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Record of Decision

EXF Thinning, Fuels Reduction, and Research Project

Pringle Falls Experimental Forest
Bend/Ft. Rock Ranger District, Deschutes National Forest
Deschutes County, Oregon

T. 20 S., R 9 E., Sections 28-33; T. 21 S., R. 9 E., Sections 4-6
Willamette Meridian

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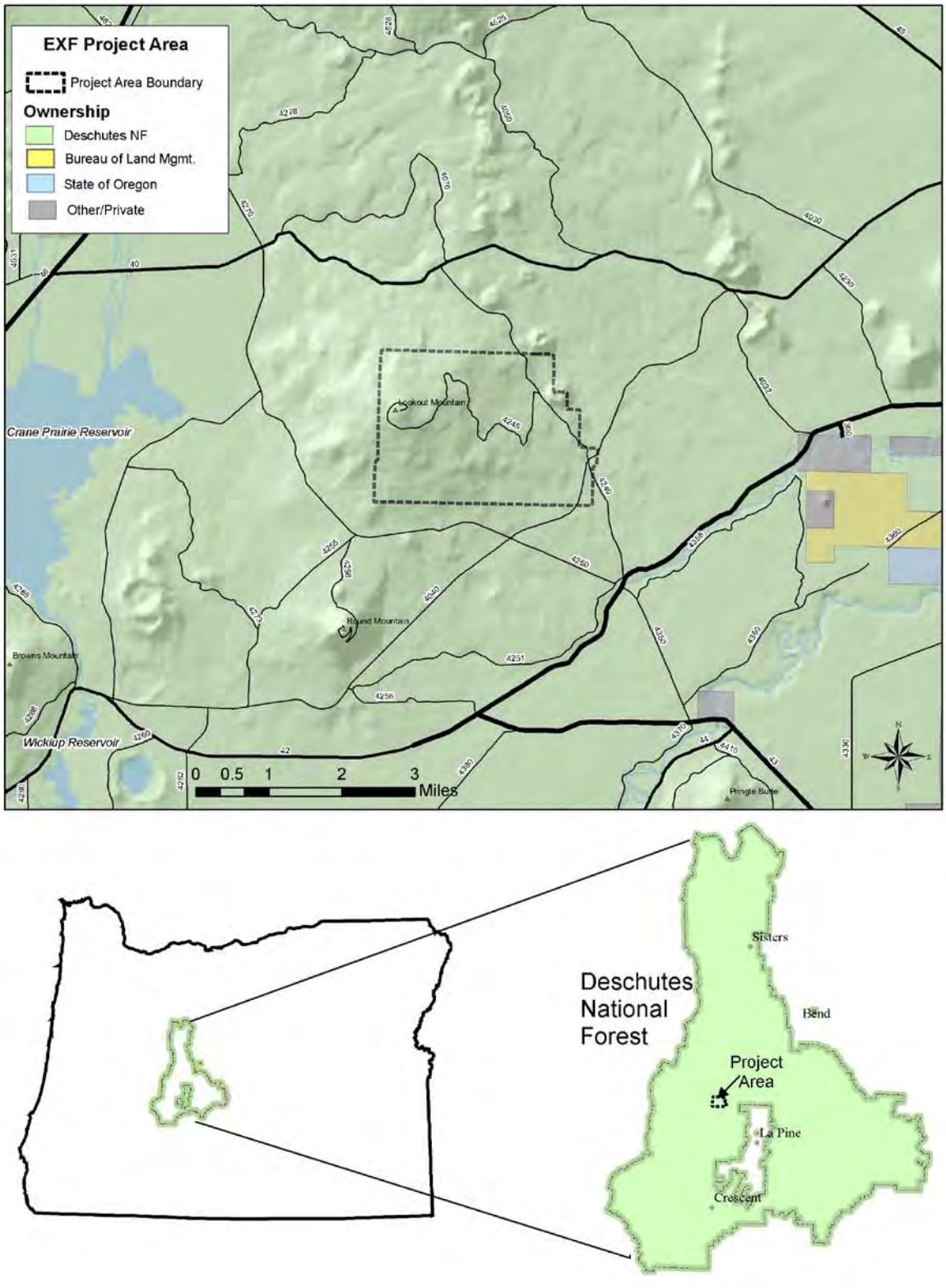

Figure 1. Location of the EXF Project area.

RECORD OF DECISION

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USDA Forest Service, Pringle Falls Experimental Forest
Bend/Ft. Rock Ranger District, Deschutes National Forest
Deschutes County, Oregon

Township 20 South, Range 9 East, Sections 28-33; Township 21 South, Range 9 East, Sections 4-6
(Willamette Meridian)

Introduction

This Record of Decision (ROD) documents our decision and rationale for the selection of Alternative 2, the preferred alternative described in the March 2010 Final Environmental Impact Statement for the EXF Thinning, Fuels Reduction, and Research Project. This project will address serious management issues within the Pringle Falls Experimental Forest, while also setting up an operational-scale research project that will improve our understanding of forest vegetation dynamics. The research will also produce information pertinent to fuels management, forest insect and disease issues, and over the long term address climate change issues.

In summary, this decision includes:

- Thinning across 2,554 acres to reduce stand density;
- Mechanical shrub treatment across 70-90% of the thinned units;
- Prescribed underburning across 2,554 acres to reduce fuels;

Associated actions include approximately one mile of temporary road construction, 35 miles of road maintenance, placement of a gate on the 4245 road, and two Forest Plan amendments.

Project Background

The Pringle Falls Experimental Forest is a diverse field laboratory within the Deschutes National Forest. It was the first experimental forest to be established in the Pacific Northwest in 1931, as a center for silviculture, forest management, and insect and disease research in ponderosa pine forests east of the Cascade Range. It is divided into two units: Lookout Mountain Unit and Pringle Falls Unit. The Lookout Mountain unit, where the current project is located, was added to the Experimental Forest in 1937.

Within the Lookout Mountain unit is a relatively large block of closed-canopy forest which was established in 1845 following a stand-replacement fire. The 165-year old cohort of ponderosa pine has grown exceptionally well and it is known that within this portion of the western distribution of ponderosa pine, individual trees could survive for 600 years (Youngblood et al. 2004). However, the trees here have declined in radial growth over the past decade, and have structural characteristics that indicate they are at imminent risk of catastrophic loss to bark beetles and high risk of loss to wildfire.

Given the condition of the Lookout Mountain unit and the fact that it is an Experimental Forest with a statutory mission[1] to provide places for forestry research and development, the stated purpose and need for the EXF project is twofold:

There is a need to address the risk of a severe insect epidemic or catastrophic fire. The purpose of the project is to reduce stand densities and surface fuels in stands of ponderosa pine and mixed conifer plant associations dominated by ponderosa pine to maintain high growth rates and reduce susceptibility to catastrophic loss to insects, disease, or fire. Reducing risk of loss will protect long-term studies and keep large blocks of homogenous structure to maintain options for future research opportunities.

Bark beetle hazard is gauged by tree stocking density. Cochran et al. (1994) used the stand density index concept to set stocking guidelines and an Upper Management Zone (UMZ) for sustaining healthy stand conditions. UMZs defined for plant associations on the Deschutes National Forest represent the level of stocking or relative density beyond which there is imminent risk of catastrophic loss of overstory trees to bark beetle. Tree density within the EXF project area is currently at a point where stands are from about 132 to 224% of the Upper Management Zone (UMZ) in stand density index.

Stand health and bark beetle hazard can also be gauged from tree radial growth rates. Radial growth rates slower than 13 rings per inch indicate declining tree vigor and increasing susceptibility to successful insect attack. Growth rates sampled in the project area ranged from 14 to 38 rings per inch, averaging 27 rings per inch. This indicates trees are growing slower and are more susceptible to insect-caused mortality. Additionally, tree vigor is shown to be low in the project area by measurements of the live crown ratio (the percent of a tree's height occupied by green branches). High stand densities coupled with low tree vigor and ongoing beetle-caused mortality are indicative of stands that are not sustainable. The purpose of thinning to the UMZ or below is to address this risk and improve or maintain the health and vigor of the overstory.

In addition to the risk of bark beetle mortality, fuels pose a risk to losing the stand to a wildfire. Fuels in the project area would support moderate flame lengths on 21% of the area and high flame lengths on 29% of the area. In the event of a wildfire there is potential for a passive crown fire to occur under current fuel and stand conditions over about 46% of the project area. Passive crown fire can make suppression difficult, cause short and long-range spotting, and lead to crown fires. The purpose of reducing surface and ladder fuels, decreasing crown density, and maintaining the largest trees, is to address this risk and improve fire resilience across the project area.

There is a need to provide operational scale research opportunities through a series of thinning and fuel reduction treatments applied across the landscape. This need comes generally from the establishment record for the Experimental Forest, and specifically from the study plan. The project will provide a platform for research addressed in the Pacific Northwest Research Station's study plan titled "Vegetation Dynamics after Thinning and Fuels Reduction in Dry Forests." The project is designed to address the following specific research questions:

1. What set of fuel reduction treatments best accelerates the development of large trees while over the long-term reintroduces natural disturbance processes that provide greater ecosystem resiliency?
2. What is the long-term influence of climate change interacting with a set of fuel reduction treatments on vegetation dynamics and forest structure?
3. Can single cohort stands be readily converted to multi-cohort stands?

[1] Research and Development Authority: The Forest and Rangeland Renewable Resources Research Act of 1978 is the comprehensive statutory authority for planning and conducting ongoing forestry research and development (Forest Service Manual 4070.1).

4. Do multi-cohort stands share the same risks of multiple, interacting stresses as single-cohort stands?
5. How does the dominant shrub, giant chinquapin, respond in the near term to a set of fuel reduction treatments?
6. How does the residual stand structure resulting from a set of fuel reduction treatments interact locally and in the near-term with wind to cause additional structural changes?

