length and 60 centimeters in diameter.

Habitat Access: There are nine road culverts within the Deer Creek Watershed that restrict passage of juvenile salmonids. They include; South Fork Deer Creek, South Fork Deer Creek (Tributary #2), South Fork Deer Creek (Tributary #1), White Creek #1, White Creek #2, Thompson Creek (Tributary #1), Thompson Creek (Tributary #2), Draper Creek #2, and Draper Creek #3.

BLM conducted a culvert inventory in 2002 on BLM-administered land within the Sucker Creek Watershed. Three passage barriers are listed on Bear Creek and one barrier on Little Bear Creek. The BLM replaced one culvert on Bear Creek and one on Little Grayback Creek with bottomless structures to improve fish passage in 1999 and 2003, respectively.

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

3.6.3 Environmental Effects

Alternative 1 – No Action

Direct and Indirect Effects

While activities associated with the proposed action would not occur under the No Action Alternative other activities which are not associated with the proposed action may occur and are discussed below.

Vegetation management projects and/or timber sales include: Picket West Fuels, Young Stand Management Treatments (2017-2022 CX), Young stand Management Treatments and Hand Piling and Burning by the District Integrated Vegetation Management EA, Josephine County Forestry, 250-acre Salvage CX, Insect, and Disease Hazard Tree CX. These projects are BLM approved projects and would follow all provisions of the Clean Water Act (40 CFR Subchapter D) and Department of Environmental Quality's (DEQ's) provisions for maintenance of water quality standards. These projects would apply riparian reserve buffers when in proximity to streams and CH and apply PDFs and BMPs such as ones that minimize ground disturbance within the Riparian Reserves, prohibit fording of fish-bearing streams with heavy equipment, limit expansions of landings or new landings within Riparian Reserves, minimize shade removal and sediment inputs, and maintain levels of large woody debris in order to minimize effects to listed species and their habitat. Projects associated with private lands would comply with Oregon Forest Practices that are designed to protect aquatic resources.

Miscellaneous projects include projects such as Federal Land Access Program-Josephine County, Road Maintenance and Pump Chance CX, and the Limestone Challenge Equestrian Endurance Ride. These types of projects would either be located outside Riparian Reserves so

that the effect to listed species would be negligible or contain BMPs and PDFs that minimize effects to listed species and their habitat. Road maintenance activities that benefit hydrologic function within the PA will also benefit habitat for fish and aquatic species.

Under the No Action Alternative, there would be no project-related road maintenance activities. Road maintenance activities improve the function of system roads and decrease non-point source pollution that may emanate from unmaintained roads. Thus, under the No Action Alternative, there would be no decrease to non-point source pollution within the PA associated with project activities. Additionally, under the No Action Alternative, Riparian Thinning of middle zones of intermittent streams would not occur. Thus there would be no logs produced to benefit Fisheries Management Objectives or aquatic species associated with this Alternative (for more information on Fisheries Management Objectives, see 2016 ROD/RMP, p.91). Therefore, this project is not anticipated to cumulatively effect fish species and habitat within the Clean slate PA.

Cumulative Effects

Within the Project Area, other projects that would be anticipated to occur including other vegetation management projects such as timber sales, and fuel reduction projects, along with miscellaneous projects.

Vegetation management projects and/or timber sales include: Picket West Fuels, Young Stand Management Treatments (2017-2022 CX), Young stand Management Treatments and Hand Piling and Burning by the District Integrated Vegetation Management EA, Josephine County Forestry, 250-acre Salvage CX, Insect, and Disease Hazard Tree CX. These projects are BLM approved projects and would follow all provisions of the Clean Water Act (40 CFR Subchapter D) and Department of Environmental Quality's (DEQ's) provisions for maintenance of water quality standards. These projects would; apply riparian reserve buffers when in proximity to streams and CH, and apply Project Design Features and Best Management Practices such as ones that minimize ground disturbance within the Riparian Reserves, don't allow fording of live streams with heavy equipment, limit expansions of landings or new landings within Riparian Reserves, minimize shade removal and sediment inputs, and maintain levels of large woody debris in order to minimize effects to listed species and their habitat. Projects associated with private lands would comply with Oregon Forest Practices that are designed to protect aquatic resources.

Miscellaneous projects include projects such as Federal Land Access Program-Josephine County, Road Maintenance and Pump Chance CX, and the Limestone Challenge Equestrian Endurance Ride. These types of projects would either be located outside Riparian Reserves so that the effect to listed species would be negligible or contain BMPs and PDFs that minimize effects to listed species and their habitat. Road maintenance activities that benefit hydrologic function within the PA will also benefit habitat for fish and aquatic species.

Under the No Action Alternative, there would be no project-related road maintenance activities. Road maintenance activities improve the function of system roads and decrease non-point source pollution that may emanate from unmaintained roads. Thus, under the No Action Alternative, there would be no decrease to non-point source pollution within the PA associated with project activities. Additionally, under the No Action Alternative, Riparian Thinning of middle zones of intermittent streams would not occur. Thus there would be no logs produced to benefit to Fisheries Management Objectives or aquatic species associated with this Alternative (for more information on Fisheries Management Objectives, see 2016 ROD/RMP p.91). Therefore, this project is not anticipated to cumulatively effect fish species and habitat within the Clean Slate PA.

Alternative 2

Direct and Indirect Effects

Special Status Species and their Designated Critical Habitat under the Endangered Species Act Federally Threatened Fish Species:

Southern Oregon/Northern California Coast Coho and their Designated Critical Habitat: Stand treatments, yarding, landing construction and rehabilitation, temporary route construction and reconstruction (including route decommissioning), road maintenance, hauling, and activity fuel treatments would have a negligible effect on SONCC Coho Salmon (ESA-Threatened) and CH. For the Clean Slate Project PA, the closest CH (Thompson Creek) is 1,096 feet from the closest treatment unit (21-8). This treatment unit will have Riparian Reserves Distances of 50 feet for intermittent, non-fish-bearing stream buffer.

The Clean Slate PA haul road segments and road-related activities intersect two stream segments containing CH. Because the two crossings occur on bituminous (paved) surface type and erosion from paved roads is not expected, they are dropped from further analysis. The 38-7-27.0 Road listed in Table 3-23 crosses Thompson Creek twice.

Table 3-23: Critical Habitat Crossings within the Clean Slate Planning Area

Structure #	Road #	Creek	HUC 10	Road Surface
1	38-7-27.0	Thompson Creek	Deer Creek	Bituminous
2	38-7-27.0	Thompson Creek	Deer Creek	Bituminous

Bureau Special Status/Sensitive Species (SSS): KMP Steelhead, SONCC Chinook, and Pacific Lamprey are within Deer Creek, and Sucker Creek HUC 10 Watershed. KMP Steelhead,

SONCC Chinook, and Pacific Lamprey habitats are contained within the Presence Verified (PV) and Presence Not Verified (PNV) GIS data analyzed for Fish-bearing streams. The SSS in the Clean Slate PA are 670, 776, and 784 feet from the closest treatment units (13-3, 13-4, and 22-5, respectively). These treatment units would have Riparian Reserves of 50 feet for intermittent, non-fish bearing streams due to their lack of proximity to fish-bearing streams.

The Clean Slate PA haul road segments and road-related activities intersect 14 streams containing SSS (See Table 3-24 below). These 14 road segments represent bridges and/or culverts on SSS streams. Because the nine crossings occur on bituminous (paved) surface type and erosion from paved roads is not expected, they are dropped from further analysis. See Table 3-24 for the location of the five SSS Crossings. Sediment would not be expected to enter SSS habitat as a measurable unit because of haul or maintenance on haul roads, dry-condition haul, properly functioning cross drains, and sediment barriers installed, where needed, to prevent measurable sediment delivery into SSS streams. Project activities would follow all provisions of the Clean Water Act (40 CFR Subchapter D) and Department of Environmental Quality's (DEQ's) provisions for maintenance of water quality standards.

Table 3-24: SSS Crossings within the Clean Slate Planning Area

Structure #	Road #	Creek	HUC 10	Road Surface
1	38-7-19.0	McMullin Creek	Deer Creek	Bituminous
2	39-7-21.0	Bear Creek	Sucker Creek	Bituminous
3	38-7-31.0	McMullin Creek	Deer Creek	Rocked
4	39-7-21.0	Bear Creek	Sucker Creek	Bituminous
5	38-7-27.0	Thompson Creek	Deer Creek	Bituminous
6	38-7-19.0	McMullin Creek Trib	Deer Creek	Bituminous
7	39-7-21.0	Bear Creek	Sucker Creek	Bituminous
8	38-7-21.2	Ryan Creek	Deer Creek	Rocked
9	39-7-21.0	Bear Creek	Sucker Creek	Bituminous
10	38-7-31.0	McMullin Creek	Deer Creek	Rocked
11	39-7-21.0	Bear Creek	Sucker Creek	Bituminous
12	38-7-31.0	McMullin Creek	Deer Creek	Rocked
13	38-8-13.0	Quedo Creek	Deer Creek	Rocked
14	38-7-27.0	Thompson Creek	Deer Creek	Bituminous

Treatment units, yarding, landing construction and rehabilitation, temporary route construction and reconstruction (including route decommissioning), road maintenance, hauling, and activity fuel treatments would have negligible effects on KMP steelhead, SONCC Chinook, Pacific Lamprey. Sediment would not be expected to enter SSS habitat as a measurable unit because of haul or maintenance on haul roads, dry-condition haul, properly functioning cross drains, and sediment barriers installed, where needed, to prevent measurable sediment delivery into SSS

streams. Project activities would follow all provisions of the Clean Water Act (40 CFR Subchapter D) and Department of Environmental Quality's (DEQ's) provisions for maintenance of water quality standards. Fish species are listed as special status species by ESUs. See the Federally Threatened Fish Species section above for the definition of ESUs.

Essential Fish Habitat under the Magnuson-Stevens Act
Treatment units, yarding, landing construction and rehabilitation, temporary route construction and reconstruction (including route decommissioning), road maintenance, hauling, and activity fuel treatments would not adversely affect coho and Chinook salmon EFH. The closest treatment unit (21-8) is approximately 1,096 feet from EFH. These treatment units would have Riparian Reserve buffers averaging 120 feet on perennial or fish-bearing streams, and 50-foot buffer on non-fish-bearing streams.

The Clean Slate PA haul road segments and road-related activities intersect two streams on Thompson Creek containing EFH. These two road segments are on bituminous road surface and represent bridges and/or culverts on EFH streams. Sediment would not be expected to enter EFH as a result of the bituminous road surfacing

Riparian Reserves
Four units (13-3, 17-2, 3-9, and 9-5) contain perennial stream buffers and were field verified by the project fish biologist for direct tree-tipping efforts. Due to various reasons such as lack of stream channel, lack of water, appropriate levels of LWD, streams considered to be non-fish-bearing, stream gradient too steep to support log placement, these four units will not have tree-tipping actions taking place within the Riparian Reserve.

Unit 23-4 was identified as a strategic location that could provide and store logs ideal for fish habitat restoration projects elsewhere in the Deer Creek watershed. A total of thirty trees were selected that will be extracted from the Riparian Reserve and decked at nearby landings. Their subsequent removal from the landings and placement into CCH within the fifth field will be covered under an Aquatic Habitat EA.

There is one haul route (38-7-27.0) that crosses over CH twice (Thompson Creek); the road surface type is bituminous or paved road. All haul routes that cross over CH are located in the Deer Creek Fifth-Field Watershed. No low water ford crossings in the Riparian Reserves have been identified for usage under the Clean Slate Project. Three discontinuous road segments, totaling 0.5 miles of proposed haul routes, are within 200 feet of listed fish habitat. These three road segments (38-7-27.0 Road) are all located within the Deer Creek Fifth-Field Watershed yet are not expected to have impacts on adjacent listed habitat within Thompson Creek because they are all paved roads.

Aquatic Habitat

Spawning Substrate: Stream substrate is likely to be similar to the description within the Affected Environment because the proposed activities would occur outside the no-treatment Inner Riparian zone, and BMPs and PDFs in upslope areas and along haul routes would greatly reduce the likelihood of harvest-related sediment entering spawning substrate.

Pool Quality: Pool quality would not be affected by proposed harvest and road-related activities. Activities would occur outside of Inner Riparian zones and BMPs and PDFs in upslope areas and along haul routes would greatly reduce the likelihood of harvest-related sediment affecting pool quality.

Large Woody Debris: Fish bearing streams would receive a 120-foot buffer on either side of the stream or 50 feet on non-fish bearing streams. These buffers would be sufficient to keep large wood at current levels. As a result, there would be no probability of an effect to Large Woody material as a result of proposed harvest and road-related activities.

Habitat Access: Habitat access would remain unaltered under Alternative 2. Fish passage culverts or bridges are not proposed to be replaced or upgraded under this project.

Summary of Direct and Indirect Effects for Alternative 2

The Clean Slate proposed project is within the Rogue Basin and the range of the federally threatened Southern Oregon/Northern California Coasts (SONCC) coho salmon and would have insignificant effects on coho or critical habitat. Consultation for the Endangered Species Act and Essential Fish Habitat for the Magnuson-Stevens Fishery Conservation and Management Act with the National Marine Fisheries Service is covered under the *Endangered Species Act Section 7(a)(2) Biological Opinion, and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat for the Programmatic Forest Management Program for Western Oregon* (WCR-2017-7574).

Cumulative Effects

Within the Project Area, other anticipated projects include other vegetation management projects such as timber sales, and fuel reduction projects, along with miscellaneous projects.

As stated above the projects listed under the No Action Alternative are reasonably foreseeable to occur. Those projects in association with the activities described in the Proposed Action are not expected to have detrimental environmental effects.

Vegetation management projects and/or timber sales would apply riparian reserve buffers when in proximity to streams and Critical Habitat. The PDFs and BMPs such as ones that minimize

ground disturbance within the Riparian Reserves, don't allow fording of fish-bearing streams with heavy equipment, limit expansions of landings or new landings within Riparian Reserves, minimize shade removal and sediment inputs, and maintain levels of large woody debris would be applied in order to minimize effects to listed species and their habitat.

Foreseeable private forest harvest within the PA would comply with Oregon Forest Practices Act. The BLM does not regulate harvest on private land. The requirements of the Oregon Forest Practices Act are intended to protect fish, wildlife, and water quality when forest management activities occur near waters of the state and within riparian management areas (ODA, 2016, p. 10). There are expected to be no cumulative impacts to waters of state and aquatic resource because BLM actions and private land harvest are implemented under state and federal laws and regulations. While the BLM is not directly regulated under the Oregon Forest Practices Act, the agency meets and exceeds the requirements of the Act.

Miscellaneous projects would either be located outside Riparian Reserves so that the effect to listed species would be negligible or contain BMPs and PDFs that minimize effects to listed species and their habitat. Road maintenance activities that benefit hydrologic function within the PA would also benefit habitat for fish and aquatic species.

Under Action Alternative 2, there would be project-related road maintenance activities. Road maintenance activities improve the function of system roads and decrease non-point source pollution that may emanate from unmaintained roads. Thus, under Alternative 2, there would be a decrease in non-point source pollution within the PA associated with project activities. Additionally, under the Alternative 2, Riparian Thinning would occur. This would be a benefit to Fisheries objectives or aquatic species associated with this Alternative. With the implementation of the BMPs, PDFs, stream buffers, and seasonality of ground disturbance; there would be insignificant indirect effects from Alternative 2. Therefore, this project is not anticipated to cumulatively effect fish species and habitat within the Clean Slate PA.

Alternative 3

Direct and Indirect Effects

During the public scoping period, the BLM received an alternative which proposed a two-step thinning strategy which was described as being, "more consistent with the Uneven-Aged Timber Area land use allocation because there is no option for regeneration type harvest in the future."

The two-step thinning alternative would retain a much greater proportion of large trees and canopy cover than the maximum logging intensity allowed for the UTA land use allocation. The commenter believes that this method of forest management would ensure that a second viable

harvest could be conducted in the near future while achieving the silvicultural objectives, Northern Spotted Owl objectives, and 2016 RMP direction for the UTA land use allocation.

The commenter asserts “It is highly unlikely that maximizing timber harvest in Clean Slate units would “generate a successive stand of timber for future harvest in accordance with sustained yield timber management as directed by the 2016 ROD/RMP.” We assert that maximizing volume under UTA guidelines (e.g., 30% openings, 4-acre regeneration, 20% relative density) in the Clean Slate units would eliminate the potential for economic thinning harvest for 50 years.

The two-step thinning alternative consists of the following:

- 20% untreated skips, and
- 5% openings (1/8-1/2 acre), and
- Relative Density of 45% with canopy maintained at 40-60%, and
- Skips and gaps accomplished with techniques described in Churchill et al. 2013a and Churchill et al. 2013b *Individuals, Clumps, and Openings.*

The Proposed Action and Alternative 3 propose to treat the same quantity of acres. They differ in the type of silvicultural system that may be implemented. The analysis which details the difference between the Alternatives is located within the Forest Condition analysis in Chapter 3.

Under Alternative 3, because riparian thinning would not be altered in acres or buffer widths, and seasonality of tree extraction or haul would not be altered, there would be no difference in effects to Fisheries as Alternative 3. With the implementation of the BMPs and PDFs, there would be no additional effects from Alternative 3.

Cumulative Effects

As stated above the projects listed under the No Action Alternative are reasonably foreseeable to occur. Those projects in association with the activities described in the Proposed Action are not expected to have detrimental environmental effects.

Vegetation management projects and/or timber sales would apply riparian reserve buffers when in proximity to streams and Critical Habitat. The PDFs and BMPs such as ones that minimize ground disturbance within the Riparian Reserves, don’t allow fording of fish-bearing streams with heavy equipment, limit expansions of landings or new landings within Riparian Reserves, minimize shade removal and sediment inputs, and maintain levels of large woody debris would be applied in order to minimize effects to listed species and their habitat.

Foreseeable private forest harvest occurring within the PA would comply with Oregon Forest Practices Act. The BLM does not regulate harvest on private land. The requirements of the Oregon Forest Practices Act are intended to protect fish, wildlife, and water quality when forest

management activities occur near waters of the state and within riparian management areas (ODA, 2016, p. 10). There are expected to be no cumulative impacts to waters of state and aquatic resource because BLM actions and private land harvest are implemented under state and federal laws and regulations. While the BLM is not directly regulated under the Oregon Forest Practices Act, the agency meets and exceeds the requirements of the Act.

Miscellaneous projects would either be located outside Riparian Reserves so that the effect to listed species would be negligible or contain BMPs and PDFs that minimize effects to listed species and their habitat. Road maintenance activities that benefit hydrologic function within the PA would also benefit habitat for fish and aquatic species.

Under Action Alternative3, there would be project-related road maintenance activities. Road maintenance activities improve the function of system roads and decrease non-point source pollution that may emanate from unmaintained roads. Thus, under Alternative 3, there would be a decrease in non-point source pollution within the PA associated with project activities. Additionally, under the Alternative 3, Riparian Thinning would occur. Thus there would be a benefit to Fisheries objectives or aquatic species associated with this Alternative. With the implementation of the BMPs, PDFs, stream buffers, and seasonality of ground disturbance there would be insignificant indirect effects from Alternative 3, and therefore this project is not anticipated to cumulatively effect fish species and habitat within the Clean Slate PA.

Conclusion

The Clean Slate proposed project is within the Rogue Basin and the range of the federally threatened Southern Oregon/Northern California Coasts (SONCC) coho salmon and would have insignificant effects on coho or critical habitat. Consultation for the Endangered Species Act and Essential Fish Habitat for the Magnuson-Stevens Fishery Conservation and Management Act with the National Marine Fisheries Service is covered under the *Endangered Species Act Section 7(a)(2) Biological Opinion, and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat for the Programmatic Forest Management Program for Western Oregon* (WCR-2017-7574).

3.7 Economics

Issue: How would the removal of forest products contribute towards the local and regional economy?

This section analyzes the potential impacts of the proposed forest management activities on economics.

3.7.1 Methodology and Assumptions

Methodology

Economics focus on the 2016 ROD/RMP objectives of managing forest stands to achieve continual and sustained timber production and offering for sale the declared Allowable Sale Quantity of timber (2016 ROD/RMP, p. 62); thus, providing jobs and contributing to community stability. In addition to commodity supply, evaluation of the economic feasibility of management actions is a consideration in project design. The Analysis Area includes all BLM-administered lands within the Project Area. This analysis considers the commodity supplies and associated employment opportunities that would be contributed from lands in the Analysis Area. Economic values that are assessed include total commodity output (wood fiber harvested), total dollar return to the Federal Treasury, and dollar value per unit of output. Units of output are measured as MBF (thousand board feet) of harvest for sawlog material. The values used per MBF of harvest are based on May 2018 prices for Douglas-fir ($877 per MBF). Level of commodity output provides the basis for assessing commodity supply, resultant employment levels, and estimates of net revenue and revenue per unit of output to the Federal Treasury. Positive net revenue serves as an indicator of economic feasibility and revenue per unit of output indicates the level of economic efficiency.

The economic impacts of non-commodity-based activities are only assessed where there is a correlation to commodity supply. Management actions, such as habitat improvement or fuel hazard reduction, have economic effects; however, the primary focus of these actions is not for inputs to the economy but to provide for resource enhancement. As a result, the economic impacts of non-commodity-based actions are recognized but are not a primary decision factor in considering the implementation of an action alternative.

Assumptions

Affected employment levels per MMBF (million board feet) processed is 9.07 jobs in the solid wood products industry (USDA/USFS, USDI/BLM; 1994, 3&4-293).

Economic values are static and intended to provide for a relative comparison among alternatives. Average harvest levels are from historical yields of treatments in the Grants Pass Field Office similar to those proposed in the Project Area, and vegetation modeling that applies the silvicultural prescriptions for each alternative to widely varying stand conditions (see section 3.2 Forest Condition). Volumes used in this analysis are estimates, and actual average volume/acre from the proposed action alternatives is estimated to range from 5 to 45 MBF/acre. The vegetation models are intended to be used as comparisons of relative tradeoffs, not predictors

Vegetation models historically have tended to overestimate actual harvest volumes because logging operations are complex and cannot harvest all modeled timber, defects are not accurately captured in modeling outputs. Because the same set of modeling assumptions are applied to all

alternatives, the predicted outputs can provide the deciding official with adequate information to decide between alternatives.

The estimated return to the Federal Treasury is based on current pond values excluding estimated logging costs. Logging costs are based on average yarding distances as well as average road renovation, and temporary route construction and reconstruction costs for each alternative.

Fuels hazard reduction creates approximately 28.8 jobs per $1 million invested (Moseley 2009). Fuels hazard reduction treatments cost approximately $1,000 per acre based on past similar treatments within the Grants Pass Field Office.

3.7.2 Affected Environment

A regional perspective of the economic setting is provided in the Southwestern Oregon RMP EIS (2016ROD/RMP, pp. 585-744). Merchantable timber on the Harvest Land Base is highly dispersed, and the stocking levels of merchantable-size trees are variable. Individual tracts of BLM-administered land within the Clean Slate Project Area are fragmented by a mixed ownership pattern with private lands. Individual BLM tracts range from. Lands within each tract are further fragmented by varying land use allocations under the 2016 ROD/RMP. This, in conjunction with past harvest treatments on these lands, has resulted in the existing stages of development with respect to potential timber supply.

Assuming no disturbance occurs, the larger size classes of timber would be expected to increase in representation over time with younger stands becoming less prevalent on the land base. Treatment under existing management direction would tend to accelerate growth to the next development stage through thinning of the younger size classes. The seedling-to-pole size class would be maintained through regeneration of the large sawlog component.

Factors that affect supplying forest commodities in an economically feasible manner are the amount and distribution of material available for harvest, the method of harvest, access to harvest areas, and the associated costs to mitigate the impacts of harvest, such as treatment of activity slash. These factors considered individually or collectively have an effect on the economic feasibility (positive net revenue) and economic efficiency (revenue per unit of harvest) of harvest proposals.

The amount and distribution of commercial forest products existing on the Harvest Land Base are interrelated with access and method of harvest. Harvest of timber stands with a relatively higher harvest volume per acre in a concentrated area would result in lower access and removal costs compared to stands with relatively lower harvest volumes located in a more dispersed pattern.

Common methods of harvest (yarding trees from stump to truck) are primary factors affecting actual harvest costs. Ground-based tractor yarding is the most cost-effective method of removal with typical logging costs around $150/MBF. Cable yarding incurs a higher removal cost at around $250/MBF. Helicopter yarding is the most costly removal method, which costs approximately $400/MBF. Appropriate harvest methods vary and are generally based on management objectives in conjunction with site conditions such as access, topography, and available harvest volume. Where more cost-effective harvest methods can be used, economic efficiency is increased. Economic feasibility is affected when relatively lower harvest volumes or values are associated with more costly yarding methods.

Important factors to consider in determining the economic feasibility of ground-based yarding systems (tractor, skidder) are the maximum yarding distance and the average yarding distance to the landing. Maximum yarding distance varies by the type of ground-based equipment used. Typical logging operations in this area would use either crawler tractors or rubber-tired skidders. The maximum yarding distances generally range from 700 feet for tractors and 1,000 feet for skidders. Optimum average yarding distance is in the 500- to 700-foot range for this equipment. The slope is a limiting factor for tractor yarding in the Project Area. Tractor yarding is generally limited to slopes less than 35%. Felling costs would be minimized in all alternatives by using mechanized felling equipment, such as tracked harvesters, in ground-based yarding units.

Skyline-cable yarding is proposed on steeper-slopes (>35%) within the Project Area. Strategically located existing roads or new routes, generally at the top of units, are necessary in order to feasibly harvest units using skyline-cable yarding systems. Optimum yarding distance for skyline-cable yarding systems is 1,000 feet with a maximum yarding distance capability of 4,000 feet. Harvest volume per acre, size of harvest trees, and move-in/move-out costs are other key factors that contribute to an economically feasible skyline-cable yarding operation. Limited road access and topographic features such as convex slopes, uneven terrain, and long, constant slopes can present difficulties for skyline-cable yarding systems. Where these difficulties cannot be engineered around or where environmental issues limit road construction or ground disturbance, then helicopter yarding can be considered if economically feasible.

Optimum yarding distance for helicopter yarding is approximately 2,500 to 5,000 feet with a maximum distance of three to four miles. Local experience has shown that operations are optimum at 2,500 feet with a maximum distance of one mile. Harvest volume per acre, size, and weight of harvest trees are other important factors that contribute to an economically feasible helicopter operation.

