BIOLOGICAL ASSESSMENT of the PROPOSED RESOURCE MANAGEMENT PLAN for WESTERN OREGON

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Appendix A: Management Objectives and Direction

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Appendix C: Forecasting Habitat Change, and Northern Spotted Owl Population Responses, in Washington, Oregon and California

Appendix D: Livestock Grazing

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I. INTRODUCTION

A. SCOPE OF THE ASSESSMENT

The USDI Bureau of Land Management (BLM) prepared this assessment of its Proposed Resource Management Plan/Final Environmental Impact Statement for Western Oregon (Proposed RMP) pursuant to sec. 7(a)(2) of the Endangered Species Act of 1973, as amended (ESA). Approval of the Proposed RMP *may affect* the endangered Gentner's fritillary (*Fritillaria gentneri*), endangered western lily (*Lilium occidentale*), endangered Cook's lomatium (*Lomatium cookii*), endangered rough popcornflower (*Plagiobothrys hirtus*), endangered Taylor's checkerspot (*Euphydryas editha taylori*), endangered Fender's blue butterfly (*Icaricia icarioides fenderi*), endangered gray wolf (*Canis lupus*), Lower Columbia River Distinct Population Segment of the endangered Columbian white-tailed deer (*Odocoileus virginianus leucurus*), threatened Kincaid's lupine (*Lupinus sulphureus ssp. kincaidii*), threatened Nelson's checker-mallow (*Sidalcea nelsoniana*), threatened vernal pool fairy shrimp (*Branchinecta lynchi*), threatened Oregon spotted frog (*Rana pretiosa*), threatened marbled murrelet (*Brachyramphus marmoratus*), threatened western snowy plover (*Charadrius alexandrinus nivosus*) and threatened northern spotted owl (*Strix occidentalis caurina*). In addition, approval of the Proposed RMP *may affect* the critical habitats of the Cook's lomatium, vernal pool fairy shrimp, marbled murrelet, western snowy plover and northern spotted owl.

Approval of the Proposed RMP would have *no effect* on the endangered Applegate's milk-vetch (*Astragalus applegatei*), endangered Willamette daisy (*Erigeron decumbens var. decumbens*), endangered large-flowered woolly meadowfoam (*Limnanthes pumila* var. *grandiflora*), endangered Steller's sea lion (*Eumetopias jubatus*), threatened Bradshaw's desert-parsley (*Lomatium bradshawii*), threatened golden paintbrush (*Castilleja levisecta*), threatened water howellia (*Howellia aquatilis*), threatened Oregon silverspot butterfly (*Speyeria zerene hippolyta*) and the threatened streaked horned lark (*Eremophila alpestris strigata*) because these species are neither known nor suspected to occur in the **action area**, nor would they be affected by approval of the Proposed RMP. In addition, approval of the Proposed RMP would have *no effect* on the critical habitats of the Taylor's checkerspot, Fender's blue butterfly, Kincaid's lupine, Oregon silverspot butterfly, Willamette daisy, large-flowered woolly meadowfoam, Steller's sea lion and streaked horned lark because these critical habitats are neither delineated in the **action area** nor would they be affected by approval of the Proposed RMP.

The U.S. Fish and Wildlife Service proposed to list the fisher (*Martes pennant*) under the ESA (79 FR 60419 – 60443) and to designate critical habitat for the Oregon spotted frog (78 FR 53538 – 53579). The ESA requires the BLM to conference with the Service on actions that are likely to jeopardize a proposed species or adversely modify proposed critical habitat. Because the BLM does not determine jeopardy or adverse modification, BLM policy is to confer with the Service on discretionary actions that *may affect and are likely to adversely affect* a proposed species or proposed critical habitat (BLM Manual 6840.1F6).

B. INCIDENTAL TAKE

The BLM does not request an incidental take permit. As described in Section II A of this assessment, approval by the BLM of the Proposed RMP would be a "mixed programmatic action" as defined by 50 CFR §402.02 (77 FR 26844). As described in Section II A, the Proposed RMP directs actions to survey for, and monitor, the Taylor's checkerspot, Fender's blue butterfly, vernal pool fairy shrimp, Oregon spotted frog, western snowy plover and northern spotted owl, and such actions may affect those species. However, the necessary taking of individuals, as directed by Proposed RMP management actions, would be authorized by separate recovery permitting processes. BLM actions to survey for, and monitor, the gray wolf, Columbian white-tailed deer and marbled murrelet would not cause the incidental taking of individuals of those species because survey and monitoring methods do not require biologists to intrude into sensitive areas, collect or handle individuals, or elicit a species' response.

C. EXCLUSIONS

This assessment does not address the effects of scientific research, including scientific take. The BLM addresses research-related effects through separate processes.

This assessment does not address the effects of propagating federally-listed plants in the **action area**, or in association with the proposed action, with respect to seed collection, growth or transplant, as the BLM addresses such effects through separate processes.

No actions are interrelated to, or interdependent on, approval and implementation of the Proposed RMP in that the BLM has no evidence, knowledge or expectation that approval and implementation of the Proposed RMP would cause actions on, or alter the management of, non-BLM- administered lands or resources in the RMP **planning area**. There are no actions of which the BLM is aware that "have no independent utility apart from" the Proposed RMP, nor "any actions that are part of the larger action," in this case the Proposed RMP, "and depend on" the Proposed RMP "for their justification." (50 CFR §402.02)[1].

D. DEFINITIONS

- **Action area** refers to the subset of lands in the **planning area**, including subsurface minerals, for which the BLM has authority to make land use and management decisions (**Figure I-1**), and all areas affected directly or indirectly by approval of the Proposed RMP (50 CFR §402.02). In general, the BLM has jurisdiction over all BLM-administered lands (surface and subsurface) and over subsurface minerals in areas of split estate (*i.e.*, areas where the BLM administers Federal subsurface minerals, but the surface is not administered by the BLM). Also see Section II C of this assessment.
- **Disturbance**: A human action that *may affect* a federally-listed animal species by the addition, above ambient condition, of noise or human intrusion, or the mechanical movement of habitat (*e.g.*, the shaking of the forest canopy from helicopter rotor wash). **Disturbance** is temporary/short term (minutes to days) and does not modify habitat structure, or water/air flow or quality. (**Disturbance** should not be confused with "surface disturbance," which refers to an action that modifies soil, water or vegetation.) **Disturbance** requires the presence of a listed animal.
- **Disruption**: A type of **disturbance** that that creates the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. **Disruption** is a subset of **disturbance**. An action that would **disrupt**

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[1] The BLM approved its 1995 RMPs for western Oregon to be consistent with the Northwest Forest Plan, which the BLM and the U.S. Forest Service had developed collaboratively to amend both the existing BLM RMPs and U.S. Forest Service Land and Resource Management Plans. Thus, the BLM plan amendments and the U.S. Forest Service plan amendments were part of a larger action that depended on the larger action for their justification . This is not the case with BLM approval of the Proposed RMP because the U.S. Forest Service has not indicated that it will change its management as a result of BLM approval of the Proposed RMP or in collaboration with the BLM. The U.S. Forest Service has identified that they will soon begin planning processes for the national forests in western Oregon, but their planning processes will be entirely independent of the BLM planning process or approval of the Proposed RMP. Any U.S. Forest Service plan amendments or revisions will not occur for many years after approval of the Proposed RMP, and the eventual substance of those amendment or revisions is entirely speculative. The BLM has no history indicating that approval of the Proposed RMP would alter the management of adjacent federal, State or private lands.

In the Proposed RMP socio-economic analysis, the BLM assumed, as *reasonably foreseeable* under the NEPA, that increased timber production on BLM-administered land generally would be balanced by a decrease in timber production on other lands in western Oregon. However, the BLM did not have evidence of this or speculate which lands would be affected or by how much. Such assumed decreases, although *reasonably foreseeable* under the NEPA, are speculative and, therefore, are not *reasonably certain to occur* under the ESA.

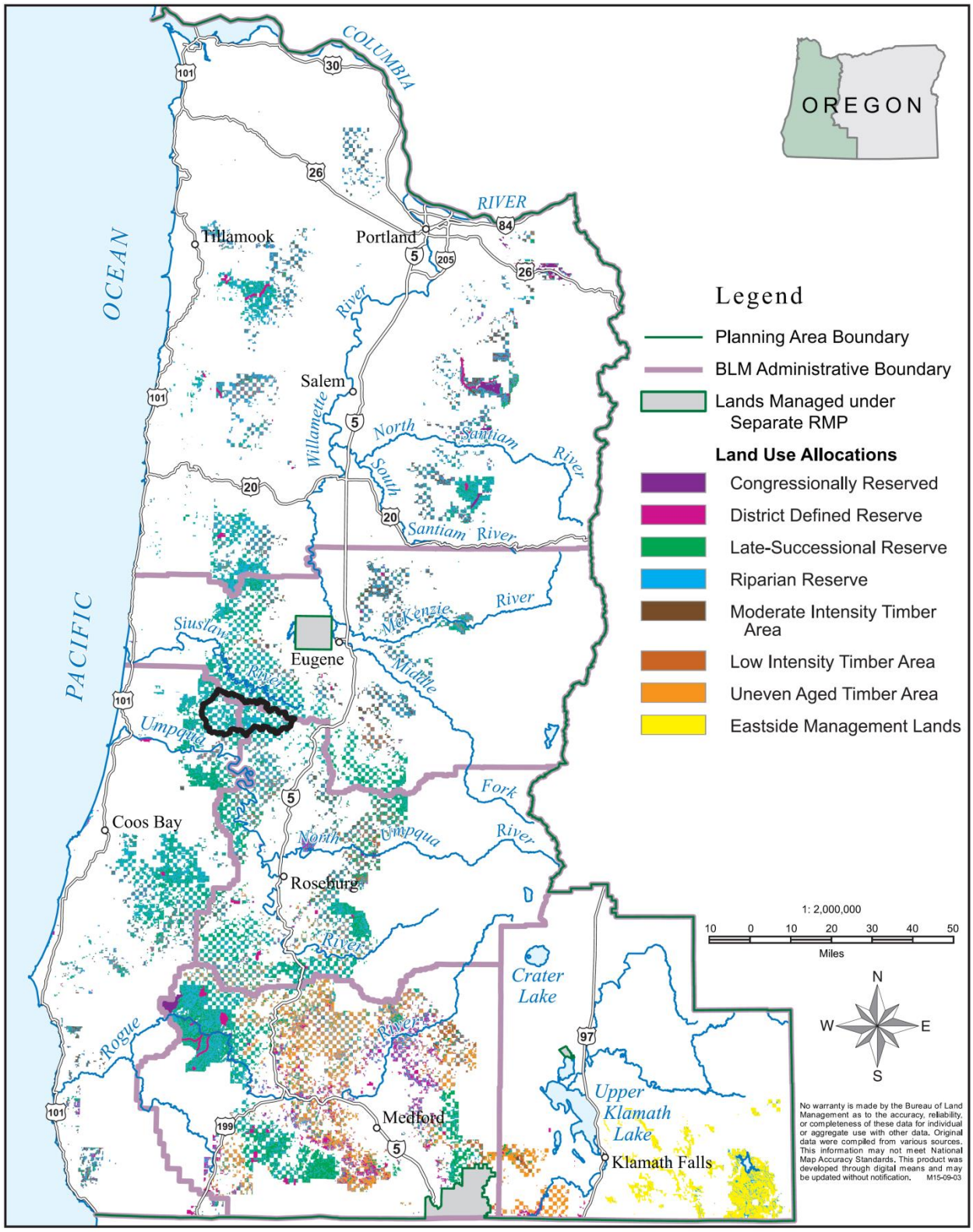


Figure I-1. The Proposed RMP **planning area** and **action area**. The **action area** is delineated by the proposed land use allocations.

- the normal behavior of a listed species *may affect, and would be likely to adversely affect*, the species and likely would cause the taking of affected individual(s).
- **Maintain marbled murrelet habitat** refers to a silvicultural activity that changes a conifer forest stand but maintains structural characteristics such that the stand continues to support marbled murrelet nesting opportunities. Wildfire suppression and activities needed to protect the overall health of the stand or adjacent stands, such as fuels reduction and insect and disease control, may occur even if they remove marbled murrelet habitat.
- **Maintain northern spotted owl nesting-roosting habitat** refers to a silvicultural activity that changes a conifer forest stand but maintains structural characteristics such that the stand continues to support the same northern spotted owl life history requirements: nesting-roosting habitat continues to support northern spotted owl nesting-roosting. Scientific findings support the idea that conifer forest stands can be altered in a manner that does not necessarily change their use by northern spotted owls (see the summary in the *Revised Recovery Plan for the Northern Spotted Owl*, USDI FWS 2011, p. III-15). Although structural characteristics vary across the northern spotted owl's range, northern spotted owl nesting-roosting habitat generally is characterized by conifer stands with a multi-layered, multispecies canopy dominated by large (>30" diameter at breast height) conifer overstory trees, and an understory of shade-tolerant conifers or hardwoods, ≥60 percent canopy cover, substantial decadence in the form of large, live conifer trees with deformities (such as cavities, broken tops, and dwarf mistletoe infections; numerous large snags), ground cover characterized by large accumulations of logs and other woody debris, and a canopy that is open enough to allow northern spotted owls to fly within and beneath it. Wildfire suppression and activities needed to protect the overall health of the stand or adjacent stands, such as fuels reduction and insect and disease control, may occur even if they downgrade or remove northern spotted owl habitat.
- **Marbled murrelet occupied stand** refers to all forest stands, regardless of age or structure, within ¼ mile (1,320 feet) of the location of marbled murrelet behavior indicating occupancy and not separated from the location by more than 328 feet of non-forest.
- **Planning Area** refers to all lands within the geographic boundary of the Proposed RMP planning effort (**Figure I-1**) regardless of ownership or jurisdiction. However, the BLM would make decisions only for lands and resources that fall under BLM jurisdiction (including subsurface minerals).
- **Protect the plants addressed by this assessment** means: (1) manage each species in a manner that is consistent with pertinent recovery plans, conservation agreements, species management plans, designated critical habitat final rules, and species/project-specific conservation measured developed with the U.S. Fish and Wildlife Service, including the protection and restoration of habitat, altering the type, timing and intensity of actions, and implementing strategies to recover populations, (2) manage species' habitats to maintain species' populations, (3) prior to implementing actions that could result in habitat modification or species disturbance in the suitable habitat of any species, conduct surveys to determine species presence, and (4) conduct additional surveys on BLM-administered lands for species within suitable habitat to find new populations.
- **Protect the Fender's blue butterfly, Taylor's checkerspot. vernal pool fairy shrimp, Oregon spotted frog, Lower Columbia River Distinct Population Segment of the Columbian white-tailed deer, and western snowy plover** means: (1) to manage the species in a manner that is consistent with the approved species' recovery plan, survey and monitoring protocol, any site-specific conservation agreement or species management plan and species/project-specific conservation measured developed with the U.S. Fish and Wildlife Service, (2) to not approve, fund or carry out an action that would adversely affect the species unless the action is done in accordance with the approved species' recovery plan, survey and monitoring protocol, and any site-specific conservation agreement or species management plan, and the action is necessary for the conservation of the species.
- **Protect the critical habitats of the Cook's lomatium, vernal pool fairy shrimp and western snowy plover** means: to not approve, fund or carry out an action that would adversely affect critical

habitat except when (1) the action is done in accordance with the approved species' recovery plan, critical habitat final rule and species/project-specific conservation measured developed with the U.S. Fish and Wildlife Service, and (2) the action is necessary for the conservation of the species.

- **Protect older, structurally-complex forest** means to prohibit harvesting activities in a conifer forest stand except as provided in this definition. Harvesting activities are limited to the following: felling of live or dead hazard trees and logs for streams, the construction, modification, maintenance and removal of linear and nonlinear rights-of-way, spur roads, yarding corridors or other facilities, as long as the forest stand continues to support the same northern spotted owl and marbled murrelet life history requirements: northern spotted owl nesting-roosting habitat continues to support northern spotted owl nesting-roosting; northern spotted owl dispersal habitat continues to support northern spotted owl movement and survival; and marbled murrelet nesting habitat continues to support marbled murrelet nesting. Wildfire suppression and activities needed to protect the overall health of the stand or adjacent stands, such as fuels reduction and insect and disease control, may occur even if they downgrade or remove northern spotted owl habitat or remove marbled murrelet habitat.
- **Protect marbled murrelet occupied stands** means to prohibit activities in the occupied stand except for the felling of live or dead hazard trees, felling trees for habitat restoration, the construction of linear and nonlinear rights-of-way, spur roads, yarding corridors or other facilities, as long as the occupied stand continues to support marbled murrelet nesting. Wildfire suppression and activities needed to protect the overall health of the stand or adjacent stands, such as fuels reduction and insect and disease control, would be allowed, as long as the occupied stand continues to support marbled murrelet nesting. Actions needed to combat sudden oak death would be allowed even when they remove occupied habitat.
- **Retain untreated portions within the stand where fisher natal or maternal denning or dens are documented** means to include such sites in skips in the Harvest Land Base as described in the management direction for the Low Intensity Timber Area (pages A-9 – A-10), Moderate Intensity Timber Area (pages A-10 – A-12) and Uneven-Aged Timber Area (pages A-12 – A-13).

E. CONSULTATION HISTORY

On June 30, 2015 the BLM provided the U.S. Fish and Wildlife Service with its evaluation of the Preferred Alternative of the Draft Resource Management Plan/Draft Environmental Impact Statement for Western Oregon (USDI BLM 2015). The BLM prepared that evaluation in partial fulfillment of BLM mandates under ESA sec. 7(a)(1). The Service provided its review of the BLM assessment on December 17, 2015. The BLM addressed the Service's recommendations with the Service's designated representatives. Here the BLM summarizes those recommendations and the subsequent BLM decisions as reflected in the Proposed RMP.

- The Service asked that, when proposed activities would be confined to specific BLM administrative units, the BLM clearly define those units to facilitate the Service's review. In this assessment, the BLM provides the requested clarifications.
- The Service asked that the BLM more clearly define how it proposes to protect federally-listed plants in the Harvest Land Base. The BLM provided a definition for **protect the plants addressed by this assessment** in Section I D of this assessment.
- The Service requested clarification regarding how the BLM would conduct surveys for, and monitor, the species and proposed and designated critical habitats addressed by this assessment. The BLM states here that all survey and monitoring addressed by this assessment would be done by professional biologists or botanists, as appropriate, and in accordance with approved survey and monitoring protocols, as applicable. In the absence of approved survey and monitoring protocols (e.g., fisher), the BLM would seek the advice of the Service prior to implementing actions.
- The Service indicated that the BLM assessment did not address anticipated effects to the critical habitats of Fender's blue butterfly, Taylor's checkerspot butterfly, Oregon silverspot butterfly or Kincaid's lupine. The BLM augmented its analysis to address effects to the critical habitats of Cook's

lomatium, Kincaid's lupine, Taylor's checkerspot, Fender's blue butterfly, vernal pool fairy shrimp, and marbled murrelet, and the proposed critical habitat of the Oregon spotted frog. As stated in Section I A of this assessment, critical habitat for the Oregon silverspot butterfly does not occur in the action area and would not be affected by approval or implementation of the Proposed RMP.

- The Service recommended that the BLM adopt, for the Proposed RMP, the BLM definition of "structurally-complex forest stands" in Alternative B. The BLM implemented the Service's recommendation.
- The Service asked that the BLM invite the Service to participate in the preparation or revision of management plans for Areas of Critical Environmental Concern that have federally-listed or proposed species or critical habitats among their relevant and important values. The BLM will invite the requested collaboration as it prepares or revises such management plans.

1. Gentner's Fritillary
The Service listed the conservation measures included in existing biological opinions, but made no recommendation.

2. Western Lily
The Service made specific management recommendations to contribute toward the conservation and recovery of western lily. Management direction common to all alternatives would require the BLM to manage Federally-listed plant species consistent with recovery plans and designated critical habitat, including the protection and restoration of habitat; altering the type, timing, and intensity of actions, and other strategies designed to recover populations of species. The Proposed RMP includes that management direction and additional management direction designed to contribute to the conservation and recovery of all Federally-listed plant species, including western lily. The proposed management direction would require the BLM to manage habitat to maintain populations of Federally-listed, proposed, and candidate plant species and to maintain or restore natural processes, native species composition, and vegetation structure in natural communities. Thus, the BLM fully addressed the recommendations of the Service.

3. Cook's Lomatium and its Critical Habitat
The Service listed the conservation measures included in existing biological opinions, but made no recommendation.

4. Rough Popcornflower
The Service offered no comment or recommendation.

5. Kincaid's Lupine

- The Service recommended that the BLM clarify how it would protect known populations. In Section I D of this assessment the BLM defined **protect the plants addressed by this assessment**.
- The Service recommended that the BLM state if known populationsoccur in forested areas of the Late-Successional Reserve and how forest ingrowth might affect the species. The BLM provides this information in Section IV F 3a.

6. Nelson's Checker-mallow
The Service offered no comment or recommendation.

7. Taylor's Checkerspot
The Service recommended that the BLM revise its analysis to include oak savannah and openings in wooded areas as modeled habitat for Taylor's checkerspot. The BLM adopted the Service's recommendation and incorporated oak woodlands into Section III G.

8. Fender's Blue Butterfly

- In its assessment, the BLM made a preliminary determination of *may affect, but not likely to adversely affect*, for habitat restoration and maintenance (i.e. under Invasive Species management direction). However, the Service recommended that the BLM make a *may affect, likely to adversely affect*, determination based on the inability of blue butterfly larvae to escape restoration activities (e.g. burning and mowing). The BLM adopted the Service's recommendation and modified its effects determination and supporting rationale.
- The Service recommended that the BLM define "survey and protect." The BLM clarified "survey for and monitor" at the beginning of Section I E of this assessment. In Section I D the BLM defined **protect the Fender's blue butterfly, Taylor's checkerspot. vernal pool fairy shrimp, Oregon spotted frog, Lower Columbia River Distinct Population Segment of the Columbian white-tailed deer, and western snowy plover**.
- The Service recommended that the BLM include language to require surveyors of Fender's blue butterfly to be permitted in accordance with ESA section 10(a)(1)(A). ESA sec. 10(a)(1)(A) does not address technical standards for surveyors, only the regulatory process to control and account for incidental takings. The management direction of the Proposed RMP would require the BLM, before implementing actions in suitable habitat that could affect the Fender's blue butterfly, to conduct surveys to determine species presence and, if found to be present, to not approve, fund, or carry out actions that would adversely affect the species. The BLM would employ fully trained and qualified biologists and botanists to survey for the blue butterfly and its host plant, Kincaid's lupine. The BLM would conduct those surveys in accordance with the best-available science and survey protocols. The current consultation, of which this assessment is a part, implements the ESA sec. 10(a)(1)(A) process.

9. Oregon Silverspot Butterfly

In its assessment, the BLM made a preliminary determination of *may affect, but not likely to adversely affect*. However, the Service recommended that the BLM make a *no effect* determination based on the lack of evidence that the Oregon silverspot occurs in the **action area** or would be affected by the Proposed RMP. After reviewing its baseline information, the BLM adopted the Service's recommendation and excluded the Oregon silverspot from this assessment.

10. Vernal Pool Fairy Shrimp and its Critical Habitat

The Service recommended that the BLM implement specific actions to protect and restore fairy shrimp habitat, and to minimize the potential adverse effects to fairy shrimp habitat and critical habitat during habitat restoration activities. The BLM determined that, since the Proposed RMP addresses overall program objectives, as opposed to the specific means to achieve those objectives, as recommended by the Service, the inclusion of the actions recommended by the Service are best addressed by the BLM during project planning, which would be subject to ESA sec. 7(a)(1) consultation with the Service. The management direction of the Proposed RMP would require the BLM, prior to implementing actions that could result in habitat modification or species disturbance in habitat for the vernal pool fairy shrimp, to conduct surveys to determine species presence, to not approve, fund, or carry out actions that would adversely affect the vernal pool fairy shrimp except when done in accordance with an approved recovery plan, conservation agreement, species management plan, survey and monitoring protocol, or critical habitat rule, and when the action is necessary for the conservation of the species, and to not approve, fund, or carry out actions that would adversely affect the designated critical habitats of the vernal pool fairy shrimp except when done in accordance with an approved recovery plan, conservation agreement, species management plan, survey and monitoring protocol, or critical habitat rule, and when the action is necessary for the conservation of the species.

11. Oregon Spotted Frog and its Proposed Critical Habitat

The Service recommended that the BLM (1) limit its definition of Oregon spotted frog habitat to habitat formerly occupied by spotted frogs, and within 3.1 miles upstream or downstream along a wetted

environment of proposed critical habitat, (2) not exclude from its definition patches of wetland habitat less than 2.5 acres in size, (3) survey habitat within 3.1 miles upstream and 6.2 miles downstream before implementing projects that would adversely affect spotted frogs, (4) protect all occupied sites by maintaining water quality, flow and temperature, and by excluding late season livestock grazing from shallow pool environments, and (5) minimize or end livestock grazing in occupied sites. The BLM adopted Service recommendations (1), (2), (4) and (5) above. Regarding recommendation (3), the Proposed RMP does not state specific distances, as those are subject to change based on new science. Instead, the Proposed RMP includes management direction that would require the BLM, prior to implementing actions that could result in habitat modification or species disturbance in habitat for the spotted frog, to conduct surveys to determine species presence, and to not approve, fund, or carry out actions that would adversely affect the spotted frog except when done in accordance with an approved recovery plan, conservation agreement, species management plan, survey and monitoring protocol, or critical habitat rule, and when the action is necessary for the conservation of the species.

12. Gray Wolf

- The Service recommended that the BLM modify its proposed seasonal restriction for activities within one mile of an active den from April 30th through August 15th to April 1st through July 15th. The BLM adopted the Service's recommendation.
- The Service recommended that the BLM include management direction to reduce potential livestock-wolf conflicts in active grazing allotments. The BLM adopted the Service's recommendation (see pages A-54 and A-55 of this assessment).

13. Lower Columbia River Distinct Population Segment of the Columbian White-tailed Deer

The Service recommended that the BLM narrow its definition of the range of this population segment on BLM-administered lands to Sauvie Island and nearby areas based on current knowledge of the population and movements. The BLM adopted the Service's recommendation.

14. Fisher

- In its assessment, the BLM made a preliminary determination of *may affect, but not likely to adversely affect,* fisher in the Harvest Land Base land use allocations. However, the Service recommended that the BLM make a *may affect, likely to adversely affect*, determination based on the potential that timber harvest could occur at or near undiscovered fisher dens and would remove habitat. The BLM adopted the Service's recommendation.
- The Service recommended that the BLM maintain management flexibility with management direction that did not limit direction regarding fisher only to places where they are currently known, but instead to where they are known and discovered in the future. The BLM adopted the Service's recommendation.
- The Service recommended that the BLM expand its analysis to include portions of the planning area where the Service is considering fisher reintroductions. The BLM rejected the Service's recommendation because, without a decision by the Service to proceed with a reintroduction, areintroduction is speculative and does not meet the definitions of *reasonably foreseeable* under the NEPA or *reasonably certain to occur* under the ESA. Thus, the possibility of reintroduction is not addressed by this assessment. If the Service decides to reintroduce fisher, the BLM would address the effects of its actions on the species, as warranted, through separate ESA sec. 7 conferencing/consultation(s).
- The Service recommended looking at different strategies and analyses from the U.S. Forest Service for different effects analysis approaches. The BLM reviewed the available strategies, revised the proposed management direction in the Proposed RMP accordingly, and added a forecast of the fisher population in the planning area to its effects analysis.The Service recommended that the BLM remove

a reference to the Rocky Mountain distinct population segment as the information does not pertain to the west coast distinct population segment. The BLM removed the reference and information.

- The Service recommended that the BLM develop and implement a protocol to survey for denning and natal sites. The BLM does not normally develop such protocols but, instead, participates in interagency processes that involve outside species subject-matter experts and implements only those protocols that are accepted by the Service.
- The Service questioned what the BLM meant by "retain known natal and maternal sites." In Section I D of this assessment, the BLM defined **retain untreated portions within the stand where fisher natal or maternal denning or dens are documented**.
- The Service recommended that, within seven key sub-basins, the BLM decrease its standard for conifer retention from ≥ 36 inches diameter at breast height, and dead hardwood retention from ≥ 24 inches diameter at breast height, in both cases, to 11 to 14 inches diameter at breast height. The BLM determined that ≥ 24 inches diameter at breast height (page A-54) for both metrics and its management direction to **retain untreated portions within the stand where fisher natal or maternal denning or dens are documented**, met its management objectives.
- The Service questioned the BLM's *no effect* determination for livestock grazing as potentially in conflict with recent determinations by the BLM Medford District. The BLM reviewed information from the Medford District and provides the rationale for its determination in Section III N 7 of this assessment. A determination of the effects of implementing RMP management direction does not necessarily preclude or modify a determination of the effects of implementing a specific project in accordance with that management direction (e.g., RMPs do not always preclude or address actions that might affect a species).

15. Marbled Murrelet and its Critical Habitat

- The Service recommended that the BLM require pre-project surveys of suitable habitat in marbled murrelet zone 2 and protect occupied forest stands. The Service also expressed concern that the primary constituent elements of marbled murrelet critical habitat would be adversely affected by moderate- and low-intensity timber harvest and uneven-aged management. The BLM discussed these issues with the Service and expanded its protection area in zone 2 to all suitable habitat outside the Harvest Land Base. The BLM proposes to include 3.0 percent of murrelet nesting habitat in the Harvest Land Base in zone 2; the remaining 97.0 percent would be in a reserve or would receive pre-project survey and be protected if occupied. The BLM proposes to include 8.3 percent of critical habitat on its administered lands in the Harvest Land Base in zone 2 or 3.0 percent of the total subunit acreage for those critical habitat subunits that are coincident with BLM-administered lands. The remaining 91.7 percent of critical habitat on BLM-administered lands (or 97.0 percent of the entire subunit acreage) would be in a reserve or would receive pre-project survey and be protected if occupied. The BLM also developed with the Service management guidance to avoid or delay the loss of habitat associated with northern spotted owl known sites, which should include substantive portions of murrelet suitable habitat in zone 2. Therefore, the BLM determined that its proposed management of murrelet nesting habitat and critical habitat was sufficient in light of the status of the species and the BLM's other federal mandates.
- The Service recommended that the BLM expand its protection of occupied forest stands to include all forest habitat within 300 feet of occupied stands. The BLM implemented the Service's recommendation.
- The Service recommended that the BLM clarify its definition of an **occupied marbled murrelet stand** to avoid confusion with a survey site as defined by the Pacific Seabird Group survey protocol. The BLM and Service collaborated on the proposed definition (see Section I D of this assessment).
- The Service recommended that the BLM manage nesting structure in younger stands in a manner consistent with the North Coast Level 2 Policy. The BLM and Service collaborated on the proposed management direction (see pages A-55 – A-57 of this assessment).

16. Western Snowy Plover and its Critical Habitat
The Service recommended that the BLM include a set of conservation measures in its Proposed RMP to adequately protect snowy plovers and their critical habitat in the New River ACEC and the Coos Bay North Spit. The BLM re-designated both ACECs and adopted the Service's recommendation and included management direction to not approve, fund, or carry out actions that would adversely affect snowy plovers or their designated critical habitat, except when done in accordance with an approved recovery plan, conservation agreement, species management plan, survey and monitoring protocol, or critical habitat rule, and when the action is necessary for the conservation of the species. In addition, the BLM would not authorize or construct additional discretionary roads and trails within designated critical habitat for the snowy plover or within snowy plover habitat.

17. Northern Spotted Owl and its Critical Habitat
The Service recommended that the BLM maintain and develop northern spotted owl habitat in the **action area** to the extent possible, emphasizing currently occupied nest sites and nest sites with a high potential for re-occupancy if the Service implements a barred owl management program. As shown in Section III P 3f of this assessment, under the Proposed RMP the BLM would maintain and develop habitat to the extent possible given the BLM's administrative capabilities and federal mandates. Within 50 years, the BLM would contribute to habitat conditions that support 76 percent of northern spotted owl known sites at or above the thresholds of Recovery Action 10 of the *Revised Northern Spotted Owl Recovery Plan*, as opposed to 78 percent if the BLM implemented no forest treatments during that period. In addition, as shown in Section II H of this assessment, the BLM would (1) become a cooperator in the Service's barred owl research program with financial support, (2) agree to avoid timber sales that cause the incidental taking of northern spotted owls until the Service implements a barred owl management program (also see page A-57), and (3) implement guidance developed with the Service for the management of northern spotted owl known sites associated with the Harvest Land Base.

F. ADDITIONAL CHANGES BETWEEN THE PREFERRED ALTERNATIVE OF THE DRAFT RMP/EIS AND THE PROPOSED RMP

Between the Preferred Alternative (Alternative B) of the Draft RMP/EIS and the Proposed RMP, the BLM refined its delineation of proposed land use allocations to better address its management objectives. To provide added support for east-west northern spotted owl movement and survival between the Cascades and Coast Range, the BLM allocated additional lands south of Eugene from the Harvest Land Base to the Late-successional Reserve. The BLM also increased its allocations to the Riparian Reserve, expanding the Riparian Reserve from 382,805 acres (15 percent of the **action area**) to 635,717 (26 percent of the **action area**). This contributed to overall decreases of the Late-Successional Reserve from 1,127,320 acres (46 percent of the **action area**) to 948,466 acres (38 percent of the **action area**) and the Harvest Land Base from 556,335 acres (22 percent of the **action area**) to 469,215 acres (19 percent of the **action area**). Within the Harvest Land Base, the BLM decreased the lands allocated to the Uneven-Aged Timber Area from 273,890 acres (11 percent of the **action area**) to 199,541 acres (8 percent of the **action area**) and increased its allocation to the Low Intensity Timber Area from 72,358 acres (3 percent of the **action area**) to 89,126 acres (4 percent of the **action area**). The acres allocated to the Moderate Intensity Timber Area decreased from 201,087 acres (8 percent of the **action area**) to 180,549 acres (7 percent of the **action area**).

1. Federally-listed Plants and Cook's Lomatium Critical Habitat
The BLM allocated all known plant populations and Cook's lomatium critical habitat on BLM-administered lands in the **action area** to one of its reserve land use allocations, and clarified its management direction for the protection of those populations and critical habitat, and the discovery of new populations.

2. Taylor's Checkerspot and Fender's Blue Butterfly
The BLM clarified its management direction for the protection of known populations in the **action area** and the discovery of new populations.

3. Oregon Silverspot Butterfly
The BLM added an evaluation of the location of potential habitat on BLM-administered lands relative to dispersal capabilities of Oregon silverspot butterflies.

4. Vernal Pool Fairy Shrimp and its Critical Habitat
- The BLM allocated all known shrimp populations and critical habitat on BLM-administered lands in the **action area** to an Area of Critical Environmental Concern (ACEC) and clarified its management direction for the protection of those populations and critical habitat, and the discovery of new populations.
- The BLM incorporated additional management direction for ACECs into the effects analysis for vernal pool fairy shrimp habitat and its critical habitat.

5. Oregon Spotted Frog and its Proposed Critical Habitat
The BLM updated the analytical assumptions for Oregon spotted frog habitat based on information from the U.S. Fish and Wildlife Service (as described above in Section E 11).

6. Gray Wolf
The BLM updated information regarding known packs in the planning area and added analysis and discussion of wolf predation rates on domestic livestock and wild deer and elk.

7. Lower Columbia River Distinct Population Segment of the Columbian White-tailed Deer
The BLM updated the analytical range of the Lower Columbia River population based on information from the U.S. Fish and Wildlife Service, and the analytical range of the Douglas County population based on information from the Oregon Department of Fish and Wildlife.

8. Fisher
The BLM added an analysis of the fisher population in the planning area.

9. Marbled Murrelet and its Critical Habitat
- The BLM changed the land use allocation of critical habitat unit OR-06a from the Harvest Land Base to the Late-Successional Reserve.
- The BLM updated marbled murrelet detection rates from BLM surveys and the subsequent forecast of occupied sites lost or discovered and protected. The BLM also updated discussion and analysis based on recent published literature, including the *Northwest Forest Plan—The first 20 years (1994-2013): status and trend of marbled murrelet populations and nesting habitat* (Falxa and Raphael 2015).
- The BLM added tabulation of habitat availability and the forecast of occupied marbled murrelet sites by Conservation Zone 3 and 4 (**Appendix E**).
- The BLM developed with the Service a definition of **marbled murrelet occupied stand**.

10. Western Snowy Plover and its Critical Habitat
The BLM added discussion of the effect of ACEC designation on western snowy plover habitat and designated critical habitat.

11. Northern Spotted Owl and its Critical Habitat
- The BLM minimized the creation of barriers or strong filters to northern spotted owl east-west movement and survival between the Oregon Coast Range and Oregon Western Cascades

physiographic provinces, and north-south movement and survival between habitat blocks within the Oregon Coast Range Province, by augmenting its proposed allocation to the Late-Successional Reserve in those areas.

- The BLM added management direction (page A-57) to maintain habitat conditions for northern spotted owl movement and survival between and through the large blocks of northern spotted owl nesting-roosting habitat.
- When northern spotted owl critical habitat is altered by wildfire, representatives of the U.S. Fish and Wildlife Service informally recommended that the BLM delay and minimize the removal of primary constituent elements in those stands. As shown in Section III P 3g (Issue 7) of this assessment, the BLM anticipates that fewer than 10,000 acres of critical habitat on its administered lands would experience high- or moderate-intensity wildfire during any given decade; *i.e.*, less than 0.4 percent of BLM-administered lands per decade. The BLM proposes to include 72 percent of its land base in reserves where the BLM would retain post-fire legacy components consistent with public safety and infrastructure maintenance. The BLM proposes to include 22 percent of its lands in the Harvest Land Base where the BLM would implement variable retention of legacy components as described in this assessment. (The BLM would include the remaining 6 percent of its land base in the Eastside Management Area which does not include northern spotted owl critical habitat.)
- The BLM added to its analyses forecasts of how the acres of northern spotted owl critical habitat would change, by decade in each critical habitat sub-unit, under the Proposed RMP. The results are shown in **Table III-28 through Table III-31** in Section III P 4 of this assessment.

II. DESCRIPTION OF THE PROPOSED RMP

A. INTRODUCTION

Approval of the Proposed RMP would be a "mixed programmatic action" as defined by 50 § CFR 402.02 (77 *Fed. Regis*. 26844). Programmatic actions that the BLM would authorize, fund or carry out under the Proposed RMP *without* further decision or ESA sec. 7 consultation, and that may affect federally-listed and proposed species and designated and proposed critical habitats, would be limited to:

- Designation of the Late-Successional Reserve and Riparian Reserve land use allocations. The BLM anticipates that woodland and forest communities within these reserves would become older and more structurally-complex without further BLM review or decision. Unknown populations of Gentner's fritillary or Kincaid's lupine that occur in such reserves could be affected by diminished sunlight below the vegative canopy caused by the development of stand structure.
- Designation of areas for Off-Highway Vehicle use of existing routes or designated routes. Such routes would be used by the public, subject to BLM regulation and law enforcement, without further BLM review or decision.
- The Proposed RMP would direct the BLM to survey for and monitor federally-listed and proposed species and designated and proposed critical habitats. The BLM would conduct such work in accordance with approved protocols, when they exist. However, such work, even when done in accordance with a protocol, could affect listed and proposed species; *e.g.*, biologists could inadvertently step on listed plants, biologists cannot reasonably count butterfly eggs without dislodging some for host plants, and some survey protocols require biologists to intrude into occupied habitats or solicit a species response. The BLM would conduct such work in accordance with pertinent recovery strategies and recovery permits, but without further review or decision.

All other actions that the BLM would authorize, fund or carry out under the Proposed RMP would be subject to project-level review and decision, and ESA sec. 7 consultation as mandated by regulation.

The Proposed RMP describes BLM objectives and direction for the management of its administered-lands and natural resources in the **action area**. Once the Final Resource Management Plan for Western Oregon (FRMP/EIS) is approved, the BLM may do additional actions in the **action area** to address unanticipated threats, problems and opportunities. However, such discretionary additional actions would comply with all applicable laws, including the ESA, and would proceed only in accordance with the FRMP/EIS. Although the BLM may implement actions in the **action area** that are not addressed by the FRMP/EIS, it may not implement an action that is inconsistent with the management objectives and direction of the FRMP/EIS.

B. PURPOSE AND NEED

The purpose and need statement describes why the BLM is revising the 1995 RMP/EISs and what outcomes the BLM intends the Proposed RMP/Final EIS to achieve. The purpose and need statement defines the range of alternatives that were analyzed in the planning process, because alternatives must respond to the purpose and need for plan revision to be considered reasonable.

The current planning process revises the 1995 RMP/EISs with land use allocations, management objectives, and management direction that best meet the purpose and need.

This plan revision process takes place against the backdrop of past planning efforts. These previous planning efforts and their supporting analyses, including the Record of Decision for the Northwest Forest Plan (USDA FS & USDI BLM 1994a), the 1995 RMP/EISs (the plans currently in effect; USDI BLM 1995 a, b, c, d, e, f), and the 2008 RMP/EISs (which are no longer in effect; USDI BLM 2008 a, b, c, d, e, f), together with the results of the scoping process for this planning effort help to inform the BLM's discretion in determining the purpose and need for this plan revision and to identify the scope of alternatives and impacts that need to be explored in this planning effort.

1. Need for the Plan Revision

The BLM conducted plan evaluations in accordance with its planning regulations, which require that RMP/EISs "shall be revised as necessary based on monitoring and evaluation findings, new data, new or revised policy and changes in circumstances affecting the entire plan or major portions of the plan" (43 CFR 1610.5-6). These evaluations concluded that "[a] plan revision is needed to address the changed circumstances and new information that has led to a substantial, long-term departure from the timber management outcomes predicted under the 1995 RMP/EISs" (USDI BLM 2012a:12). These evaluations also concluded that the management direction for most of the other resource management programs need to be modified or updated because of changed circumstances and new information. These evaluations concluded that changes are particularly indicated for the fisheries, aquatics, recreation, off-highway vehicle, and fire and fuels programs.

Moreover, the BLM needs to revise existing plans to replace the 1995 RMP/EISs' land use allocations and management direction because of new scientific information and policies related to the northern spotted owl. Since the 1995 RMP/EISs were approved, there have been analyses on the effects of land management on northern spotted owl habitat, demographic studies, and analyses of the effects of barred owls on northern spotted owls. In addition, since that time, new policies for northern spotted owls have been put in place, including a revised recovery plan and a new designation of critical habitat.

2. Purpose of the Plan Revision

The purpose of this plan revision is to make land use plan decisions to guide the management of BLM-administered lands.

Several of the purposes of the plan revision are necessary for the BLM to deliver a predictable supply of timber from the BLM-administered lands, based on the BLM's almost two decades of experience

implementing the Northwest Forest Plan, new scientific information, and the advice of other Federal agencies, as discussed below. Harvesting timber on a sustained-yield basis for the Oregon and California Railroad and Coos Bay Wagon Road Grant Lands Act (O&C Act; 43 U.S.C. 1181a *et seq*.) purposes is required under the O&C Act. Harvesting timber on a sustained-yield-basis ensures that the BLM will achieve the purposes of the O&C Act, which include continuing to be able to provide, over the long-term, a sustained volume of timber within the management direction in the RMP/EIS. Declining populations of species now listed under the Endangered Species Act (16 U.S.C. 1531 *et seq*.) have caused the greatest reductions and instability in the BLM's supply of timber in the past. Any further population declines of listed species or new species listings would likely lead to additional reductions in timber harvest. Contributing to the conservation and recovery of listed species is essential to delivering a predictable supply of timber. Specifically, the BLM recognizes that providing large, contiguous blocks of late-successional forest and maintaining older and more structurally-complex multi-layered conifer forests are necessary components of the conservation and recovery of the northern spotted owl. Providing clean water is essential to the conservation and recovery of listed fish, and a failure to protect water quality would lead to restrictions that would further limit the BLM's ability to provide a predictable supply of timber. Furthermore, the O&C Act recognizes the importance of water quality; the purposes of sustained yield include, among others, "protecting watersheds and regulating stream flow." Finally, in fire-prone ecosystems in southern Oregon, the BLM must manage forests to reduce the likelihood of catastrophic fires and the attendant loss of timber. These purposes require the BLM to exercise its discretion to determine how best to achieve sustained-yield timber production over the long term and avoid future limitations on timber production.

Provide a Sustained Yield of Timber. The purpose of the plan revision includes providing a sustained yield of timber. The O&C Act requires that the revested Oregon and California Railroad Grant lands and reconveyed Coos Bay Wagon Road Grant lands (O&C lands) be managed "for permanent forest production, and the timber thereon shall be sold, cut, and removed in conformity with the principal of sustained yield for the purpose of providing a permanent source of timber supply, protecting watersheds, regulating stream flow, and contributing to the economic stability of local communities and industries, and providing recreational facilities" (43 U.S.C. 1181a). The O&C Act goes on to state that "[t]he annual productive capacity for such lands shall be determined and declared … [p]rovided, [t]hat timber from said lands … not less than the annual sustained yield capacity … shall be sold annually, or so much thereof as can be sold at reasonable prices on a normal market." In meeting the various requirements for managing the O&C lands, the Secretary of the Interior has discretion under the O&C Act to determine how to manage the forest to provide for permanent forest production on a sustained yield basis, including harvest methods, rotation length, silvicultural regimes under which these forests would be managed, or minimum level of harvest. In addition, the FLPMA specifically provides that if there is any conflict between its provisions and the O&C Act related to management of timber resources or the disposition of revenues from the O&C lands and resources, the O&C Act prevails (*i.e.*, takes precedence) (43 U.S.C. 1701 note (b)). Thus, the multiple-use management direction of the FLPMA does not apply to the O&C lands that are suitable for timber production. The planning process established by the FLPMA is applicable to the O&C lands, because it is not in conflict with the O&C Act's management direction for those lands.

For the public domain lands, the FLPMA requires that public lands be managed "on the basis of multiple use and sustained yield unless otherwise specified by law" (43 U.S.C. 1701 [Sec. 102.a.7]). The FLPMA also requires that "the public lands be managed in a manner which recognizes the Nation's need for domestic sources of minerals, food, timber, and fiber from the public lands" (43 U.S.C. 1701 [Sec. 102.a.12]).

Conservation and Recovery of Threatened and Endangered Species. The purpose of the plan revision includes contributing to the conservation and recovery of threatened and endangered species within the **planning area**, including the northern spotted owl, marbled murrelet, and threatened and endangered

anadromous fish. The Endangered Species Act requires agencies to ensure that their actions are not likely to jeopardize the continued existence of listed species or result in the adverse modification or destruction of critical habitat. Since the adoption of the Northwest Forest Plan, BLM has recognized that additional species listings could have the effect of further limiting the BLM's ability to provide a sustained yield of timber under the O&C Act (USDA FS & USDI BLM 1994a, pp. 49-50). Using its discretion and authority under the O&C Act and the FLPMA, the BLM can direct sustained-yield management of the O&C lands and public domain lands in western Oregon in a manner that contributes to the conservation and recovery of listed species and helps limit or avoid future listings, and thereby best ensures a permanency of timber production over the long-term, while, among other benefits of sustained yield, contributing to the economic stability of local communities.

The purpose of contributing to the conservation and recovery of the northern spotted owl necessarily includes 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, based on the existing scientific information on the conservation needs of the northern spotted owl and the results of previous analyses as described below.

Large, Contiguous Blocks of Late-Successional Forest. Large, contiguous blocks of late-successional forest have been an element of northern spotted owl conservation strategies for over two decades. Thomas *et al.* (1990:23-27) described that a conservation strategy for the northern spotted owl requires large blocks of nesting, roosting, and foraging habitat (*i.e.*, suitable habitat) that support clusters of reproducing owls, distributed across a variety of ecological conditions and spaced so as to facilitate owl movement between the blocks. Courtney *et al.* (2004:9-11 and 9-15), in the status review for the northern spotted owl, evaluated the conservation needs of the northern spotted owl and concluded that, based on existing knowledge, large contiguous blocks of suitable habitat are still necessary for northern spotted owl conservation. Culminating this confirmation of the scientific information on the conservation needs of the northern spotted owl, the owl recovery plan recommends managing for large, contiguous blocks of late-successional forest (USDI FWS 2011a:III-19).

Based on the results of previous analyses, large contiguous blocks of late-successional forest would not develop in the absence of a land use allocation reserving a network of large blocks of forest. The Supplemental EIS for the Northwest Forest Plan (USDA FS & USDI BLM 1994b:2-22) explicitly required that all alternatives analyzed in detail include the allocation of a network of Late-Successional Reserves. Other previous planning efforts have considered alternatives that would not allocate such a network, including:

- Alternative A in the 1994 RMP/EIS, which would have reserved no late-successional forest outside of special areas and sites occupied by listed species
- the Proposed RMP/Final EIS in the 1994 RMP/EIS, which would have reserved small blocks of late-successional forest
- Alternative 3 in the 2008 RMP/EIS, which would have allocated the majority of the landscape to a General Landscape Area that directed timber harvest on long rotations

For each of those alternatives, the analyses concluded that these alternatives would have resulted in less contribution to northern spotted owl conservation than alternatives that allocated a network of large blocks of forest. Notably, Alternative 3 in the 2008 RMP/EIS would have resulted in a total acreage of northern spotted owl habitat comparable to most other action alternatives, but would have failed to meet the conservation needs of the spotted owl because of the arrangement of that habitat. Overall, these previous analyses demonstrated that large, contiguous blocks of late-successional forest would not have developed under these alternatives, further demonstrating that reserving a network of large blocks of forest from programmed timber harvest is a necessary part of the purpose of contributing to the conservation and recovery of the northern spotted owl.

Older and More Structurally-Complex Multi-Layered Conifer Forests. The scientific foundation for the importance of older, more structurally-complex multi-layered conifer forests as habitat for the northern spotted owl has been clearly established. Thomas *et al.* (1990) described high-quality northern spotted owl habitat as older, multilayered, structurally-complex forests characterized by large-diameter trees, high amounts of canopy cover, numerous large snags, and lots of downed wood and debris. Courtney *et al.* (2004:5-18), in the status review for the northern spotted owl, evaluated the existing scientific information on spotted owl habitat and confirmed that nesting, foraging and roosting habitat is associated with older, more structurally-complex multi-layered conifer forests in the Pacific Northwest. The 15-year spotted owl monitoring report concluded that the highest stand-level habitat suitability for spotted owls is provided by older, more structurally-complex forests (Davis *et al.* 2011:38).

The owl recovery plan recommends maintaining older and more structurally complex multi-layered conifer forests. As noted in the owl recovery plan, the maintenance of older, more structurally-complex multi-layered conifer forests has scientific support at several scales: "At the scale of a spotted owl territory, Dugger *et al.* (in press) found an inverse relationship between the amount of old forest within the core area and northern spotted owl extinction rates from territories. At the population scale, Forsman *et al.* (2011) found a positive relationship between recruitment of spotted owls into the overall population and the percent cover of spotted owl NRF [nesting, roosting, and foraging] habitat within study areas" (USDI FWS 2011a:III-67). The U.S. Fish and Wildlife Service noted that, in dry forest areas, maintaining these older and more structurally-complex multi-layered conifer forests may require active management to meet the overlapping goals of spotted owl recovery and restoration of dry forest structure, composition, and processes including fire, insects, and disease.

Previous planning efforts have considered a wide variety of approaches to the management of older, more structurally-complex multi-layered conifer forests, including—

- Alternative A in the 1994 RMP/EIS, which would have reserved no late-successional forest outside of special areas and sites occupied by listed species;
- The 1995 RMP/EIS, which reserved approximately 83 percent of old-growth forest;
- The Proposed RMP/EIS in the 2008 RMP/EIS, which would have reserved 81 percent of old-growth forest and would have deferred harvest of any forest older than 160-years-old for 15 years;
- Alternative E in the 1994 RMP/EIS, which would have reserved all old-growth forest;
- A sub-alternative for Alternative 1 in the 2008 RMP/EIS, which would have reserved all forests older than 200 years old; and
- A sub-alternative for Alternative 1 in the 2008 RMP/EIS, which would have reserved all forests older than 80 years old.

None of these alternative approaches defined management direction explicitly in terms of older, more structurally-complex, multi-layered conifer forests, but used a variety of different terms, such as older forest, old-growth forest, late-successional forests, or a specific stand age. Nevertheless, these different management approaches would have resulted in the maintenance of differing amount of older and more structurally-complex multi-layered conifer forests. Those analyses demonstrated that alternatives that would have maintained more older and more structurally-complex multi-layered conifer forests would have maintained more northern spotted owl habitat and would have provided better conditions for northern spotted owl movement between large blocks of habitat than alternatives that would have maintained less older and more structurally-complex multi-layered conifer forests.

The existing science clearly establishes the importance of older and more structurally-complex multi-layered conifer forests as northern spotted owl habitat; the owl recovery plan recommends the maintenance of older and more structurally-complex multi-layered conifer forests; and the results of

previous analyses demonstrate that maintaining older and more structurally-complex multi-layered conifer forests would contribute to meeting conservation needs of the northern spotted owl. Therefore, maintaining older and more structurally-complex multi-layered conifer forest is a necessary part of the purpose of contributing to the conservation and recovery of the northern spotted owl.

To respond to this purpose for the plan revision, alternatives explored differing approaches to defining older and more structurally-complex multi-layered conifer forest, by such criteria as stand age, structure, size, or landscape context. In addition, alternatives explored differing management approaches to maintaining older and more structurally-complex multi-layered conifer forest, such as active management in dry forest areas to reduce fire risk and restore fire resiliency.

The purpose of this plan revision includes maintaining marbled murrelet habitat. The status review of the marbled murrelet prepared for the U.S. Fish and Wildlife Service reviewed the existing scientific information and confirmed the importance of maintaining suitable nesting habitat to the conservation and recovery of the marbled murrelet (McShane *et al.* 2004:4-61 – 4-63). Additionally, the recovery plan for the marbled murrelet (USDI FWS 1997) recommends protecting adequate nesting habitat for marbled murrelets.

The purpose of this plan revision includes protecting existing habitat and restoring degraded habitat for threatened and endangered anadromous fish. The status review of threatened and endangered anadromous fish prepared by the National Marine Fisheries Service reviewed the existing scientific information and confirmed the importance of maintaining existing habitat and restoring degraded habitat to the conservation and recovery of threatened and endangered fish (Good *et al.* 2005). The National Marine Fisheries Service has prepared several final and draft recovery plans for listed salmonid fish within the **planning area**, including the Upper Willamette River Conservation and Recovery Plan for Chinook Salmon and Steelhead (ODFW and USDC NMFS 2011), which recommend maintaining existing habitat and restoring degraded habitat.

*Provide Clean Water in Watersheds.*The purpose of the plan revision includes continuing to comply with the Clean Water Act (33 U.S.C. 1251 et seq.), which directs the restoration and maintenance of the chemical, physical, and biological integrity of the nation's waters. The policy declaration in the FLPMA states that the BLM should manage the public lands in a manner that protects many resources and their values, including the water resource (43 U.S.C. 1701[a][8]). The FLPMA directs that land use plans provide for compliance with applicable State and Federal air, water, noise, or other pollution control laws, standards, or implementation plans (43 U.S.C. 1712[c][8]).

In addition, the O&C Act includes reference to protecting watersheds and regulating stream flows, requiring that the O&C lands be managed "for permanent forest production, and the timber thereon shall be sold, cut, and removed in conformity with the principal of sustained yield for the purpose of … protecting watersheds, regulating stream flow, …" (43 U.S.C. 1181a).

Restore Fire-Adapted Ecosystems. The purpose of the plan revision includes restoring fire-adapted ecosystems to increase fire resiliency. Previous analyses have shown that active management in the dry forest landscape of southern Oregon can positively influence fire risk and fire resiliency, thereby restoring fire-adapted ecosystems (2008 RMP/EIS). Further, as noted in the owl recovery plan, natural landscape resilience mechanisms in the dry forest landscape of southern Oregon have been decoupled by fire exclusion and wildfire suppression activities. The owl recovery plan recommends active management within the dry forest landscape to restore ecosystem resiliency. Additionally, in order to provide for sustained yield of timber from public lands under the O&C Act, BLM management must account for potential loss of this timber to fire. Based on the BLM's authority under the O&C Act, the results of previous analyses showing the benefits of active management in restoring fire-adapted ecosystems, and in

light of the recommendations in the owl recovery plan, the purpose of this plan revision includes restoring fire-adapted ecosystems to increase fire resiliency.

Provide for Recreation Opportunities. The purpose of the plan revision includes providing for recreation opportunities. The FLPMA requires that, among other uses, "the public lands be managed in a manner that will … provide for outdoor recreation" 43 CFR 1701 [Sec. 102.a.8]. In addition, the O&C Act states that O&C lands shall be managed "… for permanent forest production, and the timber thereon shall be sold, cut, and removed in conformity with the principal of sustained yield for the purpose of … providing recreational facilities" (43 U.S.C. 1181a). Finally, changes in BLM policy since the 1995 RMP/EISs for recreation land use allocations and management objectives necessitate plan revision, as concluded in the BLM plan evaluations (USDI BLM 2012, pp. 28-29).

Coordinate Management of Lands Surrounding the Coquille Forest with the Coquille Tribe. The management of the Coquille Forest is subject by law (25 U.S.C. 715c (d)) to the standards and guidelines of forest plans for adjacent or nearby Federal forest lands. Title V of the Oregon Resource Conservation Act of 1996 (Public Law 104-208) created the Coquille Forest to be held in trust for the benefit of the Coquille Tribe. This Act states that the Coquille Forest shall be managed "under applicable State and Federal forestry and environmental protection laws, and subject to critical habitat designations under the Endangered Species Act and subject to the standards and guidelines of Federal forest plans on adjacent or nearby Federal lands, now and in the future." This Act also requires the Secretary of the Interior to take the Coquille Forest lands into trust for the benefit of the Coquille Tribe. As such, the purpose of the plan revision includes coordinating the management of BLM-administered lands "adjacent or nearby" the Coquille Forest with the Coquille Tribe.

C. DESCRIPTION OF THE ACTION AREA

The **action area** includes 2.5 million acres of BLM-administered land in western Oregon managed by the BLM's Coos Bay, Eugene, Medford, Roseburg, and Salem districts and the Lakeview District's Klamath Falls Field Office (**Figure I-1**). Within the western Oregon districts, three BLM-administered areas are excluded from the **action area**: the Cascade Siskiyou National Monument (Medford District), the Upper Klamath Basin and Wood River Wetland (Klamath Falls Field Office), and the West Eugene Wetlands (Eugene District). These three areas have independent RMPs/EISs. The Proposed RMP would not alter those independent RMPs/EISs.

D. EXISTING DECISIONS

The following existing decisions, which are valid for continued implementation and are supported by an EIS, are part of the Proposed RMP:

- Management plans for congressionally-designated areas such as Wilderness Areas, Wilderness Study Areas, and Wild and Scenic Rivers
- Pokegama Wild Horse Herd Management Area Plan (Klamath Falls Field Office, USDI BLM 2002)
- Record of Decision for Management of Port-Orford-cedar in Southwest Oregon (Coos Bay, Medford, and Roseburg Districts; USDI BLM 2004)
- Record of Decision for Implementation of a Wind Energy Development Program and Associated Land Use Plan Amendments (USDI BLM 2005b)
- Record of Decision and Resource Management Plan Amendments for Geothermal Leasing in the Western United States (USDA FS/USDI BLM 2008)
- Approved Resource Plan Amendments/Record of Decision for Designation of Energy Corridors on Bureau of Land Management-administered lands in the 11 Western States (USDI BLM 2009)
- Vegetation Treatments Using Herbicides on BLM Lands in Oregon Record of Decision (USDI BLM 2010)

- Seed Orchard Records of Decision for Integrated Pest Management (Salem, Eugene, Medford Districts; USDI BLM 2005c, 2005d, 2006)
- North Bank Habitat Management Area and Area of Critical Environmental Concern Record of Decision (Roseburg District; USDI BLM 2001)

E. OVERVIEW OF THE PROPOSED RMP

The Proposed RMP would include land use allocations or administrative designations that the BLM would use to manage different resources or groups of resources. These types of allocations or designations include but are not limited to –

- vegetation and habitat management (Congressionally Reserved, District-Designated Reserves, Late-Successional Reserve, Riparian Reserve, Harvest Land Base, and Eastside Management Area)
- land tenure (Zones 1, 2, or 3)
- visual resource management (Class I, II, III, or IV)
- recreation management (Special Recreation Management Area, Extensive Recreation Management Area, or public lands not designated for recreation management)
- off-highway vehicle management (*open*, *limited*, or *closed*)

Within each allocation or designation, including the examples above, the Proposed RMP would assign each acre within the **action area** to one, and only one category.[2] For example, in the land tenure designation type, every acre in the **action area** would be assigned to either the Land Tenure Zone 1, 2, or 3 category. Similarly, for visual resource management, every acre within the **action area** would be assigned to either the Visual Resource Management Class I, II, III, or IV category. These different types of allocations or designations overlap. For example, an individual acre might be allocated to Riparian Reserve, Land Tenure Zone 2, Visual Resource Management Class IV, Extensive Recreation Management Area, and *closed* to off-highway vehicle use.

The Proposed RMP includes the following land use allocations categories for vegetation and habitat management: Congressionally Reserved Lands and National Landscape Conservation System, District-Designated Reserves, Late-Successional Reserve, Riparian Reserve, Harvest Land Base, and Eastside Management Area.

Within the Proposed RMP, the land use allocation categories of District-Designated Reserves, Eastside Management Area, Harvest Land Base, Late-Successional Reserve, and Riparian Reserve have been further divided into sub-allocations with different management direction. The Harvest Land Base has three sub-allocations—the Moderate Intensity Timber Area, Low Intensity Timber Area and Uneven-aged Timber Area—with different management direction for forest management. **Appendix A** contains full descriptions of the management direction for the sub-allocations of the Harvest Land Base.

In the context of these land use allocations, the term "reserve" indicates that the BLM would reserve, or Congress has reserved, lands within the allocation from sustained-yield timber production. These reserve land use allocations—Congressionally Reserved Lands, District-Designated Reserves, Late-Successional Reserve, and Riparian Reserve—are in contrast to the Harvest Land Base, which would include management objectives for sustained-yield timber production. This does not mean that the BLM would prohibit active management in these reserve allocations. On the contrary, the Proposed RMP would include management direction to conduct the management actions necessary to achieve the management objectives for reserve allocations.

[2] An exception are Areas of Critical Environmental Concern (ACECs) that would overlap the Harvest Land Base where the special management needed to maintain the relevant and important values of the ACEC would be compatible with sustained-yield timber production. In these areas, the BLM would apply the management direction for both ACECs and the Harvest Land Base.