Some of these research questions can be answered quickly. For example, research on giant chinquapin and post-treatment blowdown can be addressed within about five years. Questions about development of large trees and resiliency will require several decades (Appendix B p. 28). The resulting information from this study will be directly applicable to local forest management issues. For example, results of this research will provide mangers with scientifically sound data showing the effects of a range of tree densities on growth rates, mortality, and windthrow or how to restructure single-cohort stands to multi-cohort stands – information that can be directly applied to all or a portion of the 200,000 + acres of blackbark ponderosa pine stands on the Deschutes National Forest.

This project will also serve as a foundation for additional studies. For example, there is interest in studies involving pine-associated wildlife.

The proposed action will further the mission of the Pacific Northwest Research Station.

Decision and Rationale

It is our decision to select Alternative 2 in its entirety, including the associated connected actions, forest plan amendments, resource protection measures, and monitoring, described in the FEIS (pp. 17-21, 26-32).

Specifics of Decision

Table 1 lists each unit and what treatment will occur.

Table 1. Selected Alternative - Prescription for Treatment Units

Unit No.	Acres	Silviculture Prescription	Basal Area to be Left	Natural Fuels Prescription
11	118	Thin to 75% UMZ*	76	Mow/Underburn
12	192	Thin to 50% UMZ	51	Mow/Underburn
13	83	Thin to 75% UMZ w/ small openings	76	Mow/Underburn
14	194	Thin to UMZ	101	Mow/Underburn
15	64	No Treat	remains at 138	No Treat
21	106	Thin to 75% UMZ w/ small openings	83	Mow/Underburn
22	206	Thin to 75% UMZ	83	Mow/Underburn
23	225	Thin to 50% UMZ	56	Mow/Underburn
24	196	Thin to UMZ	111	Mow/Underburn
25	108	No Treat	remains at 174	No Treat
31	148	Thin to 50% UMZ	70	Mow/Underburn
32	164	Thin to UMZ	140	Mow/Underburn
33	335	Thin to 75% UMZ	105	Mow/Underburn
34	94	Thin to 75% UMZ w/ small openings	105	Mow/Underburn

35	109	No Treat	remains at 184	No Treat
41	116	Thin to 50% UMZ	35	Mow/Underburn
42	160	Thin to UMZ	70	Mow/Underburn
43	70	Thin to 75% UMZ w/ small openings	53	Mow/Underburn
44	147	Thin to 75% UMZ	53	Mow/Underburn
45	61	No Treat	remains at 154	No Treat

*UMZ = Upper Management Zone.

The intensity of proposed thinning uses the Stand Density Index (SDI), which is a relative tree density measurement of each stand. At certain SDI the trees in a stand exhibit reduced vigor due to excessive density and bark beetle activity can be expected to increase dramatically. This SDI is called the upper management zone (UMZ). Where stands are denser than the UMZ, as in the case of Lookout Mountain, there is imminent risk of catastrophic loss of overstory trees to bark beetles. Treatments closer to UMZ (e.g. 75% of UMZ) leave more trees; those further from UMZ (e.g. 50% of UMZ) leave fewer trees.

Table 2. Selected Alternative - Summary of Treatments

Thinning Type	Acres
1- Thin to UMZ	714
2- Thin to 75% UMZ	806
3- Thin to 50% UMZ	681
4- Thin to 75% UMZ & Create small openings	353
Total	**2,554**
5- No Treat (Control Units)	342

Forest Plan Amendments: Our decision includes amendments to the Deschutes National Forest Land and Resource Management Plan. First, Interim Wildlife Standard 6.d from the Regional Forester's Forest Plan Amendment #2 (the Eastside Screens) would not apply to the implementation of the EXF project in units east of the owl line where LOS is present. This will allow harvest within approximately 22 acres of LOS where one or more LOS stage within a PAG is currently below the historic range of variability. Secondly, Interim Wildlife Standard 6.d.2.a would not apply to the implementation of the EXF project east of the owl line in units 31, 34, 42, 43, and 44. This will allow harvest of trees > 21" DBH east of the owl line in those units. These amendments will allow consistent application of the prescriptions across all units, which is an important component of the research design (see FEIS p. 247-250).

Thinning: Thinning will be conducted with ground-based machinery. For treatment types 1, 2, and 3 thinning is from below: to reduce stand density by removing trees from the lower crown classes or smaller diameters to improve growth and overall forest health of trees in the upper crown classes or the larger trees. Larger trees are retained. Treatment type 4 (thin to 75% UMZ with small openings up to about ¼ acre in size) will be a free thin across the entire diameter distribution to begin transition to an all-aged stand structure (i.e. multi-cohort). Target basal area and trees per acre are applied as an average across a unit. The target stand density index and basal area are based on the predominant plant association (see FEIS p. 19).

For all treatment types, species preference for cutting is as follows: 1) lodgepole pine, 2) grand/white fir, 3) small-diameter ponderosa pine, 4) small-diameter mountain hemlock, 5) small diameter Douglas-fir. This preference is intended to be flexible, with the intent of moving towards greater resilience. As diameters increase, retention of trees having more vigor will be emphasized.

Slash and Smaller Material: Trees with commercial value (usually greater than 7" or 8" DBH) will be whole-tree yarded, with limbs and tops attached to the landings, thereby reducing the need for slash piling within the units. Tops and limbs will be utilized as biomass as market conditions allow, otherwise they will be burned at the landings. Smaller material (generally < 7" DBH) will be felled by hand and will also be utilized as biomass as market conditions allow. The material would be brought out to the landings on the existing skid trails and temporary roads. If it cannot be utilized, the lighter concentrations will be lopped and scattered and heavier concentrations grapple piled and burned. Assuming no market for smaller material, approximately 50 percent of the unit acres will have heavier concentrations of small material grapple piled and burned. This assumption is used in the analysis.

Mowing: Thinning and slash treatment will be followed by mechanical shrub treatment, also known as mowing. This involves the use of mechanized equipment to mow, cut, chop, grind or otherwise reduce shrub or ground fuel vertical structure to a height of about 8 inches. All units are planned for mowing and it is estimated that between 70 to 90 percent of each unit will actually be mowed because of the distribution of shrubs.

Burning: Following thinning, slash treatment, and mowing, prescribed fire is planned for most areas. This is considered a landscape-scale burning operation where fire will be applied when conditions are conducive to meeting the burning objectives.

Fire lines are used to control the fire during prescribed burning operations. Existing roads will be used as much as possible. Line construction will be necessary at the project perimeter, around control units, and around the plantation in the middle of the project area. Lines will be built with an ASV (a rubber tracked "All Surface Vehicle" commonly used to place fireline on slopes of less than 30%), and will be approximately 3 to 4 feet wide. Handline will be constructed where necessary, such as with steeper slopes and would be 1.5 to 2 feet wide. Approximately 12 miles of fireline will be created. Displaced topsoil and unburned woody debris would be redistributed over the firelines following prescribed burning activities.

Connected Actions

Temporary road construction: Harvest operations are expected to require approximately 1 mile of temporary road to be developed for access to units 11, 14, 21, and 23. Temporary roads are built to facilitate ground-based harvest systems for the purpose of removing forest products from a treated stand. These roads are short, averaging less than 0.2 miles. Temporary roads will be built to low specifications that would allow equipment access to landing sites. These temporary roads will be built on slopes less than 10 percent and will be constructed to the lowest possible standard capable of supporting log haul in order to minimize ground disturbance. These temp roads will be restored after use.

Road maintenance: Approximately 35 miles of existing roads in the project area will require maintenance prior to use for timber haul. Maintenance is blading and shaping of the roadbed and brush removal.

Gating: A Forest Service gate will be placed on the 4245 road at the intersection of the 4240 and 4245 roads. This will prevent public vehicle access on the main road through the Experimental Forest. The gate will be closed year-round. Access for administrative use and for research purposes will be provided.

Danger tree removal: Federal and State of Oregon safety regulations require that danger trees along project area travel routes be felled prior to activities taking place. Roadside danger trees will be felled along these travel routes and where activity units border the road system. Felled danger trees will be left on the ground.

Resource Protection Measures: This decision includes all resource protection measures described for Alternative 2 in the FEIS. These are listed in Appendix A of this ROD.

Reasons for the Decision

Our decision to select Alternative 2 was made by considering how well the alternative meets the purpose and need, how the alternative responds to the issues, if public comments have been adequately considered, and what the likely environmental effects will be. In selecting Alternative 2, we carefully reviewed disclosures in Chapter 3 of the FEIS. The analysis discloses predicted environmental consequences of the actions, including effects to the northern spotted owl and other wildlife, benefits to forest health, reductions in wildfire risk, compliance with water and air quality regulations, and maintenance of soil productivity. Our conclusions are based on a review of the entire project record, which includes a thorough review of relevant scientific information, and a consideration of responsible opposing views. The following narratives go into detail on our reasons for the decision.

Response of Alternative 2 to the Purpose and Need

There is a need to address the risk of a severe insect epidemic or catastrophic fire.

The FEIS explains that the trees in the Lookout Mountain Unit have grown to a point where they are so close together that they are growing slower, are less vigorous, and are susceptible to bark beetle-caused mortality (FEIS pp. 85-87). Losing a large portion of the Experimental Forest to bark beetles is not acceptable because it is an important component of the Experimental Forest network where there are ongoing long-term research projects and the potential for future research.

The analysis shows that all of the units will benefit from thinning by moving them to or below the upper management zone (UMZ). Live crown ratios and diameter growth will improve. Tree vigor will improve, and the larger residual trees will be better able to quickly respond to the increased availability of nutrients and water following density reduction. Stands with the greatest density reduction will remain below the stand density index, therefore not at risk of density-related beetle mortality, for as much as 150 years (FEIS p. 93).

The project area, dominated by ponderosa pine, is at a point where the density and fuels conditions are such that, under summer weather conditions, a wildfire would produce moderate to high flame lengths and a potential for passive crown fire (FEIS pp. 103-105). Mowing and underburning will reduce fuels across the thinned units. The analysis shows that Alternative 2 would substantially change expected fire behavior to a point where a wildfire could be attacked directly and contained at a small size (FEIS pp. 113-116). This would protect valuable research and allow the large trees to continue to grow.