Access to harvest areas is a factor with respect to the number of road systems needed and the condition of those roads. Cost factors include the level of road improvement needed for hauling

material, road surface condition with respect to the length of the operating season, use restrictions during wet conditions, and move-in/move-out costs of equipment where multiple road systems are used for access. Economic feasibility and efficiency are reduced where road improvement costs and the number of road miles or road systems needed for harvest access increase.

There are costs associated with the implementation of required Project Design Features (PDFs), such as ripping compacted soils, decommissioning or closing roads, treating activity slash, and operating under seasonal restrictions. The cost and level of mitigation needed is situation dependent.

3.7.3 Environmental Consequences

Alternative 1 - No Action

Direct and Indirect Effects

Under the No Action Alternative, proposed management actions would be deferred. There would be no timber volume from the Clean Slate Project Area in fiscal year 2018 to contribute toward the Medford District's annual allowable sale quantity, and there would be no return to the Federal Treasury. Under this alternative, timber harvest would not provide any forestry-related jobs. This would include jobs directly related to the timber harvest such as timber fallers, logging crews, log truck drivers, road crews, and sawmill employees.

Timber volume predicted from the Clean Slate Project would constitute most of the Grants Pass Field Office's contribution to the Medford District's Allowable Sale Quantity for fiscal year 2018. Under the No Action Alternative there would be a far lower contribution from the Grants Pass Field Office and given the management direction to produce a sustainable supply of timber from the Harvest Land Base, the supply, and resulting economic effects would fall short of projected levels for fiscal years 2018. Opportunities for future timber harvest in the short- and long-term would remain unchanged. With no action, there would be a lost opportunity in maximizing growth potential in mature stands and in younger stands where densities are high.

The No Action Alternative has potential effects to timber purchasers and processors, the county government, and the local and regional community. The economic impacts of the BLM's timber program were extensively analyzed in the 2015 FEIS. The BLM depends on a functioning timber industry infrastructure, including both sawmills and loggers, to accomplish the land management and community support goals established by the O&C Act and the Federal Land Policy & Management Act (FLPMA) 43 U.S.C. 1781. Not harvesting timber in the Project Area may negatively affect the companies and their long-term planning for a reliable supply of timber from federally managed lands. These negative effects may, in turn, affect employees of the company

and the various contractors whose businesses are associated with logging and wood products manufacturing.

Without the implementation of timber harvest, there would be no percentage of receipts to the county government, as entitled by the O&C Act. County governments rely in part on those receipts to fund services to county residents. The local and regional communities would be deprived of the jobs and economic benefits of timber harvest.

Forestry-related jobs for commercial harvest would not be provided. Fuels treatments would not provide additional jobs.

Indirectly, fire suppression costs would be higher because fuel loads in planned timber harvest and non-commercial units would not be reduced.

Indirectly, road maintenance costs would increase because maintenance of 32.9 miles of roads in the Project Area would not occur, allowing roads to continue to deteriorate over time and increasing the eventual costs to restore the roads.

Alternative 2 - Proposed Action

Direct and Indirect Effects

Under Alternative 2, approximately 150-175 ft^2/ac of commercial basal area would be harvested, according to local experience with commercial harvest in similar forest types, this would result in approximately 10-15 MBF/acre on 408 acres (due to inner riparian zones being ineligible for harvest) resulting in a potential harvest of approximately 4.1-6.1 MMBF. Direct employment as a result of timber harvest and processing a commodity would result in approximately 45 full-time equivalent jobs. The estimated return to the Federal Treasury for timber harvest would be $652 per MBF for a total value of approximately $2.7-4 million.

The 314 acres treated under the Integrated Vegetation Management strategy applied to the Uneven-age Timber Allocation (UTA) could be available for harvest again in the future. In the long-term, volume growth capability would be increased in the treated stands. Indirectly, fire suppression costs would be lower due to the reduced fuel loads on 461 acres of Integrated Vegetation Management through the associated activity fuels treatment. Road maintenance costs would be decreased in the long-term along 32.9 miles of road maintenance on existing routes. The proposed action includes removing brush, repairing drainage features such as culverts and cleaning ditches, and improving travel surfaces by blading and/or adding gravel to bring roads up to haul standards.

Alternative 2 would provide harvest volume and net revenue to the Federal Treasury from commercial stands and improve future timber supply potential in developing stands through thinning treatments as well as maximizing growth rates in mature stands by generating cohorts of new trees by small-scale regeneration harvest. Harvest would contribute approximately 4.1-6.1 MMBF to the Medford District's Allowable Sale Quantity for fiscal year 2018.

Alternative 2 would meet RMP direction to provide for sustained harvest activity on timber stands in the Project Area. Volume projections provided here are only an estimate based on vegetation modeling and local experience; actual volume generated would depend on the outcomes of a timber cruise. This alternative would maximize harvest volume and net revenue to the treasury from commercial stands and improve future timber supply potential in developing stands through thinning treatments and allowing for the regeneration of new cohorts of trees. In the long-term, volume growth capability would be maximized on areas treated.

Cumulative Effects

At this time, there are no other planned timber sales in the Project Area on BLM-administered lands and no known harvest planned on private land. Consequently, there are no cumulative economic effects forecasted for the Clean Slate Project Area.

Alternative 3

Direct and Indirect Effects

As with the description for Alternative 2, volume projections provided here are only an estimate based on vegetation modeling and local experience, actual volume generated would depend on the outcomes of a timber cruise. Under Alternative 3, vegetation modeling performed as part of this environmental assessment showed a volume reduction of approximately 20%; the basal area available for harvest would be approximately 120-140ft^2/ac. approximately 8-12 MBF would be harvested across 408 acres (due to inner riparian zones being ineligible for harvest) resulting in an estimated harvest of 3.3-4.9 MMBF. Direct employment as a result of timber harvest and processing a commodity would result in approximately 37 full-time equivalent jobs. The estimated return to the Federal Treasury for timber harvest would be $652 per MBF for a total value of approximately $2.1-3.2 million.

Indirectly, fire suppression costs would be lower due to the reduced fuel loads on 461 acres of Integrated Vegetation Management through the associated activity fuels treatment. Road maintenance costs would be decreased in the long-term along 32.9 miles of road within the Project Area.

Alternative 3 would meet the purpose and need of this project and meet RMP direction to provide for sustained harvest activity on timber stands in the Project Area. This alternative would

provide harvest volume and net revenue to the Federal Treasury from commercial stands, and improve future timber supply potential in developing stands through thinning treatments. Harvest would contribute approximately 3.3-4.9 MMBF to the Medford District's Allowable Sale Quantity for fiscal year 2018.

The 314 acres of Integrated Vegetation Management units could be available for harvest again in the future. In the long-term, volume growth capability would be increased in the thinned stands.

Alternative 3 would provide about 1 MMBF less volume and approximately $700,000 less return to the Federal Treasury than Alternative 2 would provide for the 2018 Fiscal Year. Alternative 3 would prevent the establishment of a vigorous growing new cohort of trees that would be available for future harvest, instead retaining additional existing trees with declining growth rates that would be available for future harvest.

Cumulative Effects

At this time, there are no other planned timber sales in the Project Area on BLM-administered lands and no known harvest planned on private land. Consequently, there are no cumulative effects forecasted for the Clean Slate Project Area.

Chapter 4 – Consultation and Coordination

4.1 U.S. Fish and Wildlife Service

The federally threatened northern spotted owl is the only threatened and endangered wildlife species within or near the Clean Slate Project Area. The BLM has determined that the Clean Slate Project is likely to adversely affect the northern spotted owl. Formal consultation with the U.S. Fish and Wildlife Service (USFWS) for the northern spotted owl began when the Medford District BLM sent the Biological Assessment (BA) to the USFWS in April 2018. Meetings (March 2017) and a field trip (December 2016) to proposed project units took place as part of a more streamlined consultation process. A Biological Opinion (BO) from the USFWS is expected in June 2018. The Grants Pass Field Manager would not issue a Decision Record for the Clean Slate project until the Biological Opinion (BO) is received. Following receipt of the BO, both the BA and the BO would be posted on the BLM's ePlanning internet site at: https://go.usa.gov/xnTwS.

4.2 National Marine Fisheries Service

The Clean Slate project is within the Rogue Basin which is in the range of the federally threatened Southern Oregon/Northern California Coasts (SONCC) coho salmon. The project would have insignificant effects on coho salmon or its critical habitat. Consultation for the Endangered Species Act and Essential Fish Habitat for the Magnuson-Stevens Fishery Conservation and Management Act with the National Marine Fisheries Service is covered under the *Endangered Species Act Section 7(a)(2) Biological Opinion, and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat for the Programmatic Forest Management Program for Western Oregon* (WCR-2017-7574).

4.3 Tribal Coordination

The BLM sent the Clean Slate Forest Management project scoping letter to local federally recognized Tribes interested in Medford District BLM proposed projects. The Tribes include the Cow Creek Band of Umpqua Tribes on Indians, the Confederated Tribes of the Grande Ronde Community of Oregon, and the Confederated Tribes of the Siletz Indians of Oregon. These letters invited the Tribes to participate in meetings and or initiate formal consultation. Although no Tribes expressed interest in formal consultation, the BLM will continue to work with individual tribal governments to further identify and address Native American concerns and traditional uses of BLM-administered lands, including the progress of this project.

4.4 State and Local Agency Coordination

The BLM Medford District is party to the *State Protocol between the Oregon-Washington State Director of the Bureau of Land Management and Oregon State Historic Preservation Office* (Protocol). The Protocol provides a streamlined process for complying with Section 106 of the Nation Historic Preservation Act for the proposed project.

Because the Clean Slate project was designed to avoid and/or buffer all cultural sites, formal consultation with SHPO was not necessary. No additional resources were identified as a result of intensive field inventories. No historic properties will be affected by the project, and no further review or consultation is required as per the Protocol.

The Josephine County Board Commissioners, the Josephine County Planning Department, and the Public Works Department were sent scoping letters requesting input on the Clean Slate proposal. They will be sent EA release letters requesting comments.

Chapter 5 – List of Preparers

This Section lists the BLM staff involved in the development of the Clean Slate Forest Management Project and the preparation of this document.

IDT members	Title	Responsibility
Marlin Pose and Jason Reilly	Wildlife Biologist	Wildlife/Consultation
Mike Crawford	Fisheries Biologist	Fisheries
Bob Lange	Hydrologist	Hydrology/Water Resources/Soils
Dan Stephens	Forester	Harvest System and Road Design
Stacy Johnson	Botanist	Special Status Plants/Noxious Weeds
Trevor Wallace	Fuels Specialist	Fire and Fuels/Air Quality
Andrew Spencer	Silviculturist	Vegetation
Pete Meadville and Julie Arwood	Archaeologist	Cultural Resources
Erica Freemen	Engineer	Road Specifications/Engineering
Jay Wise	Soil Scientist	Soil Compaction and Productivity/Erosion
Sarah Mathews	Outdoor Recreation Planner	Recreation/Visual Resources
Jim Brimble	Associate Field Manager	Port-Orford cedar/Management Representative

IDT members	Title	Responsibility
Don Ferguson	Public Information Specialist	Public Outreach and Coordination
Scott Hicks	Planning and Environmental Specialist	Writer/Editor/NEPA Compliance
Ferris Fisher	Planning and Environmental Coordinator	Project Lead/NEPA Lead/Writer/Editor

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Appendix A -- Issues Considered but not Analyzed in Further Detail

The following questions, concerns, or comments were raised by the public or the interdisciplinary team during the development of the project. The BLM considered these issues but did not analyze them in further detail, often because the project's design or implementation of Best Management Practices would eliminate or reduce effects to the resource. In some cases, issues raised by the public or the interdisciplinary team were not considered in greater detail as they were determined to be beyond the scope of this project. These issues, along with a rationale for not analyzing them further in this EA, are discussed below.

Air Quality - Smoke Management

Issue A-1: How would the smoke created from burning timber slash and underburning affect air quality?

Background Information: For all prescribed burning activities, the Medford District BLM is required to be in compliance with the Oregon Smoke Management Plan (OAR 629-048-0010). The Oregon Smoke Management Plan designates SSRA (Smoke Sensitive Receptor Areas), which are areas designated for the highest level of protection under the smoke management plan, as described and listed in OAR 629-048-0140. The SSRA closest to the Project Area is the Grants Pass, as described in OAR 629-048-0140. The objective of the Smoke Management Plan is to prevent smoke from prescribed burns from entering the SSRA.

Medford District BLM is also required to be in compliance with the Oregon Visibility Protection Plan (OAR 340-200-0040, Section 5.2) which mandates that prescribed burning does not affect the visibility of Class I areas. Class I areas are defined in the Clean Air Act as Forest Service wildernesses and national memorial parks over 5,000 acres, National Parks over 6,000 acres, and international parks. Local Class I areas include Crater Lake National Park, Kalmiopsis Wilderness, and Rogue Wilderness. The Project Area is not within a Class I area.

Prior to conducting prescribed burning activities, the BLM must register prescribed burn locations with Oregon Department of Forestry. The specific location, size of the burn, fuel loadings, ignition source, time, and duration of ignition are reported prior to ignition. Smoke management advisories or restrictions are generated on a daily basis by the State Meteorologist. This information is used to determine the appropriate time to conduct the planned prescribed burn. Most prescribed burning on the Medford District is accomplished by hand-pile burning. Hand-pile burning generally occurs throughout the winter months during storm events when unstable atmospheric conditions are present in order to maximize mixing and lessen smoke impacts to localized areas. All piles would

be covered with four-millimeter polyethylene plastic sheeting to facilitate rapid and efficient ignition and consumption of fuels to minimize residual smoke (Aurell et al., 2016).

Rationale: This issue was considered but eliminated from further analysis because there would be negligible direct or indirect effects on air quality within the Clean Slate Project Area and the SSRA. Effects on air quality from activity slash burning would be short-term and localized. All units are not burned at the same time or in the same year. A large portion of particulate matter emissions produced during prescribed burning is lifted by convection into the atmosphere where it is dissipated by horizontal and downward dispersion. At distances greater than five miles, the air concentrations for these emissions are expected to be small. Under these conditions and by following the prescribed fire management guidelines in the Oregon Smoke Management Plan, there would be negligible direct or indirect effects on air quality within the Project Area and the SSRA.

Prescribed burning will comply with the guidelines established by the Oregon Smoke Management Plan and the Visibility Protection Plan (OAR 340-200-0040, Section 5.2). As a result, prescribed burning emissions are not expected to adversely affect annual PM10 attainment within the Grants Pass SSRA. In addition, the BLM does not expect prescribed burning to affect visibility within Crater Lake National Park, Kalmiopsis or Rogue Wilderness Areas due to the distance from the Project Area and implementation of smoke management guidelines. Therefore, this issue was not analyzed further.

Botanical Species (Special Status Plants and Fungi, Invasive Plants, Noxious Weeds)

Issue A-2: How would ground disturbance, decreases in woody vegetation cover, and fuel treatments affect the persistence of Bureau Special Status plants, native plant communities, and fungi in the Clean Slate Project Area?

Background Information: The BLM has completed botanical surveys following requirements and protocols for federally Threatened & Endangered (T&E) and Bureau Sensitive plants in the Clean Slate Project Area. All surveys were completed by professional botanists.

Four federally-listed plant species are known or suspected to occur on the Medford District (*Arabis macdonaldiana*, *Fritillaria gentneri*, *Limnanthes pumila* ssp. *grandiflora*, and *Lomatium cookii*). None of these species occur in the Project Area. *Lomatium cookii* critical habitat is just outside of the Project Area. One haul route does go through critical habitat for approximately 680 meters (~2,230 feet). The nearest population of *Lomatium cookii* is 490 meters (~1,600 feet) away from this haul route at the nearest point. Project design criteria have been incorporated to avoid impacts to the critical habitat.

Botany surveyors have documented 27 sites of Bureau Sensitive plants and fungi within the Clean Slate Project Area, 15 of which could be directly affected by proposed habitat-disturbing activities (Table A-1). These 15 sites are comprised of 8 Bureau sensitive and candidate species. All other sites are greater than 100 feet away from proposed treatment units, temporary route construction, road construction, road decommissioning, and other proposed activities. To prevent direct impacts to the potentially affected sites, the BLM would implement no-treatment buffers, 10 to 100 feet in radius. Buffers would also minimize indirect impacts from changes in environmental conditions following removal of forest canopy. Buffer widths were prescribed based on proposed treatment, current canopy cover, canopy cover remaining after treatment, and the affected species biology, habitat needs, population size, rarity, and management recommendations.

Table A-1: Special Status Plant Buffers

Species	# of affected sites	Status	# of sites on District (% affected)	Buffer distance (in feet)
Chaenotheca subroscida	1	Previously S&M	309 (< 0.1%)	50
Cypripedium fasciculatum	2	Bureau sensitive	989(<0.1%)	100
Dendrocollybia racemosa	2	Previously S&M	164(<1%)	100
Phaeocollybia californica	1	Previously S&M	40(2.5%)	50-100
Phaeophyscia kairamoi	1	Bureau candidate	1(100%)	50-100
Phymatoceros phymatodes	1	Bureau sensitive	20(5%)	10
Piperia candida	6	Bureau sensitive	44(13.7%)	50
Rhizopogon truncatus	1	Previously S&M	169(<1%)	50

Rationale: This issue was considered but not analyzed in further detail because, with the completion of required surveys and the protection of known sites, there are no potential impacts to Bureau Special Status plants and fungi. The BLM determined that the actions proposed would have "no effect" to T&E plants or their critical habitat because no populations or critical habitat occur in or near project action areas. Conducting surveys for these species, and implementing conservation measures would prevent direct impacts and would reduce non-beneficial indirect effects. These actions would ensure Bureau Sensitive plant and fungi species would persist in the Clean Slate Project Area, prevent species from needing further protection under the Endangered Species Act, and prevent adding cumulative effects to these species during implementation.

Of the 8 Special Status and candidate plant species that could be affected by the project, four species are relatively common (occurring on over 100 sites) on the Medford District; thus, loss of individual plants within the Project Area would not adversely affect species' persistence on the

District. In addition, all of the special status species, candidates and previous survey and manage fungi species will be protected by a buffer. However, an uncommon fungi species *Phaeophyscia kairamoi* was discovered in unit 22-5 during clearance surveys in this Project Area. Because it is the only known site of this species on BLM-administered land in Oregon; therefore, it is a candidate for a Bureau Special Status species. It will receive a ~ 50x100-foot buffer to ensure persistence. The site is located in T38S-R08W section 22 in unit 22-5. This site represents 100% of known sites on the District and within the state on BLM-administered land. Because this species is currently not a special status species, the protections given to this species are above and beyond what is required to ensure biological diversity of fungi is maintained. *Piperia candida,* a Bureau Sensitive species with 6 sites in the Project Area, is also relatively uncommon; 14% of known sites on the District are in the Project Area. All of these sites occur in T38S-R08W section 13, and each site will be buffered by 50 feet to ensure persistence.

Of the 7,887 acres of BLM-administered land in the Project Area, the proposed action only totals 461 acres or ~ 6% of the cumulative area. Because 94% of remaining Project Area that will not have biomass removal, a diversity of native plant and fungi species, and native plant communities will be sustained. In addition, all of the special status and candidate species have been protected by buffers to ensure that the biological diversity does not decline within the Project Area. There might be a short decline in percent cover of native plant species as a response to the loss of biomass and disturbed soil, but this will be short term, less than 3 years.

Issue A-3: How would soil disturbance, decreases in woody vegetation cover, and fuel treatments affect the introduction and spread of non-native invasive plants and noxious weeds?

Background Information: Invasive plants are non-native plants with the potential to cause ecological damage or economic losses. 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.

The BLM botanist used botany survey reports and invasive plant infestation data in the BLM’s National Invasive Species Information Management System (NISIMS) to characterize and evaluate invasive plant infestations within the Project Area. The NISIMS dataset represents the known distribution and abundance of noxious weeds on the Medford District (Figure A-1), but it does not include most other invasive plants species. The BLM has documented and mapped 10 invasive plant species on 37 sites, totaling an estimated 2 net infested acres (29.25 gross acres) or less than 1% of the Project Area (Table A-2); 95% of these infestations are smaller than 0.1 net acres, and none of the infestations are larger than 0.6 net acres. The BLM botanist gathered information about 15 species of unmapped non-native and invasive plant occurrences from vascular plant survey reports completed from 2016 to 2017 (Table A-4). The majority of

infestations occur within 50 feet of a road. Many species, including Himalayan blackberry, are more common in riparian areas, while scotch broom and knapweed are more common on roadsides.

The BLM botanist categorized the potential ecological impacts of invasive plants species occurring in the Project Area based on the Oregon Department of Agriculture's Noxious Weed Policy and Classification System (ODA, 2017), California Invasive Plant Inventory Database ratings (Cal-IPC, 2017), 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 range 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 are limited.

Figure A-1: Distribution of Invasive Plants in the Clean Slate Project Area

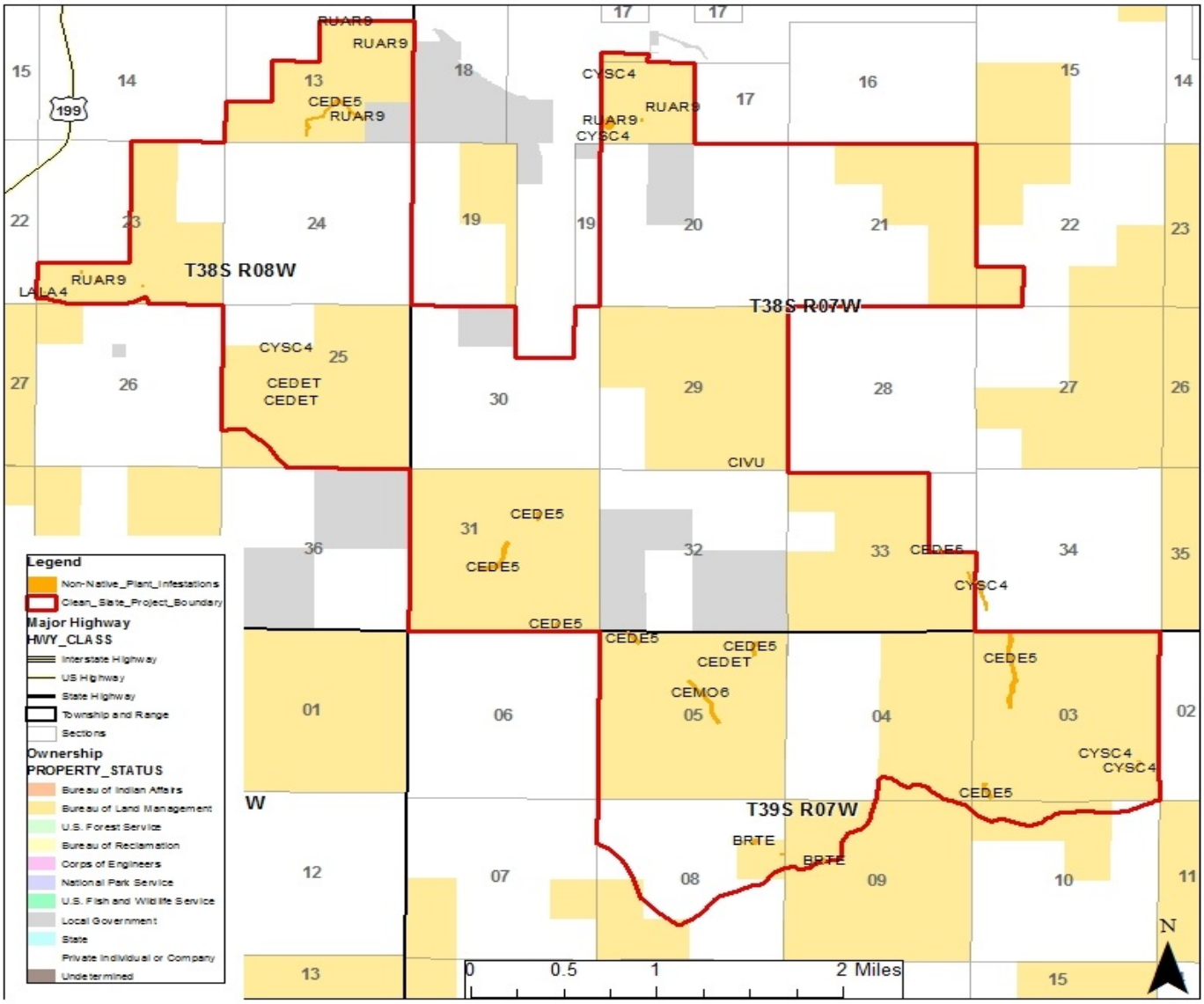


Table A-2: Invasive Plant Infestations in the Clean Slate Project Area

Species	Effects Rating	ODA Status	Net Acres	# of Sites	Predominant Habitats in the Project Area
Bromus tectorum cheat grass	low	--	0.1	2	Roadsides, meadows
Centaurea x *moncktonii* meadow knapweed	high	B	1.1	11	Roadsides, meadows
Centaurea nigra Lesser knapweed	low	B	< 0.1	3	Roadsides, meadows
Centaurea nigrescens Tyrol knapweed	low	B	< 0.1	1	Roadsides, meadows
Cirsium vulgare bull thistle	low	B	<0.1	1	Forest openings, landings, skid roads, roadsides, disturbed sites
Cytisus scoparius Scotch broom	moderate	B	< 0.1	8	Roadsides, landings, forest openings, disturbed sites, riparian areas
Lathyrus latifolius perennial peavine	low	B	< 0.1	1	Roadsides, disturbed sites
Rubus armeniacus Himalayan blackberry	moderate	B	0.8	9	Riparian areas, roadsides, landings
Taeniatherum caput-medusae medusahead rye	low	B	< 0.1	1	Meadows, open woodlands, roadsides

Assuming no major changes in the typical types and extent of natural disturbances in the Project Area, the BLM assumed that under the No Action Alternative, invasive plants would continue to spread, on average, at 12% annually (USDI/BLM, 2010, pp. 135-137). Invasive plants can spread over great distances by wind, water, animals, and humans through vehicle and foot traffic. A majority of spread would occur along roadsides and riparian areas, grasslands, and open woodlands.