1. Congressionally Reserved Lands and National Landscape Conservation System
Congressionally Reserved Lands are those lands that Congress has designated and defined management through law, such as designated Wilderness and Wild and Scenic Rivers. The mandated management of these lands requires that the BLM reserve these lands from sustained-yield timber production. In addition to Congressionally Reserved Lands, the BLM also would identify Wilderness Study Areas in the **action area**, pursuant to Section 603 of the FLPMA. Until Congress makes a final determination on a Wilderness Study Area, the BLM manages these areas to preserve their suitability for designation as Wilderness.

2. District-Designated Reserves
District-Designated Reserves[3] would include lands that are reserved from sustained-yield timber production for a variety of reasons, including:

- Areas that the BLM has constructed for specific purposes (such as roads, buildings, maintenance yards, seed orchards, and other facilities and infrastructure);
- Areas that the BLM has identified through the Timber Production Capability Classification[4] system as unsuitable for sustained-yield timber production (e.g., rock outcrops);
- Areas of Critical Environmental Concern (ACECs), including Research Natural Areas (RNAs) and Outstanding Natural Areas (ONAs) that would not overlap the Harvest Land Base; and
- Other reserves (e.g., Special Recreation Management Areas, areas protected for Bureau sensitive species, and lands managed for their wilderness characteristics).

Under the Proposed RMP, the BLM would manage roads, maintenance yards, buildings, and other facilities for the purpose for which they were constructed.

The BLM identifies as unsuitable for sustained-yield timber production through the Timber Production Capability Classification system and may manage these areas for other uses, if those uses are compatible with the reason for which the BLM has reserved these lands (as identified by the timber production capability classification codes). The BLM will periodically add additional areas to those areas reserved through updates to the timber production capability classification system, when examinations indicate that an area meets the criteria for reservation. The BLM may also delete areas from those areas reserved and return the area to sustained-yield timber production through updates to the timber production capability classification system, when examinations indicate that an area does not meet the criteria for reservation.

ACECs are lands where special management attention is needed to protect and prevent irreparable damage to important historic, cultural, or scenic values, fish, and wildlife resources or other natural systems or processes or to protect life and provide safety from natural hazards, pursuant to Section 202(c)(3) of the FLPMA. The BLM would reserve Areas of Critical Environmental Concern on O&C lands consistent with the The O&C Act and the FLPMA. ACECs that would overlap the Harvest Land Base where the special management needed to maintain the relevant and important values of the ACEC would be compatible with sustained-yield timber production; in these areas, the BLM would apply the management direction for both ACECs and the Harvest Land Base. The BLM would allocate as District-

[3] These areas have been termed Administratively Withdrawn in previous planning efforts. This RMP/EIS does not use the term withdrawn in this context to avoid confusion with the withdrawal of areas from operation of public land laws, location, and entry under mining laws, or application and offers under mineral leasing laws.
[4] The Timber Production Capability Classification is an analytical classification system by which the BLM inventories and identifies sites as capable of supporting sustained-yield timber production without degrading the site's productive capacity. This classification considers factors such as soil depth, available moisture, slope, drainage, and stability. Sites that are not capable of supporting sustained-yield timber production are not included in the Harvest Land Base.

Designated Reserves those ACECs that would not overlap the Harvest Land Base or ACECs where the special management needed to maintain the relevant and important values of the ACEC would not be compatible with sustained-yield timber production. The BLM would reserve ACECs on O&C lands consistent with the The O&C Act and the FLPMA.

The BLM would designate Special Recreation Management Areas as District-Designated Reserves on public domain lands and acquired lands; on non-forested O&C lands; on O&C lands that would otherwise be allocated to a land use allocation that would preclude sustained-yield timber production; or on O&C lands for which the Timber Productivity Capability Classification category is not included in the Harvest Land Base. The BLM would designate Special Recreation Management Areas on the Harvest Land Base on O&C lands to the extent that the management for recreation and visitor services would be compatible with planning for sustained-yield timber production for the purposes of the O&C Act, even if that management might condition how sustained-yield timber production would be conducted.

District-Designated Reserves - Lands Managed for their Wilderness Characteristics are areas outside of designated Wilderness or Wilderness Study Areas that the BLM would manage for their wilderness characteristics. The BLM would reserve lands with wilderness characteristics (outside of Wilderness or Wilderness Study Areas) on O&C lands consistent with the The O&C Act and the FLPMA.

3. Land Use Allocation Overviews

Congressionally Reserved Lands and National Landscape Conservation System

Under the Proposed RMP, the BLM would recommend for inclusion in the National Wild and Scenic River System the eligible Wild and Scenic River segments with recreation identified as an Outstandingly Remarkable Value and the eligible river segments that the BLM found suitable during its administrative process (as outlined in BLM Manual 6400, USDI BLM 2012b).

District-Designated Reserves

The Proposed RMP includes management for wilderness characteristics of all lands with wilderness characteristics that are outside of the Harvest Land Base.

Eastside Management Area

The Proposed RMP includes an Eastside Management Area land use allocation, which applies to BLM-administered lands in the Klamath Falls Field Office east of Highway 97.

Harvest Land Base

In the Proposed RMP, the Harvest Land Base is comprised of the Uneven-aged Timber Area, Low Intensity Timber Area, and Moderate Intensity Timber Area.

The Uneven-aged Timber Area is located in —

- dry and very dry forest types identified by potential vegetation types in the Klamath Falls Field Office,
- dry forest types within northern spotted owl critical habitat designated in the 2012 final rule (77 FR 71908) and very dry forest types in the Medford District, and
- very dry forest types in the South River Field Office.

The Low Intensity Timber Area is located in areas within the Harvest Land Base outside of the Uneven-aged Timber Area, in which the BLM identified that higher level of retention within regeneration harvest units would better integrate the management of multiple resources. Timber harvest in the Low Intensity Timber Area includes thinning and regeneration harvest with retention of 15 to 30 percent of the stand. In delineating these areas, the BLM included —

- northern spotted owl critical habitat designated in the 2012 final rule (77 FR 71908) in the Harvest Land Base outside of the Uneven-aged Timber Area,
- dry forest types outside of designated northern spotted owl critical habitat in the Harvest Land Base in the Medford District, and
- Special Recreation Management Areas that overlap the Harvest Land Base outside of the Uneven-aged Timber Area where increased tree retention in regeneration harvests would facilitate recreation management.

The Moderate Intensity Timber Area is located in the remaining portions of the Harvest Land Base. Timber harvest in the Moderate Intensity Timber Area includes thinning and regeneration harvest with retention of 5 to 15 percent of the stand.

In contrast to Alternative B, the Proposed RMP includes either natural tree regeneration or replanting after timber harvest in both the Low Intensity Timber Area and Moderate Intensity Timber Area.

Late-Successional Reserve

In the Proposed RMP, the Late-Successional Reserve includes, primarily, Structurally-Complex Forest, Large Block Forest Reserves (Late-Successional Reserve - Moist and Late-Successional Reserve - Dry), and much smaller acreages from existing occupied marbled murrelet sites and existing sites of the North Oregon Coast Distinct Population Segment of the red tree vole north of Highway 20. In addition, the Proposed RMP includes requirements for surveys for the marbled murrelet and the North Oregon Coast Distinct Population Segment of the red tree vole, as described below; newly discovered sites would be included in the Late-Successional Reserve. Thus, this description of the Late-Successional Reserve includes predictions of the acreage of newly discovered marbled murrelet and red tree vole sites. Within the Late-Successional Reserve, the BLM would not conduct timber salvage after disturbance, except when necessary to protect public safety, or to keep roads and other infrastructure clear of debris.

Structurally-Complex Forest

The Proposed RMP includes within the Late-Successional Reserve all stands identified by existing, district-specific information on structurally-complex forests.[5]

Large Block Forest Reserves: Late-Successional Reserve - Moist and Late-Successional Reserve - Dry[6]

The Proposed RMP includes within the Late-Successional Reserve blocks of functional and potential northern spotted owl habitat, sufficient to meet block size and spacing requirements (Thomas *et al*. 1990, pp. 24, 28) in all provinces except the Coast Range province, where reserves include blocks of habitat without limitations for size and spacing. In comparison to Alternative B, the Proposed RMP includes additional areas of Late-Successional Reserve in the Eugene and Roseburg Districts to facilitate east-west northern spotted owl movement and survival between the Coast Range and Cascade Mountains. In moist forests, the BLM would conduct restoration thinning to promote the development of structurally-complex forest, which may include commercial removal of cut trees. In dry forests, the BLM would conduct restoration activities including thinning and prescribed burning to promote the development of structurally-complex forest and to improve resilience to disturbance, which may include commercial removal of cut trees.

[5] The BLM has updated this information since the preparation of Alternative B in the Draft RMP/EIS, which used the district-specific information on structurally-complex forests available at that time.

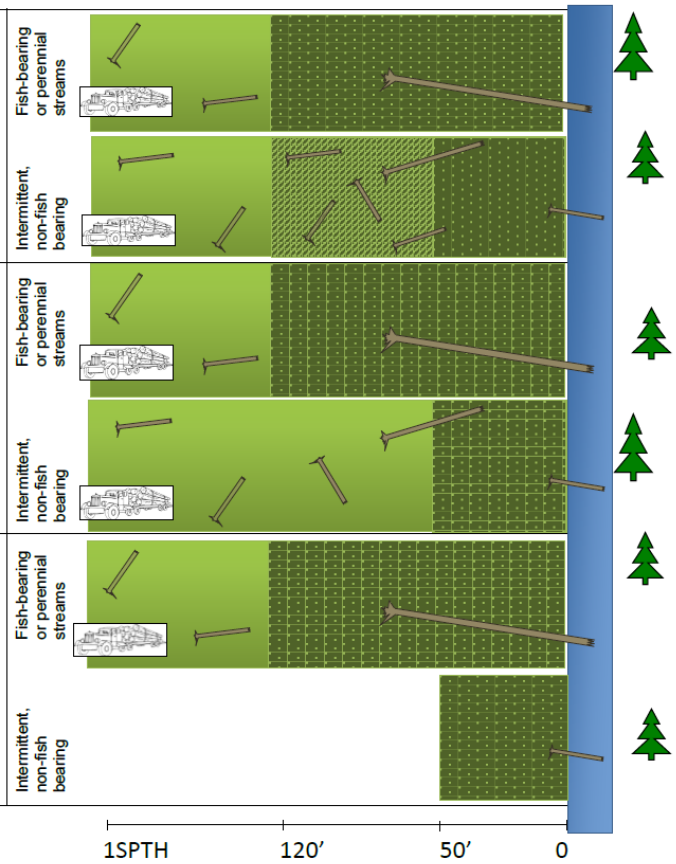
[6] The Late-Successional Reserve – Dry and Riparian Reserve – Dry sub-allocations in the Proposed RMP are delineated as those portions of the Late-Successional Reserve and Riparian Reserve, respectively, which are in dry and very dry forest types identified by potential vegetation types within the Klamath Falls Field Office, the Medford District, and the South River Field Office of the Roseburg District.

Riparian Reserve (west of Highway 97) - Moist

In the Proposed RMP, the Riparian Reserve encompasses lands along streams and other waterbodies. The design of the Riparian Reserve – west of Highway 97 varies among three classes of subwatersheds,[7] based on the importance of the subwatershed to the conservation and recovery of listed fish. The BLM evaluated the importance of subwatersheds to the conservation and recovery of listed fish based on designated critical habitat[8] and the abundance of streams with a high intrinsic potential for salmon. Class I subwatersheds are those that include both designated critical habitat and an abundance of high-intrinsic potential streams.[9] Class II subwatersheds are those that include either designated critical habitat or an abundance of high-intrinsic potential streams. Class III subwatersheds are those that include neither designated critical habitat nor an abundance of high-intrinsic potential streams.

Riparian Reserve Classes

Class 1	• fish-bearing and perennial streams: one site potential tree height with a 120-foot no-thin zone • intermittent, non-fish bearing streams: one site potential tree height with 50-foot no-thin zone/ 50-120 feet – non-commercial thinning only • outer zone thinning: Thin stands as needed to ensure that stands are able to provide stable wood to the stream. Maintain at least 30 percent canopy cover and 60 trees per acre.
Class 2	• fish-bearing and perennial streams: one site potential tree height with a 120-foot no-thin zone • intermittent, non-fish bearing streams: one site potential tree height with 50-foot no-thin zone • outer zone thinning: Apply thinning to promote the development of large, open grown trees, develop layered canopies and multi-cohort stands, develop diverse understory plant communities, and allow for hardwood vigor and persistence. Maintain at least 30 percent canopy cover and 60 trees per acre.
Class 3	• fish-bearing and perennial streams: one site potential tree height with a 120-foot no-thin zone • intermittent, non-fish bearing streams: 50-foot (all no-thin zone) • outer zone thinning: Apply thinning to promote the development of large, open grown trees, develop layered canopies and multi-cohort stands, develop diverse understory plant communities, and allow for hardwood vigor and persistence. Maintain at least 30 percent canopy cover and 60 trees per acre.



Class I subwatersheds

The Riparian Reserve encompasses lands within one site-potential tree height on either side of all streams.

[7] The BLM defined the three classes for Riparian Reserve design in the Proposed RMP based on "sixth-field watersheds" (Hydrologic Unit Code-12). Hydrologic Unit Codes (HUC) are a U.S Geological Survey classification based on a hierarchy of nested watersheds. HUC-12 sub-watersheds are typically 10,000 to 40,000 acres in size.

[8] For sub-watersheds on the east side of the Willamette River, the BLM included core-genetic and core-legacy populations in addition to designated critical habitat.

[9] The "intrinsic potential" is the set of habitat features that most influence whether that habitat is likely to be used or selected (or not) by an individual fish species. "High intrinsic potential" streams are those streams with the habitat features that are known to be highly productive for an individual fish species.

The Riparian Reserve includes an inner zone in which thinning is generally not permitted. Inner zone widths are —

- 120 feet on either side of perennial streams and fish-bearing intermittent streams, and
- 50 feet on either side of non-fish-bearing, intermittent streams.

The Riparian Reserve includes a middle zone of from 50 to 120 feet on either side of non-fish-bearing, intermittent streams. No middle zone is delineated on perennial streams and fish-bearing intermittent streams. In the middle zone, the BLM would conduct restoration thinning as needed to ensure that stands are able to provide trees to form stable instream structures. In the middle zone in moist forests, the BLM would conduct restoration thinning without commercial removal of timber (i.e., coarse woody debris and snag creation only). In the middle zone in Riparian Reserves - Dry, restoration activities would include prescribed burning and thinning that would include removal of cut trees, including commercial removal, as needed to reduce the risk of stand-replacing, crown fires.

The outer zone of the Riparian Reserve would be from 120 feet to one site-potential tree height on either side of all streams. In the outer zone, the BLM would conduct restoration thinning, which may include commercial removal, as needed to ensure that stands are able to provide stable wood to the stream.

Class II subwatersheds

The Riparian Reserve encompasses lands within one site-potential tree height on either side of all streams.

The Riparian Reserve includes an inner zone in which thinning is generally not permitted. Inner zone widths are —

- 120 feet on either side of perennial streams and fish-bearing intermittent streams, and
- 50 feet on either side of non-fish-bearing, intermittent streams.

In the outer zone, the BLM would conduct restoration thinning, which may include commercial removal, as needed to develop diverse and structurally-complex riparian stands.

Class III subwatersheds

The Riparian Reserve encompasses lands within—

- One site-potential tree height on either side of perennial streams and fish-bearing intermittent streams, and
- 50 feet on either side of non-fish-bearing, intermittent streams.

The Riparian Reserve includes an inner zone in which thinning is generally not permitted. Inner zone widths are —

- 120 feet on either side of perennial and fish-bearing intermittent streams, and
- 50 feet on either side of non-fish-bearing, intermittent streams.

In the outer zone, the BLM would conduct restoration thinning, which may include commercial removal, as needed to develop diverse and structurally-complex riparian stands.

F. DEVELOPMENT OF THE PROPOSED RMP

The BLM developed the Proposed RMP as a variation on Alternative B, which the BLM identified in the Draft RMP/EIS as the preferred alternative. The Proposed RMP has a Late-Successional Reserve that is a refinement of the Late-Successional Reserve design in Alternative B. The Harvest Land Base is comprised of the Uneven-Aged Timber Area, Low Intensity Timber Area, and Moderate Intensity Timber Area, as in Alternative B. The geographic extent of the portion of the Harvest Land Base in Uneven-Aged Timber Area in the Proposed RMP is intermediate between Alternative B and Alternative C. As in

Alternative B, the Low Intensity Timber Area and Moderate Intensity Timber Area include regeneration harvest with varying levels of retention.

The BLM identified Alternative B as the preferred alternative in the Draft RMP/EIS because of the outcomes associated with most resources. However, Alternative B does not provide the best possible response to the purpose and need for action and the guidance for the formulation of alternatives concerning the management of every resource. Recognizing this, the Draft RMP/EIS explained that the BLM would seek to develop a Proposed RMP that would, in comparison to Alternative B, —

- Reduce the risk of adverse effects to listed fish and water quality,
- Increase protection of unique recreation settings and increase recreation use,
- Increase protection of identified lands with wilderness characteristics, and
- Minimize the spread of Sudden Oak Death.

Based on the analysis in the Draft RMP/EIS and comments the BLM received on the Draft RMP/EIS, the BLM modified the management approach of Alternative B for riparian management, recreation management, protection of lands with wilderness characteristics, and treatment of Sudden Oak Death in the development of the Proposed RMP, as summarized below.

To reduce the risk of adverse effects to listed fish and water quality compared to Alternative B, the Proposed RMP includes a Riparian Reserve design that is intermediate among the alternatives and incorporates elements of each of the alternatives. The Proposed RMP carries forward the concept of key watersheds from the Northwest Forest Plan in that it varies riparian management based on the importance of the subwatershed to the conservation and recovery of listed fish. For fish-bearing streams and perennial streams in all subwatersheds, the Riparian Reserve design is similar to Alternative D. For non-fish-bearing intermittent streams, the Riparian Reserve design in Class I and II subwatersheds is a slight modification of Alternative A, and the Riparian Reserve design in Class III subwatersheds is similar to Alternative C.

To increase protection of unique recreation settings and increase recreation use compared to Alternative B, the Proposed RMP includes an approach to the management of recreation resources modified from Alternative C.

To increase protection of identified lands with wilderness characteristics compared to Alternative B, the Proposed RMP includes an approach to the management of lands with wilderness characteristics from Alternative A.

To minimize the spread of Sudden Oak Death compared to Alternative B, the Proposed RMP includes the Sudden Oak Death treatment approach of the No Action alternative, Alternative C, and Alternative D.

In designing the Proposed RMP to best meet all of the purposes for the RMP revision, the BLM considered the effects disclosed in the Draft RMP/EIS as well as the comments received from the public and cooperating agencies. The BLM made many of the modifications to Alternative B to further mitigate adverse effects through the land use allocations and the management direction. Specifically, the BLM modified the Riparian Reserve design and management direction of Alternative B for the Proposed RMP to reduce the risk of adverse effects to listed fish and water quality. The BLM increased the protection of identified lands with wilderness characteristics under the Proposed RMP compared to Alternative B to reduce the loss of wilderness characteristics. The BLM adopted the most aggressive Sudden Oak Death treatment approach among the alternatives for the Proposed RMP to minimize the spread of Sudden Oak Death. Additionally, the Proposed RMP includes specific management direction intended to reduce or avoid adverse effects. For example, as described below and in **Appendix A**, the Proposed RMP would

prohibit the incidental taking of northern spotted owls from timber harvest until implementation of a barred owl management program has begun, and would participate in, cooperate with, and provide support for an interagency program for barred owl management when the U.S. Fish and Wildlife Service determines the best manner in which barred owl management can contribute to the recovery of the northern spotted owl.

The design of the Proposed RMP includes all reasonable measures to avoid and minimize adverse effects to natural resources while meeting the statutory requirements under the O&C Act for sustained-yield of timber and the other purposes of the action. The Proposed RMP would not eliminate all adverse effects. Some level of residual adverse effects would be necessary to accomplish all of the purposes for the action. For example, the application of management direction and best management practices for road construction would reduce, but not eliminate, the potential for sediment delivery to streams. Some amount of road construction and consequent potential sediment delivery would be necessary to accomplish the purpose of providing for a sustained-yield of timber and management objectives such as providing access to BLM-administered lands and facilities to support resource management programs. The management direction in the Proposed RMP intended to reduce or avoid adverse effects are too numerous to catalog here, but the effectiveness of such management direction in mitigating adverse effects and residual adverse effects on listed and proposed species and designated and proposed critical habitats are addressed in Section IV of this assessment.

G. DESCRIPTION OF THE PROPOSED RMP

Table II-1 shows the acres that would be allocated to each land use allocation and sub-allocation. **Figure II-1** displays the relative sizes of the land use allocations. **Figure I-1** (in Section I) displays the spatial arrangement of the land use allocations. **Table II-2** shows the estimated acres of forest treatment by land use allocation and decade. **Table II-3** shows the acres of northern spotted owl critical habitat by land use allocation. **Appendix A** contains the management objectives and management direction in their entirety for all land use allocations, sub-allocations, and resource programs of the Proposed RMP.

Table II-1. Proposed RMP land use allocations.

Allocation	Acres	Total Acres (%)	Sub-Allocation	Acres	Total Acres (%)
Late-Successional Reserve[10]	948,466	38%	Structurally-Complex Forest	427,881	17%
			Large Block Forest Reserve (Moist)	250,546	10%
			Large Block Forest Reserve (Dry)	186,949	8%
			Occupied Marbled Murrelet Sites	42,174	2%
			Predicted Marbled Murrelet Sites[11]	31,242	1%
			Occupied Red Tree Vole Sites	128	<1%
			Predicted Red Tree Vole Sites	9,546	<1%
Riparian Reserve[12]	635,717	26%	Riparian Reserve (Class I subwatersheds)	497,331	20%
			Riparian Reserve (Class II subwatersheds)	107,453	4%
			Riparian Reserve (Class III subwatersheds)	30,933	1%
Other Reserves	263,647	11%	Congressionally Reserved Lands	40,505	2%
			District Designated Reserves[13]	223,142	9%
Harvest Land Base	469,215	19%	Moderate Intensity Timber Area	180,549	7%
			Low Intensity Timber Area	89,126	4%
			Uneven-Aged Timber Area	199,541	8%
Eastside Management Area[14]	161,810	7%	Eastside Management Area	149,971	6%
			Eastside Management Area – Riparian Reserve	11,838	<1%
			Totals	**2,478,856**	**-**

[10] The acreage of the different components of the Late-Successional Reserve in this table is presented for comparison to the information for the action alternatives. The different components describe areas that are included in the Late-Successional Reserve for different reasons, including analytical projections of areas that the BLM would identify in the future as part of the Late-Successional Reserve. These different components are not sub-allocations, in that they do not have differing management objectives or management direction. The only sub-allocations of the Late-Successional Reserve, as detailed in **Appendix A** – Management Objectives and Direction, are Late-Successional Reserve – Dry and Late-Successional Reserve – Moist.

[11] For the Proposed RMP, the BLM used updated detection rates to calculate acres of predicted marbled murrelet sites, which increased the acreage of predicted marbled murrelet sites compared to the alternatives (see the Forest Management and Wildlife sections of Chapter 3).

[12] The design of the Riparian Reserve – west of Highway 97 varies among three classes of sub-watersheds. In addition, the Riparian Reserve – west of Highway 97 includes sub-allocations of Riparian Reserve – Moist and Riparian Reserve – Dry, which overlap the three classes of sub-watershed. This table only presents the Riparian Reserve – west of Highway 97 by sub-watershed class for simplicity of presentation.

[13] District Designated Reserves include several sub-allocations, as detailed in **Appendix A**, which are grouped together in this table.

[14] The acreage for the Eastside Management Area in this table includes both forested and non-forested lands and Eastside Management Area – Riparian Reserve.

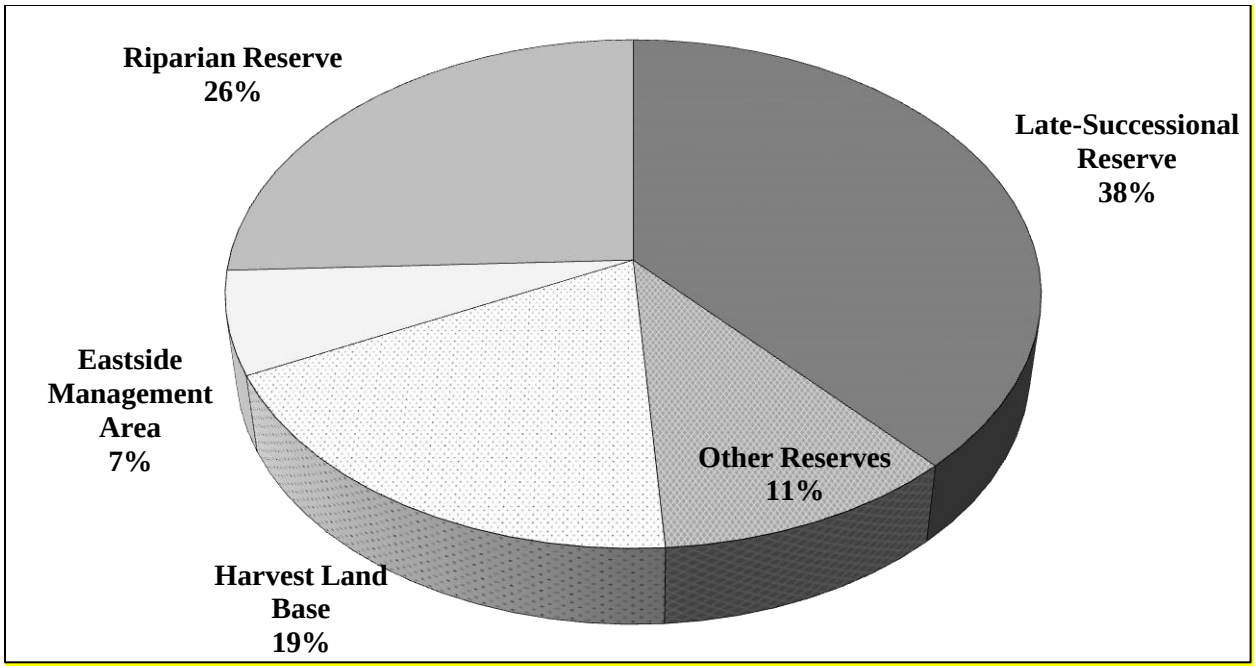


Figure II-1. The relative sizes of the proposed land use allocation based on the acres of BLM-administered land allocated to each.

Table II-2. Estimated acres of forest treatment, based on BLM Woodstock modeling, by land use allocation and decade, under the Proposed RMP.

Land Use Allocation	Acres	Treatment	Acres of Treatment per Decade				
			First	Second	Third	Fourth	Fifth
1. Late-successional Reserve							
1a. Structurally-complex Forest	427,881		0	0	0	0	0
1b. Late-Successional Reserve (Moist)	250,546	Commercial thinning	23,127	21,834	19,057	15,942	11,303
1b. Late-Successional Reserve (Dry)	186,949	Group and single-tree selection harvest	22,057	22,089	22,073	22,084	22,047
1c. Occupied Marbled Murrelet Sites	42,174		0	0	0	0	0
1c. Predicted Marbled Murrelet Sites	31,242		0	0	0	0	0
1d. Occupied Red Tree Vole Sites	128		0	0	0	0	0
1d. Predicted Red Tree Vole Sites	9,546		0	0	0	0	0
2. Riparian Reserve (Moist and Dry)	635,717	Commercial thinning	8,291	7,877	7,094	5,831	4,220
		Non-commercial thinning	2,270	2,160	1,967	1,711	1,213
District Designated Reserves	223,142		0	0	0	0	0
3. Harvest Land Base							
3a. Moderate Intensity Timber Area	180,549	Commercial thinning	14,544	29,800	18,142	14,361	19,227
		Salvage (variable retention harvest)	221	80	90	163	104
		Regeneration harvest (variable retention harvest)	26,831	18,259	29,384	22,851	14,437
3b. Low Intensity Timber Area	89,125	Commercial thinning	7,760	9,580	7,886	9,575	11,566
		Salvage (variable retention harvest)	0	583	16	261	219
		Regeneration harvest (variable retention harvest)	8,548	8,592	8,728	8,895	6,501
3c. Uneven-Aged Timber Area	199,541	Group or single-tree selection harvest	35,730	37,406	42,636	40,143	37,895
		Salvage	2,018	1,614	3,714	2,333	4,881
4. Eastside Management Area	161,810		0	0	0	0	0

Table II-3. Acres of northern spotted owl critical habitat by land use allocation/sub-allocation.

Allocation	Sub-Allocation	Acres
Late-Successional Reserve		609,551
Riparian Reserve	Inner Riparian Reserve	185,635
	Outer Riparian Reserve (Moist)	60,323
	Outer Riparian Reserve (Dry)	92,377
Other Reserves	Congressionally Reserved	7,908
	District Designated Reserves	70,009
Harvest Land Base	Moderate Intensity Timber Area	895
	Low Intensity Timber Area	73,022
	Uneven-Aged Timber Area	108,229
Eastside Management Area	-	0

1. Management Objectives by Land Use Allocation

Congressionally Reserved Lands and National Landscape Conservation System

- Conserve, protect, and restore the identified outstanding cultural, ecological, and scientific values of the National Landscape Conservation System and other congressionally designated lands.
- Preserve the wilderness character of designated Wilderness Areas.
- Preserve wilderness characteristics in Wilderness Study Areas in accordance with non-impairment standards as defined under the management policy for Wilderness Study Areas (USDI BLM Manual 6330), until Congress either designates these lands as wilderness or releases them for other purposes.

District-Designated Reserves

- Maintain the values and resources for which the BLM has reserved these areas from sustained-yield timber production.

Eastside Management Area (forested lands)

- Manage forested lands on a sustainable basis for multiple uses including wildlife habitat, recreational needs, riparian habitat, cultural resources, community stability, and commodity production, including commercial timber and other forest products.
- Promote development of fire-resilient forests. Apply prescribed burns, mechanical or hand fuels treatments to reduce the potential for uncharacteristic wildfires. Apply maintenance treatments at appropriate intervals to retain fire resilient conditions.
- Offer for sale the probable sale quantity of 350,000 board feetof timber per year.

Eastside Management Area (non-forested lands)

- Manage non-forest lands with the intent of maintaining or improving wildlife habitat and rangeland conditions based on ecological site parameters. Where conditions are currently late seral or potential natural community, maintain these conditions. Where conditions are early or mid seral, improve conditions towards late seral or potential natural community.
- Manage non-forest lands for multiple uses in addition to those listed above including: recreational needs, community stability, and commodity production. Commodities include firewood, logs, biomass, chips, and other products and byproducts from juniper woodlands and rangelands.
- Promote development of fire-resilient woodlands and rangelands.

- Provide for the conservation of BLM Special Status Species.

Eastside Management Area - Riparian Reserve

- Provide for conservation of special status fish and other special status riparian-associated species.
- Provide for the riparian and aquatic conditions that supply stream channels with shade, sediment filtering, leaf litter and large wood sources, and stream bank stability.
- Maintain and restore water quality and hydrologic functions.
- Maintain and restore access to stream channels for all life stages of aquatic species.
- Maintain and restore the proper functioning condition and ecological site potential of riparian and wetland areas.

Harvest Land Base

The Harvest Land Base has management objectives to—

- Manage forests to achieve continual timber production that can be sustained through a balance of growth and harvest;
- Offer for sale the declared annual productive capacity of timber (205,000,000 board feet per year);
- Recover economic value from timber harvested after disturbance, such as a fire, windstorm, disease, or insect infestation;
- Ensure the establishment and survival of desirable trees appropriate to the site and enhance their growth in harvested or disturbed areas; and
- Enhance the economic value of timber in forest stands.

Late-Successional Reserve

The Late-Successional Reserve has management objectives to—

- Protect stands of older, structurally-complex, conifer forest;
- Maintain habitat for the northern spotted owl and marbled murrelet;
- Promote development of habitat for the northern spotted owl in stands that do not currently meet suitable habitat criteria; and
- Promote development of nesting habitat for the marbled murrelet in stands that do not currently meet nesting habitat criteria.

Riparian Reserve

The Riparian Reserve has management objectives to—

- Contribute to the conservation and recovery of listed fish species and their habitats and provide for conservation of special status fish and other special status riparian associated species;
- Maintain and restore natural channel dynamics and processes and the proper functioning condition of riparian areas, stream channels and wetlands by providing forest shade, sediment filtering, wood recruitment, stability of stream banks and channels, water storage and release, vegetation diversity, nutrient cycling, and cool and moist microclimates;
- Maintain water quality and stream flows within the range of natural variability, to protect aquatic biodiversity, and provide quality water for contact recreation and drinking water sources;
- Meet ODEQ water quality criteria;
- Maintain high quality water and contribute to the restoration of degraded water quality downstream of BLM-administered lands; and
- Maintain high quality waters within ODEQ designated Source Water Protection watersheds.

2. Management Objectives by Resource Program

Administrative Actions

- Provide for the orderly and efficient management of resources.

Air Quality

- Protect air quality related values in Federal mandatory Class I areas.
- Prevent exceedances of national, state, or local ambient air quality standards.

Areas of Critical Environmental Concern

- Maintain or restore relevant and important values in Areas of Critical Environmental Concern, including Research Natural Areas and Outstanding Natural Areas.

Under the Proposed RMP, the BLM would designate 108 Areas of Critical Environmental Concern.

Cultural Resources

- Preserve and protect significant cultural resources and ensure that they are available for appropriate uses by present and future generations.
- Reduce imminent threats and resolve potential conflicts from natural or human-caused deterioration or potential conflict with other resources by ensuring that all authorizations for land and resource use will comply with Section 106 of the National Historic Preservation Act.

Fire, Fuels, and Wildfire Response

- Respond to wildfires in a manner that provides for public and firefighter safety while meeting land management objectives by utilizing the full range of fire management options.
- Fire management strategies would be risk-based decisions that consider firefighter and public safety, values at risk, management objectives, and costs that are commensurate with the identified risk.
- Actively manage the land to restore and maintain resilience of ecosystems to wildfire and decrease the risk of uncharacteristic, large, high-intensity/high-severity wildfires.
- Manage fuels to reduce wildfire hazard, risk, and negative impacts to communities and infrastructure, landscapes, ecosystems, and highly valued resources.
- Participate with communities bordering Federal lands in partnership with local, State, and Federal stakeholders to reduce the risks and threats from wildland fire.

Fisheries

- Improve the distribution and quantity of high quality fish habitat across the landscape for all life stages of ESA-listed, BLM Special Status Species, and other fish species.
- Maintain and restore access to stream channels for all life stages of aquatic species.

Forest Management

- Enhance the health, stability, growth, and vigor of forest stands.
- In harvested or disturbed areas, ensure the establishment and survival of desirable vegetation appropriate to the site.
- Facilitate safe and efficient forestry operations for the BLM, reciprocal right-of-way agreement holders, and permittees.

Hydrology

- Maintain water quality within the range of natural variability that meets ODEQ water quality standards for drinking water, contact recreation, and aquatic biodiversity.

Invasive Species

- Prevent the introduction of invasive species and the spread of existing invasive species infestations.
- Prevent the introduction and the spread of sudden oak death (*Phytophthora ramorum*) infections.

The Proposed RMP includes treatment at all sudden oak death infection sites.

Lands, Realty, and Roads

- Make land tenure adjustments to facilitate the management of resources and enhance public resource values.
- Provide legal access to BLM-administered lands and facilities to support resource management programs.
- Provide needed right-of-ways, permits, leases, and easements over BLM-administered lands in a manner that is consistent with Federal and State laws.
- Protect lands that have important resource values or substantial levels of investment by withdrawing them, where necessary, from the implementation of nondiscretionary public land and mineral laws.
- Provide a road transportation system that serves resource management needs (administrative/commercial) and casual use needs (recreational/domestic) for both BLM-administered lands and adjacent privately-owned lands.

Under the Proposed RMP, right-of-way avoidance areas would increase from 243,928 acres to 326,510 acres, and right-of-way exclusion areas would increase from 43,590 acres to 93,274 acres. Other than the designation of right-of-way avoidance areas and right-of-way exclusion areas, the Proposed RMP does not contain any *affirmative agency actions* subject to the ESA regarding rights-of-way. The Proposed RMP does not make any designations or allocations regarding rights-of-way other than the right-of-way avoidance areas and right-of-way exclusion areas. Other than the designation of right-of-way avoidance areas and right-of-way exclusion areas, the Proposed RMP makes no decision in principle about future rights-of-way and does not establish criteria for granting or denying future rights-of-way. Other than the designation of right-of-way avoidance areas and right-of-way exclusion areas, all components of the Proposed RMP regarding rights-of-way state the BLM's existing authorities and responsibilities or are beyond the discretion of the BLM.

Livestock Grazing

- Provide for livestock grazing consistent with other resource objectives while maintaining or improving the health of the public rangelands.
- Prevent livestock from causing trampling disturbance to spawning beds where ESA-listed and Bureau Sensitive fish species occur.

Under the Proposed RMP, the BLM would manage allotments in compliance with Standards for Rangeland Health and Guidelines for Livestock Grazing Management for Public Lands in Oregon and Washington (USDI BLM 1997). The BLM would adjust grazing levels and management practices when needed to meet or make progress toward meeting the standards for rangeland health. The BLM would make unavailable to grazing those allotments that have generally been vacant or inactive for 5 years or more, as listed in **Appendix D**.

Minerals

- Manage the development of leasable (including traditional and non-traditional hydrocarbon resources), locatable, and salable resources in an orderly and efficient manner.
- Maintain availability of mineral material sites needed for development and maintenance of access roads for forest management, timber harvest, local communities, rights-of-way for energy production and transmission, and for other uses.

Under the Proposed RMP, the BLM would recommend for withdrawal from locatable mineral entry 307,312 acres and would close 249,241 acres to salable mineral development.

Paleontological Resources

- Protect and preserve significant paleontological localities from natural or human-caused deterioration or potential conflict with other resources.
- Provide appropriate scientific, educational, and recreational use, such as research and interpretive opportunities for paleontological resources.

Rare Plants and Fungi

- Provide for conservation and contribute toward the recovery of plant and fungi species that are listed, or are candidates for listing, under the ESA.
- Support the persistence and resilience of natural communities, including those associated with forests, oak woodlands, shrublands, grasslands, cliffs, rock outcrops, talus slopes, meadows, and wetlands. Support ecological processes and disturbance mechanisms to allow for a range of seral conditions.
- Provide for the conservation of Bureau Special Status plant and fungi species.
- Support the persistence and resilience of oak species within oak woodlands and within mixed hardwood/conifer communities.

Under the Proposed RMP, the BLM would manage mixed hardwood/conifer communities to maintain and enhance oak persistence and structure and manage mixed conifer communities to maintain and enhance pine persistence and structure.

Recreation and Visitor Services

- Provide a diversity of quality recreational opportunities.
- Meet legal requirements for visitor health and safety and mitigate resource user conflicts.
- Mitigate recreational impacts on natural and cultural resources. In land use allocations where management of other resources is dominant, provide recreational opportunities where they can be managed consistent with the management of these other resources.
- Develop new recreation opportunities (e.g., trails, trailheads, restrooms) to address recreation activity demand created by growing communities, activity groups, or recreation-tourism if—
    - Recreation development is consistent with interdisciplinary land use plan objectives;
    - The BLM has legal public access to the site; and
    - The BLM has secured commitments from partners in the form of a cooperative management agreement, adopt a trail agreement, memorandum of understanding, etc.

The Proposed RMP includes designation of Special Recreation Management Areas at currently developed recreation facilities, and on lands where designation does not conflict with sustained-yield timber harvest. The Proposed RMP includes designation of Extensive Recreation Management Areas where the BLM has developed and currently manages recreation activities outside of developed facilities, primarily where the BLM has authorized motorized and non-motorized trails, and where the BLM currently manages dispersed recreation activities. In addition, the BLM would designate Special Recreation Management Areas and Extensive Recreation Management Areas to address specific recreation demand and scarcity, or where unique opportunities for activity-specific demands exist. In the rest of the **action area**, the BLM would not manage specifically for recreation, but recreation could occur to the extent that the BLM has legal public access and recreation is not in conflict with the primary uses of these lands.

Soil Resources

- Maintain or enhance the inherent soil functions of management ecosystems (e.g., ability of soil to take in water, store water, regulate outputs for vegetative growth and stream flow, and resist erosion or compaction).
- Provide landscapes that stay within natural soil stability failure rates during and after management activities.

Sustainable Energy

- Develop sustainable energy resources to the maximum extent possible without precluding other land uses.

Trails and Travel Management

- Maintain a comprehensive travel network that best meets the full range of public use, resource management, and administrative access needs.
- Protect fragile and unique resource values from damage by public motorized vehicle use.
- Provide public motorized vehicle use opportunities where appropriate.

Visual Resource Management

- Protect the quality of the scenic values on public lands where visual resources are an issue or where high-value visual resources exist, and protect areas having high scenic quality, visual sensitivity, and public visibility.
- Prohibit activities that would disrupt the existing character of the landscape in Visual Resource Management Class I areas.
- Retain the existing character of the landscape in Visual Resource Management Class II areas.
- Partially retain the existing character of the landscape in Visual Resource Management Class III areas.
- Allow for major modification of the existing character of the landscape in Visual Resource Management Class IV areas.

Under the Proposed RMP, the BLM would manage Congressionally Reserved Lands where decisions have been made to preserve a natural landscape (e.g., designated Wilderness Areas and the wild sections of Wild and Scenic Rivers) as Visual Resource Management Class I. The BLM would manage the following as VRM II: designated and recommended suitable Wild and Scenic Rivers classified as scenic; National Trail management corridors; Lands with Wilderness Characteristics where the BLM chooses to protect the inventoried characteristics; and Special Recreation Management Areas that fall within the primitive and backcountry setting. The BLM would manage the following as VRM III: designated and recommended suitable Wild and Scenic Rivers classified as recreational; and Special and Extensive Recreation Management Areas that fall within the middle country setting. The BLM would manage visual resources on ACECs according to their established Inventory class, except that the BLM would manage ACECs within the Harvest Land Base that are VRI II as VRM III. The BLM would manage all other lands as Visual Resource Management Class IV.

Wild Horses

- Manage and maintain a healthy population of wild and free-roaming horses in the Pokegama Herd Management Area of the Klamath Falls Field Office.

Wildlife

- Conserve and recover species that are ESA-listed, proposed, or candidates, and the ecosystems on which they depend.

- 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.
- Conserve or create habitat for species addressed by the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act and the ecosystems on which they depend.

Under the Proposed RMP, the BLM would implement the mitigation measure described in the Draft RMP/EIS for BLM participation in barred owl management (see Section II H 1 of this assessment, below). As described in the Draft RMP/EIS, the BLM would cooperate with the U.S. Fish and Wildlife Service and provide financial support for their experimental removal of barred owls. Further, when the U.S. Fish and Wildlife Service determines the best manner in which barred owl management can contribute to the recovery of the northern spotted owl, the BLM would participate in, cooperate with, and provide support for an interagency program for barred owl management to implement Recovery Action 30. Barred owl management actions on BLM-administered lands within the range of the northern spotted owl could include BLM participation in scheduling, funding, and implementing such actions.

Within the Harvest Land Base, the Proposed RMP includes—
- A requirement to avoid the incidental take of northern spotted owls until implementation of a barred owl management program has begun.
- A requirement for surveys for the marbled murrelet prior to management actions in marbled murrelet Zone 1 and protection of habitat within 300 feet around newly discovered occupied sites;
- The protection of trees capable of providing marbled murrelet nesting structures in younger stands in marbled murrelet Zone 1; and
- A requirement for surveys for North Oregon Coast Distinct Population Segment of the red tree vole prior to management actions north of Highway 20 and protection of habitat areas around newly discovered nest sites north of Highway 20.

H. SPECIAL PROVISIONS FOR NORTHERN SPOTTED OWL MANAGEMENT

1. BLM Participation in Barred Owl Management

The U.S. Fish and Wildlife Service is currently authorizing the removal of barred owls from four study areas in California, Oregon, and Washington to evaluate the feasibility, cost, and effectiveness of barred owl removal and the resulting effects to northern spotted owl populations (USDI FWS 2013e). In the Revised Recovery Plan for the Northern Spotted Owl, Recovery Action 29 describes the design and implementation of large-scale barred owl control experiments to assess the effects on spotted owl site occupancy, reproduction, and survival (USDI FWS 2011a, p. III-65). Recovery Action 30 calls for management to reduce the negative effects of barred owls on spotted owls so that the recovery criterion for a stable population trend can be achieved. In the Revised Recovery Plan for the Northern Spotted Owl, the U.S. Fish and Wildlife Service acknowledges the need for aggressive strategies to address the threat from barred owls in the face of scientific uncertainty, and will employ an active program of adaptive management in order to deal with uncertainty and risk (USDI FWS 2011a, p. II-6–II-10).

Based on information in the Revised Recovery Plan for the Northern Spotted Owl (USDI FWS 2011a), the analysis in the U.S. Fish and Wildlife Service EIS for Experimental Removal of Barred Owls to Benefit Threatened Northern Spotted Owls (USDI FWS 2013e), and preliminary results from experimental removals (Diller 2013, Diller *et al*. 2014), barred owl management may result in decreased competition between barred owls and northern spotted owls, increased site occupancy by northern spotted owls, and increased northern spotted owl survival and reproduction. These outcomes may increase the likelihood of recovery of the northern spotted owl. As such, the experimental removals represent an inquiry into the best manner in which barred owl management can contribute to the recovery of the northern spotted owl.

The BLM is cooperating with the U.S. Fish and Wildlife Service and providing financial support for this experimental removal of barred owls. Further, when the U.S. Fish and Wildlife Service determines the best manner in which barred owl management can contribute to the recovery of the northern spotted owl, the BLM would participate in, cooperate with, and provide support for an interagency program for barred owl management to implement Recovery Action 30. Barred owl management actions on BLM-administered lands within the range of the northern spotted owl could include BLM participation in scheduling, funding, and implementing such actions. These actions would be implemented pursuant to appropriate NEPA analysis and decision-making. To the extent the BLM funds implementation of the Experimental Removal of Barred Owls to Benefit Threatened Northern Spotted Owls (USDI FWS 2013e), the NEPA analysis for that action is already completed. The EIS prepared by the U.S. Fish and Wildlife Service describes and evaluates nine alternatives for an experimental removal of barred owls on a scale sufficient to determine if the removal would increase northern spotted site occupancy and improve population trends. Results from these experiments would be used by the U.S. Fish and Wildlife Service to inform future decisions on potential long-term management strategies for barred owls (USDI FWS 2013e). That analysis is hereby incorporated by reference.

The BLM and U.S. Fish and Wildlife Service will develop a monitoring program that will evaluate whether such a barred owl management program is having the biological benefits to the northern spotted owl assumed by the Biological Opinion on the RMP. The BLM and U.S. Fish and Wildlife Service will meet as necessary, at least annually, to review the results of the monitoring program.

2. Incidental Take of Northern Spotted Owls

As described in **Appendix A**, the BLM will not authorize timber sales that would cause the incidental take[15] of northern spotted owl territorial pairs or resident singles from timber harvest until implementation of a barred owl management program consistent with the assumptions contained in the Biological Opinion on the RMP has begun. Implementation of a barred owl management program includes the existence of a monitoring program that will evaluate whether a barred owl program is having the biological benefits to the northern spotted owl assumed by the Biological Opinion on the RMP.

Whether a specific timber harvest would result in incidental take will be determined on a case-by-case basis. Until implementation of a barred owl management program has begun, the BLM will not authorize any timber harvest that it determines would cause incidental take of northern spotted owls or is determined to cause incidental take through a section 7 consultation process. The BLM will be authorizing timber harvest that does not result in incidental take of northern spotted owls (e.g., harvest in unoccupied home ranges or harvest within occupied home ranges that does not constitute incidental take), provided that such harvest otherwise meets BLM's obligations under ESA section 7.

As part of the process to determine whether a planned timber harvest would result in take of northern spotted owls, the BLM will establish whether the northern spotted owl is actually present in the area that would be affected by the timber harvest using the best available science at that time, such as through pre-project northern spotted owl surveys consistent with USDI Fish and Wildlife Service 2012 *Protocol for Surveying Proposed Management Activities That May Impact Northern Spotted Owls* (February 2, 2011; revised January 9, 2012). The U.S. Fish and Wildlife Service has updated the northern spotted owl survey protocol to account for the influence of barred owl and may update it in the future.

[15] The ESA defines "take" as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." 16 U.S.C. 1532(19). The definition of harm is "an act which actually kills or injures wildlife. Such an act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering." 50 C.F.R. 17.3; *Babbitt v. Sweet Home Chapter of Cmtys. for a Greater Or.*, 515 U.S. 687, 696-700 (1995).

If the BLM and the Service jointly determine that implementation of a barred owl management program has begun, the BLM may proceed with implementation of timber harvest consistent with the ROD/RMP that may include incidental take of northern spotted owl territorial pairs or resident singles. Any proposed timber harvest that may include such incidental take would be implemented only after and consistent with appropriate project-level section 7 consultation and incidental take statement.

After implementation of a barred owl management program has begun, the BLM and Service will meet as necessary, at least annually, to review the results of the monitoring program. If the BLM or the Service concludes that the monitoring program shows that the results of such a barred owl management program are not consistent with the assumptions in its Biological Opinion, the BLM will reinitiate section 7 consultation on the RMP.

If the BLM or the Service concludes that implementation of a barred owl management program consistent with the assumptions contained in the Biological Opinion has not begun after five years from the effective date of the ROD/RMP, the agencies will meet as necessary, at least annually, and evaluate whether implementation of a barred owl management program consistent with the assumptions of the Biological Opinion is reasonably certain to occur. If both the BLM and the Service agree that such a barred owl management program is still reasonably certain to occur, the BLM will continue to not authorize timber sales that would cause the incidental take of northern spotted owl territorial pairs or resident singles from timber harvest. If the BLM or the Service concludes that such a barred owl management program is not reasonably certain to occur, the BLM will reinitiate section 7 consultation on the RMP.

If implementation of a barred owl management program has not begun after eight years of the effective date of the ROD/RMP, the BLM will reinitiate section 7 consultation on the RMP.

If reinitiation of section 7 consultation on the RMP is triggered for any of the reasons above, the BLM will comply with ESA section 7(d) and will not authorize timber harvest that is likely to adversely affect the northern spotted owl or likely to adversely affect its critical habitat until consultation is complete.

After implementation of a barred owl management program has begun, the BLM would continue to seek to avoid or reduce negative impacts to northern spotted owl sites, to the extent consistent with the management objectives and management direction for the Harvest Land Base, as detailed below.

3. Management of Northern Spotted Owl Known Sites Associated with the Harvest Land Base

In 2013, an estimated 175 known sites occurred in what would be the Harvest Land Base under the Proposed RMP. In addition, the Harvest Land Base under the Proposed RMP would contribute to the 500-acre core use areas of an additional estimated 660 known sites located in other land use allocations, and to the median provincial home range areas of another estimated 250 known sites. Thus, an estimated 1,085 known sites, or 44 percent of the known sites associated with BLM-administered lands, potentially would be affected by BLM management actions in the Harvest Land Base under the Proposed RMP. Given the severe biological stressors currently affecting the northern spotted owl, when designing, locating and implementing actions in the Harvest Land Base, BLM managers would[16] avoid or delay negative impacts to northern spotted owl known sites located in the Harvest Land Base, and avoid causing the abandonment of northern spotted owl known sites located in other land use allocations, to the extent

[16] Guidance in this section for avoiding harvest or prioritizing harvest is in the context of those actions that are allowable consistent with the management objectives and management direction for the Harvest Land Base. Thus, statements throughout this section about actions that the BLM would or would not take are solely explanations of how the BLM would use the completed RMPs and do not constitute additional requirements beyond the management direction described in **Appendix A**.

consistent with the management objectives and management direction for the Harvest Land Base, as described below.

This guidance is not intended to prevent all negative effects to known sites associated with the Harvest Land Base or the eventual loss of known sites in the Harvest Land Base. Instead, this guidance is intended to avoid or delay, to the extent consistent with the management objectives and management direction for the Harvest Land Base, near-term negative effects to known sites as northern spotted owl habitat continues to develop in the reserved land use allocations and the U.S. Fish and Wildlife Service evaluates options for barred owl management.

The following information is intended to help BLM managers implement this guidance.

Known Sites Located in the Harvest Land Base

With respect to sites currently occupied by a northern spotted owl territorial pair or resident single at any time during project implementation, to the extent consistent with the management objectives and management direction for the Harvest Land Base, BLM managers would:

- Avoid management actions that would cause the abandonment of more than 10 percent of such sites during the first decade of plan implementation, more than 15 percent of such sites during the second decade of plan implementation, and more than 20 percent of such sites per decade thereafter. These thresholds are intended to reflect site abandonment caused by a BLM action; they are not intended to reflect site abandonment from other causes such as displacement by barred owls or habitat losses on adjacent lands. If the BLM determines that an action would not cause the incidental taking of a territorial pair or resident single, and the U.S. Fish and Wildlife Service concurs with that determination, subsequent abandonment of a site associated with the action would not be considered as resulting from the action.
- Give priority to maintaining existing habitat in the associated nest patch, 500-acre core use area and median provincial home range area, in that order of priority, to support continued site occupancy.

With respect to sites not currently occupied but known to have been occupied by a territorial pair or resident single within the prior 5 years, BLM managers would give priority to maintaining existing habitat conditions in the nest patch and 500-acre core use area, and maintaining existing nesting-roosting-foraging habitat in the associated median provincial home range area, to the extent consistent with the management objectives and management direction for the Harvest Land Base. If the BLM cannot maintain all existing nesting-roosting habitat in the median provincial home range area, BLM managers would give priority to maintaining nesting-roosting habitat closest to the 500-acre core use area and maintaining at least 50 percent of the median provincial home range area as nesting-roosting-foraging habitat when all lands are considered.

With respect to sites not currently occupied, but known to have been occupied by a territorial pair or resident single within the prior 10 years, BLM managers would give priority to maintaining existing habitat conditions in the nest patch and maintaining existing nesting-roosting habitat in the 500-acre core use area, or promoting the protection and development of nesting-roosting habitat in the nest patch and 500-acre core use area, to the extent consistent with the management objectives and management direction for the Harvest Land Base.

BLM managers would give priority to implementing management actions that are located outside the median provincial home range area of a site, or would affect sites not known to have been occupied by a territorial pair or resident single within the prior ten years, over actions that would affect sites that have been occupied within the prior ten years.

Known Sites Located Outside the Harvest Land Base

In 2013, approximately 590 known sites in other BLM land use allocations under the Proposed RMP were occupied by a territorial pair or resident single within the prior five years and had portions of the Harvest Land Base within their median provincial home range. In addition, if the U.S. Fish and Wildlife Service implements a barred owl management program, the BLM anticipates that northern spotted owls would reoccupy currently unoccupied habitat in areas where barred owls are managed.

As stated above, when designing, locating and implementing actions in the Harvest Land Base, BLM managers would avoid causing the abandonment of northern spotted owl known sites located in other land use allocations, to the extent consistent with the management objectives and management direction for the Harvest Land Base.

BLM managers would give priority to actions that affect sites–

- That are not known to have been occupied by a territorial pair or resident single within the prior 10 years. The longer a site has been unoccupied, the less likely it is to be re-occupied by northern spotted owls.
- That have less than 50 percent nesting-roosting-foraging habitat within the associated median provincial home range area when all land ownerships are considered. Sites with median provincial home range areas supporting less than 50 percent nesting-roosting-foraging habitat are less likely to be re-occupied by northern spotted owls until habitat conditions recover.
- With less than 50 percent of the associated median provincial home range area occurring in the Late-successional Reserve, when all land ownerships and Forest Service reserves are considered. Sites associated with more reserved lands are more likely to be re-occupied by northern spotted owls, resist displacement by barred owls and contribute to species recovery.

BLM managers would avoid actions that–

- Occur in the nest patch of a site. Habitat modification in the nest patch will negatively affect re-occupancy of the site by northern spotted owls until habitat conditions recover.
- Cause the loss of nesting-roosting-foraging habitat in the 500-acre core use area surrounding a site. Sites with core use areas supporting less than 50 percent nesting-roosting-foraging habitat, when all land ownerships are considered, are less likely to be re-occupied by northern spotted owls until habitat conditions recover.
- Cause the amount of nesting-roosting-foraging habitat in the median provincial home range area surrounding a site to decline below 50 percent, when all land ownerships are considered.

III. ENVIRONMENTAL BASELINE

A. GENTNER'S FRITILLARY

Gentner's fritillary is a member of the lily family (*Liliaceae*) and has showy deep red to maroon flowers on a single erect flowering stem arising from an underground bulb. The bulbs produce small bulblets that are loosely attached to the parent individual. These asexually produced bulblets are the primary means of reproduction for the species (Amsberry and Meinke 2007). Many Gentner's fritillary plants do not flower or flower only in some years, thus making positive identification of newly discovered sites difficult.

Gentner's fritillary occurs in scattered locations throughout the Rogue and Illinois River watersheds within the BLM Medford District. Potential habitat also occurs in the Klamath Falls Resource Area of the BLM Lakeview District. Habitat is diverse, ranging from Oregon white oak woodlands, moist riparian areas, Douglas-fir forests, and serpentine areas. Where the species occurs within forested communities, it generally occurs on the edge or in openings.

The Medford District has surveyed an average of 40,000 acres of suitable habitat per year during 2008 – 2013. On average, the surveyors found one new Gentner's fritillary site for every 4,400 acres surveyed. Most sites are very small – fewer than 12 individuals. However, a few sites contain several hundred flowering plants with many more bulbs producing only vegetative leaves. The Medford District has augmented sites by outplanting bulblets since 2002.

There are 162 known sites in the **action area**. There are an additional 36 sites on BLM-administered lands within the Cascade-Siskiyou National Monument, which is outside the **action area**.

Gentner's fritillary occurs within eight active livestock grazing allotments. The Medford District has surveyed all suitable habitats within grazing allotments, and populations generally occur on steeper slopes outside of riparian areas, where cattle use is light. Botanists monitor the effects of grazing on Gentner's fritillary, and there is little evidence of direct grazing or trampling by cattle (M. Wineteer, BLM, personal communication, 2014). Currently, 62 Gentner's fritillary known sites, ranging in size from one plant to approximately 30 plants, occur in eight active grazing allotments. Another 55 Gentner's fritillary known sites occur within eight vacant grazing allotments. Of the active allotments with Gentner's fritillary sites, all are in the Improve Management category, meaning that the current resource condition does not meet Rangeland Standards and Guidelines. While cattle are not known to directly affect Gentner's fritillary, removing cattle might improve adjacent habitat for the species and allow for expansion.

Forty-six Gentner's fritillary known sites would occur in reserve land use allocations under the Proposed RMP. Seven known sites would occur in District-Designated Reserves. There are 13 known sites within the Uneven Aged Timber Area.

Gentner's fritillary can respond positively to wildfire due to increased light and moisture from the loss of overtopping and competing vegetation, and the increase in nutrients available.

B. WESTERN LILY

Western lily is a perennial in the lily family (*Liliaceae*) and occurs in a narrow strip along the immediate Pacific coast between Coos Bay, Oregon, and Eureka, California, in a variety of early-successional habitats: freshwater wetlands, coastal prairie and scrub, and the edges of Sitka spruce forest. The single natural BLM site occurs within the New River ACEC in the Coos Bay District. An experimental introduction of Western lily within the New River ACEC in 1996 produced its first flowering plant in 2011, but the researcher has not noted any natural reproduction as of 2014 (Guerrant 2015). Suitable habitat for additional introductions within the New River ACEC is limited (T. Rodenkirk, BLM Botanist, personal communication, 2014).

C. COOK'S LOMATIUM AND ITS CRITICAL HABITAT

Cook's lomatium is a perennial forb in the carrot family (*Apiaceae*). The species occurs in the BLM Medford District on 34 known sites in the Illinois Valley of Josephine County.. All of the known BLM sites would occur within District-Designated Reserves for Critical Habitat or within ACECs. ACECs that include Cook's lomatium are French Flat, Waldo Takilma, Rough and Ready, and Reeves Creek.

Habitats include the edge of vernal pools and, in the Illinois Valley, in seasonally wet grassy meadows, oak woodlands, and serpentine meadow and shrub habitats. The largest populations on BLM-administered lands are in and adjacent to the French Flat ACEC. Rural development, illegal refuse dumping, and recreational use threaten Cook's lomatium habitat in the Illinois Valley. Illegal uses such as OHV trespass and refuse dumping occasionally damage sites on BLM-administered lands, although the use of barricades and law enforcement efforts have successfully reduced effects in recent years (R.

Showalter, BLM, personal communication, 2014). Under the Proposed RMP, the BLM would not authorize livestock grazing of any habitat containing Cook's lomatium.

The BLM would allocate all 3,125 acres of Cook's lomatium critical habitat in the **action area** to District-Designated Reserves for Critical Habitat and manage those reserves for the species and its critical habitat.

D. ROUGH POPCORNFLOWER

Rough popcorn flower is an annual to perennial herb in the borage family (*Boraginaceae*) that occurs in seasonally wet meadows or Oregon ash-swale openings in northern Douglas County within the Roseburg District. There are no naturally-occurring populations of rough popcorn flower on BLM-administered lands. The Oregon Department of Agriculture, in cooperation with the BLM, planted three sites within the North Bank Habitat Management Area ACEC starting in 1998. One of these populations is thriving and has expanded to fill the potential habitat within the area. The second site is still extant; however, the number of plants has declined drastically over the years, likely due to a change in the site's hydrology. The BLM planted additional suitable habitat adjacent to the original planted location in 2006. The third population occurs in marginal habitat that is too dry for the species, and it is unlikely that the species still occurs there.