There is a need to provide operational scale research opportunities through a series of thinning and fuel reduction treatments applied across the landscape.

The project will further the mission of the Pacific Northwest Research Station's Managing Disturbance Regimes Research, Development, and Application Program. Full implementation of the Study Plan "Forest Dynamics after Thinning and Fuel Reduction in Dry Forests" will allow for important research questions to be addressed in the Experimental Forest in a statistically valid manner.

The different thinning prescriptions described in Table 1, p. 2-3 of this ROD, are divided among four treatment blocks with relatively homogeneous elevation, aspect, and plant association. The post-

treatment comparisons will test the hypotheses outlined in the Study Plan (FEIS p. 5, and FEIS Appendix B pp. 22-25).

Research results will be directly applicable to local Forest managers and managers across the range of ponderosa pine in the west, such as how to restructure single-cohort ponderosa pine stands into multi-cohort stands. The research will also provide managers with scientifically sound data showing the effects of a range of tree densities on growth rates, mortality, and windthrow. This information will be particularly relevant to management of the 200,000+ acres of second-growth black bark pine on the Deschutes National Forest (FEIS p. 3, FEIS Appendix F p. 3-4).

Response of Alternative 2 to the Key Issues

In response to the Proposed Action, and based on feedback from the public, the Interdisciplinary Team identified one key issue which was used to develop Alternative 3:

Key Issue #1: Northern Spotted Owl

The EXF project area is on the easternmost edge of the range of the spotted owl (see Figure A-3). Within the range of the spotted owl, the project area lies primarily within the Administratively Withdrawn (AWD) allocation but also includes a portion of the Sheridan Late Successional Reserve (LSR) (see FEIS pp. 8, 11-12).

The selected alternative includes thinning and fuels reduction within 211 acres of spotted owl NRF habitat within the AWD allocation (Table 3); however, there is no Critical Habitat within the project area, and the selected alternative does not enter any spotted owl home range (FEIS p. 8, 46, 56).

Table 3. Acres of Spotted Owl NRF Habitat Treated with Selected Alternative

Northwest Forest Plan Allocation	Acres of Allocation within the Selected Alternative Units	Amount of Spotted Owl NRF Habitat within Units	Amount of Spotted Owl Home Range within Units	Spotted Owl Critical Habitat within Proposed Action Units
Sheridan Late Successional Reserve	161	0	0	0
Administratively Withdrawn	2,623	211	0	0

A total of 250 acres of spotted owl NRF habitat occurs within the project area. The Forest Service reviewed the areas of NRF habitat in the field (Biological Assessment and FEIS Appendix E), which shows that the patches of spotted owl NRF habitat within the project area currently have greater foraging and dispersal quality than nesting because it lacks large Douglas-fir trees and has sparse canopy closure. Thinning in combination with fuel treatments will reduce canopy closure and reduce the multi-storied aspect of suitable habitat so that it no longer functions as nesting habitat, but may continue to be used for foraging and dispersal. This will occur on 211 acres, all within the AWD allocation. Effects of heavier thinning are more pronounced because more basal area is removed. Treatments may also reduce the foraging opportunities for the prey of northern spotted owls.

Most of the stands mapped as NRF habitat within the project area do not contain old, decadent Douglas-fir with cavities, which are present at most spotted owl nest sites on the Deschutes National Forest. It is not likely that the ponderosa pine/white fir stands would provide the nesting component presently or in the future. The Biological Opinion states that although the project will remove suitable habitat for spotted owls, it will likely promote forest stand resiliency to insects, disease, and fire. Ponderosa pine is the predominant tree species within the project area and will likely benefit from proposed stand density reductions that lessen physiological stresses.

Dispersal habitat is also affected by the reduction in canopy closure and where thinning is the heaviest, the stands will no longer meet dispersal guidelines (FEIS p. 65); however, dispersal habitat will remain throughout the watershed.

The selected alternative will thin and treat fuels across 161 acres of the Sheridan Late Successional Reserve (Table 3). The current condition of that area is unsustainable (FEIS p. 83) and so management activities are clearly needed to reduce the risk of losing the overstory to bark beetles or fire. Based on public comments on the Draft EIS, we believe it is important to make clear that this portion of the LSR does not currently provide NRF habitat for the northern spotted owl, provides only 39 acres of dispersal habitat, and minimally provides habitat for other LSR indicator species (FEIS p. 59). The thinning and fuels reduction activities that will take place within the LSR follow recommendations in the LSR Assessment and will improve the health of the stand and promote habitat conditions (specifically large trees) for common wildlife indicator species in the area (pileated woodpecker, northern goshawk, white-headed woodpecker, and flammulated owl). This project will provide for better habitat protection for 30 to 55 years and it will not prevent the LSR from playing an effective role in maintaining the objectives for which it was established (FEIS p. 67).

We considered how each Alternative addresses the spotted owl issue. Alternative 3 would avoid thinning and fuels reduction on 211 of NRF habitat. The consequences of treating within spotted owl NRF habitat were assessed and we consulted with the U.S. Fish and Wildlife Service, asking them for a Biological Opinion. Their opinion is that Alternative 2 would not likely jeopardize the continued existence of the spotted owl. The amount and location of the NRF and dispersal habitat that will be treated will not significantly affect connectivity between Late Successional Reserves or the ability of reserves to support conservation and recovery of the spotted owl as planned through the Northwest Forest Plan. The NRF habitat does not currently provide the nesting component for spotted owls because of the lack or large Douglas-fir; but Alternative 2 will promote the continued development of large trees in the project area.

Alternative 3 (no treatment in NRF and no treatment in LSR) would be risking the loss of the overstory trees to bark beetles. Alternative 3 addressed the issue of spotted owls by not treating in these areas, but the analysis shows that it would not substantially benefit spotted owls. Additionally, under Alternative 2, we will have the ability to study the response for each of the four thinning types, as well as control units. We find that Alternative 2 is the best course of action for the Experimental Forest by maintaining tree growth rates, reducing the threat of mortality from insects, and reducing fuels in this ponderosa pine-dominated forest.

Consideration of Public Comment

In making this decision we thoroughly considered the comments received during the 45-day comment period. Appendix F of the Final EIS details the consideration and response to public comments. Conflicting opinions and points of view about the best use of National Forest System lands are not unique to this project, and our reasoning here will not resolve these issues for everyone. We recognize that some groups that reviewed the project were fervently opposed to commercial-size thinning in the project area; however, we feel that this decision does the best job of reducing risk to the Experimental Forest from insects and wildfire, and makes the best use of the Experimental Forest according to the purpose for which it was established.

Some respondents were approving of the project and supportive of the risk reduction as well as the research component. For example, the Deschutes County Forester expressed support for Alternative 2 because the fuels reduction work will meet standards and recommendations from the area's Community Wildfire Protection Plan. Also, the Environmental Protection Agency expressed support for the project as a means to address the risk of severe insect epidemic or catastrophic fire, and as an opportunity to study forest dynamics after thinning and fuels reduction in dry forests. The EPA stated

appreciation that the long-term influence of climate change will be considered within the context of the study.

Some organizations expressed concerns that the Forest Service has not relied on scientific information in describing the need for the project, in developing the proposed action and study plan, and in predicting the environmental effects of implementing the project. We find that the claims of inadequately utilizing scientific information are unwarranted. The basis for the need to reduce stand density in the project area is grounded in a large body of science. Observations and measurements taken in the field evidence the risk to the area from bark beetles and current fuel conditions (see FEIS p. 85-89, 102-106, 110-112, Appendix B). Comments are responded to in Appendix F and some of the information has been brought forward into Chapter 1 to provide a clearer picture of the direct link between the current condition and the need for action (FEIS pp. 4-5).

Our interdisciplinary team, including the lead researcher for the study plan, has reviewed documents that were provided during the comment period as either cited references or simply copies of research, articles, opinion pieces, and more. Many documents are referenced to support a claim that thinning is not necessary to reduce the risk of fire or that thinning will exacerbate the risk of fire (FEIS Appendix F, pp. 18-22). However, there is ample evidence in the FEIS that several components of the project will reduce the risk of fire. First, the thinning will be conducted with whole tree yarding – a method that leaves less slash in the forest because the thinned trees are all brought to the landing with the limbs and tops attached. Second, small material that is felled will also be used as biomass as markets allow; also resulting in less slash in the forest. Third, thinning is followed by mowing and then by application of prescribed fire which will reduce surface fuels. The literature supports the conclusions that this combination of thinning followed by mowing and burning will appreciably reduce the expected fire behavior to a level that will be easier to control and has less torching (FEIS p. 107-108).

Some comments also gave the impression that reviewers of the DEIS were concerned that the Forest Service is proposing to remove commercial-size trees for the sole purpose of fuels reduction. Even a cursory review of the FEIS makes clear the need for density reduction. Reducing the number of trees within the treatment units will make the residual stand more resilient because more nutrients and water are available to the trees. We expect the residual trees to respond with improved diameter growth and better live crown ratios (FEIS p. 89-91). Beetle-related tree mortality will not be a concern in these stands for 30 to 150 years, depending on the level of thinning (FEIS p. 93).

Research has been part of the Forest Service mission since the agency's inception in 1905. Research and Development in the USDA Forest Service works at the forefront of science to improve the health and use of our Nation's forests and grasslands, and the Pringle Falls Experimental Forest is a key component to the Experimental Forest network. As Director of the Pacific Northwest Research Station and Supervisor of the Deschutes National Forest, we have confidence in the abilities and expertise of our scientists and experts and we look forward to realizing the results of the study and applying the new information to future forest management efforts. We believe that the research conducted under the approved Study Plan will provide important information for forest managers in the short term, and that Alternative 2 will help to assure that the Pringle Falls Experimental Forest will continue to provide a field laboratory for research by addressing management issues over the long term.