Proposed projects 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 for some species would exceed the average baseline rate. Areas that would be particularly vulnerable to weed invasions

would include newly disturbed soil, such as in skid trails, landings, newly constructed roads and routes, decommissioned roads, and burn pile scars. Weed Invasions of these sites would further increase where soil disturbance would be accompanied by a reduction in woody vegetation cover. 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. Where soil disturbances would be more severe or extensive, invasive plant infestations could persist and become sources for further invasive plant spread.

However, BLM botanists would evaluate and monitor infestations and disturbed areas to determine when and where to take management action. The Medford District currently uses an integrated approach to manage noxious weeds in ways that minimize adverse effects to ecological function and economic values. For each infestation, the BLM botanist would establish an action threshold and monitor to determine if the threshold has been reached or exceeded. Action thresholds are the levels of ecological or economic damage permitted before treatments are needed, and these thresholds differ across sites, projects, and species. For example, for most invasive plant species, the action threshold would be different along a disturbed roadside than it would be next to a population of a Special Status species known to be intolerant of the invasive plant. For a given site, some aggressive invasive plant species may reach the threshold very quickly, while for other species the threshold may rarely be reached at any site. Species with "high" effects ratings would be prioritized for treatment over species with "limited" effects ratings. Species only strongly associated with roadsides or not capable of persisting in forests or woodlands would not be prioritized because their ecological effects would be minor or transitory (less than three years).

The BLM botanist would select invasive plant control methods that would be most effective for the target species and appropriate for the infested site, including the presence of sensitive or high-value resources. Selection of treatment methods is guided by Department of the Interior policy which states "Bureaus will accomplish pest management through cost-effective means that pose the least risk to humans, natural and cultural resources, and the environment" and requires Bureaus to "[e]stablish site management objectives and then choose the lowest risk, most effective approach that is feasible for each pest management project" (USDI/BLM, 2007.b). Control methods considered for the Project Area would include manual (such as pulling and grubbing), herbicide spot treatments (with backpack or utility terrain vehicle sprayers), and classical biological control. This combination of control treatments available for use in the Project Area is estimated to be, on average, 60% effective at controlling noxious weed infestations with the initial treatment (USDI/BLM, 2010, p. 136).

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 would often be coupled with competitive seeding. The objective of competitive seeding would be to provide a desirable native vegetative component to compete with invasive plants in the treatment

areas. When revegetating disturbed sites in the Project Area, the BLM botanist would select locally adapted native grass and forb seeds that are genetically appropriate for each revegetation site, thereby increasing the probability of successful and persistent native plant establishment that is resistant to invasive plants. “The right seed in the right place at the right time.” is the vision and mission of the National Seed Strategy 2015-2020 by the Plant Conservation Alliance (PCA). The PCA is a public-private partnership of organizations that share the same goal: to protect native plants by ensuring that native plant populations and their communities are maintained, enhanced, and restored. The PCA Federal Committee, chaired by the Bureau of Land Management, developed the “National Seed Strategy for Rehabilitation and Restoration 2015-2020” in cooperation with Federal and non-Federal partners. This project could be considered implementation of this strategy with the use of locally sourced native plant materials.

Rationale: This issue was considered but was not analyzed in further detail because the implementation of Best Management Practices (BMPs), Project Design Features (PDFs), and invasive plant control treatments and monitoring before and after project implementation would limit the amount the proposed action could contribute to invasive plant spread through the Project Area. PDFs, such as seeding disturbed areas with native species and mulching with weed-free straw, would aid in the establishment of desirable vegetation that would then compete with invasive plants. An integrated invasive plant management approach would include annual monitoring and evaluation of existing and new infestations to determine the appropriate management response.

Further analysis of the issue would not lead to a more informed decision. The abundance of invasive plants in the Project Area is less than 1% of the total area (Table A-3). The implementation of this project would result in a short-term pulse in invasive plant abundance following project implementation but, within approximately 5 years, new infestations would be outcompeted by native woody vegetation or be controlled by BLM. Two invasive plant species, meadow knapweed, and Himalayan blackberry are the most abundant (each occupying around one cumulative acre) in the Project Area. Both species are rated high for potential ecological effects and have the ability to persist in some of the Project Area’s habitat types; however, because the BLM currently has effective treatment methods available for both species, new infestations would be controlled before they have a chance to become well-established and cause adverse effects. Scotch broom is rated moderate for potential ecological effects. Its presence near project activities is limited, and the BLM has effective methods for controlling infestations before they cause adverse effects. Non-native annual grasses, medusahead rye and cheat grass, are rated for low for potential ecological effects, primarily in meadows and open woodlands or shrublands, but the species are not a strong competitor in conifer forests, so its spread to those habitats would be limited and short-term. Infestations of this species are currently small, and the BLM would control them with herbicide spot treatments if ecological effects reach an action threshold.

The BLM has analyzed the use of new treatment tools to more effectively control non-native plants including with fewer impacts to non-target species. The additional herbicides available are effective at lower rates (USDI/BLM, 2018, pp. 74-76), are better suited for controlling an increasing number of species of invasive plants (USDI/BLM, 2018, pp. 74-76), decrease the potential for herbicide resistance (USDI/BLM, 2018, pp. 91-97), and can be used to make associated non-herbicide methods more available and more effective (USDI/BLM, 2018, pp. 91-97). The BLM has analyzed these actions in the Integrated Invasive Plant Management for the Medford District Environmental Assessment, which tiers to the 2010 Vegetation Treatments Using Herbicides on BLM-administered lands in Oregon Final Environmental Impact Statement (FEIS) and Record of Decision (ROD) and the 2016 Vegetation Treatments Using Aminopyralid, Fluroxyphr, and Rimsulfuron EIS and ROD (USDI/BLM, 2016d).

Table A-3: Abundance and Proposed Management Approach for Mapped Invasive Plant Infestations

Species (CODE)	Proposed Action		Management Approach	
	Net Acres	No. of Sites	Pre-project	Post-project (3 years)
Bromus tectorum (BRTE) cheat grass	0.1	2	None	Monitor; treat as needed
Centaurea x *moncktonii* (CEDE5) meadow knapweed	1.1	11	Spot spray	Monitor, spot spray
Centaurea nigra (CENET) Lesser knapweed	< 0.1	3	None	Monitor, treat as needed
Centaurea nigrescens (CENI2) Tyrol knapweed	< 0.1	1	None	Monitor, treat as needed
Cirsium vulgare (CIVU) bull thistle	<0.1	1	Hand pull	Monitor, treat as needed
Cytisus scoparius (CYSC4) Scotch broom	< 0.1	8	Spot Spray	Monitor, spot spray
Lathyrus latifolius (LALA4) perennial peavine	< 0.1	1	None	Monitor, treat as needed

Species (CODE)	Proposed Action		Management Approach	
	Net Acres	No. of Sites	Pre-project	Post-project (3 years)
Rubus armeniacus (RUAR9) Himalayan blackberry	< 0.1	1	None	Monitor, treat as needed
Taeniatherum caput-medusae (TACA8) medusahead rye	0.8	9	None	Monitor, spot spray new infestations
Subtotal	***2.03 acres***	***37 infestations***		

Table A-4: Proposed Management Approach for Unmapped Invasive Plant Infestations

Species (CODE)	Management Approach	
	Pre-project	Post-project (3 years)
Aira caryophyllea	None	Monitor, treat as needed
Bromus hordaceous	None	Monitor, treat as needed
Cichorium intybus	None	Monitor, treat as needed
Cynosurus echinatus	None	Monitor, treat as needed
Daucus carota	None	Monitor, treat as needed
Hypericum perforatum	None	Monitor, treat as needed
Hypochaeris radicata	None	Monitor, treat as needed
Leucanthemum vulgare	None	Monitor, treat as needed
Polygonum aviculare	None	Monitor, treat as needed
Rubus laciniatus	None	Monitor, treat as needed
Schedonorus arundinaceus	None	Monitor, treat as needed
Thinopyrum intermedium	None	Monitor, treat as needed
Torilis arvensis	None	Monitor, treat as needed
Vicia sativa	None	Monitor, treat as needed
Vulpia myuros	None	Monitor, treat as needed

Issue A-4: Will there be effects on public health from pesticide use within the Project Area and how are pesticides determined to be the appropriate treatment method?

Background Information: This project tiers to the Integrated Invasive Plant Management EA for the Medford District which has analyzed the use of new treatment tools to more effectively control non-native plants. These new tools do not include pesticides. This analysis also tiers to the 2010 Vegetation Treatments Using Herbicides on BLM-administered lands in Oregon Final Environmental Impact Statement (FEIS) and Record of Decision (ROD) and the 2016 Vegetation Treatments Using Aminopyralid, Fluroxyphr, and Rimsulfuron EIS and ROD (USDI/BLM, 2016d). The issue of public health was analyzed in detail in the EIS documents.

Rationale: Because pesticides are not included in the Integrated Invasive Plant Management EA for the Medford District, and will not be used in the Project Area, there will be no effects to public health and safety. Herbicide use will be a component of integrated invasive plant management in the Project Area before and after implementation, as funding and staffing levels allow. The analysis completed for the herbicide use in the EIS documents are extensive and include lengthy risk assessments for each chemical. "When evaluating risks from the use of herbicides proposed in a NEPA planning document, reliance on the United States Environmental Protection Agency EPA's herbicide registration process as the sole demonstration of safety is insufficient. Although the BLM can use EPA toxicology data, it is still required to do an independent assessment of the potential risks of using herbicides rather than relying on Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) registration alone FIFRA does not require the same examination of impacts that the BLM is required to undertake under NEPA. Further, Risk Assessments consider data collected from both published scientific literature and data submitted to EPA to support FIFRA product registration, whereas EPA utilizes the latter data only. The EPA also considers many wildland herbicide uses to be minor" (UDSI/BLM, 2018, p. 44).

These Risk Assessments indicate a zero or low risk to human health– both for applicators and the public - at typical and maximum application rates (USDI/BLM, 2018, pp. 161-165). This is the justification of why this issue was not analyzed in detail. Herbicide use in the Project Area has been very minimal in the past totaling less than 0.5 acres of cumulative herbicide treatments in the NISIMS database. Herbicide treatment areas will be signed and flagged in order to increase public awareness and safety and facilitate monitoring and contract inspections. Flagging will not be removed for at least six months after treatment. Signs would be removed at project inspection or monitoring. New flagging and signs will be hung each year that herbicide is applied (USDI/BLM, 2018, p. 165).

Climate Change

Issue A-5: How would removal or burning of vegetation (i.e., timber harvest and fuels reduction treatments) affect carbon storage and greenhouse gas emissions?

Background Information: The effects of the Clean Slate Project on greenhouse gas emissions, carbon storage, and climate change tiers to the analysis in the 2015 Proposed Resource Management Plan/Final Environmental Impact Statement for Western Oregon (FEIS).

Rationale: This issue was considered but not analyzed in further detail because the Proposed Action is consistent with the 2016 ROD/RMP and the Proposed Action is not expected to have significant effects beyond those already analyzed in the FEIS. Project activities that would affect carbon storage and greenhouse gas emissions are commercial and non-commercial timber harvest and activity fuels treatments. The NEPA project record contains further information regarding calculations and assumptions conducted for the FEIS.

Cultural Resources

Issue A-6: How would ground disturbance from the proposed project activities affect cultural resources such as archaeological and historical sites, artifacts, and features?

Background Information: The Grants Pass Field Office archaeologist conducted archival research, a search of the archaeological database of known sites, and conducted a field survey to identify cultural resources that may be located within the Project Area. The results of the field survey will be detailed in a cultural resource inventory report contained in the Administrative Project Record. This report discusses all prehistoric and historic archaeological sites, and isolated finds identified in the Project Area and assesses them in terms of their National Register of Historic Places (NRHP) eligibility. Non-eligible sites and isolated finds do not require further consideration.

Rationale: This issue was considered but not analyzed in further detail as it was determined that this project would have no effect on historic properties. Impacts to NRHP-listed or eligible prehistoric or historic archaeological sites would be avoided by the establishment of buffers, within which no project activities would take place.

Issue A-7: How would the project affect traditional cultural or religious significance to tribes, such as ground-disturbing activities or by altering accessibility or use?

Background Information: Tribal consultation was undertaken to identify places of traditional religious or cultural significance to tribes who take an interest in the Project Area. This consultation did not result in the identification of any sites of concern to tribes.

Rationale: This issue was considered but not analyzed in further detail because no sites of traditional cultural or religious significance to Tribes were identified in the Project Area.

Fire and Fuels

Issue A-8: What effects would timber management activities have on fuel loading, fuel structure, and fire behavior?

Background Information: Historically, fire was a normal occurrence and has played a key role as a natural disturbance process throughout southwest Oregon. However, fire suppression and forest management activities have altered the historic vegetative patterns within the Project Area on both public and private lands.

Fuel loading is a term describing the amount of available fuel in a stand measured in tons per acre, including live and dead vegetation. Fuel structure refers to the arrangement and size of the vegetative fuels within a stand. Fire behavior describes how a wildland fire burns based on environmental characteristics such as surface fuels, vegetation, canopy base height, density or closure, slope, aspect, weather, and elevation. The identification of fuel models helps to describe the fuels available to a fire based on the amount, distribution, and continuity of the vegetation and wood. Fuels combined with inputs such as weather and slope are used to predict potential surface fire behavior characteristics such as rate of spread, flame length, and fireline intensity.

Timber management activities generally increase the surface fuels within a stand. However, whole tree harvesting with the disposal of the tops at the landings is the most effective method of preventing surface fuel increases within the residual stand (Agee & Skinner, 2005). At the landings, slash would be piled, chipped, sold for firewood, or prescribe burned. Slash remaining within the stands would be lopped and scattered, or hand piled and burned. Prescribed underburning would be implemented in selected stands where conditions indicate a low-intensity burn could be achieved. These treatments would help create stand conditions that would be more resilient to future wildland fire and other environmental stress agents.

Rationale: This issue was considered but not analyzed in further detail because planned post-harvest fuels reduction in units would minimize the short-term effects to fuel loading, fuel

structure, and fire behavior and the resultant long-term effects would be beneficial. The increase of fire hazard in stands proposed for Group Select would be negligible at the Project Area scale (up to 89 acres or <1%).

Thinning treatments such as; Selection Harvest, Commercial Thinning, and Riparian Thinning are intended to create multi-aged and multi-layered stands. Up to 408 acres (or 6.5% of lands in the Project Area) of thinned stands would be left in a condition more resilient to environmental stressors such as fire, drought, and insects. Isolated un-thinned areas could exhibit isolated and group torching of trees during a wildland fire; however, the reduced canopy bulk density of the stand and openings would limit large-scale crown fire potential. Because of such structural diversity, these stands would still represent timber understory and timber litter fuel types but with reduced surface fuel loading. Stands would exhibit a decrease in overall potential fire behavior and an increase in fire suppression capability. Treated stands would experience a decrease in fire hazard and risk for 5 to 15 years or until vegetation density returned to existing levels.

Immediately following thinning activities until about 1-year post-treatment (prior to fuels reduction treatment, i.e., burning of piles, underburning, or biomass removal), fire behavior potential would increase from the current condition due to increased surface fuels. Following fuel reduction and removal treatments, a reduction in potential fire behavior would occur due to the reduction in surface fuel loading and the change in horizontal and vertical fuel arrangement. Approximately 89 acres (1% of lands in the Project Area) could be managed utilizing Group Selection, to provide structural complexity in the post-treatment stand. Group selection openings will not be greater than 4 acres in size, and no greater than 30 percent in Uneven-aged Timber Area.

For the first 1 to 5 years after harvest, these stands would remain a slash fuel type until the shrubs, grasses, and planted trees become established. After the establishment of regeneration, these stands would move into a brush fuel type. Brush fuel types are more volatile and are susceptible to high rates of fire-caused mortality. Stands could exhibit higher flame lengths, rates of spread, and fire intensity. Fires started within these stands could be difficult to initially attack and control. For 5 to 20 years following planting, the overall fire hazard would increase in these stands.

The BLM fuels management specialist would conduct a fuels assessment within each treatment unit following timber harvest activity. This assessment would determine the fuel hazard and fire risk based on surface fuel loading, aspect, slope, access, and location of each unit. The fuels management specialist would treat remaining slash concentrations within the stands by a lop-and-scatter or handpile and burn treatment. Where conditions allow, a prescribed underburn may be implemented to reduce fuel loading and increase stand resilience. At the landings, slash would

be piled, chipped, sold for firewood, or prescribe burned. Post-treatment surface fuel loading would be reduced because the majority of the slash would be removed from the unit. Lopping and scattering the activity slash would reduce the vertical height and horizontal continuity of the fuel bed. However, it would temporarily increase the surface fuel loads. This would put the stand into a slash fuel model resulting in higher predicted flame lengths, fire duration, and intensity. In 10 to 15 years after lopping and scattering, the effect of the slash on fire behavior would be ameliorated by the decomposition and new vegetation growth (McIver & Ottmar, 2006).

Hand piling and burning would decrease fuel loading of material 1 to 6 inches in diameter by 85% to 95%. Fuels greater than 6 inches in diameter would be left on the surface and would contribute to the down woody debris load. This treatment would move stands from a slash fuel type into a timber fuel type, which would result in a reduced rate of fire spread and average flame length. Piles would be burned in the fall to winter season after at least one inch of precipitation to reduce the potential for fire to spread and to reduce the potential for scorch and mortality to residual trees and shrubs.

The degree of effects to microclimate change on fire behavior is highly dependent on stand conditions after treatment, mitigation to offset the effects of microclimate change, and the degree of openness. For example, Pollet and Omi (1999) found that more open stands had significantly less fire severity, while Weatherspoon and Skinner (1995) found greater fire severity. Plantations are more susceptible to severe fire effects than unmanaged older forests (Weatherspoon & Skinner 1995). However, the same study indicated substantially less damage from wildfires where surface fuels were also treated. The structural attributes of young trees (crowns close to the ground, crown consisting mostly of fine fuels), and the amount and location of forest floor fuels (logging/thinning debris, forest floor vegetation) are important factors. Piles are burned in the fall to winter season after at least one inch of precipitation to reduce the potential for fire to spread and to reduce the potential for scorch and mortality to residual trees and shrubs.

The implementation of actions which follow the management direction from the 2016 ROD/RMP is expected to contribute to the restoration of fire-adapted ecosystems in the dry forest landscape of southern Oregon (2016 ROD/RMP, p. 26).

Fish and Aquatic Habitat

Issue A-9: How would timber harvest actions (ground-based and skyline-cable yarding) affect federally-listed and native fish species and their habitats (aquatic habitat)?

Background Information: Ground-disturbing activities in or near stream channels have the greatest potential to impact federally-listed and native fish species and their habitat (aquatic habitat) by increasing erosion and sediment transport to, and storage in, stream channels. The following proposed projects have the potential to contribute sediment to streams: skid trails and skyline corridors.

Aquatic habitat character and quality are directly related to sediment. Sediment can increase embeddedness and accumulate in pools, reducing depths. These effects reduce spawning and rearing habitat quality and quantity. Increased sediment production and delivery to stream channels as the primary mechanism that may have potential impacts to aquatic habitats. The potential impacts to aquatic habitats from these activities would be minimized or eliminated through project design and implementation, including the use of Best Management Practices, Project Design Features, and Riparian Reserves.

Rationale: This issue was considered but not analyzed in further detail because the activities described in the proposed actions would not have connectivity to streams this is achieved through the implementation of Best Management Practices, Project Design Features, and Riparian Reserves. Therefore there would be no casual mechanism to input sediment into streams, which will protect aquatic habitat function.

Proposed skid trails and skyline corridors would have no connectivity to hydrologically connected channels, and hence, no causal mechanism would exist for these areas to input sediment into stream channels. Additionally, the activities described in the proposed actions would not affect aquatic habitat because of the distance to fish-bearing streams (the nearest action is approximately 670 feet from fish-bearing streams). Best Management Practices, such as constructing water bars and using erosion-control techniques on skid trails and limiting landing construction to the dry season, would minimize the potential for sediment delivery into streams at levels indistinguishable beyond background levels.

See Issue A-10 through A-15 below and Section 3.5 for more information on how effects to water quality were considered in this EA.

Hydrology and Water Quality

Issue A-10: Would timber harvest and temporary road construction under the Proposed Action affect annual water yields, summer low flows, water flow intensity, duration and/or timing of peak or low base flow conditions?

Background Information: The potential impact of timber harvest and road construction on peak stream flows was analyzed in detail for snow dominated hydro-regions as Issue 2 in the

2016 ROD/RMP pp. 384-394. Annual water yield, low summer flows, water flow, and duration were considered but not analyzed in detail in the 2016 ROD/RMP pp. 408-409, and this analysis is incorporated here by reference.

Water Yield: Forest harvesting generally increases the fraction of precipitation that is available to become streamflow (Moore & Wondzell, 2005). On a catchment scale, the Equivalent Clear-cut Area (ECA) and the roaded area may be evaluated to analyze potential impacts to streamflows.

Reductions in forest cover above 20% can increase annual water yields, but reductions below 20% are not likely to result in measurable changes in annual streamflow yields (Stednick, 1996). Annual water yield is the total surface water output for a given watershed per year. Studies have shown an increase in water yield in the first few years after clear-cuts (Perry & Jones, 2016). Removal of trees and canopy cover shows more or less a linear relationship to increased water yield during the first years after harvest (Harr et al., 1975).

None of the treatments proposed in the Clean Slate PA would decrease canopies by more than 20 percent on a catchment scale. The highest ECA as a percentage of an analysis area is the Deer Creek Watershed (16%), this large watershed includes many open valley bottoms that account for a higher ECA. When adding openings proposed by this project, the proposed 73-acre Josephine County Forestry project, and the BLM Salvage Categorical Exclusion project, the openings estimated did not increase (Section 3.5 Hydrology & Sedimentation, Table 3-15). The next highest potential treatment area is the Upper McMullin catchment at 12%. This estimate includes both group select areas and landings in the estimate for ECA and is well below the 20 percent threshold. Therefore, no measurable increase in annual water yield for streams in these catchments can be expected due to the proposed vegetation treatments.

The 2016 ROD/RMP states found that “timber harvest with the alternatives and Proposed RMP would produce an inconsequential change in annual water yield.” Water yield refers to the total water produced from a watershed including base flows. An analysis of numerous paired watershed studies, water yield does not show a measurable increase until 20% of forest canopy is removed (Stednick, 1996). Any measurable enhancement of peak flows evaporates 2-4 years after the initial disturbance as vegetation reestablishes as effective canopy and transpiration increase (Best et al., 2003). Assuming timber harvest on private lands would be similar in intensity to what has happened in the past, it would take an additional 3,000 acres of harvest to have reached 20% of the watershed being non-forest.

Although there is proposed thinning in the Outer and Middle Riparian Zones, no commercial harvest would occur in the Inner Riparian Zone, and no group select cuts (opening as large as 4 acres) would occur in the Riparian Reserve. Approximately 22 group select cuts are proposed outside of the Riparian Reserve. These openings were added to the analysis for ECA (89 acres) and did not result in increases in annual water yields, low streamflow conditions, water flow

intensity, duration and/or the timing of peak or low flows (Chapter 3.5 Hydrology & Sedimentation).

Summer Low Base-flow Conditions: Most paired watershed studies used in baseline research did not employ timber harvest practices commonly used today. However, these studies can provide a reasonable frame of reference for interpreting the potential effects of today's practices (Grant et al., 2008).

Long-term paired watershed experiments indicate that the conversion of mature and old-growth conifer forests to plantations produced persistent summer streamflow deficit of 50%, in plantations aged 25 to 45 years (Perry & Jones, 2016). The relationship was less apparent in paired watersheds that had partial or patch cuts, and none of the watersheds had riparian buffers (Jones & Grant, 1996). Lower summer streamflows as a result of timber harvest are less likely in rain-dominated catchments, like Deer Creek (Moore & Wondzell, 2005).

An analysis of daily streamflow from paired watershed studies found summer flow deficits in basins with clear-cuts replanted with young Douglas-fir (i.e., plantations). Persistent summer deficits also tend to correspond to winter surpluses (Perry & Jones, 2016). These winter surpluses often occur in the same season as peak flows. For the Illinois River, this would be between October and May. This time of year already has winter surpluses that show up in the natural hydrograph, see Figure A-2. Higher evapotranspiration rates from June to September for young Douglas-fir trees are likely the primary driver of low summer flows (Moore, 2004).

The size of canopy opening explained the magnitude and duration of initial summer streamflow surpluses and subsequent streamflow deficits. Summer deficits did not emerge over time in treatments involving shelterwood and small openings (1.5 acres to 3.2 acres), but studies did see large initial summer surpluses and persistent summer deficits with patches of 20 acres or more (Perry & Jones, 2016).

The largest openings consider for this project are 4-acre group select areas. These areas would amount to a maximum of 89 acres across the proposed 461 acres of proposed harvest

None of these areas would be located within the Inner Riparian Zone, and low flows appear to be more sensitive to transpiration from vegetation than the rest of the catchment (Moore & Wondzell, 2005). Under this project, proposed commercial harvest will not occur in the Inner Riparian Zone (120 feet for fish-bearing and perennial streams and 50 feet for intermittent streams), group select openings will only occur outside of the Riparian Reserve. Catchment hydrological responses for the H.J. Andrews Experimental Forest found streamflow response is strongly sensitive to harvest distance from the stream channel (Abdelnour et al., 2011). Due to the small opening size of the group selects proposed and because the openings will be outside of the Riparian Reserves with less impact to streamflow, no measurable decrease in summer baseflows are expected. Higher evapotranspiration rates 25 to 45 years out from plantings in

these group-select areas can be expected to reduce hillslope shallow groundwater to streams, but because of the small treatment areas, this effect is not expected to be noticeable and may be offset by climate or other vegetation responses.

Water Flow Magnitude, Duration and/or the Timing of Peak or Low Flows: The potential to enhance peak flows was analyzed in detail with sedimentation (Chapter 3.5 Hydrology & Sedimentation). The timing of the increase in streamflow that can be expected following forest harvest indicates the increased summer streamflow can occur for up to 5 years after harvest (Surfleet & Skaugset, 2013). Evapotranspiration rates should recover to pre-harvest rates and may even exceed pre-harvest rates in the long-term for the summer months.