E. KINCAID'S LUPINE

Kincaid's lupine is a long-lived herbaceous perennial species in the pea family (*Fabaceae*). It ranges from Lewis County, Washington, to Douglas County, Oregon. Botanists first described the species from the Willamette Valley, where most of the known and historic populations occur. The habitat for Kincaid's lupine in the Willamette Valley consists primarily of upland prairie remnants. Within the **planning area**, the primary habitat is open woodland and meadow edges, often near roadsides, associated with Pacific madrone, incense cedar, and Douglas-fir trees with a relatively open canopy cover. Ten Kincaid's lupine sites are known in the **action area**, of which 8 occur in openings within woodland or forest communities. In addition, there are five sites on BLM-administered land within the West Eugene Wetlands, which is outside of the **action area**. In 2006, the U.S. Fish and Wildlife Service designated critical habitat for Kincaid's lupine in the Willamette Valley and Washington State, but not in the southern portion of its range in Douglas County. The only designated critical habitat for Kincaid's lupine on BLM-administered lands is within the West Eugene Wetlands, which is outside of the **action area**. In April 2006, the Roseburg District, U.S. Fish and Wildlife Service, and the Umpqua National Forest completed a programmatic conservation agreement for Kincaid's lupine in Douglas County (USDI BLM, USDI FWS, and USDA FS 2006). The three cooperating agencies completed the "Management Plan for Kincaid's Lupine in Douglas County, Oregon" in March 2008 (USDI BLM, USDI FWS, and USDA FS 2008). The management actions specified in the management plan tier to the management goals and objectives for recovery of Kincaid's lupine (USDI FWS 2010a). The primary threats to Kincaid's lupine in the **planning area** are forest succession and resulting canopy shading, noxious weed invasions, and road maintenance. In addition, the populations in the **planning area** are generally small and isolated from each other. This isolation limits the likelihood of cross-pollination between populations, which could result in inbreeding depression.

F. NELSON'S CHECKER-MALLOW

Nelson's checker-mallow is a long-lived perennial in the mallow family (*Malvaceae*) that occurs in the Willamette Valley from Benton County, Oregon, and north into Cowlitz and Lewis Counties, Washington. In the Willamette Valley, Nelson's checker-mallow occurs in wet prairies, stream sides, and occasionally in Oregon ash woodlands or among woody shrubs. On BLM-administered lands, the species occurs at one site in the Walker Flat ACEC on the Salem District. Most of the plants in this population occur on adjacent City of McMinnville property. Nelson's checker-mallow requires open habitats; succession and canopy closure is a threat to the species (USDI FWS 2012b).

G. TAYLOR'S CHECKERSPOT

The U.S. Fish and Wildlife Service listed Taylor's checkerspot butterfly (*Euphydras editha taylori*) as an endangered species under the ESA on October 3, 2013 (78 FR 61452). Within the **planning area**, this butterfly species was historically found throughout grasslands in in the Willamette Valley but the current range is reduced to Benton County (78 FR 61452 and USDI BLM 2013, p. 144). Analysis of the Management Situation for the RMPs for Western Oregon provides more information on the historic range and known populations (BLM 2013, p. 144).

The primary threat to Taylor's checkerspot butterfly is loss, conversion, and degradation of habitat due to agricultural and urban development, successional changes to grassland habitat, and invasive plants (78 FR 61473). Dispersal and nectaring distances for this species are poorly understood (Stinson 2005). The best available information estimates this species can disperse up to approximately 1.5 km (0.93 mi) between habitat patches (Benton County 2010, citing USDI FWS 2008b). There are four historic sites from the 1940s, approximately 1,800 feet from BLM-administered lands, but subsequent surveys have not re-located the species (GeoBOB 2013).

The U.S. Fish and Wildlife Service designated critical habitat for the Taylor's checkerspot butterfly on October 3, 2013 (78 FR 61506). The U.S. Fish and Wildlife Service designated 20 acres in Oregon, all on private lands (78 FR 61524).

The Recovery Plan for the Prairie Species of Western Oregon and Southwestern Washington, which addresses the recovery of the Taylor's checkerspot, recommends the following actions for this species:

- Determine this species' status in the area addressed by the Recovery Plan.
- Protect and restore populations and habitats to preclude the further decline of this species (USDI FWS 2010a, pp. IV-69, III-9).

Taylor's checkerspot butterfly is strongly associated with short-stature prairie and oak savanna habitats that have a mosaic of low-growing grasses and forbs, low-density canopy cover (high solar exposure), and relatively undisturbed soils (USDI BLM 2011, p. 19). For its analysis, the BLM considered habitat for Taylor's checkerspot butterfly to be grassland and prairie vegetation within Benton County. The BLM tabulated the amount of grassland and prairie habitat acres using vegetation model output for forests on BLM-administered lands, 2012 GNN structural condition for forest on non-BLM-administered lands, and 2012 GNN ecological systems for non-forest on all lands. The BLM also calculated the amount of oak woodland from a separate data layer used by the RMP interdisciplinary team to map forest site moisture conditions that included potential vegetation data. However, it is not possible for the BLM to determine how much of this potential habitat actually contains suitable host plants to provide nectar sources for Taylor's checkerspot butterfly larvae.

There are 16,621 acres of Taylor's checkerspot butterfly habitat within the **planning area**, of which only 4.4 acres occur on BLM-administered lands in the **action area** in the Salem District. The 4.4 acres is distributed amongst 16 patches with a maximum patch size of 2.0 acres. There no observations of this species on BLM-administered lands (GeoBOB FaunaObs, March 6, 2013) and the BLM does not suspect its occurrence there.

The BLM also identified the Oak Basin Prairie ACEC (224 acres) in the **action area** in the Eugene District, as containing an unspecified quantity of habitat for the Taylor's checkerspot (USDI BLM 2011, p. 19). However, no surveys for this species have been conducted. Given the occurrence of only two populations in Oregon 25 miles away, the limited ability of this species to disperse, and the generally low amount of host and nectar plants in or near Oak Basin, the BLM does not know or suspect that the Taylor's checkerspot butterfly occurs in the Oak Basin Prairie ACEC (USDI BLM 2011, p. 19).

H. FENDER'S BLUE BUTTERFLY

The U.S. Fish and Wildlife Service listed Fender's blue butterfly (*Icaricia icarioides fenderi*) as an endangered species under the ESA on January 25, 2000 (65 FR 3875). The West Eugene population, which is not within the **action area**, includes almost all of the current BLM-administered Fender's blue butterfly sites and critical habitat (USDI BLM 2012a). Analysis of the Management Situation for the RMPs for Western Oregon provides more information on the historic range and known populations of Fender's blue butterflies (USDI BLM 2013, p. 135).

The Recovery Plan for the Prairie Species of Western Oregon and Southwestern Washington, which addresses the recovery of the Fender's blue butterfly, recommends the following actions (USDI FWS 2010a, p. vi):

- Preserve, restore, and manage existing populations and habitat for Fender's blue butterfly.
- Coordinate management with recovery efforts for Kincaid's lupine, the larval host plant for Fender's blue butterfly.
- Implement a standardized population monitoring protocol.
- Monitor prairie quality and diversity at all population sites.
- Reintroduce populations and restore habitat, as necessary, to meet recovery goals.
- Implement further research needed for the conservation of the species.
- Develop a post-delisting monitoring plan prior to delisting.

Fender's blue butterfly is found exclusively in prairie habitats containing its larval food plants, primarily Kincaid's lupine, but also spur lupine, and occasionally sicklekeeled lupine (USDI FWS 2010a, USDI BLM 2012a). These butterflies have limited dispersal ability and remain close to their natal lupine patches. When foraging, more than 95 percent of Fender's blue butterflies are found within 33 feet of lupine patches (Schultz 1998, p. 289 and USDI BLM 2012a, pp. 70-80).

The U.S. Fish and Wildlife Service designated critical habitat for Fender's blue butterfly on October 31, 2006 (71 FR 63862). There are 2,180 acres of designated critical habitat for Fender's blue butterfly within the **planning area**, including on BLM-administered lands in the West Eugene Wetlands, which is outside of the **action area**. However, there is no designated critical habitat for Fender's blue butterfly within the **action area**. Therefore, the BLM will not analyze effects to critical habitat for this species further.

In its analysis, the BLM considered habitat for Fender's blue butterfly to be native grassland and prairie vegetation within Benton, Lane, Polk and Yamhill counties. The BLM tabulated the amount of grassland and prairie habitat acres using vegetation model output for forests on BLM-administered lands, 2012 GNN structural condition for forest on non-BLM-administered lands, and 2012 GNN ecological systems for non-forest on all lands.

There are 44,762 acres of Fender's blue butterfly habitat within the **planning area**, 102 acres of which occur on BLM-administered lands in the Eugene and Salem Districts. There are three localities on BLM-administered lands in the **action area** where Fender's blue butterflies have been documented, all three within the Eugene District: the Oak Basin Prairie ACEC (USDI BLM 2011:2, p. 17-18), Kelly Creek (GeoBOB 2015), and the Low Down timber sale (GeoBOB 2015). Within the Oak Basin Prairie ACEC, the BLM and other cooperators have been monitoring Fender's blue butterflies since 2006, and the population of adult Fender's blue butterflies has ranged from 23 to 83 individuals between 2006 and 2010 (USDI BLM 2011, pp. 17-18).

I. VERNAL POOL FAIRY SHRIMP AND ITS CRITICAL HABITAT

The U.S. Fish and Wildlife Service listed the vernal pool fairy shrimp (*Branchinecta lynchi*) as a threatened species under the ESA on September 19, 1994 (59 FR 48136). At the time of its listing, the species was known to occur only in California (USDI FWS 2014a). In 1998, additional populations were discovered in vernal pools in Jackson County, Oregon, in the Table Rocks area north of Medford. The U.S. Fish and Wildlife Service designated 5,153 acres of critical habitat for the vernal pool fairy shrimp in 2003 (68 FR 46684); 422 acres of critical habitat is on BLM-administered lands in the Table Rocks area of the Medford District. The U.S. Fish and Wildlife Service identified human recreation as the primary threat (USDI FWS 2005, p. II-200).

The Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon, which addresses the vernal pool fairy shrimp, recommends five recovery actions:

- Protect vernal pool habitat in the largest blocks possible from loss, fragmentation, degradation, and incompatible uses.
- Manage, restore, and monitor vernal pool habitat to promote the recovery of listed species and the long-term conservation of the species of concern.
- Conduct range-wide status surveys and status reviews for all species addressed in this recovery plan to determine species status and progress toward achieving recovery of listed species and long-term conservation of species of concern.
- Conduct research and use results to refine recovery actions and criteria, and guide overall recovery and long-term conservation efforts (USDI FWS 2005, p. IV-1 – IV-72).

Historically, there were 32,000 acres of vernal pool habitat in southern Oregon (USDI FWS 2005, p. II-192), but over 40 percent has been degraded (*ibid*., p. II-199). Threats to vernal pool habitat in Oregon include commercial and industrial development, agricultural conversion, and utility construction/expansion (*ibid*). Specific threats to the vernal pool habitat on BLM-administered lands in the Table Rocks area include trampling in the wet areas near pools from recreation and potential change in subsurface or surface flow runoff patterns due to trail construction or trail improvement (*ibid.*, p.II-200).

In this analysis, the BLM considered habitat for the vernal pool fairy shrimp to be vernal pools as identified in the 2012 GNN as "northern California claypan vernal pool" ecological systems. There are 7,668 acres of vernal pool fairy shrimp habitat within the **planning area**, of which 307 acres occur on BLM-administered lands. Under the Proposed RMP, all of the designated vernal pool fairy shrimp critical habitat on BLM-administered lands would be within the Table Rocks Outstanding Natural Area/Area of Critical Environmental Concern (ONA/ACEC), and the shrimp and its habitat would be among the "relevant and important values" of the ONA/ACEC. Approximately 96 percent of vernal pool fairy shrimp habitat (293 of 307 acres) would be within the Table Rocks ONA/ACEC as well; the 14 acres of habitat that would not be included in the Table Rocks ONA/ACEC would be allocated to the Riparian Reserve under the Proposed RMP.

J. OREGON SPOTTED FROG AND ITS PROPOSED CRITICAL HABITAT

The Oregon spotted frog (*Rana pretiosa*) has been lost from 48 of the 61 localities in which it historically occurred, and the species may no longer occur in 76 to 90 percent of its historical range (78 FR 53588). Historically, the spotted frog occurred from British Columbia, Canada, to northeastern California (78 FR 53587). It is currently found in five sub-basins within the **planning area**: the McKenzie River, Middle Fork Willamette, Upper Klamath, Upper Klamath Lake and Williamson River sub-basins. The U.S. Fish and Wildlife Service listed the Oregon spotted frog as a threatened species under the ESA on August 29, 2014 (79 FR 51658).

Oregon spotted frog habitat includes perennial bodies of warm water such as ponds, reservoirs, wetlands, and irrigation canals (78 FR 53586). They inhabit available wetland sites up to 4,915 acres, although sites greater than 9 acres in size may be necessary to support stable, local populations (78 FR 53586). Spotted frogs lay their eggs in wetland areas with low amounts of herbaceous cover, but rarely at bare or rocky sites (USDI FWS 2011c). Breeding and egg-laying occurs during February to March at lower elevations and during early April to early June at higher elevations; tadpoles metamorphose into froglets during the first summer (79 FR 51660). The maximum movement distance for Oregon spotted frogs between habitats is 3.1 miles (79 FR 51662).

Threats to Oregon spotted frogs include loss of wetland habitat due to human development or conversion to agriculture, livestock grazing, and introduction of nonnative plant and animal species (78 FR 53593). Heavy livestock grazing can consume and trample riparian vegetation, compact soil in riparian and upland areas, and introduce urine and feces to water sources. The resulting increases in temperature, sediment production, and changes in water quality can negatively affect Oregon spotted frog habitat (USDI FWS 2011c). Infestations of invasive reed canary grass create dense areas of vegetation that would be unsuitable for spotted frog egg-laying and reduce the biological and structural diversity. Removal or reduction of reed canary grass can improve the quality of the breeding habitat for spotted frogs (*ibid*.).

On August 29, 2013, the U.S. Fish and Wildlife Service proposed to designate critical habitat for the Oregon spotted frog on 16,715 acres in the **planning area**, eight acres of which occurs on BLM-administered lands in the Klamath Falls Field Office (78 FR 53538). Primary constituent elements for Oregon spotted frog proposed critical habitat (78 FR 53543 – 53544) are:

- Nonbreeding (N), Breeding (B), Rearing (R), and Overwintering Habitat (O). Ephemeral or permanent bodies of fresh water, including, but not limited to natural or manmade ponds, springs, lakes, slow-moving streams, or pools within or oxbows adjacent to streams, canals, and ditches, that have one or more of the following characteristics:
    - Inundated for a minimum of 4 months per year (B, R) (timing varies by elevation but may begin as early as February and last as long as September);
    - Inundated from October through March (O);
    - If ephemeral, areas are hydrologically connected by surface water flow to a permanent water body
    - (e.g., pools, springs, ponds, lakes, streams, canals, or ditches) (B, R);
    - Shallow water areas (less than or equal to 30 centimeters (12 inches), or water of this depth over vegetation in deeper water (B, R);
    - Total surface area with less than 50 percent vegetative cover (N);
    - Gradual topographic gradient (less than 3 percent slope) from shallow water toward deeper, permanent water (B, R);
    - Herbaceous wetland vegetation (i.e., emergent, submergent, and floatingleaved aquatic plants), or vegetation that can structurally mimic emergent wetland vegetation through manipulation (B, R);
    - Shallow water areas with high solar exposure or low (short) canopy cover (B, R);
    - An absence or low density of nonnative predators (B, R, N)
- Aquatic movement corridors. Ephemeral or permanent bodies of fresh water that have one or more of the following characteristics:
    - Less than or equal to 5 kilometers (3.1 miles) linear distance from breeding areas;
    - Impediment free (including, but not limited to, hard barriers such as dams, biological barriers such as abundant predators, or lack of refugia from predators).
- Refugia habitat. Nonbreeding, breeding, rearing, or overwintering habitat or aquatic movement corridors with habitat characteristics (e.g., dense vegetation and/or an abundance of woody debris) that provide refugia from predators (e.g., nonnative fish or bullfrogs).

After consulting with the U.S. Fish and Wildlife Service, the BLM assumed that Oregon spotted frog habitat includes wetlands of any size within 3.1 miles of habitats occupied, or formerly occupied, by spotted frogs. Occupied and formerly occupied habitats are represented by the extent of proposed critical habitat for the spotted frog (B. White, USFWS Oregon State Office, Consultation Branch Manager, *pers. comm*., Sept. 4, 2015). The BLM characterized wetlands smaller than 9 acres in size as small habitat patches, and wetlands at least 9 acres in size as large habitat patches.

Since the U.S. Fish and Wildlife Service identified livestock grazing as a threat, the BLM tabulated how much spotted frog habitat in the **action area** was coincident with BLM-administered grazing allotments. BLM consulted the riparian portions of the rangeland health assessments to determine if grazing management in those particular allotments would be contributing adverse effects to spotted frog habitat.

The BLM has documented Oregon spotted frogs in the Klamath Falls Field Office (GeoBOB 2013). There are 99,743 acres of Oregon spotted frog habitat within the **planning area**, and 99 percent of that habitat occurs in large habitat patches (**Table III-1**). There are 286 acres of habitat on BLM-administered lands, and 67 percent of that habitat occurs in large habitat patches. The remaining 99,458 acres of habitat in the **planning area** occur on lands managed by the private landowners (55 percent), U.S. Fish and Wildlife Service (40 percent), Forest Service (4 percent), the Bureau of Reclamation (<1 percent), and other landowners (1 percent). The U.S. Fish and Wildlife Service expects that habitat losses will continue on private lands but at much lower rates than in the past because of Federal and State regulations that pertain to wetlands (USDI FWS 2011c).

Table III-1. Oregon spotted frog habitat in the **action** and **planning area**s.

Oregon Spotted Frog Habitat	Action Area (Acres)	Planning Area (Acres)
Small Habitat Patches	94	1,315
Large Habitat Patches	191	98,428
Totals	**286**	**99,743**

There are 285 acres of spotted frog habitat within four grazing allotments in the **action area** (Buck Mountain [#00103], Buck Lake [#00104], Buck Point [#10114],and Keene Creek [#10115]). Of these four grazing allotments, the BLM identified that all four were meeting rangeland health standards. The season-of-use in these grazing allotments varies, but begins in May and ends between August and October, depending on the individual allotment.

The Oregon spotted frog is identified as one of the “relevant and important values” of the proposed Tunnel Creek ACEC. There are 38 acres of spotted frog proposed critical habitat and 40 acres of habitat in the proposed ACEC.

K. GRAY WOLF

The U.S. Fish and Wildlife Service originally listed subspecies or regional populations of wolves (the timber wolf, *Canis lupus lycaon*) under the Endangered Species Preservation Act of 1966 on March 11, 1967 (32 FR 4001). On March 9, 1978, the U.S. Fish and Wildlife Service listed the gray wolf (*C. lupus*) as an endangered species under the ESA at the species level on March 9, 1978 (43 FR 9607). Between 2003 and 2009, the U.S. Fish and Wildlife Service published several rules delisting gray wolves in most of the United States (except for populations in the southwestern United States and Mexico). As a result of litigation, the listing status of the gray wolf in 2010 was the same as it was in 1978 (78 FR 35666). The U.S. Fish and Wildlife Service delisted the Northern Rocky Mountain distinct population segment of the gray wolf (except in Wyoming) on May 5, 2011 (76 FR 25590).The U.S. Fish and Wildlife Service currently considers the gray wolves in the Pacific Northwest to be the subspecies *Canis lupus nubilus* (78 FR 35671). The U.S. Fish and Wildlife Service proposed to remove gray wolves, including those in the

Pacific Northwest, from the list of endangered and threatened wildlife under the ESA on June 13, 2013 (78 FR 35664). Critical habitat for the gray wolf has not been designated by the U.S. Fish and Wildlife Service in Oregon (USDI FWS 2014b).

There is one known pack of gray wolves in the **planning area**, called the Rogue pack (which includes the radio-collared male [OR7] who became pack alpha). The Rogue pack's area of use includes portions of the Klamath Falls Field Office and Medford District (**Figure III-1**). There is also a second area of known wolf activity (called the Keno pair) in the **planning area**, where a pair of wolves has shown repeated use. A wolf had been using the Keno area since December 2014, and the Oregon Department of Fish and Wildlife documented use by a second wolf in January 2015, which establishes this as an area of known wolf activity (ODFW 2015a; **Figure III-1**).

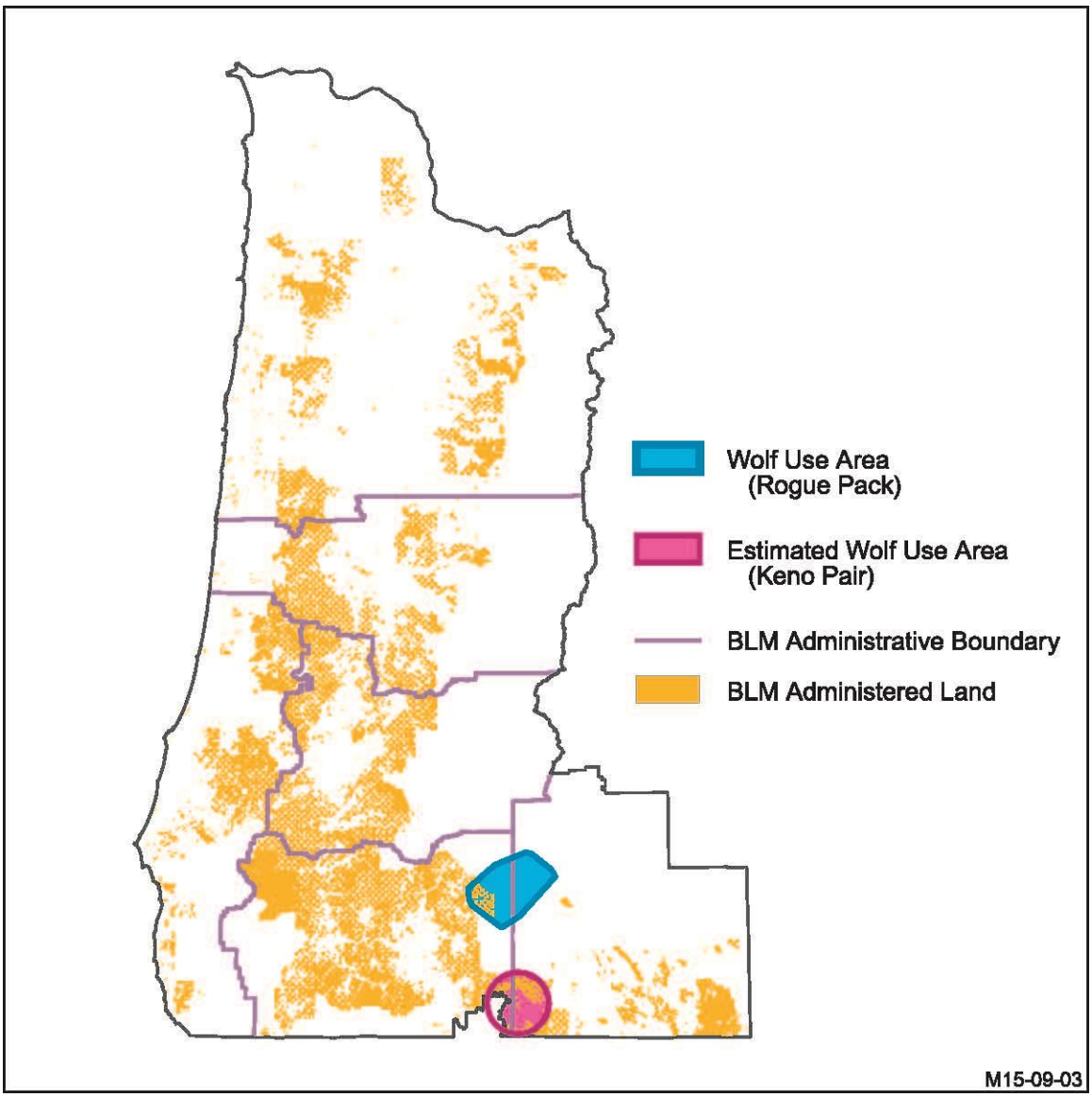


Figure III-1. Known areas of wolf activity in the **planning area**.

OR7 is a radio-collared male gray wolf whose movements are tracked by Oregon Department of Fish and Wildlife. OR7 dispersed from the Imnaha pack located in northeastern Oregon in September 2011. In March 2013, OR7 moved into Klamath County, Oregon, and found a mate in May 2014. Oregon Department of Fish and Wildlife biologists confirmed that OR7 and his mate had produced pups, and thus became a "pack" on June 4, 2014 (ODFW 2014a), and the pack also had pups in 2015 (ODFW 2015b). Genetic evidence suggests that OR7's mate (the alpha female) is a wolf with heritage from two other packs in northeastern Oregon: the Snake River and Minam packs. Prior to the Rogue pack formation, there had been dispersing wolves documented in western Oregon but no verified wolf packs (78 FR 35679, ODFW 2010). A minimum of 14 adult wolves (dispersing individuals, not associated with a pack) were known to live in Oregon as of 2010 (ODFW 2010). As of August 2015, ODFW has delineated 14 areas of known wolf activity in northeastern Oregon and two areas of known wolf activity (Rogue pack and Keno pair) in southwestern Oregon (ODFW 2015a and 2015b) (Figure III-1); however, spatial descriptions for the two most recent designations are not available and are not shown on Figure III-1 above. As of 2014, there are seven wolves in the **planning area** (the Rogue Pack and the Keno pair), and 77 wolves in the state of Oregon (**Table III-2**). The population of wolves in the state has increased five-fold from between 2009 through 2014 (**Table III-2**). In time, gray wolves will likely establish additional packs in the **planning area**, given the observed increase in the wolf population in Oregon.

Table III-2. Wolf population, control, and depredation in Oregon

Wolf Statistics	2009[1]	2010[2]	2011[3]	2012[4]	2013[5]	2014[6]	Cumulative Total
Minimum Wolf Population *(# individuals)*	16	21	29	46	64	77	*Not applicable*
Wolf Packs *(# packs)*	2	2	4	6	8	9	*Not applicable*
Wolves Removed *(# individuals removed)*	2	-	2	-	-	-	4
Wolves Removed *(percent of population)*	13%	-	7%	-	-	-	*Not applicable*
Confirmed Wolf Depredations *(# livestock)*	30	8	17	12	12	32	111

[1] USFWS *et al.* 2010
[2] USFWS *et al.* 2011
[3] ODFW 2011
[4] ODFW 2013
[5] ODFW 2014b
[6] ODFW 2015c

Wolves are highly mobile habitat generalists with large home ranges. They persist where wild ungulate (e.g., deer and elk) populations are adequate to provide prey and conflicts with humans and livestock are low (78 FR 35680). There is no known future condition that would cause a decline in ungulate prey populations sufficient to affect the gray wolf throughout its range (78 FR 35681). As part of their economic considerations, the Oregon Department of Fish & Wildlife assumed that wolves would consume 7.8 elk and 23.4 deer per wolf per year (ODFW 2010, p. 100).

Attributes of wolf habitat include: forest cover, public land, high ungulate density, and low livestock density (78 FR 35680). Conversely, low forest cover, high human density, and year-round livestock presence makes lands unsuitable as wolf habitat (78 FR 35680). The U.S. Fish and Wildlife Service also identified increased land development (e.g., road development) as having the potential to make some areas less suitable for wolf occupancy (78 FR 35681). However, it is unlikely that increased land development will affect wolves for the following reasons:

(1) Wolves are habitat generalists and one of the most adaptable large predators in the world, and became extirpated in the southern portion of the subspecies' range only because of sustained, deliberate, human-targeted elimination.
(2) Land-use restrictions on land development are not necessary to ensure the continued conservation of the subspecies; even active wolf dens can be quite resilient to nonlethal disturbance by humans.
(3) Vast areas of suitable wolf habitat and the current wolf population are secure in the subspecies' range (e.g., national parks, wilderness, road-less areas) and are not available for intensive levels of land development (78 FR 35681).

Due to the wolves being habitat generalists, the U.S. Fish and Wildlife Service does not consider them vulnerable to climate change (78 FR 35686).

There is sufficient habitat in the **planning area** to support gray wolves. Land-use practices do not appear to be affecting viability of wolves and do not need modification to conserve the subspecies (78 FR 35680). Land development projects can render some areas less suitable for wolves, but land-use restrictions are not necessary to ensure conservation of the subspecies (78 FR 35681). Wolves in northwest Montana exist amidst a complex arrangement of different land ownerships and management practices (public land, small private-land holders, and large industrial-land holders), and it would not be unusual for wolves to traverse all of these land-holders in a single day (ODFW 2010, p. 119). Land ownership patterns in Oregon are similar to those in northwestern Montana, so wolves in Oregon could similarly traverse multiple ownerships in a day. Management plans on public lands are more than adequate to support viable wolf populations across the range of the subspecies (78 FR 35681). National parks and monuments provide refugia from hunting, trapping, control activities and may act as source for dispersing wolves (78 FR 35685). Human intolerance and an active program to eradicate gray wolves were the primary reasons wolves were extirpated from portions their historical range (78 FR 35684; ODFW 2010, p. 3).

The size and boundaries of a given wolf pack's territory vary annually based on prey movements or movements of other packs (ODFW 2010, p. 118). Territories of wolf packs first to colonize an area tend to be larger (e.g., 460 square miles) and as packs fully occupy the landscape, territories become smaller (e.g., 185 square miles) (*ibid*., p. 119). Pups eventually leave their parents' pack and either establish a new territory or join an existing pack. On average, male wolves disperse at 28.7 months old and travel 60 miles, and females disperse at 38.4 months and travel 48 miles. Dispersal distances of 221 miles have been reported (*ibid*., p. 120). Activity of the wolf pack is centered at or near the den or rendezvous sites as adult pack members hunt and bring food to the pups from late-April until September (ODFW 2010, p. 118). Wolf dens can be resilient to non-lethal disturbance by humans (78 FR 35681).

For its analysis, the BLM assumed that habitat changes in the **action area** would not affect wolf populations, and did not specifically model habitat for the gray wolf, in the **action area** because gray wolves are habitat generalists, have large home ranges, are capable of dispersing long distances, and are resilient to land-use practices. The amount of habitat for gray wolves would not change under the Proposed RMP, given the plasticity of gray wolves in using the landscape.

The BLM assumed that opportunities for wolf-livestock conflict would be the only meaningful effect of BLM management on wolf populations in the **action area**. Wolf-livestock conflicts can potentially adversely affect wolf populations through conflicts with humans. Potential loss of individual wolves through lethal removal (agency control actions) to address livestock depredation issues in the **planning area** would be decisions made by the U.S. Fish and Wildlife Service and Oregon Department of Fish and Wildlife.

Between 2009 and 2014, wolves depredated a total of 111 livestock in Oregon, and the Oregon Department of Fish and Wildlife lethally removed a total of four wolves to address wolf-livestock

conflicts (**Table III-2**). Within the Northern Rocky Mountain population of gray wolves (which includes Montana, Wyoming, Idaho, Oregon, and Washington), wolves depredated a total of 3,426 livestock, and agency control actions removed 1,293 wolves between 2009 and 2014 (**Table III-3**). Agency control removed 7 to 13 percent of the minimum wolf population in each year within the Northern Rocky Mountains (**Table III-3**). Similarly, Oregon Department of Fish and Wildlife removed up to 13 percent of the minimum wolf population in Oregon but removed wolves only in 2009 and 2011 (**Table III-2**). Based on the trends in agency control actions in the Northern Rocky Mountain population and in Oregon overall, removal of wolves could range from zero to 13 percent of the minimum population of wolves in a given year, at the scale of the population or across Oregon. However, it is not possible for the BLM to forecast specific loss of wolves from agency control actions in the **planning area**. To date, there have been no confirmed wolf depredations or wolf removals within the **planning area**. There is no reasonable basis on which the BLM could predict if and when individual wolves would become chronic livestock predators or if and when subsequent control actions would occur.

Table III-3. Wolf Population, Control, and Depredation in the Northern Rocky Mountain Population

Wolf Statistics	2009[1]	2010[2]	2011[3]	2012[4]	2013[5]	2014[6]	Cumulative Total
Minimum Wolf Population *(# individuals)*	2,292	2,045	2,354	2,569	2,613	2,401	*Not applicable*
Wolf Packs *(# packs)*	242	244	287	321	320	313	*Not applicable*
Wolves Removed *(# individuals removed)*	272	260	166	231	202	162	1,293
Wolves Removed *(percent of population)*	12%	13%	7%	9%	8%	7%	*Not applicable*
Confirmed Wolf Depredations *(# livestock)*	966	465	371	674	632	318	3,426

[1] USFWS *et al.* 2010
[2] USFWS *et al.* 2011
[3] USFWS *et al.* 2012
[4] USFWS *et al.* 2013
[5] USFWS *et al.* 2014
[6] USFWS *et al.* 2015

The BLM assumed that the acreage available for grazing would generally correspond to the opportunities for wolf-livestock conflict. However, there are no quantifiable metrics to equate a specific acreage available for grazing to a specific rate of wolf-livestock conflicts.

L. LOWER COLUMBIA RIVER DISTINCT POPULATION SEGMENT OF THE COLUMBIAN WHITE-TAILED DEER

The U.S. Fish and Wildlife Service listed the Columbian white-tailed deer (*Odocoileus virginianus leucurus*) as an endangered species under the Endangered Species Act on March 10, 1967 (32 FR 4001). There are two distinct population segments[17] of Columbian white-tailed deer in the **planning area**: the Lower Columbia River population, which occurs in Clatsop and Columbia counties, and the Douglas County population, which occurs in Douglas County (USFWS 2013b). Historically, the Columbian white-tailed deer's range included 23,170 square miles from Grants Pass, Oregon north to the Cowlitz River in Washington (USFWS 2013c). Currently, the range of the Lower Columbia River DPS is reduced to

[17] A distinct population segment (DPS) is a discrete population of a species and the smallest portion of a vertebrate species that can be protected under the Endangered Species Act.

approximately 93 square miles and includes portions of Clatsop, Columbia, and Multnomah counties in Oregon but given their mobility, deer can periodically occur outside of these areas. In addition, Oregon Biodiversity Information Center data indicate that since 1990 Columbian white-tailed deer have been observed in Clatsop, Columbia, Multnomah, and Douglas counties (ORBIC 2014). The U.S. Fish and Wildlife Service delisted the Douglas County distinct population segment on July 24, 2003 (68 FR 43647); the Lower Columbia River distinct population segment remains listed as endangered. Critical habitat for the Columbian white-tailed deer has not been designated by the U.S. Fish and Wildlife Service.

At the time of listing, the U.S. Fish and Wildlife Service estimated the total number of deer remaining to be less than 1,000, but the Douglas County population segment has now increased to over 5,000 animals (USFWS 2013b). In 1996, the Lower Columbia River distinct population segment suffered heavy losses due to extensive flooding of its habitat. However, the U.S. Fish and Wildlife Service expects this population segment to recover to pre-flood numbers. The total deer population in the Lower Columbia River DPS has been at least 400 animals since 1984, and the total population was 603 deer in 2011 (USFWS 2013c) and 830 in 2014 (80 FR 60856).

The Columbian White-tailed Deer Recovery Plan recommends four recovery actions:

- Annually assess the viability of each extant subpopulation
- Ensure the viability of extant populations
- Establish necessary new populations in existing habitat
- Encourage public support for the Columbian white-tailed deer restoration program (USDI FWS 1983, pp. 31-33).

Habitat for Columbian white-tailed deer in the Lower Columbia River DPS includes pastures of reed canary grass, tall fescue, and mixed deciduous and Sitka spruce forest (USFWS 2013c). Habitat for Columbian white-tailed deer in the Douglas County DPS includes predominantly oak-madrone woodland and riparian cover types. Columbian white-tailed deer concentrate their habitat use near streams or rivers (within 650 feet). Distance to stream is more important than the vegetative condition in determining habitat for Columbian white-tailed deer. However, Columbian white-tailed deer evolved in association with prairie edge and woodland habitats and were not historically confined limited to riparian and lowland habitats as the species now exhibits. Urban development and agricultural areas now limit the Columbian white-tailed deer to lower lying and wetter habitat than the species would have been historically associated. The Oregon Department of Fish and Wildlife associate differences in the quality of habitat with forage quality and forest structural stage for related deer species (e.g., black-tailed deer). Early-successional forests provide more diverse, abundant, and nutritious forage through the forbs and shrubs that grow for 10 to 15 years following a clear-cut or stand-replacing natural disturbance (ODFW 2014b, ODFW 2008). These high-quality forage conditions persist until the canopy from regenerating conifer seedlings restricts sunlight to the low-lying forbs and shrubs (ODFW 2014b).

In its analysis, the BLM assumed that the range of the Lower Columbia River population is all lands within 17 miles of the Columbia River downstream from the confluence of the Willamette and Columbia River (**Figure III-2**). In consultation with the U.S. Fish and Wildlife Service, the BLM considered future occupation of the BLM-administered lands in the Salem District west of Sauvie Island (the "Scappoose Block") to be reasonably certain. Since the U.S. Fish and Wildlife Service started relocating animals to Ridgefield National Wildlife Refuge, the deer have expanded across the river to Sauvie Island, which is across Highway 30 from the Scappoose Block of BLM-administered land. The past two years have been exceptional for Columbian white-tailed deer reproduction, and it is reasonable to assume that the deer will successfully expand their population across the river into this area (B. White, USFWS Oregon State Office, Consultation Branch Manager, *pers. comm*., July 14, 2015). The Scappoose Block parcels are up

to 17 miles from the Columbia River. However, currently Columbian white-tailed deer are not confirmed or documented to occur on BLM-administered lands within the Salem District (R. Price, BLM, Salem District Wildlife Biologist, personal communication, June 17, 2015).

In its analysis, the BLM used the range for the Douglas County population delineated by the Oregon Department of Fish and Wildlife (J.Kern, ODFW, Wildlife GIS Analyst, *pers. comm.*, May 2015) (**Figure III-2**).

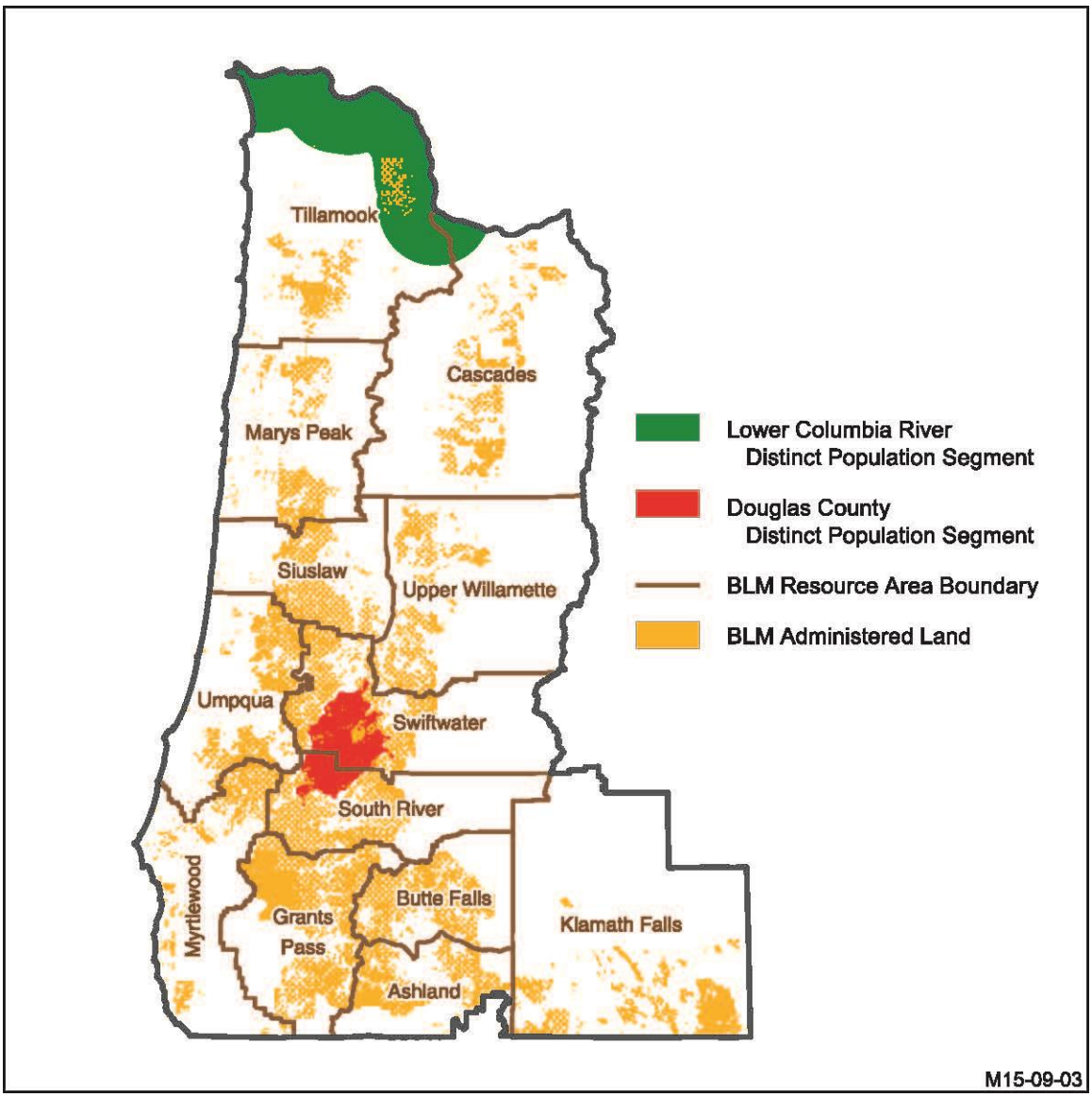


Figure III-2. Range of the Columbian white-tailed deer.

In this analysis, the BLM also assumed that the early-successional stage forest represents high-quality forage habitat for deer. Given the similarity in habitat needs and the life history of black-tailed deer and Columbian white-tailed deer, the BLM assumed that early-successional forests would similarly provide high-quality forage habitat for Columbian white-tailed deer. The Early Successional forest stage provides

more diverse, abundant, and nutritious forage through the forbs and shrubs that grow for 10–15 years following a clear-cut or stand-replacing natural disturbance (ODFW 2008, 2014a). Rowland *et al.* (2013) developed a model to evaluate elk nutrition and habitat use in landscape settings. The BLM ran the nutrition model on two watersheds (Upper Alsea River and Rock Creek watersheds) to test if using the early-successional structural stages as a surrogate for high-quality forage habitat is a reasonable assumption. In the Upper Alsea River watershed, the mean dietary digestible energy class was slightly higher in the early-successional stages (low-marginal forage quality) than in the other structural stages (poor forage quality) although the median class was indistinguishable from the others (low-marginal forage quality). In the Rock Creek watershed, the mean and median dietary digestible energy classes were slightly higher in the early-successional stages (low-marginal forage quality) than in the other structural stages (poor forage quality). Based on these results from the sample watersheds, the absolute difference in forage quality between early-successional and the other structural stages was not substantively different, but the early-successional stage appears to provide slightly better forage quality relative to the other stages. Therefore, the BLM regards early-successional structural stages as a reasonable measure of "high-quality forage habitat" for deer and elk species. BLM did not use the habitat-use component in the Rowland *et al.* (2013) model in this analysis, because that model requires information on locations of open and closed roads across ownerships, which the BLM cannot reasonably predict across ownerships through time.

In addition, the BLM assumed in its analysis that oak woodlands would also provide higher-quality forage habitat for Columbian white-tailed deer than early-successional forest habitat. The BLM calculated the amount of oak woodland from a separate data layer used by the RMP interdisciplinary team to map forest site moisture conditions that included potential vegetation data. The oak woodland data overlaps the vegetation modeling output used for early-successional structural stage described above. Therefore, while the acreage of oak woodlands is informative of relative conditions of deer forage habitat, the oak woodlands acreage is not additive with the early-successional stage acreage.

The BLM evaluated both the direct and indirect effects on Columbia white-tailed deer habitat in the **action area** and an analysis of the cumulative effects on Columbia white-tailed deer habitat of past, present, and reasonably foreseeable future actions, including land management activities on BLM-administered lands and non-BLM-administered lands in the **planning area**. The BLM modeled habitat on non-BLM-administered lands within the **planning area** using the 2012 GNN structural condition.

The BLM did not model changes in the white-tailed deer population since there are other factors that influencing populations outside the scope of BLM land management decisions, such as mortality from predators or vehicle collisions. The Douglas County population of Columbian white-tailed deer is also subject to harvest levels authorized by the Oregon Department of Fish and Wildlife.

BLM management direction for the Columbian white-tailed deer would include continued implementation of the record of decision for the North Bank Habitat Management Area (USDI BLM 2015, p. 936). Continued management of the North Bank Habitat Management for white-tailed deer habitat is consistent with conservation actions recommended by the Oregon Department of Fish & Wildlife in the Oregon Conservation Strategy (ODFW 2006, p. 320).

There currently are 459 acres of high-quality, early-successional forage habitat for the Lower Columbia River population of Columbian white-tailed deer on BLM-administered lands, which is 3 percent of the 17,158 habitat-capable acres. There are 55,952 acres of high-quality, early-successional forage habitat for the Lower Columbia River population across all land ownerships, which is 9 percent of the 623,624 habitat-capable acres. The current BLM contribution to high-quality, early-successional forage habitat for the Lower Columbia River population is 1 percent of the available high-quality, early-successional forage

habitat available across all land ownerships. There are no additional acres of oak woodlands available for the Lower Columbia River population.

Under the Proposed RMP, in 50 years the BLM would provide three times the amount of higher quality, early-successional forage habitat (1,488 acres) than it does currently (459 acres) in the **action area** (**Figure III-3**). In contrast, the No Timber Harvest Reference Analysis would decrease the amount of habitat provided, dropping to zero (**Figure III-3**).

Across all ownerships in the planning area, the amount of higher-quality, early successional forage habitat would increase to 56,894 acres (an increase of 2 percent) under the Proposed RMP (**Figure III-4**). Under the No Timber Harvest Reference Analysis, the amount of higher-quality, early-successional forage habitat for the Lower Columbia River population would decrease to 55,405 acres (a decrease of 1 percent).

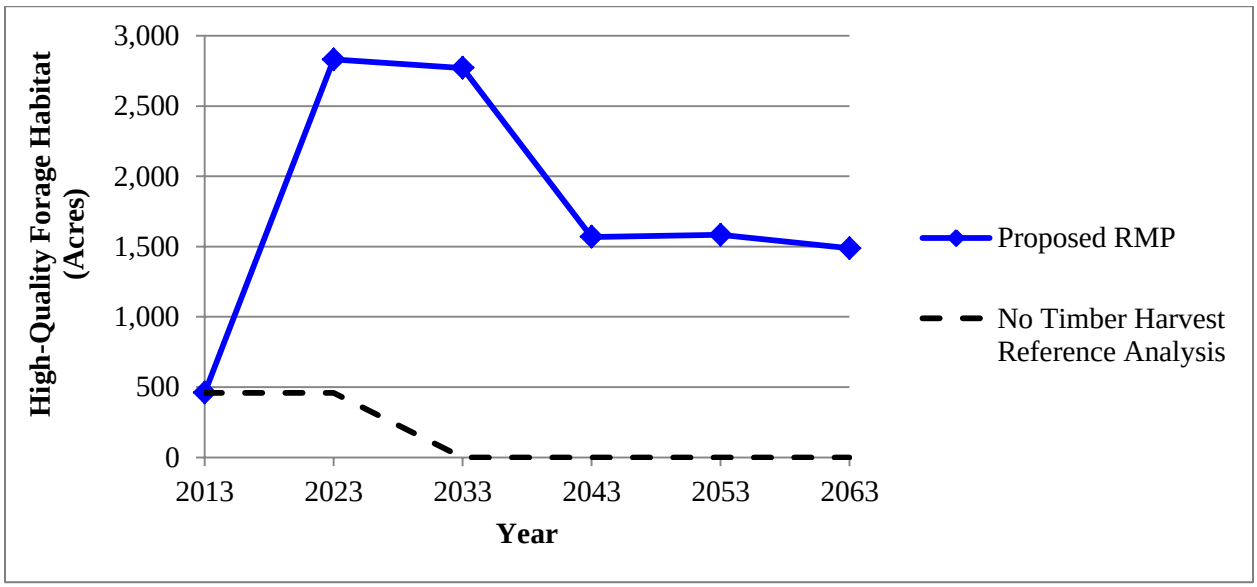


Figure III-3. High-Quality forage habitat development for the Lower Columbia River population of the Columbian white-tailed deer in the **action area**.

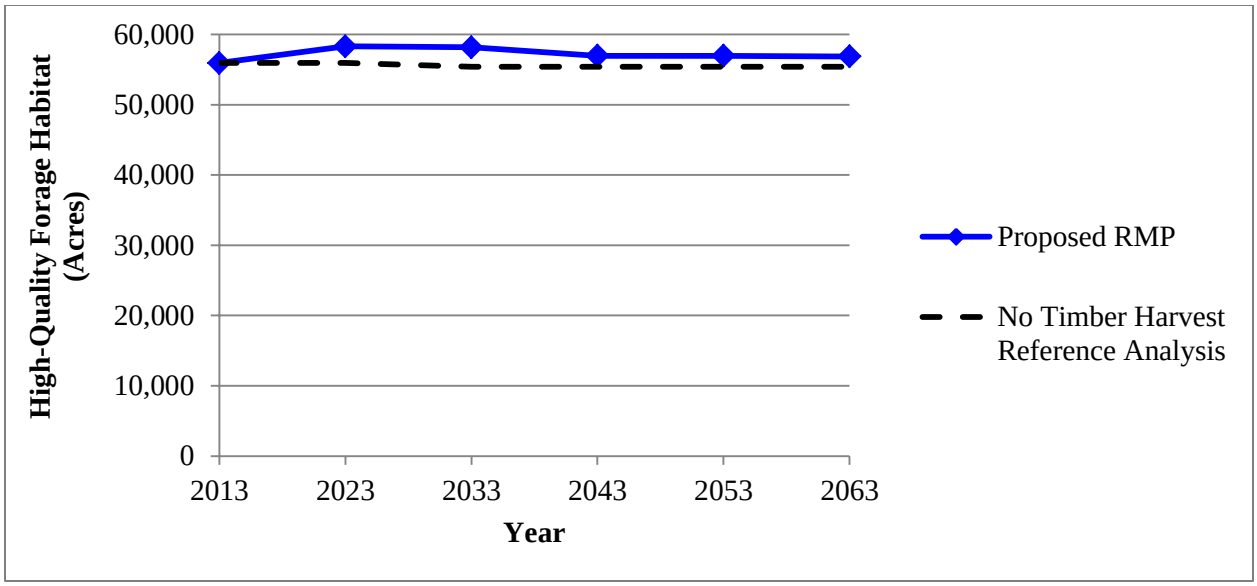


Figure III-4. High-Quality forage habitat development for the Lower Columbia River population of the Columbian white-tailed deer in the **planning area**.

M. FISHER

Historically, fishers (*Pekania pennanti*) occurred in Oregon throughout the Coastal and Cascade mountains (USDI FWS 2013f). Currently, remaining populations of fishers are restricted to two separate and genetically isolated populations in southwestern Oregon: one in the northern Siskiyou Mountains and one in the southern Cascade Range (USDI FWS 2013f). The U.S. Fish and Wildlife Service proposed to list the West Coast Distinct Population Segment of fisher, referred to as "fisher" henceforth, as a threatened species under the Endangered Species Act on October 7, 2014 (79 FR 60419).

Reliable fisher observations occur in 10 sub-basins in the **planning area** including: Applegate, Chetco, Illinois, Middle Rogue, Upper Klamath, Upper Klamath Lake, Upper Rogue, North Umpqua, South Umpqua, and Williamson (GeoBOB 2013, ORBIC 2014).

Fisher habitat is comprised of denning habitat, resting habitat, and foraging habitat. Denning habitat is habitat that fishers use for reproduction, denning, and rearing of young. Cavities in live or dead trees are a key characteristic of denning habitat (Lofroth *et al.* 2010, p. 112-115). Resting habitat is habitat that fishers use for thermal regulation and security, in proximity to prey. High canopy cover, an abundance of large trees, and incidence of mistletoe or rust brooms are characteristic of resting habitat (*ibid*., p. 98-106). Fishers use foraging habitat to locate and capture prey (*ibid*., p. 95-98).

Throughout their range, fishers are obligate users of tree or snag cavities for denning, and they select resting sites with characteristics of late-successional forests (79 FR 60427). There is little evidence that individual den sites are reused over time, limiting the value of protecting past den sites (69 FR 18782). Fishers rest every day, but reuse of rest sites is infrequent (Lofroth et al. 2010, pg. 119).

Vegetation management that removes important habitat elements (such as den sites and canopy cover) has a greater effect on fishers than activities that maintain these elements (79 FR 60430). Canopy cover is important to fishers; the most consistent predictor of fisher occurrence at large spatial scales is moderate to high amounts of contiguous canopy cover (Lofroth 2010, p. 119). Several studies reported that females used sites for denning that had relatively high amounts of overhead canopy cover (70 to 100 percent; Study Areas 8, 14, 17, 25; Plate 7.15) (Lofroth 2010, p. 117). Mean overhead canopy cover at 373

random points was only 67 percent compared to 80 percent and 88 percent at natal and maternal den sites, respectively (Lofroth 2011, p. 35).

The main threats to fisher are habitat loss and fragmentation due to wildfire and vegetation management, toxicants (i.e., anti-coagulant rodenticides), and the synergistic effects of these and other factors (e.g. fisher mortality from vehicle collisions) on small populations (USDI FWS 2013f, Aubry and Lewis 2003, 79 FR 60420). Analysis of the Management Situation for the RMPs for Western Oregon provides more information on the historic range, habitat, and known populations, which is incorporated here by reference (USDI BLM 2013, p. 145).

Surveys detected fisher more often in areas with fewer disjunct core areas and more contiguous patches of habitat (Lofroth *et al.* 2011, p. 60). Core habitat is habitat located more than 328 feet from a habitat edge (*ibid*). Fisher are detected more in habitat that has a greater amount of Douglas-fir, a greater amount of 51 to 75 percent canopy cover, less barren area, a greater density of low use roads (closed to public or seasonal use only), and fewer disjunct core habitat (*ibid*.).

The mean male home range size is 20.8 square miles (13,329 acres), and the mean female home range is 7.3 square miles (4,692 acres) (*ibid*., p. 67). Dispersing juvenile fisher are capable of moving long distances (up to 84 miles) and navigating across or around various landscape features including rivers, highways, and rural communities. In the Cascade Range in southern Oregon, juvenile males dispersed an average of 18.0 miles and juvenile females dispersed an average of 3.7 miles (*ibid*., p. 73). During the breeding season, male fishers may move up to 18.6 miles from their territory in the search for a mate (Lofroth *et al*. 2010).

In its analysis, the BLM assumed that total habitat for the fisher is comprised of young, mature, or structurally-complex forest stands within the 11 sub-basins that represent the current range of the species (**Figure III-5**).

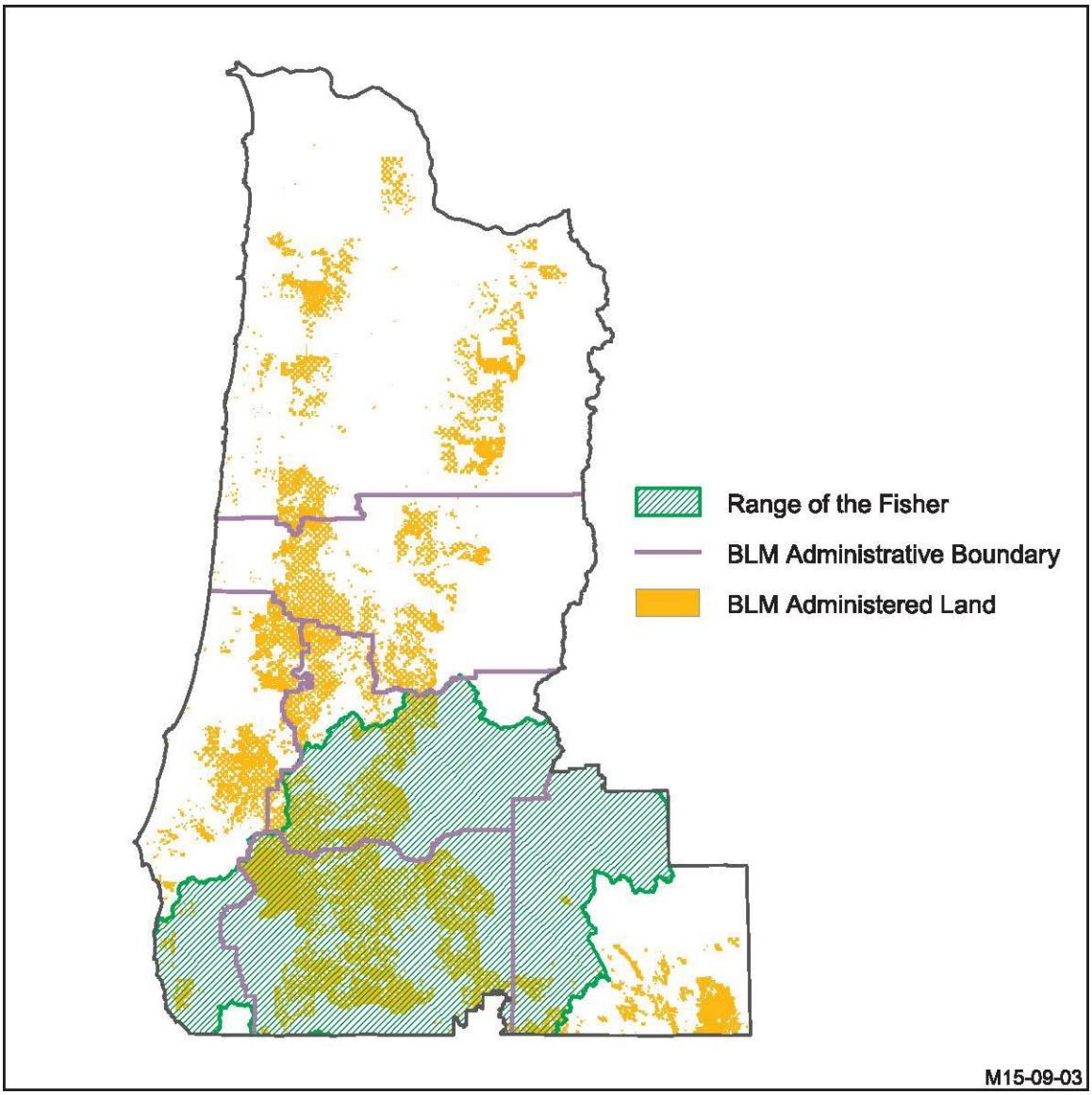


Figure III-5. Range of the fisher.

The BLM identified the current range of the fisher based on sub-basins where there are documented, reliable observations. The BLM considered observations to be reliable if they are noted as having "excellent" reliability in GeoBOB or ORBIC.[18] For this analysis, the 11 sub-basins currently representing the current range of fisher include the 10 listed above and the Lower Rogue sub-basin. Even though the Lower Rogue sub-basin does not have reliable observations, the BLM included this sub-basin within the current range of the fisher in this analysis because of the arrangement of the other sub-basins and the fisher's ability to disperse. The Lower Rogue sub-basin is approximately 11 to 20 miles across, north to south, generally within the fisher's dispersal range (an average of 3.7 to 18.0 miles) of sub-basins with reliable sightings to the north, east, and south.

The BLM defined fisher habitat as young, mature, and structurally-complex forest stands in the 11 sub-basins that represent the current range of the species. The BLM divided habitat for the fisher into denning, resting, and foraging habitat. The following structural stages represent these three categories:

[18] Observations in the GeoBOB database are ranked as having excellent, good, fair, poor, or unknown reliability.

- Denning Habitat = structurally complex
- Resting Habitat = mature with multi-layered canopy
- Foraging Habitat = young with structural legacy

The BLM assumed that denning habitat would also provide resting and foraging functions, that resting habitat would also provide foraging function, and that foraging habitat would only provide foraging function.

This analysis evaluates both the direct and indirect effects of implementing the Proposed RMP on fisher habitat in the **action area** and an analysis of the effects on fisher habitat of past, present, and reasonably foreseeable future actions, including land management activities on BLM-administered lands and non-BLM-administered lands in the **planning area**. The BLM modeled habitat on non-BLM-administered lands within the **planning area** using the 2012 GNN structural condition.

The BLM assessed habitat connectivity by calculating the amount of "edge habitat" and "core habitat" on BLM-administered lands. Based on Lofroth *et al.* (2011, p. 60), the BLM defined core habitat as the interior portion of a contiguous block of denning habitat that is more than 328 feet from non-habitat; edge habitat is denning habitat that is within 328 feet of non-habitat. There are no quantified thresholds for the amount of core habitat needed by fishers or the effects of changes in patch size. In this analysis, the BLM considered habitat quality and connectivity to increase as the proportion of available habitat in core habitat increases and as patch size increases.

The BLM estimated the fisher population in the **planning area** by emulating methods used by the U.S. Forest Service in the Bybee Forest Vegetation Management Project (USFS 2013, Appendix F-183 to F-187), as suggested by the U.S. Fish and Wildlife Service (B. White, USFWS Oregon State Office, Consultation Branch Manager, *pers. comm.*, July 22, 2015). The BLM divided the total amount of habitat (i.e., denning , resting, and foraging) in the **planning area** by the average home range size for male and female fishers. The BLM assumed full occupancy of habitat by the species and male home ranges overlapping female home ranges. There are other factors that influence fisher populations which are not predictable and are unaffected by BLM land management actions (e.g., mortality from toxicants or vehicle collisions) and were not included in estimating fisher populations. Therefore, these estimates of the fisher population are very approximate and the absolute population numbers should be interpreted with great caution. The BLM estimated population numbers only to provide the BLM with the relative outcomes of the fisher population under the Proposed RMP.

There are currently 319,503 acres of denning habitat, 156,657 acres of resting habitat, and 95,100 acres of foraging habitat for fisher in the **action area** (**Table III-4**). Approximately 54 percent of the BLM-administered land capable of providing fisher habitat currently provides habitat function: 30 percent as denning habitat, 15 percent as resting habitat, and 9 percent as foraging habitat.

Table III-4. Current fisher habitat in the action and **planning area**s.

Fisher Habitat Type	Action area		Planning area	
	(Acres)	(% of Habitat Capable)	(Acres)	(% of Habitat Capable)
Denning	319,503	30%	634,595	10%
Resting	156,657	15%	828,658	13%
Foraging	95,100	9%	3,018,519	49%
Total Fisher Habitat	**571,355**	**54%**	**4,481,891**	**72%**
Total Habitat-Capable	**1,057,676**	**100%**	**6,224,237**	**100%**

In the **planning area**, there currently are 634,595 acres of denning habitat, 828,658 acres of resting habitat, and 3,018,519 acres of foraging habitat for the fisher. Approximately 72 percent of the land capable of providing fisher habitat is providing some form of habitat function. The BLM-administered lands contribute 51 percent of the available denning habitat and 13 percent of total fisher habitat in the **planning area**.