We also considered many comments related to climate change. The tools for estimating carbon and sequestration are not fully developed and meaningful thresholds have not been adopted by the agency to weight project-related effects. Further, the scale of this project would likely be immeasurable when considered at a global scale. The EXF project provides a unique opportunity to explore vegetation dynamics under a changing climate (FEIS p. 245) and this will provide insights into the effects of climate change at the community scale, providing managers much needed information on the

restructuring of plant composition as a result of regional climate interacting with legacies of past management. These insights will inform management options to better incorporate these changes.

Other Resource Issues and Public Concerns

We considered the suggestions for changing the focus of the Experimental Forest from a place of research into silvicultural practices to a place where natural processes are observed and studied. Some argued that the value of the area is higher if unmanaged. We disagree because our best science tells us that the trees in the Lookout Mountain unit will succumb to extensive mortality from bark beetles, and we have evidence of the value that field research conducted on a live growing forest can provide. We find that it is unacceptable to defer management in the Lookout Mountain unit because this Experimental Forest is for the purpose of studying the ponderosa pine-dominated ecosystem. It is important to note that the Forest Service not only has a system of Experimental Forests where active management is the focus of research, but also has a system of Research Natural Areas (RNAs). RNAs are managed to maintain the natural features for which they were established, and to maintain natural processes. Non-manipulative research and monitoring activities are encouraged in RNAs and can be compared with manipulative studies conducted in other similar ecoregions. There are five RNAs on the Deschutes National Forest, including one within the Pringle Falls Experimental Forest (FEIS pp. 2, 35).

Soils: Impacts of project activities to the area's soil resource was thoroughly analyzed (FEIS pp. 201-225). Most vehicle activity, with the exception of mechanical harvesters, will be restricted or confined to the existing road network, building the early 1970s to facilitate the kinds of research and management activities as proposed in Alternative 2. Physical disturbance from temporary roads, landings, and skid trails will affect soil productivity through compaction. Restricting machinery to designated skid trails will minimize the area affected. Project design features and management requirements, such as avoiding steep slopes, will also minimize or avoid adverse soil effects. Following subsoiling, the project area will be within detrimental soil condition limits set by Forest Plan standards.

Wildlife Habitat: Impacts to Regional Forester's sensitive species have been carefully analyzed in the FEIS (pp. 126-144). Two sensitive species will be beneficially impacted by the project: Habitat for the white-headed woodpecker and the Lewis woodpecker is already present and will improve over time. For the Pacific fisher and the Johnson's hairstreak, the project May Impact Individuals or Habitat, but would not likely Contribute to a Trend Towards Federal Listing. For all other sensitive species there will be No Impact. When habitat for a Management Indicator Species, Birds of Conservation Concern, and Landbird Focal Species was present, the effects of the project were evaluated. Some species will likely benefit because the quality of the habitat improves or more is available, while some species will likely experience at least short-term declines in habitat quality or availability (FEIS pp. 143-200). These trade-offs often result from forest management. We believe the beneficial impacts outweigh the negative impacts because large ponderosa pine structure will be developed, which is below the HRV compared to them id-seral structural stage (FEIS p. 83).

Water Quality / Hydrology: Because there is no surface water or riparian areas within the project area, there will be no effect to water, riparian vegetation, or fisheries (FEIS pp. 226-230). The FEIS also discussed the potential for impacts to the Fall River, which is over one mile away, and found that there is no potential for effects to the hydrology of that stream.

Climate Change: The Lookout Mountain Unit offers a unique opportunity for studying vegetation dynamics under a changing climate regime (FEIS p. 244). Public comments concerning carbon storage have been addressed (Appendix F).

Botanical Resources: No threatened or endangered botanical species are present in the project area. For one sensitive fungal species, the project May Impact Individuals or Habitat, but will not likely

contribute to a trend towards federal listing (FEIS p. 238). No other sensitive or rare and uncommon species will be impacted.

Economics: Implementation of thinning will be through timber sales followed by slash treatments, mowing, and burning. The expected output is approximately 28 million board feet of timber. Jobs associated with implementation that will be created or maintained number approximately 268 (FEIS p. 242). We feel this is an important contribution to the region's economy.

Other Alternatives Analyzed

In addition to the selected Alternative 2, two additional alternatives were analyzed in detail. They include Alternative 1 the no action and Alternative 3. Additional alternatives include those considered in the FEIS and "dropped from detailed consideration" (FEIS, pp. 35-37).

Alternative 1 (No Action)

The purpose of the No Action alternative is to allow management to continue at the current level. Current and ongoing research activities would continue but would be at an increasing risk of loss from disturbance from wildfire and bark beetle outbreak; custodial activity would continue, such as routine maintenance of roads. Response to environmental emergencies, such as suppressing a wildfire, would continue. There would be no additional thinning or fuels treatments; the study plan would not be implemented; and the proposed research would not be undertaken.

Expected consequences of the No Action include: Tree growth rates and tree vigor will remain low or continue to decrease; density-caused tree mortality will increase; development of small and medium-sized trees into large trees will be retarded; large tree numbers will increase slowly and then decrease because of pine beetle mortality (FEIS p. 88-89). There is currently an unacceptable risk of passive crown fire over nearly half of the project area and the fuel conditions could create passive crown fire (FEIS p. 103). Current and ongoing research activities would continue but would be at an increasing risk of loss from disturbance from wildfire and bark beetle outbreak.

This alternative was not selected because as stated previously, the Experimental Forest is of great value to the Forest Service and the public. It is important that the purpose and need be met with this project, and the No Action does nothing to meet the purpose and need.

Alternative 3

Alternative 3 was designed to address the key issue around impacts to spotted owl habitat. To that end, 211 acres of field-verified NRF habitat located within the Administratively Withdrawn (AWD) allocation would not have been treated under this alternative. Also, because Late Successional Reserves help provide the dispersal network for spotted owls across their range, Alternative 3 also would have deferred 161 acres of treatment within the Sheridan LSR. Under Alternative 3, a total of 2,182 acres would receive the same treatments described for Alternative 2.

Alternative 3 would still thin a portion of the Lookout Mountain Unit, but it would break up the units and nearly eliminate one entire replicate (see FEIS p. 25). The untreated areas would remain at risk to insects and wildfire. The FEIS points out that the NRF habitat that would be avoided in this alternative is not likely to produce high quality habitat (p. 62). The Biological Opinion from the US Fish and Wildlife Service states that Alternative 2 is unlikely to affect the reproductive success of owls that may forage in the area (B.O. p. 50) and that the habitat modification will not significantly affect connectivity between LSRs or the ability of reserves to support conservation and recovery of the spotted owl as planned through the Northwest Forest Plan. For these reasons, we are not inclined to select Alternative 3, which will not provide any significant benefit to the spotted owl but does render the proposed research design incomplete. Alternative 3 does not fully meet the purpose and need for action described in the FEIS (p. 4-5) and was therefore not selected.

The Environmentally Preferable Alternative

Under the National Environmental Policy Act, the agency is required to identify the environmentally preferable alternative (40 CFR 1505.2(b)). This is interpreted to mean the alternative that would cause the least damage to the biological and physical components of the environment, and which bests protects, preserves, and enhances, historic, cultural, and natural resources (Council on Environmental Quality, *Forty Most Asked Question Concerning CEQ's National Environmental Policy Act Regulations*, 46 Federal Register 18026). Factors considered in identifying this alternative include: (1) fulfilling the responsibility of this generation as trustee of the environment for future generations, (2) providing for a productive and aesthetically pleasing environment, (3) attaining the widest range of beneficial uses of the environment without degradation, (4) preserving important natural components of the environment, including biodiversity, (5) balancing population needs and resource use, and (6) enhancing the quality of renewable resources. An agency may discuss preferences among alternatives based on relevant factors, including economic and technical considerations and statutory missions {40 CFR 1505.2(b)}.

We have determined that the environmentally-preferable alternative is Alternative 2, the proposed action. Alternative 2 treats more area within the Experimental Forest with thinning, mowing, and underburning that will be more fire and insect resilient. Alternative 2 also does the best job of meeting the statutory mission of the Experimental Forest by reducing the risk of losing a large portion of it to fire or insects, and incorporating important research into the design of risk-reduction activities.

Public Involvement

Preparation of the FEIS followed the procedures outlined at 40 CFR 1501.7, 40 CFR 1503, and 36 CFR 215. The FEIS describes scoping efforts and the public comment period (p. 6). Field trips were offered to the public on two occasions (August 2008 and July 2009). Additionally, the project was the subject of a field trip during the "Creating Stand-Level Prescriptions to Integrate Ecological & Fuel management Objectives for Dry Forests of the Eastern Cascade Range" workshop in October 2009. The public comment period is addressed further in Chapter 4. Comments received were carefully reviewed and substantive comments are responded to individually in Appendix F. Some comments led to changes from the Draft EIS to the Final EIS.

Consultation with Government Agencies and Tribes

The U.S. Fish and Wildlife Service was consulted during project planning. A Biological Assessment was submitted and formal consultation according to the Endangered Species Act was requested on August 31, 2009. The Service provided a Biological Opinion on January 4, 2010. Following their review of the current status of the spotted owl, the environmental baseline for the action area, the effects of the proposed action and the cumulative effects, **it is the U.S. Fish and Wildlife Service's biological opinion that the EXF Project is not likely to jeopardize the continued existence of the spotted owl.** The U.S. Fish and Wildlife Service reached a no jeopardy determination for the EXF Project for the following reasons:

1) The Northwest Forest Plan provides a well-distributed set of reserves which protect suitable habitat across the range of the spotted owl. Suitable spotted owl habitat proposed for removal in the EXF project area is within the Administratively Withdrawn land allocation under the NWFP, which were intended to provide demographic support for spotted owls and provide for connectivity and dispersal between larger blocks of habitat in LSRs. The NWFP recognized the need for silvicultural management in the Eastern Oregon Cascades Province for the purpose of reducing the risk of stand-replacing fires. The EXF Project is consistent

with management guidelines within the NWFP in that a key purpose of the project is to improve the forest resiliency to large-scale disturbance events such as insect, disease, and fire that will lead to loss of late-successional forest across the landscape. The amount and location of the nesting, roosting, foraging and dispersal habitat proposed for removal in the EXF project will not significantly affect connectivity between LSRs or the ability of reserves to support conservation and recovery of the spotted owl as planned through the NWFP.