Rational: A plausible scenario for local streamflow downstream from units in the Clean Slate PA is a short-term local increase in peak flows and annual water yield. These local changes in duration, magnitude, and timing on a unit scale are not expected to add to any potential increases in annual water yields, low streamflow conditions, water flow intensity, duration and/or the timing of peak or low flows that could be measured downstream. Recovery to pre-harvest conditions appears to occur within about 10 to 20 years in coastal catchments (Moore & Wondzell, 2005). Once areas recover and revegetate and evapotranspiration rates stabilize; there is a potential for lower summer base-flow about 25-45 years after planting. Any of these potential changes would likely be small, local and impossible to differentiate from underlying climate and seasonal variability, and other vegetation responses.

Issue A-11: Would commercial thinning and fuels treatments maintain water quality within the range of natural variability and meet Oregon Department of Environmental Quality water quality standards?

Background Information: Poor water quality is typically the result of several combined factors. For example, nutrients can combine with high seasonal temperatures to reduce dissolved oxygen for aquatic life and impact drinking water quality. Also, increased sediment loads can lead to wider and shallower streams that have higher summer temperatures.

The major water quality concerns from past, present, and future projects are changes in nutrients, sediment, and water temperature. These can all be detrimental to the habitat of aquatic species such as salmon due to the production of algal blooms, loss of dissolved oxygen, high stream temperatures, and loss of physical habitat due to sedimentation. This also applies to the resident fish and other aquatic life, particularly resident cutthroat, which are present in Clean Slate PA streams.

When impairment of water quality standards is identified, and a Total Maximum Daily Limit (TMDL) is developed for non-point source pollution; Oregon DEQ water quality standards are met by implementing Water Quality Restoration Plans (WQRPs). There are two WQRPs that cover BLM-administered lands in the Clean Slate PA; they are the McMullin Creek WQRP

(USDI/BLM, 2005) and Deer Creek WQRP (USDI/BLM, 2011). Specific recommendations for Forest Management from these plans include implementing silvicultural treatments designed to promote hardwood and conifers health in the riparian areas and to minimize sedimentation with good road management.

The Oregon Department of Environmental Quality (ODEQ) water quality assessment was evaluated for the Illinois River (ODEQ, 2012). The only reaches listed as impaired have TMDLs applied for temperatures. After reviewing the information available in the Clean Slate PA from the WQRPs, the most common water quality concern is stream temperature (Stream Temperature is analyzed in the 2016 ROD/RMP as Issue 1, starting on page 369), and is incorporated here by reference.

The Clean Slate PA does not contain any portions of surface water intake source areas or groundwater sources identified to protect public drinking sources (ODEQ, 2017).Two of the haul routes outside of the Clean Slate PA are in the East Fork of the Illinois River, which is a source area for the surface intake for the city of Cave Junction. These haul routes with aggregate surfaces (about 6 miles) will have maintenance activities during the dry season and may receive waivers to accommodate winter haul conditions. With appropriate maintenance and implementation of Best Management Practices (BMPs) (2016 ROD/RMP, Appendix C) no changes to water quality from the use of these haul routes are expected.

Physical and chemical characteristics of the soil, combined with past and current land use management may alter water quality over the short-term. However, BMPs and Project Design Features (PDFs) for this project have been implemented to reduce potential impacts to water quality (2016 ROD/RMP Appendix C, pp. 163-208 and the Proposed Action). An example of a reduction in potential impacts is implementing management direction from the 2016 ROD/RMP by restricting commercial harvest in the Inner Riparian Zone. This practice allows for a vegetative buffer between commercial harvest areas and the stream, which has been shown to be effective in reducing nutrient loads. A recent study showed that, as a general rule, in terrain with gentle side slopes, a 100-foot forest buffer retains about 80% of the Nitrogen and Phosphorus passing through in surface and subsurface flow from such activities (US EPA, 2005).

The 2016 ROD/RMP, pp.410-411 looked at the effect of timber harvest and road construction in source water watersheds and this analysis is incorporated here by reference. There are no Clean Slate project details that would change the 2016 ROD/RMP analysis for public water systems.

Based on water quality studies, both sediment and nutrients are generally elevated in the first 2 years after disturbances such as fire, timber harvest, and/or severe storm events, but loads tend to diminish as vegetation reestablishes or areas are stabilized and reclaimed. It is expected that there will be local changes to nutrient and sediment loads, but these impacts will be reduced by implementation of BMPs (2016 ROD/RMP Appendix C, pp 163-208); therefore, they would likely be unmeasurable and short-term.

No impacts to groundwater aquifers or measurable changes in surface water quality are expected from thinning or fuel treatments downstream from the units. Therefore, no changes to the water quality in dispersed water sources are anticipated. Dispersed water sources include private domestic drinking water wells and surface intakes that serve rural homes downstream of proposed commercial thinning and fuel treatments, no changes to water quality or availability are expected for these sources.

Although no indirect impacts from proposed forest management activities are expected, an example of current water quality problems within the Clean Slate PA is Lake Selmac. Fish kills in November 2017 were likely the result of eutrophic conditions and reservoir turn-over. Lake Selmac's water quality has been identified as a problem by ODEQ for some time. In 2010, based on measured toxicity levels, a health advisory was issued for Lake Selmac by Oregon Harmful Algae Bloom Surveillance (HABS) program.

McMullin Creek, a tributary to Deer Creek, was dammed in 1961 to create Lake Selmac. As measured in 1981, Lake Selmac had a mean depth of only seven feet, and nearly three-quarters of the lake were shallower than 10 feet (USDI/BLM, 2005). Middle McMullin Creek, Upper McMullin, and most of the Quedo Creek Analysis Areas (defined in Table A-5) drain into Lake Selmac, which is seven miles upstream from Deer Creek's confluence with the Illinois River.

Table A-5 Hydrological Unit Code and Analysis Area Boundaries

Subbasin (HUC 08)	Watershed (HUC 10)	Project Area	Hydrology Analysis Area for Smaller Catchments
Illinois HUC#17100311 (633,551 acres)	Deer Creek HUC# 1710031105 (72,605 acres)	Clean Slate PA (9,212 acres)	Middle McMullin Creek (2,466 acres)
			Thompson Creek (2,234 acres)
			Upper McMullin Creek (2,647 acres)
			Quedo Creek and Tributaries to Deer Creek (1,865 acres)

The capacity and depth of Lake Selmac continue to decrease making the shallow waters more sensitive to increased algae and weed growth as well as warmer water temperatures. The shallow water is probably the primary factor in recent increasing algae and weed growth in the Lake. Nutrient loading from possible sources as septic systems or upstream forest management practices may also be a factor. Excessive aquatic weeds and algae can lead to eutrophic conditions. When algae and weeds die, the decomposition process consumes oxygen. During the winter, the warm oxygen-depleted surface water cools and becomes denser, causing it to sink, and the lake "turns-over." This turn-over can cause dramatic water quality changes in a short time and can cause fish kills. This phenomenon is likely the cause of a fish kill in November of 2017.

Any potential increases in nutrients or sediment loads into Lake Selmac from this project would likely be indistinguishable from background conditions due to the small amount of the McMullin watershed that would be impacted by this project (136 acres, 1.6 % of the contributing watershed to Lake Selmac). Assuming a 1% increase in nutrient or sediment yields from these treated units over background conditions over the first two years (this is extremely unlikely due to the implementation of BMPs), the result would be a 0.016% change in nutrient loads, assuming all this load was transported downstream. Any increase in nutrient or sediment loads would likely be transported during high flow conditions during December-March and be impossible to measure or separate from other inputs that also increased during this period.

The 2016 ROD/RMP, pp. 409-410 analyzed how timber harvest might affect nutrient loading in streams, this analysis is incorporated here by reference. The 2016 ROD/RMP analysis for nutrient loads found that the Inner Zone of the riparian reserve would be an effective nutrient filter on most or all streams and therefore timber harvest as proposed in the 2016 ROD/RMP would have no substantive effect on nutrient loading in streams.

Rationale: No streams in the Clean Slate PA or downstream are listed on the 303(d) list for impaired waters due to exceeding water quality standards for nutrients (US EPA, 2018). The 2016 ROD/RMP analyzed potential impacts to water quality and found no substantive effect on nutrient or sediment loading in streams from activities consistent with those proposed in this project. Lake Selmac was identified by ODEQ in 1998 for turbidity issues, but data were insufficient to be placed on the impaired list. Project activities were analyzed in detail (Section 3.5 Hydrology & Sedimentation) for potential downstream impacts.

In summary, potential impacts to water quality from commercial thinning and fuel treatments were considered but not analyzed in detail since the proposed action includes the implementation of BMPs specifically designed to maintain water quality, there are no impaired water bodies on the 303d list that would be impacted by this project, and the project will adhere to the relevant WQRPs. Although some sediment and nutrients may enter Lake Selmac due to project activities, BMPs, such as buffers on streams would reduce impacts to the point that they would be undetectable compared to background levels.

Issue A-12: How would timber harvest, road maintenance, temporary route construction, and timber hauling affect forest hydrology?

Background Information: There are 32.9 miles of road maintenance on existing routes proposed including removing brush, repairing drainage features such as culverts and cleaning ditches, and improving travel surfaces by blading and/or adding gravel to bring roads up to haul standards. An additional 1.66 miles of new temporary road construction is proposed 0.37 miles of reconstructed roads and 0.24 miles of tractor swing routes.

Timber harvest, including road building, has been shown to increase the fraction of precipitation that is available to become streamflow. However, separating road building from other forest harvest activities is difficult because, in most studies, these activities occur simultaneously. BLM-administered lands are only a portion of the watersheds; therefore, forest harvest techniques and land and water management practices on private lands can often mask project impacts.

Historical and seasonal changes typical to the Deer Creek watershed can be evaluated at the United States Geological Survey Streamflow measurement site for the Illinois River near Kirby with 60 years of data (Figure A-2). As seen in the hydrograph, maximum runoff events or peak flows from excessive rainfall can occur anytime between August and June. The highest historical flows occurred in December 1965 (64,500 cfs), and January1971 (37,900 cfs). These flows can be compared to the stream statistics for the site of 100-year peak flow of 60,400 cfs and a 5-year peak flow of 33,200 cfs (USDI/USGS, 2018b) and a mean annual flow of 1,240 cfs and a two-year peak flow of 24,000 cfs (Figure A-2).

These statistics indicate the potential for large flood events nearly every year as compared to the mean annual flows, and these flood events are likely to happen in the winter or early spring (December through March). This is a typical pattern for coastal systems in southern Oregon.

As part of maintaining roads for the project there will be culvert replacements as a requirement of the timber or stewardship contract, as part of a reciprocal Right-of-Way agreement, through a watershed partnership, and/or with BLM deferred maintenance funding. No culvert replacements are proposed on fish-bearing streams, but if a culvert fails during the life of the project, it would be replaced by the operator or the BLM. Culvert replacements on fish-bearing streams will be done within the in-stream work window and use proper dewatering methods (2016 ROD/RMP, p. 169 R17 and R23).

Figure A-2: Surface Water Stream Daily Average Statistics from USGS Illinois River near Kerby from 1961 – 2016 (USGS, 2017).

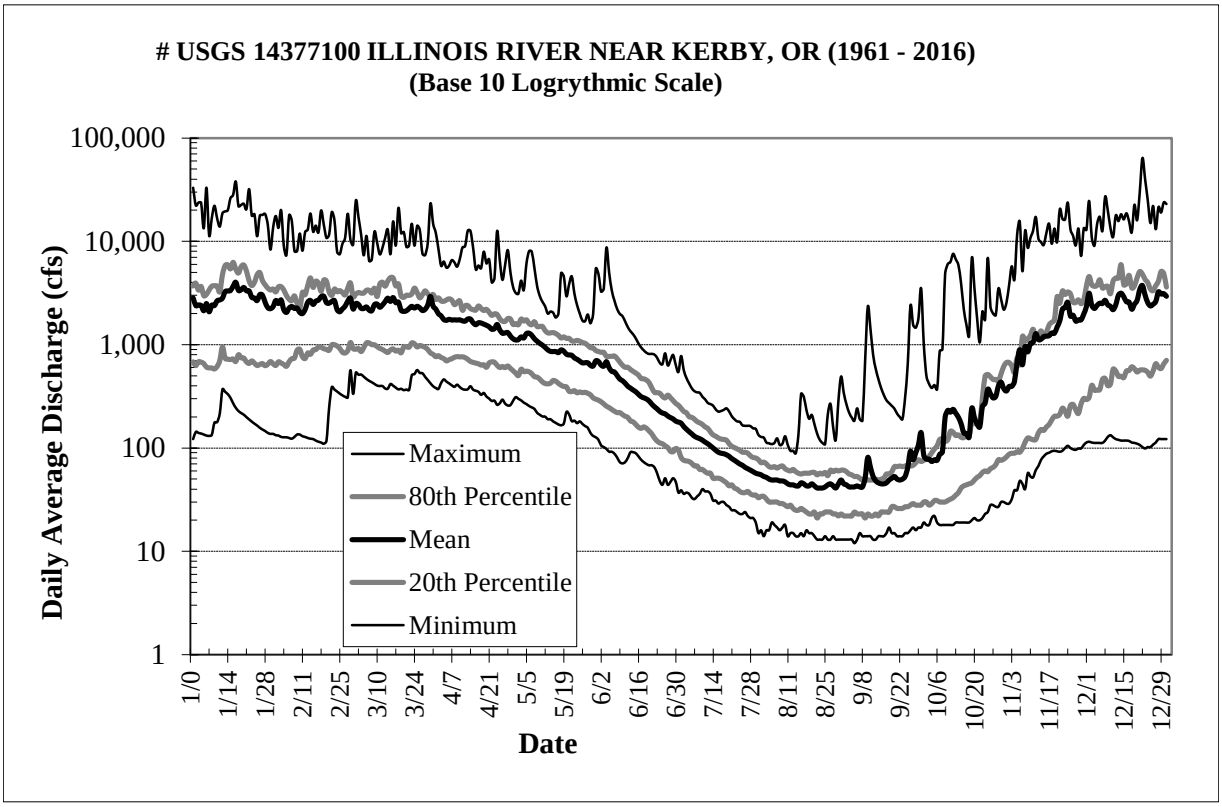


Table A-6: Road Density and Estimated Road Disturbance (Roaded Area) of the Existing BLM Road System in the Project Area

Analysis Area Name^	Analysis Area (Acres)	Analysis Area (mi^2) *	Roads (mi)	Road Density (mi/mi^2)	Road Disturbance+ (Acres)	Percent Roaded Area
Deer Creek (1710031105)	63,886	100	456	4.56	2,211	3.5%
Clean Slate Project Area	9,211	14.4	95.6	6.64	464	5.0%
BLM-Administered Lands in the Project Area	5,299	8.3	59.2	7.13	287	5.4%
Middle McMullin Creek	2,466	3.9	22.2	5.69	108	4.4%
Thompson Creek	2,234	3.5	23.3	5.68	113	4.3%
Upper McMullin Creek	2,647	4.1	32.3	7.88	157	5.9%
Quedo Creek and Deer Creek Tributaries	1,865	2.9	17.8	6.14	86	4.6%

^These are the portions of the 5th level (HUC5) watersheds * miles = mi
+ Roaded Area, calculated by assuming an average disturbance width of 40 feet

The percentage of roaded area for each Analysis Area is estimated at 5% or less, except for Upper McMullin Creek which is 5.9% (Table A-6), well below 12%; which is the threshold that may result in increases of peak flow according to most studies (Ziemer, 1981).

Road density in the Deer Creek Watershed is 4.56 mi/mi^{2,} and for the Project Area, it is 6.64 mi/mi^2. The Upper McMullin subwatershed has the highest road density (7.78 mi/mi^2). The proposed action would add 1.66 miles of new temporary road construction, 0.37 miles of reconstructed roads, and 0.24 miles of tractor swing routes. Of this total of 2.27 miles of temporary road; the road disturbance acres and percent roaded area would only change slightly, Table A-7.

Table A-7: Changes in Road Density and Area of Disturbance in the Analysis Areas from Temporary Routes

Analysis Area Name^	Analysis Area (mi^2) *	Current Roads (mi)	Proposed Temp Roads (mi)	New Road Density (mi/mi^2)	Total Area of Road Disturbance	Percent Roaded Area
Deer Creek (1710031105)	100	456	2.27	4.58	2,222	3.48%
Clean Slate Project Area	14.4	95.6	2.27	6.76	475	5.16%
BLM Lands in the PA	8.3	59.2	2.08	7.38	297	5.61%
Middle McMullin Creek	3.9	22.2	0.25	5.76	109	4.43%
Thompson Creek	3.5	23.3	0.67	6.85	116	5.20%
Upper McMullin Creek	4.1	32.3	0.24	7.94	158	5.98%
Quedo Creek and Deer Creek Tributaries	2.9	17.8	1.07	6.51	91	4.89%

The largest change in road density will be for the Thompson Creek catchment, the road density would be 6.85 mi/mi^2 instead of 5.68 mi/mi^2, and this is still well below the threshold of 12%. Short-term and local impacts from these roads can be expected when they are constructed and used.

Temporary routes will be decommissioned under the Proposed Action. Decommissioning means temporary routes would be physically blocked, tilled (ripping or pitting to an effective depth), water barred, seeded, mulched, pulling back unstable road fill, ditches and cross drain culverts removed and converted to long-term maintenance-free drainage configuration such as an outsloped road surface and waterbars, reestablish stream crossings to the natural stream gradient, seed and/or plant to reestablish vegetation in the same season of use, when possible. After use, these roads are decommissioned, and with successful reclamation, forest hydrology impacts should be reduced to background levels in two years.

There are 32.9 miles of road maintenance on existing routes proposed including removing brush, repairing drainage features such as culverts and cleaning ditches, and improving travel surfaces by blading and/or adding gravel to bring roads up to haul standards. This should improve the drainage features on these roads and impacts to forest hydrology would be the same or less after this maintenance. Of the proposed haul routes, 6 miles would be within 200 feet of perennial

streams, of this, 3.3 miles would be on paved roads, 2.2 would be on gravel roads, and 0.5 miles on natural surface roads.

Rationale: No new permanent roads would be built, and all temporary routes would be decommissioned after use. Therefore there would be no increase in road density over the long-term. The relatively small amount of newly compacted ground and lack of connection to streams of the newly constructed temporary roads would not affect forest hydrology.

Issue A-13: Would commercial thinning and fuel treatments result in a measurable increase in stream temperatures?

Background Information: Water temperature in streams and rivers is critical for aquatic life success, especially for salmon, and is an important variable in determining the availability of dissolved oxygen and downstream impacts of nutrients.

The analysis in the 2016 ROD/RMP, pp. 369-384 addresses stream shading along perennial and fish-bearing streams on BLM-administered land and is incorporated here by reference. Commercial thinning and fuel treatments are proposed in the Dry Forest west of Highway 97 and in Class I subwatersheds.

Stream shading reduces radiant energy from solar radiation responsible for increasing stream temperature. Solar radiation is the most important radiant energy source for the heating of streams during daytime conditions and therefore has a strong relationship to seasonal variability of daylight (Beschta & Taylor, 1988). The primary shade zone is the vegetation that shades the stream during the warmest part of the day (10am - 2pm), and therefore most responsible for increases in stream temperature (USDA/USFS, USDI/BLM; 2012).

Effective shade is the percentage of sunlight blocked by topography, forest trees, and vegetation during a solar day. Effective shade reaches an upper limit in the 80-90% range from normally stocked young to mature stands (USDA/USFS, USDI/BLM; 2012). In addition to effective shade, micro-climate zones are important for maintaining stream temperatures. These micro-climate zones can have significantly lower air temperatures than the surrounding forest and are likely to coincide with to the Inner Riparian Zone.

The proposed action does not consider commercial thinning in the Inner Riparian Zone. The 120-foot stream buffer for perennial streams is fully expected to protect the primary shade zones (USDA/USFS, USDI/BLM; 2012, p. 29) and protective of micro-climates on perennial streams. Near-stream microclimate gradients are topographically controlled but are also generally within this first 120 feet. Thinning in the Outer Riparian Zone is expected to reduce some shading in the secondary shade zone during cooler parts of the day (2pm - 10am). The effects from thinning in the secondary shade zone have less impact to stream temperatures than does thinning in the primary shade zone (USDA/USFS, USDI/BLM; 2012, p. 31).

Based on a study conducted on the Rogue River Siskiyou National Forest in 2006 a no-cut buffer of 60 feet was found to be effective in maintaining the Angular Canopy Density and therefore the effective stream shade (USDA/USFS, USDI/BLM; 2012). The joint studies for implementing the Northwest Forest Plan found that density management or thinning beyond 15 meters (50 feet) from streams does not measurably affect microclimate (USDA/USFS, USDI/BLM; 2012). All proposed vegetation treatments, including activity fuels treatments, will be more than 60 feet from perennial and fish-bearing streams.

Commercial thinning in the Outer Riparian Zone and fuel treatments are expected to reduce the potential for catastrophic wildfire, insects, disease, and promote healthier riparian stands. Healthy riparian stands are more likely to withstand disturbance successfully, and therefore, more able to provide stability and shade to stream systems in the long-term.

Shade tolerant species in riparian reserves important for maintaining stream temperature generally maintain their abundance over the long-term even through periods of drought, severe fire, and moderate erosion events (Colombarolia & Gavina, 2010). This is because they are generally quick to recolonize areas of low canopy cover. However, the Deer Creek Watershed Analysis found this resiliency has likely been reduced by fragmentation due to road building, logging, and mining (USDI/BLM, 1997).

To understand the spatial and temporal variability of stream temperatures more directly, BLM monitors stream temperature at various sites and supplies data to DEQ for listing decisions. There are 20 BLM historical monitoring sites and 1 current BLM monitoring site within the Clean Slate PA.

Rationale: The 2016 ROD/RMP used two analytical methods to assess potential increases to stream temperatures and considered a shade loss exceeding 3% as representing a risk to stream temperatures. The first analytical method (Method A) used tree heights for mature to structurally-complex stands. The second method used an Environmental Protection Agency calibrated model (Method B) with tree heights for mature stands (50 to 70 years old). Stands proposed for thinning in the Clean Slate PA are mature stands. The 2016 ROD/RMP identified that less than 0.5% of the total perennial and fish-bearing stream miles could have increases in stream temperature.

The only areas that were found to have the potential for an increase beyond the threshold expected in the 2016 ROD/RMP are thinning stands in areas with low riparian canopy (i.e., streams with meadows where the secondary shade zone is important). There are no Outer Riparian Zones proposed for thinning in the Clean Slate PA that could be considered to have low canopy cover in the Inner Riparian Zone.

In summary, the treatments proposed for this project are constant with the 2016 ROD/RMP, and RMP modeling does not predict measurable increases in stream temperature or effects to

microclimates. This view is supported by research and site-specific analysis. Commercial thinning in the Outer Riparian Zone accounts for 10% of the riparian reserves on BLM-administered lands in the Clean Slate PA. Riparian in the secondary shade zone is likely to reduce the risk for catastrophic fires. Fuel treatments may occur in the Inner Riparian Zone but are unlikely to impact effective shading or microclimates. BLM has historical data and will continue to monitor stream temperatures to evaluate long-term trends.

Issue A-14: How would the proposed vegetation treatment activities affect riparian function?

Background Information: Riparian areas begin at the interface between hillside groundwater and surface water and are critical to support aquatic ecosystems. The boundary of this zone is typically defined by a change in vegetation, hydrology, and seasonally saturated soils. The Riparian Reserve includes the upland area that contributes directly to the function of riparian areas; there is 1,096 acres of BLM-administered Riparian Reserves within the PA. For the Deer Creek watershed, the Riparian Reserve area is one Site Potential Tree Height (SPTH) or 190 feet from streams.

Riparian areas along the valley floor have been dramatically altered on both private and federally managed lands in the Deer Creek Watershed. Serpentine dominated soils generally have a narrow riparian zone, while more productive soils have a wider riparian zone. Surveys conducted in 1916-1917 describe a wide thickly wooded riparian zone, dominated with large conifers (USDI/BLM, 1997). Riparian areas are an important component of the forested landscape and provide ecological and social benefits to uplands, aquatic environments, and downstream water quality and availability.

The condition of riparian areas, channel morphology, and hydrology can be affected by land use activities such as timber harvest or road use and maintenance. All the Riparian Reserves in the Clean Slate PA are Class I and have been identified in the field by finding the inception points for streams, identifying springs and seeps, and finding wetlands or areas with unstable soils. GIS, LiDAR, and field surveys were conducted from June 2016 to March 2018 and were used to identify the location and extent of riparian reserves in the Clean Slate PA.

Management objectives and direction for Riparian Reserves are detailed in the 2016 ROD/RMP for dry forests (2016 ROD/RMP, pp. 75-77 & 82-87). Management objectives and direction are incorporated here by reference and have already been built into the proposed action. Inner Riparian Zones are 120 feet for fish-bearing and perennial streams and 50 feet for non-fish bearing intermittent streams (Figure 2-2).

In general, the RMP management direction for the riparian reserve is to limit disturbance from mechanical harvest and new construction of routes and landings in riparian areas near streams. For example, commercial harvest is restricted in the Inner Riparian Zone but allowed in the Middle and Outer Riparian Zone. Thinning with cut buffers have been shown to be effective at protecting in-stream wood recruitment. However, placement or tipping can increase the positive channel aspects more quickly than buffers alone (Benda et al., 2016). Maintaining lower tree densities directly above riparian areas may be beneficial to increase tree growth and vigor in riparian areas (Ruzicka et al., 2014).

Logging activities would fell trees to build landings, yarding corridors or skid trails in the riparian reserves; these trees would be left in adjacent stands as woody debris or be removed to facilitate placement for fish restoration. All activities would achieve post-harvest canopy cover, trees per acre, and snag requirements (2016 ROD/RMP, pp. 82-84). Skid trails in the riparian reserve would be scarified, seeded, water barred, mulched, and blocked after use.

There are 94 acres being analyzed for Outer Riparian Zone commercial thinning. Fieldwork did not identify any Outer Riparian Zones that could not be benefited by thinning for forest health. If unstable soils were identified during field surveys, non-commercial treatment buffers were extended. Riparian thinning has the goal of promoting species diversity, forest health and improving resiliency to landscape disturbances. Commercial thinning and fuel management actions can achieve these goals by reducing competition for desirable species, reducing fuel loading, and putting forest stands on a trajectory to achieve complexity of age and structure.