Under the Proposed RMP, the amount of fisher habitat in the **action area** would increase from 571,355 acres to 645,588 acres in 50 years (**Figure III-6**). Initially, the amount of denning habitat would decrease less than 3 percent during the first decade, and the amounts of total habitat and resting habitat would decrease by 10 and 15 percent, respectively, during the first two decades. Within 50 years, denning habitat would increase from the current 319,503 acres to 366,541 acres; resting habitat would increase from the current 156,753 acres to 188,043 acres, and foraging habitat would decrease from the current 95,100 acres to 91,004 acres (**Figure III-6**).

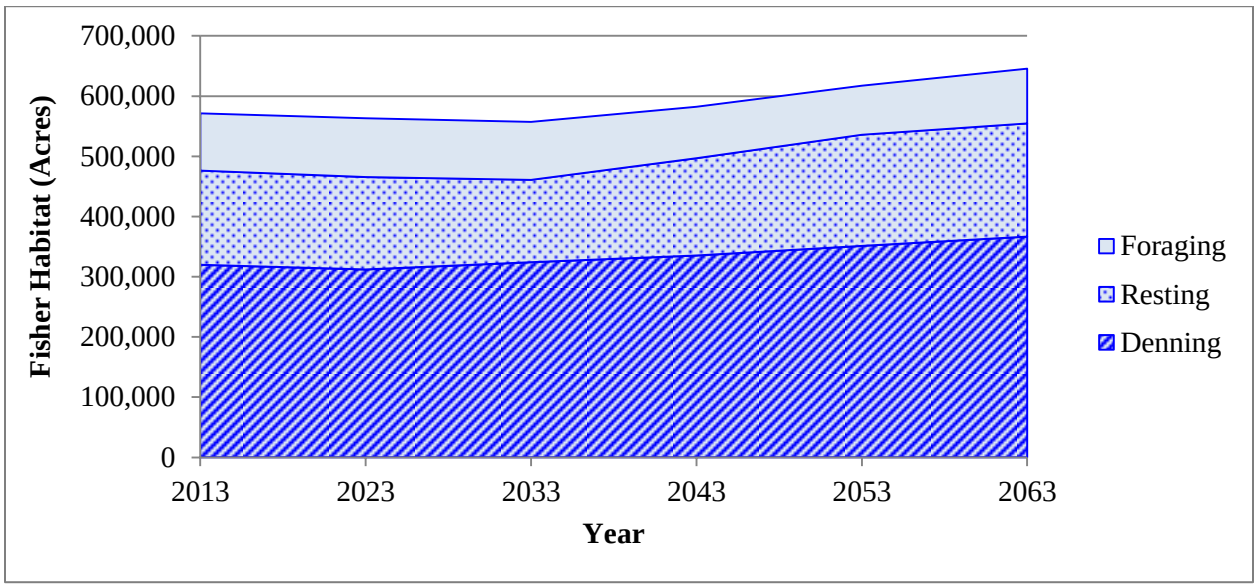


Figure III-6. Fisher habitat under the Proposed RMP in the **action area**.

Currently, the average patch size of fisher habitat is 31.0 acres. Under the Proposed RMP, in 50 years the average patch size would decrease to 27.3 acres. Currently, 29 percent of habitat is core habitat; 168,200 acres of core habitat versus 403,200 acres of edge habitat. Under the Proposed RMP, in 50 years 30 percent of habitat would be core habitat; 195,100 acres of core habitat versus 450,500 acres of edge habitat.

Because fishers use large contiguous tracts of habitat (Lofroth *et al.* 2011, p. 60), increased fragmentation of habitat would reduce the suitability of forest stands as habitat. However, fishers typically use numerous patches of habitat over a large landscape, and it is unknown if the slight reductions in patch size under the Proposed RMP would cause any meaningful decrease in habitat use by the fisher. Similarly, it is unknown whether the slight increases of core habitat under the Proposed RMP would cause any meaningful increase in habitat use by the fisher.

For all lands in the **planning area**, total fisher habitat under the Proposed RMP would increase in 50 years from 4,484,891 acres to 4,692,992 acres (**Figure III-7**).

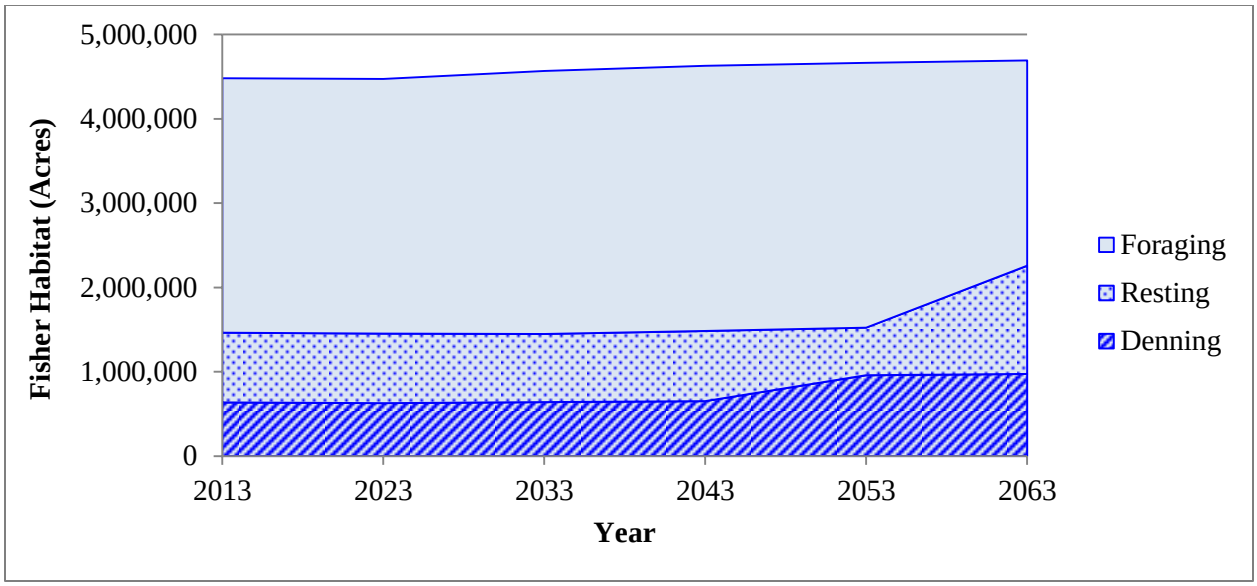


Figure III-7. Fisher habitat under the Proposed RMP in the **planning area**.

The BLM estimates there are about 1,291 fishers in the **planning area**, based on habitat availability in 2013 (**Figure III-8**). Under the Proposed RMP and using the assumptions described above, the BLM estimates the number of fishers in the **planning area** would increase by 61 during the next 50 years (**Figure III-8**).

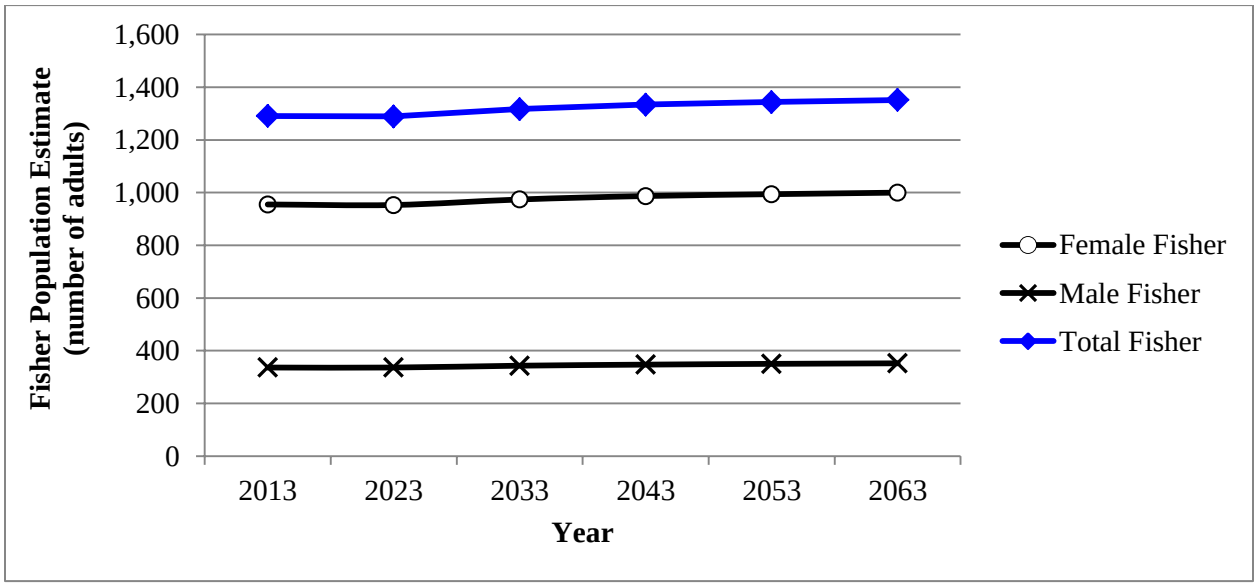


Figure III-8. Fisher population estimates under the Proposed RMP in the **planning area**.

N. MARBLED MURRELET AND ITS CRITICAL HABITAT

1. Background

The U.S. Fish and Wildlife Service listed the marbled murrelet (*Brachyramphus marmoratus*) as a threatened species under the Endangered Species Act on October 1, 1992 (57 FR 45328). The U.S. Fish

and Wildlife Service identified several anthropogenic threats to the marbled murrelet at the time of listing and in the Recovery Plan for the Marbled Murrelet (USDI FWS 1997), including:

- Habitat destruction and modification in the terrestrial environment from timber harvest and human development caused a severe reduction in the amount of nesting habitat
- Unnaturally high rates of predation at nest sites resulting from forest "edge effects"
- Existing regulatory mechanisms, such as land management plans (in 1992), were considered inadequate to ensure protection of the remaining nesting habitat and reestablishment of future nesting habitat
- Manmade factors such as mortality from oil spills and entanglement in fishing nets used in gill-net fisheries

Subsequently, the U.S. Fish and Wildlife Service reported changes in the levels of these threats (USDI FWS 2004, pp. 11-12 and 2009, pp. 27-67). Even though implementation of the Northwest Forest Plan had reduced some threats to marbled murrelets (USDI FWS 2004, pp. 11-12), threats from habitat loss, high predation rates, mortality from oil spills and entanglement in fishing nets continued (USDI FWS 2004:11-12 and 2009b, pp. 27-67). In 2009, the U.S. Fish and Wildlife Service identified the following additional environmental and anthropogenic threats to the marbled murrelet (USDI FWS 2009b, pp. 27-67):

- Environmental factors
  - Elevated levels of polychlorinated biphenyls in marbled murrelet prey species
  - Changes in prey abundance and availability
  - Changes in prey quality
  - Harmful algal blooms that produce bio-toxins leading to domoic acid and paralytic shellfish poisoning that have caused murrelet mortality
  - Climate change in the Pacific Northwest
- Anthropogenic factors
  - Derelict fishing gear leading to mortality from entanglement
  - Energy development projects (wave, tidal, and on-shore wind energy projects) leading to mortality
  - Disturbance in the marine environment (from exposures to lethal and sub-lethal levels of high underwater sound pressures caused by pile-driving, underwater detonations, and potential disturbance from high vessel traffic)

Nelson *et al.* (2006) completed a review of marbled murrelet biology and nesting habitat. According to Nelson *et al*. (2006) —

- Marbled murrelets are secretive, non-colonial nesters that forage at sea and nest inland,
- The majority of marbled murrelets nest within 37 miles of the coast, although nests have been documented up to 52 miles inland in Washington and 47 miles inland in Oregon (R. Espinosa, BLM, personal communication, 2007),
- The most important component in the nesting habitat for the marbled murrelet is the presence of large platforms (i.e., limbs or other structures that are at least 4 inches in diameter with a substrate [moss or other duff] capable of forming a nest cup),
- Other important factors include vertical and horizontal cover location with respect to forest openings or edge, and height of platform. Platforms should be high enough to provide for jump-off departures and open enough to provide for stall landings, while still providing protection from predators and the weather,
- Nest trees documented in the Northwest Forest Plan area are greater than 19 inches (diameter at breast height) and greater than 98 feet tall. Nest trees are typically taller than the average non-nest tree, and

- Vertical cover (cover above the nest) is typically above 70 percent.

Forest stands that provide nesting habitat typically possess a high density of large trees with platforms, have multiple canopy layers, and are typically older. Studies summarized for Oregon indicate that the density of trees with platforms and the number of platforms in general were the most important variables in predicting marbled murrelet nesting habitat at the stand level (USDI BLM 2008g, p. 301-302).

Falxa and Raphael (2015, p. 165) suggest that the amount and pattern of higher-quality nesting habitat may establish the carrying capacity for marbled murrelet abundance. The abundance of marbled murrelets at-sea is positively correlated with the amount of higher-suitability nesting habitat available on adjacent inland areas and high cohesion of that nesting habitat (a measure of connectivity related to the geometry of patches of habitat – essentially larger patch size) (Falxa and Raphael 2015, p. 162, 170; Raphael *et al.* 2015, p. 20). Murrelet at-sea abundance has declined the most where higher-suitability nesting habitat has also declined the most, which suggests that nesting habitat may be the factor limiting population stability and recovery (Falxa and Raphael 2015, p. 163, 167). Falxa and Raphael (2015, p. 165) report that annual variation in marbled murrelet abundance at-sea is more strongly correlated than with amount of nesting habitat than with ocean conditions. Falxa and Raphael (2015) also report that declines in murrelet abundance and distribution appear to be in response to contemporaneous loss in nesting habitat. They theorize that murrelets move out of an area once nesting habitat is lost, but also state that there is no direct evidence supporting this theory (Falxa and Raphael 2015, p. 166).

In Oregon, 9.2 percent of higher-suitability nesting habitat was lost between 1993 and 2012 (Falxa and Raphael 2015, p. 89). Falxa and Raphael (2015, pp. 90, 120) reported that 21.1 percent of higher-suitability nesting habitat on non-federal lands in Oregon was lost between 1993 to 2012. Timber harvest accounted for 98 percent of nesting habitat loss on non-federal lands (Falxa and Raphael 2015, p. 90). On federal lands, 0.3 percent of higher-suitability nesting habitat on non-reserved federal lands was lost between 1993 to 2012, and 3.8 percent was lost on federal reserved lands (Falxa and Raphael 2015, p. 119). Wildfire, timber harvest, insects and disease, and other natural disturbances accounted for 80, 18, 1, and <1 percent of the loss of higher-suitability habitat from federal lands in Oregon, respectively (Falxa and Raphael 2015, p. 123). While timber harvest resulting in nesting habitat removal is generally restricted in federal reserves, some harvest did occur in federal reserves after implementation of the Northwest Forest Plan where timber sales had been approved prior to 1994 (Falxa and Raphael 2015, p. 90). Also, the change detection analysis in Falxa and Raphael (2015) likely included rapid nesting-habitat losses from blowdown, landslides, and floods in the "timber harvest" category, which would over-attribute habitat loss due to timber harvest.

Climate-influenced factors, particularly wildfire but also insects and disease and other natural disturbances, contributed to the loss of higher-suitability nesting habitat for marbled murrelets between 1993 to 2012 (Falxa and Raphael 2015, p. 167). In the future, additional climate change may result in the additional loss of marbled murrelet nesting habitat due to increased frequency and severity of wildfires (Falxa and Raphael 2015, p. 168)

The U.S. Fish and Wildlife Service designated critical habitat for the marbled murrelet on May 24, 1996, (61 FR 26256); this designation included a description of the Primary Constituent Elements that support nesting, roosting, and other normal behaviors that are essential to the conservation of the marbled murrelet. The Primary Constituent Elements include: 1) forested stands containing large sized trees, generally more than 32 inches in diameter with potential nesting platforms at sufficient height, generally greater than or equal to 33 feet in height; and 2) the surrounding forested areas within 0.5 mile of these stands with a canopy height of at least one-half the site-potential tree height. Designated critical habitat also includes habitat that is currently unsuitable, but has the capability of becoming suitable habitat in the future. On October 5, 2011, the U.S. Fish and Wildlife Service revised the critical habitat for the marbled

murrelet, removing acres in northern California and southern Oregon from the 1996 designation (76 FR 61599). **Table III-5** shows the acres on marbled murrelet critical habitat in the **action area** that the BLM would allocate to each land use allocation under the Proposed RMP.

Table III-5. Proposed acres of marbled murrelet critical habitat in the **action area** by land use allocation.

Land Use Allocation	Acres
Late-Successional Reserve	261,587
Riparian Reserve	157,035
Inner Riparian Reserve	83,874
Middle Riparian Reserve (moist & dry)	24,959
Outer Riparian Reserve (moist & dry)	48,201
Congressionally Reserved	1,914
District-Designated Reserve	20,145
Harvest Land Base	39,718
Moderate Intensity Timber Area	15,310
Low Intensity Timber Area	23,877
Uneven-Aged Timber Area	531
TOTAL ACRES IN THE ACTION AREA	**480,398**

The Recovery Plan for the Marbled Murrelet (USDI FWS 1997) outlines the conservation strategy with both short- and long-term objectives. This recovery plan places special emphasis on the terrestrial environment for habitat-based recovery actions due to nesting occurring in inland forests.

The Recovery Plan for the Marbled Murrelet (USDI FWS 1997) outlines the conservation strategy with both short and long term objectives, and places special emphasis on the terrestrial environment for habitat-based recovery actions due to nesting occurring in inland forests. Short-term actions include protecting occupied habitat, minimizing the loss of unoccupied but suitable habitat, maintaining large blocks of suitable habitat, maintaining and enhancing buffer habitat, decreasing risks of nesting habitat loss due to fire and windthrow, reducing predation, and minimizing disturbance (*ibid*., p. 119). Long-term conservation needs include:

- Increasing productivity (abundance, the ratio of juveniles to adults, and nest success) and population size
- Increasing the amount (stand size and number of stands), quality, and distribution of suitable nesting habitat
- Protecting and improving the quality of the marine environment
- Reducing or eliminating threats to survivorship by reducing predation in the terrestrial environment and anthropogenic sources of mortality at sea

The recovery plan identifies six conservation zones throughout the listed range of the species: Puget Sound (Conservation Zone 1), Western Washington Coast Range (Conservation Zone 2), Oregon Coast Range (Conservation Zone 3), Siskiyou Coast Range (Conservation Zone 4), Mendocino (Conservation Zone 5), and Santa Cruz Mountains (Conservation Zone 6). The **planning area** includes all of Conservation Zone 3 and the northern portion of Conservation Zone 4 (**Figure III-9**). Recovery zones are the functional equivalent of recovery units as defined by U.S. Fish and Wildlife Service policy (*ibid*., p. 115).

Given the observed association between marbled murrelet abundance and nesting habitat, Falxa and Raphael (2015, pp. 168-170) suggest that conservation and restoration of higher-suitability nesting habitat are the primary factors for murrelet conservation. Buffers around nesting habitat would reduce fragmentation, risk of windthrow, and risk of predation (Falxa and Raphael 2015, p. 170). The Recovery

Plan for the Marbled Murrelet suggests that buffer widths should be a minimum of 300 feet and consist of whatever age stand is present to provide replacement habitat in the future (USDI FWS 1997, p. 140).

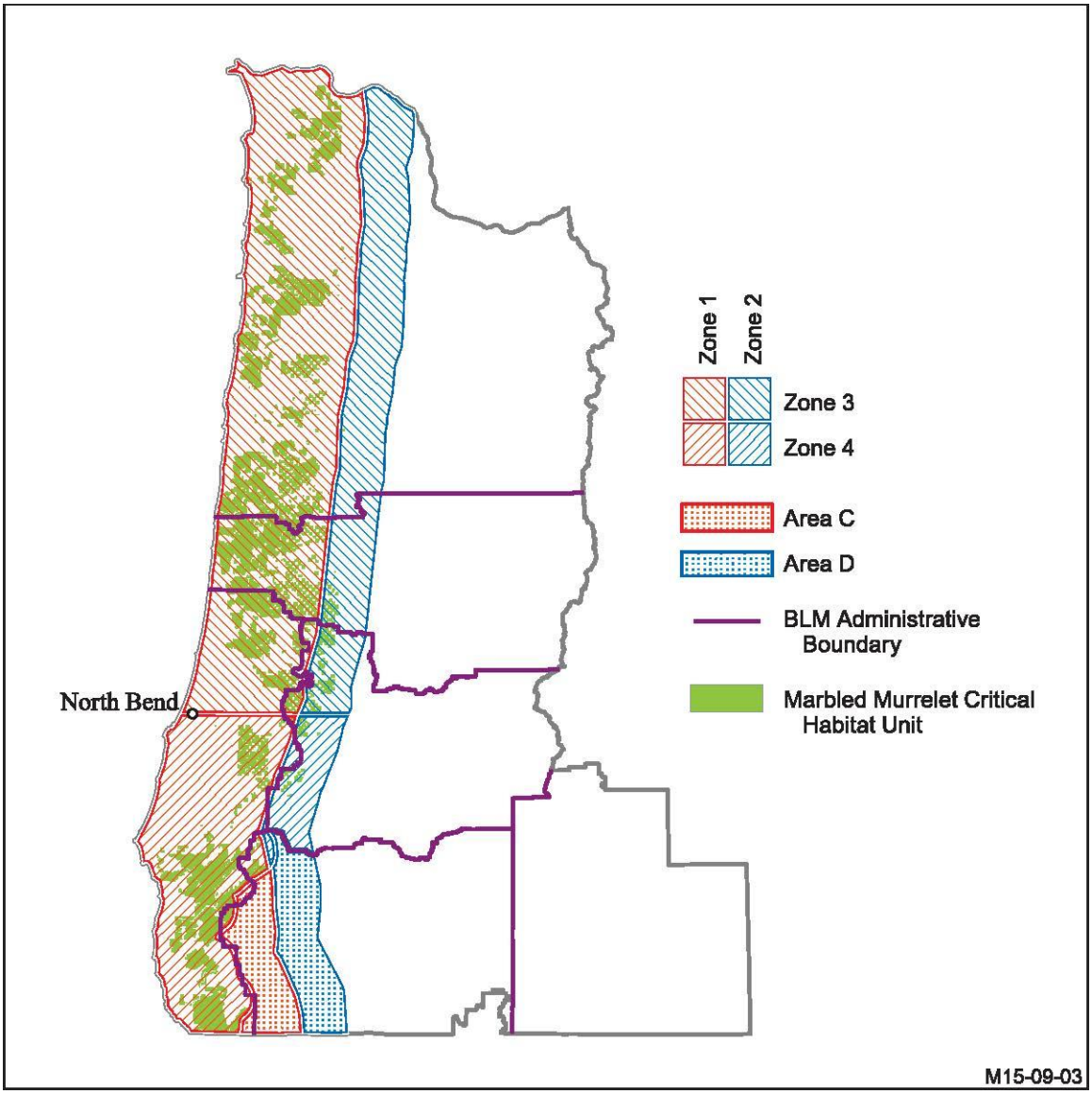


Figure III-9. Range and management zones of the marbled murrelet.

The Northwest Forest Plan established two management zones for the marbled murrelet: Zone 1 from the coast to approximately 35 miles inland, and Zone 2 from the eastern boundary of Zone 1 to approximately 50 miles inland from the coast (**Figure III-9**).

Systematic surveys in the Medford District have indicated that marbled murrelets are likely confined to the hemlock-tanoak vegetation zone (USDA FS and USDI BLM 2002, USDI FWS 2002 Memo). The portion formally considered part of the range of the marbled murrelet in the Medford District is depicted as Area C and Area D in **Figure III-9**.

There is no evidence for a trend in the marbled murrelet population in Oregon (+0.3 percent per year; 95 percent confidence interval: -1.8 to 2.5; Falxa and Raphael 2015, p. 23, 43). There is also no evidence for

a trend for the marbled murrelet population within the Northwest Forest Plan area (all five conservation zones) (Falxa and Raphael 2015, p. 23). Even though the estimates for the annual rate of population change in Oregon was +0.3 and the rate of population change for the Northwest Forest Plan area was -1.2 percent, the evidence is inconclusive, because the 95 percent confidence interval includes zero in both cases (Falxa and Raphael 2015). Falxa *et al.* (2014) reported that the 2013 at-sea population estimate for marbled murrelets was 7,896 birds in Conservation Zone 3 and 5,993 birds in Conservation Zone 4. The 2013 population estimate for all five conservation zones is 19,617 marbled murrelets. The annual rate of population change between 2000 and 2013 was +0.6 percent in Conservation Zone 3 and +1.5 percent in Conservation Zone 4 (Falxa and Raphael 2015, pp. 23, 43). However, these results are also inconclusive because the confidence interval for the rate of population change in Conservation Zones 3 and 4 also overlap zero.

The lack of a conclusive trend in marbled murrelet populations described above is different than previous reports. Previously, Miller *et al.* (2012) reported that the marbled murrelet population was declining throughout its range (estimated at 29 percent decline for the listed population from 2001 to 2010). The annual population decline during 2001 to 2010 was 3.7 percent. It is unknown what is driving recent population levels. It is premature to conclude that the observations during 2011 to 2013 indicate a change in the declining trend (Falxa and Raphael 2015; Falxa *et al.* 2014). According to Falxa and Raphael (2015, p. 29), the increase in the marbled murrelet population between 2011 and 2013 is too rapid to be attributable to habitat change, because nesting habitat takes many decades to several centuries to develop and is too slow a process to account for the rate of population change.

The Analysis of the Management Situation for the RMPs for Western Oregon provides more information on the species range, population trend, and threats, which is incorporated here by reference (USDI BLM 2013, pp. 143, 149-150).

2. Availability of Nesting Habitat

In its analysis, the BLM considered nesting habitat for the marbled murrelet to be young forests with structural legacies, mature forests, and structurally-complex forests within the range of the marbled murrelet in the **planning area**. The BLM divided nesting habitat for the marbled murrelet into two categories: high-quality nesting habitat and low-quality nesting habitat. The BLM assumed that structurally-complex forest stands within the range of the marbled murrelet represent high-quality nesting habitat, which provides trees and platforms suitable for nesting on a regular, reliable basis. Based on CVS data, the BLM estimates the average platform density in high-quality nesting habitat is 54.2 platforms/acre in Zone 1 and 41.8 platforms/acre in Zone 2 platforms/acre. Young stands with structural legacies and mature stands represent lower-quality nesting habitat, which may have trees and platforms suitable for nesting murrelets, but the frequency and density of such structures is lower. The BLM estimates the average platform density in lower-quality nesting habitat is 18.1 platforms/acre in Zone 1 and 15.3 platforms/acre in Zone 2.

The BLM modeled habitat on non-BLM-administered lands within the **planning area** using the U.S. Forest Service 2012 Gradient Nearest Neighbor (GNN) structural condition. The BLM modeled the structural condition on non-BLM-administered lands as continuing to provide the same distribution of habitat through time as the current condition, except in Forest Service reserves (i.e., Late-Successional Reserves and Congressionally Reserved lands). The BLM modeled structural conditions continuing to develop on Forest Service reserve lands through time. This modeling of Forest Service reserve lands assumed that habitat would not develop on Forest Service reserve lands that experience wildfire in the modeling. The BLM assumed that the future distribution of habitat conditions on non-BLM-administered lands and on Forest Service reserves that burned would continue to reflect the current distribution of habitat conditions. On private lands in Oregon, the assumption that the future distribution of habitat conditions would remain the same as current conditions likely overestimates the amount of nesting

habitat, since Falxa and Raphael (2015, p. 90) found that 21.1 percent of higher-suitability nesting habitat was lost between 1993 to 2012. On State and Forest Service non-reserve lands, this assumption likely underestimates the future development of habitat. The BLM acknowledges that the spatial arrangement of structural conditions would change in the future, but lacks information to make more specific projections of how structural conditions would change over time on non-BLM-administered lands. This assumption is consistent with the assumption used in the analysis of forest structure and spatial pattern in the 2008 RMP/EIS, which describes the limitations on analyzing future changes on non-BLM-administered lands and is incorporated here by reference (USDI BLM 2008g, pp. 532-536).

The GNN structural condition categories used for estimating high-quality nesting habitat on non-BLM-administered lands include structural components and provide a reasonable estimate of high-quality nesting habitat in the **planning area** for context. However, the GNN structural condition categories are not effective for estimating lower-quality nesting habitat. Initial calculations of total nesting habitat at the **planning area** scale using the GNN structural condition categories were unreasonably high when compared to Raphael *et al.* (2011) and Falxa and Raphael (2015). The GNN structural condition categories cannot distinguish young stands with structural legacies from young stands without structural legacies, and would therefore include all young stands in lower-quality nesting habitat, grossly overestimating the amount of lower-quality nesting habitat and total marbled murrelet nesting habitat. Therefore, for this analysis, the BLM limits discussion of marbled murrelet nesting habitat at the **planning area** scale to high-quality nesting habitat only, because of the limitations on interpreting the data available for non-BLM-administered lands.

Falxa and Raphael (2015) present a different methodology to model marbled murrelet habitat. The two models are coincident on 847,826 acres of BLM-administered lands. The habitat model in Falxa and Raphael (2015) extends to approximately 35 miles inland from the Pacific Ocean and as such does not provide coverage all BLM-administered lands in the **planning area**. The BLM quantitatively compared the level of agreement between two different models of marbled murrelet habitat in the **action area** (**Appendix E**). Overall, the marbled murrelet habitat model in this analysis appears to have fair agreement with the habitat model described in Falxa and Raphael (2015). The models generally agree in discerning nesting habitat from non-habitat and high-quality habitat from other stand conditions (either non-habitat or lower-quality nesting habitat). There is relatively less agreement between the two models in discerning higher-quality from lower-quality habitat. However, the BLM identified no systematic disagreement between the two models.

The BLM assessed habitat connectivity by calculating the amount of "edge habitat" and "core habitat" on BLM-administered lands. Following Raphael *et al.* (2011, p. 19), the BLM defined core habitat as the interior portion of a contiguous block of nesting habitat that is more than 295 feet from non-habitat. BLM also defined edge habitat as nesting habitat that within 295 feet of non-habitat. The distance to edge or core habitat is based on findings that marbled murrelets have reduced nest success along forested edges due to nest depredation, predominantly by species of corvids (Falxa and Raphael 2015, Raphael *et al.* 2011, McShane *et al.* 2004). The BLM assumed that since the risk of nest predation by corvids is greater along habitat edges, there would be less risk of nest predation within larger patches of nesting habitat. Although there are no quantified thresholds for the amount of core habitat needed by marbled murrelets or the effects of changes in patch size, the BLM assumed that the quality of nesting habitat would increase as the proportion of available habitat in core habitat increases and as patch size increases.

There are 493,434 acres of total nesting habitat for the marbled murrelet on BLM-administered lands in the **action area**, of which, 232,493 acres is high-quality nesting habitat (**Table III-6**).[19] Of the forested

[19] These acreages for the current condition represent the BLM update of baseline forest structural conditions resulting from 2013/2014 wildfires. There is 726 acres less high-quality nesting habitat under the updated current

lands capable of providing nesting habitat in the **action area**, 56 percent is currently nesting habitat, and 26 percent is currently high-quality nesting habitat.

Table III-6. Current marbled murrelet nesting habitat.

Marbled Murrelet Habitat	Action area		Planning area	
	(Acres)	(% of Habitat Capable)	(Acres)	(% of Habitat Capable)
High-Quality Nesting Habitat	232,493	26%	572,424	9%
Lower-Quality Nesting Habitat	260,941	29%	-	-
Total Nesting Habitat	**493,434**	**56%**	-	-
Total Habitat-Capable Acres	**885,590**	**100%**	**6,638,960**	**100%**

According to the No Timber Harvest Reference Analysis, BLM-administered lands in the **action area** are capable of supporting 840,024 acres of nesting habitat (**Figure III-10**) and 319,070 acres of high-quality nesting habitat in 50 years (**Figure III-11**). Under the Proposed RMP, BLM-administered lands in the **action area** would support 778, 175 acres of nesting habitat and 308,863 acres of high-quality nesting habitat in 50 years, or 93 percent of the nesting habitat and 97 percent of the high-quality nesting habitat that BLM-administered lands are capable of supporting as shown under the No Timber Harvest Reference Analysis (**Figure III-10** and **Figure III-11**). Although, during the first decade (2013 – 2023), implementation of the Proposed RMP would results in a 1.0 percent loss (1,988 acres) of high-quality nesting habitat, sufficient high-quality nesting habitat would develop by the second decade to surpass current amounts (**Figure III-11**). Also under the Proposed RMP, the BLM would include 93 percent (459,072 acres) of existing nesting habitat, and 99 percent (229,067 acres) of existing high-quality nesting habitat, in reserved land use allocations.

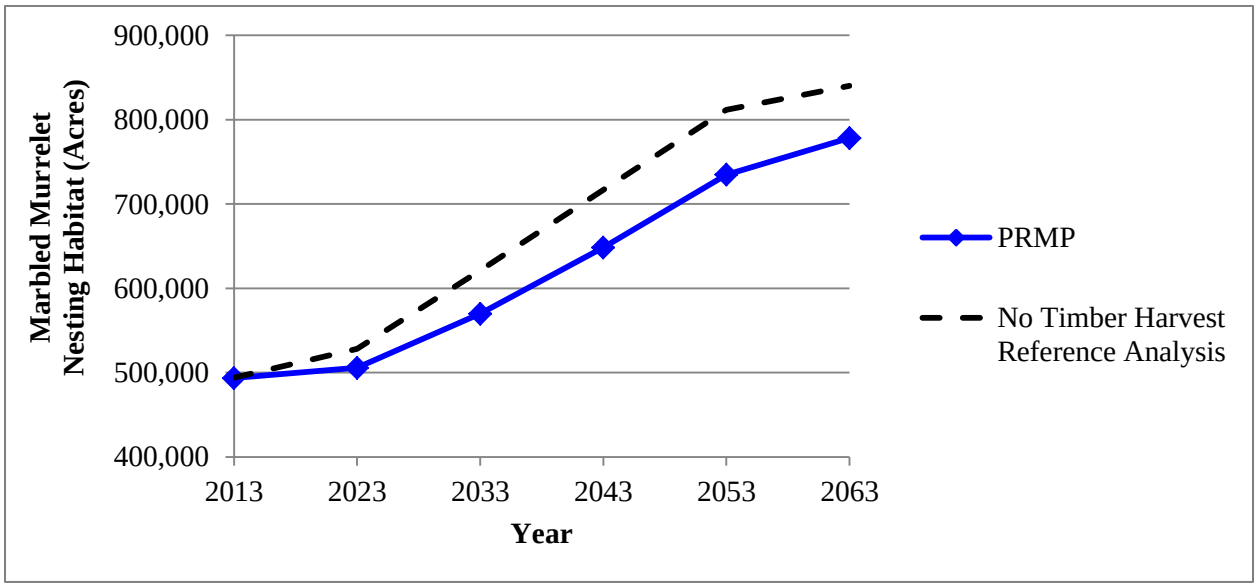


Figure III-10. Marbled murrelet nesting habitat under the Proposed RMP in the **action area**.

condition of the Proposed RMP incorporating the effect of the 2013/2014 wildfires than under the current condition previously modeled for the other alternatives. This difference in starting condition represents a difference of less than 1 percent and does not alter the comparative analytical results.

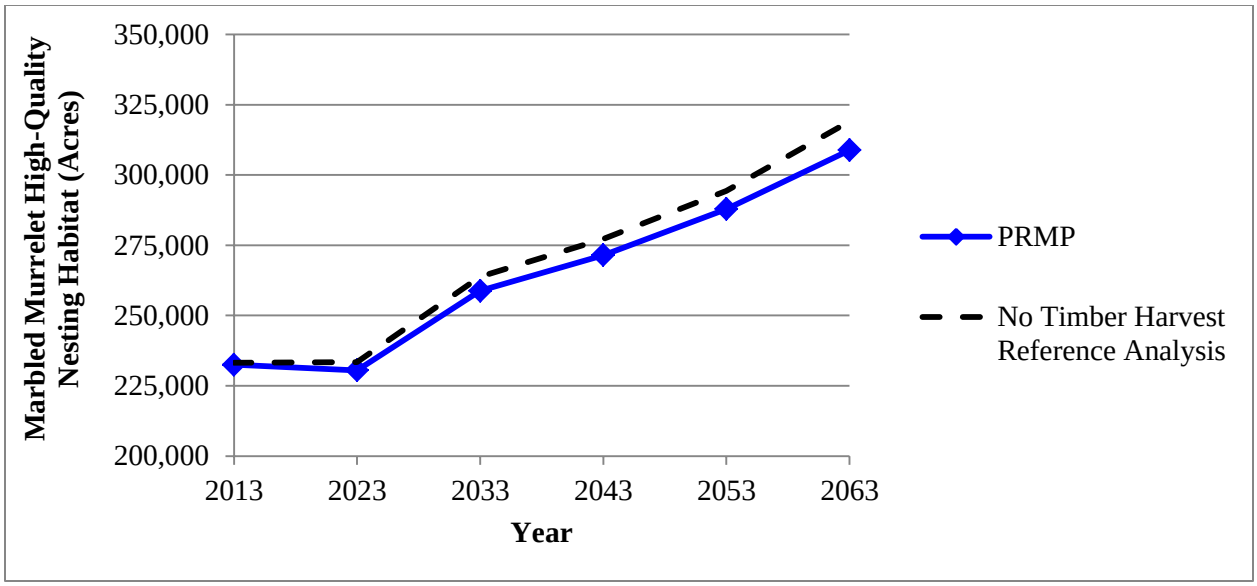


Figure III-11. High-quality marbled murrelet nesting habitat under the Proposed RMP in the **action area**.

Marbled Murrelet habitat availability and development within Conservation Zone 3 and Conservation Zone 4 exhibit similar trends as discussed above. **Appendix E** shows how marbled murrelet habitat would develop over time within Conservation Zone 3 and Conservation Zone 4 under the proposed RMP.

Currently, the average patch size of marbled murrelet nesting habitat on BLM-administered lands in the **action area** is 33.2 acres (**Table III-7**). According to the No Timber Harvest Reference Analysis, average patch size could increase to 69.7 acres in 50 years. Under the Proposed RMP, the average patch size of marbled murrelet nesting habitat would increase to 42.3 acres in 50 years.

Table III-7. Marbled murrelet nesting habitat patch metrics.

	Mean Patch Size (Acres)	Edge vs. Core Habitat		
		Edge Habitat (Acres)	Core Habitat (Acres)	Percent Core (%)
Current Condition (2013)	33.2	320,463	172,969	35%
PRMP (2063)	42.3	481,482	296,690	38%
No Timber Harvest (2063)	69.7	472,978	367,046	44%

Currently, 35 percent of nesting habitat is core habitat (**Table III-7**). According to the No Timber Harvest Reference Analysis, the percent of core habitat could increase to 44 percent in 50 years. Under the Proposed RMP, the percent of core habitat would increase to 38 percent in 50 years.

BLM-administered lands currently support 232,493 acres of the high-quality nesting habitat for the marbled murrelet, or 41 percent of all high-quality habitat on all land ownerships in the **planning area** (**Table III-6**). Currently, there are 572,424 acres of high-quality nesting habitat for the marbled murrelet across all ownerships, or 9 percent of the forest land capable of providing nesting habitat in the **planning area (Table III-6)**. Falxa and Raphael (2015, pp. 115-118) report that approximately 12 percent of habitat-capable lands was higher-suitability nesting habitat in 2012 within Zone 1 in Oregon. Thus, the BLM estimate of high-quality nesting habitat across all ownerships as modeled in this analysis is slightly lower but comparable to estimates in Falxa and Raphael (2015).

According to the No Harvest Reference Analysis, forest lands across all ownerships in the **planning area** could contribute 824,931 acres of high-quality nesting habitat in 50 years (**Figure III-12**). Under the Proposed RMP, forest lands in the planning area would contribute 814,725 acres of high-quality nesting habitat across all land ownerships in 50 years, or 99 percent of that compared to the No Harvest Reference Analysis (**Figure III-12**).

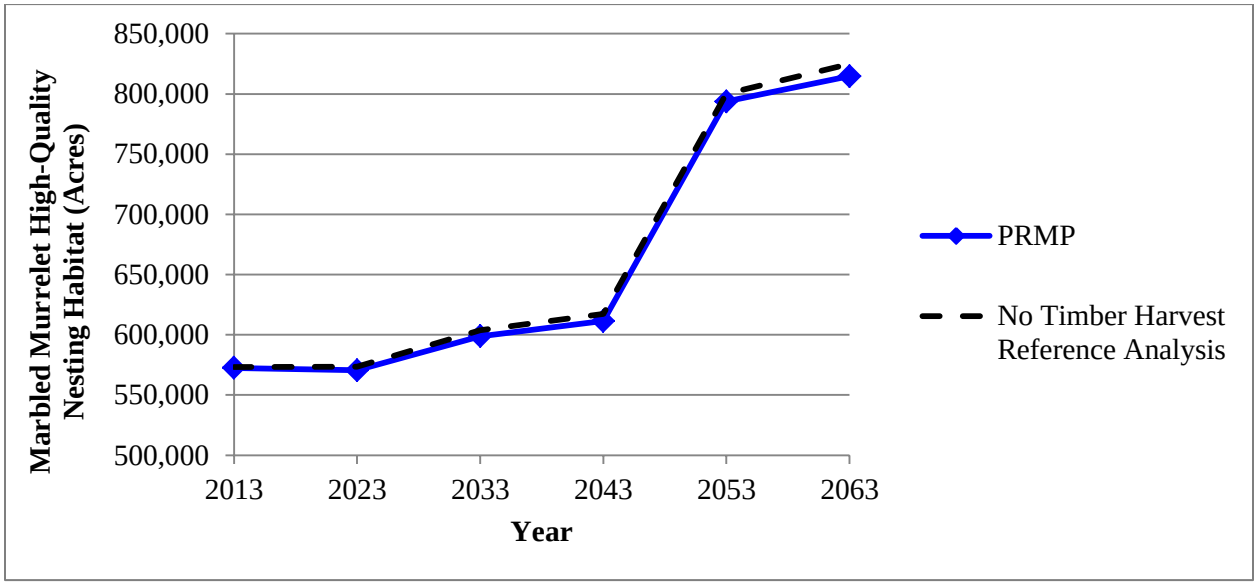


Figure III-12. High-quality marbled murrelet nesting habitat under the Proposed RMP in the **planning area**.

There are 480,369 acres of marbled murrelet critical habitat in the **action area** and 1,338,400 acres in the **planning area**. Currently, 273,178 acres of marbled murrelet critical habitat on BLM-administered lands in the **action area** support nesting habitat and 154,331 acres support high-quality nesting habitat.

The No Timber Harvest Reference Analysis indicates that BLM-administered lands in the **action area** are capable of supporting 446,137 acres of nesting habitat within designated critical habitat, and 198,051 acres of high-quality nesting habitat within designated critical habitat in 50 years. Under the Proposed RMP, BLM-administered lands in the **action area** would support 422,335 acres of nesting habitat within designated critical habitat or 95 percent as much nesting habitat as compared to the No Timber Harvest Reference Analysis (**Figure III-13**). Under the Proposed RMP, BLM-administered lands in the **action area** would support 196,107 acres of high-quality nesting habitat within designated critical habitat in 50 years or 99 percent as much high-quality nesting habitat as compared to the No Timber Harvest Reference Analysis (**Figure III-14**).

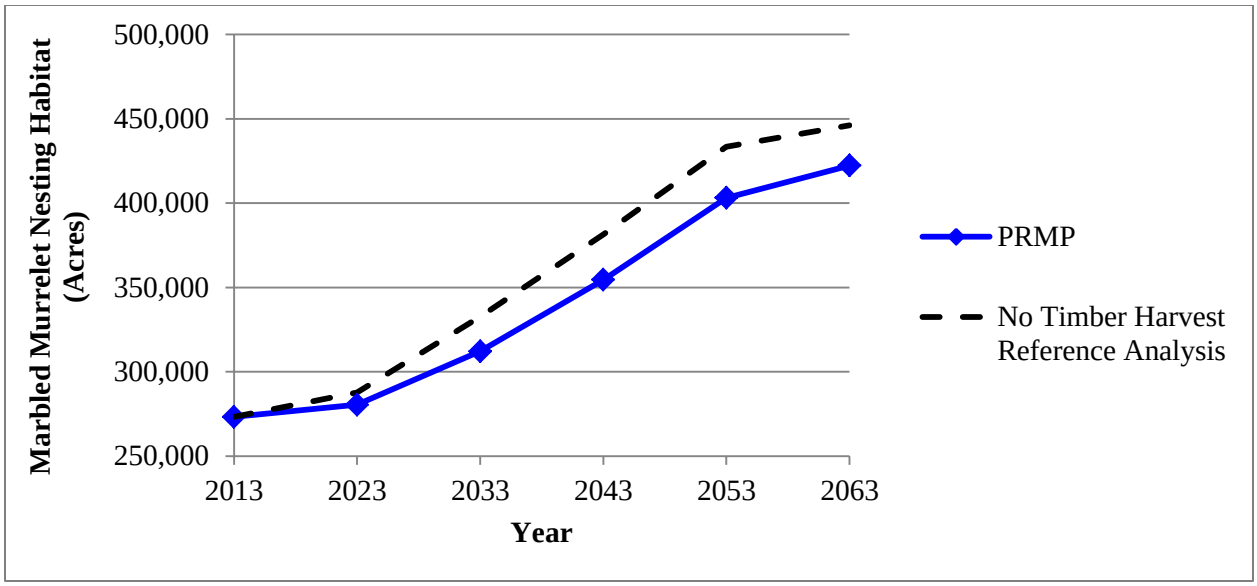


Figure III-13. Marbled murrelet nesting habitat in designated critical habitat under the Proposed RMP in the **action area**.

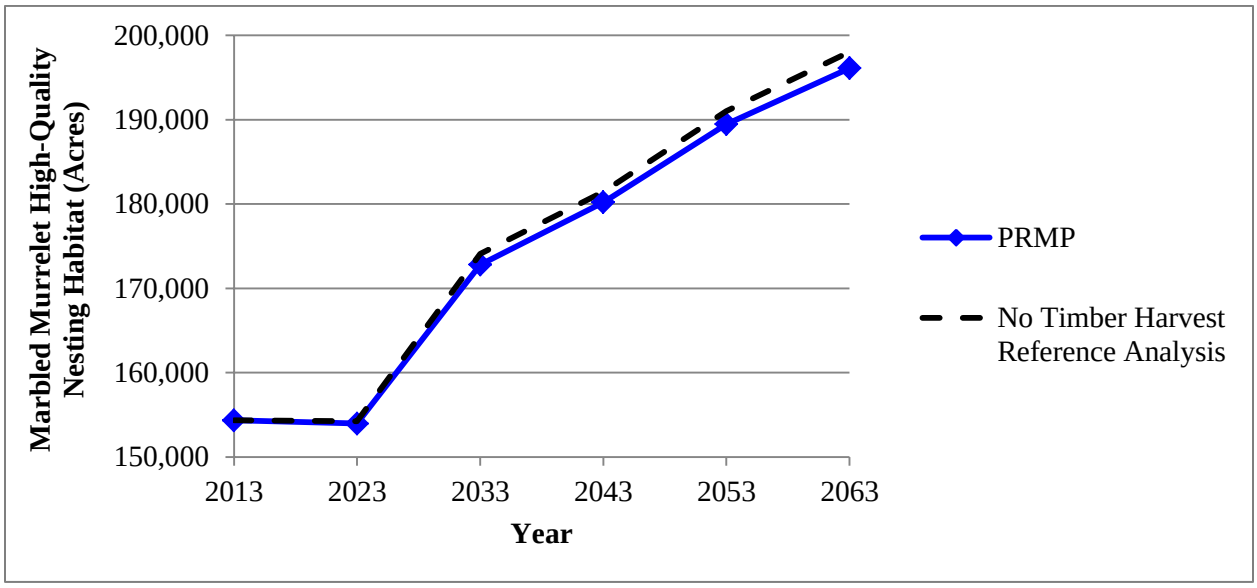


Figure III-14. High-quality marbled murrelet nesting habitat in designated critical habitat under the Proposed RMP in the **action area**.

According to the No Harvest Reference Analysis, forest lands across all ownerships in the **planning area** could support 524,050 acres of high-quality nesting habitat within designated critical habitat in 50 years (**Figure III-15**). Under the Proposed RMP, forest lands in the **planning area** would support 522,106 acres of high-quality nesting habitat within designated critical habitat in 50 years, or 99.6 percent as much high-quality nesting habitat as compared to the No Timber Harvest Reference Analysis (**Figure III-15**).

Appendix B shows how marbled murrelet critical habitat would develop over time, by critical habitat sub-unit, under the proposed RMP.

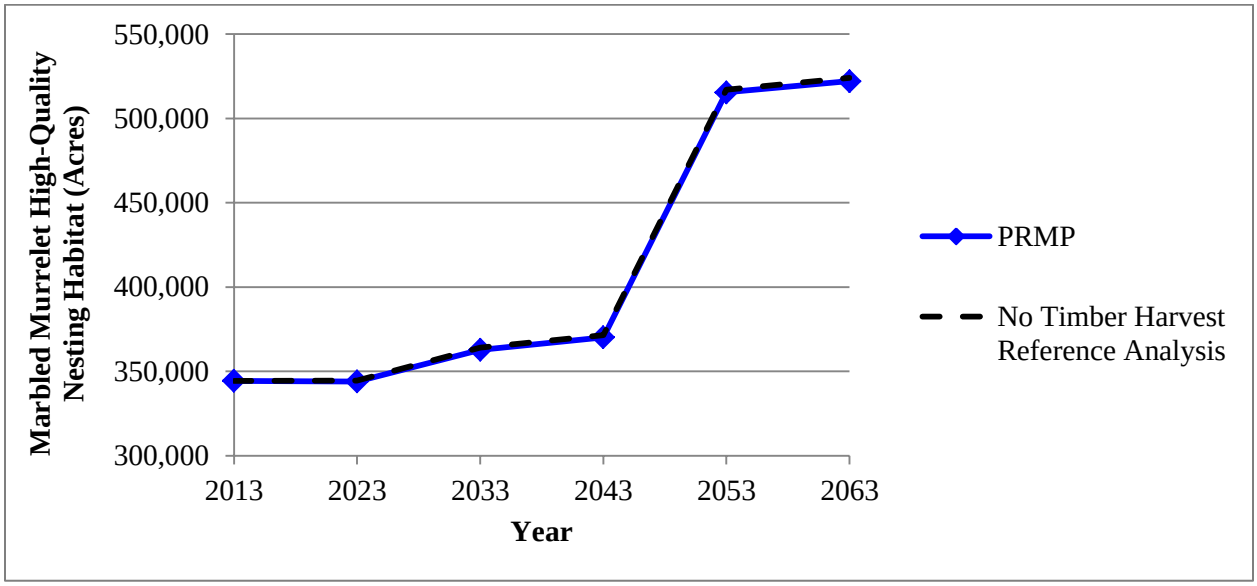


Figure III-15. High-quality marbled murrelet nesting habitat in designated critical habitat under the Proposed RMP in the **planning area**.

3. Marbled Murrelet Occupancy

The BLM used the BLM corporate murrelet database to identify known, occupied murrelet sites (GeoBOB, 2015).

The BLM forecasted the number of marbled murrelet occupied sites that the BLM would identify in the future by applying observed detection rates of occupancy and the mean size of occupied stands. Through preliminary analysis of previous surveys, the BLM found marbled murrelet occupancy is 54.8 percent of survey polygons within 0 to 25 miles of the coast (251 of 458 survey polygons) and 10.2 percent of survey polygons within 25 to 50 miles of the coast (106 of 1,038 survey polygons) (USDI BLM, unpublished data, 2015). The BLM used two different detection rates split at 25 miles from the Pacific Ocean, because there was a marked difference in the rate of occupancy detections within 25 miles of the Pacific Ocean and 25 to 50 miles from the Pacific Ocean (**Figure III-16**). The survey polygons examined in this preliminary analysis represent 83,234 acres of survey effort.

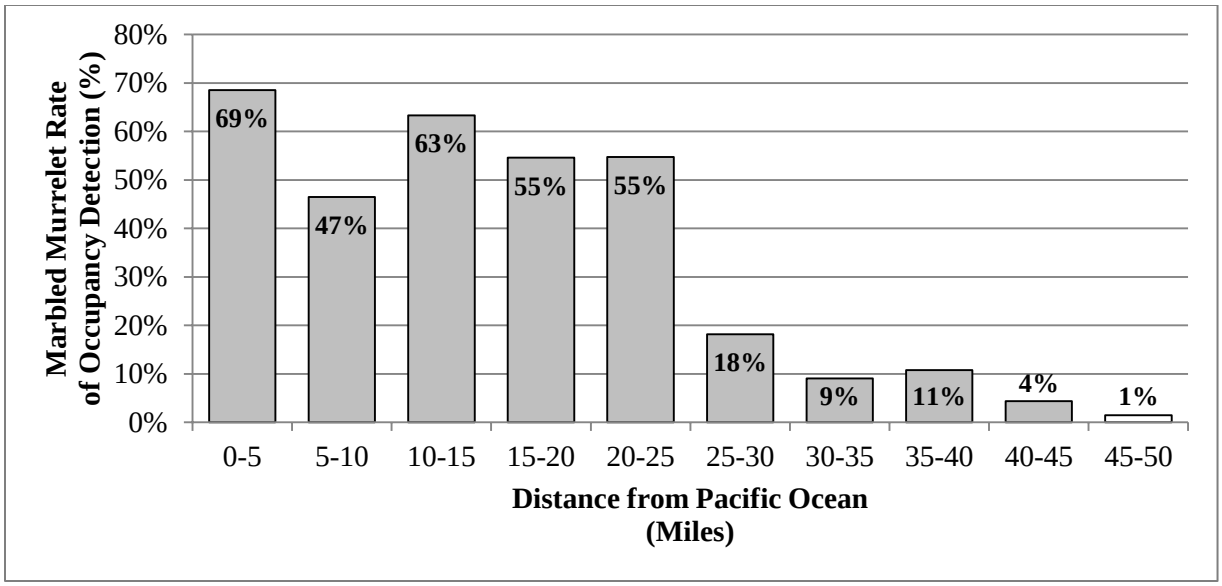


Figure III-16. Marbled murrelet occupancy detection rates.

The BLM applied these detection rates to the amount of marbled murrelet nesting habitat that the BLM modeled for potential timber harvest in the vegetation modeling for the Proposed RMP (see **Tables III-8 – III-10**). **Table III-8** displays the total acreage of marbled murrelet nesting habitat that would be considered for harvest by decade under the Proposed RMP prior to forecasting the results of survey and site management requirements.

Table III-8. Decadal forecast for marbled murrelet nesting habitat considered for harvest over 50 years (2013-2063) under the Proposed RMP.

	Marbled Murrelet Nesting Habitat Considered for Harvest by End of Decade (Acres)					**Cumulative Nesting Habitat Considered for Harvest (Acres)**
	2023	**2033**	**2043**	**2053**	**2063**	
PRMP	28,493	21,166	15,329	16,287	23,056	104,332

Table III-9 displays the amount of marbled murrelet nesting habitat modeled for harvest under the Proposed RMP which would require surveys prior to harvest. If surveys on these acres were to detect marbled murrelets, the BLM would protect the occupied site and would not implement the timber harvest. That is, these are acres to which the BLM applied the detection rates to forecast "predicted marbled murrelet sites" that would be allocated to the Late-Successional Reserve.

Table III-9. Marbled murrelet nesting habitat modeled for harvest that would be subject to surveys prior to harvest under the Proposed RMP.

	Marbled Murrelet Nesting Habitat Considered for Harvest *with* Surveys by End of Decade (Acres)					**Cumulative Nesting Habitat Considered for Harvest (Acres)**
	2023	**2033**	**2043**	**2053**	**2063**	
PRMP	21,331	18,024	11,571	13,702	18,333	82,960

Table III-10 displays the amount of marbled murrelet nesting habitat modeled for harvest under the Proposed RMP that would not be surveyed and would be lost, as described in this analysis below.

Table III-10. Marbled murrelet nesting habitat modeled for harvest that would not be subject to surveys under the Proposed RMP.

	Marbled Murrelet Nesting Habitat Harvested *without* Surveys by End of Decade (Acres)					**Cumulative Nesting Habitat Harvested (Acres)**
	2023	**2033**	**2043**	**2053**	**2063**	
PRMP	7,162	3,143	3,758	2,586	4,723	21,371

The average size of survey polygons is 55.6 acres (USDI BLM, unpublished data, 2015), and the BLM assumed that survey polygons are the best available dataset depicting marbled murrelet occupancy at the stand level. The BLM divided the acreage of available nesting habitat at the end of each decade (2023, 2033, 2043, 2053, and 2063) by the average size of survey polygons to forecast the number of future, occupied sites that may exist in the future. While this forecast uses spatial data, the BLM did not forecast the specific location of future, occupied sites. Thus, the BLM did not specifically and separately analyze habitat development in or near these forecast sites. The forecast of the total number of marbled murrelet sites in the **action area** would help to provide context for the effects of implementing the Proposed RMP.

Based on total amount of nesting habitat, the observed detection rates of occupancy and the mean size of occupied stands described above, the **action area** currently support an estimated 2,459 marbled murrelet sites. To evaluate the accuracy of this forecast, the BLM also estimated marbled murrelet occupied sites on BLM-administered lands using a different methodology. Raphael *et al.* (2002) estimated 150 hectares (370 acres) of nesting habitat could support a pair of marbled murrelets on the Olympic Peninsula. Applying their estimate to the amount of nesting habitat currently available on BLM-administered lands (493,969 acres), the **action area** supports an estimated 1,335 marbled murrelet sites – approximately half the estimate based on BLM survey detection rates. Thus, the estimate of marbled murrelet sites, both currently and in the future under the Proposed RMP, may overestimate the number of future marbled murrelet sites in the **action area**.

Under the Proposed RMP, the BLM would survey marbled murrelet nesting habitat in all land use allocations in Zone 1 (0 to 35 miles from the coast). In Zone 2 (35 to 50 miles from the coast) the BLM would survey murrelet nesting habitat in reserve land use allocations but would not survey nesting habitat in the Harvest Land Base. For its analysis, the BLM assumed that nesting habitat without surveys would still contain marbled murrelet sites using the detection rates described above, but that those sites would remain undiscovered and the habitat at those sites within the Harvest Land Base would be removed by timber harvest.

There are 351 known, occupied marbled murrelet sites on BLM-administered lands in the **action area** (GeoBOB, 2015), encompassing 51,995 acres, as delineated by the BLM offices (**Figure III-17**). There also are 417 known occupied marbled murrelet sites on the lands administered by the U.S. Forest Service in Oregon and 237 sites on state lands managed by the Oregon Department of Forestry, for a total of 1,005 sites in the **planning area** (**Table III-11**). Information regarding marbled murrelet occupancy for other land-owners is not available. BLM-administered lands support 35 percent of the known, occupied marbled murrelet sites in Oregon, whereas BLM-administered lands only comprise 13 percent (885,590 acres) of the habitat-capable acres within the range of the marbled murrelet in the **planning area** (6,638,960 acres; **Table III-6**). This may, in part, reflect a greater survey effort on BLM-administered lands than on other land ownerships, given the lack of information on survey efforts on several land ownerships. However, as detailed above, BLM-administered lands currently contribute 41 percent of the

high-quality nesting habitat for the marbled murrelet in the **planning area**. This suggests that BLM-administered lands play a substantial role in the conservation of the marbled murrelet.

Table III-11. Known marbled murrelet sites in the **planning area**.

Ownership	Known Occupied Marbled Murrelet Sites			Marbled Murrelet Survey Effort			
	(#)	Total Known Sites (%)	(Acres)	Survey Period (Years)	Stations (#)	Survey Polygons (#)	Survey Area (Acres)
BLM	351	35%	51,995	1991-2014	6,121	1,496	83,234
Forest Service	417[a]	41%	21,144[b]	1986-2009	Not Available	Not Available	Not Available
Oregon Department of Forestry	237	24%	21,235	1989-2014	9,650	2,107	300,455
Totals	**1,005**	**100%**	**94,374**	**-**	**-**	**-**	**-**

[a] Combination of 133 occupied marbled murrelet sites reported from the Rogue-Siskiyou National Forest and surveyors observed occupied behaviors at 381 survey stations on the Siuslaw National Forest. For this analysis, BLM assumed that the stations within 400 meters of each other represented the same occupied site since the maximum effective distance of a survey station is 200 meters radius (Mack *et al*. 2003, p. 9). Thus, the 381 survey stations with occupied behaviors represent approximately 284 occupied sites.

[b] Only includes acreage from the Rogue-Siskiyou National Forest; acreage from the Siuslaw National Forest is not available.

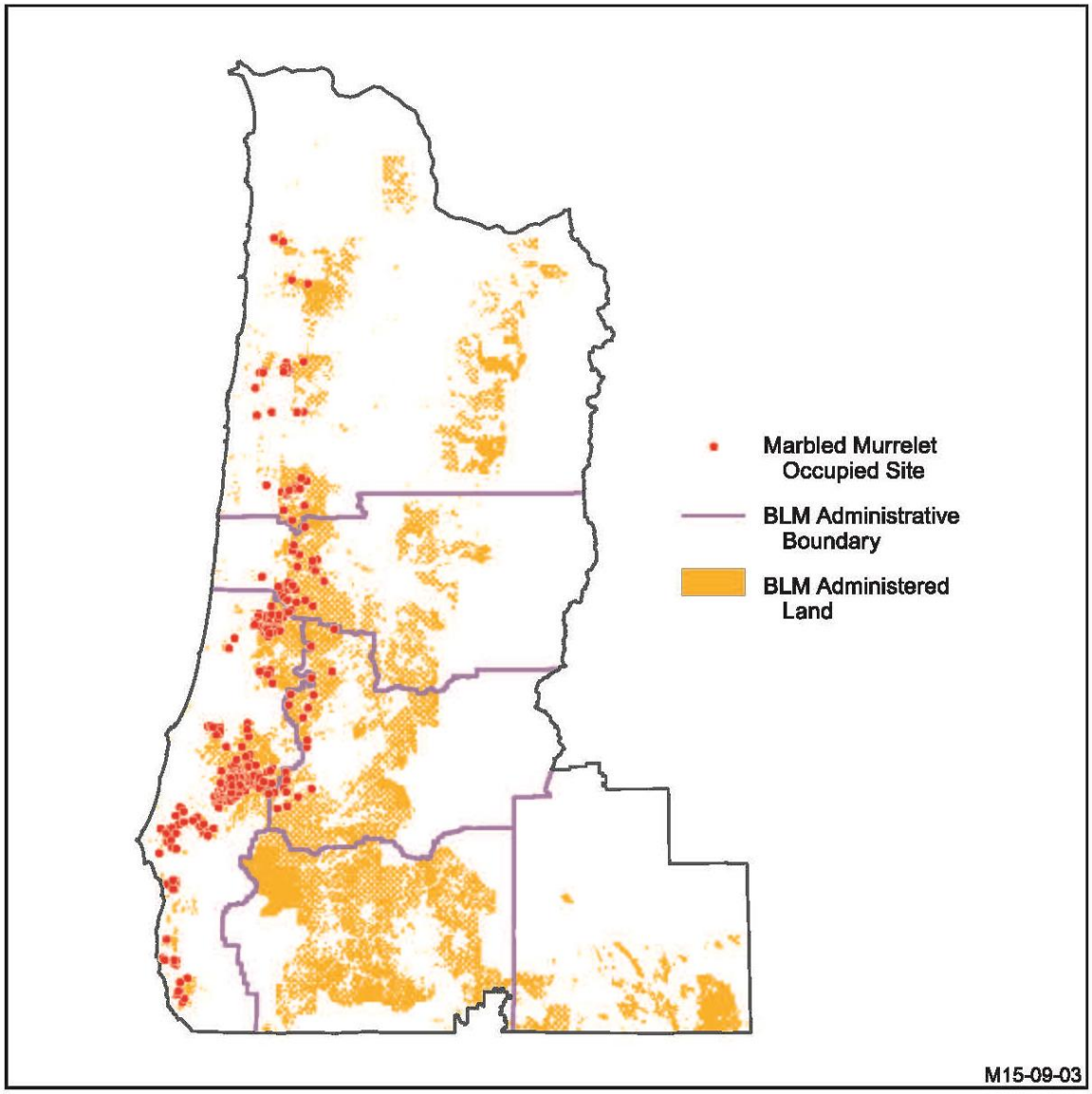


Figure III-17. Known, occupied marbled murrelet sites in the **action area**.