2) All spotted owl suitable habitat within the project area has been surveyed to protocol and all sites of occupation have been documented. No suitable habitat will be removed within spotted owl home ranges or core areas within the EXF project area. (Biological Opinion, pp. 51-52).

The Draft EIS was filed with the Environmental Protection Agency (EPA) for review pursuant to 40 CFR 1506.9. The EPA's reviewing official wrote on November 2, 2009:

> "As a participant on the Deschutes Provincial Advisory Committee (PAC), EPA has had the opportunity to survey other ongoing research efforts on the Pringle Falls Experimental Forest. This forest is an important natural laboratory that is serving to enhance our understanding of the role of natural and human-caused disturbances as agents of change in ponderosa pine, lodgepole pine and mixed conifer forests, and the degree to which they can be effectively managed to achieve or sustain desired ecological conditions. We are supportive of the proposed project, both as a means to address the risk of severe insect epidemic or catastrophic fire, and as an opportunity to study forest dynamics after thinning and fuels reduction in dry forests. Although a small component, we are appreciative that the long-term influence of climate change will be considered within the context of the study. As climate changes, so may the way in which fuel reduction treatments affect vegetation dynamics and forest structure. Research such as this can help to build our understanding and inform future management."

The following Tribal governments were notified of the project proposal: Confederated Tribes of the Warm Springs, Burns Paiute Tribe, and the Klamath Tribes. These Tribal governments did not express any concerns about the project.

Legal Requirements and Policy

In reviewing the FEIS and actions associated with Alternative 2, we have concluded that our decision is consistent with the following laws and requirements:

The National Environmental Policy Act (NEPA)

NEPA establishes the format and content requirements of environmental analysis and documentation as well as requirements for public involvement and disclosure. The entire process of preparing this environmental impact statement was undertaken to comply with NEPA.

The National Forest Management Act (NFMA)

We find this decision to be consistent with the long term management objectives as discussed in the Deschutes National Forest Plan as amended, except as discussed below. All other Forest Plan direction, including from the Regional Forester's Forest Plan Amendment #2 (Eastside Screens) and the Northwest Forest Plan has been adhered to and incorporated into the project's design. Appendix C of the FEIS provides an assessment of the project's relationship to Forest-wide and management area standards and guidelines of the Forest Plan.

Deschutes Forest Plan Amendments: Some aspects of the selected alternative are not consistent with direction in the Regional Forester's Forest Plan Amendment #2 (Eastside Screens). In order to

implement Alternative 2, two amendments are necessary. These amendments are described previously on page 3 of this ROD. Based on the analysis in the FEIS (p. 247-250), we find these amendments take place on a very small fraction of eastside forest and are non-significant. These amendments will not have an impact on the goals and objectives for the Forest Plan and they provide for activities that contribute to meeting the Experimental Forest management area objectives. All other aspects of the selected alternative is consistent with the direction in the Eastside Screens where it applies.

The EXF project is consistent with the NWFP Research standard (C-4) because it is located within the Experimental Forest allocation which was established for the purpose of research activities (FEIS Appendix C p. 3).

The Northwest Forest Plan allows research activities to occur within LSRs following an assessment of consistency with LSR objectives (C-18). The Sheridan Mountain LSR Assessment (LSRA), as approved in 1997 by the Regional Ecosystem Office, supports thinning and fuels reduction to reduce risks. Analysis in the FEIS shows that the proposed activities are consistent with those management recommendations (pp. 66-67).

The EXF project area contains no surface water and no riparian areas and is not located within a key watershed. Analysis shows that while accomplishing project objectives, none of the activities in the selected alternative would prevent attainment of the aquatic conservation strategy objectives at the watershed level or at the project level (FEIS p. 229-230). We have determined that the project is consistent with the Aquatic Conservation Strategy.

We find this decision to be consistent with the 2001 *Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines*. Specifically we considered the fact that no habitat was present within the Northwest Forest Plan area for Crater Lake tightcoil, Great gray owl, or *Cypripedium montanum.* W also considered the finding that no species sites are known in the project area that would require management, but don't require pre-disturbance surveys.

We find the selected alternative to be consistent with the requirements of the National Forest Management Act implementing regulations; specifically:

Silvicultural Practices
In Alternative 2, there is no timber harvest on lands classified as unsuitable for timber production. Alternative 2 is consistent with 36 CFR 219.27(c)(1).

Vegetative Manipulation/Management Requirements
Alternative 2 is consistent with the seven management requirements from 36 CFR 219.27 and the vegetation requirements from 36 CFR 219.27(b).

The Preservation of American Antiquities Act of June 1906 and the National Historic Preservation Act: The Oregon State Historic Preservation Officer (SHPO)

A cultural resource inventory has been completed for the project area. On June 09, 2006, the Deschutes National Forest completed the "Project Review for Heritage Resources under the Terms of the 2004 Programmatic Agreement" with the Oregon State Historic Preservation Officer (SHPO). The activities in the selected alternative have been designed to have no effect to cultural resource sites through both protection and avoidance. A finding of Historic Properties Avoided has been made for this project. The project is compliant with the SHPO regulations.

The Endangered Species Act of 1973, as amended

Biological Assessment and Biological Evaluations were prepared to document the possible effects of the proposed activities to endangered and threatened species within the project area. Appropriate coordination, conferencing, and consultation with USFWS have been completed (See previous section

of this document titled Consultation with Government Agencies). The selected alternative is determined to "May Affect, Likely to Adversely Affect" the threatened northern spotted owl. As stated on the previous page, a Biological Opinion was provided by the U.S. Fish and Wildlife Service. The Service's biological opinion is that the EXF Project is not likely to jeopardize the continued existence of the spotted owl (FEIS p. 256 and Appendix F). It has been determined that implementation of all of the proposed activities will have no effect to any threatened or endangered fish or plant species and would have either no impact on any sensitive wildlife species or associated habitat or may impact individuals or habitat but not cause a trend toward federal listing (FEIS pp. 128-144, 226-227, 239).

The Clean Water Act, 1982 and 303(d)

The selected alternative will comply with the Clean Water Act. This Act establishes a non-degradation policy for all federally proposed projects. Because there are no permanent or seasonal streams within or adjacent to the project area, and because there is no potential for rain or snowmelt to provide runoff directly into a permanent water source, the selected alternative meets anti-degradation standards (FEIS p. 227).

The Clean Air Act

The selected alternative will comply with the Clean Air Act. The Act prescribes air quality to be regulated by each individual state. The Forest Service will follow directions of the Oregon State Forester in conducting prescribed burning in order to achieve strict compliance with all aspects of the Clean Air Act and adherence to the Oregon Smoke Management Plan (FEIS p. 246).

Civil Rights and Environmental Justice

Executive Order 12898 on environmental justice requires federal agencies to identify and address any disproportionately high and adverse human health or environmental effects on minority and low income populations. The analysis focuses on potential effects from the project to minority populations, disabled persons, and low-income groups.

After evaluating the discussion in the FEIS, page 252, we have determined that there would be no discernable impacts from any of the alternatives on Native Americans, women, other minorities, or the Civil Rights of any American citizen.

Implementation

Implementation will likely begin in the spring of 2011. We reviewed the FEIS and associated appendices and believe there is adequate information within these documents to provide a reasoned choice of action. We are fully aware of adverse effects that cannot be avoided and believe the risks are outweighed by the benefits. Implementing the selected alternative will cause no unacceptable cumulative impact to any resource.

Minor changes may be needed during implementation to better meet on-site resource management and protection objectives. In determining whether and what kind of further NEPA action is required, we will consider the criteria to supplement an existing Environmental Impact Statement in 40 CFR 1502.9(c) and FSH 1909.15, sec. 18, and in particular, whether the proposed change is a substantial change to the intent of the Selected Alternative as planned and already approved, and whether the change is relevant to environmental concerns. Connected or interrelated proposed changes regarding particular areas or specific activities will be considered together in making this determination. The cumulative impacts of these changes will also be considered.

Minor adjustments to unit boundaries may be needed during final layout for resource protection, to improve logging system efficiency, and to better meet the intent of our decision. Many of these minor

changes will not present sufficient potential impacts to require any specific documentation or action to comply with applicable laws.

Appeal Rights

This decision is subject to appeal pursuant to 36 CFR 215. The 45-day appeal period begins the day following the date the legal notice of this decision is published in *The Bulletin*, Bend, Oregon. Only individuals or organizations that submitted comments during the 45-day comment period, which ran from September 15, 2009 to November 2, 2009, may appeal. Notices of appeal must meet the requirements of 36 CFR 215.14. Appeals can be submitted in several forms, but must be received by the Appeal Deciding Officer, Regional Forester, within 45 days from the date of publication of notice of the decision in *The Bulletin*, Bend, OR. Appeals may be:

1) Mailed to: *Appeal Deciding Officer, Pacific Northwest Region, USDA Forest Service, Attn. 1570 Appeals, PO Box 3623, Portland, OR 97208-3623;*

2) Emailed to: *appeals-pacificnorthwest-regional-office@fs.fed.us.* Please put APPEAL and the project name in the subject line. Electronic appeals must be submitted as part of an actual e-mail message, or as an attachment in Microsoft Word (.doc), rich text format (.rtf), or portable document format (.pdf) only. E-mails submitted to addresses other than the ones listed above or in formats other than those listed above or containing viruses will be rejected. It is the responsibility of the appellant to confirm receipt of appeals submitted by electronic mail. For electronically mailed appeals, the sender should normally receive an automated electronic acknowledgement from the agency as confirmation of receipt. If the sender does not receive an automated acknowledgement of the receipt of the appeal, it is the sender's responsibility to ensure timely receipt by other means;

3) Delivered to: *Pacific Northwest Regional Office, 333 S.W. First Avenue, Robert Duncan Plaza Building, Portland, Oregon 97204-3440* between 7:45 AM and 4:30 PM, Monday through Friday except legal holidays; or

4) Faxed to: *Regional Forester, Attn: 1570 APPEALS at (503) 808-2255.*

Contact Persons / Further Information

Project records are on file at the Bend/Ft. Rock Ranger District office. The Final EIS is also available on the internet at http://www.fs.fed.us/r6/centraloregon/projects/units/bendrock/index.shtml.