No-commercial treatment buffers (i.e., the Inner Riparian Zone) make up roughly 8.3% of the unit acre totals. No-commercial treatment buffers (120 feet for perennial, 50 feet for intermittent) have been applied to protect aquatic resources. Canopy cover in the Riparian Reserve would remain above 30% with 60 trees per acre on average. Therefore species diversity and forest health would be maintained. No-cut buffers have been shown to be effective at protecting in-stream wood recruitment (Benda et al., 2016). Buffers are also effective in protecting in-stream wood recruitment. However, placement or tipping can increase the positive channel aspects more quickly than buffers alone (Benda et al., 2016).

Rationale: Potential impacts for Riparian Reserve function was considered but not analyzed in detail, since commercial harvest treatments in the Inner Riparian Zone and mechanical disturbance in the Riparian Reserve would be restricted, fuel treatments would be conducted to reduce the risk of future stand-replacing crown fires and finally, maintaining canopy, density and snag requirements post-harvest (2016 ROD/RMP, pp. 82-84).

Commercial thinning would occur only in the Outer Riparian Zone and would be a small percentage of the Riparian Reserve within the Clean Slate PA (8%). Canopy cover in the Outer Riparian Zone would remain above 30%, therefore, species diversity, and forest health would be

maintained. Thinning treatments in the Outer Riparian Zone would be done, "as needed to ensure that stands are able to provide trees that would function as stable wood in streams and fuel treatments would be done within 60 feet of fish-bearing or perennial streams as needed to reduce risk of stand-replacing crown fires (2016 ROD/RMP, p. 82).

Issue A-15: Would thinning in the Outer Riparian Zone reduce wood recruitment to streams?

Background Information: Woody debris is important for maintaining the proper function of stream systems in southern Oregon. Coarse wood provides channel complexity, captures sediment, and creates pools and waterfalls. In addition to oxygenating water, water retention and cycling in and out of the alluvial aquifer cools water and improves water quality. The physical and chemical benefits of coarse wood improve conditions for aquatic life including salmonids. Large woody debris is often more stable and less likely to migrate downstream with flood flows, but moderate and small diameter wood can often provide the same benefits to stream channels, both types of wood are called coarse wood.

Coarse wood in streams is primarily recruited through near-stream inputs (e.g., tree mortality and bank erosion) and landslides and debris flows. Empirical studies indicate that 95% of total instream wood (from near-stream sources) comes from distances of 82 to 148 feet (ICS, 2013).

For near-stream riparian inputs, empirical and modeling studies suggest that stream wood input rates decline exponentially with distance from the stream and vary by stand type and age (ICS, 2013). The Interagency Coordinating Subcommittee (ICS) report compared studies and showed that 90 to 100% of the wood recruitment came from with 115 feet (35 meters) of the stream. The report found that a no treatment buffer of 120 feet (36.6 meters) would likely retain at least 95% of the wood available for recruitment to the stream from stands that have been harvested in the past (ICS, 2013, p. 31).

Riparian buffers should consider the difference between short-term and long-term effects on wood recruitment. The use of no-harvest buffer zones may not properly account for the importance of wood sources further away from the stream. This is because small intermittent streams comprise most of the stream network length in the PA, and wood recruitment from these areas typically comes from episodic landslides and debris flows. Recruitment of wood near streamside (50 feet) areas appears responsible for the vast majority of wood. However, low tree mortality and decomposition, fewer landslides and debris flows, breakage and redistribution of existing instream wood, may result in future wood deficits in headwater streams in the absence of natural disturbances or human-mediated recruitment (Burton et al., 2016).

Rationale: The Inner Riparian Zone buffers for commercial thinning would be protective of wood recruitment to perennial streams. Fuels treatments that would occur within 60 feet would

leave tree boles greater than 6 inches on site for potential wood recruitment (Section 2.5: Project Design Features). Because this material would be left on site fuel treatments are not expected to impact wood recruitment to streams.

Woody material from the outer zone typically is transported to streams via lands-slides, debris flows, and wind events. These would still occur under the proposed action but may be less frequent because thinning is effective at reducing the potential for catastrophic wildfire. However, thinning in the Outer Riparian Zone is not likely to reduce material available for recruitment to the Inner Riparian Zone since a portion of the cut trees would be left on site or made available for fish habitat restoration (2016 ROD/RMP, pp. 76-77).

Port-Orford Cedar and Port-Orford Cedar root disease (*Phythophthora latereralis)*

Issue A-16: Would the Clean Slate proposed action cause Port-Orford Cedar (POC) root disease (*Phythophthora latereralis)* to spread within the Project Area?

Background Information: Port-Orford Cedar (*Chamaecyparis lawsoniana)* is a species of conifer native to Oregon and northwestern California, and grows from sea level up to 4,900 feet in the valleys of the Klamath Mountains, often along streams.

POC root disease is primarily water-borne or is transported by humans and other vectors in mud from wet area to wet area. Running or standing water is needed for successful introductions. POC root disease infection begins when mycelium, from a germinated spore, invade the roots. The infection then spreads through the inner bark and cambium around the base of the tree. Spread up the trunk is generally limited. Infected tissue dies and effectively girdles the tree. The soil on vehicle tires, especially logging trucks, is considered a significant problem due to the volume of soil that can be carried and the traffic rate in and between susceptible areas.

Rationale: This issue was considered but not analyzed in further detail because there are no known infested populations of Port-Orford Cedar in the Clean Slate Project Area or on haul routes. The nearest known population is approximately 2 miles away on a separate road network not connected to the Clean Slate haul routes. In addition, equipment utilized to implement the proposed action is required to be washed prior to entering work areas to reduce the spread of dirt which may contain POC root disease spores. To reduce the transport of POC root disease by the public, the BLM seasonally closes gates in and near the project area.

Recreation and Visual Resource Management

Issue A-17: How would proposed forest management and associated roadwork operations and non-motorized trail construction affect recreational opportunities within the Lake

Selmac Special Recreation Management Area and dispersed recreational activity throughout the Project Area?

Background Information: For the purpose of recreation management, the 2016 ROD/RMP designated BLM-administered lands into two recreation management categories; Special Recreation Management Areas (SRMAs) and Extensive Recreation Management Areas (ERMAs). SRMAs are an administrative unit where the existing recreation opportunities and recreation setting characteristics are recognized for their unique value, importance, and distinctiveness as compared to other areas used for recreation. Within SRMAs, where specific recreation opportunities and recreation setting characteristics are managed and protected on a long-term basis, recreation is the predominant land-use focus. ERMAs are an administrative unit that requires specific management consideration in order to address recreation use, demand, and recreation and visitor services program investments. ERMAs are managed incommensurate with the management of other resources and resource uses.

There are no ERMAs located within the Clean Slate Project Area; however, there is one designated SRMA, the Lake Selmac Trails SRMA (Figure A-3). The Lake Selmac Trails SRMA was designated for the potential to provide non-motorized recreational trail opportunities in a remote setting (USDI/BLM 2016b, p. 100). The Lake Selmac Trails SRMA is closed to biking and Off-Highway Vehicle (OHV) use, and shooting.

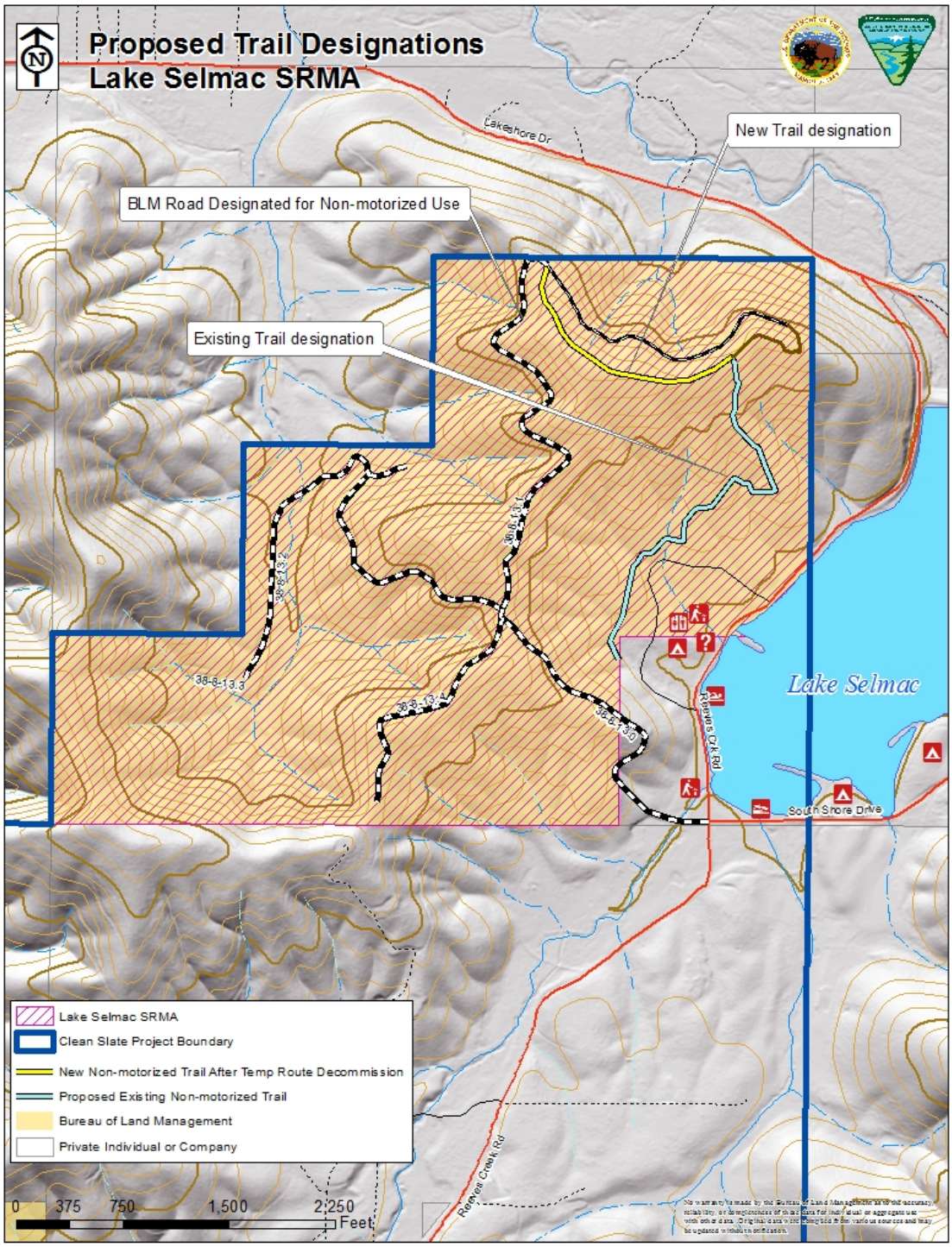
Timber Harvest is allowed in the Lake Selmac Trails SRMA if compatible with meeting recreation objectives and not interfering with recreation opportunities and maintaining setting characteristics (USDI/BLM 2016b, p. 101).

Currently, there are approximately 4.5 miles of designated non-motorized trails within the Lake Selmac Trails SRMA or on other BLM-administered lands in the Project Area. The proposed action would designate 3.75 miles of existing trail and road to increase recreation based access to public lands.

There is a developed recreation site on BLM-administered lands in the Project Area managed by Josephine County. The proposed designation of trails would provide day-use hiking, biking, and equestrian opportunities to campers and visitors in the area within the project area.

Recreational use in the remainder of the Project Area is generally low and dispersed in nature, consisting primarily of hunting, dispersed camping, driving for pleasure, exploration, and a yearly Special Recreation Permit issued for a competitive equestrian event. This event uses the trails purposed in this document as well as designated roads throughout the project area. All private and public lands within this area are managed for wildlife habitat and watershed health.

Figure A-3: Map of Lake Semac SRMA Proposed Trails



Forest management and associated roadwork operations have the potential to disrupt recreational activities in the following ways:

1) during harvest, noise from truck and helicopter activities could discourage recreational use of some areas;
2) harvest and fuels treatment activity during the fall deer, elk, and bird hunting seasons may negatively affect hunters' experiences;
3) treatments occurring adjacent to hiking trails may negatively affect the experience of hikers or temporarily limit camping experiences; and
4) treatments have the potential to 'open up' land to off-highway vehicle intrusions.

Rationale: This issue was considered but eliminated from further detailed analysis because the dispersed nature of the proposed treatments, the incorporation of Project Design Features that would limit unauthorized OHV use, and the minimal interruption to designated recreation areas. The potential to effect (beneficial or adverse) recreational opportunities within the Lake Selmac Trails SRMA or other BLM-administered lands in the Lake Selmac Trails area is not expected. There would be a slight increase in recreational opportunities within the Lake Selmac Trails SRMA by incorporating the proposed and existing 3.75 miles of non-motorized trail into the current trail network.

Effects to dispersed recreational activities outside the Lake Selmac Trail SRMA would be low due to dispersed nature of the proposed treatments spread widely across the Project Area. BLM-administered lands in the Project Area are proposed for forest management treatments which would leave the remainder of acres available for dispersed recreation. Additionally, treatments would occur over a period of 3 to 5 years, the average length of a timber sale contract. While there is the potential that some recreationists may be discouraged from recreating near treatment areas during timber harvest, there are numerous other areas that recreationists could hike, hunt, bird watch, etc. in the Project Area and beyond.

Approximately 0.45 miles of the existing and purposed trail would be incorporated and designated after the harvest to minimize the potential for impacts to recreationists from timber harvest. The potential to 'open up' land to off-highway vehicle intrusions would be minor as there are currently barricades to limit OHV access to this area.

Issue A-18: How would proposed forest management, associated roadwork operations, and non-motorized trail construction 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 Clean Slate Project Area includes VRM Classes III and IV lands. See the descriptions below for allowable levels of modification within these classes (2016 ROD/RPM, p. 114).

- VRM Class III – manage areas for moderate levels of change to the characteristic landscape. Management activities will attract attention but will not dominate the view of the casual observer.
- VRM Class IV – management activities may dominate the view and will be the major focus of viewer attention.

No timber harvest or associated roadwork operations are proposed on BLM-administered lands classified as VRM Class I or II. There are approximately 1.32 miles of non-motorized trail designation, 0.45 miles which will be designated after construction and decommission of the temporary route within the VRM Class III area. There are no group select openings proposed within the VRM Class III area.

An assessment, or Visual Contrast Rating, was conducted in February 2018 to evaluate the potential effects of proposed projects located in the VRM Class III landscape. There are approximately 443 acres of VRM Class III with the Lake Selmac Trail SRMA. There are less than four acres that are within the VRM Class III landscape and one temporary purposed route. All other projects are located in the VRM Class IV landscape.

Rationale: This issue was considered but eliminated from further detailed analysis because the proposed designation of trail and trail maintenance would not hinder attainment of VRM Class III objectives. After completing a contrast rating for the Lake Selmac Trails SRMA, the BLM determined that temporary road construction and trail designation would not draw attention from the casual observer due to existing textural contrast within the pre-treatment landscape as well as the heavy vegetative screening from the conifer stands that the trail is routed through. With the distance from the proposed temporary route construction and trail designation and the heavy vegetative screening, it was determined that the proposed treatments would not attract attention from the casual observer.

The area of timber harvest proposed within the VRM Class III landscape was not visible from any key observation points. Therefore, it would have no impact on Visual Resources and would not be noticeable to the casual observer.

All other proposed forest management treatments and associated road and landing construction are within the VRM Class IV landscape. There are timber harvest units proposed along existing roads that will be visible and would attract attention from the casual observer through increased light entering the forest floor as well as logging activity and slash. All projects proposed in the VRM Class IV landscape would meet all visual objectives for VRM Class IV landscapes.

Issue A-19: How would the proposed action affect the preservation of wilderness characteristics within the District Designated Reserve-LMWC land use allocation in the long-term?

Background Information: For the purpose of preserving wilderness characteristics for the long term, the 2016 ROD/RMP designated District Designated Reserve-Lands Managed for their Wilderness Characteristics (DDR-LMWC). These areas were deemed to have roadlessness, naturalness, opportunities for solitude, and primitive unconfined recreation, and identified supplemental values. There are no DDR-LMWC designated areas within the Project Area.

Rationale: This issue was considered but eliminated from further detailed analysis because there is no District Designated Reserve Lands Managed for their Wilderness Characteristics (DDR-LMWC) within the Project Area.

Soil Productivity and Stability

Issue A-20: How would proposed ground-based and skyline-cable yarding, activity and hazardous fuels reduction treatments, road and route construction affect soil productivity (compaction, displacement, burning, and change in organic matter and soil chemistry)?

Background Information: Soil is a fundamental resource that controls the quantity and quality of such renewable forest resources like timber, wildlife habitat, forage, and water yield. Soil productivity is 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. These two properties regulate critical site processes through their roles in microbial activity, soil aggregate stability, water and gas exchange, physical restrictions on rooting, and resource availability (Powers et al., 2004, p. 194). Site organic matter and soil porosity are most important when measuring the effects of management, although other factors such as water regimes, soil biological types and populations, and soil loss can also affect long-term soil productivity.

Many factors can affect soil productivity such as compaction, displacement, erosion, organic matter loss and more. The 2016 ROD/RMP provides management direction for applying Best Management Practices (BMP), as needed, to maintain or restore soil functions and soil quality and limit detrimental soil disturbance. The 2016 ROD/RMP also provides direction to limit detrimental soil disturbance from forest management operations to less than 20% of the harvest unit area. Where the combined detrimental soil disturbance from the implementation of current forest management operations and detrimental soil disturbance from past management operations exceeds 20% of the unit area, apply mitigation or amelioration to reduce the total detrimental soil disturbance to less than 20% of the harvest unit area (2016 ROD/RMP, p.109).

The 2016 ROD/RMP analyzed how timber harvest, road construction, and fuel reduction treatments, and the combination of these activities would affect soil quality this analysis is included here by reference. This analysis evaluated detrimental soil disturbance, which is the limit where the naturally occurring soil properties change to a reduced state and inherent solid capacity to sustain the growth of desired vegetation. Detrimental soil disturbance can occur from erosion, loss of organic matter, severe heating to seeds or microbes, soil displacement, or compaction (2016 ROD/RMP, p. 746-765). The Clean Slate Forest Management Project incorporated the applicable Best Management Practices from the 2016 ROD/RMP (Table C-2, pp. 183-185) and designed site-specific Project Design Features to mitigate detrimental soil disturbance (Section 2.5).

Impacts to soils and soil productivity were evaluated where ground-disturbing actions are proposed (e.g., treatment units, road, and route construction, pre-designated skid trails, fuels treatments). Proposed actions that affect soil productivity and have the potential of creating detrimental disturbance close to 20% threshold include; timber harvest, yarding, activity slash treatments, temporary route, and landing construction.

Rationale: This issue was considered but not analyzed in further detail because the potential for impacts to soil productivity beyond what was anticipated and analyzed in the Final Environmental Impact Statement (FEIS) for the 2016 ROD/RMPs is negligible. The Clean Slate Forest Management Project incorporates applicable Best Management Practices from the 2016 ROD/RMP (Table C-2, pp. 183-185) and site-specific Project Design Features. 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 proposed treatment areas. Implementation of the Project Design Features described above eliminates the potential for detrimental impacts over 20% to occur from implementation of the proposed actions. For this reason, the Clean Slate Forest Management Project would meet the required detrimental disturbance threshold after implementation. Road construction that would occur within treatment units counts towards the 20% threshold. Best Management Practices, such as limiting skid trails to 15% of the unit area, were designed in part to account for the potential of road construction in these areas.

Timber Harvest – Ground-Based and Skyline-Cable Yarding: For timber harvest that would apply ground-based yarding, Best Management Practices such as utilizing existing skid trails where possible, limiting the area of skid trails to under 15% of the area, and spacing skid trails an average of 150 feet apart, would limit compaction and soil displacement to within the acceptable limit (below 20% of the area with compaction being no higher than 15% of that area).

In an Oregon State University study on partial cutting (using designated skid trails), 4% of the treatment area was occupied by designated skid trails, compared to 22% for conventional logging

(Bradshaw, 1979). In a study of thinning and partial-cutting utilizing ground-based yarding systems, skidding logs caused soil disturbance on approximately 21% of the site, resulting in 13% displacement and 8% compaction (Landsberg et al., 2003). Observations during field review of the proposed treatment units reveal very few old skid trails still apparent across the landscape. Tree and brush vegetation have re-established in most of the skid trails that were previously compacted from past harvesting.

Soil erosion from ground-based yarding would be localized to skid trails and would not be displaced off-site because of the gentle slope, a low degree of soil erodibility, and the adjacent undisturbed soils. The duff organic horizon and vegetation adjacent to ground disturbance would catch displaced soil particles. Best Management Practices such as waterbarring, seeding, mulching, and dry condition haul would limit the amount of soil erosion and, if it were occurring, would limit displacement of the disturbed soil particles.

For timber harvest that would apply skyline-cable yarding, restrictions such as constructing waterbars where gouging occurs and using partial or full suspension would limit the potential for displacement in yarding corridors. These restrictions would reduce the amount of displacement and further erosion to acceptable levels anticipated in the FEIS (USDI/BLM, 2015, p. 183).

Fuels and Understory Reduction Treatments: The burning of activity fuels and natural-hazardous fuels, including pile burning and underburning, have the potential to impact soil productivity through detrimental heating of the soil and increasing erosion potential. These impacts count toward the overall impact of detrimental soil disturbance. However, Best Management Practices, such as dispersing hand piles across the unit into small piles and burning when soil moistures are high (Section 2.5), would minimize the intensity and extent of the burn.

Temporary Route and Landing Construction: The construction of temporary routes would have a direct effect on soil productivity on that site. The soils in these locations would be bladed and compacted. The impacts from temporary route construction are expected to be limited because any routes constructed on BLM-administered lands would be decommissioned after use. Whether the road is located within or outside of a treatment unit also affects how soil disturbance is calculated.

Temporary Route Construction: Alternative 2 also proposes to construct approximately 1.8 miles of temporary routes; which equates to about 7.2 acres of detrimental disturbance. Approximately 0.4 and 0.3 miles of temporary route reconstruction and tractor swing route construction will be completed; this would equate to approximately 1.6 and 1.2 acres of detrimental disturbance, respectively. The effects to soil resources from temporary routes are expected to be the same both during construction and use. Temporary routes would be fully decommissioned at the close of project activities. Soil erosion from route decommissioning would be avoided or minimized

due to the incorporation of Best Management Practices. For example, seasonal restrictions during all road construction activities would reduce the potential for runoff and off-site erosion from intensive winter storms and saturated soil conditions.

Temporary route construction would result in a temporary (<10 years) full loss of soil productivity. Decommissioning would likely not return the soil to the original bulk density in the short-term. However, seeding and mulching would discourage soil displacement, surface sealing, reintroduce organic material and root systems into the soil, and facilitate the vegetative recovery of the soil. Soil productivity is expected to return in the long-term (10+ years). However, studies (Rice et al., 1972) and local observations by BLM soil scientists reveal that vegetation recovery and erosion rates can return to near-normal levels within approximately 5 years.

Soil erosion from route construction would be avoided or minimized due to the incorporation of Best Management Practices, such as limiting construction to between May 15th and October 15th or during dry soil conditions (less than 25% soil moisture) and locating routes on stable locations, such as ridgetops and stable benches, or flats where topographically feasible. These Best Management Practices, and other Project Design Features identified in Chapter 2, would reduce the potential for runoff and off-site erosion from intensive winter storms and saturated soil conditions.

Landings: In total, 159 landings are proposed to be used or constructed as under Alternative 2. The anticipated effects of landing construction would be the same as temporary route construction since the soil would be detrimentally disturbed but would be de-compacted, seeded and mulched to aid the recovery of the soil towards natural productivity.

Issue A-21: How would disturbance from proposed ground-based, skyline-cable, roadwork, and non-motorized trail management and use affect slope stability (i.e., the risk of mass movement) of fragile granitic soils in the Project Area?

Background Information: There are soils classified as fragile under the Timber Productivity Capability Classification (TPCC) Handbook (USDI/BLM, 1988) in the proposed Clean Slate Forest Management Project Area. Fragile soils were also identified using the Medford District's current corporate GIS layer for fragile soils, the Oregon Department of Geology and Mineral Industries (DOGAMI) geology maps that help indicate where slope stability issues may occur aerial imagery, and site-specific field review. Data collected from the site-specific field review ultimately determined whether there were fragile soils present in the areas where activities are proposed.

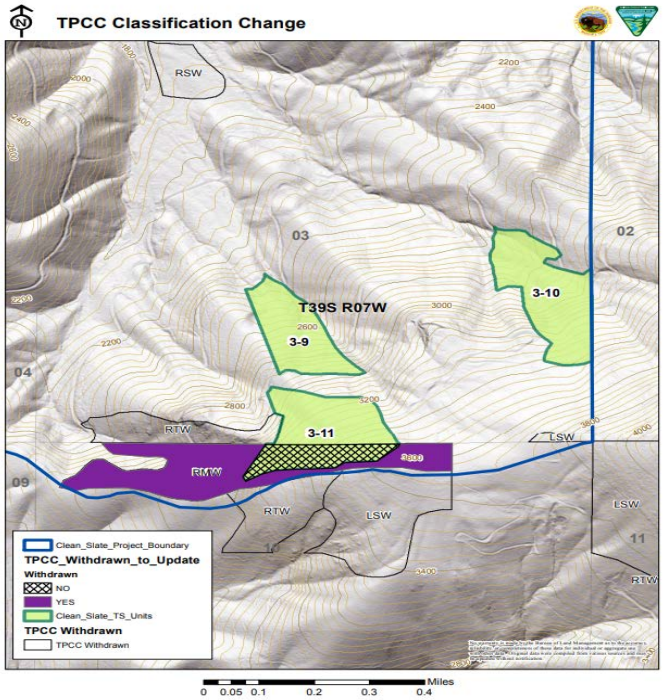
There are no "Soils of Concern" as identified in the TPCC GIS layers with the potential for Surface Erosion (FM) or Mass Movement (FP), therefore no need for the Best Management

Practices in Table C-14 (2016 ROD/RMP, p.205). The 2016 ROD/RMP provides management direction for soil resources which is to **"**avoid road construction and timber harvest on unstable slopes where there is a high probability of causing 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).

Rationale: The type of fragile soils present in the Clean Slate Forest Management Project Area is alluvium derived from ultramafic or granitic rocks. The alluvial materials are sediments that have been deposited by running waters. Soils derived from ultramafic or granitic rocks tend to be very gritty in texture and are prone to slumps and mass movement due to the lack of cohesion between the sediments. However, the small parcel of fragile soils within the Project Area is not within any of the harvest units, thus will not be analyzed further in this project.