Approximately 88 percent of total occupied site acres in the **action area** are currently nesting habitat, 9 percent is capable of developing into nesting habitat in the future, and 3 percent is non-forest. Existing, known sites would be included within the Late-Successional Reserve under the Proposed RMP. Therefore, all current nesting habitat associated with occupied sites would be retained, and eventually 97 percent of the acres associated with occupied sites would develop into nesting habitat under the Proposed RMP.

Under the Proposed RMP, the BLM would discover and protect an estimated 377 occupied marbled murrelet sites during the first five decades (**Table III-12**) through surveys of nesting habitat all land use allocations in Zone 1 and outside the Harvest Land Base in Zone 2. In the Harvest Land Base in Zone 2 under the Proposed RMP, an estimated 39 occupied marbled murrelet sites would be lost during the first five decades (**Table III-13**) because the BLM would not conduct surveys prior to modification or removal of nesting habitat in the Harvest Land Base in Zone 2.

Table III-12. Decadal forecast for marbled murrelet occupied sites discovered over 50 years (2013-2063).

	Occupied Sites Discovered and Protected (by End of Decade)					Cumulative Occupied Sites Discovered and Protected
	2023	2033	2043	2053	2063	
PRMP	97	76	42	69	91	377

Table III-13. Decadal forecast for marbled murrelet occupied sites lost over 50 years (2013-2063).

	Occupied Sites Forecast to be Lost (by End of Decade)					Cumulative Occupied Sites Lost
	2023	2033	2043	2053	2063	
PRMP	13	6	7	5	9	39

Table III-14 and **Figure III-18** shows the BLM forecasts of the number of occupied marbled murrelet sites that would occur in the **action area**, by decade, according to the No Timber Harvest Reference Analysis and under the Proposed RMP. Despite the anticipated losses of undiscovered marbled murrelet occupied sites under the Proposed RMP, the BLM forecasts that the marbled murrelet population would increase over 50 years due to the continued development of nesting habitat and the net increase in the number of occupied sites, reaching 94 percent of the number of occupied sites that could occur in the **action area** compared to the No Timber Harvest Reference Analysis.

Table III-14. Estimated changes in the number of marbled murrelet occupied sites in the **action area** during the next 50 years (2012 – 2063), by decade, according to the No Timber Harvest Reference Analysis and under the Proposed RMP.

	2013	2023	2033	2043	2053	2063
No Timber Harvest	2,461	2,621	3,080	3,544	4,043	4,193
PRMP	2,459	2,524	2,838	3,246	3,710	3,932

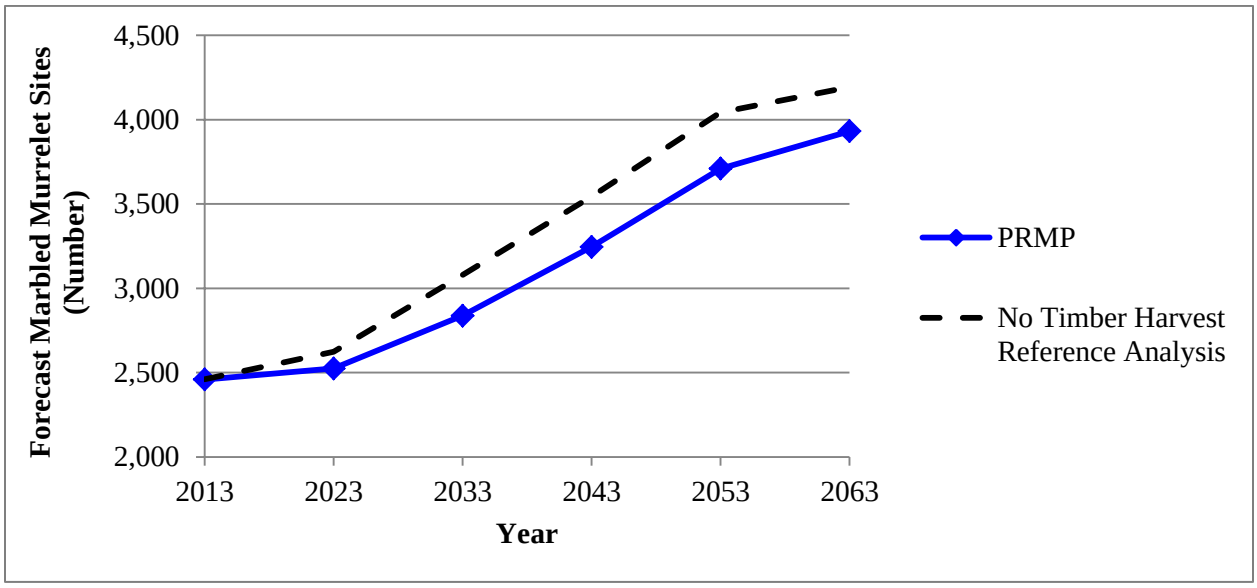


Figure III-18. Forecast of the number occupied marbled murrelet sites in the **action area**.

Forecast of the number of occupied marbled murrelet sites within Conservation Zone 3 and Conservation Zone 4 exhibit similar trends as discussed above. **Appendix E** shows the forecast of occupied marbled murrelet sites over time within Conservation Zone 3 and Conservation Zone 4 under the proposed RMP.

O. WESTERN SNOWY PLOVER AND ITS CRITICAL HABITAT

Historically, western snowy plovers *(Charadrius nivosus nivosus)* nested in at least 29 locations on the Oregon coast (USDI FWS 2013d). Currently, only nine locations in Oregon support nesting western snowy plovers (Lauten *et al.* 2013) and two of those areas are on BLM-administered lands (Coos Bay North Spit and New River). The U.S. Fish and Wildlife Service listed the Pacific Coast distinct population segment of the western snowy plover as a threatened species under the Endangered Species Act on March 5, 1993 (58 FR 12864).

Nesting habitat for the Pacific Coast distinct population segment of the western snowy plover includes coastal beaches comprised of unconsolidated sand with sparse vegetation, from southern Washington to southern Baja California. Threats to snowy plovers include recreational activities (including pedestrians and unleashed pets) near nesting habitat, habitat loss from the encroachment of European beach grass, and predation, particularly from avian predators (58 FR 12869 and 77 FR 36754). The main cause of nest failure for snowy plovers along the Oregon coast in 2013 was predation by avian predators, particularly corvids (Lauten *et al.* 2013, p. 9). Resprouting and growth of European beachgrass continues to degrade nesting habitat.

The U.S. Fish and Wildlife Service designated revised critical habitat for the Pacific Coast distinct population segment of the western snowy plover on June 19, 2012 (77 FR 36728). The primary constituent elements of designated critical habitat for the snowy plover include sandy beaches, dune systems immediately inland of an active beach face, salt flats, mud flats, seasonally exposed gravel bars, artificial salt ponds and adjoining levees, and dredge spoil sites, with:

- Areas that are below heavily vegetated areas or developed areas and above the daily high tides;
- Shoreline habitat areas for feeding, with no or very sparse vegetation, that are between the annual low tide or low-water flow and annual high tide or high-water flow, subject to inundation but not constantly under water, that support small invertebrates, such as crabs, worms, flies, beetles, spiders, sand hoppers, clams, and ostracods, that are essential food sources;
- Surf- or water-deposited organic debris, such as seaweed (including kelp and eelgrass) or driftwood located on open substrates that supports and attracts small invertebrates above for food, and provides cover or shelter from predators and weather, and assists in avoidance of detection (crypsis) for nests, chicks, and incubating adults; and
- Minimal disturbance from the presence of humans, pets, vehicles, or human-attracted predators, which provide relatively undisturbed areas for individual and population growth and for normal behavior.

In the Recovery Plan for the Pacific Coast Population of the Western Snowy Plover, the U.S. Fish and Wildlife Service establishes recovery goals to maintain 250 breeding adults along the Oregon and Washington coast for a 10-year period and a ratio of at least 1.0 fledgling per male for the 5-year period prior to delisting (USDI FWS 2007b).

Overall, the population of snowy plovers has been increasing since their time of listing in 1993. Following the 2013 nesting season, the 10-year average for the number of breeding adults was 211 to 216 adults. The number of breeding adults along the Oregon coast increased between 1993 (55 to 61 adults) and 2013 (190 to 191 adults) (Lauten *et al.* 2013) but was below the recovery goal of 250 breeding adults. Lauten *et al.* (2013) suggest that the number of resident plovers is a better index of plover breeding than the number of breeding adults, given the difficulties in positively identifying breeding adults. Based on

the number of resident plovers, the population in 2013 reached 250 breeding adults (*ibid*.). The 5-year average for the number of fledglings per male was 1.15 through the 2013 nesting season, which meets the recovery goal of 1.0 fledglings per male (USDI FWS 2007, p. 147).

Currently, the BLM Coos Bay District implements various management actions on a recurring basis to restore snowy plover habitat in areas which the BLM has mapped as "Habitat Restoration Areas." The BLM maintains breeding and wintering habitat in the Habitat Restoration Areas by periodically plowing encroaching beach grass (80 acres in 2012) or augmenting nesting habitat by scattering oyster shells to attract plover nesting (USDI BLM 2012c Coos Bay District Annual Program Summary, p. 14). In addition, the Coos Bay District BLM cooperates with the USDA Animal and Plant Health Inspection Services to control predators of snowy plover nests.

For its analysis, the BLM considered the Habitat Restoration Areas, as mapped by the Coos Bay District, to represent current habitat for the snowy plover. The BLM assumed that these Habitat Restoration Areas are representative of current plover habitat, based on discussion with Coos Bay District staff (K. Palermo, BLM, personal communication, 2014, and S. Fowler, BLM, personal communication, July 2014). The BLM did not quantify changes in plover population numbers, because other factors beyond BLM's control influence the population, such as predation by avian predators.

There are currently 334 acres of snowy plover habitat in the **planning area**, of which, 230 acres are in the **action area** on the Coos Bay District and the remaining 104 acres of plover habitat are located on lands managed by the Army Corps of Engineers on the Coos Bay North Spit adjacent to BLM-administered habitat. The BLM assumed in this analysis that habitat conditions and trends on the Coos Bay North Spit are comparable between lands administered by the BLM and Army Corps of Engineers.

There are 2,279 acres of designated critical habitat for the snowy plover in the **planning area** (**Table III-15**) of which 383 acres are in the **action area**, all in the Coos Bay District. Under the Proposed RMP, all snowy plover habitat and all designated critical habitat in the **action area** would be within the New River ACEC or the North Spit ACEC.

Table III-15. Designated critical habitat for the Pacific Coast distinct population segment of the western snowy plover.

Unit Number	Unit Name	Planning area Critical Habitat (Acres)	Action area Critical Habitat (Acres)
OR 2	Necanicum River Spit	11	-
OR 4	Bayocean Spit	201	-
OR 6	Sand Lake South	5	-
OR 7	Sutton/Baker Beaches	276	-
OR 8a	Siltcoos Breach	15	-
OR 8b	Siltcoos River Spit	116	-
OR 8c	Dunes Overlook/Tahkenitch Creek Spit	383	-
OR 8d	North Umpqua River Spit	59	-
OR 9	Tenmile Creek Spit	223	-
OR 10	Coos Bay North Spit	273	101
OR 11	Bandon to New River	541	282
OR 12	Elk River Spit	167	-
OR 13	Euchre Creek	9	-
	Totals	**2,279**	**383**

Under the Proposed RMP, a portion of the New River ACEC would be *closed* to off-highway vehicles and a portion would be *limited*. The *limited* portion of the New River ACEC would include existing roads and trails that have already been designated. Similarly, the BLM has designated roads and trails for the North Spit ACEC. The Proposed RMP specifically directs BLM to not authorize or construct additional roads or trails within snowy plover habitat or designated critical habitat (see **Appendix A**).

In addition, the Proposed RMP would provide direction to continue activities that restore or maintain snowy plover nesting habitat as the Coos Bay District has been implementing historically (*e.g.*, mechanical treatment of plowing of European beach grass and augmenting nesting grounds with oyster shells). The Proposed RMP would also include direction to avoid disruption of plover nesting behaviors through the restricting the timing and location of beach access or activities (see **Appendix A**). Under the Proposed RMP, the BLM would not approve, fund or carry out actions that would adversely affect snowy plover habitat or critical habitat except when done in accordance with an approved recovery plan, conservation agreement, species management plan, survey and monitoring protocol, or critical habitat rule, and when the action is necessary for the conservation of the species (see **Appendix A**).

ACEC management direction limiting off-highway vehicles and avoiding disruption to snowy plover nesting is consistent with actions recommended by the Oregon Department of Fish & Wildlife in the Oregon Conservation Strategy (ODFW 2006, p. 12).

P. NORTHERN SPOTTED OWL AND ITS CRITICAL HABITAT

1. Background

The U.S. Fish and Wildlife Service, in its Revised Recovery Plan for the Northern Spotted Owl (USDI FWS 2011a, pp. I-6 – I-10; hereafter referred to as the Revised Recovery Plan), and its final rule on northern spotted owl critical habitat (77 FR 71818; hereafter referred to as the final rule), described the biology and management history, and the threats to the conservation and recovery, of the northern spotted owl.

The BLM evaluated the potential effects of the Proposed RMP on the northern spotted owl according to the specific criteria developed by the U.S. Fish and Service in its Revised Recovery Plan, and used by the Service to evaluate proposed actions in accordance with the ESA of 1973, as amended. Specifically, the BLM designed its northern spotted owl analyses to determine if the BLM would:

- Contribute to a landscape in the **planning area** that meets the four "habitat-dependent" conservation needs of the northern spotted owl;[20] and
- Manage its administered lands in the **planning area** in a manner that addresses the resources and processes described by Recovery Actions 6, 10, 12 and 32 of the Revised Recovery Plan (USDI FWS 2011a). RMP planning decisions could affect the implementation and accomplishment of only those four recovery actions.

a. Conservation Needs of the Northern Spotted Owl

In 1990 Thomas *et al.* (pp. 23-27) determined that northern spotted owl conservation required:

> 1. Large blocks of nesting, roosting and foraging habitat that support clusters of reproducing owls, are distributed across a variety of ecological conditions, and are spaced to facilitate owl movement between the blocks, and;
>
> 2. Habitat conditions within and surrounding large blocks of nesting, roosting and foraging habitat that facilitate owl movement between the blocks and ensure the survival of dispersing owls.

In 2004, Courtney *et al.* (Chapter 9) concluded that, although subsequent northern spotted owl research had refined these conservation needs, they remained valid. In 2012, the U.S. Fish and Wildlife Service reaffirmed these conservation needs in its final rule on northern spotted owl critical habitat (77 FR 71908).

After the report by Courtney *et al.* (2004), the U.S. Fish and Wildlife Service identified two additional habitat-dependent conservation needs for the northern spotted owl:

> 3. A coordinated, adaptive management effort to reduce the loss of habitat due to catastrophic wildfire throughout the northern spotted owl's range, and a monitoring program to clarify whether these risk reduction methods are effective and to determine how owls use habitat treated to reduce fuels, and;
>
> 4. In areas of significant population decline, sustain the full range of survival and recovery options for this species in light of significant uncertainty.

The U.S. Fish and Wildlife Service considers all four habitat-dependent conservation needs when it evaluates proposed actions. The Service added Conservation Needs 3 and 4 because of findings that the range-wide losses of northern spotted owl habitat to wildfire, especially in southern Oregon, posed a greater threat to northern spotted owl conservation than previously thought (Courtney *et al.* 2004, Chapter 6) and because of observed declines in the northern spotted owl population (Anthony

[20] The U.S. Fish and Wildlife Service also identifies two "habitat-independent" conservation needs in its biological opinions: a coordinated research and adaptive management effort to better understand and manage competitive interactions between spotted and barred owls, and monitoring to better understand the risk of West Nile virus and sudden oak death pose to spotted owls and, for West Nile virus, research into methods that may reduce the likelihood or severity of outbreaks in spotted owl populations. The BLM analysis did not address these conservation needs because they are habitat-independent and would be unaffected by Proposed RMP decisions.

et al. 2006). Conservation Need 4 has become increasingly important with continued population declines (Forsman *et al.* 2011 and Dugger *et al.* 2016) and recent findings on competitive interactions between northern spotted owls and barred owls (e.g., Van Lanen *et al.* 2011, Dugger *et al.* 2011, Wiens *et al.* 2014).

b. Recovery Actions 6, 10, 12 and 32

The U.S. Fish and Wildlife Service issued its Revised Recovery Plan in 2011. Although recovery plans are guidance documents (Stanford Environmental Law Society 2001, p. 76), they describe reasonable actions and criteria that the U.S. Fish Wildlife Service or National Marine Fisheries Service recommend for the recovery of listed species. Thus, the Revised Recovery Plan provides a useful framework for this analysis. Of the thirty-three recovery actions in the Revised Recovery Plan, only four are pertinent to the RMP planning effort in that BLM planning decisions could affect the implementation and accomplishment of only those actions on BLM-administered lands in the **planning area** (USDI FWS 2011a):

- *"Recovery Action 6*: In moist forests managed for spotted owl habitat, land managers should implement silvicultural techniques in plantations, overstocked stands and modified younger stands to accelerate the development of structural complexity and biological diversity that will benefit spotted owl recovery" (p. III-19).
- *"Recovery Action 10*: Conserve spotted owl sites and high value spotted owl habitat to provide additional demographic support to the spotted owl population" (p. III-43).
- "*Recovery Action 12*: In lands where management is focused on development of spotted owl habitat, post-fire silvicultural activities should concentrate on conserving and restoring habitat elements that take a long time to develop (e.g., large trees, medium and large snags, downed wood)" (p. III-49).
- *"Recovery Action 32*: Because spotted owl recovery requires well distributed, older and more structurally-complex multi-layered conifer forests on Federal and non-Federal lands across its range, land managers should work with the Service as described below to maintain and restore such habitat while allowing for other threats, such as fire and insects, to be addressed by restoration management actions. These high-quality spotted owl habitat stands are characterized as having large diameter trees, high amounts of canopy cover, and decadence components such as broken-topped live trees, mistletoe, cavities, large snags, and fallen trees" (p. III-67).

2. Summary of Analytical Methods

The BLM framed its evaluations of the four habitat-dependent conservation needs of the northern spotted owl and the implementation of Recovery Actions 6, 10, 12 and 32 as analytical questions, stated below. To complete its evaluations, the BLM created a series of northern spotted owl relative habitat suitability data surfaces (i.e., digitized geospatial datasets used in computer analyses) for all lands in the United States-portion of the northern spotted owl's range.[21] These surfaces reflect current habitat values and forecast changes in habitat values at decadal increments for the next 50 years. The forecasts include anticipated changes to northern spotted owl habitat from forest ingrowth, forest treatment including restoration and timber harvest, and wildfire. The BLM describes the creation and validation of these surfaces in **Appendix C**. The BLM did not incorporate projections of climate change into the simulation of the growth of stands through time because of the uncertainty in climate change predictions and problems in downscaling the available climate predictions for use in forest stand growth and harvesting models.

[21] A small population of northern spotted owls exists in British Columbia but it would be unaffected by BLM planning decisions and its size and location would prevent it from measurably affecting the results of the BLM analyses.

The BLM chose a 50-year analytical timeframe for its northern spotted owl analyses, mindful that the Revised Recovery Plan identifies a 30-year timeframe for the recovery of the northern spotted owl (USDI FWS 2011a, p. viii). However, the 30-year timeframe is unchanged from that of an earlier recovery plan (USDI FWS 2008a) which the U.S. Fish and Wildlife Service issued before the most recent meta-analyses of northern spotted owl demography (Forsman *et al.* 2011 and Dugger *et al.* 2016) and recent findings on competitive interactions between northern spotted owls and barred owls (e.g., Van Lanen *et al.* 2011, Dugger *et al.* 2011, Wiens *et al.* 2014). In addition, on April 3, 2013, the assistant directors for Regions 1 and 2 of the U.S. Fish and Wildlife Service, which include the Proposed RMP **planning area**, issued agency guidance on implementation of the final rule on 2012 northern spotted owl critical habitat, in which they identified a conservation timeframe of at least 50 years.

The BLM analyses differ from the analyses done by the U.S. Fish and Wildlife Service to inform its decisions on northern spotted owl recovery and northern spotted owl critical habitat (USDI FWS 2011a, Appendix C; USDI FWS 2012). These differences arise from differences in planning needs and regulatory requirements, as well as differences in data availability. The Service delineated critical habitat units, in part, assuming that existing Northwest Forest Plan land use allocations and management standards would continue, including on BLM-administered lands. In contrast, the BLM evaluated scenarios in which Northwest Forest Plan land use allocations and management standards would change on BLM-administered lands in the **planning area**. The Service and BLM also relied on different relative habitat suitability surfaces and different processes to evaluate the effects of habitat change.[22] Prior to deciding on its analytical methods, the BLM reviewed with the Service and other subject matter experts the methods developed by the Service. The BLM then incorporated or augmented those datasets and methods that met its planning needs (see **Appendix C**).

3. Management Issues

a. Issue 1

*In accordance with Conservation Need 1, would the Proposed RMP contribute to a landscape in the **planning area** that creates large blocks of nesting, roosting and foraging habitat that are capable of supporting clusters of reproducing owls, distributed across a variety of ecological conditions and spaced to facilitate owl movement between the blocks?*

1). Summary of Analytical Methods

To meet Conservation Need 1, BLM-administered lands would contribute to "large blocks of habitat," each capable of supporting at least 25 northern spotted owl nesting pairs, in the Oregon Western Cascades, Oregon Eastern Cascades, Oregon Coast Range and Oregon Klamath physiographic provinces during each of the next five decades and, within 30 to 50 years, to a network of large habitat blocks that are spaced no more than 12 miles (19.3 km) apart. Where large blocks do not form within 30 to 50 years, BLM-administered lands would contribute to a network of "small blocks of habitat," each capable of supporting 1 to 24 northern spotted owl nesting pairs, that are spaced no more than 7 miles (11.3 km) from large habitat blocks or from other small habitat blocks. Because this conservation need is not specific to BLM-administered lands, the BLM evaluated Conservation Need 1 by forecasting habitat conditions on all lands in the **planning area** during the next 50 years as described in **Appendix C**.

[22] The U.S. Fish and Wildlife Service evaluated northern spotted owl responses to "pessimistic" and "optimistic" habitat change scenarios, neither of which was intended to predict future habitat conditions. The BLM instead chose to simulate northern spotted owl responses to forecasts of habitat change over time, on all land ownerships, from forest ingrowth, treatment and wildfire.

Thomas *et al.* (1990, p. 164) described northern spotted owl "nesting, roosting and foraging habitat" as "multi-layered, multispecies canopy dominated by large (greater than 30 inches diameter at breast height) conifer overstory trees, and an understory of shade-tolerant conifers or hardwoods; a moderate to high (60 to 80 percent) canopy closure; substantial decadence in the form of large, live conifer trees with deformities, such as cavities, broken tops, and dwarf mistletoe infections; numerous large snags; ground cover characterized by large accumulations of logs and other woody debris; and a canopy that is open enough to allow owls to fly within and beneath it." Their description, in light of subsequent research, remains valid (Courtney *et al.* 2004, Chapter 5; USDI FWS 2011a, pp. G-2 and G-3).[23]

Thomas *et al.* (1990, p. 24) described a "large block" of nesting, roosting and foraging habitat as being capable of supporting 15 to 20 northern spotted owl nesting pairs which they estimated was the minimum number for a local, reproductively-stable population. Lamberson *et al.* (1994), based on modeling, estimated that large blocks capable of supporting 20 to 25 owl pairs would have the highest efficiency of use by northern spotted owls (i.e., number of northern spotted owl pairs to block size ratio). Although "efficiency of use" is not a measure of population stability, the BLM considered their findings relevant to its evaluation of block size in light of recent information on competitive interactions between northern spotted owls and barred owls. Marcot *et al.* (2013, p. 196), also based on modeling, determined that "Long-term occupancy rates of habitats are significantly higher in scenarios with habitat clusters supporting at least 25 NSO [northern spotted owl] pairs." Marcot *et al.* did not model clusters of 15 to 20 northern spotted owl pairs; the next largest cluster size they modeled was 9 pairs. Nonetheless, part of the BLM Purpose and Need for the Proposed RMP is to contribute to the conservation and recovery of the northern spotted owl, which requires more than managing for essentially static populations. Therefore, the BLM defined a "cluster of reproducing owls" as at least 25 northern spotted owl nesting pairs, and a "large block" as the amount and spatial arrangement of nesting-roosting habitat capable of supporting at least 25 pairs. Consequently, a "small block" of habitat is capable of supporting 1 to 24 northern spotted owl nesting pairs.

Thomas *et al.* (1990, p. 318) considered large blocks of nesting, roosting and foraging habitat to be "distributed across a variety of ecological conditions" when they occurred in all ecological gradients of the northern spotted owl's range (i.e., in all environmental regions of a landscape). The Northwest Forest Plan (USDA FS and USDI BLM 1994a, p. A-3, with map), based on findings by the Forest Ecosystem Management and Assessment Team (FEMAT 1993), defined the ecological gradients within the northern spotted owl's range by the boundaries of physiographic provinces which differentiated "areas of common biological and physical processes." The BLM analysis of Conservation Need 1 used the same physiographic provinces in the **planning area** to express ecological condition, in part, because Thomas *et al.* (1990, p. 194) calculated median home range sizes for the northern spotted owl, described below, for those provinces. The physiographic provinces in the **planning area** are the Oregon Western Cascades, Oregon Eastern Cascades,[24] Oregon Coast Range and Oregon Klamath provinces. The Willamette Valley Physiographic Province also occurs in the BLM **planning area** but does not support habitat for analytically meaningful numbers of northern spotted owls.

[23] Studies in the California Klamath and Coast Range provinces (e.g., Dugger *et al.* 2005) found that habitat comprised of a mixture of older and younger forests supported northern spotted owl reproduction better than habitat comprised almost exclusively of older forests. However, other studies have not supported that conclusion. Given the checkerboard land ownership pattern of BLM-administered lands in much of the planning area, the BLM did not consider excessive homogeneity of older forests to be a management issue.

[24] Only a portion of the Oregon Eastern Cascades Physiographic Province occurs in the planning area.

Thomas *et al.* (1990, p. 28) defined "spaced to facilitate owl movement between the blocks" as large blocks separated by no more than 12 miles (19.3 km) and small blocks separated by no more than 7 miles (11.3 km). Marcot *et al.* (2013, pp. 196-200), based on modeling, determined that habitat blocks with similar spacings had significantly higher northern spotted owl occupancy rates than blocks with larger spacing.

The BLM qualified its criteria for meeting Conservation Need 1, based on previous modeling (USDI BLM 2008g[2], pp. 4-646–4-655; No Timber Harvest Reference Analysis), according to the limited quantities and distributions of BLM-administered lands in some portions of the **planning area**—most notably in the northern half of the Oregon Coast Range Province—which might preclude the BLM from contributing to properly-spaced habitat blocks everywhere in the **planning area**. The BLM identified such areas by completing a No Timber Harvest Reference Analysis which forecasted potential habitat changes on (1) BLM-administered lands in the **planning area** from forest ingrowth and wildfire but in the absence of forest treatment (i.e., no forest restoration or timber harvest), and (2) all other lands in the range of the northern spotted owl from forest ingrowth, timber harvest, and losses due to insects, disease and wildfire.

To address Conservation Need 1, the BLM identified areas in the **planning area** with the quantity and spatial arrangement of habitat sufficient to support at least one northern spotted owl nesting pair. As explained below, "spatial arrangement" is a function of the median annual home range of the northern spotted owl, which varies by physiographic province, and the minimum amount of habitat that must occur within both the median annual home range area and the 500-acre (200-ha) core use area surrounding a potential nest site. **Table III-16** shows these values. The BLM based the size of the median annual home range in each physiographic province on Thomas *et al.* (1990, p. 194). Because Conservation Need 1 addresses reproducing northern spotted owls, and foraging habitat commonly does not support nesting (USDI FWS 2011a, p. G-2), the BLM analyses relied on nesting-roosting habitat.

Table III-16. Metrics to identify blocks of northern spotted owl nesting-roosting habitat.

Physiographic Province	Median Annual Home Range (Acres)	Radius of a Circle Equal in Size to the Median Annual Home Range (Miles)	Calculated Minimum Quantity of Nesting-Roosting Habitat Within a Median Annual Home Range (Acres)	Calculated Minimum Quantity of Nesting-Roosting Habitat Within a 500-acre Core Area (Acres)
Oregon Western Cascades	2,900	1.2	1,450	250
Oregon Coast Range	4,520	1.5	2,260	250
Oregon Klamath	3,400	1.3	1,700	250

Thomas *et al.* (1990, p. 194) first tabulated median annual home ranges of northern spotted owl pairs in different study areas and physiographic provinces. According to Courtney *et al.* (2004, p. 5-5), although the sizes of northern spotted owl home ranges differ by physiographic province and forest type, and among individual owl pairs within a study area, research since 1990 has shown that provincial variations are similar to those tabulated by Thomas *et al.* (1990, p. 194). However, neither Thomas *et al.* (1990) nor Courtney *et al.* (2004, pp. 5-24) estimated the median annual home range size in the Oregon Eastern Cascades Physiographic Province. Therefore, the BLM applied the Oregon Western Cascades metrics in **Table III-16** (and **Table III-17**, below) to the Oregon Eastern Cascades due to their proximity and because Davis *et al.* (2011, pp. 34-35), for their analyses of northern spotted owl habitat, merged the two provinces due to their ecological similarities.

The "calculated minimum quantity of nesting-roosting habitat within a median annual home range" for each physiographic province, shown in **Table III-16**, is based on Courtney *et al.* (2004, Chapter 5, Table 5-1), Olson *et al.* (2004, pp. 1048-1052), and Dugger *et al.* (2005, pp. 873-875). It is a multiple of the median annual home range area and the minimum quantity of nesting-roosting habitat (50 percent) that should occur in that area to support owl survival and reproduction. The quantity of nesting-roosting habitat is not the best predictor of owl reproduction and survival, and the observed quantities of nesting-roosting habitat within occupied owl home ranges vary by region and by study. Nevertheless, based on expert advice (Thrailkill 2005; Jim Thrailkill, U.S. Fish and Wildlife Service, personal communication to Eric Greenquist, 2005; and Robert Anthony, Oregon Cooperative Wildlife Research Unit, Oregon State University, Eric Forsman, U.S. Forest Service, Pacific Northwest Research Station, and Joe Lint, BLM, personal communications to Eric Greenquist, 2007; also see USDI BLM 2008a[1], p. 3-288), the BLM considered a northern spotted owl territory to be unstable when less than 40 to 50 percent of the land within the home range supported nesting-roosting habitat.

Bingham and Noon (1997, pp. 133-138) defined the core use area as that portion of a northern spotted owl home range that receives disproportionately high use by owls for nesting, roosting and access to prey; they suggested that 60 to 70 percent of owl activity during the breeding season occurs in about 20 percent of the home range. Even though observed core area sizes vary among northern spotted owls (Courtney *et al.* 2004, p. 5-5), Jim Thrailkill (2005; and personal communication to Eric Greenquist, BLM, 2005) determined that Bingham and Noon (1997), Wagner and Anthony (1999), Franklin *et al.* (2000) and Irwin *et al.* (2004) collectively suggested a core area of 500 acres (200 ha). Meyer *et al.* (1998, pp. 24-25) and Zabel *et al.* (2003, pp. 1032-1037) found that their best fitting models for predicting owl occupancy also were at the 500-acre scale. Based on several studies (*e.g.*, Bart 1995, Franklin *et al.* 2000, Zabel *et al.* 2003, and Dugger *et al.* 2005) and expert advice (Robert Anthony, Eric Forsman and Joe Lint personal communications to Eric Greenquist, 2007; also see USDI BLM 2008g[1], pp. 3-288–3-289), the BLM determined that 250 acres (50 percent of a 500-acre core use area) of nesting-roosting habitat within a 500-acre circle was needed for a functional core use area[25].

This issue presents an analysis of the cumulative effects on large blocks of northern spotted owl habitat of past, present, and reasonably foreseeable future actions, including both land management on BLM-administered lands and non-BLM-administered lands in the **planning area**.

Because Conservation Need 1 is not specific to BLM-administered lands, the BLM analysis mapped blocks of nesting-roosting habitat on all land ownerships in the **planning area** (and 10 km into Washington and California). To do this the BLM analysis "moved" a 500-acre (200-ha; core use area-size) circle over the **planning area**, centering it in turn on each 30 × 30-m pixel, and calculated the acres of nesting-roosting habitat on all lands in that circle. For those 500-acre circles that supported at least 250 acres of nesting-roosting habitat, the BLM analysis calculated the acres of nesting-roosting

[25] As explained in **Appendix C**, the BLM derived the relative habitat suitability value of each 30 × 30-m pixel from the means of 11 covariate values within 2,600 feet (800 m) of each pixel; 2,600 feet is the radius of a 500-ac (200-ha) circle. Thus, the 500-ac core use area, as modeled by the BLM, does not have a hard boundary because relative habitat suitability values within the 500-ac circle are diminishingly influenced by variable values up to 2,600 ft outside the circle boundary. This better represents how northern spotted owls choose and use core habitat. With respect to modeling functional core use areas, the BLM determination is consistent with the literature cited in this paragraph, which states that northern spotted owl survival is influenced by forest conditions up to 4,900 ft (1,500 m) from site centers, and core use sizes vary substantively among studies and site locations due to reasons in addition to the amount of older forest. Since the BLM chose the 500-ac circle scale, as influenced by variable values up to 2,600 ft away, to better simulate how northern spotted owls select and use site locations, the BLM used the same scale to evaluate habitat block development.

habitat within the associated provincial median annual home range circle.[26] Where the amount of nesting-roosting habitat within the median annual home range circle also met or exceeded the "calculated minimum quantity of nesting-roosting habitat within a median annual home range" shown in **Table III-16**, the BLM analysis defined all lands in that median annual home range circle as a block of nesting-roosting habitat. The BLM considered such a block to have both the quantity and spatial arrangement of nesting-roosting habitat capable of supporting a pair of reproducing northern spotted owls, regardless of observed owl occupancy.

In this manner, the BLM analysis evaluated the areas around all 30 × 30-m pixels, on all land ownerships in the **planning area**. Where blocks of nesting-roosting habitat overlapped, the BLM analysis aggregated those blocks into a single block of nesting-roosting habitat. The BLM aggregated habitat blocks in this manner because, when their potential nest locations are separated by more than the diameter of the median annual home range circle, northern spotted owl pairs are less able to support each other demographically (i.e., their dispersing young are less likely to encounter each other and form nesting pairs), which is required for an owl cluster.

As described above, a "large block" is capable of supporting at least 25 pairs of northern spotted owls. The BLM determined the minimum size of a large block using a formula adapted from Thomas *et al.* (1990, p. 198, 25 owl pairs × the median annual pair home range size × 0.75). The function 0.75 accounts for the estimated 25 percent overlap of northern spotted owl home ranges (Thomas *et al.* 1990, p. 320). This formula generated the minimum area of a large block of nesting-roosting habitat for each province, shown in **Table III-17**.

Table III-17. Metrics to identify and map large blocks of northern spotted owl nesting-roosting habitat.

Physiographic Province	Median Annual Home Range (Acres)	Minimum Area of a Large Habitat Block (Acres)
Oregon Western Cascades	2,900	54,375
Oregon Coast Range	4,520	84,750
Oregon Klamath	3,400	63,750

If the area of a habitat block equaled or exceeded the "minimum area of a large habitat block" shown in **Table III-17**, the BLM analysis defined that block as a large block of nesting-roosting habitat. The BLM classified the remaining blocks as small blocks of nesting-roosting habitat. Finally, the BLM analysis delineated the area around each block: 6 miles (9.7 km) from the boundaries of large blocks and 3.5 miles (5.6 km) from the boundaries of small blocks.

The products were maps of the **planning area** showing large and small habitat blocks on all land ownerships at decadal increments, each surrounded by delineations to help visually determine if large blocks would be within 12 miles (19.3 km) of other large blocks and small blocks would be within 7 miles (11.3 km) of large or other small blocks. Since the underlying relative habitat suitability surfaces varied between the No Timber Harvest Reference Analysis and the Proposed RMP, and by decade over 50 years, the resulting maps and their habitat block configurations also varied by management scenario and decade.

2). Management Outcome

Figure III-19 shows the current locations of large and small habitat blocks in the **planning area**, and areas within 6 miles of large blocks and within 3.5 miles of small blocks. Currently, large habitat

[26] **Table III-17** shows the province-specific radii of such circles. For home range circles that fell in more than one province, this analysis used the province-specific metrics appropriate for the center pixel.

blocks, each capable of supporting a cluster of reproducing northern spotted owls (i.e., at least 25 owl pairs), are distributed across the variety of ecological conditions (i.e., in all physiographic provinces). In addition, the large blocks are spaced to facilitate northern spotted owl movement between and through the large blocks in and between the Oregon Western Cascades, Oregon Eastern Cascades and Oregon Klamath provinces, and between the Oregon Klamath Province and the southern half of the Oregon Coast Range Province. However, the northern half of the Oregon Coast Range Province currently supports one large habitat block, which is not spaced properly with any other large habitat block. In addition, the small habitat blocks in this area, when added to the single large habitat block, are insufficient to meet Conservation Need 1.

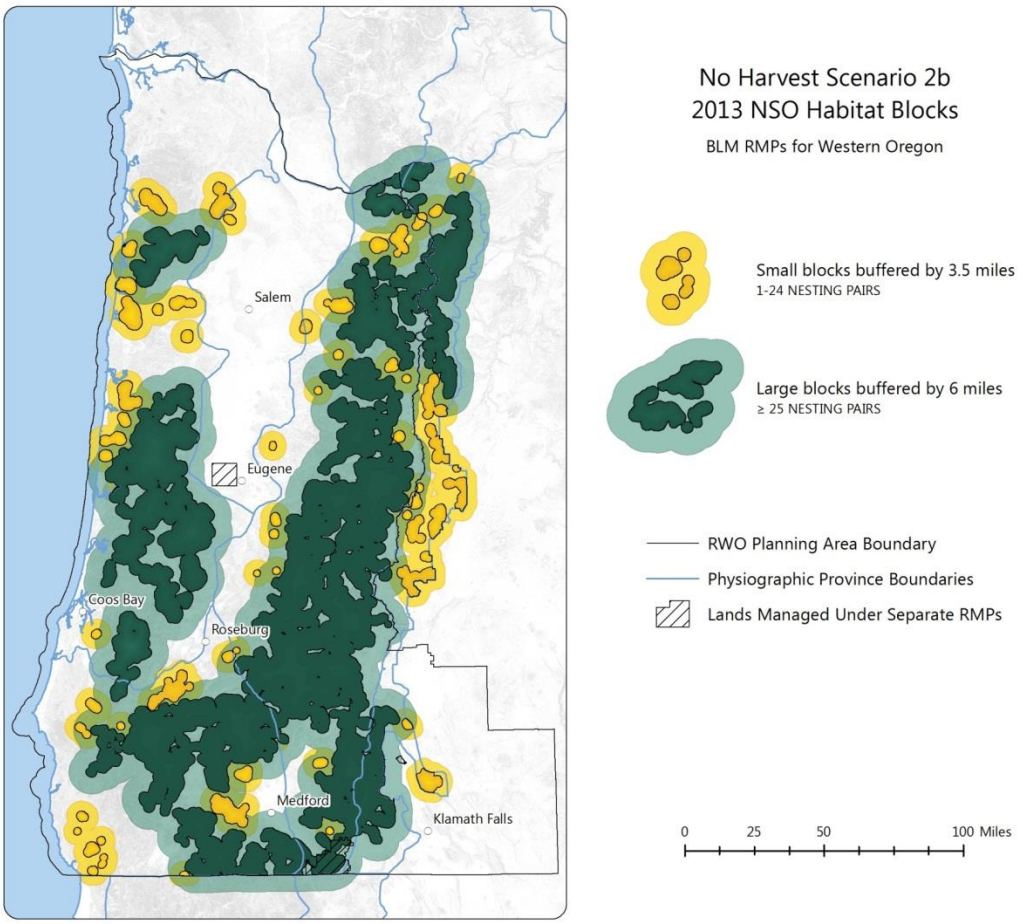


Figure III-19. The current (2013) positions of northern spotted owl habitat blocks in western Oregon.Dark green blocks are capable of supporting ≥ 25 pairs; dark yellow blocks are capable of supporting 1-24 pairs. Light green denotes areas within 6 miles of dark green blocks; light yellow denotes areas within 3.5 miles of dark yellow blocks.

Figure III-20 shows the capability of the forested landscape managed by the BLM in the **planning area** to contribute to habitat block development in 30 years (2043) and 50 years (2063) according to the No Timber Harvest Reference Analysis. As evidenced by this figure, the forested landscape managed by the BLM is capable of continuing to contribute to a western Oregon landscape that meets Conservation Need 1 in both 30- and 50-year timeframes, except in the northern half of the Oregon Coast Range Province.

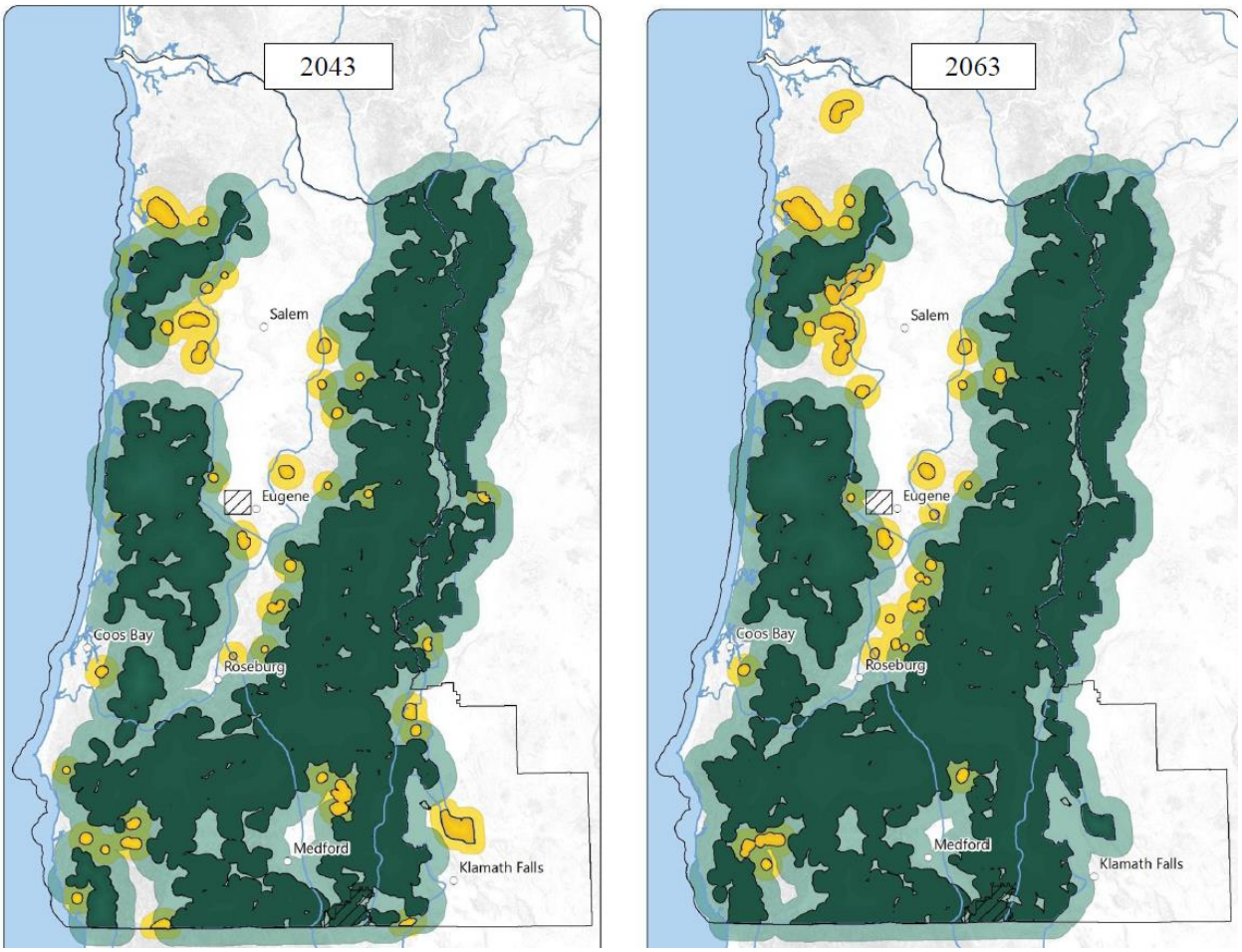


Figure III-20. The potential contributions of BLM-administered lands in western Oregon to habitat blocks in 2043 and 2063 according to the No Timber Harvest Reference Analysis.

Figure III-21 shows the locations of northern spotted owl habitat blocks in 30 years (2043) and 50 years (2063) under the Proposed RMP. During the next 50 years, the BLM would contribute to a landscape that supports large blocks of nesting, roosting and foraging habitat in accordance with Conservation Need 1, with the exception of the northern half of the Oregon Coast Range Province in which the BLM has no opportunity to contribute to properly spaced large habitat blocks.

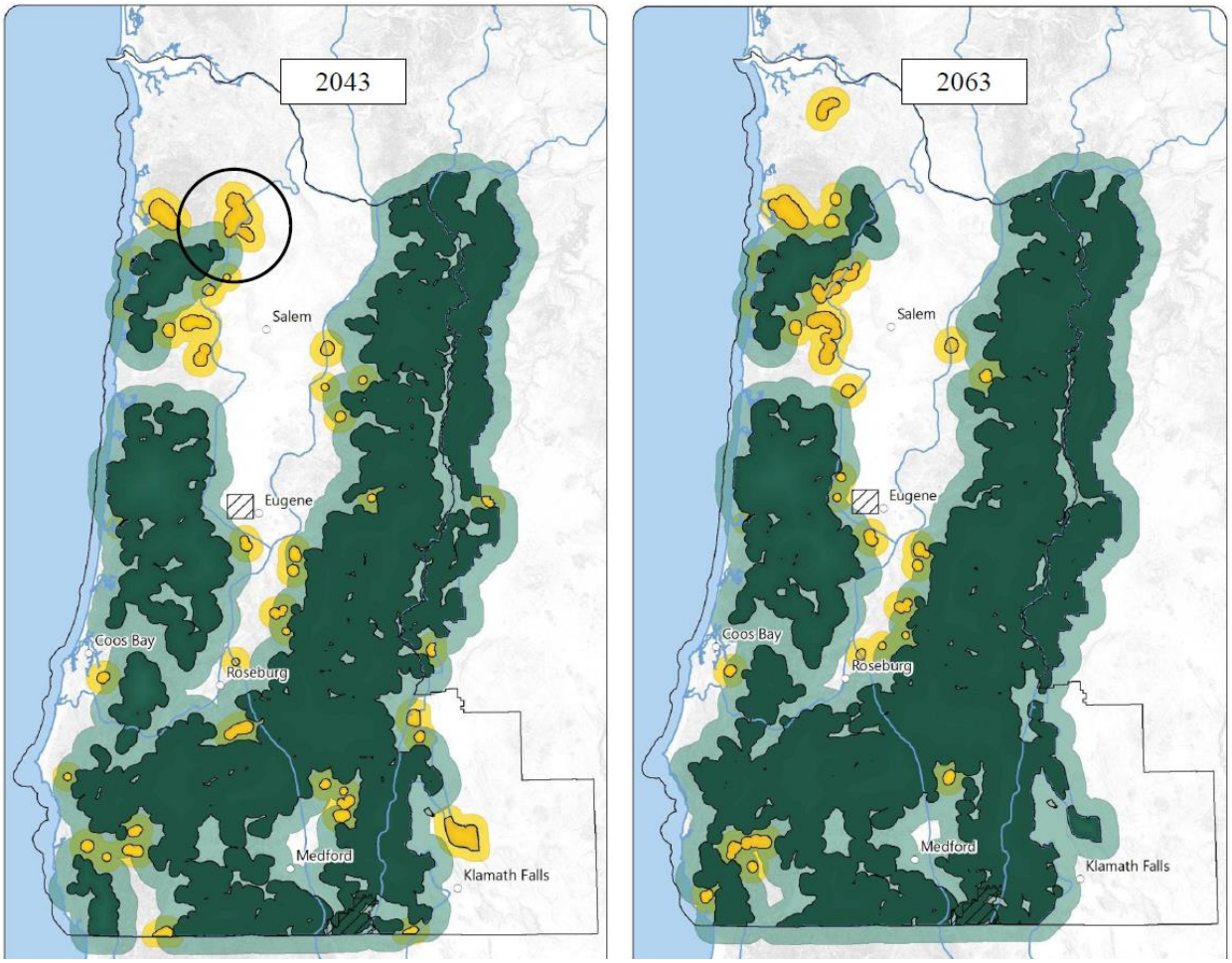


Figure III-21. Northern spotted owl habitat block locations in 2043 and 2063 under the Proposed RMP. The circled area is discussed in the text.

The substantive difference between the No Timber Harvest Reference Analysis and the Proposed RMP is that, by 2043 a portion of the large habitat block in the northern half of the Coast Range Province (circled areas in **Figure III-21**) would not develop as well under the Proposed RMP as it could according to the No Timber Harvest Reference Analysis (**Figure III-20**). However, under the Proposed RMP, the 2043 spacing between the large and small habitat blocks in this area is sufficient for northern spotted owl movement between the blocks. In addition, by 2063 this substantive difference would disappear (2063 maps in **Figures III-20** and **III-21**).

The remaining differences between the Proposed RMP and the No Timber Harvest Reference Analysis are negligible in terms of their overall contributions to Conservation Need 1. The Proposed RMP would reserve those BLM-administered lands necessary to support large habitat blocks and, once those lands are reserved, reserving additional lands provides little added support to the development and spacing of large habitat blocks.

b. Issue 2

In accordance with Conservation Need 2, would the Proposed RMP contribute to a landscape in the ***planning area*** *that facilitates northern spotted owl movement between and through large blocks of nesting, roosting and foraging habitat and ensures the survival of dispersing owls?*

1). Summary of Analytical Methods

To meet Conservation Need 2, the BLM would contribute to a western Oregon landscape that, within 30 to 50 years, supports northern spotted owl movement between the physiographic provinces, and between and through the large blocks of nesting, roosting and foraging habitat within each physiographic province[27]. Because this conservation need is not specific to BLM-administered lands, the BLM forecasted the development of northern spotted owl dispersal habitat on all lands in the **planning area** during the next 50 years.

This issue presents an analysis of the cumulative effects on northern spotted owl dispersal habitat of past, present, and reasonably foreseeable future actions, including both land management on BLM-administered lands and non-BLM-administered lands in the **planning area**.

Even though Thomas *et al.* (1990, pp. 27-29, Appendix J) and Courtney *et al.* (2004, Chapter 5) defined the structural characteristics of dispersal habitat, the scientific literature on the northern spotted owl does not define the quantity or spatial arrangement of such habitat needed to support spotted owl movement or the survival of dispersing owls. Instead, Thomas *et al.* (1990, pp. 27 and 309-310) stated that, if 50 percent of the land in a regulated forest supported stands that were older than 40 years (i.e., had an average trunk diameter of at least 11 inches [0.3 m] at breast height and a canopy closure of at least 40 percent), and were managed in association with stands of older forest (*e.g.*, visual and riparian corridors, and stands harvested on relatively long rotations), then "We would expect much of that managed landbase to be suitable for passage by dispersing northern spotted owls." Although Forsman *et al.* (2002) subsequently examined northern spotted owl dispersal, the relationship between the degree of forest fragmentation, and the movement and survival of dispersing owls, was beyond the scope of their study (p. 22).

Davis *et al.* (2011, pp. 40-43) first modeled the spatial arrangement of habitat needed to support the movement of northern spotted owls. Davis *et al.* based their model on empirical evidence that at least 40 percent habitat within (i.e., at the scale of) a 15.5-mile (25.0 km) radius circle is sufficient to support dispersing northern spotted owls (Davis *et al.* 2011, p. 40). Marcot *et al.* (2013, p. 202), based on modeling, reported similar results, stating "The various combinations of size and spacing of habitat clusters that produced at least 35-40% of the landscape in habitat seemed adequate to provide for successful NSO [northern spotted owl] dispersal and recolonization."

To evaluate northern spotted owl movement, the BLM produced decadal maps of habitat in the **planning area** capable of supporting such movement, relying on the distance and habitat quantity thresholds developed by Davis *et al.* (2011, p. 40). As described in **Appendix C, Sections A** and **B**, to conform to BLM planning needs to forecast habitat change, the BLM northern spotted owl relative habitat suitability surfaces differed from that used by Davis *et al.* (2011).

[27] In addition to northern spotted owl movement between habitat blocks, Conservation Need 2 addresses habitat conditions outside habitat blocks that support the survival of dispersing northern spotted owls (i.e., all life functions until a northern spotted owl can establish a territory). In the Draft RMP/EIS (USDI BLM 2015, pp. 765-773) the BLM modeled how northern spotted owls would move and survive across the planning area (i.e., dispersal flux) under each alternative and over time. The BLM determined that, under all alternatives, change in simulated northern spotted owl movement and survival over time primarily was a function of competitive interactions between northern spotted owls and barred owls, as opposed to habitat changes resulting from BLM planning decisions (USDI BLM 2015, p. 773). Therefore, the BLM did not model dispersal flux for the Proposed RMP.

2). Management Outcome

Figure III-22 shows those lands in the **planning area** that support northern spotted owl dispersal **Figure III-23** shows how the forested landscape managed by the BLM is capable of contributing to dispersal capability in 2043 and 2063 according to the No Timber Harvest Reference Analysis. In both figures, the areas of western Oregon that are capable of supporting northern spotted owl dispersal are indicated by stippling. Because the No Timber Harvest Reference Analysis simulates only the effects of forest ingrowth and wildfire on BLM-administered lands, the BLM shows only these two decadal maps; the intermediate decadal maps show a transition of dispersal-capable lands between those in **Figures III-22** and **III-23**.

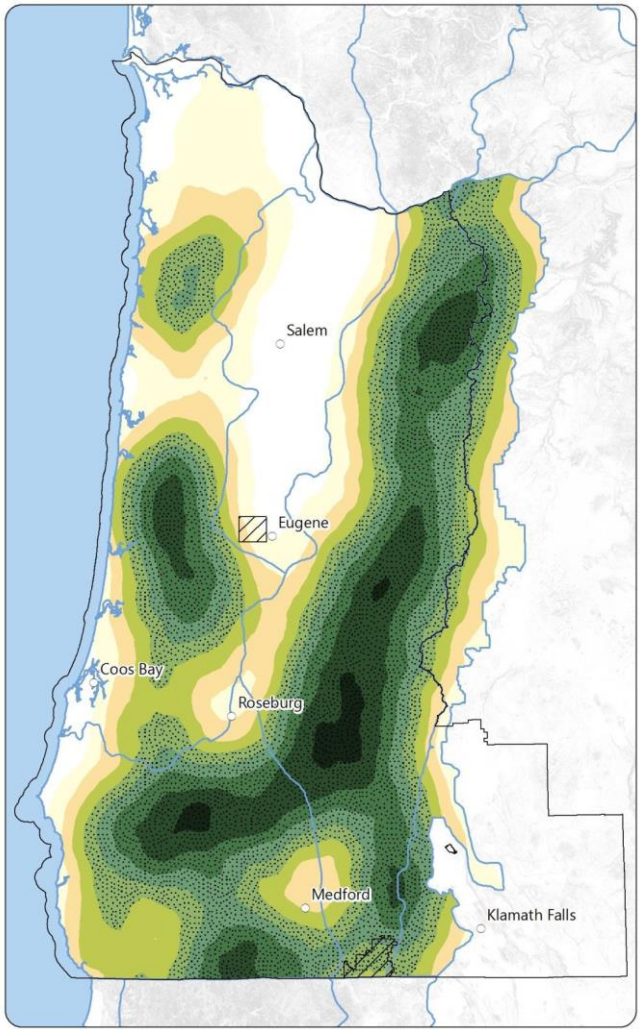


Figure III-22. The northern spotted owl dispersal-capable landscape (stippled areas) in 2013, according to the No Timber Harvest Reference Analysis.

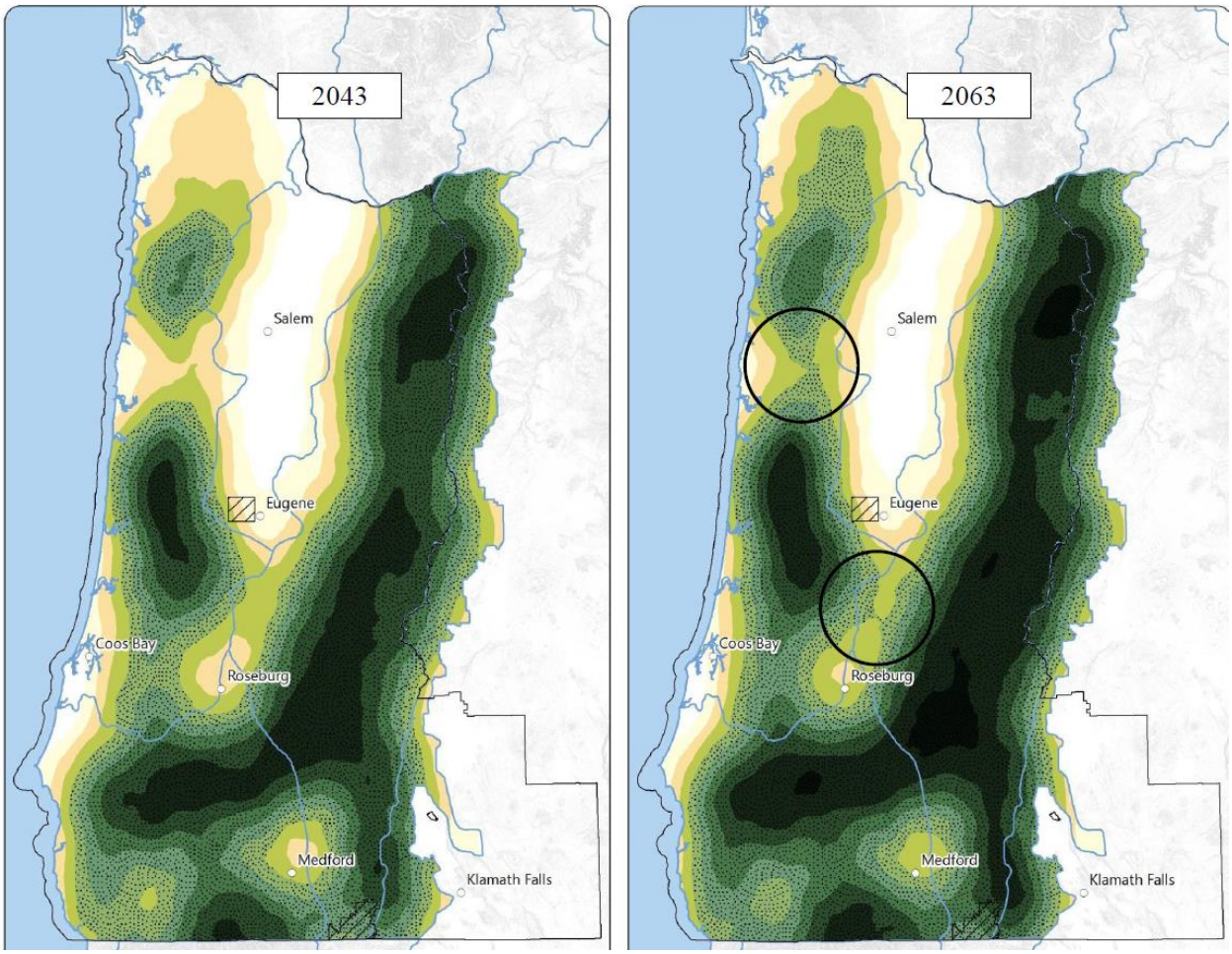


Figure III-23. The northern spotted owl dispersal-capable landscape (stippled areas) in 2043 and 2063, according to the No Timber Harvest Reference Analysis.
The circled areas are discussed in the text.

Currently, BLM-administered lands contribute to north-south northern spotted owl movement throughout the Oregon Western Cascades Province and through much of the Oregon Klamath Province (**Figure III-22**). However, current habitat conditions do not support adequate north-south northern spotted owl movement through much of the Oregon Coast Range Province or between the Oregon Coast Range and the other physiographic provinces. According to the No Timber Harvest Reference Analysis, the forested landscape managed by the BLM is capable of progressively improving the dispersal-capable landscape during the next 50 years (**Figure III-23**), contributing to habitat conditions that support north-south northern spotted owl dispersal through the Oregon Coast Range Province and between the Oregon Coast Range and the Oregon Klamath and Oregon Western Cascades provinces. Most importantly, by 2063 BLM-administered lands are capable of contributing to areas that support northern spotted owl movement between the northern and southern portions of the Oregon Coast Range Province (the circled area west of Salem), and between the Oregon Coast Range and the Oregon Western Cascades provinces (the circled area south of Eugene), two areas where current habitat conditions appear to create barriers or strong filters to northern spotted owl movement and survival; see USDI BLM 2015, pages 767 and 768.