For additional information concerning the specific activities authorized with this decision, you may contact:

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Responsible Officials

The Director of the Pacific Northwest Research Station and the Supervisor of the Deschutes National Forest are the officials responsible for deciding the type and extent of management activities in the EXF project area.

/s/ John Allen March 15, 2010

JOHN ALLEN — Date
Forest Supervisor
Deschutes National Forest

/s/ Cynthia West (for) March 15, 2010

BOV EAV — Date
Director
Pacific Northwest Research Station

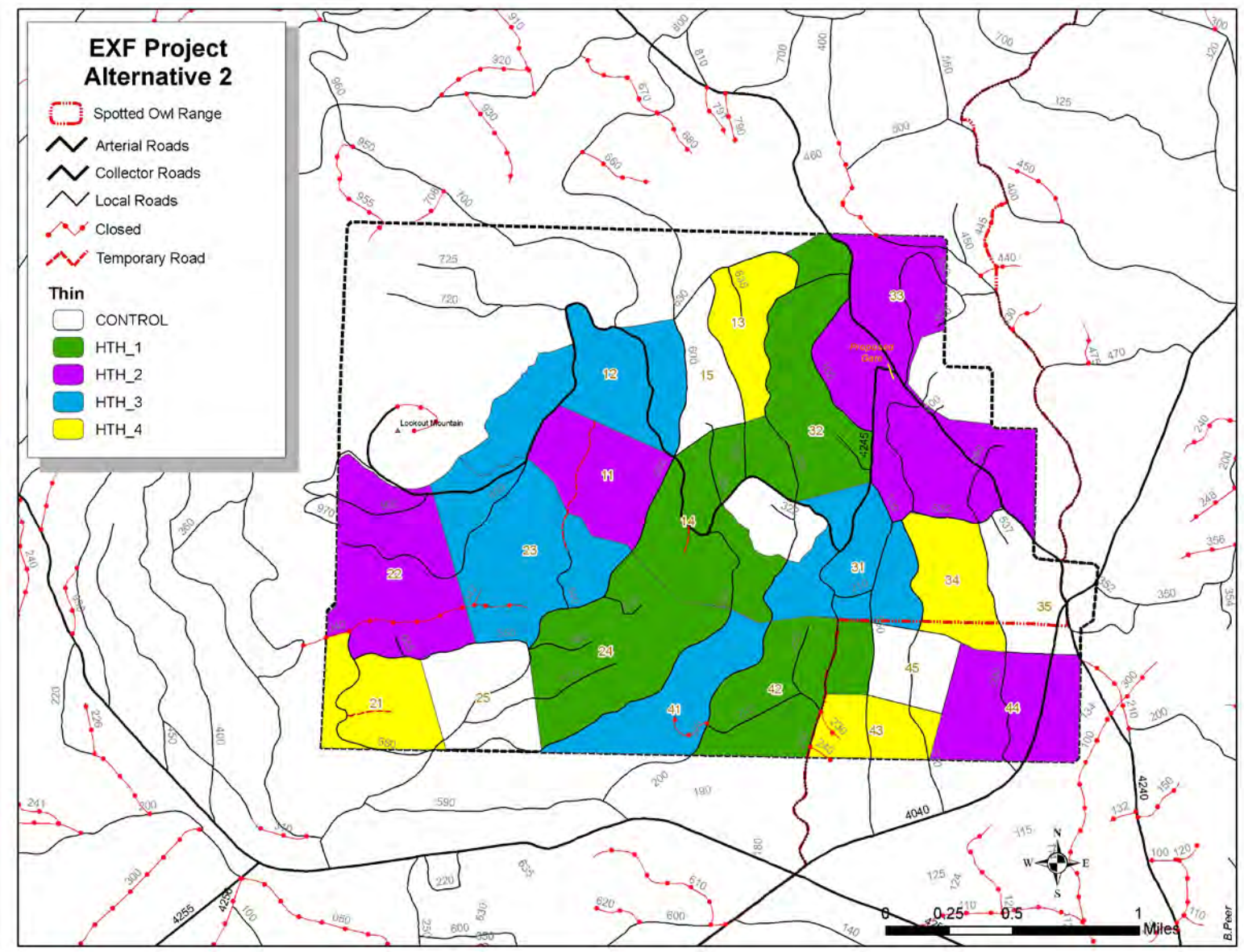

Figure A-1: Alternative 2 Treatment Units, Temp Roads, and Gate Location

APPENDIX A

Resource Protection Measures

We have decided to implement all resource protection measures described for Alternative 2 in the FEIS and we are confident that these measures will adequately prevent adverse effects for the following reasons: 1) the selected measures are practices we have used successfully in the past and 2) they are based on current research (e.g., the snag management approach). These measures will be implemented through project design and layout, contract specifications, contract administration, and monitoring by Forest Service officers.

	Purpose	**Comments**
To protect existing research installations from project activities		
1.	No direct ignition of prescribed fire within a 120-foot buffer around plots within the Levels of Growing Stock study area. Areas to avoid will be flagged. Units: 24, 41, 42	Tree height buffer used in previous projects.
To ensure prescribed fire activities are implemented appropriately		
2.	Conduct prescribed fire in compliance with National Ambient Air Quality Standards, Oregon Department of Environmental Quality regulations and restrictions, and under the Oregon Smoke Management Plan regulations and restrictions.	Federal and state regulation.
3.	Prescribed burning will be conducted under favorable smoke dispersal conditions, to avoid impacts to urban areas and Class I airsheds. Inversion conditions, which would increase the potential for smoke pooling in valleys and drainages, would be avoided during burning operations.	Federal and state regulation.
To protect soil		
4.	In all proposed activity areas, locations for new yarding and transportation systems would be designated prior to logging operations. This includes all log landings, and primary (main) skid trail networks.	LRMP SL-1 & SL-3; Timber Management BMP T-11, T-14 & T-16
5.	*Surface Drainage on Temporary Roads* – minimize the erosive effects of concentrated water through the proper design and construction of temporary roads.	Road BMP R-7
6.	*Road Maintenance* – conduct regular preventive maintenance to avoid deterioration of the road surface and minimize the effects of soil.	Road BMP R-18, R-19
Prescribed Burn Operations		
7.	A burn plan addressing compliance with all applicable LRMP standards and guidelines and Best Management Practices will be completed before the initiation of prescribed fire treatments in planned activity areas. Prescribed burn plans need to include soil moisture guidelines to minimize the risk of intense fire and adverse impacts to the soil resource.	LRMP SL-1 & SL-3; Timber BMP T-2, T-3 & T-13; Fuels Management BMP F-2, F-3

Coarse Woody Debris/Down Wood

8. Retain adequate supplies of coarse woody debris (greater than 3-inches in diameter) to provide organic matter reservoirs for nutrient cycling following the completion of all project activities. It is recommended that a minimum of 5 to 10 tons per acre of CWD be retained on Ponderosa Pine sites, and 10 to 15 tons of CWD per acre should be retained on mixed conifer and lodgepole pine sites to help maintain long-term site productivity. These amounts are less than the recommended levels for wildlife habitat objectives. LRMP SL-1

Maintaining Duff Layer

9. Strive to maintain fine organic matter (organic materials less than 3-inches in diameter; commonly referred to as the duff layer) over at least 65 percent of an activity area (pertains to both harvesting and post-harvest operations). If the potential natural plant community (i.e., site) is not capable of producing fine organic matter over 65 percent of the area, adjust minimum amounts to reflect potential vegetation site capabilities. LRMP SL-6; Fuels Management BMP F-2; Timber Management BMP T-13

Minimize the extent of new soil disturbance from mechanical treatments

10. Implement appropriate design elements for avoiding or reducing detrimental soil impacts from project activities. ***Options include using some or all of the following:***

    - Use existing log landings and skid trail networks (whenever possible) or designate locations for new skid trails and log landings.
    - Maintain spacing of 100 to 150 feet for all primary (main) skid trail routes, except where converging at landings. Closer spacing due to complex terrain must be approved in advance by the Timber Sale Administrator. Main skid trails spaced an average of 100 feet apart limit soil impacts to 11 % of the unit area. For the larger activity areas (greater than 40 acres) that can accommodate wider spacing distances, it is recommended that distance between main skid trials be increased to an average of 150 feet to reduce the amount of detrimentally disturbed soil to 7 percent of the unit area (Froehlich, 1981, Garland, 1983). This would reduce the amount of surface area where restoration treatments, such as subsoiling, would be required to mitigate impacts to achieve soil management objectives.
    - Restrict grapple skidders to designated areas (i.e., roads, landings, designated skid trails) at all times, and limit the amount of traffic from other specialized equipment off designated areas. The use of harvester machines will be authorized to make no more than two equipment passes on any site-specific area to accumulate materials.
    - Avoid equipment operations during times of the year when soils are extremely dry and subject to excessive soil displacement.
    - Avoid equipment operations during periods of high soil moisture, as evidenced by equipment tracks that sink deeper than during dry or

frozen conditions.

- Operate equipment over frozen ground or a sufficient amount of compacted snow to protect mineral soil. Equipment operations should be discontinued when frozen ground begins to thaw or when there is too little compacted snow and equipment begins to cause soil puddling damage (rutting).

11. Prevent additional soil impacts in random locations of activity areas, between skid trails and away from landings, by machine piling and burning logging slash on existing roads and logging facilities that already have detrimental soil conditions.