Additionally, the bottom part of unit 3-11 lies within a withdrawn polygon (unit key 220386). After field investigations, it was determined that this part of unit 3-11 should not be withdrawn (Figure A-3) from the HLB-UTA. Hence, the boundary of the polygon has been redrawn to exclude the bottom part of unit 3-11. The TPCC area in 3-11 will be managed as described in the proposed action for areas which are within the HLB-UTA. This process is documented in the Administrative Project Record.

Figure A-3: Proposed TPCC change for unit 3-11



Terrestrial Wildlife and Special Status Species

Issue A-22: How would the project be monitored to assure that canopy cover requirements for the northern spotted owl are met?

Background Information: The Medford District has developed a Guide for Planning and Implementing Vegetation Management Projects (USDI/BLM, 2015) to establish six steps and five checkpoints to ensure that projects are consistent with National Environmental Policy Act (NEPA) documents and with Endangered Species Act (ESA) Section 7 consultation requirements. Included in these steps are habitat evaluations and northern spotted owl surveys. Silviculturists work with wildlife biologists to develop forest treatment prescriptions. The Biological Assessment and Biological Opinion are reviewed by the planning team and the interdisciplinary team. The Marking Crew Lead is informed of the consultation requirements prior to the on-the-ground delineation of treatment units and tree marking. The silviculturist, in consultation with the wildlife biologist and other specialists, monitors the marking of trees as it is completed to ensure it meets the consultation requirements and stand management objectives. Modifications to the marking of trees would be applied as needed. The Contract Administrator monitors harvesting activities and ensures contract stipulations are met. Lastly, the wildlife biologist monitors a subset of units post-treatment to evaluate consistency between implementation, NEPA analysis, and ESA consultation requirements; this includes evaluating canopy cover. These requirements are described in further detail in the Clean Slate Monitoring section of the EA.

Rationale: Because the EA thoroughly describes the implementation and monitoring requirements to ensure canopy cover requirements for the northern spotted owl would be consistent with the EA and consultation requirements, this issue was considered but not analyzed in further detail in Chapter 3 of the EA.

Issue A-23: How would noise associated with proposed timber harvest, restoration actions, fuels reduction activities, and roadwork affect northern spotted owls during their nesting season?

Background Information: The proposed Clean Slate Project is located within the range of the northern spotted owl (NSO) and has the potential to cause noise disturbance near NSO nest sites. The BLM will follow guidance from the U.S. Fish and Wildlife Service (USFWS) and will conduct surveys in the Project Area to determine nesting status. No timber harvest would occur within 0.25 mile of NSO nest sites between March 1st and June 30th but may be extended up to September 30th based on site-specific conditions (such as late nesting or re-nesting attempts). In addition, no disturbance would occur within active 300-meter NSO nest patches. The USFWS

recommended noise disturbance distances for activities other than timber harvest would be applied (See Table 2-5).

Rationale: This issue was considered but not analyzed in further detail because the potential for NSOs to be impacted by noise associated with proposed project activities is eliminated through the implementation of Project Design Features (PDFs) (Chapter 2).

Nesting owls are confined to an area close to the nest, but once the young fledge, they can move away from noise and activities that might cause them harm. Because all project activities would follow mandatory PDFs that restrict activities to outside of the breeding season (March 1st to June 30th) and beyond recommended disturbance distance thresholds (Tables 2-2 and 2-3 in Chapter 2) as established by the USFWS, no harm to nesting owls, or their young, is expected from project-related noise.

Issue A-24: How would ground disturbance from proposed project activities and timber harvest affect Bureau Special Status wildlife species?

Background Information: Wildlife survey databases were reviewed for known locations of Bureau Special Status Species. For species not directly observed within the Project Units, the project wildlife biologist determined whether or not a species' known range extended into the Project Area, and then whether or not a species' habitat was present within the Project Area, followed by whether or not treatment units contained habitat for a species.

The project wildlife biologist has evaluated the effects of the proposed project activities and has determined that the No Action Alternative along with the Action Alternatives would not rise to the level that would result in the following Bureau Special Status wildlife species to no longer be able to persist within the 11,704-acre BLM acres in the Project Area boundary.

Special Status wildlife species, known or suspected to be present in the Project Area based on habitat types, field survey data, or historical ranges, are bald eagle, foothill yellow-legged frog, western pond turtle, fisher, marten, fringed myotis bat and Townsend's big-eared bat.

Through habitat modification or noise disturbance, activities that may impact Special Status wildlife species (known or suspected in the Project Area) include the harvest land base UTA IVM proposed treatments, and associated landings and road construction. Helicopter yarding, landing road reconstruction and timber haul may cause noise disturbance as well.

Other Special Status wildlife species not suspected to be present in the Project Area based on habitat types, field survey data, and/or literature reviews are: Lewis' woodpecker, grasshopper sparrow, peregrine falcon, white-headed woodpecker, Franklin's and Western Bumblebees,

Oregon spotted frog, streaked horned lark, Oregon vesper sparrow, Johnson's hairstreak butterfly, Pacific martin, purple martin, tricolored blackbird, white-tailed kite, Siskiyou hesperian snail, travelling sideband snail, chase sideband snail, Oregon shoulderband snail, Crater Lake Tightcoil snail, pallid bat, and vernal pool fairy shrimp. These species were not evaluated in further detail.

Rationale: This issue was considered but not analyzed in further detail because an abundance of late-successional habitat would still be available after treatment in the Project Area and would ensure Special Status wildlife species closely related to late-successional and forests would continue to persist within the Project Area. Approximately 10% of each treated stand would be in untreated skip areas. No modification of the inner riparian zones is proposed in any riparian reserves, and no suitable perennial flowing streams of low-gradient and fish-bearing quality are adjacent to proposed units with potential for pond turtle or yellow-legged frog habitat. Approximately 90% of riparian reserves on BLM would not be treated, and riparian reserves in complex structure condition are not treated. No modification would occur to caves, adits, or other structures that provide Townsend's big-eared bat habitat.

For species dependent upon or related to late-successional characteristics (fringed myotis bat, pacific marten): Unique stand features such as snags, large decayed coarse woody debris, large hardwoods, legacy trees >36" DBH, and 10% of each stand retained in untreated skip areas, would be retained to maintain desired structural components within treated units. Approximately 4,067 acres (35%) of the NSO analysis area would be retained providing late-successional habitat conditions (Figure 3-6). Up to 175 acres of harvest would result in the removal or degradation of approximately 4% of the late-successional habitat in the analysis area, and reduce the proportion of habitat within the analysis area from approximately 36% to 35%. Some stand features would also be retained including trees >36" DBH, hardwoods >24" DBH, and 10% of each stand in untreated skip areas, and could continue to be used by these Bureau Special Status Species.

There are no known marten detections in or near the project area which is in the historical range, but if resident populations occur, it is expected to be at lower levels of abundance because the project area is near the eastern edge of the historical coastal range and out of the current southern Oregon coastal population. The project area and falls between coastal and cascade population area where recent surveys were unable to detect martens (Slauson & Zielinski, 2004; Moriarity et al., 2016) in Josephine County. Approximately 36% of the Project Area (1,184 acres) is in Reserves and 60% (7,130 acres) of the NSO analysis area are in Reserve land status (Riparian Reserve, LSR, District Defined Reserve) and withdrawn from intensive timber harvest, supporting development of late-successional habitat characteristics for terrestrial and riparian related sensitive species. Section 2.5 Wildlife PDFs for fisher are expected to retain habitat elements and disturbance restriction adequate for marten to persist.

Bald Eagle: The Project Area contains one site. No action is proposed in known nesting or roost trees. For harvest actions within ½ mile, seasonal restrictions would be applied to avoid disturbance.

Issue A-24: How would proposed timber harvesting activities affect Sensitive listed woodpeckers and cavity nesters?

Background Information: Bureau Sensitive woodpeckers, such as the Lewis' woodpecker and white-headed woodpecker, are not expected to occur in significant levels in the Project Area. Lewis's woodpeckers are associated with open woodlands near streams and rivers. Habitat preference includes hardwood oak stands with scattered ponderosa pine near grassland shrub communities. Species may be present in the Project Area during the fall and winter seasons (migratory).

The white-headed woodpecker is typically associated with open ponderosa pine or mixed conifer stands dominated by ponderosa pine. They forage on ponderosa pine seed and insects and use large snags (> 20 inches) for nesting.

Rationale: This issue was considered but was not analyzed in further detail because unique stand features such as large snags, large ponderosa pines, and large hardwoods would be retained to maintain desired structural components for woodpeckers and cavity nesters. Additionally, timber harvest treatments would promote and retain healthy ponderosa pine trees within the mixed-conifer stands. None of the proposed action units qualify as oak woodland habitat or pine-dominated stands. Reserves (36% of Project Area) and late-successional habitat (35% of Project Area across all land allocations) in addition to untreated skip areas and retained large conifers and hardwoods in treatment areas, would provide for the distribution of habitat across the project area for cavity nesters.

Issue A-24: How would timber harvest, fuels reduction, underburning, and new road construction affect neotropical bird population trends?

Background Information: The following bird species have been located, or are likely present, within the Project Area: Olive-sided Flycatcher (BCC), Purple Finch (BCC), Rufous Hummingbird (BCC), Northern Goshawk (BCC), Band-tailed pigeon (GBBC), Willow Flycatcher (BCC).

The BLM has issued interim guidance for meeting BLM's responsibilities under the Migratory Bird Treaty Act and Executive Order (EO) 13186. Both the Act and the EO promote the conservation of migratory bird populations. The interim guidance was transmitted through Instruction Memorandum (IM) No. 2008-050. The IM relies on two lists prepared by the

USFWS in determining which species are to receive special attention in land management activities; the lists are Bird Species of Conservation Concern (BCC) found in various Bird Conservation Regions and Game Birds Below Desired Condition (GBBDC). In December 2008, the US Fish and Wildlife Service released The Birds of Conservation Concern 2008 (USDI/USFWS, 2008). This publication identifies species, subspecies, and populations of migratory and non-migratory birds in need of additional conservation actions, updating the April 2008 Birds of Conservation Concern List. This list meets USFWS mandates for the conservation of migratory non-game birds.

Additionally, the USFWS and the BLM signed a Memorandum of Understanding in April 2010 that identified strategies to avoid or minimize adverse impacts on migratory birds. The Clean Slate Project would follow these guidelines to reduce the impacts to migratory birds. For example, many of the PDFs, such as seasonal restrictions that minimize effects to some wildlife species, would also benefit migratory birds.

Rationale: This issue was considered but was not analyzed in further detail as the proposed actions would not have the potential to cause adverse effects with the implementation of required PDFs. Implementation of treatments might occur during bird nesting season. However, many of the PDFs (seasonal restrictions, special status plant and wildlife buffers, and Riparian Reserves) would benefit migratory birds and help minimize the amount of disturbance during nesting season. Proposed treatment units (461 acres) are dispersed across a large area (over 5,300 federal acres), and would likely occur over the course of multiple years Smaller; staggered treatments would minimize the immediate disturbance to nesting birds. Over time, these treatments would create a mosaic landscape with increased structure and biodiversity, which may provide a long-term benefit to bird and wildlife species. Removing or partially harvesting late successional habitat and creating early successional habitat gaps (openings) shifts habitat availability from one guild to another, shifting the benefits from one species to another. Goshawks and band-tailed pigeons favor older habitat classification, but olive-sided flycatchers, rufous-sided hummingbirds, and purple finches prefer younger and more open habitat. Proposed treatments across the project area provide and maintain a mosaic of habitat types for neotropical birds.

There would be no perceptible shift in species composition during the breeding season following treatment, and future breeding seasons, because of the limited scale of habitat modifications in relation to the Project Area. Adequate undisturbed areas within and adjacent to the Project Area would maintain habitat for displaced individuals. Overall, populations in the region would be unaffected due to this small amount of habitat and/or reproduction loss. These effects would not be measurable at the regional scale. Analyzing bird populations at this scale is supported by Partners in Flight (California Partners in Flight, 2002).

Appendix B -- Scoping Comments

The BLM is required to respond to substantive comments submitted during scoping (40 CFR § 1503.4). The National Environmental Policy Act Handbook (section 6.9.2.1, p. 66) describes substantive comments as doing one or more of the following: 1) question, with reasonable basis, the accuracy of the information contained within the EA, 2) question the adequacy of the methodology for, or assumptions used in the analysis, 3) present new information relevant to the analysis, 4) present reasonable alternatives other than those described in the EA, or 5) cause changes or revisions in one or more of the alternatives. The Environmental Assessment only considered and responded to substantive comments (BLM Manual, National Environmental Policy Handbook, 2008). Comments are considered non-substantive if they: 1) express favor for or against the Action Alternative without reason, 2) agree or disagree with BLM policy or resource decisions without justification or supporting data, 3) don't pertain to the Planning Area or the Action Alternatives, or 4) take the form of vague, open-ended questions.

During the analysis substantive comments received during scoping were considered in one of the following ways: 1) comments may have been incorporated into the design of the project, 2) comments may have been mitigated through project design features, 3) comments may be responded to in this Appendix, 4) Analyzed in Detail section, and 5) comments may be discussed in the Issues and Alternatives Not Analyzed in Detail section. For a detailed explanation of the scoping process for the Clean Slate project see Chapter 1.7: Scoping. All comments received during scoping are cataloged and are contained within the Administrative Record.

1) **Topic Statement:** *Environmental Impact Statement*

Comment Summary: The BLM should conduct an Environmental Impact Statement that incorporates the most current and best available science specific to our bioregion. The urgent issues of global species extinctions, global climate change, and the knowledge and understanding of the role of fire in ecosystem dynamics around the world are constantly evolving as new science is conducted. Please conduct a full evaluation and give a "hard look" as required by NEPA at the emerging science, new and current information on these urgent topics. Simply stating that this project is tiered to another document does not automatically make the decision to exclude analysis in compliance with NEPA.

BLM Response: An Environmental Assessment (EA) is a tool to determine the significance of the environmental impacts of a proposed action. The Clean Slate EA is being prepared to determine, through analysis, if the significance of effects of the proposed action warrants an EIS or if the preparation of a Finding of No Significant Impact (FONSI) is appropriate. The BLM is using the most recent and best science available to support the analysis. BLM is not required to explain every possible scientific uncertainty in an EA.

The BLM does not need to prepare an EIS to take a "hard look" at environmental Impacts. The BLM takes a "hard look" when the NEPA document contains a "reasonably thorough" discussion of an action's environmental consequences, and the agency can make an informed decision about whether there are any significant environmental impacts.

The commenter is correct in; tiering does not exclude analysis; tiering allows the use of the analysis within a broader NEPA document, specifically the 2016 Final Environmental Impact Statement (FEIS). Tiering is appropriate for the Clean Slate EA because the 2016 FEIS analyzed general forest management practices, while the analysis for the Clean Slate Proposed Action is site-specific. Tiering has not replaced site-specific and project-specific refinements conducted for the Clean Slate project. Tiering to the 2016 Record of Decision/Resource Management Plan (2016 ROD/RMP) is appropriate (40 CFR § 1508.28, 40 CFR § 1502.20), NEPA Handbook p.27.

2) **Topic Statement:** *Fuel reduction*

Comment Summary: Where were the impacts of these fuel reduction treatments of "activity fuels" and "natural-hazardous fuels" analyzed in the RMP and what was the methodology for determining that these are necessary and beneficial? Management practices only increase fire hazard. Removing the shade of the canopy increases the temperature and decreases the relative humidity on the forest floor. Logging slash and natural debris will dry out earlier in the fire season. Increased sunlight creates increased shrub growth, resulting in a more flammable forest. Larger, older trees are more fire-resistant and should be retained. BLM must estimate future fuel reduction costs. BLM should avoid any increase in particulate emissions.

BLM Response: The Final Environmental Impact Statement (FEIS) Affected Environment and Environmental Consequences section concerning fire and fuels begins on page 223 and includes a detailed explanation of analytical methodologies and assumptions utilized in developing the Proposed RMP.

The 2016 ROD/RMP (p. 26) states "The Proposed RMP will contribute to restoring fire-adapted ecosystems in the dry forest landscape of southern Oregon by increasing fire resiliency. The Proposed RMP will increase stand-level fire resistance and decrease stand-level fire hazard from current conditions. Active forest management and the treatment of activity fuels is expected to contribute to the restoration of fire-adapted ecosystems. For all prescribed burning activities, the Medford District BLM is required to comply with the Oregon Smoke Management Plan (OAR 629-048-0010). The Oregon Smoke Management Plan designates SSRA (Smoke Sensitive Receptor Areas), which are areas designated for the highest level of protection under the smoke management plan, as described and listed in OAR 629-048-0140. The Clean Slate EA

determined that there would be negligible direct or indirect effects on air quality within the Project Area and the SSRA (EA, p. 175)

3) Topic Statement: *Economic value of timber*

Comment Summary: What is the process the ID team will use to ensure that when offered for sale, the timber receives reasonable prices? How will negative externalities be incorporated into the analysis? How will BLM ensure that they are getting the same prices for the timber when the quality of the wood is substantially reduced?
BLM ignored the vast array of amenity-based businesses and jobs that rely on retaining natural quality and integrity. What will be the impacts to micro-industries in the Deer Creek Watershed from this project, such as Lake Selmac Resort, local bed and Breakfasts, vineyards, organic gardens, water for agriculture and fish, home-based entrepreneurs or online businesses, and retirement community?

BLM Response: The Clean Slate economic analysis (EA, p. 146) tiers to the economic analysis conducted for the 2016 ROD/RMP, which contains a detailed economic analysis for establishing the value of wood products (2016 ROD/RMP pp. 592 & 603).

The 2016 ROD/RMP (p. 26) concluded there will be an increase in recreation opportunities and goes on to state "The Proposed RMP will not seek to achieve this maximum level of recreation opportunities…" The analysis within the Clean Slate EA adheres to and follows the management direction in the 2016 ROD/RMP, and by doing so, this project is expected to contribute to recreational opportunities, yet not maximize levels of recreation within the Project Area.

4) **Topic Statement:** *Controversy over 2016 ROD/RMP Land Use Allocation determinations.*

Comment Summary: What methodology was used to determine harvest land use allocations and sustained yield productivity from these lands? Why is there such a disproportionate amount (70%) of harvest land base in this project area and only 3% LSRs? Why are we a sacrifice zone? Why are there cutover lands in the LSR designation? And why are there late successional communities that should have been in the LSRs in the Harvest Land Base?

What evidence is there that these specific forest management actions are needed to achieve continual timber production? From evaluating already managed BLM lands, it is clear that these practices are not achieving continual timber production, and are instead doing the opposite.
BLM must analyze the high level of controversy regarding the effects of the action on the quality of the human environment with respect to its size, nature, and effect. The long history of the community resisting and challenging the basic assumptions of conventional BLM agri-forestry

management practices, including fuel reduction, has led to the creation of a very controversial public environment surrounding the Clean Slate Project.

BLM Response: The 2015 FEIS (pp 1163-1228) describes the vegetation modeling used to analyze the application of the land use allocation, management action, and forest development assumptions to characterize forest conditions 10, 20, 30, 40, 50 and 100+ years in the future. This modeling was used to determine what the timber management results of the different alternatives would be over a 200 year period (p. 1207) and was used to help select the 2016 ROD/RMP. The Harvest Land Base is the land that shows the best characteristics of achieving continual timber production sustained through a balance of growth and harvest, offering timber for sale to meet ASQ, and through silvicultural treatments, enhance timber values and reduce fire risks and insect and disease outbreaks (2016 ROD/RMP, p. 62). The Clean Slate Project is designed to harvest timber for sale from the Harvest Land Base. The Harvest Land Base is intended to be managed to provide timber for sale to meet the requirements of ASQ described in the O&C Act.

Within the Clean Slate EA the BLM analyzed the effects of the action alternatives with respect to the size, nature, and effects of the actions. The 2016 ROD/RMP established Land Use Allocations (LUAs) which certain direct types of management to occur. An EA is not the proper place to challenge the basic assumptions of the management of public lands established in the 2016 ROD/RMP.

In 2012, the Josephine County Commissioners placed an advisory question on the November ballot: “In your opinion, is the practice of forest management to produce timber revenue an appropriate source for County services?” The public agreed with the question, as 71% of the voters responded: “Yes” (Hayden, March 1, 2018; p.18). There is a small group of citizens who do not agree with producing timber for revenue; however, this does not make the issue controversial.

5) **Topic Statement:** *2016 ROD/RMP timber volume requirements, yield modeling, and sustained yield*

Comment Summary: We assert that the Clean Slate project is not necessary to contribute to the Medford District’s Fiscal Year 2018 allowable sale quantity (ASQ). The 2016 ROD/RMP p. 7 clearly states that timber planning issues arising during 2016- 2018 could result in a 40% variation factor for 2017 and 2018 timber volumes.

Please provide a methodology for how “timber yield projections” were determined at the RMP level and how they are being calculated and evaluated in this project. How is the level of “sustained yield” determined? Please provide the methodology for how it was determined that

the management directions in the RMP would achieve the overall RMP management objectives. For example, how will the tree farming practices in the management direction achieve continual timber production through a balance of growth and harvest, and contribute to the ASQ in perpetuity, not just one time? How long has BLM determined it will take before the same amount of volume can be harvested from these lands again in the future? What was the methodology for predicting this?

Why is BLM only looking at short-term volume for one year when it is required to provide sustained yield for the indefinite future? How much volume will be offered for sale in the Clean Slate Project? How much will be offered for sale in the whole district in 2018? Knowing how much the rest of the district is offering for sale is relevant to this project as the district is looked at as a unit.

BLM Response: Estimates of timber volume to be contributed by the Clean Slate project will be disclosed in the Timber Sale Prospectus issued with the Decision Record for the project. The BLM can offer a 40 % variation in MMbf (million board feet) of the yearly ASQ amount in timber sales. The BLM can offer as low as 60% or as high as 140% of ASQ goals in a given year. Some years may be higher than others to achieve decadal ASQ goals, which range from 260 to 480 MMbf. The RMP will manage BLM-administered lands to achieve continual timber production through a balance of growth and harvest. Timber in the harvest land base will be used to meet the ASQ requirements of the O&C Act. This will be achieved by harvesting timber and implementing silvicultural practices to grow trees in different age classes to be harvested in future forest management activities. Because trees will be growing in the units in different age classes, the units can be re-entered in approximately 10 years to harvest a different class of trees. Page from RMP?

The FEIS details the analytical methods, models, and assumptions used to determine timber yield projections (FEIS pp. 1192-1220). The terms ‘annual productive capacity,’ ‘annual sustained yield capacity,’ and ‘allowable sale quantity’ are synonymous. Details of the vegetation modeling used in determining sustained yield are contained in the FEIS Appendix C (p. 1163). The 2016 ROD/RMP (pp. 5-7) discusses ASQ and how sustained-yield timber production will be accomplished on the Harvest Land Base Land Use Allocation, and directs the BLM to provide a sustained yield of timber (p. 21).

Descriptions and management objectives for all Land Use Allocations (LUAs) are disclosed in detail (2016 ROD/RMP, p.53). The Clean Slate project proposes timber harvest exclusively in the Uneven-age Timber Area LUA. The 2016 ROD/RMP provides management objects for the UTA (p. 67).

6) **Topic Statement:** *Purpose and Need for the Action*

Comment Summary: The Purpose & Need in the Clean Slate Scoping Notice is too narrow and targeted to allow for a broad range of alternatives. The purpose and need are arbitrarily attempting to limit the scope of this project only to areas that have "necessary clearance and surveys" in order to fast track this project through.

BLM Response: The Clean Slate EA purpose and need statement is brief, unambiguous, and as specific as possible; and explains why the BLM is proposing the action. The BLM has a need to contribute to the 2018 Allowable Sale Quantity. Capitalizing on past investments, such as completed clearance surveys, is reasonable and allows the BLM to complete projects in a timely manner.

7) **Topic Statement:** *Public Scoping Period*

Comment Summary: I ask that you reconsider holding this public meeting and that you, please extend the comment deadline, since December 22 is so close to the Christmas holiday. We respectfully request an extension of the comment period for an additional month, to allow for a community public meeting after the holidays and time to prepare substantive comments.

BLM Response: Public scoping meetings are not required for EAs. At the request of public commenters, the BLM extended the scoping period for this project from 30 days to 44 days. At the request of the public, Interdisciplinary Team members and the Grants Pass field manager had multiple small-group meetings with members of the public at the Grants Pass Interagency Office during the fall of 2017 to discuss the project. External scoping for EAs is optional, and it is the decision-maker's choice how to conduct scoping. For this EA, the decision-maker chose not to have a public meeting but to have 44-day scoping comment period instead of the usual 30-day scoping comment period. The public submitted 651 comment letters during the scoping period. Each comment received was considered and accounted for in the analysis. The scoping process is described in detail in Section 1.7.

8) **Topic Statement:** *Definition of large, old trees*

Comment Summary: The Scoping Information p.6 incorrectly defines large trees as > 36 inches DBH. Why is BLM using this definition of large trees when the 2016 RMP FEIS defines large trees as >20" DBH? This is important because the proposed action is degrading stand structure contrary to RMP by removing large numbers of large trees/acre that are >20"DBH.

BLM Response: All proposed treatment units occur on the Uneven-aged Timber Area (UTA) Land Use Allocation. For the UTA, the 2016 ROD/RMP (P. 68) directs "When treating stands

with integrated vegetation management, retain dominant Douglas-fir (Pseudotsuga menziesii) and pine (Pinus spp.) trees that are both ≥ 36" 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" DBH, except where falling is necessary for safety or operational reasons and no alternative harvesting method is economically viable or practically feasible." The commenter never explains management direction from the 2016 ROD/RMP for the retention of 20" diameter at breast height trees, nor do they cite a page number.

9) Topic Statement: *Project objectives to improve forest conditions*

Comment Summary: What evidence is there that "integrated vegetation management" that includes "vegetation control, planting, snag creation, prescribed fire, biomass removal, thinning, single-tree selection harvest, and group selection harvest" will be able to "achieve project objectives"?

BLM Response: Because management objectives are meant to "eventually result from implementation of actions consistent with the RMP", it is only through effectiveness monitoring that the "BLM will assess whether implementing actions in accordance with the management direction is achieving the management objectives of the RMP" (2016 ROD/RMP, p. 47). The analysis within the 2016 ROD/RMP concluded that if the management direction for the use of integrated vegetation management were followed, the BLM would achieve multiple objectives. Some examples include providing a sustained yield of timber (2016 ROD/RMP, p. 21), conservation of threatened and endangered species, and restoration of fire-adapted ecosystems (2016 ROD/RMP, p. 1).