Figure III-24 shows the northern spotted owl dispersal-capable landscape as it would develop in 30 years (2043) and 50 years (2063) under the Proposed RMP. The circled areas indicate the substantive differences between the Proposed RMP the No Timber Harvest Reference Analysis.

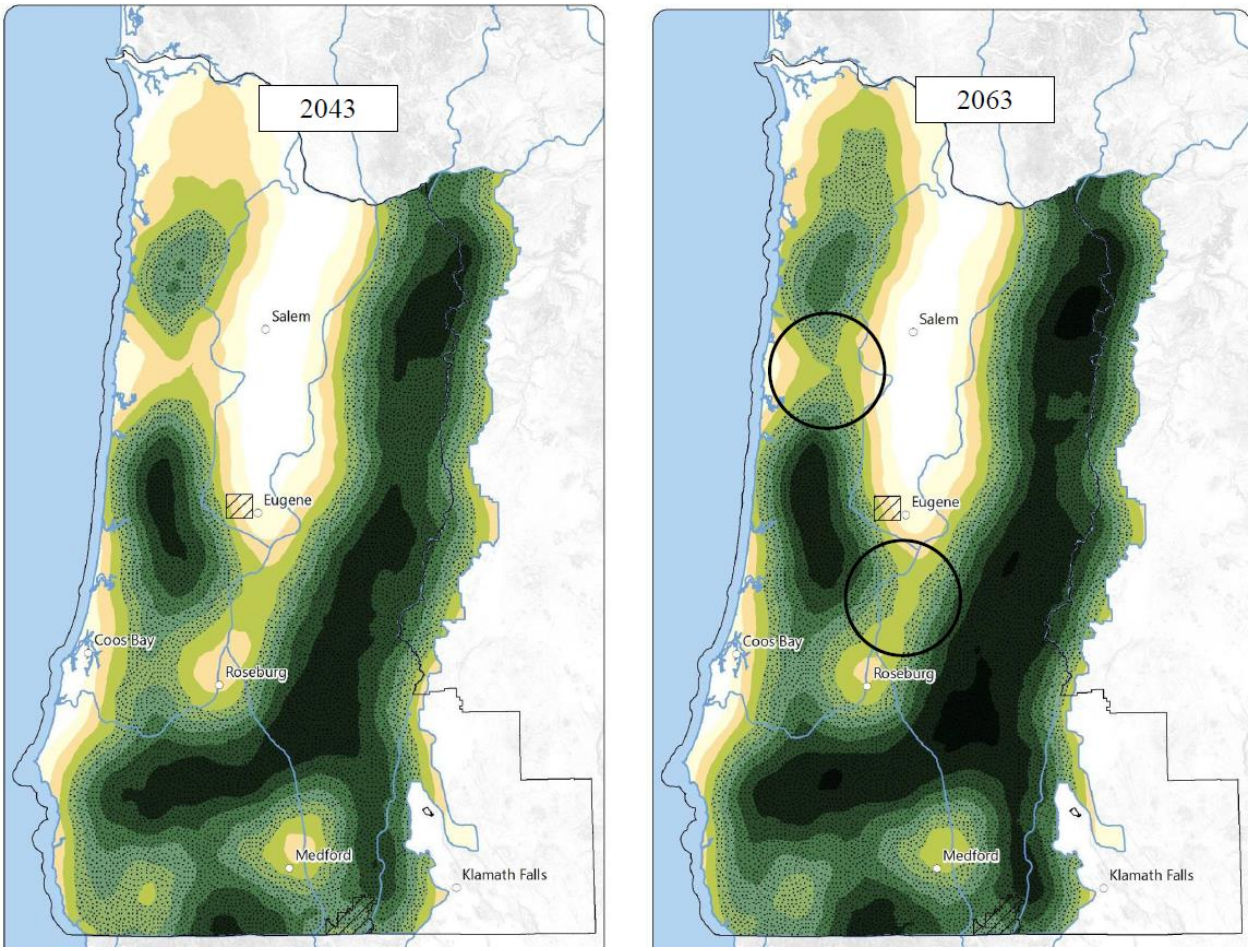


Figure III-24. Dispersal-capable lands (stippled areas), as they would exist in 2043 and 2063, under the Proposed RMP.
The circled areas are discussed in the text.

When compared to the No Timber Harvest Reference Analysis (**Figure III-23**), by 2063 the Proposed RMP would support north-south northern spotted owl movement in the Oregon Coast Range (circled area west of Salem) as well but would appear to provide slightly less support to east-west northern spotted owl movement between the Oregon Coast and Oregon Western Cascades provinces (the circled area south of Eugene). This is despite the BLM decision, in crafting the Proposed RMP, to augment the Late-Successional Reserve land use allocation specifically to support east-west northern spotted owl movement through this area.

In spite of this single difference between the Proposed RMP and the No Timber Harvest Reference Analysis, the BLM is confident that the Proposed RMP would support northern spotted owl east-west movement through this area as well as can be achieved with its administered lands. As the BLM described in the Draft RMP/EIS (USDI BLM 2015, p.768), its delineations of lands capable of supporting northern spotted owl movement are influenced by an artifact of scale. In other words, the determination of whether each point on the landscape is capable of supporting northern spotted owl movement is based on the mean of all habitat values within a 15.5-mile radius (~ 196,000 ha) circle

around each point. Thus, the delineation of lands that support northern spotted owl movement is influenced by non-habitat within 15.5 miles. In this case, the delineations of lands that support east-west northern spotted owl movement between the Oregon Coast and Oregon Western Cascades provinces is influenced by large areas of non-habitat: the Willamette Valley immediately to the north and the Umpqua Basin immediately to the south. The BLM confirmed this by analyzing 2013 dispersal flux through this area (USDI BLM 2015, pp. 767 – 769). In crafting the Proposed RMP, the BLM, in consultation with the U.S. Fish and Wildlife Service, examined its landbase and augmented the Late-Successional Reserve with those lands that it judged could facilitate east-west movement and survival. The BLM did not include all lands within 15.5 miles of this area; instead, it excluded those lands that it judged would not substantively contribute to east-west movement and survival due to size, location and spatial arrangement. Since, under the Proposed RMP, the BLM specifically configured its Late-Successional Reserve network to maximize its contribution to east-west northern spotted owl movement through this area, the BLM is confident that the Proposed RMP would maximize its contribution to Conservation Need 2.

c. Issue 3

In accordance with Conservation Need 3, would the Proposed RMP contribute to a coordinated, adaptive management effort to reduce the loss of habitat due to catastrophic wildfire throughout the northern spotted owl's range?

The U.S. Fish and Wildlife Service addresses catastrophic wildfire as a separate Conservation Need. However, wildfire is relevant to northern spotted owl conservation only because it modifies northern spotted owl habitat and, consequently, demography, which the BLM addressed by evaluating Conservations Needs 1, 2 and 4. As explained in **Appendix C**, the relative habitat suitability surfaces the BLM developed to address Conservation Needs 1, 2 and 4 incorporate habitat changes from wildfire. The BLM methodology for modeling wildfire is shown in Appendix D of the Draft RMP/EIS (USDI BLM 2015). Thus, the evaluations of Conservation Needs 1, 2 and 4 also address Conservation Need 3. The BLM needed no additional analysis.

d. Issue 4

In accordance with Conservation Need 4, would the Proposed RMP, in areas of significant population decline, sustain the full range of survival and recovery options for the northern spotted owl in light of significant uncertainty?

1). Summary of Analytical Methods

To meet Conservation Need 4, the BLM would contribute to a landscape that supports, in light of current uncertainties, reproductively viable northern spotted owl populations in each western Oregon modeling region (as defined in USDI FWS 2011a, Appendix C) during the next 50 years or, if the No Timber Harvest Reference Analysis indicates that supporting populations for 50 years is not possible, during the next 30 years. Because this conservation need is not specific to BLM-administered lands, the BLM simulated on all land ownerships the northern spotted owl population responses to habitat changes and competitive interactions with barred owls. The BLM evaluated those population responses in terms of population size and population extirpation risk[28].

[28] For the Draft RMP/EIS (USDI BLM 2015, pp. 782- 783 and 800-804) the BLM also modeled how northern spotted owl population sources would change under each alternative and over time. However, the BLM determined that, under all alternatives, change in simulated northern spotted owl population sources over time primarily was determined by competitive interactions between northern spotted owls and barred owls, as opposed to habitat changes resulting from BLM planning decisions (USDI BLM 2015, p. 804). Therefore, the BLM did not evaluate northern spotted owl population sources for the Proposed RMP.

This issue presents an analysis of the cumulative effects on northern spotted owl population response of past, present, and reasonably foreseeable future actions, including both land management on BLM-administered lands and non-BLM-administered lands in the **planning area**.

In 2006, the U.S. Fish and Wildlife Service convened seven experts to identify threats to the northern spotted owl (USDI FWS 2011d). The experts identified past habitat loss, current habitat loss and competition from barred owls as the most pressing threats, even though implementation of the Northwest Forest Plan had reduced the rate of timber harvest on Federal lands. They noted evidence of these threats in the scientific literature. The range of threat scores by the individual experts was narrowest for barred owl competition, indicating more agreement about the threat from barred owls.

Northern spotted owl populations are declining across their range at an annual rate of 2.9 percent (Forsman *et al.* 2011, p. 44). Therefore, "areas of significant population decline" include the entire **planning area**. A principal cause of the decline is competition from barred owls, which have colonized portions of Washington, Oregon and California during the past forty years. Barred owls now occupy the entire range of the northern spotted owl, utilize all northern spotted owl habitats and prey species, displace northern spotted owls from their breeding territories, inhibit northern spotted owls from establishing new territories and outbreed northern spotted owls (Forsman *et al.* 2011, Van Lanen *et. al*. 2011, Dugger *et al.* 2011, Wiens *et al.* 2014). Although BLM-administered lands play a key role in northern spotted owl conservation in some portions of the **planning area** (USDI BLM 2015, pp. 768-769 and 804), current research provides no evidence that the BLM can manage individual forest stands to provide northern spotted owls with a competitive advantage over barred owls (Dugger *et al.* 2011 and Wiens *et al.* 2014). Instead, research reaffirms the importance of older forest conditions and managing for large blocks of unfragmented older forest (Dugger *et al.* 2011, p. 2463; Wiens *et al.* 2014, pp. 36-38).

To address Conservation Needs 1 and 2, the BLM examined potential BLM contributions to northern spotted owl habitat in the **planning area**: to the formation of blocks of nesting-roosting habitat, to spacing between the blocks, and to habitat conditions that support northern spotted owl movement and survival between and through the blocks. The BLM northern spotted owl relative habitat suitability surfaces include forecasts, on all land ownerships, of forest ingrowth, forest treatment, and wildfire. Therefore, to address Conservation Need 4, the BLM simulated how northern spotted owl populations would respond to changing habitat conditions on a landscape occupied by barred owls. Even though the BLM analyses focused on the **planning area**, the BLM modeled northern spotted owl population responses throughout the United States-portion of their range because the movement of northern spotted owls across the **planning area** boundaries would affect owl populations in the **planning area**.

Population Modeling

To address Conservation Need 4, the BLM used a spatially-explicit, individual-based HexSim model (Schumaker 2011) to simulate northern spotted owl demographic responses over time.[29] Although computer modeling commonly involves an inherent tension between improved realism and errors

[29] Due to the number of biological and physical variables that affect northern spotted owl demography, some of which are not fully understand, no model can accurately forecast a northern spotted owl demographic response over 50 years. However, the BLM determined that the individual-based HexSim model developed by the U.S. Fish and Wildlife Service for the northern spotted owl represented the best analytical tool to simulate northern spotted owl responses to alternative BLM land use scenarios and, thus, help inform BLM decision-making (see **Appendix C**). That said, the BLM does not intend to portray its northern spotted owl population forecasts as absolute values, but only as comparative outcomes of alternate management scenarios in terms of general populations numbers, trends and risk probabilities.

associated with increased complexity, HexSim was designed to quantify wildlife population responses to multiple, interacting environmental stressors, as deemed appropriate, without unnecessarily simplifying landscapes, species' life histories, or disturbances. HexSim also can—

- Incorporate environmental stochasticity (i.e., species traits, such as individual fecundity and survival, as probabilities based on observed rates instead of as less-realistic fixed parameters)
- Operate at relatively fine spatial scales, in this case at a scale of 214-acre (86.6-ha) hexagons;
- Generate a full set of demographic response data, including simulated numbers and locations of individual northern spotted owls, at any year, which is important for BLM evaluations of northern spotted owl responses to alternatives; and
- Generate both rate-based and count-based matrices for each modeling region during each decade.
- Count-based matrices record the numbers of individuals moving between locations, important for evaluating northern spotted owl movement and survival.
- Rate-based matrices are important for evaluating how habitat change affects the northern spotted owl population in an ecologically meaningful way.[30]

The BLM determined that the HexSim model developed by the U.S. Fish and Wildlife Service to inform its decisions on northern spotted owl recovery and critical habitat (USDI FWS 2011a, Appendix C, and USDI FWS 2012c), would meet, and could be adapted to, BLM planning needs with cost and technical efficiency (i.e., this model incorporated appropriate information on northern spotted owl demography and ecology, including barred owl competition, without introducing unnecessary analytical assumptions or complexity). The BLM described its application of the Service's HexSim model in **Appendix C**.

Analytical Scales

The BLM evaluated its contributions to conservation needs 1 and 2 using the physiographic provinces (USDA USFS and USDI BLM 1994a, p. A-3), because Thomas *et al.* (1990, p. 320) defined northern spotted owl median home range sizes—which they used to define large habitat blocks—for each physiographic province. More recently, Davis *et al.* (2011, pp. 34-36) modeled northern spotted owl relative habitat suitability values according to six modeling regions that were similar to the physiographic provinces but based exclusively on ecological divisions (*i.e.*, unlike the physiographic provinces, two modeling regions crossed state boundaries). And the U.S. Fish and Wildlife Service, during its process to delineate northern spotted owl critical habitat, divided the northern spotted owl range into eleven modeling regions (USDI FWS 2011a, pp. C-7–C-13) on all land ownerships that reflected "regional differences in forest environments and factors such as important prey species" (USDI FWS 2011a, p. C-7). Again, the Service modeling regions were similar to the physiographic provinces but four of the regions crossed state boundaries.

To address Conservation Need 4, the BLM tabulated results at the scales of the physiographic provinces and the U.S. Fish and Wildlife Service modeling regions, because Schumaker *et al.* (2014, p. 585) found key insights by comparing simulated northern spotted owl responses at different scales. The BLM considered tabulating results only for the **planning area** (i.e., by truncating modeling regions that extended into California or Washington at state boundaries), because BLM planning decisions would affect only BLM-administered lands in the **planning area**. Additionally, tabulating results for regions that extend into another state—some of which occur mostly in another state—might "dilute" the analytical effects of BLM alternatives. However, the BLM decided to tabulate data by entire modeling regions because those regions are most appropriate for examining northern spotted owl population extirpation risk. Aware of the limitations of its model, and that the BLM would use

[30] The BLM arrayed parameters driving population change analytically instead of inferring such parameters from habitat patterns, as was done in previous land use planning efforts at this scale (i.e., the 1994 Northwest Forest Plan and the 2008 BLM Western Oregon Plan Revisions).

results mainly to compare alternatives, the BLM felt that tabulating results by entire modeling regions more accurately would reflect northern spotted owl responses to BLM alternatives unaffected by biologically-arbitrary divisions at state boundaries. The BLM chose not to tabulate results by the Davis *et al.* (2011, pp. 34-36) modeling regions, because it felt that their larger modeling regions, only three of which occurred in the **planning area**, were too coarse to augment the analyses at the other scales.

Barred Owl Encounter Rates

The BLM included the influence of barred owl competition in its modeling of northern spotted owl population response. Barred owl competition is reflected in the HexSim population modeling by a barred owl encounter rate—the estimated probability, based on observation, that a northern spotted owl will encounter a barred owl in the northern spotted owl's territory—which, in the HexSim model, affects northern spotted owl survival.[31]

Between the Draft RMP/EIS and Proposed RMP/Final EIS, the BLM changed how it applied barred owl encounter rates in its HexSim model. As described below, the BLM updated the barred owl encounter rates based on results from the 2015 northern spotted meta-analysis provided by Dr. Dugger. In addition, for reasons described below, for the Draft RMP/EIS the BLM completed supplemental analyses of some alternatives using a modified barred owl encounter rate specific to each modeling region, which the BLM applied uniformly to each modeling region. For the Proposed RMP/Final EIS, the BLM delineated a network of barred owl control areas and applied an updated modified barred owl encounter rate in those control areas only, applying the estimated barred owl encounter rates in the remainder of each modeling region (see **Appendix C, Section E**).

Estimated Encounter Rates

For the Draft RMP/EIS the BLM used estimated barred owl encounter rates (**Table III-18**, column 3) from USDI FWS 2011a, p.C-66 and Table C-25. For the Proposed RMP/Final EIS, the BLM updated the estimated encounter rates (**Table III-18**, column 4) based on the results of the 2015 northern spotted owl meta-analysis (Dugger *et al.* 2016).

[31] Survival, as used in the U.S. Fish and Wildlife Service's HexSim model, and subsequently by the BLM, was derived from Forsman *et al.* (2011) (see USDI FWS 2011a:C-59, C-68 and C-69, and 1012:10 and 13) and results from the 2015 northern spotted owl meta-analysis provided by Dr. Katie Dugger (see **Appendix C**). Although survival, as it is used in the model, might not reflect the ecological processes, such as interference competition, that cause northern spotted owls to react to barred owls in specific ways, it is based on scientific research.

Table III-18. Estimated (observed) and modified barred owl encounter rates. The estimated encounter rates for the Draft RMP/EIS came from USDI FWS 2011a, p.C-66 and Table C-25; for the Proposed RMP/Final EIS they came from the results of the 2015 northern spotted owl meta-analysis (Dugger *et al.* 2016). For the Draft RMP/EIS the modified encounter rates came from USDI FWS 2012, p. 27 and Table 4; for the Proposed RMP/Final EIS they came from the U.S. Fish and Wildlife Service (Betsy Glenn, personal communication to Eric Greenquist, 9/1/2015).

		Estimated Encounter Rates		Modified Encounter Rates	
Modeling Region*	**Acronym**	**Draft RMP/EIS**	**Proposed RMP**	**Draft RMP/EIS**	**Proposed RMP**
North Coast and Olympics**	NCO	0.505	0.515	0.375	0.150
East Cascades-North	ECN	0.296	0.374	0.375	0.150
West Cascades-North	WCN	0.320	0.405	0.375	0.150
West Cascades-Central	WCC	0.320	0.411	0.375	0.150
Oregon Coast**	ORC	0.710	0.831	0.375	0.150
West Cascades-South**	WCS	0.364	0.442	0.375	0.150
Inner California Coast Range	ICC	0.213	0.269	0.250	0.150
East Cascades-South**	ECS	0.180	0.228	0.250	0.150
Klamath-Siskiyou-East**	KLE	0.245	0.411	0.250	0.150
Klamath-Siskiyou-West**	KLW	0.315	0.398	0.250	0.150
Redwood Coast	RDC	0.205	0.259	0.250	0.150

* The names of some modeling regions differ from those shown elsewhere in USDI FWS 2011a:C-9–C-13.
** Modeling regions entirely or partially in the **planning area**.

Modified Encounter Rates

The U.S. Fish and Wildlife Service, during its final simulations to inform its decisions on northern spotted owl critical habitat, modified barred owl encounter rates to isolate the effects of habitat on simulated northern spotted owl populations and evaluate the relative contributions of different critical habitat configurations to northern spotted owl recovery (USDI FWS 2012c, pp. 26-27). If the Service had used estimated barred owl encounter rates in their analysis, the overwhelming negative influence of barred owls on northern spotted owl population responses would have confounded the results (USDI FWS 2012c, p. 26). These modified encounter rates are shown in **Table III-18**, column 5.

During preparation of the Draft RMP/EIS, the BLM used the estimated barred owl encounter rates (**Table III-18**, column 3) derived by the U.S. Fish and Wildlife Service (USDI FWS 2011a, p. C-66 and Table C-25). At the suggestion of the Service, the BLM also conducted second simulations of Alternative C and the No Timber Harvest Reference Analysis using the Service's modified barred owl encounter rates (**Table III-18**, column 5) to help parse out the differential effect of habitat changes over time from the effects of barred owls. The BLM recognized that the relatively high current barred owl encounter rate observed in the Oregon Coast Modeling Region might prevent northern spotted owl persistence in that region regardless of habitat development on BLM-administered lands. Modeling Alternative C and the No Timber Harvest Reference Analysis with both current and modified barred owl encounter rates allowed the BLM to evaluate the influence of barred owls coupled with minimum (Alternative C) and maximum (No Timber Harvest) habitat development on BLM-administered lands, effectively bracketing the possible influence of the alternatives on the northern spotted owl population in a hypothetical scenario of barred owl control.

Application of Encounter Rates

As shown in the northern spotted owl population responses in the Draft RMP/EIS (USDI BLM 2015, pp. 783 – 796), when the BLM simulated estimated barred owl encounter rates, those encounter rates mostly or completely overwhelmed the effects of habitat development on BLM-administered lands in western Oregon. As shown in columns 3 and 4 of **Table III-18**, in all cases the 2015 barred owl encounter rates exceeded those the BLM used for the Draft RMP/EIS, which means that the influence of the barred owl on the northern spotted owl population response under the Proposed RMP would be even stronger in all parts of the northern spotted owl's range. Therefore, for the Proposed RMP/Final EIS, the BLM saw no utility in simulating northern spotted owl population responses only in the absence of a hypothetical barred owl control program. Instead, the BLM simulated northern spotted owl responses to the Proposed RMP in two ways: (1) using the estimated encounter rates (**Table III-18**, column 4) throughout each modeling region, and (2) using the modified encounter rate (**Table III-18**, column 6) in hypothetical barred owl control areas and the estimated encounter rates throughout the remainder of each modeling region.

Therefore, for the Proposed RMP/Final EIS, The BLM worked with the U.S. Fish and Wildlife Service to model a realistic, albeit hypothetical, barred owl control program. The Service recommended that the BLM evaluate its alternatives by delineating hypothetical barred owl control areas, and using the 2015 estimated barred owl encounter rates (**Table III-18**, column 4) outside control areas and a modified encounter rate of 0.150 (**Table III-18**, column 6) within the control areas. (To clarify, for the Draft RMP/EIS, the BLM applied the modified encounter rates [**Table III-18**, column 5] for each modeling region to the entire modeling region.) The BLM describes its process in **Appendix C, Section E**. The BLM delineated control areas, and modified the barred owl encounter rate within those areas, to forecast the effects of a hypothetical barred owl control program by the Service. The Service recommended the modified encounter rate of 0.150 to reflect the greater effects of barred owl control only in hypothetical control areas, which comprise about 10 percent of each modeling region (see **Appendix C, Section E**).

Population Change Analysis

As described above, the BLM simulated northern spotted owl demographic responses over 50 years (2013 – 2063), with relative habitat suitability values changing every decade according to BLM forecasts, and then held habitat values constant after 50 years and allowed each of 500 replicate simulations to run to 100 years (2113). This allowed the BLM to evaluate the Proposed RMP in terms of simulated northern spotted owl population change and trend during years 2013 - 2063 and the ability of habitat conditions in 2063 to support stable northern spotted owl populations. The BLM ran both environmentally stochastic and non-stochastic simulations. In stochastic simulations, the BLM allowed the fecundity and survival of individual northern spotted owls to vary probabilistically according to observed rates. In non-stochastic simulations, the BLM fixed those variables as the mean of observed rates. The stochastic model introduced more variability between replicate simulations (thus, requiring 500 replicates), making it more reliable for evaluating extinction risk over time using quasi-extinction thresholds (described below); the non-stochastic model eliminated that variability (thus requiring only 100 replicates), making it more reliable for evaluating overall population responses to changing habitat conditions.

Population Risk Analysis

In this analysis, the BLM used population thresholds of 250 and 100 females in each modeling region, respectively representing moderate and high population risk. The BLM set these population thresholds consistent with the thresholds used by the U.S. Fish and Wildlife Service during its process to delineate critical habitat for the northern spotted owl.

The HexSim model developed by the U.S. Fish and Wildlife Service, and adapted by the BLM, simulates female northern spotted owls that reproduce probabilistically; i.e., the model does not simulate male northern spotted owls or rely on northern spotted owl pair formation. The Service designed the model this way because female northern spotted owls are more influential on population dynamics (USDI FWS 2011a, p. C-56). However, this feature also allows simulated females to reproduce independently of population size and density. Thus, simulated northern spotted owl populations could decline independently of an Allee effect; i.e., a decrease in individual fitness (e.g., from inbreeding depression or reduced encounters between potential mates) that can occur at low population levels and cause sudden, local extirpation (Akcakaya 2000, p. 3; Singleton 2012, p. 146). This concerned the BLM because barred owl encounter rates, in the BLM model, affect northern spotted owl survival. Since the BLM model applied estimated barred owl encounter rates uniformly over a modeling region (outside the barred owl control areas of some simulations) because available data do not allow for greater refinement, the affect to northern spotted owl survival might provide no option for long-term northern spotted owl persistence in some regions (i.e., local extirpation might be statistically predetermined by the parameters of the BLM model). Since the BLM did not design its HexSim model to account fully for small population processes, the BLM anticipated situations where regional forecasts of northern spotted owl populations might become so low as to be unreliable.

In previous applications of HexSim, in which modelers did not design their models to account fully for small population processes, modelers relied on quasi- or pseudo-extinction thresholds. The U.S. Fish and Wildlife Service, during its process to delineate critical habitat for the northern spotted owl, set quasi-extinction thresholds of 250 and 100 females in each modeling region, respectively representing moderate and high population risk, and range-wide thresholds of 1,250 and 1,000 females, also respectively representing moderate and high population risk (USDI FWS 2012c, pp. 19-21, 30-32). The Service set these levels based on what constituted a "high risk of extinction"(USDI FWS 2012c, p. 20) at each scale. The Service based these thresholds on northern spotted owl biology and general principles of conservation biology (Betsy Glenn, personal communication to Eric Greenquist, 10/15/2014.); the Service did not base these thresholds on empirical evidence of extinction risk, because such data do not exist. Dunk *et al.* (2014, p. 9), using the U.S. Fish and Wildlife Service modeling regions, used a similar approach for their evaluation of northern spotted owls in western Washington, stating that a population of 100 individual northern spotted owls "represents a population size below which we believe Spotted Owls would be in danger of becoming extirpated," and "a population of grave concern." Again, Dunk *et al.* (2014, p. 9) did not base their threshold on empirical evidence of extinction risk, stating, "One hundred individuals is not necessarily a 'tipping point' population size;" instead, it provides "a quantitative threshold that allows for comparison among the baselines and alternative conservation scenarios." Heinrichs *et al.* (2010, p. 2233), in their simulations of a small population of kangaroo rats, developed quasi-extinction thresholds that, again, were based on expert opinion informed by *a posteriori* analyses that compared how their model performed with alternate thresholds (Julie Heinrichs, University of Washington, personal communication via e-mail to Eric Greenquist, 11/13/2013). And Singleton (2013, p. 146), in his analysis of northern spotted owls in the eastern Cascades of Washington, developed a *relative index* of pseudo-extinction rate based on the calculated carrying capacity of his study area, estimating that extinction risk was high when simulated northern spotted owl populations fell below 10 percent or 20 percent of the calculated carrying capacity. *Relative index* is important because Singleton only compared the results of different modeling scenarios and did not attempt to forecast actual extinction events (Singleton 2013, p. 146, and Peter Singleton, Pacific Northwest Research Station, U.S. Forest Service, personal communication via e-mail to Eric Greenquist, 11/13/2013).

For its analyses, the BLM relied on the quasi-extinction thresholds established by the U.S. Fish and Wildlife Service: 250 and 100 females in a modeling region. A regional population of no more than 250 females is at risk for extirpation, because it is vulnerable to small population processes and

stochastic events; a regional population of no more than 100 females is *de facto* extirpated due to the high likelihood that individuals would be too dispersed to form a cluster. Under northern spotted owl Issue 1, the BLM defined a cluster of northern spotted owls—the minimum size of a reproductively-stable population—as 20 to 25 breeding pairs that support each other demographically (i.e., their territories overlap such that their offspring readily would encounter each other). The U.S. Fish and Wildlife Service also considers a regional population of no more than 100 female northern spotted owls to be *de facto* extirpated (Betsy Glenn, personal communication via phone to Eric Greenquist, 07/29/2014.)

Regarding how to portray extinction risk over time, Akcakaya (2000, p. 2) stated that such risk is communicated best by specifying the entire distribution of extinction time instead of calculating only the mean or median extinction time; i.e., by plotting a cumulative probability distribution that shows the probability of extinction at or before a specific time. "Thus, the result becomes (the distribution of) the time (e.g., number of years) until the population declines below a predetermined threshold" (Akcakaya 2000, p. 3, parentheses in original). Therefore, the BLM plotted a cumulative time to quasi-extinction curve, for the Proposed RMP, using the modeling region-specific quasi-extinction thresholds developed by the U.S. Fish and Wildlife Service (USDI FWS 2012c, pp. 19-21 and 30-32). This allowed the BLM to evaluate the Proposed RMP in terms of the number of years from present during which the simulated northern spotted owl population had a certain probability of persisting above these thresholds in each modeling region and range-wide. The BLM did not intend these to be actual forecasts of persistence but only an estimate of the relative contribution of the Proposed RMP to northern spotted owl persistence.

Population Source Analysis

For the Draft RMP/EIS, the BLM evaluated northern spotted owl population sources (USDI BLM 2015, pp. 800 – 804). The BLM did not to evaluate population sources for the Proposed RMP because, although the results for the Draft RMP/EIS helped the BLM refine its network of reserve land use allocations to better protect sources, they also indicated that none of the alternatives appreciably altered mean source values across the **planning area** or limited northern spotted owl production in any part of the **planning area** due to the effects of competitive interactions between northern spotted owls and barred owls under all alternatives.

2). Management Outcome

Population Change

Simulations of northern spotted owl population responses for the No Timber Harvest Reference Analysis indicate that the forested landscape managed by the BLM is capable of contributing to a range-wide northern spotted owl population that would decline from current levels but would stabilize within 40 years (**Table III-19**). However, as shown in **Tables III-20** and **III-21**, this range-wide stabilization would result mostly from population increases in the California and eastern Cascades-portions of the range.[32] In the western Cascades, Olympic Peninsula, Oregon Coast Range and Oregon Klamath-portions of the range, simulated populations decline throughout the next 50 years.

[32] However, as described in the next section, Population Risk, the forecast of population increase in the eastern Cascades of Oregon is unreliable.

Table III-19. No Timber Harvest Reference Analysis: Northern spotted owl range-wide populations (mean of 500 replicate non-stochastic simulations) by year.

Populations	Simulation Year						
	2013	2023	2033	2043	2053	2063	2113
Number of Territorial Females	3,696	3,510	3,397	3,346	3,317	3,319	3,315
Number of All Females	4,763	4,490	4,332	4,259	4,217	4,224	4,218

Table III-20. No Timber Harvest Reference Analysis: Simulated northern spotted owl populations (mean of 500 replicate non-stochastic simulations), by modeling region and year.

Modeling Region	Simulation Year						
	2013	2023	2033	2043	2053	2063	2113
West Cascades-North	24	21	20	20	19	18	15
East Cascades-North	308	298	302	308	318	324	321
North Coast and Olympic*	159	137	122	109	97	87	53
West Cascades-Central	154	142	135	129	126	122	107
West Cascades-South*	854	770	695	632	578	532	378
Oregon Coast*	153	105	72	52	36	27	13
East Cascades-South*	170	168	171	174	178	185	195
Klamath-Siskiyou-East*	539	502	466	445	425	414	355
Klamath-Siskiyou-West*	616	581	561	547	533	524	489
Redwood Coast	852	844	861	897	939	988	1,172
Inner California Coast	933	922	927	948	969	1,003	1,121

* Modeling regions entirely or partially in the **planning area**.

Table III-21. No Timber Harvest Reference Analysis: Simulated northern spotted owl populations (mean of 500 replicate non-stochastic simulations), by physiographic province and year.

Physiographic Province	Simulation Year						
	2013	2023	2033	2043	2053	2063	2113
Washington Eastern Cascades	182	170	166	165	166	164	156
Washington Western Cascades	167	152	142	133	128	122	105
Washington Western Lowlands	2	2	1	1	1	1	1
Washington Olympic Peninsula	142	124	111	100	89	80	49
Oregon Coast Range*	161	110	77	55	38	29	12
Oregon Willamette Valley*	2	2	2	1	1	1	1
Oregon Eastern Cascades*	226	233	250	266	285	302	313
Oregon Western Cascades*	1,117	1,008	913	834	764	709	525
Oregon Klamath*	519	486	455	439	422	409	346
California Cascades	80	80	83	86	90	97	124
California Klamath	1,277	1,241	1,228	1,228	1,230	1,244	1,319
California Coast Range	887	883	905	950	1,003	1,065	1,267

* Physiographic provinces entirely or partially in the **planning area**.

Tables III-22 – III-24 show the results for the same population forecasts (i.e., without barred owl control) under the Proposed RMP.

Table III-22. Proposed RMP: Northern spotted owl range-wide populations (mean of 500 replicate non-stochastic simulations) by year, without barred owl control.

Populations	Simulation Year						
	2013	2023	2033	2043	2053	2063	2113
Number of Territorial Females	3,696	3,510	3,397	3,339	3,316	3,314	3,290
Number of All Females	4,765	4,489	4,333	4,249	4,223	4,218	4,184

Table III-23. Proposed RMP: Simulated northern spotted owl populations (mean of 500 replicate non-stochastic simulations), by modeling region and year, without barred owl control.

Modeling Region	Simulation Year						
	2013	2023	2033	2043	2053	2063	2113
West Cascades-North	25	23	21	20	20	19	15
East Cascades-North	310	302	307	311	320	328	318
North Coast and Olympic*	157	137	121	108	96	85	50
West Cascades-Central	155	142	134	128	123	120	103
West Cascades-South*	855	766	693	629	573	524	363
Oregon Coast*	156	107	74	52	37	28	13
East Cascades-South*	170	166	170	174	180	187	194
Klamath-Siskiyou-East*	543	501	470	445	428	412	351
Klamath-Siskiyou-West*	608	575	554	540	533	526	488
Redwood Coast	853	849	864	897	946	995	1,172
Inner California Coast	933	921	926	945	967	995	1,115

* Modeling regions entirely or partially in the **planning area**.

Table III-24. Proposed RMP: Simulated northern spotted owl populations (mean of 500 replicate non-stochastic simulations), by physiographic province and year, without barred owl control.

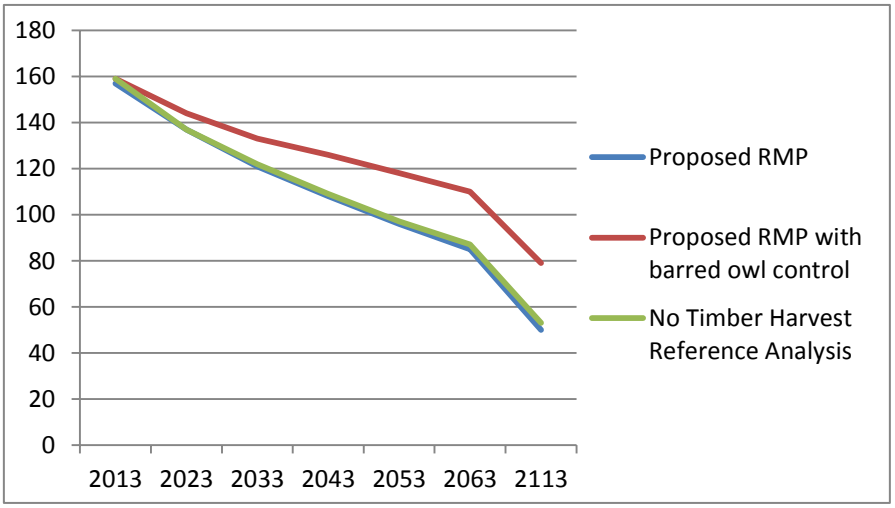
Physiographic Province	Simulation Year						
	2013	2023	2033	2043	2053	2063	2113
Washington Eastern Cascades	185	175	170	167	166	166	156
Washington Western Cascades	169	153	141	133	126	120	102
Washington Western Lowlands	2	1	1	1	1	1	1
Washington Olympic Peninsula	140	123	110	99	88	78	47
Oregon Coast Range*	163	113	78	55	40	30	11
Oregon Willamette Valley*	2	2	2	2	1	1	1
Oregon Eastern Cascades*	225	232	250	267	288	305	308
Oregon Western Cascades*	1,119	1,002	911	830	761	702	510
Oregon Klamath*	515	479	452	434	417	403	339
California Cascades	81	80	83	88	91	97	121
California Klamath	1,275	1,241	1,223	1,221	1,233	1,245	1,320
California Coast Range	889	888	910	952	1,011	1,070	1,267

* Physiographic provinces entirely or partially in the **planning area**.

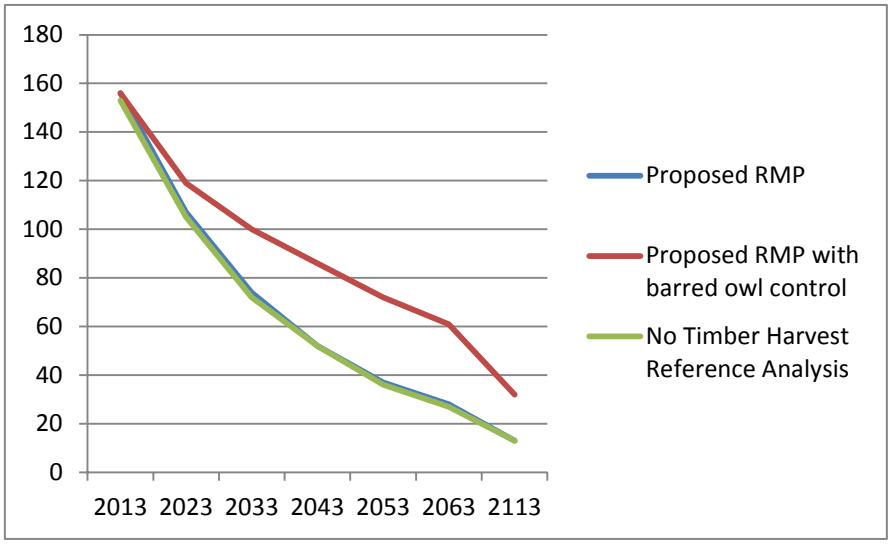
Figures III-25 and **III-26** show forecasts of how northern spotted owl populations would change under the Proposed RMP and according to the No Timber Harvest Reference Analysis. The forecasts include implementation of the Proposed RMP with and without a hypothetical barred owl control program. The graphs show, for each western Oregon modeling region (**Figure III-25**) and each western Oregon physiographic province (**Figure III-26**), changes in the mean number of females

from 500 replicate, non-stochastic simulations. These forecasts are based on decadal changes in habitat conditions during 2013-2063, then habitat conditions held static at 2063 levels until 2113.

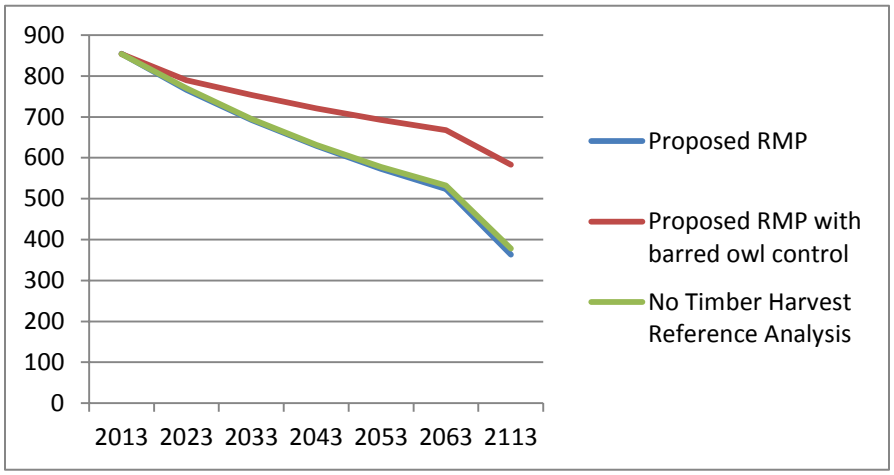
North Coast and Olympic



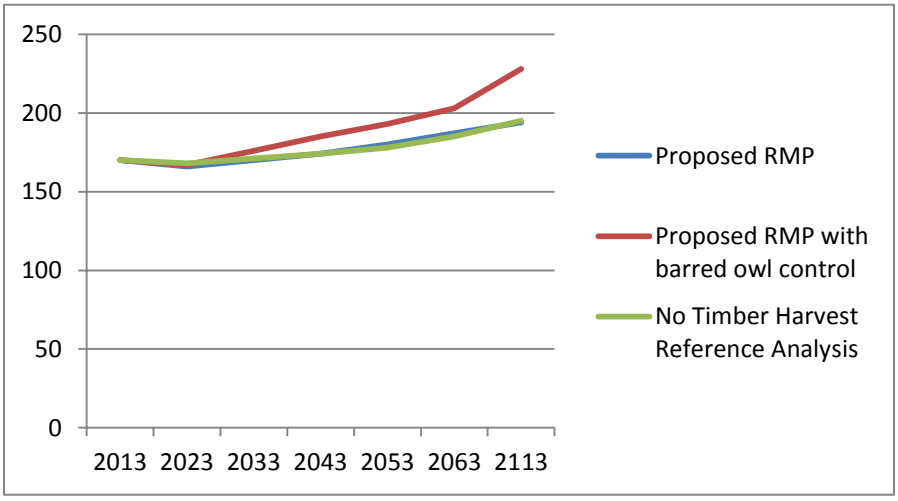
Oregon Coast



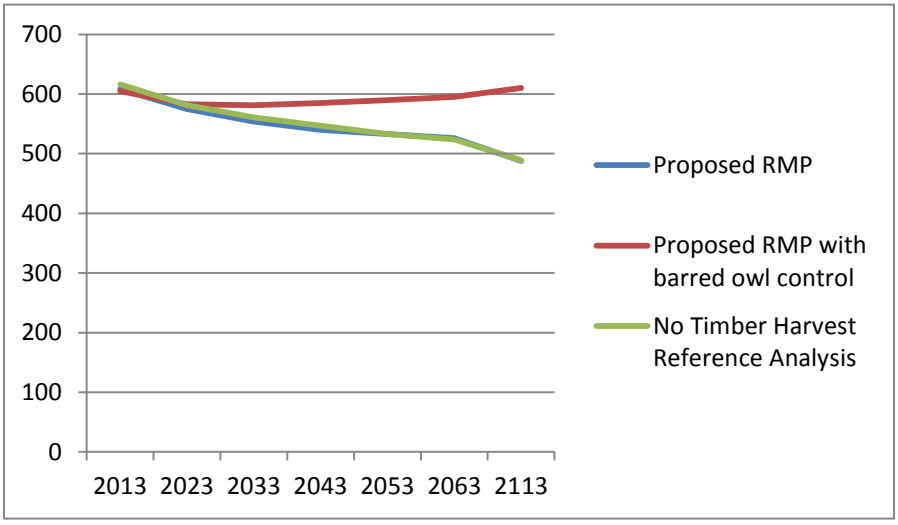
West Cascades-South



East Cascades-South



Klamath-Siskiyou-West



Klamath-Siskiyou-East

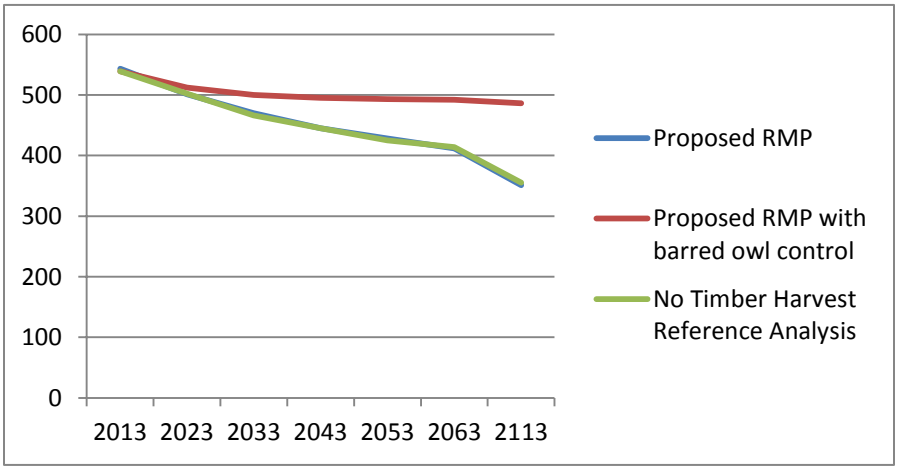
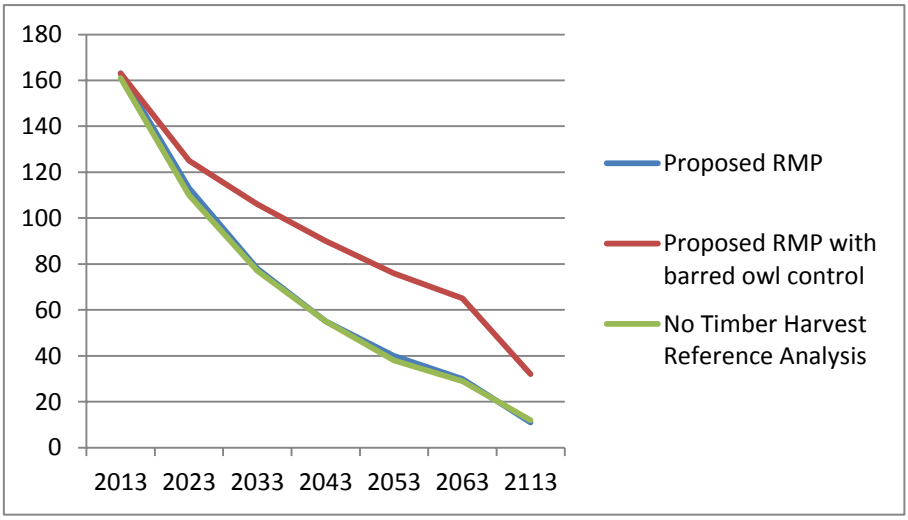
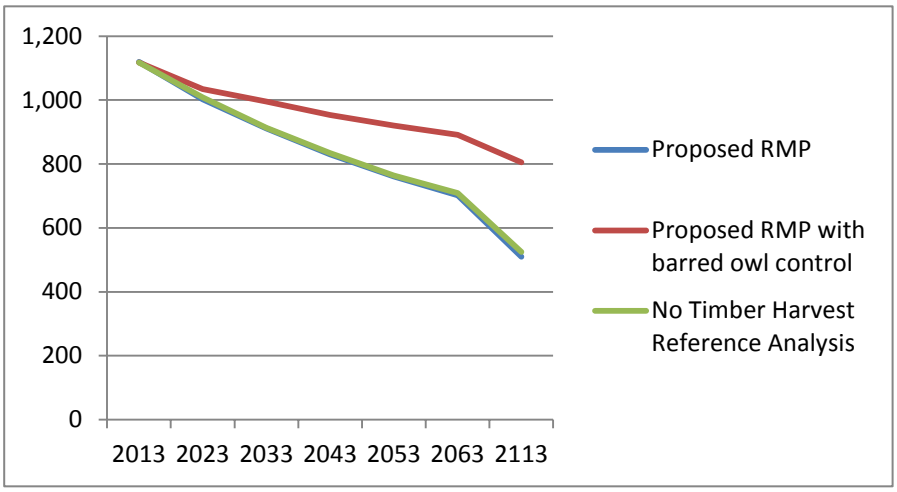


Figure III-25. Simulated northern spotted owl populations (mean numbers of females from 500 replicate non-stochastic simulations) for each western Oregon modeling region, by decade, under the Proposed RMP and according to the No Timber Harvest Reference Analysis.The Proposed RMP with and without a hypothetical barred owl control program are included for comparison.

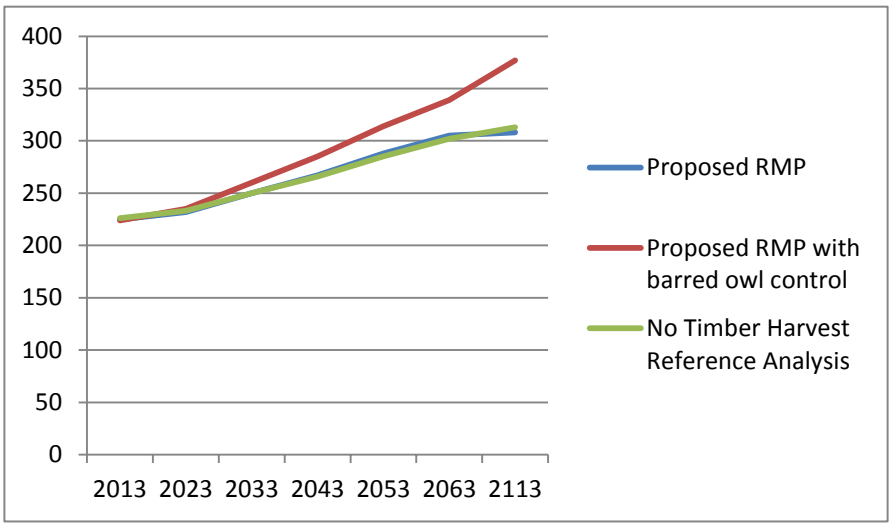
Oregon Coast Range



Oregon Western Cascades



Oregon Eastern Cascades



Oregon Klamath

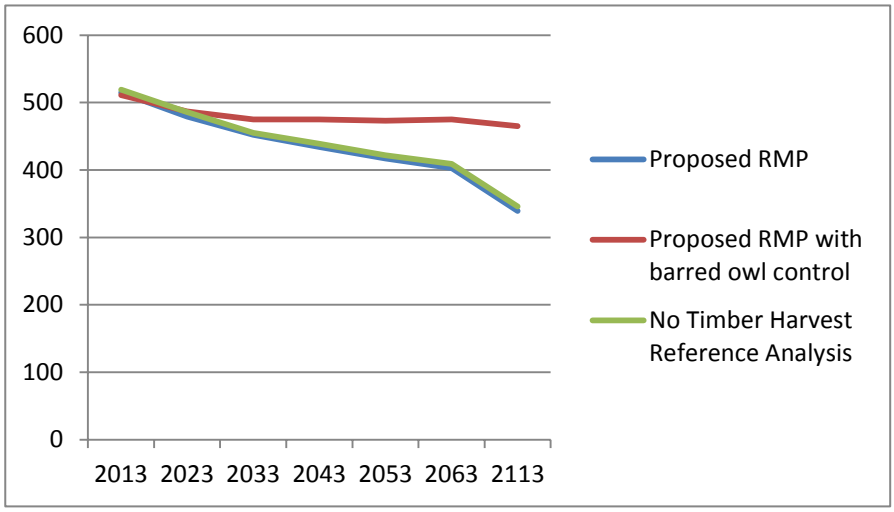


Figure III-26. Simulated northern spotted owl populations (mean numbers of females from 500 replicate non-stochastic simulations) for each western Oregon physiographic province, by decade, under the Proposed RMP and according to the No Timber Harvest Reference Analysis.The Proposed RMP with and without a hypothetical barred owl control program are included for comparison.

In general, there would be no discernable difference in the northern spotted owl population response under the Proposed RMP or a management scenario reflected by the No Timber Harvest Reference Analysis, indicating that northern spotted owl populations would not respond substantively to the different amounts and distributions of habitat provided by each scenario (i.e., the habitat provided under each scenario would not limit the population response). However, in each modeling region and physiographic province, the northern spotted owl population response would be substantively higher with implementation of the Proposed RMP and a barred owl control program. This indicates that the northern spotted owl population response to the Proposed RMP is determined by the effect of barred owl encounter rates on northern spotted owl survival.

Coast Range of Oregon
Population simulations for the North Coast and Olympic and the Oregon Coast modeling regions (**Figure III-25**), and the Oregon Coast Range Physiographic Province (**Figure III-26**), show no discernable difference between the Proposed RMP and the No Timber Harvest Reference Analysis. In the North Coast and Olympic Modeling Region, which includes the Olympic Peninsula of Washington, the number of simulated females would decrease 67 percent during the next 50 years. In the Oregon Coast Modeling Region, the number of simulated females would decrease 92 percent in 50 years. Simulations for the Oregon Coast Range Physiographic Province (**Figure III-26**), which is confined to Oregon, show an essentially identical result: the number of simulated females would decrease 93 percent in 50 years.

In this portion of the northern spotted owl's range, differences in the habitat contributions under the Proposed RMP would have negligible effects on the northern spotted owl population response compared to factors such as starting habitat conditions, how those conditions change on non-BLM-administered lands, and the effect of barred owl encounter rates on northern spotted owl survival. **Figures III-25** and **III-26** include simulations according to the Proposed RMP with both estimated barred owl encounter rates and encounter rates modified to simulate a hypothetical barred owl control program (see **Table III-18**). The outcomes illustrate the substantive influence of the barred owl on the northern spotted owl population response. However, the simulation of the Proposed RMP with a hypothetical barred owl control program indicates that the forested landscape managed by the BLM, even with reduced barred owl encounter rates, is incapable of contributing to a stable northern spotted owl population in this portion of the range during the next 50 years.

Western Cascades of Oregon
As shown in simulations for the West Cascades-South Modeling Region (**Figure III-25**) and the Oregon Western Cascades Physiographic Province (**Figure III-26**), the Proposed RMP would have an equally-negligible influence on the northern spotted owl population response in this portion of the range. In the West Cascades-South Modeling Region, the number of simulated females would decrease 56 percent during the next 50 years. In the larger Oregon Western Cascades Physiographic Province, the number of simulated females would decrease 53 percent in 50 years.

Similarly to those for the Oregon Coast Range, the simulation of the Proposed RMP with a hypothetical barred owl control program indicate that the forested landscape managed by the BLM, even with reduced barred owl encounter rates, is incapable of contributing to a stable northern spotted owl population in this portion of the range during the next 50 years. However, implementation of a barred owl control program with the Proposed RMP would substantially moderate northern spotted owl population declines in this region during the next 50 years to 32 percent in the West Cascades-South Modeling Region and 28 percent in the Oregon Western Cascades Physiographic Province.

Eastern Cascades of Oregon
In sharp contrast to the Oregon Coast and Western Cascades of Oregon, simulations for the East Cascades-South Modeling Region (**Figure III-25**) and the Oregon Eastern Cascades Physiographic Province (**Figure III-26**) forecast positive population changes during the next 50 years. In the East Cascades-South Modeling Region, the number of simulated females would increase 15 percent during the next 50 years. In the Eastern Cascades Physiographic Province (**Figure III-26**), the number of simulated females would increase 38 percent in 50 years. The results are different because the East Cascades-South Modeling Region includes the southern portion of the eastern Cascades of Oregon and extends into California (**Figure III-25**), whereas the more-northerly Oregon Eastern Cascades Physiographic Province includes the entire eastern Cascades of Oregon.

The simulations indicate that, under the Proposed RMP, the forested landscape managed by the BLM would contribute to stable and increasing northern spotted owl populations in this portion of the range during the next 50 years, even in the absence of a hypothetical barred owl control program. (However, as is shown in the next section [Population Risk], the northern spotted owl population in this portion of the range currently is at risk of extirpation due to its low number.)

Klamath Basin of Oregon
Simulations for the Klamath-Siskiyou-West and Klamath-Siskiyou-East modeling regions (**Figure III-25**) and the Oregon Klamath Physiographic Province (**Figure III-26**), show no discernable differences in northern spotted owl population responses under the Proposed RMP or according to the No Timber Harvest Reference Analaysis. In the Klamath-Siskiyou-West Modeling Region, the number of simulated females would decrease 21 percent during the next 50 years. In the Klamath-Siskiyou-East Modeling Region, the number of simulated females would decrease 34 percent in 50 years. In the Oregon Klamath Physiographic Province (**Figure III-26**), the number of simulated females would decrease 33 percent in 50 years.

However, simulations of the Proposed RMP with a hypothetical barred owl control program indicate that, during the next 50 years, the forested landscape managed by the BLM could contribute to a stable or slightly increasing northern spotted owl population in the Klamath-Siskiyou-West Modeling Region, and to stable or slightly decreasing populations in the Klamath-Siskiyou-West Modeling Region and the Oregon Klamath Physiographic Province (see **Figures III-25** and **III-26**).

Population Risk
As shown in **Table III-19**, at no time during the simulation of the No Timber Harvest Reference Analysis did the range-wide number of territorial females northern spotted owls decline to the quasi-extinction threshold of 1,250 females used by the U.S. Fish and Wildlife Service, suggesting that the forested landscape managed by the BLM in the **planning area** is capable of contributing to species persistence throughout the next 50 years. That said, **Figure III-27** shows the probability, over time, of the simulated northern spotted owl population in each western Oregon modeling region declining to 250 females—the quasi-threshold of a population at risk for extirpation—according to the No Timber Harvest Reference Analysis. There is at least a 90 percent probability that northern spotted owl populations in the North Coast and Olympic and East Cascades-South modeling regions currently are below the 250-female threshold. There also is a 71 percent probability that the population in the Oregon Coast Region currently is below the 250-female threshold, and the BLM has no opportunity to prevent that probability from surpassing 90 percent in ten years.

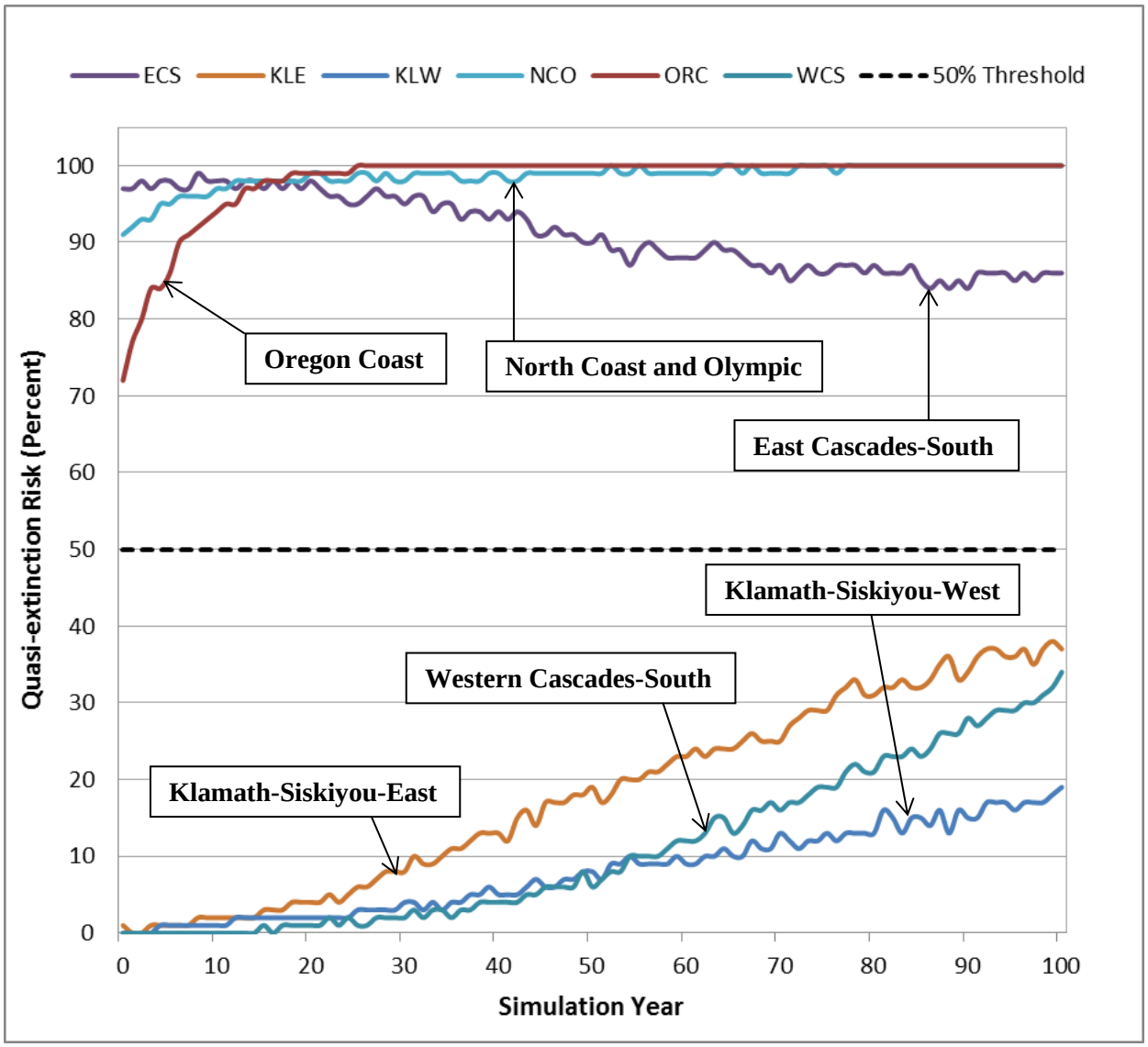


Figure III-27. No Timber Harvest Reference Analysis: extinction risk as a function of time, using a quasi-extinction level of 250 females in each modeling region.
This graph shows the mean probability, by year (0 = 2013), that 500 simulated stochastic populations in each of the western Oregon modeling regions decline to 250 females.

In the previous section, Population Change, the BLM reported that the eastern Cascades of Oregon is an area in which the landscape managed by the BLM is capable of contributing to a stable or increasing northern spotted owl population. However, the risk analysis indicates that the current population in that region already is so small that the BLM forecast of stability is unreliable. This population currently is at risk from small population processes and stochastic changes to the environment.

In the Klamath-Siskiyou-East Modeling Region, **Figure III-27** shows that the forested landscape managed by the BLM is capable of contributing to a landscape with no more than a 19 percent probability that the regional population would decline to 250 females at any time during the next 50 years. In the Western Cascades-South and Klamath-Siskiyou-West modeling regions, the probability during the next 50 years would be less than 10 percent.