12. Restrict mechanical disturbance to existing roads and skid trails at all times on portions of activity areas that contain slopes greater than 30 percent. Prohibit any new development of temporary roads and/or designated skid trails on sensitive soils with steep slopes. Require operators to winch logs to skidders with at least 75 feet of bull line. Hand felled trees shall be directionally felled toward pre-approved skid trails, and the leading end of logs shall be suspended while skidding. Exceptions for areas that make up less than 10 percent of an activity area would be subject to Forest Service approval. On slopes steeper than 30 percent, existing skid trails (used by the purchaser) shall be reclaimed by applying appropriate rehabilitation treatments (see *Mitigation* below).

    The following activity areas are proposed for mechanical treatment and contain slopes over 30 percent:

    Alternative 2: Units 11, 12, 14, 22, 23, 24, 32, and 41.

13. Reclaim all temporary roads and some of the log landings and primary (main) skid trails by applying appropriate rehabilitation treatments in activity areas where detrimental soil conditions are expected to exceed the Regional Policy guidelines. Decommission (obliterate) logging facilities that will not be needed for future management. Options for mitigating the effects of project activities include the use of subsoiling equipment to loosen compacted soils on log landings and designated skid trails, redistributing humus-enriched topsoil in areas of soil displacement damage, and pulling available slash and woody materials over the treated surface to establish effective ground cover protection.

    Reclaim all temporary roads and some of the logging facilities in portions of the following activity areas:

    Alternative 2 Units: 13, 14, 21, 22, 23, 24, 31, 32, 33, 34, 41, 42, 43, and 44.

14. Under both action alternatives, reclaim all machine-built fire lines by redistributing displaced topsoil and unburned woody debris over the disturbed surface.

Wildlife

Spotted Owl

To prevent disturbance to nesting birds during breeding season

15.	Should a new spotted owl nest site or activity center be discovered during project implementation, disruptive work activities will not take place and consultation would be re-initiated.	Programmatic BA Project Design Criteria
16.	Prescribed fire managers need to use smoke management forecasts in order to minimize smoke entering into the Three Trappers Butte home range and to ensure that dissipation would be adequate.	Programmatic BA Project Design Criteria

Raptors

To prevent disturbance to nesting birds during breeding season

17. Any active raptor nest stands found during management activities will be protected from disturbing activities within ¼ mile of the nest by restricting site disturbing operations during the following periods: — LRMP WL-3, WL-33, WL-28.

Sharp-shinned hawk	April 15 – August 31
Northern goshawk	March 1 – August 31
Red-tailed hawk	March 1 – August 31
Osprey	April 1 – August 31
Great-grey owl	March 1 – June 30

18. The goshawk nest site in Unit 15 will require a seasonal restriction on disturbing operations during the period of March 1 – August 31.

Units 12, 13, 14, 15.

Snags

19. All existing snags would remain except where snags must be felled for roads, log landings, or occupational safety (including safety during logging and burning operations). Timber Sale Administrators would design harvest operations to avoid snags by locating skid trails and landings away from them, where possible. If snags need to be felled, they are to be retained for down wood. Felled snags may be moved off roads and landings, but not removed from the site.

To Prevent the Introduction and Spread of Invasive Plants

20.	Use clean-equipment contract clauses (local and regional) to minimize risk of introduction and spread of invasive plant species by contractors, for actions that operate outside the limits of the road prism (i.e. bulldozers, skidders, other logging equipment) prior to entering National Forest System Lands.	LRMP standard (Invasive Plant ROD 2005)
21.	Any fill materials should be gathered only at weed-free quarries or other weed-free source sites.	LRMP standard (Invasive Plant ROD 2005)
22.	Minimize soil disturbance and retain native vegetation, in and around	Standard prevention

	project activity areas, to the extent possible consistent with project objectives.	practice
To Preserve Visual Quality		
*The following design features apply to **Units 21 and 22**, which lie adjacent to the Scenic Views Management Area (Partial Retention Foreground), just to the west of the EXF project boundary.*		
23.	Design fuel and vegetation units to minimize ground disturbance and damage to vegetation in units adjacent to partial retention foreground areas (first 150 feet of western boundary).	These measures will ensure the scenery management objectives for views from nearby recreation sites, such as Crane Prairie Reservoir are met by minimizing visual changes at the boundary.
24.	Flush cut stumps to less than 6 inches in height within the first 150 feet of western boundary in units adjacent to partial retention foreground areas.	
25.	Clean-up activities in units adjacent to partial retention foreground areas, including landings, skid trails, and slash piles, should be completed within two years post-treatment.	
26.	Locate slash piles for burning in units that will minimize scorching adjacent to partial retention foreground areas. Limit live crown scorch to < 1/3 tree height. Locate grapple piles on logging facilities.	
27.	Remove visible flagging when unit activities are completed.	
To Protect Cultural Resources		
28.	Coordinate with District Archaeologist during implementation so that project activities avoid the known cultural resource site.	Avoidance per Regional Programmatic Agreement
29.	In the event that previously unknown sites or artifacts are found during project implementation, they will be flagged and operations in the area avoided until an archaeologist is consulted	

Monitoring Common to Both Action Alternatives

Large Tree/ Snag/ Log Retention

This monitoring is proposed in order to assess the validity of some assumptions made about effects of prescribed fire on large live ponderosa pine, snag, and logs. There has been considerable discussions as to the effects of thinning, prescribed burning and the combination on the ultimate creation or removal of these stand elements; most recently in Harrod et al. (2009) showing large tree mortality (snag creation), and loss of existing snags (falling over to become logs) occurring most often in a combination thinning and prescribed burning (spring burning) treatment.

Although past local practices have not shown this type of direct correlation, there is the opportunity under this project to gather local data on this topic. In 2007, pre-treatment plots were established that recorded the number, species, and size (diameter) of the live trees, snags and logs within the project area. These same plots would be examined post-treatments to determine large tree, snag and log retention.

Monitoring Element: Number, species, and size of individual trees, snags, and logs on tenth of an acres plots established within the various treatment blocks.

Type of Monitoring: Implementation Monitoring/Validation Monitoring

Methods/Thresholds: Stand exam procedures used during the establishment and data gathering pre-treatment. Comparisons of data would then be made.

Frequency/Duration/Required action: Once after the completion of all treatments.

Responsibility: Silviculturist, Wildlife Biologist, Fuels Planner

Unintended OHV Use

This monitoring is proposed in order to assess the potential that creation of firelines and temporary roads would attract OHV use post-project implementation. Although the temporary roads would be obliterated, and fire lines will be somewhat disguised by pulling brush over them, the "footprint" of these roads, as well as the ASV-created firelines would remain possibly attracting OHV use in the particular area that it is not currently occurring.

Monitoring Element: Presence/absence of OHV evidence (e.g. tire tracks, newly churned soil)

Type of Monitoring: Implementation Monitoring

Methods/Thresholds: Visual examination of firelines and temporary roads post-project implementation. Evidence of use may warrant signage and patrol to ensure compliance with Access and Travel Management Plan, and Experimental Forest goals and objectives.

Frequency/Duration/Required action: Two to three years after the completion of all treatments.

Responsibility: Roads Manager, Recreation/OHV specialist, Wildlife Biologist, Fuels Planner.

Soils

Monitoring is proposed to ensure the selected alternative, including mitigation measures, are properly implemented on the ground as designed and achieve the desired results.

Soil Quality Objective: To determine if post-project subsoiling mitigation was effectively accomplished and reduced the extent of detrimentally compacted soil in a representative sample of EIS Units.

Monitoring Elements: Surface area treated on temporary roads and primary logging facilities.

Area of Consideration: Individual activity areas (EIS Units).

Suggested Methodology: Combination of visual survey and shovel probing.

Invasive Plants / Noxious Weeds

Monitoring is proposed to ensure the selected alternative, including mitigation measures are properly implemented on the ground for the prevention of invasive plant introduction into an area that currently has none. To determine if prevention measures have effectively prevented introduction of invasive plant species during project implementation.

Monitoring Elements: Presence of invasive plants or noxious weeds.

Area of Consideration: Individual activity area (EIS units), landings, roads used for hauling or equipment movement.

Suggested Methodology: Visual survey. Inspect activity areas and travel routes annually during field season.