10) **Topic Statement:** *Access to Interdisciplinary Team (IDT)*

Comment Summary: We request access to the ID team members to discuss their individual analytical methodologies. The BLM's EA and EIS documents must describe the analytical methodologies used to determine effects and significance sufficiently so that the reader can understand how the analysis was conducted and why the particular methodologies were used.

BLM Response: The BLM routinely discloses its analytical methodologies within EAs. For each topic within the Clean Slate EA which is analyzed in detail, the analytical methodologies are disclosed. The commenter has not explained how access to individual IDT members would further their understanding of the analytical methodologies used in the analysis.

11) **Topic Statement:** *2016 ROD/RMP compliance with existing laws*

Comment Summary: How is the direction for the LUAs in the 2016 RMP ensuring that it complies with the O&C Act? What is the methodology for determining that? What methodology determined these practices are in accordance with the ESA and CWA?

BLM Response: As stated in the 2016 ROD/RMP, "The purpose of the RMP revision includes all of the following purposes: Provide a sustained yield of timber, contribute to the conservation and recovery of threatened and endangered species, including maintaining a network of large blocks of forest to be managed for late-successional forests; and maintaining older and more structurally-complex multi-layered conifer forests, provide clean water in watersheds, restore fire-adapted ecosystems, and provide recreation opportunities (2016 ROD/RMP, p.20).

The RMP directs BLM to harvest timber from the Harvest Land Base Land Use Allocation (LUA). The Harvest Land Base LUA was designated in the RMP as the area where timber would be harvested to meet the requirements of the Allowable Sale Quality (ASQ). The National Marine Fisheries Service (NMFS) and the US Fish and Wildlife Service (USFWS) both issued biological opinions that the RMP would not likely jeopardize the existence of any of the species under each of their jurisdiction and not likely to adversely affect critical habitat of the species under each of their jurisdiction. The riparian reserve strategy proposed for the 2016 ROD/RMP was developed by the BLM, NMFS, USFWS, and the Environmental Protection Agency. The riparian reserve strategy will provide clean water in the watersheds.

12) Topic Statement: *Seral stage and age class determination*

Comment Summary: What are the seral stages and determinations of age classes for each unit? Please describe the methodology for reaching these conclusions and the inherent limitations in the methodology**.** Please explain the difference between "average relative density" and canopy cover that was analyzed in Pickett West. Why is canopy cover no longer being used?

BLM Response: The project silviculturist used information from the Forest Operations Inventory (FOI) database and Micro*storms database to determine the age classes for each unit, supported by current stand exams on site. The FOI and Micro*storms are datasets that include information on past treatment history and the age class assigned to a stand in ten-year increments.

The Society of American Foresters defines stand age as 1) "The mean age of the dominant and codominant trees in an even-aged stand" and 2) "The mean age of a specified number of the largest trees per unit area in an even-aged stand. Note the concept of stand age is complex in the

case of two-aged stands, uneven-aged stands, or stands with residual green trees". In the uneven-aged timber land use allocation, stands are by definition of uneven age.

In the first definition shown above, the stand age would represent the average age of the dominant overstory trees. The oldest trees do contribute to the aging of a stand. This also means that one or two very old trees per acre don't necessarily make the entire stand old. In the second option listed above, the stand age means the age of the portion of the stand to be managed. It is for these reasons that providing a single age for a mixed cohort; the unevenly aged stand is somewhat complex and less useful as an aid in prescription development than stand species composition and structure.

Under the 1995 ROD/RMP stand age was considered a trigger for multiple survey requirements, and for different regeneration harvest practices. Stand age is less of a driver for developing unit-level prescriptions under the 2016 ROD/RMP.

The 2016 ROD/RMP Glossary on page 311 defines Relative Density (RD) as "A means of describing the level of competition among trees or site occupancy in a stand, relative to some theoretical maximum based on tree density, size, and species composition. Relative density percent is calculated by expressing Stand Density Index (SDI) (Reineke 1933) as a percentage of the theoretical maximum SDI, which varies by tree species and range. Curtis's relative density (Curtis 1982) is determined mathematically by dividing the stand basal area by the square root of the quadratic mean diameter.

Stand Density Index (SDI) is defined on page 314: "Reineke's (1933) stand density index is a function of quadratic mean diameter and number of trees per unit area. SDI can be interpreted as the number of 10-inch trees that would experience approximately the same level of inter-tree competition as the observed number of trees with the observed mean diameter".

Canopy cover is defined on page 301: "A measure of the percentage of ground covered by a vertical projection of the tree crowns." Canopy cover is still being used as a metric to determine effects to the Northern Spotted Owl (NSO) and to determine compliance with the 2016 ROD/RMP for avoiding take to NSO.

13) **Topic Statement:** *Understanding the public involvement process under NEPA and the 2016 ROD/RMP*

Comment Summary: We have asked for a public workshop on the NEPA Handbook, as well as the new RMP, which would help the public understand how to be more effective participants in the NEPA public involvement process. We also asked in the spring of 2017 about the NEPA

Handbook links not working and when that would be resolved, as that makes it very hard to use the Handbook. This issue has yet to be resolved. When can we expect this to be fixed?

BLM Response: The Medford District is discussing presenting a public workshop. The Grants Pass Field Office will post the requested information on our ePlanning website https://go.usa.gov/xnTwS.

14) **Topic Statement:** *Collaboration and consensus in project planning*

Comment Summary: The BLM must consider a collaborative, consensus-based approach to NEPA planning. We request that the BLM formally collaborate with Klamath Siskiyou Wildlands Center and other organizations or persons who are interested in the development of the proposed action and alternatives.

BLM Response: The International Association for Public Participation describes the public's role in the public participation process as occurring on a spectrum (http://bit.ly/2qVWTyk), from *informing* - providing the public with balanced information to aid in the understanding of the alternatives, to *empowerment* - which places the final decision making in the hands of the public. The Clean Slate project employed a public *involvement* strategy, which means that the BLM worked directly with the public throughout the EA process to ensure public concerns were considered and understood. There were members of the public who expressed an interest in *collaboration* which is defined as "a partnership with the public in each aspect of the decision-making process, including the development of the alternatives and the identification of a preferred solution." It is important to highlight that the final decision-making authority rests with the Grants Pass Field Manager. The BLM considered public comments and developed alternatives based on information and interactions with the public during the planning process for this EA.

15) **Topic Statement:** *The Rogue Basin Cohesive Restoration Strategy*

Comment Summary: What role is the Rogue Basin Cohesive Restoration Strategy from the Southern Oregon Forest Resource Collaborative playing in this project?

BLM Response: The 2016 ROD/RMP does not use the Rogue Basin Cohesive Restoration Strategy in its analysis, and the BLM does not use it in the Clean Slate analysis. The dataset used to calculate current seral classification was provided by The Nature Conservancy (TNC) and was used in the planning of the Rogue Basin Cohesive Forest Restoration Strategy (2015) from Gradient Nearest Neighbor (GNN) data.

16) **Topic Statement:** *Disclosure of information*

Comment Summary: The commenter requested the disclosure of extensively detailed information such as the level of photosynthesis per unit, genetic trait compatibility, number and size of trees per acre, percentage of canopy cover and stand age.

BLM Response: Identification of the number of trees by size class is not necessary for analysis of a project that manages forest stands, not individual trees. The EA discloses other relevant metrics such as the basal area to be removed or retained, project design features to protect critical resources, and stand densities to allow the decision maker to understand the project's compliance with the 2016 ROD/RMP and to reach a reasoned and informed decision. Not all background information is required to be part of the NEPA document. 40 CFR § 1502.1. The BLM need only, in an EA, describe the forest conditions that currently exist and "what, by using the proposed management practices, the forest conditions would be after BLM ha[s] done the proposed" work. The commenter's preference for more information does not demonstrate that BLM's analysis is flawed. The BLM described the alternatives and the impacts of those alternatives and disclosed in the EA relevant and applicable information in sufficient detail to enable an informed decision.

17) **Topic Statement:** *Litigation of the 2016 ROD/RMP*

Comment Summary: Clean Slate, if implemented, would set a precedent for future actions by accepting the flawed assumptions and untested models in the 2016 RMP that are still in litigation.

BLM Response: The 2016 ROD/RMP is the current and authorized RMP. BLM does not respond to speculative litigation.

18) **Topic Statement:** *Canopy retention to meet Northern Spotted Owl (NSO) consultation requirements*

Comment Summary: The EA must provide descriptions of technical methods used to assure the marking of timber for cutting meets consultation requirements.

BLM Response: The EA provides a plan for monitoring compliance with U.S. Fish & Wildlife Service requirements (EA p.55).

19) Topic Statement: *2016 ROD/RMP transition projects*

Comment Summary: The implementation of the 2016 SW Oregon RMP for Clean Slate scoping units is in error and inconsistent with 2016 SW Oregon RMP for transitional projects**.** The implementation of the 2016 SW Oregon RMP for Clean Slate scoping units is in error and inconsistent with 2016 SW Oregon RMP for transitional projects. The Clean Slate Forest Management Project that would implement logging on Pickett West units with the 2016 ROD/RMP is arbitrary and capricious.

Citizens and organizations should not be unduly burdened with new commenting requirements for the same logging units with an entirely different RMP at the whim of the Responsible Official. Furthermore, completion of the Clean Slate EA would put the Responsible Official in the untenable position of having 2 EAs and 2 RMPs available on which to implement further decisions for the mapped units.

The Clean Slate Forest Management Project is in clear violation of 2016 ROD/RMP. The Pickett West Forest Management Project must be implemented for proposed logging units and the Clean Slate Forest Management Project withdrawn/dropped from the NEPA process. Switching from one RMP to another RMP for the same project during the transition period is not an option in the 2016 ROD/RMP.

BLM Response: Clean Slate is not a transition project. Clean Slate is entirely consistent with the 2016 ROD/RMP.

There is nothing that precludes the BLM from reanalyzing acres which do not have an existing decision. The Grants Pass BLM made a reasoned decision that is detailed in the EA (pp. 20-21).The BLM appropriately opened a new scoping period for the Clean Slate project. A description of public involvement can be found in Section 1.7 of the EA. Decisions from the projects planned under the 1995 RMP will not be allowed after August 5, 2018. The Field Manager will no longer have the authority to authorize decisions from the Pickett West EA. The BLM has clearly not violated the 2016 ROD/RMP.

20) Topic Statement: *Human-forest relationships*

Comment Summary: While the BLM has sought out ecologic-scientific experts to assist with developing an EA, they have not sought out those with expertise that would fulfill obligations to community values about nature. We request that the EA does a full consideration of the impacts on the human environments and public health as it relates to human mental, emotional, physical, and spiritual love for these natural places and the importance of the human connection to

"place." These reduced tree densities are relevant to our human relationship to these ecosystems, for example for the nature-based recreation by members of our organizations.

The commenter has an issue with the Land Use Allocation established by the 2016 ROD/RMP because the RMP has already established the use of lands within the Planning Area.

BLM Response: The 2016 ROD/RMP identified land use allocations and areas available for active timber management. The land use allocations are no longer an issue for discussion. However, determining how to sequence harvests within a particular watershed is at the discretion of the Field Manager, and could be an issue for analysis.

The use of lands for purposes other than that established by the 2016 ROD/RMP is not ripe for decision under the Clean Slate project.

21) **Topic:** *Specific literature citations*

Comment Summary: Why were there no references at the end of this document? How are we to locate the sources cited in this document? Please make all documents, scientific or otherwise, that are being cited in this project available on the project website. As BLM requests the public to provide our sources, it seems only logical that BLM should be held to the same standards and provide the public with easy access to all publications being used in this project.

BLM Response: Every reference used by the BLM is available to the public upon request. Simply submitting copious amounts of supporting information does not equate to the submission of substantive comments. It is the responsibility of the commenter to clearly explain how and why the submitted information supports their comments. References that are submitted but never referenced in the body of the comment letter are considered non-substantive.

22) **Topic Statement:** *Implementing an "individuals, clumps and openings" (ICO) strategy*

Comment Summary: We recommend that skips and gaps be accomplished with Individuals, Clumps, and Openings with techniques described in Churchill et al. 2013a and Churchill et al. 2013b. These techniques (unlike the Rogue Basin Restoration Strategy) have been peer-reviewed, and Derek Churchill provided an intensive workshop for BLM to aid in the implementation of ICO.

BLM Response: The ICO method has been reviewed and is one of many implementation tools that is useful for achieving a spatially heterogeneous stand. Prescriptions and marking guides proposed in this project are also designed to result in a spatially heterogeneous stand while considering the importance of species diversity promotion.

23) Topic Statement: *Future harvest modeling in the Clean Slate project*

Comment Summary: The EA must model action alternatives into the future to compare the volume available for harvest 10, 20, 30 and 70 years post-harvest. We assert that maximizing volume under UTA guidelines (e.g., 30% openings, 4-acre regen, 20% relative density) in the Clean Slate units would eliminate the potential for economic thinning harvest for 50 years or more.

BLM Response: Modeling was conducted for the 2016 ROD/RMP. The EA had modeled each action alternative, using the results of the models from the RMP, and compared the results of project-specific modeling. Following the guidelines of 30% group select openings, 4-acre group selects, and 20% relative density would lead to large, open-grown trees and multi-cohort stands and promote or enhance the development of structural complexity and heterogeneity. This would ensure that economic harvest of the UTA would occur on a regular basis.

24) Topic Statement: *Cumulative impacts analysis*

Comment Summary: The EA must analyze and disclose the many adverse cumulative impacts of the proposed actions which may be insignificant related to other actions individually but cumulatively will be significant impacts. Currently, BLM is proposing several projects which would have significant impacts on the natural and human communities in the Deer Creek Watershed. BLM has not done an adequate job of communicating with the public about the status of these projects. For example, we protested the Draft DR for the Integrated Vegetation Management Project (NEPA # DOI-BLM-OR-M000-2012-0001-EA), Draft DR 9/13/16 and did not receive any further communications about the status of this project. Then there is the large-scale Pickett West Project Forest Management Project (DOI-BLM-ORWA-M070-2016-0006-EA). The EA must address habitat connectivity, forest fragmentation and the recommendations in the Deer Creek Watershed Analysis.

BLM Response: The Clean Slate EA contains a spreadsheet which documents all of the possible projects which are reasonably foreseeable within the Deer Creek watershed.

The Decision Record for the Integrated Vegetation Management Project has been protested. The BLM is working through the protest responses for this project.

The Clean Slate EA Section 2.2 describes the interaction between the Pickett West units and the Clean Slate units.

The Deer Creek Watershed Analysis was used as baseline information by the hydrologists and the fisheries biologist to inform their respective analyses for the Clean Slate EA.

25) Topic Statement: *2016 ROD/RMP survey and manage requirements*

Comment Summary: The EA must not arbitrarily limit impact analysis to federally listed (Threatened & Endangered or Candidate) or Bureau Sensitive species known or suspected to be present within the planning area and are affected by the action alternatives. There is no policy that impact assessment must be limited to Bureau Sensitive species.

The EA must disclose and analyze impacts to the Red Tree Vole. Removal of habitat is likely to contribute to the need for listing of this species. What is the rationale for not protecting known active RTV? Where has a full analysis been done on that explains why the BLM abandoned the survey and manage protocol in the 2016 RMP?

BLM Response: The 2016 ROD/RMP requires the BLM to manage for the conservation and recovery of Threatened and Endangered Species, including the Northern Spotted Owl, and Marbled Murrelet, and threatened and endangered fish and plant species. The actions analyzed in the FEIS and proposed in the 2016 ROD/RMP will contribute to the conservation and recovery of the northern spotted owl better than the alternatives.

The 2016 ROD/RMP (p. 22) states "The Proposed RMP will reserve more acres of Late-Successional Reserve than the No Action alternative and will create large blocks of nesting, roosting, and foraging habitat that are capable of supporting clusters of reproducing northern spotted owls, distributed across a variety of ecological conditions and spaced to facilitate northern spotted owl movement between the blocks. The overall reserve network under the Proposed RMP will be larger than under the No Action alternative and Alternatives B, C, and D."

The 2016 ROD/RMP (p. 25) states "The Proposed RMP will effectively contribute to the conservation and recovery of ESA-listed fish and will provide clean water in watersheds. The BLM developed the riparian management strategy of the Proposed RMP together with the National Marine Fisheries Service, U.S. Fish and Wildlife Service, and the Environmental Protection Agency" (2016 ROD/RMP, p.25). In their review of the Proposed RMP/Final EIS, the Environmental Protection Agency expressed their support for the riparian strategy of the Proposed RMP, and stated, "We find this approach to be fully responsive to the identified purpose and need in the FEIS" (US EPA, 2016, p. 1).

The 2016 ROD/RMP (p. 28) states "…the Proposed RMP will allocate a larger Late-Successional Reserve network than the No Action alternative, will protect older and more

structurally-complex forests, and will continue to provide management for many of the formerly Survey and Manage species as Bureau Sensitive species."

Bureau Sensitive species are plant or animal species eligible for ESA-listed or candidate, state listed, or state candidate (plant) status, are on list 1 in the Oregon Natural Heritage Data Base, or are approved for this category by the BLM State Director. The 2016 ROD/RMP (p. 106) directs the BLM to "Manage ESA candidate and Bureau Sensitive species consistent with any conservation agreements or strategies including the protection and restoration of habitat, alteration of the type, timing, and intensity of actions, and other strategies designed to conserve populations of the species". On page 115, the 2016 ROD/RMP directs the BLM to "Implement conservation measures that reduce or eliminate threats to Bureau Sensitive species to minimize the likelihood of and need for the ESA listing of these species." The BLM Special Status Species (SSS) program includes species listed or proposed for listing under the Endangered Species Act (ESA) and species requiring special management consideration to promote their conservation and reduce the likelihood and need for future listing under the ESA. The SSS list is periodically updated to reflect taxonomic and status changes and was most recently updated in January 2015 (USDI/BLM, 2015b). This list has two categories of species: Sensitive and Strategic.

According to BLM Special Status Species Management (USDI 2008a), only Sensitive species (including Threatened, Endangered and Candidate species) are required to be addressed in NEPA documents. All Sensitive species were considered and evaluated for this project, and only those that could be impacted by the Action Alternatives are discussed in more detail. Appendix E includes a table of all the current SSS that occur on the Grants Pass Field Office management area and a brief description of why a more detailed analysis is not required.

The Final Environmental Impact Statement (FEIS) for the Resource Management Plans for Western Oregon (USDI/BLM 2015a) incorporated analysis from the 2004 Final SEIS to Remove or Modify the Survey and Manage Mitigation Measure Standards and Guidelines (USDA FS and USDI BLM 2004, pp. 141–183) and the 2007 Final Supplement to the 2004 SEIS (USDA FS and USDI BLM 2007, pp. 162–244), which analyzed the removal of Survey and Manage measures for known site management and pre-disturbance surveys. The FEIS included analysis assessing the effect of removing the Survey and Manage Protection measures (USDI/BLM 2015a pp. 835-850) and concluded that:

> "In summary, all action alternatives and the Proposed RMP would remove the Survey and Manage measures that require pre-disturbance surveys and protection of known sites. There is incomplete and unavailable information relevant to the effects of the action alternatives and the Proposed RMP on Survey and Manage species. The 2004 FSEIS provides an incomplete analysis but supports the conclusion that most Survey and Manage species would have sufficient habitat to support stable populations under the No Action alternative without the Survey and Manage measures. All action alternatives and

the Proposed RMP allocate more acres to the Late-Successional Reserve than the No Action alternative, protect older and more structurally-complex multi-layered conifer forests, and would result in an increase in Mature and Structurally-complex habitat over time. In addition, all action alternatives and the Proposed RMP would continue to provide management for many of the Survey and Manage species as Bureau Sensitive species. As a result, in light of the incomplete information available to the BLM, all action alternatives and the Proposed RMP would protect most of the existing habitat for Survey and Manage species and would result in an increase in the total amount of habitat for Survey and Manage species over time." (USDI/BLM, 2015a, p. 850)

The 2016 ROD/RPM adopted the Proposed RMP alternative, and includes the following in regards to the Survey and Manage measures:

> The 2016 ROD/RMP does not include any Survey and Manage measures, including any requirements to survey for or provide special management considerations for species such as the Red Tree vole or the Great Grey Owl. Considering the analyses included in the FEIS (USDI/BLM 2015a) and the new management direction of the final RMP (USDI/BLM 2016a), a detailed analysis of the effects of this project on Survey and Manage wildlife taxa were considered but eliminated from detailed analysis.

The Clean Slate project adhered to the requirements and conducted all necessary surveys between 2016 and 2018.

26) Topic Statement: *Response to public comments.*

Comment Summary: I am frustrated because I have not received any response from BLM for my comment testimony on NEPA issues for the BLM MDO Pickett West Forest Management Project (PWFMP) and EA.

I have not received any oral or written response from the recipients of my June 20, 2017 testimony on NEPA issues for the BLM MDO PWFMP and OI-BLM-ORWA-MO70-0006-2016-EA.

BLM Response: BLM considers substantive comments. The BLM is not required to respond directly to commenters, nor is the BLM required to respond to non-substantive comments. The Grants Pass Field Office responds to comments submitted during the scoping period and during the EA comment period. Substantive comments question the accuracy of the information in the EA, question the adequacy or assumptions used for the environmental analysis, present new information relevant to the analysis, present reasonable alternatives not analyzed in the EA, or cause change or revisions in the alternatives. Non-substantive comments do not provide relevant information that impacts the analysis, alternatives, assumptions, or information presented in the

EA. Non-substantive comments also include personal opinion, disagreeing with BLM policy, comments not related to the project, or vague, open-ended questions. BLM is not required to respond to non-substantive comments.

It is the responsibility of commenters and interested members of the public to read the EA and the associated appendices. It is not the BLM's responsibility to reply to each individual commenter.

27) Topic Statement: *Snag management under the 2016 ROD/RMP.*

Comment Summary: The action alternatives must provide a quantitative monitoring mechanism to demonstrate that large snags are retained post-harvest as required in the RMP. The EA must provide for field monitoring of snag densities.

BLM Response: The Clean Slate project is proposed in the Harvest Land Base and Riparian Reserve LUAs. There are no target requirements for snag creation in the Harvest Land Base of the Medford District BLM, but snags greater than 20 inches diameter at breast height are to be retained (2016 ROD/RMP, p.63). Because there are no requirements to create snags in the Harvest Land Base, monitoring for snag creation is moot (2016 ROD/RMP, pp. 63 & 145). There will be thinning in the Riparian Reserves. BLM will create two snags per acre as required and monitor as appropriate (2016 ROD/RMP, pp. 73 & 143).

28) Topic Statement: *Windthrow (trees blown down by wind) modeling and monitoring.*

Comment Summary: The EA must provide an accurate assessment of how intensive thinning has had adverse impacts in the Medford District (See USDI BLM 2015- Monitoring Report with several instances of blowdown and canopies reduced due to below standards due to blowdown).

BLM Response:
All proposed treatments and tree selection criteria conform to the prescriptive elements found on the 2016 ROD/RMP pages 62-64, 67-70 for the Harvest Land Base and 75-77 and 82-87 for the Riparian Reserve. Canopy cover is not a metric for 2016 RMP/ROD compliance, refer to Appendix B page 145 for a description of the required monitoring plan. The current and desired conditions of the Clean Slate units are analyzed the potential effects are disclosed in Chapter 3 of the EA.

Management direction on page 68 of the 2016 ROD/RM states the BLM is to "Conduct integrated vegetation management for any of the following reasons: "Reduce stand susceptibility to disturbances such as a fire, windstorm, disease, or insect infestation" is just one of many potential treatment goals. In some cases, the risk of windthrow could be increased. However,

windthrow occurs in both managed and unmanaged stands and low levels of windthrow are expected and may be desirable for wildlife habitat and stand complexity as long as stand level RDI targets are attained overall post-harvest. Silvicultural prescriptions proposed are designed to remove trees that are most susceptible to windthrow, such as those with low vigor, poor crown ratios and those with high height: diameter ratios (EA, p.69) (Worthington and Staebler, 1961, p. 21; Moore et al., 2003; Wonn & O'Hara, p. 92; Tappenier et al. 2007, pp. 129-130).

29) Topic Statement: *Carbon emissions and storage*

Comment Summary: What will be the carbon emissions from cutting, burning, or otherwise "treating" the "fuels" in these units? What will be the carbon emissions from the whole Clean Slate Project? What was the methodology to determine this? What is the economic value of the carbon stored in these ecosystems?

BLM Response: The effects of the Clean Slate Project on greenhouse gas emissions, carbon storage, and climate change tiers to the analysis in the FEIS, and authorized by the 2016 ROD/RMP.

The 2016 Final Environmental Impact Statement (FEIS) analyzed the effects of timber harvesting, prescribed burning, and livestock grazing on greenhouse gas emissions and carbon storage, and the potential impacts of climate change on major plan objectives. The analysis contained within the FEIS represents current understanding of the relationships between proposed management activities, climate change, carbon storage, and greenhouse gas emissions. The analysis in the Clean Slate EA tiers to the 2015 Final Environmental Impact Statement (FEIS) carbon and greenhouse gas analysis. The EA concluded that the Clean Slate project would not exceed the outputs expected in the analysis contained in the FEIS, and thus is not expected to influence climate change. The analysis in the FEIS anticipated that all forest management Action Alternatives would favor the long-term storage of carbon. As mentioned in Chapter 1, the FEIS for the 2016 ROD/RMP included projected harvest levels from the Pickett West project, when added to projected harvest levels from other projects on the Medford District, concluding that net carbon storage would increase. Although annual greenhouse gas emissions would increase, they would remain less than 1 percent of the statewide greenhouse gas emissions. See FEIS Chapter 1.7 for more information.

***30)* Topic Statement:** *Consultation with the National Marine Fisheries Service (NMFS)*

Comment Summary: Prior to any Clean Slate decisions the Grants Pass Resource Area must formally consult with the NMFS.

BLM Response: BLM has programmatically consulted with NMFS through the *Endangered Species Act Section 7(a)(2) Biological Opinion, and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat for the Programmatic Forest Management Program for Western Oregon* (WCR-2017-7574) signed on March 9, 2018. The biological opinion stated that forest management activities are not likely to jeopardize the continued existence of coho salmon or destroy or adversely modify coho salmon critical habitat.