Figure III-28 shows the probability, over time, of the simulated northern spotted owl population of each modeling region declining to 100 females—the quasi-threshold of regional extirpation—according to the No Timber Harvest Reference Analysis. Within the **planning area**, northern spotted owl populations in the Oregon Coast modeling region reach a 50-percent probability of dropping below the 100-female threshold in 17 years, which increases to a 98 percent probability in 50 years. The northern spotted owl population in the North Coast and Olympic modeling region reaches a 50-percent probability of dropping below the 100-female threshold in 36 years. However, in the other modeling regions in the **planning area**, the forested landscape managed by the BLM is capable of contributing to a landscape with no more than an 11 percent probability of a regional population dropping below the 100-female threshold during the next 50 years.

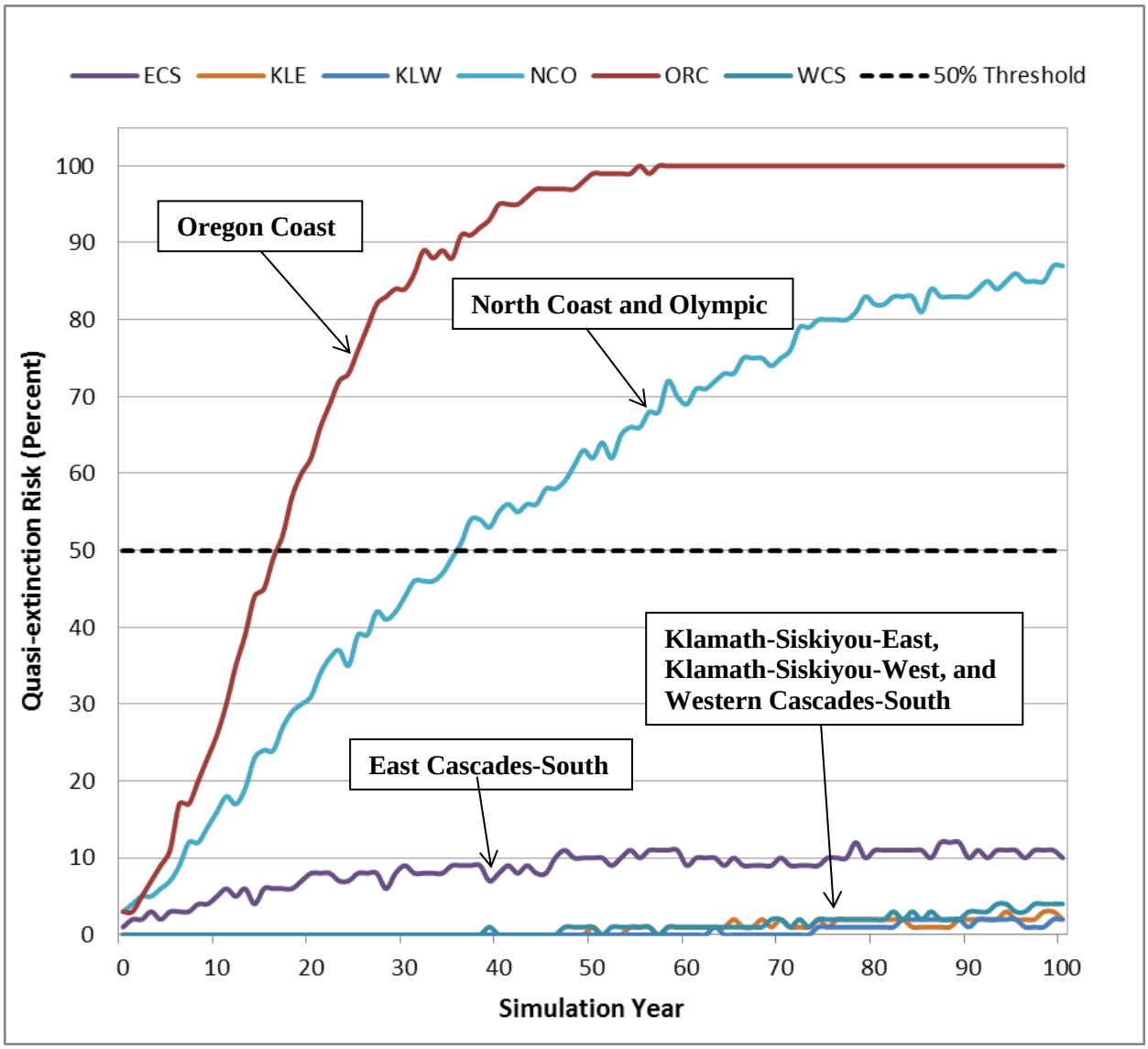


Figure III-28. No Timber Harvest Reference Analysis: Extinction risk as a function of time, using a quasi-extinction level of 100 females in each modeling region.
This graph shows the mean probability, by year (0 = 2013), that 500 stochastic populations in each of the western Oregon modeling regions declined to 100 females.

These simulations indicate that the northern spotted owl currently is under significant biological stress, and at risk for extirpation, over much of the moist forest-portion of its range. In the Coast Range-portion of the **planning area**, the species already appears to be at risk for extirpation with only a 50 percent probability of persisting during the next 20 years, which drops to a less than 5 percent probability of persisting to 50 years. This population already appears to be vulnerable to small population processes and stochastic events which could cause its sudden extirpation, and this vulnerability increases over time. So, the estimate that BLM-administered lands in the **planning area** are capable of contributing to species persistence in this area for 20 years should be interpreted with caution. The simulations also indicate that the BLM has no opportunity under current barred owl encounter rates to moderate this situation through the development of northern spotted owl habitat on BLM-administered lands.

Effects of the Proposed RMP

As shown in **Figures III-29** and **III-30**, northern spotted owl extinction risks under the Proposed RMP would not differ substantively to those under the No Timber Harvest Reference Analysis, indicating that, in western Oregon, the difference in habitat availability on BLM-administered lands under the Proposed RMP would not appreciably affect northern spotted owl population responses.

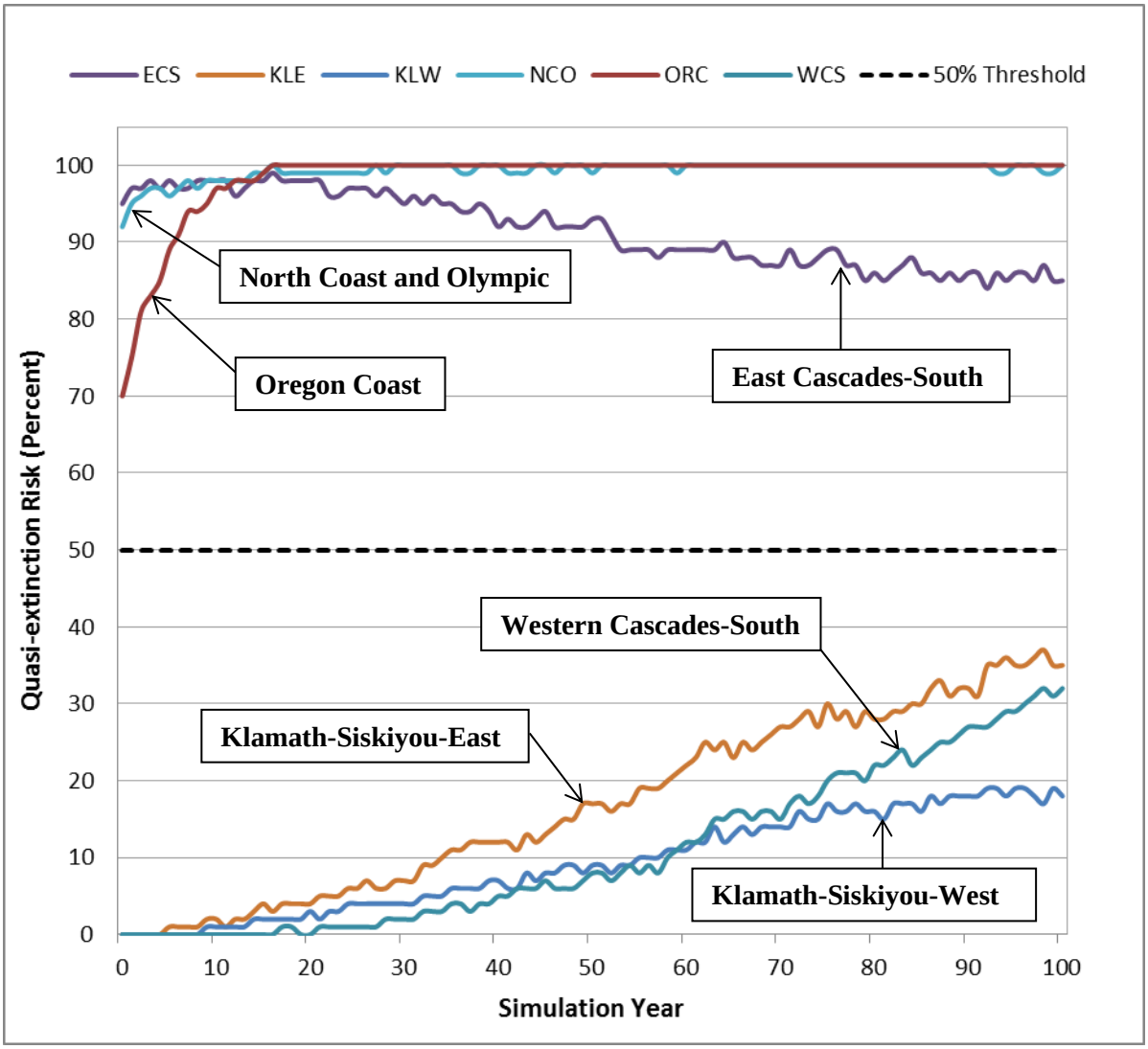


Figure III-29. Proposed RMP: extinction risk as a function of time, using a quasi-extinction level of 250 females in each modeling region.

This graph shows the mean probability, by year (0 = 2013), that 500 simulated stochastic populations in each of the western Oregon modeling regions decline to 250 females.

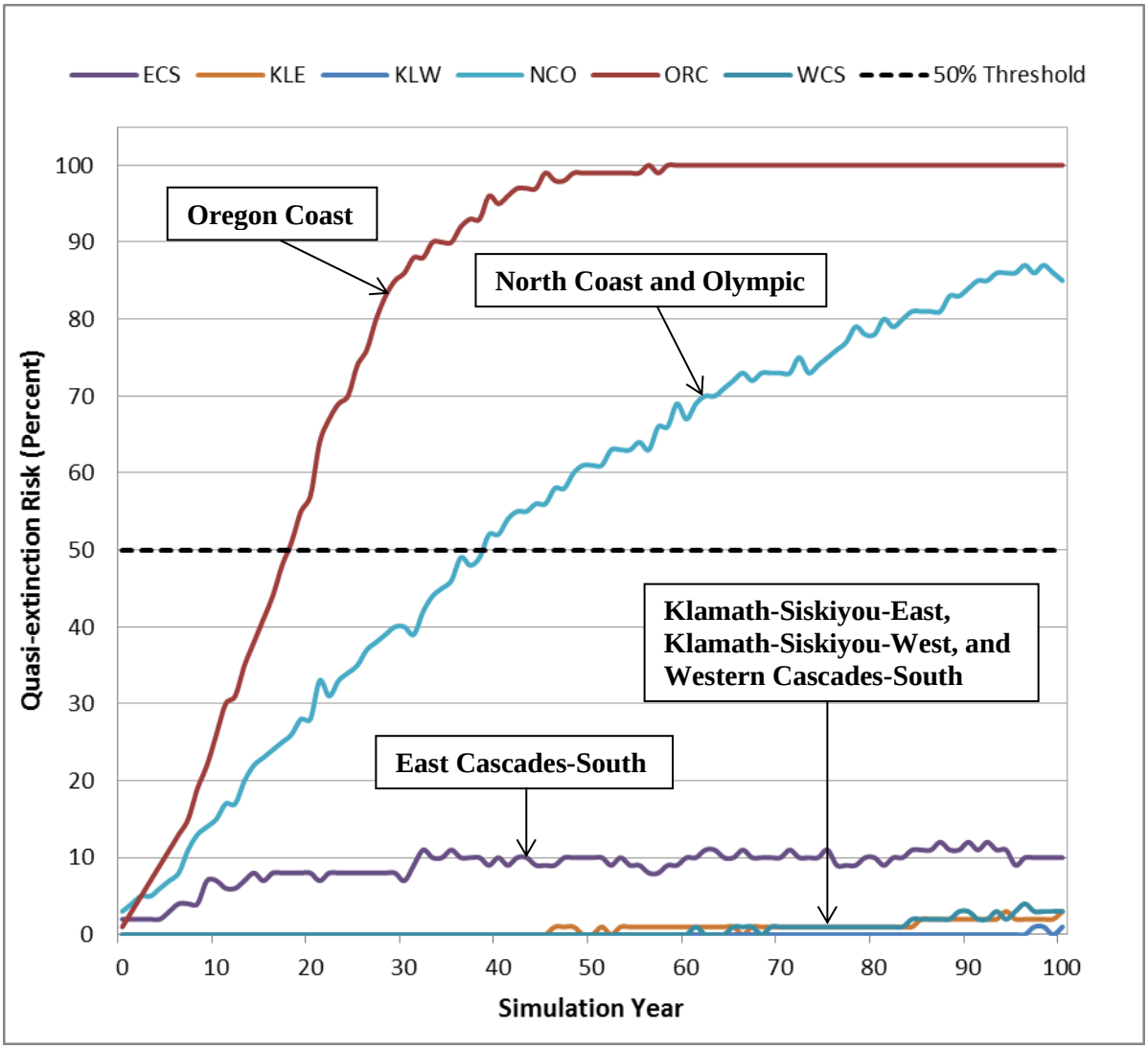


Figure III-30. Proposed RMP: Extinction risk as a function of time, using a quasi-extinction level of 100 females in each modeling region.

This graph shows the mean probability, by year (0 = 2013), that 500 stochastic populations in each of the western Oregon modeling regions declined to 100 females.

Effects of the Proposed RMP with Barred Owl Control

Figures III-31 and **III-31** show extinction risks in each western Oregon modeling region under the Proposed RMP with the implementation of a hypothetical barred owl control program.

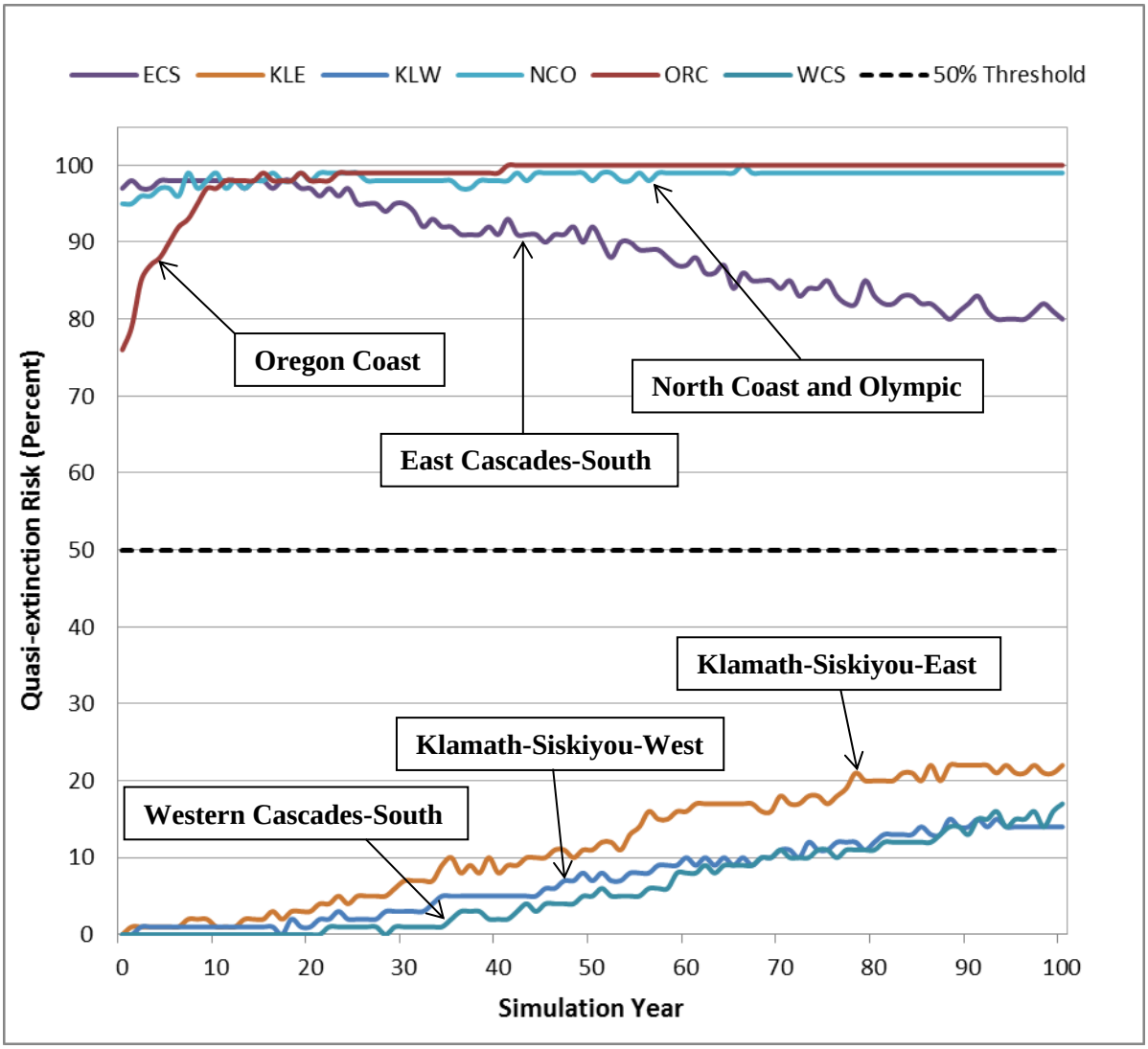


Figure III-31. Proposed RMP with barred owl control: extinction risk as a function of time, using a quasi-extinction level of 250 females in each modeling region.

This graph shows the mean probability, by year (0 = 2013), that 500 simulated stochastic populations in each of the western Oregon modeling regions decline to 250 females.

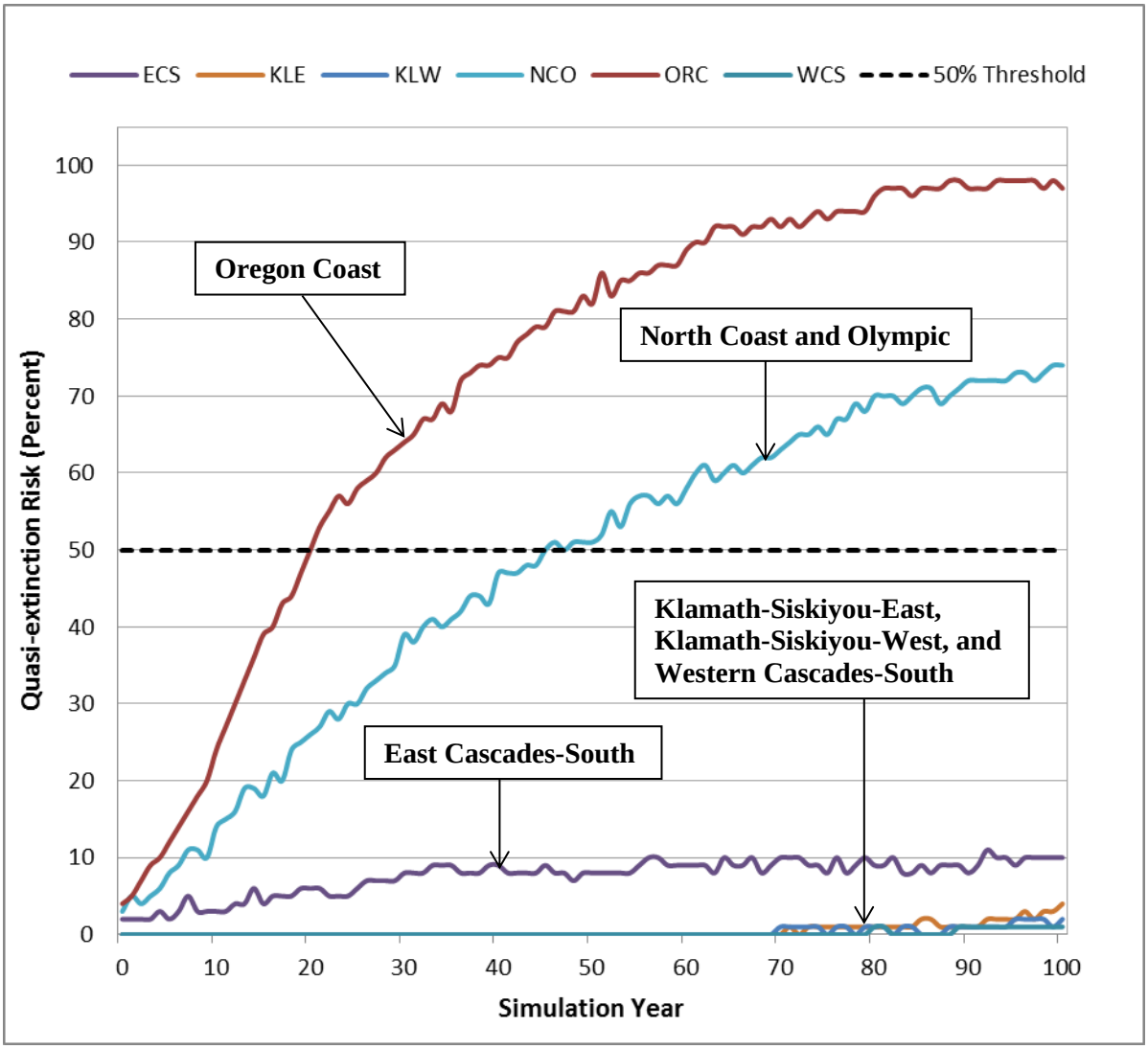


Figure III-32. Proposed RMP with barred owl control: Extinction risk as a function of time, using a quasi-extinction level of 100 females in each modeling region.
This graph shows the mean probability, by year (0 = 2013), that 500 stochastic populations in each of the western Oregon modeling regions declined to 100 females.

A comparison of **Figures III-29** and **III-31** shows that, during the next 50 years, barred owl control, as modeled by the BLM, would not appreciably reduce the probability of northern spotted owl populations declining to 250 females in the North Coast and Olympic, Oregon Coast and East Cascades-South modeling regions. However, in the Western Cascades-South, and Klamath-Siskiyou-East and -West modeling regions, during the next 50 years, barred owl control would reduce the probability of populations declining to 250 females from no more than 17 percent to no more than 11 percent.

That said, comparing **Figures III-30** and **III-32** indicates that, during the next 50 years, a hypothetical barred owl control program would appreciably delay the probability of northern spotted owl populations declining to 100 females—*de facto* extirpation—in the North Coast and Olympic and Oregon Coast modeling regions. In the North Coast and Olympic modeling region, the population would reach a 50 percent probability of declining to 100 females in 45 years as opposed to 39 years without barred owl control. In 50 years, this population would have a 51 percent probability of

declining to 100 females as opposed to a 61 percent probability without barred owl control. In the Oregon Coast modeling region, the population would reach a 50 percent probability of declining to 100 females in 20 years as opposed to 18 years without barred owl control. In 50 years, this population would have an 83 percent probability of declining to 100 females as opposed to a 99 percent probability without barred owl control. Although these might not sound like appreciable differences, delaying extirpation of the northern spotted owl populations in these modeling regions would allow the U.S. Fish and Wildlife Service added time to develop and implement additional control measures. In the other Oregon modeling regions, barred owl control would have only negligible benefits.

e. Issue 5

In accordance with Recovery Action 6, would the Proposed RMP delineate at least one reserve land use allocation in the moist forest and, within that allocation, implement silvicultural techniques in plantations, overstocked stands and modified younger stands that would benefit the northern spotted owl?

1). Summary of Analytical Methods

To evaluate Recovery Action 6, the BLM quantified the progression of non-habitat, a surrogate for "plantations, overstocked stands and modified younger stands," to northern spotted owl habitat on BLM-administered lands in the moist forest of the **planning area**, in both reserve land use allocations and critical habitat units. In this context, "non-habitat" is statistically shown to be avoided by northern spotted owls (i.e., "strongly-selected-against" habitat, as defined in **Appendix C, Sections B and C**).

Recovery Action 6 states, "In moist forests managed for spotted owl habitat, land managers should implement silvicultural techniques in plantations, overstocked stands and modified younger stands to accelerate the development of structural complexity and biological diversity that will benefit spotted owl recovery" (USDI FWS 2011a, p. III-19). The Recovery Action 6 narrative states that such activities "should be carried out in all Federal land classifications consistent with the NWFP [Northwest Forest Plan] Standards and Guidelines." The BLM initially interpreted "moist forests managed for spotted owl habitat" to refer only to reserve land use allocations. However, the U.S. Fish and Wildlife Service stated that Recovery Action 6 also addresses management within northern spotted owl critical habitat in the moist forests, even where critical habitat overlays the Harvest Land Base (Brendan White, U.S. Fish and Wildlife Service, verbal personal communication to Eric Greenquist, 09/24/2013).

Based on this input from the U.S. Fish and Wildlife Service, the BLM refined this issue to evaluate whether the BLM would designate a reserve land use allocation in the moist forest for northern spotted owl recovery, and, within that reserve allocation and within designated critical habitat in the moist forest, implement appropriate silvicultural techniques in plantations, overstocked stands and modified younger stands. However, neither Recovery Action 6 nor the associated narrative recommends an analytical threshold, such as the quantity of forest treated, for the BLM to evaluate the consistency of the Proposed RMP with Recovery Action 6. Lacking such a threshold, evaluating how the BLM would manage "plantations, overstocked stands and modified younger stands" in reserves and critical habitat would reveal nothing more, with respect to BLM contributions to overall northern spotted owl recovery, than the analyses to address Conservation Needs 1 – 4, especially since the treatment of such stands is incorporated into the northern spotted owl relative habitat suitability surfaces that the BLM uses to evaluate Conservation Needs 1 – 4.

In summary, the Proposed RMP includes reserve land use allocations in the moist forest that would be managed for structural complexity and biological diversity beneficial to the northern spotted owl. The Proposed RMP also include portions of designated critical habitat in the moist forest within the

reserve land use allocations and management direction to implement silviculture techniques in plantations, overstocked stands, and modified younger stands to benefit northern spotted owl recovery. Since Recovery Action 6 recommends no threshold for the BLM to evaluate the Proposed RMP, the BLM needs no additional analysis to determine that the Proposed RMP is consistent with Recovery Action 6. Instead, the BLM tabulates in this analysis the changes in the acres of non-habitat for reserve land use allocations and critical habitat in the moist forest under the Proposed RMP.

2). Management Outcome

Table III-25 shows the current acres of non-habitat (i.e., habitat strongly-selected-against by northern spotted owls) and the potential change in those acres according to the No Timber Harvest Reference Analysis. Since the No Timber Harvest Reference Analysis does not rely on land use allocations, the acres are confined to moist forest BLM-administered lands of the **planning area** in: 1) Northwest Forest Plan reserve land use allocations[33] ; and 2) northern spotted owl critical habitat.

Table III-25. No Timber Harvest Reference Analysis: Acres of habitat strongly avoided by the northern spotted owl in moist forest land use allocations reserved under the Northwest Forest Plan, and in moist forest critical habitat units, on BLM-administered lands in the **planning area**.

Moist Forest BLM-administered Habitat Strongly Avoided	**Year (Acres)**					
	2013	**2023**	**2033**	**2043**	**2053**	**2063**
Reserved Lands	37,808	35,987	30,908	25,866	24,696	24,021
Critical Habitat Units	69,042	62,050	47,489	39,272	35,962	33,828

According to the No Timber Harvest Reference Analysis, on BLM-administered lands in western Oregon, the acres of non-habitat in the moist forest portion of both Northwest Forest Plan reserve land use allocations and northern spotted owl critical habitat units would be capable of decreasing each decade through 2063 as a result of forest growth with the anticipated effects of wildfire.

Figure III-33 shows how the acres of non-habitat in moist forest reserve land use allocations would change over time (i.e., would transition to northern spotted owl habitat) under the Proposed RMP. Because the Proposed RMP and the Northwest Forest Plan reserve different lands, the acres of non-habitat are not directly comparable. Under the Proposed RMP, the net acres of moist forest non-habitat in reserve land use allocations would decrease by 49 percent during 50 years, resulting in a net increase of 57,500 acres of northern spotted owl habitat in reserves.

[33] Since Recovery Action 6 refers to "moist forests managed for spotted owl habitat," the BLM analysis includes the Riparian Reserve interspersed with the Late-Successional Reserve, but excludes the Riparian Reserve interspersed with other land use allocations.

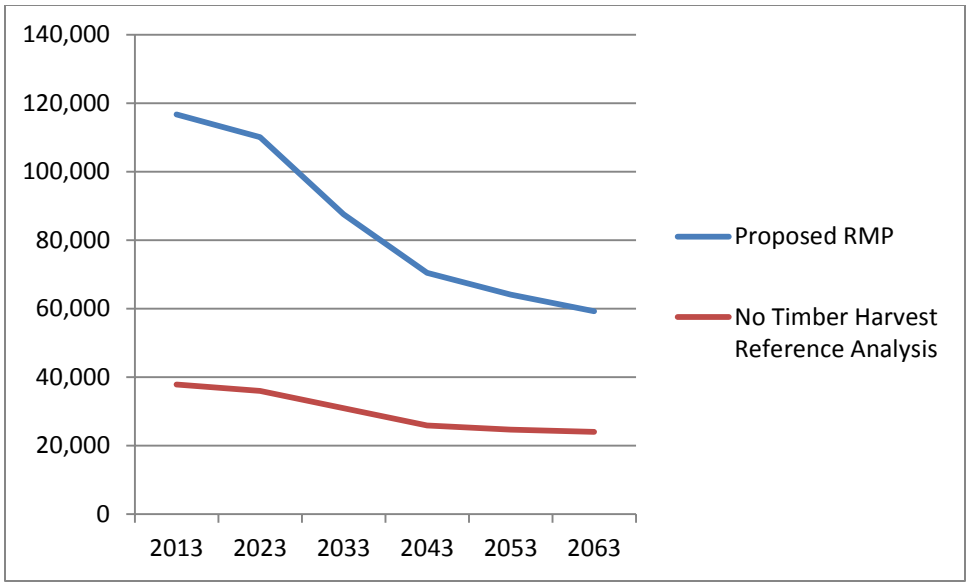


Figure III-33. Forecasted change in the acres of the forested landscape that would be strongly avoided by northern spotted owls (i.e., non-habitat) of reserve land use allocations.The No Timber Harvest Reference Analysis is included for comparison.

Figure III-34 shows how the acres of the moist forest non-habitat in critical habitat units on BLM-administered land would change over time under the Proposed RMP. Because the critical habitat units are identical under the Proposed RMP and the Northwest Forest Plan, changes in the acres of non-habitat are directly comparable. Under the Proposed RMP, the net acres of moist forest non-habitat in critical habitat would decrease by 51 percent during the next 50 years, which corresponds to a net increase of 34,600 acres of northern spotted owl habitat.

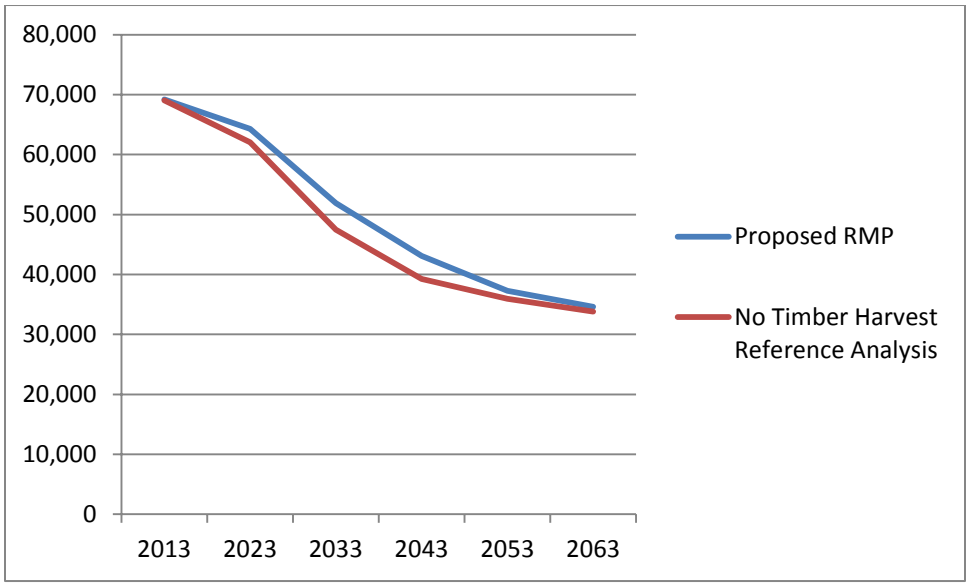


Figure III-34. Forecasted change in the acres of the forested landscape that would be strongly avoided by northern spotted owls (i.e., non-habitat) in critical habitat units on BLM-administered land.The No Timber Harvest Reference Analysis is included for comparison.

Therefore, under Proposed RMP, the BLM would delineate at least one reserve land use allocation in the moist forest and, within that allocation, implement silvicultural techniques in plantations, overstocked stands and modified younger stands that would benefit (i.e., result in net increases in the amount of habitat for) the northern spotted owl. As a result, the Proposed RMP would result in a decrease in the acres of non-habitat in the reserve land use allocation in the moist forest over time from current amounts.

f. Issue 6

In accordance with Recovery Action 10, would the Proposed RMP conserve northern spotted owl sites and high value northern spotted owl habitat to provide additional demographic support to the northern spotted owl population?

1). Summary of Analytical Methods

The intent of Recovery Action 10 "is to protect, enhance and develop habitat in the quantity and distribution necessary to provide for the long-term recovery of spotted owls" (USDI FWS 2011a, p. III-44). Conservation needs 1 and 2 also address this intent. However, Recovery Action 10 also focuses on the management of individual northern spotted owl nest sites and "high value" northern spotted owl habitat; which the Revised Recovery Plan defines as "older, multi-layered structurally-complex forests" and "areas with current and historic use by spotted owls" (USDI FWS 2011a, p. G-2).

The U.S. Fish and Wildlife Service does not recommend, through Recovery Action 10, that land managers protect all northern spotted owl known and historic sites. Instead, the Service recommends habitat enhancement to promote long term northern spotted owl conservation even when such enhancement would have short-term negative effects to individual northern spotted owl pairs or resident singles (USDI FWS 2011a, p. III-44). The Service also recommends interim guidance on how land managers should rank northern spotted owl sites according to their priority for protection, and standards for the protection of northern spotted owl habitat within the 500-acre (200-ha) core use area and the median provincial home range area that surround each site (USDI FWS 2011a, p. III-44 – III-45). The Service recommends that northern spotted owl sites be managed so that at least 50 percent of the 500-acre core use area, and at least 40 percent of the median provincial home range area, support nesting-roosting habitat (USDI FWS 2011a). However, the Service does not estimate, or provide criteria to estimate, which or how many northern spotted owl sites the BLM should maintain to be consistent with Recovery Action 10. Therefore, the evaluation of the consistency of the Proposed RMP with Recovery Action 10 is complicated by the primary focus of Recovery Action 10 on individual known and historic northern spotted owl sites, the flexibility Recovery Action 10 provides for the management of individual sites, and the lack of recommended criteria to evaluate consistency with Recovery Action 10.

Confining the analysis to the **planning area**, the BLM determined the locations of northern spotted owl known and historic sites on or near BLM-administered lands from demography studies on those lands (Forsman *et al.* 2011, pp. 5-8), survey data the BLM and its cooperators collected as part of Northwest Forest Plan effectiveness monitoring, and additional survey data since the 1970s. The BLM and its cooperators have surveyed about 80 percent of BLM-administered lands in the **planning area** for northern spotted owls; all survey results are maintained in the BLM corporate database. The BLM then tabulated if habitat conditions within the 500-acre core use area and the median provincial home range circles surrounding each site would meet the thresholds of Recovery Action 10 (i.e., at least 50 percent nesting-roosting habitat within the 500-acre core use area and at least 40 percent nesting-roosting habitat within the median provincial home range area).

In addition to managing habitat within the 500-acre core use area and the median provincial home range area around each northern spotted owl site, Swindle *et. al* (1999, p. 1216) determined that, in the central Cascades of Oregon, northern spotted owl nest site selection was most influenced by the amount of older forest habitat within 660 feet (200 m) of each site. Since the intent of Recovery Action 10 is to conserve extant northern spotted owl sites, the BLM added the standard of maintaining all forest habitat within 660 feet of those sites, even though Recovery Action 10 does not specifically recommend such protection.

Northern spotted owls on BLM-administered lands are known to nest, and produce young, in habitat conditions that are below Recovery Action 10 thresholds. This analysis does not account for additional protections that the site-specific implementation of Recovery Action 10 might provide for such pairs.

2). Management Outcome

There currently are 2,465 known (including historic) northern spotted owl sites associated with BLM-administered lands in the **planning area** (i.e., their provincial home ranges include BLM-administered lands) that are delineated as northern spotted owl critical habitat. Of these known sites, 1,395 sites (57 percent) meet Recovery Action 10 thresholds. (Only 1,380 known sites currently meet Recovery Action thresholds under the Proposed RMP because the BLM updated the baseline data for the Proposed RMP to include the effects of wildfires during 2013.) In 30 years, according to the No Timber Harvest Reference Analysis, 1,765 known sites (72 percent) would be capable of meeting Recovery Action 10 thresholds; in 50 years the number increases to 1,916 known sites (78 percent). According to the No Timber Harvest Reference Analysis, the remaining 22 percent of known sites are not capable of meeting Recovery Action 10 thresholds in 50 years due to the limited BLM-administered lands, slow habitat development of some BLM-administered lands because of poor site conditions, and competing land uses on other land ownerships.

Figure III-35 shows the number of northern spotted owl known sites that would be at or above Recovery Action 10 habitat thresholds, during each decade, under the Proposed RMP. In 30 years, under the Proposed RMP, 1,715 known sites (70 percent) would meet Recovery Action 10 thresholds; in 50 years the number would increase to 1,874 known sites(, a 36 percent increase from the current 1,380 sites and 76 percent of all the known sites associated with BLM-administered lands.

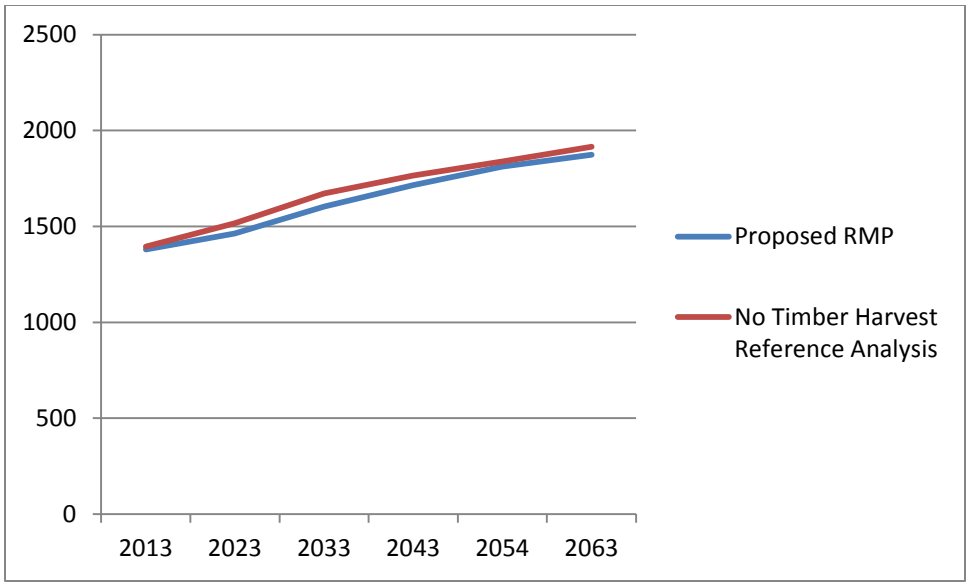


Figure III-35. Number of northern spotted owl sites that would be at or above Recovery Action 10 habitat thresholds under the Proposed RMP during each decade.The No Timber Harvest Reference Analysis is included for comparison.

g. Issue 7

In accordance with Recovery Action 12, would the BLM implement post-fire silvicultural activities on lands managed for the development of spotted owl habitat, and that are modified by wildfire, that conserve and restore habitat elements that take a long time to develop, such as large trees, medium and large snags, and downed wood?

1). Summary of Analytical Methods

For this analysis, the BLM initially interpreted "lands managed for the development of spotted owl habitat" to refer to reserve land use allocations (see the narrative for Issue 5). However, as discussed under Issue 5, the U.S. Fish and Wildlife Service stated that the Revised Recovery Plan (and hence this recovery action) also pertains to 2012 northern spotted owl critical habitat. Therefore, based on this input from the U.S. Fish and Wildlife Service, for this analysis the BLM interprets "lands managed for the development of spotted owl habitat" as reserve land use allocations and designated critical habitat.

As described in Appendix D of the Draft RMP/EIS (USDI BLM 2015) and **Appendix C, Section A**, of this assessment, the BLM forecasted wildfire locations, footprints and intensities (i.e., how fire would modify northern spotted owl relative habitat suitability values within its fire footprint) on all land ownerships within the northern spotted owl's range, including on BLM-administered lands in the **planning area**, at decadal increments during the next 50 years. The Revised Recovery Plan summarizes the effects of post-fire logging on northern spotted owl habitat (USDI FWS 2011a, pp. III-47 – III-49).

The BLM tabulated the acres of BLM-administered lands in reserve land use allocations and in critical habitat modified by wildfire during each decade, and described qualitatively the management standards for those lands under the Proposed RMP.

2). Management Outcome
Since the No Timber Harvest Reference Analysis does not include silvicultural prescriptions, the BLM cannot describe the capability of BLM-administered lands to contribute to Recovery Action 12.

Table III-26 shows the acres of reserve land use allocations (Late-Successional Reserve and Riparian Reserve that are interspersed within Late-Successional Reserve) that would be affected by high- and moderate-intensity wildfire during each decade under the Proposed RMP.

Table III-26. Acres of reserve land use allocations that would be affected by high- and moderate-intensity wildfire during each decade.

	Decade (Acres)				
	2013-2023	**2023-2033**	**2033-2043**	**2043-2053**	**2053-2063**
Proposed RMP	7,319	4,731	8,782	1,884	6,435

Table III-27 shows the acres of northern spotted owl critical habitat that would be affected by high- and moderate-intensity wildfire during each decade.

Table III-27. Acres of northern spotted owl critical habitat that would be affected by high- and moderate-intensity wildfire during each decade.

	Decade (Acres)				
	2013-2023	**2023-2033**	**2033-2043**	**2043-2053**	**2053-2063**
Critical Habitat	9,066	6,468	8,513	3,629	9,586

With respect to the treatment of areas affected by wildfire, under the Proposed RMP, the BLM would:

- Conduct wildfire rehabilitation and restoration efforts in all land use allocations to protect and sustain ecosystems, ecosystem services, public health and safety, and infrastructure adversely affected by suppression actions (fire operations) or direct fire effects.
- Prohibit timber salvage in the Late-Successional Reserve and Riparian Reserve, and in northern spotted owl critical habitat within those land use allocations, except when necessary to protect public safety, or to keep roads and other infrastructure clear of debris.
- In northern spotted owl critical habitat in the Low Intensity Timber Area, the BLM would implement timber salvage harvest after disturbance events to recover economic value and to minimize commercial loss or deterioration of damaged trees.
    - In salvage harvest units following disturbance events causing mortality of ≥60 percent of overstory trees on contiguous areas ≥10 acres in size, the BLM would retain 15 to 30 percent of pre-harvest stand basal area in live trees or snags in individual harvest units. The BLM also would retain trees and snags in a variety of spatial patterns, including aggregated groups, stringers, and individual trees.
    - In salvage harvest units following disturbance events causing mortality of ≤60 percent of overstory trees or on contiguous areas <10 acres in size, the BLM would remove all merchantable dead and down timber from disturbed area in excess of snag targets set forth in **Appendix B, Table B-3**, where removal is economically viable.
    - After salvage harvest, the BLM would use natural or artificial regeneration to regenerate a mixture of species appropriate to the site to a stand-level average of at least 130 trees per acre within 5 years of harvest.
  - For areas without timber salvage harvest after disturbance events causing mortality of ≥60 percent of overstory trees, the BLM would use natural or artificial regeneration to regenerate a mixture of species appropriate to the site to a stand-level average of at least 130 trees per acre within 5 years of harvest, to the extent possible given safety and operational constraints.

- In northern spotted owl critical habitat in the Moderate Intensity Timber Area, the BLM would implement timber salvage harvest after disturbance events to recover economic value and to minimize commercial loss or deterioration of damaged trees.
    - In salvage harvest units following disturbance events causing mortality of ≥60 percent of overstory trees on contiguous areas ≥10 acres in size, the BLM would retain 5 to 15 percent of pre-harvest stand basal area in live trees or snags in individual harvest units. The BLM also would retain trees and snags in a variety of spatial patterns, including aggregated groups, stringers, and individual trees.
    - In salvage harvest units following disturbance events causing mortality of ≤60 percent of overstory trees or on contiguous areas <10 acres in size, the BLM would remove all merchantable dead and down timber from disturbed area in excess of snag targets set forth in **Appendix B, Table B-3**, where removal is economically viable.
    - After salvage harvest, the BLM would use natural or artificial regeneration to regenerate a mixture of species appropriate to the site to a stand-level average of at least 150 trees per acre within 5 years of harvest.
  - For areas without timber salvage harvest after disturbance events causing mortality of ≥60 percent of overstory trees, the BLM would use natural or artificial regeneration to regenerate a mixture of species appropriate to the site to a stand-level average of at least 150 trees per acre within 5 years of harvest, to the extent possible given safety and operational constraints.
- In northern spotted owl critical habitat in the Uneven-Aged Timber Area, the BLM would implement timber salvage harvest after disturbance events to recover economic value and to minimize commercial loss or deterioration of damaged trees.
    - In salvage harvest units following disturbance events causing mortality of ≥60 percent of overstory trees on contiguous areas ≥10 acres in size, the BLM would retain 5 to 15 percent of pre-harvest stand basal area in live trees or snags in individual harvest units. The BLM also would retain trees and snags in a variety of spatial patterns, including aggregated groups, stringers, and individual trees.
    - In salvage harvest units following disturbance events causing mortality of ≤60 percent of overstory trees or on contiguous areas <10 acres in size, the BLM would remove all merchantable dead and down timber from disturbed area in excess of snag targets set forth in **Appendix B, Table B-3**, where removal is economically viable.
    - After salvage harvest, the BLM would use natural or artificial regeneration to regenerate a mixture of species appropriate to the site to a stand-level average of at least 150 trees per acre within 5 years of harvest.
  - For areas without timber salvage harvest after disturbance events causing mortality of ≥60 percent of overstory trees, the BLM would use natural or artificial regeneration to regenerate a mixture of species appropriate to the site to a stand-level average of at least 150 trees per acre within 5 years of harvest, to the extent possible given safety and operational constraints.

h. Issue 8

*In accordance with Recovery Action 32, would the Proposed RMP maintain and restore well-distributed, older and more structurally-complex multi-layered conifer forests on BLM-administered lands in the **planning area** while allowing for other threats, such as fire and insects, to be addressed by restoration management actions?*

1). Summary of Analytical Methods

The Revised Recovery Plan does not define "older and more structurally-complex multi-layered conifer forest" in terms of stand age, tree diameter, percent canopy cover or other forest stand structural variables that the BLM has for its administered lands. Therefore, the BLM quantified changes in the acres of habitat using two surrogate classifications:

- Forest stands classified in the BLM structural stage classification as mature multiple canopy and structurally-complex, and;
- Habitat that northern spotted owls select most strongly for nesting, i.e., "strongly-selected-for" habitat as defined in **Appendix C, Sections B and C**.

The definitions of the mature multiple canopy and structurally-complex forest in this analysis generally encompass the characteristics described in the Revised Recovery Plan for "older and more structurally-complex multi-layered conifer forest" (see the Vegetation Modeling and Forest Management sections). However, the Revised Recovery Plan includes maintaining and restoring "older and more structurally-complex multi-layered conifer forest" because of its value as northern spotted owl habitat. Therefore, the "strongly-selected-for" habitat presents another valid surrogate for "older and more structurally-complex multi-layered conifer forest." In addition, structural stages and "strongly-selected-for" habitat are defined at different scales, and analyses at multiple scales are more robust.

The BLM defined structural stage at the stand scale in this analysis. As explained in **Appendix C, Section A**, the BLM defined the association between northern spotted owls and their habitat at a 500-acre (~ 200-ha) scale, the size of a core use area. As such, the strongly-selected-for classification reflects habitat value at that scale instead of at the scale of the individual forest stand. Stated another way, the strong association of northern spotted owls to certain forest stands, as reflected in the strongly-selected-for classification, is affected by habitat conditions within the stand and the surrounding 500 acres. Thus, the structural complexity of an individual forest stand could increase over time while, at the same time, the value of that stand for northern spotted owl occupancy could decline due to changes to nearby stands (e.g., from treatment or wildfire). In such a situation, evaluating stand structure would show a positive change whereas evaluating the value of the stand for northern spotted owl occupancy would show a negative change. Thus, the BLM used both classifications.

2). Management Outcome

BLM-administered lands in the **planning area** currently support 426,100 acres of strongly-selected-for habitat and 860,200 acres of mature multiple canopy and structurally-complex forest. The No Timber Harvest Reference Analysis indicates that the forested landscape managed by the BLM is capable of supporting 675,800 acres of strongly-selected-for habitat (a 59-percent increase), and 1,136,700 acres of mature multiple canopy and structurally-complex (a 32-percent increase) in 50 years. These acres are through forest ingrowth as affected by wildfire; the No Timber Harvest Reference Analysis does not include management actions for forest restoration.

Figure III-36 shows the acres of strongly-selected-for habitat that would occur on BLM-administered lands during the next 50 years under the Proposed RMP[34]. The Proposed RMP includes management actions for forest restoration. BLM-administered lands would support 430,700 acres of strongly-selected-for habitat in ten years, a negligible increase from the current level, and then would support increasing acres of strongly-selected-for habitat each subsequent decade, reaching 643,200 acres in 50 years, a 51 percent increase from the current level.

[34] The baseline data for the Proposed RMP includes the effects of large wildfires on BLM-administered lands during 2013, which are not included in the baseline data for the No Timber Harvest Reference Analysis. Thus, the results for the No Harvest Reference Analysis reflect the influence of 5,500 more acres of strongly-selected-for habitat in 2013, and 3,100 more acres of mature multiple-canopy and structurally-complex forest in 2013, than were included in the baseline data for the Proposed RMP.

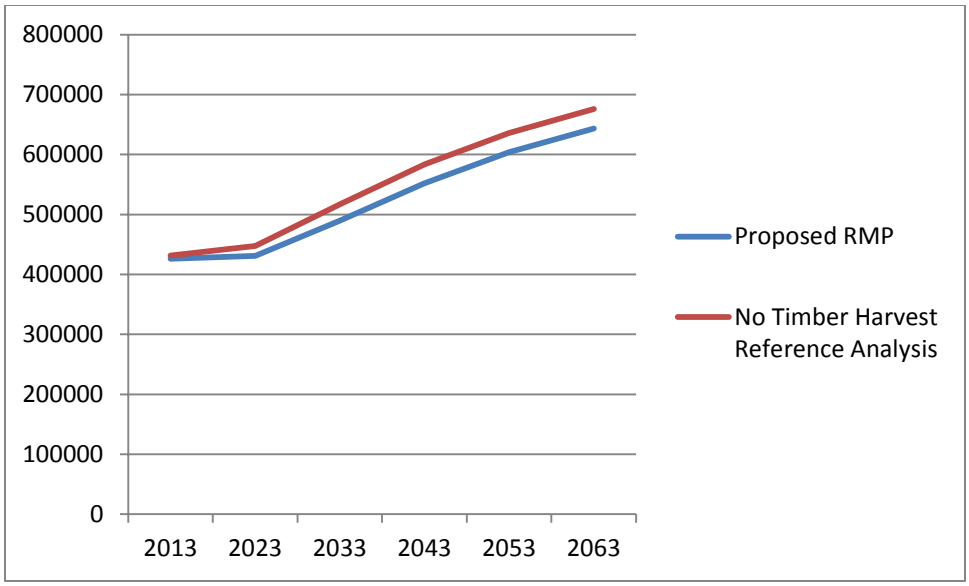


Figure III-36. Change in the acres of "strongly-selected-for" habitat on BLM-administered lands in western Oregon. The No Timber Harvest Reference Analysis is included for comparison.

Figure III-37 shows the acres of mature multiple canopy and structurally-complex forest that would occur on BLM-administered lands during the next 50 years under the Proposed RMP. BLM-administered lands would support 842,100 acres of mature multiple canopy and structurally-complex forest in ten years, a 2 percent decrease from the current level, and then would support increasing acres of mature multiple canopy and structurally-complex forest each subsequent decade, reaching 1,070,200 acres in 50 years, a 24 percent increase from the current level.

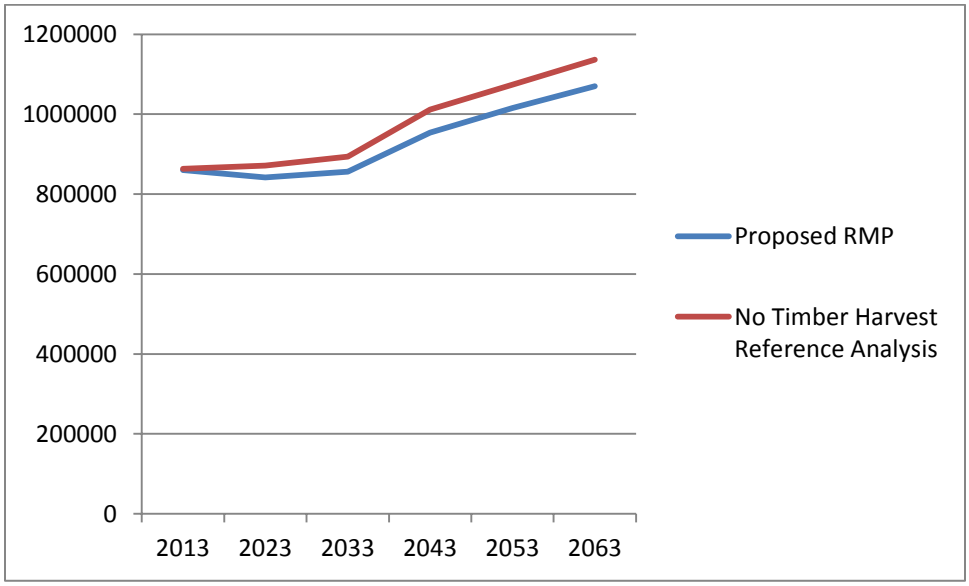


Figure III-37. Change in the acres of mature multiple-canopy and structurally-complex forest on BLM-administered lands in western Oregon. The No Timber Harvest Reference Analysis is included for comparison.

Thus, under the Proposed RMP, the BLM would implement management actions for forest restoration and would maintain well-distributed, older and more structurally-complex multi-layered conifer forests.

4. Northern Spotted Owl Critical Habitat

a. Background

Sec. 3(5)(A)(i) of the ESA of 1973, as amended (ESA), defines critical habitat as having "those physical or biological features (I) essential to the conservation of the species and (II) which may require special management considerations or protection." The U.S. Fish and Wildlife Service, in its final rule on northern spotted owl critical habitat (77 FR 71908); hereafter referred to as the final rule), stated four "special management considerations or protections" (hereafter referred to as "considerations") for critical habitat in the western Cascades and Coast Range of Oregon, and eight for the eastern Cascades of Oregon (77 FR 71908). These same considerations apply to the Klamath Basin of southwestern Oregon depending on site-specific moist and dry forest conditions (77 FR 71910).

Oregon Western Cascades and Coast Range:

"(1) Conserve older stands that contain the conditions to support northern spotted owl occupancy or high-value northern spotted owl habitat as described in Recovery Actions 10 and 32 (USDI FWS 2011, pp. III–43, III–67). On Federal lands, this recommendation applies to all land-use allocations (see also Thomas *et al.* 2006, pp. 284-285).
(2) Management emphasis needs to be placed on meeting northern spotted owl recovery goals and long-term ecosystem restoration and conservation. When there is a conflict between these goals, actions that would disturb or remove the essential physical or biological features of northern spotted owl critical habitat need to be minimized and reconciled with long-term ecosystem restoration goals.
(3) Continue to manage for large, continuous [*sic*] blocks of late-successional forest.
(4) In areas that are not currently late seral forest or high-value habitat and where more traditional forest management might be conducted (e.g. matrix), these activities should consider applying ecological forestry prescriptions. Some examples that could be utilized include Franklin *et al.* (2002, pp. 417-421; 2007, entire), Kerr (2012), Drever *et al.* (2006, entire), Johnson and Franklin (2009, pp. 39-41), Swanson *et al.* (2010, entire), and others cited in the Revised Recovery Plan for the Northern Spotted Owl (USDI FWS 2011, pp. III–14, III–17 to III–19)."

Oregon Eastern Cascades:

"(1) Conserve older stands that contain the conditions to support northern spotted owl occupancy or high-value northern spotted owl habitat as described in Recovery Actions 10 and 32 (USDI FWS 2011, pp. III–43, III–67). On Federal lands this recommendation applies to all land-use allocations (see also Thomas *et al.* 2006, pp. 284-285).
(2) Emphasize vegetation management treatments outside of northern spotted owl territories or highly suitable habitat;
(3) Design and implement restoration treatments at the landscape level;
(4) Retain and restore key structural components, including large and old trees, large snags, and downed logs;
(5) Retain and restore heterogeneity within stands;
(6) Retain and restore heterogeneity among stands;
(7) Manage roads to address fire risk; and
(8) Consider vegetation management objectives when managing wildfires, where appropriate."

The U.S. Fish and Wildlife Service delineated the northern spotted owl range into sixty-one critical habitat subunits within eleven critical habitat units (77 FR 71918). Of these, thirty-one critical habitat subunits—within all or parts of seven critical habitat units—occur in the **planning area**. To evaluate the potential effects of a proposed project on northern spotted owl critical habitat, the Service evaluates the potential effects of the project on each of the pertinent considerations at three scales: the critical habitat subunit, the critical habitat unit, and all critical habitat (77 FR 71941).

To evaluate the potential effects of the Proposed RMP on northern spotted owl critical habitat, the BLM developed spatial and tabular data, at the subunit and unit scales, on how critical habitat would change over time. In addition, as described below, the BLM evaluated the consistency of the Proposed RMP with each of the considerations to the extent it could develop relevant data.

Tables III-28 – III-31 show BLM forecasts of how the acres of northern spotted owl critical habitat would change, by decade in each critical habitat sub-unit, under the Proposed RMP.

Table III-28. Forecasted changes under the Proposed RMP in the acres of northern spotted owl dispersal habitat on all land ownerships by northern spotted owl critical habitat sub-unit. Dispersal habitat includes nesting-roosting habitat. Critical habitat units and sub-unit codes are defined in 77 *Fed. Regis*. 71920 – 71935. Sub-units in the **planning area** are denoted by an asterisk. Negative changes from the previous decade are highlighted.

		Acres by Decade					
Unit	**Sub-unit**	**2013**	**2023**	**2033**	**2043**	**2053**	**2063**
1	NCO 1	256,479	273,239	284,184	288,417	290,357	291,157
	NCO 2	194,844	202,933	207,012	207,960	208,524	208,799
	NCO 4*	65,830	70,840	76,236	81,537	92,631	100,216
	NCO 5*	183,152	185,972	188,420	190,697	192,694	193,726
2	ORC 1*	90,025	93,459	96,827	98,898	100,329	101,735
	ORC 2*	229,884	235,620	241,802	245,369	247,990	249,969
	ORC 3*	181,850	184,591	188,559	191,907	193,687	195,505
	ORC 4*	4,604	4,825	5,882	6,342	6,811	6,993
	ORC 5*	154,981	157,062	159,997	163,487	166,711	168,240
	ORC 6*	76,738	77,076	77,909	78,550	78,846	79,097
3	RDC 1	49,512	51,984	54,117	55,816	57,116	58,118
	RDC 2	56,030	58,984	61,330	62,799	63,710	63,948
	RDC 5	11,909	13,205	14,503	15,810	17,457	17,933
4	WCN 1	225,133	262,154	299,229	331,240	352,661	373,793
	WCN 2	44,874	53,404	61,397	68,865	74,326	78,781
5	WCC 1	182,901	192,374	200,640	207,722	213,901	217,785
	WCC 2	245,923	259,437	265,902	269,441	271,188	271,727
	WCC 3	360,444	371,676	377,314	381,647	384,135	384,849
6	WCS 1*	82,089	84,491	85,899	87,218	88,527	89,457
	WCS 2*	130,560	135,747	139,504	142,237	144,459	145,938
	WCS 3*	283,580	290,100	292,607	296,727	300,468	303,899
	WCS 4*	350,090	355,086	357,881	361,722	365,155	367,836
	WCS 5*	328,542	330,663	334,350	336,699	340,509	343,460
	WCS 6*	75,590	78,612	83,178	84,641	85,507	85,584
7	ECN 1	52,846	62,379	70,485	77,403	82,829	87,386
	ECN 2	26,599	32,079	36,641	40,610	44,005	46,525
	ECN 3	211,587	232,604	248,048	259,586	268,853	273,409

	ECN 4	175,727	188,496	197,464	204,081	209,106	212,005
	ECN 5	149,175	162,821	172,339	179,025	184,702	188,033
	ECN 6	72,779	76,003	77,868	78,823	79,132	79,262
	ECN 7	111,404	125,368	132,783	135,120	136,274	136,509
	ECN 8	70,334	81,885	89,693	92,633	93,249	93,330
	ECN 9	95,640	109,198	124,060	139,437	146,045	148,641
8	ECS 1*	116,967	114,862	118,256	118,741	119,171	119,545
	ECS 2*	52,971	55,815	58,386	60,321	61,936	62,604
	ECS 3	73,197	81,494	89,656	96,085	101,238	103,603
9	KLW 1*	133,812	134,533	136,485	136,978	138,159	138,897
	KLW 2*	137,675	137,232	140,742	141,487	141,831	142,838
	KLW 3*	132,335	137,190	140,408	142,032	143,297	144,053
	KLW 4*	149,413	151,744	152,997	154,457	155,556	155,006
	KLW 5	28,480	29,379	30,036	30,439	30,099	30,333
	KLW 6	104,175	108,316	111,657	113,525	114,653	115,856
	KLW 7	223,248	227,171	233,553	238,441	240,569	241,241
	KLW 8	100,366	102,848	105,548	104,266	106,257	108,233
	KLW 9	129,960	133,469	137,694	139,568	141,453	142,386
10	KLE 1*	210,728	217,135	219,361	222,995	227,589	230,786
	KLE 2*	91,256	92,186	94,064	95,477	96,265	96,241
	KLE 3*	96,605	97,224	102,066	103,513	105,205	105,331
	KLE 4*	223,204	229,008	234,991	240,005	244,494	246,940
	KLE 5*	26,934	27,469	31,317	32,145	33,133	34,149
	KLE 6*	145,764	148,495	152,835	155,901	156,897	157,861
	KLE 7	56,122	56,354	58,601	60,703	62,064	62,314
11	ICC 1	296,106	303,245	308,966	312,356	309,650	313,213
	ICC 2	177,323	182,228	185,392	189,005	190,060	192,482
	ICC 3	93,532	95,302	97,164	95,751	97,330	99,005
	ICC 4	107,692	108,531	110,305	111,128	108,775	111,210
	ICC 5	31,075	31,733	32,171	32,458	32,619	32,726
	ICC 6	1,339	1,412	1,447	1,467	1,473	1,509
	ICC 7	104,695	108,025	109,754	111,526	113,099	113,408
	ICC 8	67,825	72,544	75,669	77,055	79,242	80,680

Table III-29. Forecasted changes under the Proposed RMP in the acres of northern spotted owl nesting-roosting habitat on all land ownerships by northern spotted owl critical habitat sub-unit. Critical habitat units and sub-unit codes are defined in 77 *Fed. Regis*. 71920 – 71935. Sub-units in the **planning area** are denoted by an asterisk. Negative changes from the previous decade are highlighted.