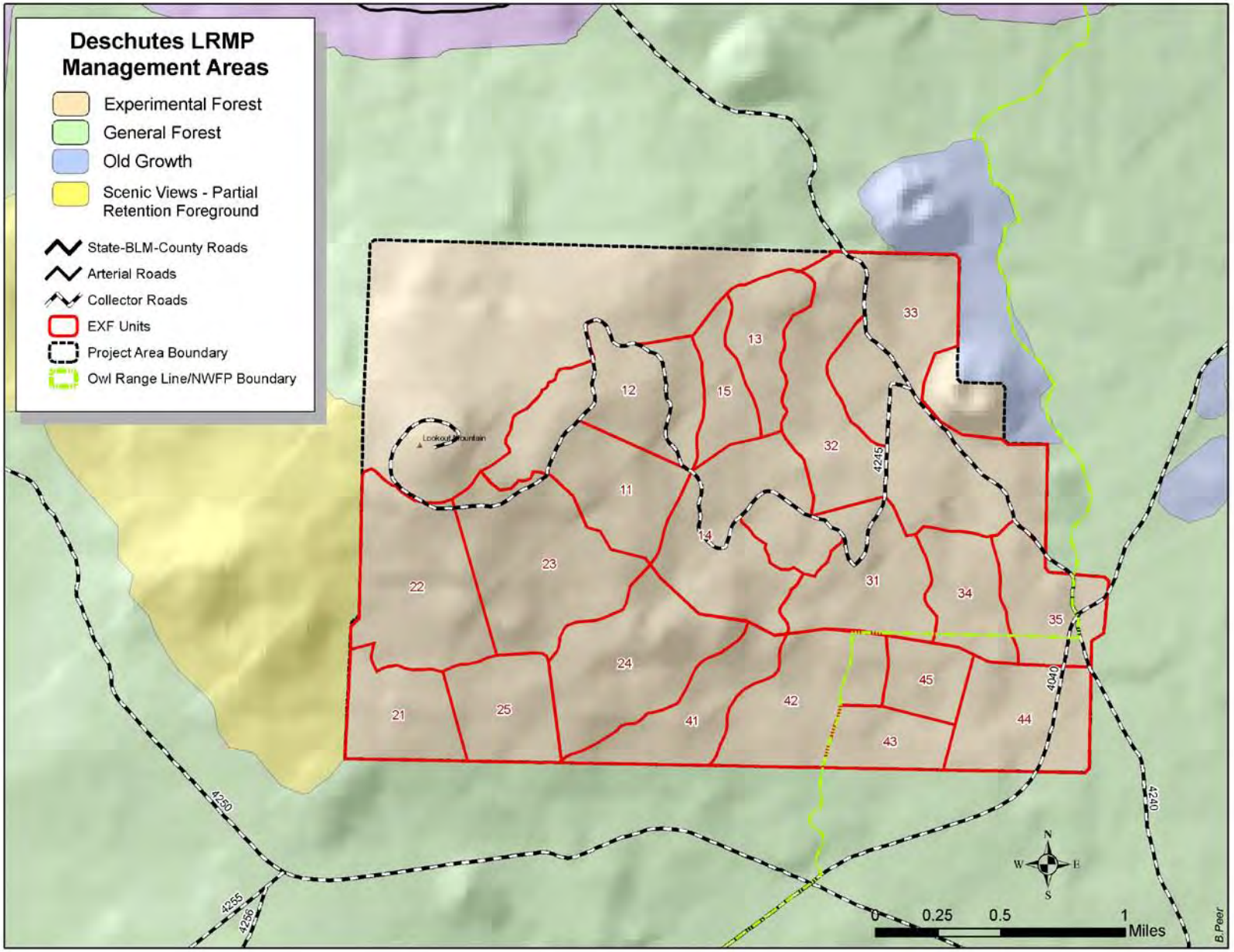

Figure A-2. Deschutes Forest Plan Management Areas

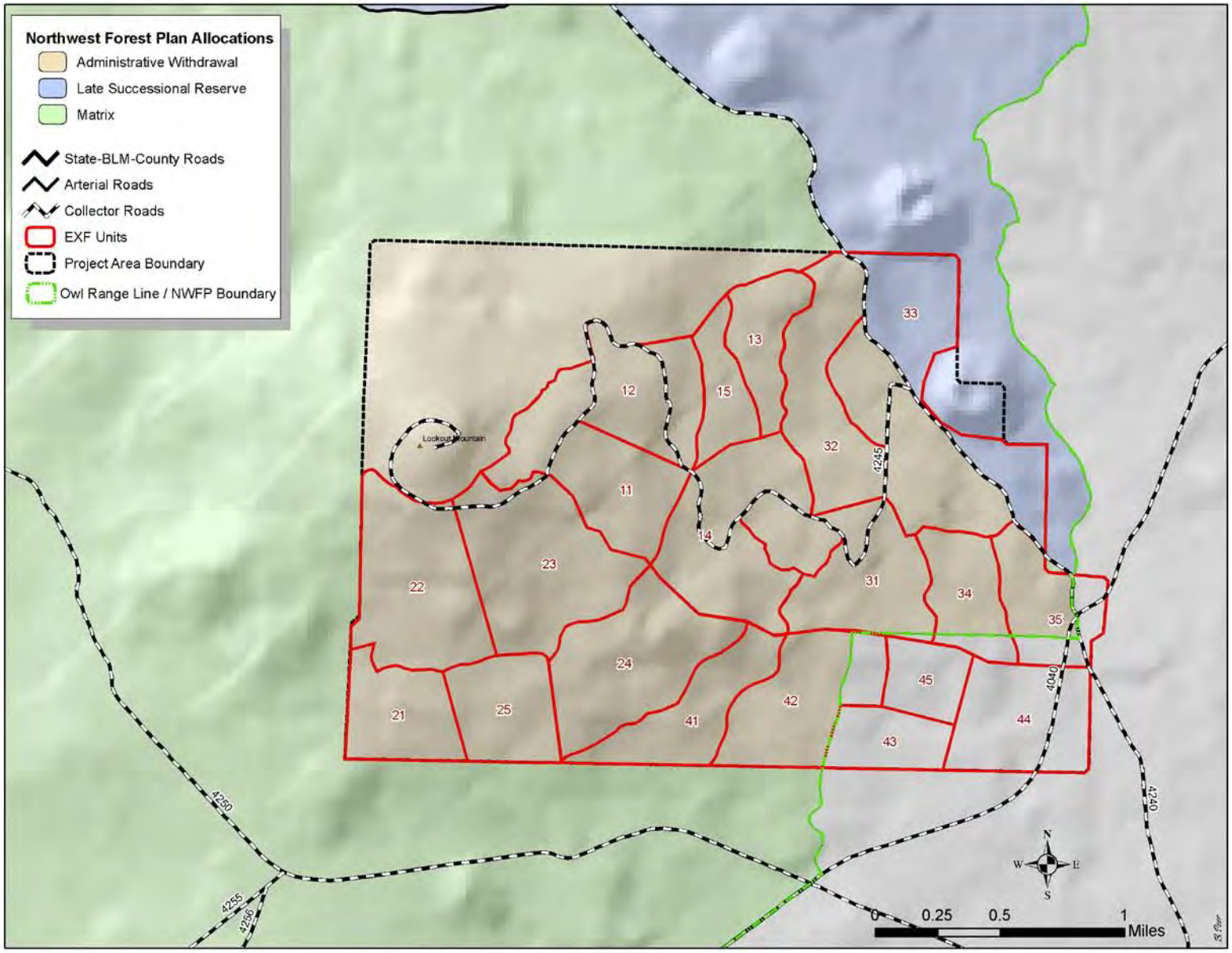

Figure A-3. Northwest Forest Plan Land Allocations.

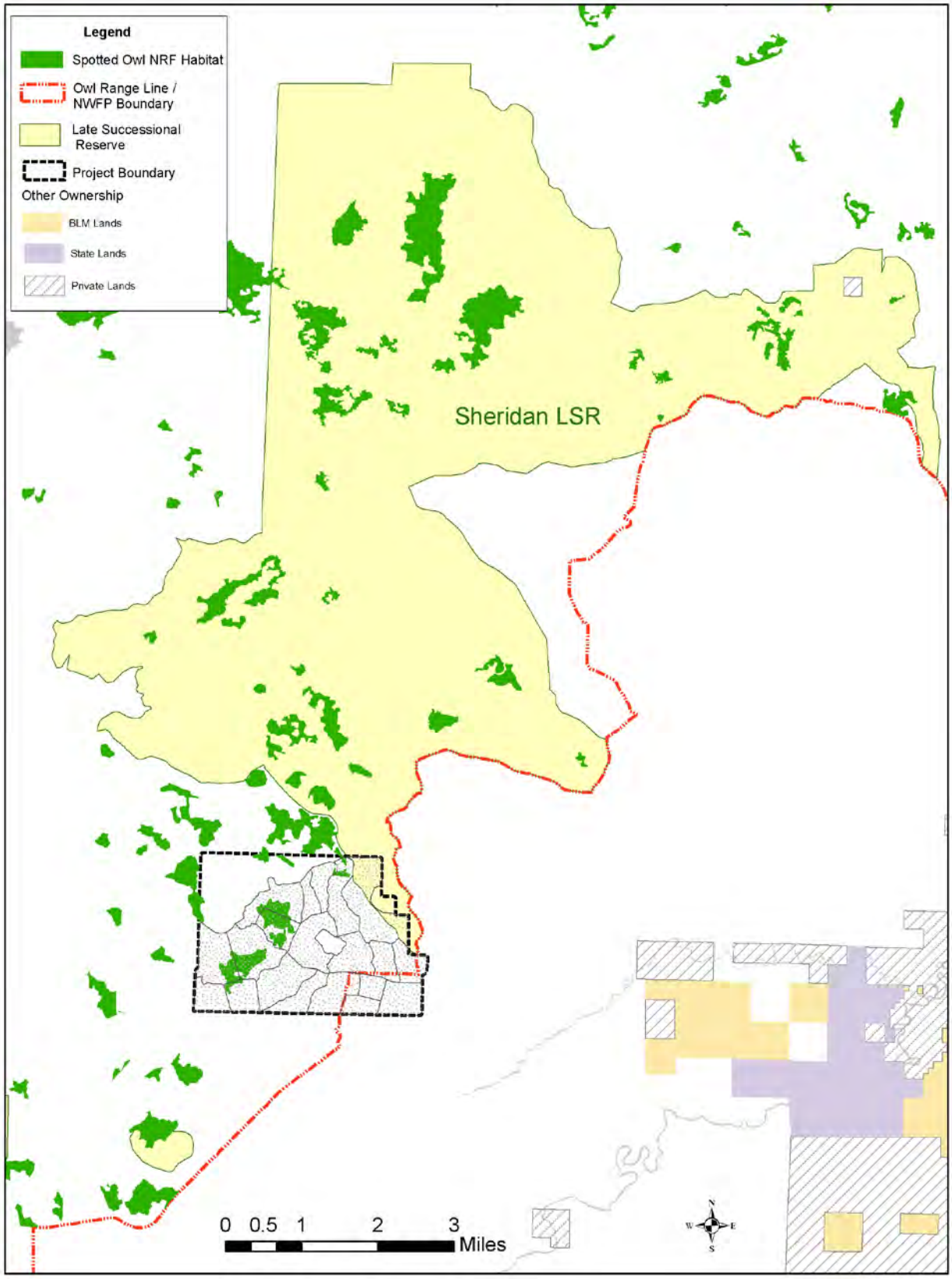

Figure A-4. Project Area in Relation to the Sheridan Late Successional Reserve.