Appendix C -- Projects for Cumulative Effects Consideration

The projects listed below are available for consideration in Chapter 3 cumulative effects analysis. Because each of the analysis areas may differ depending on the particular resource, not all projects would be considered in each analysis. These projects either occur within the Clean Slate Project Area boundary or within the Deer Creek Watershed.

Project Name	Project Type	Quantity within Clean Slate PA (Acres, sites, etc.)	Possible Effects
Pickett West Fuels	Fuels Maintenance Treatments	994 acres	The maintenance of previously treated fuels units will ensure investments in the landscape are beneficial over time. Fuels treatments decrease stand-replacing crown fires and increase initial attack and fire suppression opportunities on the landscape.
Pickett West – Deer Slate	Restoration thinning/Density Management	461 acres	These acres will not be implemented as analyzed under the Pickett West EA. They are now being considered and analyzed within the Clean Slate EA.
Young Stand Management Treatments – (2017-2022 Categorical Exclusion)	Pre-commercial thinning and brushing / Sugar Pine Blister Rust Protection	679 acres of pre-commercial thinning and/or brushing; 38 acres of pruning sugar pine to reduce the risk of blister rust	Pre-commercial thinning of young stands increases resources (light, water, nutrients, and space) which trees require to grow. Large trees tend to be less susceptible to fire mortality. Trees which have more resources are able to withstand natural disturbances such as insect and disease better.

Project Name	Project Type	Quantity within Clean Slate PA (Acres, sites, etc.)	Possible Effects
Young Stand Management Treatments and Hand Pilling and Burning analyzed by the District Integrated Vegetation Management EA	Selective slashing (16x16) of material less than 8 inches DBH followed by brushing and hand pilling of the cut material. Those piles would then be burned.	232 acres*	The treatments are expected to increase the vigor and growth of the retained trees. Hand pilling and burning the activity slash is expected to decrease surface fuels.
Josephine County Forestry	Clearcut	73 acre	Clearcutting removes most to all of the vegetation within an area. It is expected to contribute to the Equivalent Clear Area (ECA) within the Deer Creek Watershed.
Federal Land Access Program – Josephine County	Culvert replacements on Reeves Creek	Less than 10 sites	Culvert replacements are expected to improve water conveyance and fish passage within the Deer Creek Watershed.
250 acre Salvage Categorical Exclusion	Up to 250 acres of salvage for various purposes and up to 0.5 miles of temporary route construction	Unknown	Salvage may occur following wildfire or other stochastic events to protect public health and safety. All 2016 RMP requirements for each land use allocation will be followed.
Insect and Disease Hazard Tree Categorical Exclusion	The cutting of likely or imminent failure trees up to 600 acres/year and 3,000 acres in 5 years	Unknown	Provide safety for users of roads, developed recreation sites, trails, utility corridors, structures, and facilities.
Road Maintenance and Pump Chance Categorical Exclusion	Routine road maintenance activities and pump chance maintenance	Unknown	The maintenance of roads benefits the safety of users and aquatic systems by reducing sediment delivery to streams. Pump chance maintenance

Project Name	Project Type	Quantity within Clean Slate PA (Acres, sites, etc.)	Possible Effects
			increases initial attack and fire suppression activities.
Environmental Assessment for Aquatic and Riparian Habitat Enhancement	Restoration activities benefiting aquatic systems	No known projects are currently scheduled	Beneficial effects to the aquatic environment by decrease sediment potential through the reduction of the road network and increases to stream function from large woody material stream input.
Limestone Challenge Equestrian Endurance Ride; Special Recreation Permit	Equestrian use of existing recreational trails	3 routes: 10, 30, and 50-mile loop options are available	This annual event draws crowds which may contribute to the local economy within the Project Area.
*The acres showed 155 acres less than what is reflected in the Programmatic Integrated Vegetation Management Project (DOI-BLM-OR-M000-2012-0001-EA) Young Stand Management and Fuels Reduction Project: Final Decision Record. The 155 acres occur outside of both the Clean Slate Project Area and the Deer Creek Watershed.			

Appendix D – Commercial Treatment Unit Summary Table[13]

Township Range Section	Unit #	Acres	Alternative 2 RX	Alternative 3 RX	Harvest System	Riparian Reserve Total Acres	Inner Riparian Zone Acres	Middle Riparian Zone Acres	Outer Riparian Zone Acres	Botany Buffers
39-7-3	3-9	15	UTA: IVM	2-Step Thin	C	6	3	1	2	None
39-7-3	3-10	22	UTA: IVM	2-Step Thin	GB/C	15	5	6	4	None
39-7-3	3-11	23	UTA: IVM	2-Step Thin	C	1	0	0	0	CYFA ~ 100' buffer
39-7-9	9-5	60	UTA: IVM	2-Step Thin	GB/C	17	9	3	5	None
38-8-13	13-3	49	UTA: IVM	2-Step Thin	GB/C	15	4	5	6	PICA50 ~ 50' buffers CYFA ~ 100' buffer
38-8-13	13-4	28	UTA: IVM	2-Step Thin	GB/C	5	1	2	2	None
38-7-17	17-2	65	UTA: IVM	2-Step Thin	GB/C	22	8	6	8	None
38-7-21	21-12	24	UTA: IVM	2-Step Thin	GB/C	4	1	1	2	None
38-7-21	21-8	23	UTA: IVM	2-Step Thin	GB/C	3	1	1	1	None
38-7-22	22-5	12	UTA: IVM	2-Step Thin	C	0	0	0	0	PICA40 ~ 50' x 100' buffer PHKA ~ 50' buffer
38-8-23	23-3	40	UTA: IVM	2-Step Thin	GB/C	19	5	7	7	None
38-8-23	23-4	76	UTA: IVM	2-Step Thin	GB/C	40	16	14	10	Excluded from edge of unit
38-7-31	31-11	25	UTA: IVM	2-Step Thin	GB/C	0	0	0	0	DERA5, CHSU14 grouped into large 100'+ buffer RHTR4 ~ 50' buffer
Total		461				147	53	46	47	

[13] All acres rounded to nearest whole number in this table

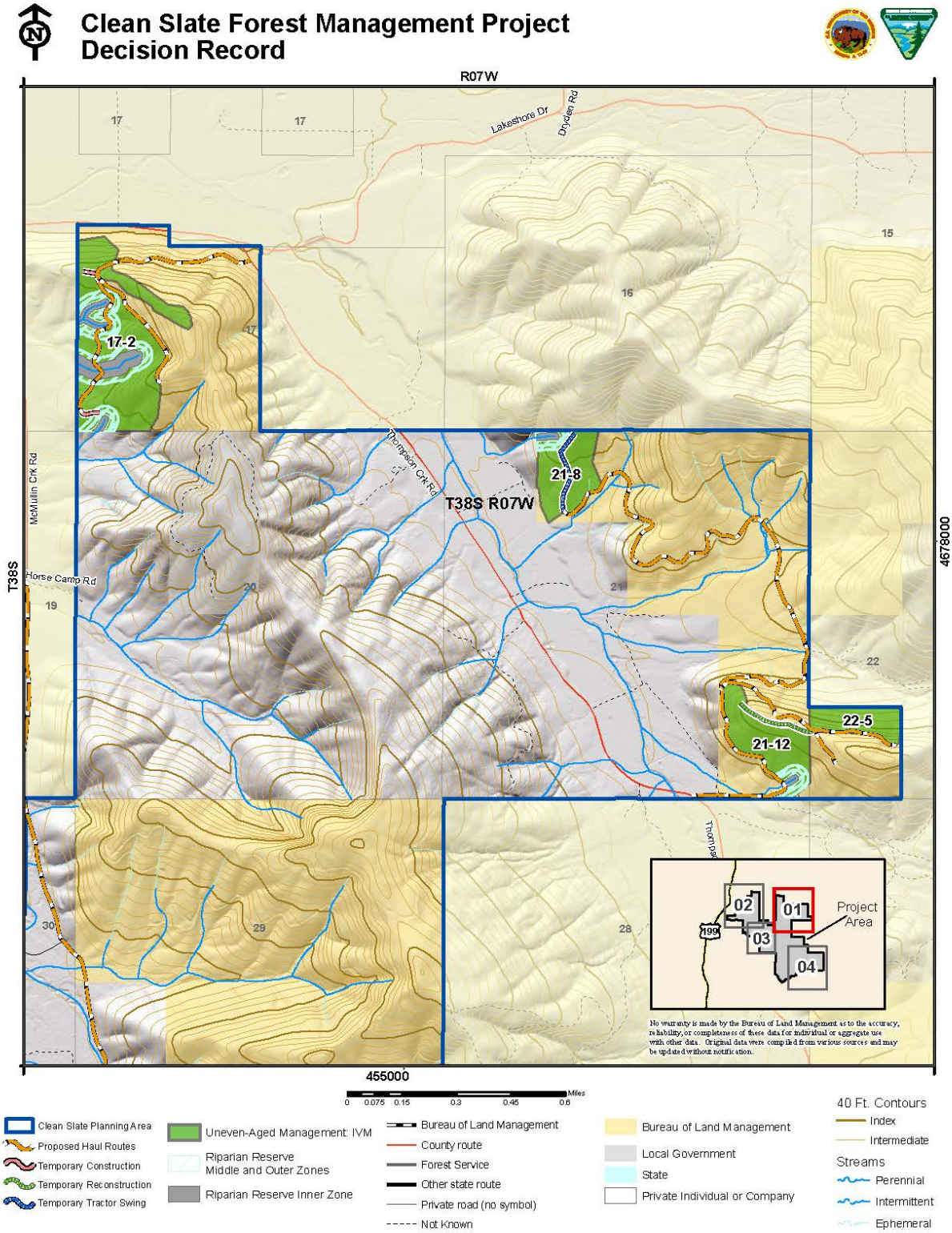
Appendix E -- Road Work and Use Table

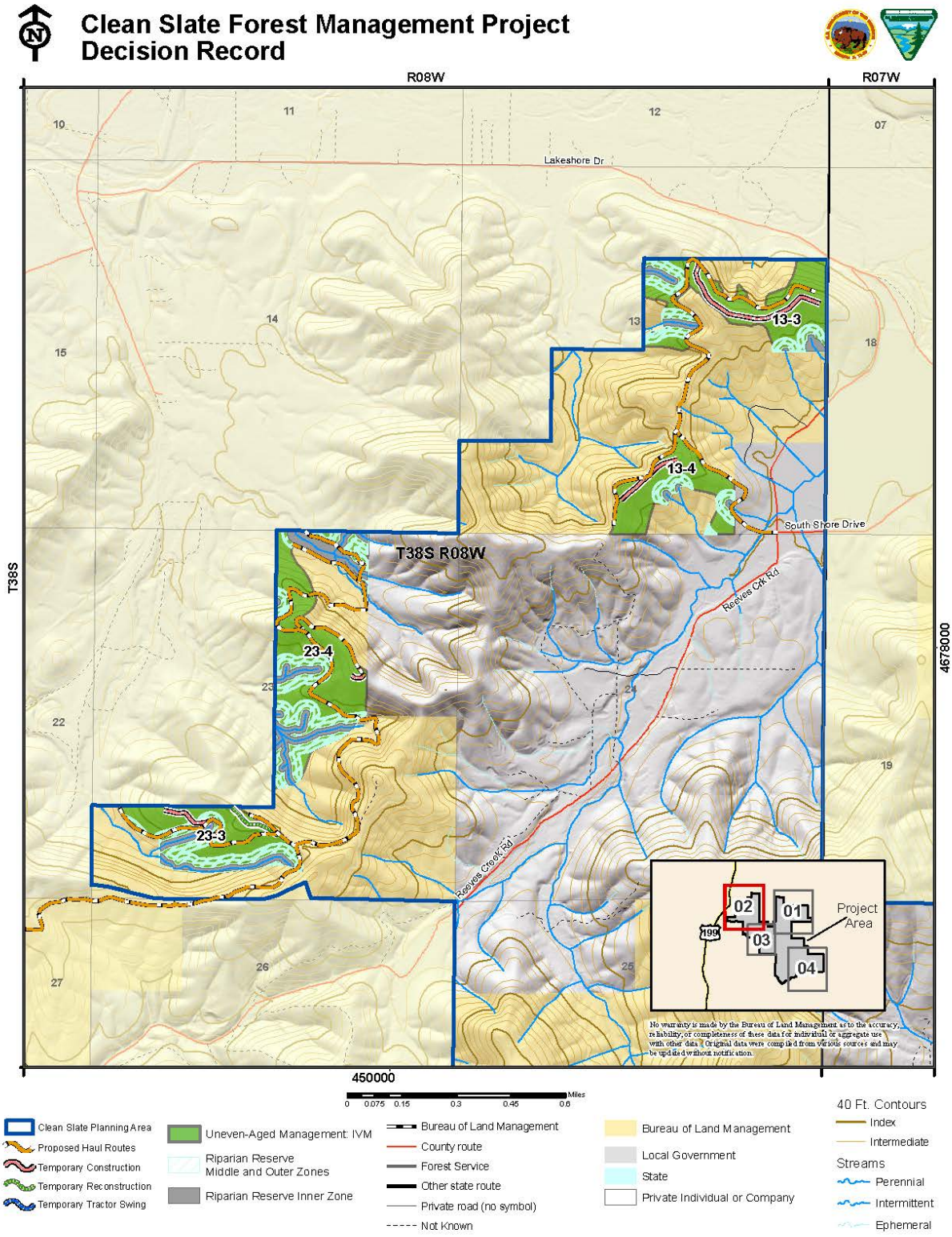
Road Work Activities	Road Number	Unit Access	Surface Type	All weather Surfacing Present	Alternative Actions 2 and 3 Miles	Alternative Actions 2 and 3 Season of Use
Maintenance & Haul ***All Season use authorized if adequate crushed rock surface applied**	38-7-17.0, A		Aggregate	Yes	0.84	All Season
	38-7-17.1		Natural	No	0.48	In Stream*
	38-7-19.0, A-C		Bituminous	Yes	1.70	All Season
	38-7-19.0, D-E		Aggregate	Yes	0.25	All Season
	38-7-21.2, A		Aggregate	Yes	1.13	All Season
	38-7-21.3		Aggregate	Yes	0.60	All Season
	38-7-21.5		Aggregate	Yes	1.27	All Season
	38-7-22.0		Aggregate	Yes	0.11	All Season
	38-7-27.0, A-C		Bituminous	Yes	3.03	All Season
	38-7-31.0, A-B		Aggregate	Yes	1.90	All Season
	38-7-31.0, C-D		Natural	No	1.08	In Stream*
	38-7-31.4		Natural	No	0.99	In Stream*
	38-8-13.0		Aggregate	Yes	0.49	All Season
	38-8-13.1		Natural	No	1.08	In Stream*
	38-8-13.4		Aggregate	Yes	0.41	All Season
	38-8-23.0		Aggregate	Yes	0.67	All Season
	38-8-23.1		Natural	No	0.11	In Stream*
	38-8-23.5, A		Aggregate	Yes	0.30	All Season
	38-8-23.5, B		Natural	No	0.02	In Stream*
	38-8-23.6		Natural	No	0.24	In Stream*
	38-8-27.0		Aggregate	Yes	3.52	All Season
	39-7-2.1, A-B		Aggregate	Yes	0.36	All Season
	39-7-3.4, A		Natural	No	0.99	In Stream*
	39-7-3.6		Aggregate	Yes	0.95	All Season
	39-7-3.7		Natural	No	0.17	In Stream*
	39-7-8.3		Natural	No	1.28	In Stream*
	39-7-8.4, A-C		Natural	No	0.40	In Stream*

Road Work Activities	Road Number	Unit Access	Surface Type	All weather Surfacing Present	Alternative Actions 2 and 3 Miles	Alternative Actions 2 and 3 Season of Use
	39-7-9.1, A		Aggregate	Yes	1.50	All Season
	39-7-9.1, B		Natural	No	0.26	In Stream*
	39-7-9.2		Aggregate	Yes	2.47	All Season
	39-7-9.6		Aggregate	Yes	0.53	All Season
Maintenance & Haul (Continued)	39-7-21.0, A-C		Bituminous	Yes	3.35	All Season
	39-8-3.0, E		Aggregate	Yes	1.13	All Season
New Temporary Route Construction **(Fully decommission after use: Block, rip, water bar, seed, and mulch)** ***All Season use authorized if adequate crushed rock surface applied**	TR 17-2-A	17-2	Natural	None	0.04	In Stream*
	TR 17-2-B	17-2	Natural	None	0.05	In Stream*
	TR 31-11	31-11	Natural	None	0.20	In Stream*
	TR 13-3	13-3	Natural	None	0.45	In Stream*
	TR 13-4-A	13-4	Natural	None	0.09	In Stream*
	TR 13-4-B	13-4	Natural	None	0.10	In Stream*
	TR 23-3-B	23-3	Natural	None	0.14	In Stream*
	TR 23-4	23-4	Natural	None	0.04	In Stream*
	TR 9-5	9-5	Natural	None	0.16	In Stream*
	TR 3-11	3-11	Natural	None	0.16	In Stream*
Existing Temporary Route Renovation/Reconstruction **(Fully decommission**	TR 21-12	21-12	Natural	None	0.23	In Stream*
	TR 23-3-A	23-3	Natural	None	0.15	In Stream*

Road Work Activities	Road Number	Unit Access	Surface Type	All weather Surfacing Present	Alternative Actions 2 and 3 Miles	Alternative Actions 2 and 3 Season of Use
after use: Block, rip, water bar, seed, and mulch) *All Season use authorized if adequate crushed rock surface applied						

Appendix F – Clean Slate Draft Decision Record Maps




Clean Slate Forest Management Project
Decision Record
R08W
R07W
T38S
T38S R08W
Lakeshore Dr
South Shore Drive
Reeves Crk Rd
Reeves Creek Rd
13-3
13-4
23-4
23-3
Project Area
02
01
03
04
199
450000
4678000
0 0.075 0.15 0.3 0.45 0.6 Miles
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.
Clean Slate Planning Area
Proposed Haul Routes
Temporary Construction
Temporary Reconstruction
Temporary Tractor Swing
Uneven-Aged Management: IVM
Riparian Reserve Middle and Outer Zones
Riparian Reserve Inner Zone
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
40 Ft. Contours
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Intermediate
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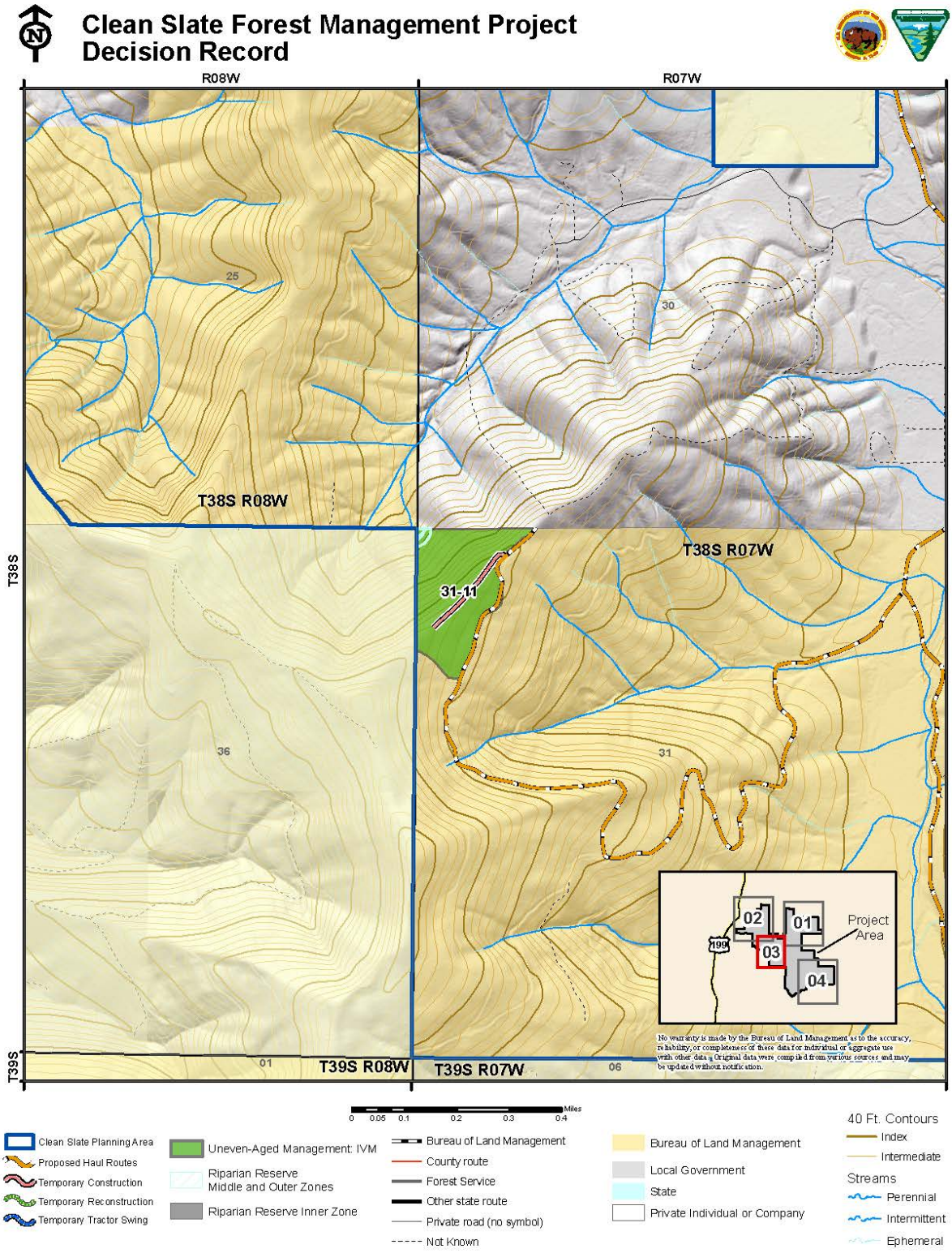
Clean Slate Forest Management Project
Decision Record
R08W
R07W
T38S
T39S
T38S R08W
T38S R07W
T39S R08W
T39S R07W
25
30
36
31
01
06
31-11
02
01
03
04
199
Project Area
No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or 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
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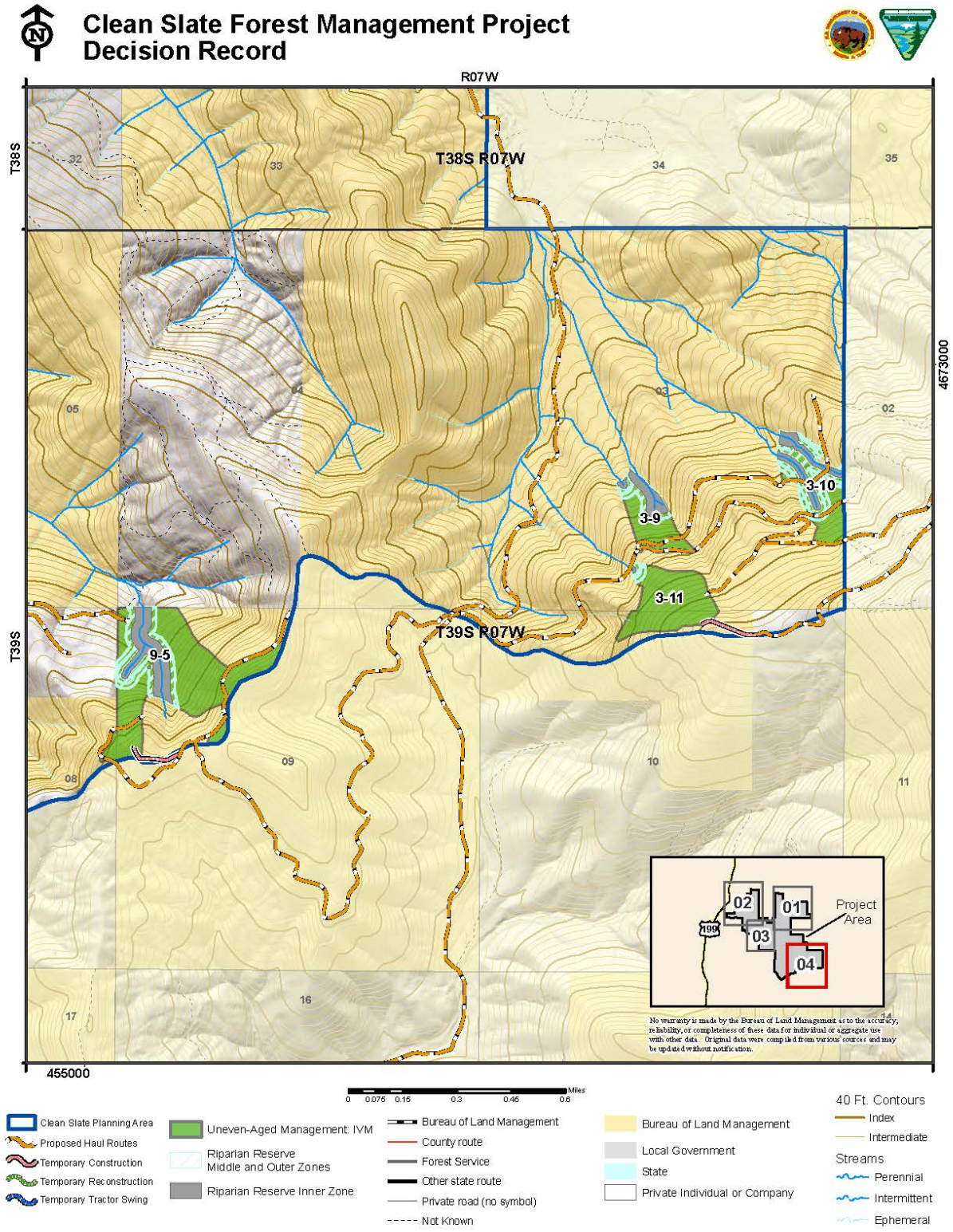
Clean Slate Forest Management Project
Decision Record
R07W
T38S R07W
T39S R07W
T38S
T39S
4673000
455000
3-9
3-10
3-11
9-5
Project Area
01
02
03
04
199
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0 0.075 0.15 0.3 0.45 0.6 Miles
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Temporary Reconstruction
Temporary Tractor Swing
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