		Acres by Decade					
Unit	**Sub-unit**	**2013**	**2023**	**2033**	**2043**	**2053**	**2063**
1	NCO 1	188,029	209,694	230,251	248,348	264,828	277,003
	NCO 2	151,249	166,087	180,226	191,591	199,898	204,512
	NCO 4*	16,685	19,973	24,045	29,027	33,068	39,909
	NCO 5*	133,619	141,798	149,094	156,009	162,097	167,996
2	ORC 1*	57,997	63,463	67,835	72,598	76,563	80,485
	ORC 2*	170,893	181,036	190,559	199,866	207,168	213,114
	ORC 3*	137,144	140,943	146,671	155,352	160,782	166,339
	ORC 4*	1,883	2,052	2,665	3,164	3,632	3,846
	ORC 5*	119,943	122,477	125,243	131,607	137,547	142,557
	ORC 6*	64,853	65,113	66,481	67,887	68,391	68,849
3	RDC 1	27,531	31,918	36,605	40,860	44,555	47,596
	RDC 2	37,842	42,294	46,707	50,678	54,248	57,188
	RDC 5	3,903	5,570	7,589	9,579	11,316	12,695
4	WCN 1	175,554	211,508	252,531	286,787	315,450	351,715
	WCN 2	33,668	41,740	51,730	59,056	65,777	74,256
5	WCC 1	137,167	149,902	162,634	176,355	189,243	199,176
	WCC 2	186,458	204,788	224,882	243,656	258,496	265,694
	WCC 3	292,646	316,026	335,252	354,292	368,558	376,153
6	WCS 1*	54,450	61,250	66,651	71,742	75,976	79,432
	WCS 2*	81,587	92,560	102,673	112,342	120,954	127,416
	WCS 3*	205,770	220,780	231,230	243,930	255,160	265,290
	WCS 4*	281,544	295,339	304,957	317,338	328,416	336,651
	WCS 5*	273,844	279,774	289,086	297,161	305,730	310,518
	WCS 6*	42,993	46,674	53,857	57,313	59,087	59,263
7	ECN 1	31,092	38,737	47,763	56,582	65,876	73,552
	ECN 2	15,725	19,366	23,693	28,436	33,709	38,317
	ECN 3	143,751	172,022	198,154	218,689	236,846	250,166
	ECN 4	129,016	148,026	165,068	178,304	190,213	198,864
	ECN 5	108,113	124,476	140,151	153,730	165,393	174,250
	ECN 6	61,569	66,505	71,052	74,603	76,820	78,113
	ECN 7	82,208	101,561	120,792	130,539	134,272	135,926
	ECN 8	47,184	61,924	77,833	87,383	91,205	92,791
	ECN 9	70,334	86,953	103,777	118,298	129,977	141,669
8	ECS 1*	99,309	102,721	110,408	112,550	114,126	115,479
	ECS 2*	36,336	40,469	45,145	48,715	51,676	53,913
	ECS 3	36,316	41,872	48,902	56,688	63,828	70,860
9	KLW 1*	85,883	88,997	96,248	101,588	107,563	110,608
	KLW 2*	96,922	97,544	106,686	108,689	112,954	116,146
	KLW 3*	73,148	85,066	95,690	105,918	116,760	124,177
	KLW 4*	106,173	113,276	120,218	126,611	132,631	134,297
	KLW 5	17,131	19,343	21,369	23,511	23,584	25,232
	KLW 6	60,174	68,752	76,983	85,226	89,756	95,767
	KLW 7	133,116	145,689	162,796	178,043	185,737	193,189

	KLW 8	71,892	78,992	85,812	85,869	89,732	93,285
	KLW 9	77,376	85,516	95,792	104,911	110,933	116,332
10	KLE 1*	163,218	172,521	176,839	183,292	191,451	198,944
	KLE 2*	71,692	73,896	79,497	82,866	85,293	85,625
	KLE 3*	70,571	71,953	80,965	85,212	89,154	89,573
	KLE 4*	172,426	181,209	190,895	199,657	208,189	216,218
	KLE 5*	15,073	15,728	21,820	24,234	26,162	28,268
	KLE 6*	113,892	120,646	128,833	133,983	135,559	138,392
	KLE 7	41,486	43,667	47,289	50,123	52,102	54,041
11	ICC 1	222,669	242,293	259,636	270,735	272,481	283,714
	ICC 2	137,228	148,635	157,461	164,404	167,575	171,646
	ICC 3	73,691	78,660	83,214	83,067	86,374	89,355
	ICC 4	81,307	86,441	92,380	93,747	91,977	95,797
	ICC 5	25,183	27,247	28,863	29,937	30,694	31,446
	ICC 6	890	1,029	1,183	1,311	1,419	1,445
	ICC 7	76,982	85,283	90,692	94,464	99,135	101,308
	ICC 8	45,434	52,463	58,415	62,762	67,739	71,833

Table III-30. Forecasted changes under the Proposed RMP in the acres of northern spotted owl dispersal habitat on BLM-administered lands in the **planning area** by northern spotted owl critical habitat sub-unit. Dispersal habitat includes nesting-roosting habitat. Critical habitat units and sub-unit codes are defined in 77 *Fed. Regis*. 71920 – 71935. Negative changes from the previous decade are highlighted.

		Acres by Decade					
Unit	**Sub-unit**	**2013**	**2023**	**2033**	**2043**	**2053**	**2063**
1	NCO 4	6,945	6,979	7,037	7,088	7,097	7,103
	NCO 5	53,597	54,432	55,101	55,634	56,231	56,610
2	ORC 1	23,060	23,196	23,376	23,681	23,761	23,841
	ORC 2	71,441	71,712	72,832	73,787	74,154	74,226
	ORC 3	125,922	126,215	127,783	130,085	130,836	131,757
	ORC 4	4,603	4,824	5,881	6,340	6,802	6,983
	ORC 5	100,763	101,060	102,054	104,174	106,329	106,968
	ORC 6	76,705	77,040	77,872	78,511	78,807	79,058
6	WCS 1	1,886	1,850	1,457	1,523	1,879	1,901
	WCS 2	4,118	4,149	4,199	4,227	4,292	4,282
	WCS 3	20,120	19,913	20,323	20,362	20,077	20,023
	WCS 4	20	22	25	24	20	17
	WCS 5	41	41	42	42	42	42
	WCS 6	75,535	78,549	83,110	84,571	85,437	85,513
8	ECS 1	16,834	16,707	19,834	20,214	20,641	20,972
	ECS 2	2,493	2,528	2,952	3,158	3,721	3,896
9	KLW 1	125,224	125,798	127,650	128,066	129,196	129,866
	KLW 2	66,093	64,174	66,162	66,653	67,096	67,586
	KLW 3	5,735	5,816	5,885	5,870	5,863	5,904
	KLW 4	63,296	63,634	64,287	64,832	65,058	65,290
10	KLE 1	87	90	90	91	91	92
	KLE 2	89,722	90,611	92,453	93,832	94,593	94,584
	KLE 3	96,259	96,852	101,671	103,107	104,795	104,920
	KLE 4	2	2	3	3	3	4
	KLE 5	26,894	27,433	31,280	32,104	33,093	34,108
	KLE 6	21,842	22,131	22,929	22,741	22,406	22,649

Table III-31. Forecasted changes under the Proposed RMP in the acres of northern spotted owl nesting-roosting habitat on BLM-administered lands in the **planning area** by northern spotted owl critical habitat sub-unit. Critical habitat units and sub-unit codes are defined in 77 *Fed. Regis*. 71920 – 71935. Negative changes from the previous decade are highlighted.

		Acres by Decade					
Unit	**Sub-unit**	**2013**	**2023**	**2033**	**2043**	**2053**	**2063**
1	NCO 4	5,807	5,818	5,939	6,173	6,235	6,300
	NCO 5	43,577	44,977	46,117	47,371	48,189	48,607
2	ORC 1	19,812	19,922	20,306	20,873	21,022	21,023
	ORC 2	59,904	60,442	62,864	64,934	65,525	65,551
	ORC 3	103,985	103,564	106,154	111,682	113,898	116,240
	ORC 4	1,883	2,051	2,664	3,163	3,632	3,845
	ORC 5	83,552	83,658	85,036	89,130	92,030	93,905
	ORC 6	64,830	65,090	66,456	67,860	68,366	68,824
6	WCS 1	1,388	1,384	784	774	1,029	1,380
	WCS 2	2,420	2,510	2,710	2,790	2,893	2,840
	WCS 3	12,060	11,906	13,004	12,857	12,203	11,963
	WCS 4	2	2	4	6	5	4
	WCS 5	25	26	37	38	38	38
	WCS 6	42,948	46,628	53,811	57,263	59,037	59,208
8	ECS 1	9,516	9,223	13,760	14,495	15,767	17,172
	ECS 2	1,165	1,260	1,565	1,726	2,222	2,446
9	KLW 1	79,596	82,076	88,906	93,747	99,358	102,214
	KLW 2	46,845	44,879	50,056	51,281	53,758	55,534
	KLW 3	4,514	4,673	4,803	4,870	4,930	5,022
	KLW 4	48,796	50,064	52,756	55,031	56,885	58,423
10	KLE 1	64	67	71	74	77	79
	KLE 2	70,400	72,525	78,067	81,385	83,772	84,131
	KLE 3	70,391	71,721	80,728	84,894	88,815	89,250
	KLE 4	0	1	1	1	1	2
	KLE 5	15,069	15,723	21,811	24,234	26,162	28,268
	KLE 6	16,062	16,389	17,857	17,647	16,293	17,034

b. Issue 1

In accordance with Consideration (1) for the Oregon Western Cascades and Coast Range, and Oregon Eastern Cascades, would the Proposed RMP conserve older stands of northern spotted owl critical habitat that contain the conditions to support northern spotted owl occupancy or high-value northern spotted owl habitat as described in recovery actions 10 and 32?

1). Summary of Analytical Methods

The BLM evaluated its potential contributions to "conditions to support northern spotted owl occupancy as described in Recovery Actions 10 and 32" on all lands in the **planning area** in its evaluations of northern spotted owl Issues 1 through 4, 6, and 8. Although the evaluations of northern spotted owl issues 1 through 4 are not specific to northern spotted owl critical habitat, they are sufficient to address this consideration, because the Conservation Needs addressed by northern spotted owl Issues 1 through 4, themselves, are not specific to critical habitat. With respect to northern spotted owl Issues 6 and 8, which specifically address Recovery Actions 10 and 32, the BLM tabulated subsets, specific to critical habitat, of the data it developed for northern spotted owl Issues 6 and 8.

2). Management Outcome

Northern spotted owl Issue 6 contains background information on the evaluation of Recovery Action 10 consistency in critical habitat. Currently, 1,554 known (including historic) northern spotted owl sites are associated with critical habitat on BLM-administered lands in the **planning area** (i.e., these sites occur on all land ownerships but their provincial home ranges include BLM-administered lands designated as critical habitat). Of these known sites, 1,144 sites (74 percent) meet Recovery Action 10 thresholds. (Only 1,140 known sites currently meet Recovery Action thresholds under the Proposed RMP because the BLM updated the baseline data for the Proposed RMP to include the effects of wildfires during 2013.) In 30 years, according to the No Timber Harvest Reference Analysis, 1,317 known sites (85 percent) would be capable of meeting Recovery Action 10 thresholds; in 50 years the number increases to 1,394 known sites (90 percent). According to the No Timber Harvest Reference Analysis, the remaining 10 percent of known sites are not capable of meeting Recovery Action 10 thresholds in 50 years due to the limited BLM-administered lands, slow habitat development of some BLM-administered lands because of poor site conditions, and competing land uses on other land ownerships.

Figure III-38 shows the number of northern spotted owl known sites that are associated with critical habitat on BLM-administered lands that would be at or above Recovery Action 10 habitat thresholds, during each decade, under the Proposed RMP. In 30 years, the Proposed RMP would support 1,309 northern spotted owl known sites (84 percent) at or above Recovery Action 10 thresholds, In 50 years, the Proposed RMP would support 1,384 northern spotted owl known sites at or above Recovery Action 10 thresholds, a 21 percent increase from the current 1,140 sites and 89 percent of all known sites in critical habitat on BLM-administered lands.

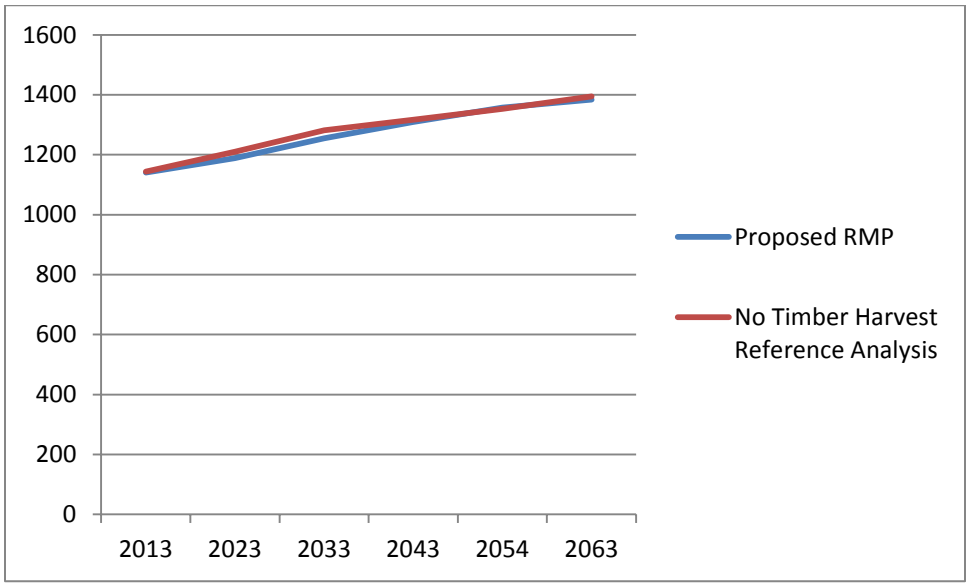


Figure III-38. Number of northern spotted owl known sites associated with critical habitat on BLM-administered lands that would be at or above Recovery Action 10 habitat thresholds under The Proposed RMP during each decade. Potential change according to the No Timber Harvest Reference Analysis is included for comparison.

Please see Northern Spotted Owl Issue 8 for background information on the evaluation of Recovery Action 32 consistency in critical habitat. Currently, BLM-administered lands in the **planning area** in critical habitat, support 346,200 acres of strongly-selected-for habitat. According to the No Timber

Harvest Reference Analysis, these lands are capable of supporting 449,500 acres of strongly-selected-for habitat in 30 years and 500,700 acres in 50 years, which correspond to increases of 30 and 45 percent, respectively.

Figure III-39 shows changes in the acres of strongly-selected-for habitat, in critical habitat, on BLM-administered lands in western Oregon under the Proposed RMP[35]. The results are similar to those for all BLM-administered lands, as discussed under Northern Spotted Owl Issue 8 (see **Figure III-24**). Under the Proposed RMP, BLM-administered lands would support 352,100 acres of strongly-selected-for habitat in ten years, a 2 percent increase from the current level, and then would support increasing acres of strongly-selected-for habitat each subsequent decade, reaching 496,800 acres in 50 years, a 44 percent increase from the current level.

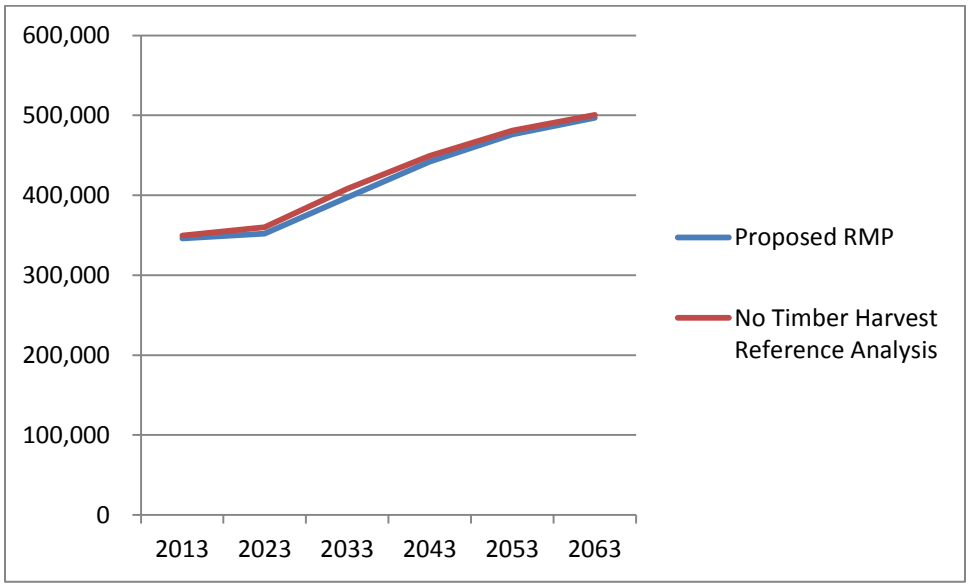


Figure III-39. Change in the acres of "strongly-selected-for" habitat in critical habitat on BLM-administered lands in western Oregon. The No Timber Harvest Reference Analysis is shown for comparison.

As verified by these analyses and those that address northern spotted owl Issues 1 through 4, under the Proposed RMP, the BLM would conserve older stands of northern spotted owl critical habitat that contain the conditions to support northern spotted owl occupancy or high-value northern spotted owl habitat as described in Recovery Actions 10 and 32.

c. Issue 2

In accordance with Consideration (2) for the western Cascades, Coast Range and moist-forest portions of the Klamath Basin, would the Proposed RMP manage northern spotted owl critical habitat to meet northern spotted owl recovery goals and long-term ecosystem restoration and conservation?

[35] The baseline data for the Proposed RMP includes the effects of large wildfires on BLM-administered lands during 2013, which are not included in the baseline data for the No Timber Harvest Reference Analysis. Thus, the results for the No Harvest Reference Analysis reflect the influence of 3,500 more acres of strongly-selected-for critical habitat in 2013 than were included in the baseline data for the Proposed RMP.

1). Summary of Analytical Methods
The BLM evaluated its potential contributions to "northern spotted owl recovery goals and long-term ecosystem restoration and conservation" on all lands in western Oregon during its evaluations of northern spotted owl Issues 1 through 4. Although those evaluations are not specific to northern spotted owl critical habitat, the evaluations of BLM contributions to a landscape in the **planning area** that meets the conservation needs of the northern spotted owl also evaluate if the BLM would manage critical habitat within that landscape to emphasize "northern spotted owl recovery goals and long-term ecosystem restoration and conservation." Therefore, the BLM needs no additional analysis to address this issue.

2). Management Outcome
As evidenced by the evaluations of northern spotted owl Issues 1, 2, and 4, under Proposed RMP, the BLM would manage its lands, including those in critical habitat, in a manner that contributes to a landscape in the **planning area** that meets northern spotted owl recovery goals and long-term ecosystem restoration and conservation. That said, current habitat conditions in the northern half of the Oregon Coast Range Physiographic Province, along with limited BLM-administered land in that area, preclude the BLM from contributing to a landscape in that area that meets the conservation needs of the northern spotted owl. In addition, as describe under northern spotted owl Issue 4, during the next 50 years, the BLM, through the management of its lands in **planning area**, is incapable of moderating risks to northern spotted owl populations in portions of the **planning area**.

d. Issue 3
In accordance with Consideration (3) for the western Cascades, Coast Range and moist-forest portions of the Klamath Basin, would the Proposed RMP manage northern spotted owl critical habitat for large, contiguous blocks of late-successional forest?

1). Summary of Analytical Methods
The BLM evaluated its potential contributions to "large, contiguous blocks of late-successional forest" on all lands in the **planning area** during its evaluation of northern spotted owl Issue 1. Although this evaluation is not specific to northern spotted owl critical habitat, due to land ownership patterns, large blocks do not form or function on BLM-administered lands in the **planning area** in isolation from lands outside of northern spotted owl critical habitat, making the Issue 1 analysis relevant to this consideration. Therefore, the BLM needs no additional analysis to address this issue.

2). Management Outcome
As described under northern spotted owl Issue 1, BLM-administered lands in the **planning area**, including those in critical habitat units, currently contribute to a western Oregon landscape that supports large blocks of contiguous late-successional forest (i.e., nesting–roosting habitat) in all areas except the northern half of the Oregon Coast Range Physiographic Province. In addition, under the Proposed RMP, during the next 50 years, the BLM would continue to contribute to the support and expansion of these large habitat blocks. That said, current habitat conditions in the northern half of the Oregon Coast Range Physiographic Province, along with limited BLM-administered land in that area, preclude the BLM from contributing to a landscape that supports large blocks of late-successional forest in that area at any time during the next 50 years.

e. Issue Considered, But Not Analyzed in Detail
In accordance with Consideration (4) for the western Cascades, Coast Range and moist-forest portions of the Klamath Basin, and in areas that are not currently late seral forest or high-value habitat, and where more traditional forest management might be conducted, would the Proposed RMP apply ecological forestry prescriptions to northern spotted owl critical habitat?

The term, "ecological forestry" is interpreted broadly, as verified by the scientific publications cited by the U.S. Fish and Wildlife Service. In addition, the U.S. Fish and Wildlife Service, in its final rule, acknowledged the site-specific nature of applying ecological forestry: "Specifically prescribing such management is beyond the scope or purpose of this document, and should instead be developed by the appropriate land management agency at the appropriate land management scale (e.g., National Forest or Bureau of Land Management District) … through the land managing agencies' planning processes and with technical assistance from the Service, as appropriate" (77 FR 71881).

The BLM concurs that some applications of ecological forestry depend on site-specific conditions and treatment design; i.e., they are too site-specific or fine-scale for collective evaluation during development of a RMP. In addition, the BLM cannot meaningfully evaluate some components of ecological forestry—such as increasing the amount of forest edge and creating stands that mimic early-seral forest—because there are no scientifically-credible or consensus thresholds against which it could evaluate the Proposed RMP. Finally, the final rule provides no descriptive or quantitative link between "ecological forestry" practices and "those physical and biological features" that are both essential to northern spotted owl conservation and can be evaluated across the **planning area**.

The BLM interprets "should consider applying" to mean that this consideration is advisory as opposed to one that might cause the BLM to reject the Proposed RMP due to an ESA Sec. 9 prohibition.

The BLM determined that its evaluations of northern spotted owl Issues 1 through 4 are more relevant to the question of northern spotted owl conservation, than a separate analysis of the means it would use (specific ecological forestry prescriptions) to foster conservation. Nor would a separate analysis generate results that would help the BLM evaluate the Proposed RMP. Therefore, the BLM determined that this issue requires no additional analysis.

In accordance with Consideration (2) for the Eastern Cascades and dry-forest portion of the Klamath Basin, would the Proposed RMP emphasize vegetation management treatments in northern spotted owl critical habitat that is outside of northern spotted owl territories and highly suitable habitat?

Although this consideration is confined to critical habitat in a portion of the **planning area**, it advocates locating timber harvest units so as to avoid the northern spotted owl habitat addressed by Recovery Actions 10 and 32 of the Revised Recovery Plan (USDI FWS 2011a). As such, the BLM evaluated this consideration under Issue 1, above. Therefore, the BLM determined that this issue requires no additional analysis.

In accordance with Considerations (3) – (8) for the Eastern Cascades and dry-forest portion of the Klamath Basin, would the BLM, in critical habitat, design and implement restoration treatments at the landscape level, retain and restore key structural components, including large and old trees, large snags, and downed logs, retain and restore heterogeneity within stands, retain and restore heterogeneity among stands, manage roads to address fire risk, and consider vegetation management objectives when managing wildfires, where appropriate?

Resource management plans provide management direction to achieve long-term goals over relatively broad areas but typically defer site-specific (e.g., forest stand management) and landscape-level (e.g., HUC 10 watershed-scale activity plan) decision-making to subsequent implementation actions. For this reason, the Proposed RMP either does not address these considerations or addresses them indirectly. That said, the U.S. Fish and Wildlife Service, in its narrative on the considerations in its final rule, stated: "Land managers should change from the practice of implementing many small, uncoordinated and independent fuel-reduction and restoration treatments. Instead, coordinated and

strategic efforts that link individual projects to the larger objectives of restoring landscapes while conserving and recovering northern spotted owl habitat are needed" (77 FR 71910). As such, the BLM determined that its evaluations of northern spotted owl Issues 1 through 4, 6, and 8, are directly pertinent to demonstrating, and sufficient to demonstrate, the emphasis of the Proposed RMP on conserving and recovering the northern spotted owl. Therefore, the BLM determined that this issue requires no additional analysis.

IV. EFFECTS OF THE PROPOSED ACTION

The effects of the Proposed RMP are determined in accordance with the standards and definitions in the *Consultation Handbook* (USDI FWS & USDC NMFS 1998:4-23 – 4-30).

As shown in Section II, the Proposed RMP is most easily described by its individual components. However, the apparent individuality of these components does not override the fact that each is part of a single action under review: approval of the Proposed RMP. As such, those activities which are described in this section as having *no effect* on listed or proposed species, or designated or proposed critical habitat, are subject of formal consultation in accordance with ESA sec. 7(a)(2).

Just as it is easier to describe the Proposed RMP by its individual components, it is clearer to state the rationales for determinations of effect, and quantify the levels of **disruption** or death/injury, by those same components. However, the Proposed RMP, in its entirety, *may affect, and would be likely to adversely affect*, the Gentner's fritillary, Kincaid's lupine, Taylor's checkerspot, Fender's blue butterfly, vernal pool fairy shrimp, Oregon spotted frog, fisher, marbled murrelet, western snowy plover and northern spotted owl, would cause the injury/death of individual Taylor's checkerspots, Fender's blue butterflies, vernal pool fairy shrimp, fishers, marbled murrelets and northern spotted owls, and *may affect, and would be likely to adversely affect*, the critical habitats of the marbled murrelet and northern spotted owl. The Proposed RMP *may affect, but would not be likely to adversely affect*, the western lily, Cook's lomatium, rough popcornflower, Nelson's checker-mallow, gray wolf, the Lower Columbia River Distinct Population Segment of the Columbian white-tailed deer, the critical habitats of the Cook's lomatium, vernal pool fairy shrimp and western snowy plover, and the proposed critical habitat of the Oregon spotted frog. This section provides rationales for those determinations.

In accordance with 50 CFR §402.02, *effects of the action* refers to the direct and indirect effects of an action on the species, and designated or proposed critical habitat, together with the effects of other activities that are interrelated or interdependent with that action, that will be added to the environmental baseline. The environmental baseline includes the past and present impacts of all Federal, State, or private actions and other human activities in the **action area**, the anticipated impacts of all proposed Federal projects in the **action area** that have already undergone formal or early section 7 consultation, and the impact of State or private actions which are contemporaneous with the consultation in process. *Indirect effects* are those that are caused by the proposed action and are later in time, but still are *reasonably certain to occur*. *Interrelated actions* are those that are part of a larger action and depend on the larger action for their justification. *Interdependent actions* are those that have no independent utility apart from the action under consideration. (As stated in Section I C of this assessment, no actions are interrelated to or interdependent on approval of the Proposed RMP.)

A. DETERMINATIONS COMMON TO ALL SPECIES AND CRITICAL HABITATS

The following determinations of effect are common to the listed and proposed species, and designated and proposed critical habitats, addressed by this assessment.

1. Congressionally Reserved and National Landscape Conservation System
The designation of these lands is beyond the discretion of the BLM and, therefore, is *not an affirmative agency action* subject to ESA sec. 7. (This determination does not pertain to Lands with Wilderness Characteristics, which the BLM includes in its system of District-Designated Reserves.)

2. Air Quality
The implementation of proposed management direction for Air Quality (page A-33) would have *no effect* on the species or designated or proposed critical habitats addressed by this assessment.

3. Cultural Resources
The implementation of proposed management direction for Cultural Resources (pages A-33 – A-34) would have *no effect* on the species or designated or proposed critical habitats addressed by this assessment.

4. Lands, Realty, and Roads
As stated in Section II G 2 of this assessment, under the Proposed RMP, right-of-way avoidance areas would increase from 243,928 acres to 326,510 acres, and right-of-way exclusion areas would increase from 43,590 acres to 93,274 acres. These changes *are not be likely to adversely affect* the species and the designated and proposed critical habitats addressed by this assessment because the potential for adverse effects caused by increasing right-of-way avoidance and exclusion areas under the Proposed RMP would be *discountable* (i.e., extremely unlikely to occur).

As stated in Section II G 2 of this assessment, other than the designation of right-of-way avoidance areas and right-of-way exclusion areas, the Proposed RMP does not contain any *affirmative agency actions* subject to the ESA regarding rights-of-way. The BLM would grant future rights-of-way only in compliance with regulatory requirements and subject to consultation in accordance with ESA sec. 7(a)(2) as appropriate.

The following proposed management direction for Lands, Realty, and Roads (page A-36 – A-37) is beyond the discretion of the BLM and, thus, does not constitute an *affirmative agency action* subject to the ESA:

- The BLM may dispose of lands designated in Zones 2 and 3 that provide habitat for ESA-listed species, including critical habitat, only following consultation with the U.S. Fish and Wildlife Service or National Marine Fisheries Service and upon a determination that such action is consistent with relevant law and maximizes public resource values.
- As required by the Oregon Public Lands Transfer and Protection Act (Public Law 105-321), do not reduce through disposal, exchange, or sale the acres of O&C lands of all classifications, and the acres of O&C and public domain lands that are available for harvesting.
- Make available for disposal the public domain lands in Zones 2 and 3 that have been classified under Section 7 of the Taylor Grazing Act.
- Recognize existing rights-of-way, permits, leases, and easements as valid uses.
- Process formal land withdrawals being relinquished by the BLM or other Federal agency according to the procedures stated under 43 CFR 2372. If the lands are found suitable for return to the public domain, the revocation order will recommend the management prescriptions developed in the environmental review. Manage the lands according to management prescriptions for those lands having the same or similar resource values in the same general area of the land withdrawal.
- Where the BLM has administrative responsibility on lands managed by other agencies, the BLM will administer those lands in accordance with interagency agreements.

The following proposed management direction (pages A-36 – A-37) is not an *affirmative agency action* subject to the ESA because, with these statements, the BLM only states its existing authorities and responsibilities before taking action. The BLM would initiate ESA sec. 7 consultation with the U.S. Fish and Wildlife Service on individual projects, as appropriate:

- Make lands in Land Tenure Zone 2 available for exchange to enhance public resource values, improve management capabilities, or reduce the potential for land use conflict. Zone 2 lands consist of all lands not listed in the descriptions of either Zone 1 lands or Zone 3 lands.
- Make lands in Land Tenure Zone 3 available for disposal using appropriate disposal mechanisms. These lands include:
    - Lands that are either not practical to manage, or are uneconomical to manage (because of their intermingled location and non-suitability for management by another Federal agency)
    - Survey hiatuses
    - Unintentional encroachments
- Assign to Zone 3 patented lands with reversionary interests reserved by the United States that are relinquished back to federal ownership.
- Acquire or dispose of lands to facilitate resource management objectives as opportunities occur.
- Manage newly acquired lands for the purpose for which they were acquired or in a manner that is consistent with management objectives for adjacent BLM-administered lands or other BLM-administered lands having similar resource values.
- Issue temporary-use permits, as identified under the Federal Land Policy and Management Act (Section 302), for a variety of uses, such as, but not limited to, stockpile and storage sites and as tools to authorize unintentional trespass situations pending final resolution.
- Use land-use authorizations to resolve agricultural or occupancy trespasses, where appropriate.
- Grant rights-of-ways in utility corridors as the preferred location for energy transmission or distribution facilities. Corridors would generally be 1,000 feet on each side of the centerline. Grant the rights-of-way as the minimum necessary to accommodate a specific request. Do not permit development or management activities that would conflict with construction, operation, or maintenance of facilities corresponding to the purpose of the utility corridor.
- Construct communication facilities on existing developed communication sites where they do not conflict with other management objectives. Require a site plan for applications for communication facilities on undeveloped communication sites.
- Expand existing communication sites and the develop new sites. Prioritize the use of existing sites and facilities for accommodating the need for additional capacity.

The effects of the following proposed management direction (page A-36) are *not reasonably certain to occur* and, thus, are not addressed by this assessment, because (1) the BLM knows of no current situation to which such direction is applicable, and (2) based on the rarity of past applicable actions the BLM cannot reasonably determine the effects of this direction. The BLM would initiate ESA sec. 7 consultationwith the U.S. Fish and Wildlife Service on individual projects, as appropriate:

- Assign to Zone 3 survey hiatuses and unintentional encroachments discovered in the future.
- Assign to Zone 3 land boundary adjustments due to river movement discovered in the future.

Implementation of the following proposed management direction (pages A-36 – A-38) *may affect, but would not be likely to adversely affect*, the species, and the designated and proposed critical habitats, addressed by this assessment because it would reduce the likelihood of species and their habitats being negatively affected by disposal or the construction in future rights-of-way, rendering the effects of implementing such direction *entirely beneficial*.

- Retain lands in Land Tenure Zone 1 under BLM administration. Lands in Zone 1 include existing and future:
    - Designated, eligible, and suitable Wild and Scenic River corridors

- Wilderness Areas
- Wilderness Study Areas
- National Trail management corridors
- District-Designated Reserves - Lands Managed for their Wilderness Characteristics
- Areas of Critical Environmental Concern (including Research Natural Areas and Outstanding Natural Areas)
- Congressionally designated Outstanding Natural Areas
- Lands acquired with Land and Water Conservation Funds

- Designate Right-Of-Way Exclusion Areas in:
  - Lands designated as Wilderness
  - District-Designated Reserves – Lands managed for their Wilderness Characteristics
  - Wilderness Study Areas
  - Designated and suitable Wild and Scenic Rivers classified as wild rivers
  - Visual Resource Management Class I areas

  In Right-Of-Way Exclusion Areas, do not grant rights-of-way, except when mandated by law.
- Designate Right-Of-Way Avoidance Areas in:
  - Areas of Critical Environmental Concern (including Research Natural Areas and Outstanding Natural Areas)
  - Recreation Management Areas (Special and Extensive)
  - Designated and suitable Wild and Scenic Rivers classified as scenic and recreational rivers
  - Visual Resource Management Class II areas not included in Right-Of-Way Exclusion Areas,

  In Right-Of-Way Avoidance Areas, grant rights-of-way if the BLM determines that the right-of-way proposals are compatible with the protection of the values for which the land use was designated, or when no feasible alternative route or designated right-of-way corridor is available as applicable with BLM laws and policy.

Implementation of the following proposed management direction (page A-36) would have *no effect* on the species and critical habitats addressed by this assessment because potentially affected areas are *not reasonably certain* to overlay listed-species' habitats:

- Do not issue leases or permits for landfills or other waste disposal facilities.
- Limit withdrawals to the area needed and restrict only those activities needed to accomplish the purposes of the withdrawal.

Determinations for effect for addition proposed management direction for Lands, Realty, and Roads are included by species, below.

5. Minerals

The implementation of proposed management direction for Minerals (pages A-45 – A-47) *may affect, but would not be likely to adversely affect*, the species and designated and proposed critical habitats addressed by this assessment. Prior to beginning any suction dredging activity within lands or waters that contain listed species or their proposed or designated critical habitat, an operator would be required to contact the BLM for the BLM to determine if the proposed use is classified as casual use, or requires a notice or a plan of operations. It would be the operator's burden to determine the location of their activity relative to the location of lands or waters that contain listed species or their proposed or designated critical habitat. Suction dredging activity proposed within lands or waters that contain listed species or their proposed or designated critical habitat, regardless of the level of surface disturbance, would not begin until the BLM had completed ESA sec. 7 consultation, as appropriate. For notice-level mining proposals that are located within lands or waters known to contain listed species or their proposed or designated critical habitat, the notice would be complete only after the BLM had reviewed the notice and completed ESA sec. 7 consultation. Plans of operation located within lands or waters known to contain listed species or their

proposed or designated critical habitat would continue to be governed by the standards in 43 CFR 3809 et seq. The effects of implementing this proposed management direction on the species and proposed and designated critical habitats addressed by this assessment would be *entirely beneficial* because it would help to ensure that potential impacts to these species and habitats are fully evaluated before any BLM authorization.

a. Leasable Minerals: Oil, Gas or Coalbed Natural Gas Resources
Proposed management direction to maintain all lands open to leasable mineral entry except those closed by legislation (page A-46) is beyond the discretion of the BLM and, thus, is not an *affirmative agency action* subject to the ESA. The implementation of the remaining proposed management direction for Leasable Minerals (page A-46), requiring the BLM to apply site-specific stipulations as needed to **protect** Federally-listed threatened and endangered species and their critical habitats, *may affect, but would not be likely to adversely affect*, the species and designated and proposed critical habitat addressed by this assessment because the effects of implementation on these species and habitats would be *entirely beneficial*.

b. Salable Minerals
As stated in Section II G 2 of this assessment, under the Proposed RMP the BLM would close 249,241 acres to salable mineral entry. The implementation of proposed management direction to close these acres to salable mineral entry (page A-46 – A-47) *may affect, but would not be likely to adversely affect*, the species, and designated and proposed critical habitats, addressed by this assessment because it would reduce the risks that species' habitats would be modified by salable mineral entry, rendering the effects on species and their habitats *entirely beneficial*. The implementation of proposed management direction to retain all areas not closed to salable mineral entry, through legislation, as open for such entry (page A-46 – A-47) is beyond the discretion of the BLM and, therefore, is not an *affirmative agency action* subject to the ESA.

c. Locatable Minerals
As stated in Section II G 2 of this assessment, under the Proposed RMP the BLM would recommend for withdrawal from locatable mineral entry 307,312 acres. The implementation of proposed management direction for Locatable Minerals (pages A-46) to petition to withdraw these acres from locatable mineral entry *may affect, but would not be likely to adversely affect*, the species, and designated and proposed critical habitats, addressed by this assessment because Congressional or Secretarial approval of the withdrawals would reduce the risks that species' habitats would be modified by locatable mineral entry, rendering the effects on species and their habitats *entirely beneficial*. The implementation of proposed management direction to retain all areas not congressionally or secretarially withdrawn from locatable mineral entry as open for such entry is beyond the discretion of the BLM and, therefore, is not an *affirmative agency action* subject to the ESA.

6. Paleontological Resources
The implementation of proposed management direction for Paleontological Resources (page A-47) would have *no effect* on the species, and designated and proposed critical habitats, addressed by this assessment.

7. Soil Resources
The implementation of proposed management direction for Soil Resources (page A-50) *may affect, but would not be likely to adversely affect*, the species, and designated and proposed critical habitats, addressed by this assessment because it would cause the BLM to maintain or enhance the inherent soil functions of managed ecosystems so that the overall soil properties do not decline beyond acceptable levels that would impede said functions across the **planning area**, and provide landscapes that stay within natural soil stability failure rates during and after management activities. Thus, the effects of restoring and

maintaining hydrologic function would be *discountable* during the short term and *entirely beneficial* during the long term to each of these species and critical habitats.

8. Sustainable Energy

The implementation of proposed management direction for Sustainable Energy (pages A-50 – A-52), to exclude from sustainable energy development areas that are part of the National Landscape Conservation System, Areas of Critical Environmental Concern, and District-Designated Reserves, *may affect, but would not be likely to adversely affect*, the species, and the designated and proposed critical habitats, addressed by this assessment because it would reduce the risks that species' habitats would be modified, rendering the effects *entirely beneficial*. The implementation of proposed management direction to develop sustainable energy sites and transmission corridors using best management practices to reduce or avoid impacts to other resource uses, including the species and habitats addressed by this assessment, *may affect, but would not be likely to adversely affect*, those species and critical habitats because it would reduce the risks that species' habitats would be modified, rendering the effects *entirely beneficial*. The implementation of proposed management direction that directs the BLM to offer timber harvest slash (biomass energy conversion feedstock) for sale as an alternative to being burned on-site or left in place for soil stabilization, *may affect, but would not be likely to adversely affect*, the species and the designated and proposed critical habitats addressed by this assessment because, even though slash removal could indirectly affect forest stand regrowth, the rarity of past requests for biomass feedstock, and the BLM analysis that shows no biomass processing infrastructure in the **planning area**, renders the effects to species and critical habitats *discountable*. If the BLM received a request for biomass, it would initiate ESA sec. 7 consultation on individual biomass projects, as appropriate

9. Visual Resource Management

The implementation of proposed management direction for Visual Resource Management (pages A-53 – A-54) *may affect, but would not be likely to adversely affect*, the species, and designated and proposed critical habitats, addressed by this assessment because it would help prevent negative impacts to these species and habitats from new construction and habitat modification, making the effects *entirely beneficial*.

10. Wild Horses

The implementation of proposed management direction for the free-roaming horses in the Pokegama Herd Management Area of the Klamath Falls Field Office (page A-61) would have *no effect* on any of the plant species and their designated critical habitats addressed by this assessment because none of these species or their critical habitats occur in this area. The Pokegama Herd Management Area is coincident with areas of known gray wolf activity in the **planning area** (Keno pair) and with modeled habitat for the fisher (although no known fisher observations within the herd management area). The implementation of proposed management direction for the free-roaming horses in the Pokegama Herd Management Area *may affect, but would not be likely to adversely affect*, the wolf and fisher because it would direct the BLM to maintain current herd levels and infrastructure, which would be expected to maintain current habitat conditions for both species, and herd harvest actions would not be expected to **disrupt** the normal behaviors of wolves or fisher in the area because of their abilities to use a variety of habitats and move away from **disturbances**. For the remaining wildlife species, and their designated and proposed critical habitats, addressed by this assessment, the implementation of proposed management direction for the free-roaming horses in the Pokegama Herd Management Area would have *no effect* because none of these species or their critical habitats occur in this area.

B. GENTNER'S FRITILLARY

1. Land Use Allocations

a. Late-Successional Reserve and Riparian Reserve

The proposed designation of these reserves *may affect, and would be likely to adversely affect*, Gentner's fritillary. Gentner's fritillary is associated with open woodland and Douglas-fir forest stands, and the BLM proposes to include 46 fritillary known sites in reserves. This indicates that unknown fritillary populations also are likely to occur in proposed reserves. The implementation of proposed management direction for the reserves (pages A-14 – A- 31) would promote the development of canopy cover and structural-complexity in woodlands and forest stands, which could adversely affect unknown fritillary populations along stand edges and in forest openings. Although proposed management direction for Rare Plants and Fungi (pages A-47 – A-48) would direct the BLM to **protect** known fritillary populations, conduct pre-project surveys for fritillary in suitable habitats prior to implementing projects, and **protect** newly-found populations, it would not direct the BLM to locate and protect unknown fritillary populations in the absence of proposed projects. (Because the other land use allocations would be more actively managed, the loss in those allocations of unknown Gentner's fritillary populations to structural development would *not be reasonably certain to occur*.) That said, the BLM would **protect** the 162 known fritillary sites in the **action area**, including the 46 in proposed reserves, along with all newly-discovered sites.

b. District-Designated Reserves

As stated in Section III A, seven Gentner's fritillary known sites would be allocated to District-Designated Reserves. The proposed designation of these reserves *may affect, but would not be likely to adversely affect*, Gentner's fritillary because, with the exception of District-Designated Reserves - Lands Managed for their Wilderness Characteristics, such reserves would be designated for specific management purposes and are relatively small in size and, thus, are well known to land managers, making it unlikely that they support unknown populations of Gentner's fritillary. In addition, the implementation of proposed management direction for Rare Plants and Fungi (pages A-47 – A-48) would require the BLM, prior to implementing actions that could result in habitat modification in the suitable habitat of any federally-listed plant species, to conduct surveys to determine species presence and **protect** new populations and their habitat. The effects of discovering and **protecting** populations would be *entirely beneficial*.

The proposed designation of District-Designated Reserves - Lands Managed for their Wilderness Characteristics would maintain 79,107 acres that are outside the Harvest Land Base, and outside Wilderness Areas and Wilderness Study Areas, for their wilderness characteristics. No Gentner's fritillary known sites occur in these lands. The implementation of proposed management direction for these lands, which includes petitioning to withdraw them from locatable mineral entry, closing them to off-highway vehicle use and salable mineral entry, *may affect, but would not be likely to adversely affect*, Gentner's fritillary because the current conditions of these areas mean that natural habitat changes that would adversely affect unknown Gentner's fritillary populations, such as the development of older and more structurally-complex forest conditions that could affect populations along the forest edge or in forest openings, have already occurred and, therefore, are *not reasonably certain to occur* as a result of the proposed designation. The proposed designations would help maintain any extant fritillary populations, making the effects *insignificant*.

c. Harvest Land Base (all BLM field offices) and Eastside Management Area (BLM Klamath Falls Field Office only)

The proposed designations of these land use allocations *may affect, but would not be likely to adversely affect*, Gentner's fritillary because the implementation of proposed management direction

for Rare Plants and Fungi (pages A-47 – A-48) would require the BLM, prior to implementing actions that could result in habitat modification in the suitable habitat of any federally-listed plant species, to conduct surveys to determine species presence and **protect** new populations and their habitat. The effects of discovering and **protecting** populations would be *entirely beneficial*.

2. Areas of Critical Environmental Concern

The proposed designations of the Cobleigh Road, Dakubetede and Pickett Creek ACECs *may affect, but would not be likely to adversely affect*, Gentner's fritillary because the fritillary is listed among the "relevant and important values" of each of these ACECs. The effects of managing these sites to **protect** and maintain the fritillary would be *entirely beneficial*. Although individual management actions needed to **protect** and maintain Gentner's fritillary in the ACECs might adversely affect the species, the ACEC designations does not direct the implementation of such action, and the BLM would address any adverse effects during project-level ESA sec. 7 consultation. In accordance with proposed management direction for Rare Plants and Fungi (pages A-47 – A-48), any future attempt to augment the extant population would proceed in accordance with the approved recovery plan and undergo separate ESA sec. 7 consultation.

3. Fire, Fuels and Wildfire Response

a. Response to Wildfire

The implementation of proposed management direction requiring the BLM to respond immediately to wildfire (pages A-34 – A-35) *may affect, but would not be likely to adversely affect*, Gentner's fritillary because, even though the species occurs in woodland and forest habitats subject to wildfire and, hence, the BLM response, the infrequency of past wildfires on BLM-administered land in the **action area**, the limited sizes of past fire footprints, and the limited acres of woodland and forest habitats with known fritillary sites, render the potential effects of a BLM response *discountable*. As warranted, the BLM would address the effects of such actions in accordance with emergency consultation procedures (50 CFR §402.05).

b. Reduce Wildfire Risk and Severity

The implementation of proposed management direction to reduce fire risk and severity (pages A-34 – A-35pages A-34 – A-35) *may affect, but would not be likely to adversely affect*, Gentner's fritillary because it would require the BLM to maintain species' habitats. In addition, management direction for Rare Plants and Fungi (pages A-47 – A-48) would require the BLM, prior to implementing actions that could result in habitat modification in the suitable habitat of any federally-listed plant species, to conduct surveys to determine species presence and **protect** new populations and their habitat. The effects of discovering and **protecting** populations would be *entirely beneficial*.

4. Fisheries

The implementation of proposed management direction for Fisheries (page A-35) *may affect, but would not be likely to adversely affect*, Gentner's fritillary because management direction for Rare Plants and Fungi (pages A-47 – A-48) would require the BLM, prior to implementing actions that could result in habitat modification in the suitable habitat of any federally-listed plant species, to conduct surveys to determine species presence and **protect** new populations and their habitat. The effects of discovering and **protecting** populations would be *entirely beneficial*.

5. Forest Management

The implementation of proposed Forest Management direction (page A-35) *may affect, but would not be likely to adversely affect*, Gentner's fritillary because proposed management direction for Rare Plants and Fungi (pages A-47 – A-48) would require the BLM, prior to implementing actions that could result in habitat modification in the suitable habitat of any federally-listed plant species, to conduct surveys to

determine species presence and **protect** new populations and their habitat. The effects of discovering and **protecting** populations would be *entirely beneficial*.

6. Livestock Grazing (BLM Medford District and Klamath Falls Field Office only)
The proposed reauthorization of livestock grazing in eight active allotments where Gentner's fritillary are present *may affect, but would not be likely to adversely affect*, this species because livestock are not known to directly affect Gentner's fritillary in these allotments through grazing or trampling, and the BLM would continue to monitor those populations to ensure their persistence, making the effects *insignificant* and *entirely beneficial*.

Gentner's fritillary occurs in eight additional allotments that currently are vacant. The proposed closing of these allotments to future livestock grazing *may affect, but would not be likely to adversely affect*, the fritillary because, even though livestock are not known to directly affect Gentner's fritillary, removing livestock might improve habitat for the species and allow for population expansions, making the effects *entirely beneficial*.

The proposal to authorize new livestock grazing, through management agreements, nonrenewable grazing permits or leases, or special use permits on lands currently not available for livestock grazing, *may affect, but would not be likely to adversely affect*, the fritillary because management direction for Grazing (pages A-39 - A-45) would restrict the BLM to permitting such actions only to control invasive plants, reduce fire danger, or accomplish other management objectives, and management direction for Rare Plants and Fungi (pages A-47 – A-48) would require the BLM, prior to implementing actions that could result in habitat modification in the suitable habitat of any federally-listed plant species, to conduct surveys to determine species presence and **protect** new populations and their habitat, making the effects to the species *discountable* during the short term and *entirely beneficial* during the long term.

7. Hydrology
The implementation of proposed management direction for Hydrology (page A-36) *may affect, but would not be likely to adversely affect*, Gentner's fritillary because management direction for Rare Plants and Fungi (pages A-47 – A-48) would require the BLM, prior to implementing actions that could result in habitat modification in the suitable habitat of any federally-listed plant species, to conduct surveys to determine species presence and **protect** new populations and their habitat. The effects of discovering and **protecting** populations would be *entirely beneficial*.

8. Invasive Species
The implementation of proposed management direction for Invasive Species (page A-36) would require the BLM to treat invasive plants and host species for invasive forest pathogens in accordance with the Records of Decision for the Northwest Area Noxious Weed Control Program Environmental Impact Statement and the Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in Oregon Environmental Impact Statement. Implementation of this direction *may affect, but would not be likely to adversely affect*, Gentner's fritillary because it would help to control invasive plant species that could adversely affect the fritillary. In addition, the implementation of proposed management direction for Rare Plants and Fungi (pages A-47 – A-48) would require the BLM, prior to implementing actions that could result in habitat modification in the suitable habitat of any federally-listed plant species, to conduct surveys to determine species presence and **protect** new populations and their habitat. The effects of controlling invasive species and discovering and **protecting** populations would be *entirely beneficial*.

9. Lands, Realty, and Roads
The implementation of the following proposed management direction for Lands, Realty, and Roads (pages A-38 – A-39) would have *no effect* on Gentner's fritillary because proposed management direction for Rare Plants and Fungi (pages A-47 – A-48) would direct the BLM to **protect** known fritillary

populations and conduct pre-project surveys for fritillary in suitable habitats prior to implementing projects and **protect** newly-found populations:

- Construct new permanent/temporary roads where needed to meet resource management objectives, including major culverts and bridges as necessary, to established BLM engineering design standards. Apply road location, design, and construction best management practices as needed.
- Maintain existing roads, including major culverts and bridges, to provide access for both resource management and casual use activities while protecting water quality and facility investments and providing user safety, to established BLM maintenance standards. Apply road maintenance and wet weather road use best management practices as needed.
- Remove hazard trees and downed trees along roads for safety or operational reasons.
- Fully decommission or obliterate (permanent closure) roads with no future resource management need. Decommission (long-term closure) roads not currently needed for resource management but that will be operated and maintained again in the future. Apply road closure best management practices as needed. Close roads only with the approval of affected reciprocal right-of-way permittees.

10. Rare Plants and Fungi

The implementation of proposed management direction for Rare Plants and Fungi (pages A-47 – A-48) *may affect, but would not be likely to adversely affect*, Gentner's fritillary because implementation would foster the discovery of new populations and require the BLM to **protect** known populations, making the effects to the species *entirely beneficial*. Even though surveying for new populations, and monitoring known populations, could result in the loss of some individual plants through handling or inadvertent trampling, such survey and monitoring would be done by professional botanists and in accordance with established protocols and approved recovery strategies, making the effects to the species *discountable*.

11. Recreation and Visitor Services

The implementation of proposed management direction for Recreation and Visitor Services (pages A-48 - A-50) *may affect, but would not be likely to adversely affect*, Gentner's fritillary because it would reduce the acres in the **action area** exposed to such activities, and ensure that Extensive Recreation Management Areas would be managed to maintain and **protect** known fritillary populations. (Fritillary populations do not occur in Special Recreation Management Areas.) The proposed management direction would reduce the potential risks to unknown fritillary populations and species' habitats, rendering the effects *entirely beneficial*.

12. Trails and Travel Management

The implementation of proposed management direction for Trails and Travel Management (pages A-50 – A-51) *may affect, but would not be likely to adversely affect*, Gentner's fritillary because it would reduce potential risks to unidentified species' populations and habitats, rending the effect *entirely beneficial*. Even though the BLM would maintain a road and trail network for public, resource management and administrative access needs, the BLM would manage that network to protect fragile and unique resource values from damage by OHV use, and limit or eliminate OHV use where appropriate. The proposed closure of 156,036 acres would eliminate potential threats from OHV use to any unknown species' populations associated with those acres. The BLM also would eliminate 319,661 acres of open area and further evaluate and designate limited areas to protect resources.

13. Wildlife

The implementation of proposed management direction for Wildlife (pages A-54 - A-61) *may affect, and would be likely to adversely affect*, Gentner's fritillary because, it would promote the development of older and more structurally-complex forest stands, which could negatively affect or eliminate unknown fritillary populations along forest edges or in forest openings (see Sec. IV, B1a, above). Although

proposed management direction under Rare Plants and Fungi (pages A-47 – A-48) would direct the BLM to **protect** known fritillary populations, conduct pre-project surveys for fritillary in suitable habitats prior to implementing projects, and **protect** newly-found populations, it would not direct the BLM to locate and **protect** any unknown fritillary populations in the absence of projects. That said, the BLM would **protect** the 162 known fritillary sites on BLM-administered lands, along with all newly-discovered sites.

C. WESTERN LILY

1. Areas of Critical Environmental Concern

The single western lily site known or suspected to occur in the **action area** is in the proposed New River ACEC and is one of the relevant and important values for which the ACEC would be designated and managed under the Proposed RMP. Therefore, the proposed designation of the New River ACEC *may affect, but would not be likely to adversely affect*, western lily because the effects of managing the site to **protect** and maintain the lily would be *entirely beneficial*. Although individual management actions needed to **protect** and maintain western lily in the ACEC might adversely affect the species, the ACEC designation does not direct the implementation of such actions. The BLM would address the effects of individual management actions needed to **protect** and maintain western lily during project-level ESA sec. 7 consultation. In accordance with proposed management direction for Rare Plants and Fungi (pages A-47 – A-48), any future attempts to augment the extant population would proceed in accordance with the approved recovery plan and would undergo separate ESA sec. 7 consultation.

2. Fire, Fuels and Wildfire Response

a. Response to Wildfire

The implementation of proposed management direction requiring the BLM to respond immediately to wildfire (pages A-34 – A-35) *may affect, but would not be likely to adversely affect*, western lily because, even though the New River ACEC is subject to wildfire and, hence, the BLM response, the infrequency of past wildfires on BLM-administered land, the limited sizes of past fire footprints, and the limited acres of the ACEC render the potential effects of a BLM response *discountable*. As warranted, the BLM would address the effects of such actions in accordance with emergency consultation procedures (50 CFR §402.05).

b. Reduce Wildfire Risk and Severity

Outside the proposed New River ACEC, the implementation of proposed management direction to reduce fire risk and severity *may affect, but would not be likely to adversely affect*, western lily because the species is not known or suspected to inhabit forest and woodland habitats where most fuels treatments would occur, proposed management direction for Fire, Fuels, and Wildfire Response (pages A-34 – A-35pages A-34 – A-35) would require the BLM to maintain species habitat, and proposed management direction for Rare Plants and Fungi (pages A-47 – A-48) would require the BLM, prior to implementing actions that could result in habitat modification in the suitable habitat of any federally-listed plant species, to conduct surveys to determine species presence and **protect** new populations and their habitat. The effects of discovering and **protecting** populations would be *entirely beneficial*.

3. Invasive Species

The implementation of proposed management direction for Invasive Species (page A-36) would require the BLM to treat invasive plants and host species for invasive pathogens in accordance with the Records of Decision for the Northwest Area Noxious Weed Control Program Environmental Impact Statement and the Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in Oregon Environmental Impact Statement. Implementation of this direction *may affect, but would not be likely to adversely affect*, western lily because it would help to control invasive plant species that could adversely

affect the lily and its habitat, rendering effects to the species *entirely beneficial*. Proposed management direction for Rare Plants and Fungi (pages A-47 – A-48) would require the BLM, prior to implementing actions that could result in habitat modification in the suitable habitat of any federally-listed plant species, to conduct surveys to determine species presence and **protect** new populations and their habitat. The effects of discovering and **protecting** populations would be *entirely beneficial*.

4. Rare Plants and Fungi
The implementation of proposed management direction for Rare Plants and Fungi (pages A-47 – A-48) *may affect, but would not be likely to adversely affect*, western lily because it would require the BLM, prior to implementing actions that could result in habitat modification in the suitable habitat of any federally-listed plant species, to conduct surveys to determine species presence and **protect** new populations and their habitat. Although survey methods place individual plants at risk from handling and unintended trampling by surveyors, surveys would be conducted by professional botanists in accordance with approved protocols and the recovery plan, minimizing those risks to *discountable* levels. The effects of discovering and **protecting** populations would be *entirely beneficial*.

5. Land Use Allocations and Other Resource Programs
The implementation of the proposed management direction for Land Use Allocations (pages A-1 – A-30), Fisheries (page A-35), Forest Management (page A-35), Grazing (pages A-39 - A-45), Hydrology (page A-36), those components of Lands, Realty, and Roads (pages A-38 - A-39), not already addressed above under Determinations Common to all Species and Critical Habitats (Section IV A, above), Recreation and Visitor Services (pages A-45 – A-46), Trails and Travel Management (pages A-52 - A-53) and Wildlife (pages A-54 - A-61) would have *no effect* on the western lily because it is not known or suspected to occur in the **action area** outside the proposed New River ACEC.

D. COOK'S LOMATIUM AND ITS CRITICAL HABITAT

1. District-Designated Reserves and Areas of Critical Environmental Concern
The designations of District-Designated Reserves for Critical Habitat and the French Flat, Waldo Takilma, Rough and Ready, and Reeves Creek ACECs, *may affect, but would not be likely to adversely affect*, Cook's lomatium and its critical habitat because these areas would be designated and managed for the species and its critical habitat, rendering the effects to the species and its critical habitat *entirely beneficial*. Although individual management actions needed to **protect** and maintain Cook's lomatium in the ACECs might adversely affect the species, the proposed designations would not direct such actions. The BLM would address the effects of individual management actions needed to **protect** and maintain Cook's lomatium during project-level ESA sec. 7 consultation. In accordance with proposed management direction for Rare Plants and Fungi (pages A-47 – A-48), any future attempt to augment the extant population would proceed in accordance with the approved recovery plan and undergo separate ESA sec. 7 consultation.

2. Other Land Use Allocations and Resource Programs
The implementation of the remaining proposed management direction for the Proposed RMP (Appendix A) would have *no effect* on Cook's lomatium or its critical habitat because the species and its habitat are not known or suspected to occur, and its critical habitat is not delineated, in the **action area** outside the District-Designated Reserves and ACECs described above.

E. ROUGH POPCORNFLOWER

1. Areas of Critical Environmental Concern
The three rough popcornflower known sites in the **action area** are in the proposed North Bank Habitat Management Area ACEC and this species and its habitat are among the "relevant and important values"

for which the ACEC would be designated and managed under the Proposed RMP. Therefore, the proposed designation of the North Bank Habitat Management Area ACEC *may affect, but would not be likely to adversely affect*, rough popcornflower because the effects of managing the site to **protect** and maintain the popcornflower would be *entirely beneficial*. Although individual management actions needed to **protect** and maintain the popcornflower in the ACEC might adversely affect the species, the proposed designation would not direct such actions. The BLM would address the effects of individual management actions needed to **protect** and maintain rough popcornflower during project-level ESA sec. 7 consultation. In accordance with proposed management direction for Rare Plants and Fungi (pages A-47 – A-48), future attempts to augment the extant population would proceed in accordance with the approved recovery plan and would undergo separate ESA sec. 7 consultation.

2. Fire, Fuels and Wildfire Response

a. Response to Wildfire

The implementation of proposed management direction requiring the BLM to respond immediately to wildfire (pages A-34 – A-35) *may affect, but would not be likely to adversely affect*, rough popcornflower because, even though the North Bank Habitat Management Area ACEC is subject to wildfire and, hence, the BLM response, the infrequency of past wildfires on BLM-administered land, the limited sizes of past fire footprints, and the limited acres of the ACEC, render the potential effects of a BLM response *discountable*. As warranted, the BLM would address the effects of such actions in accordance with emergency consultation procedures (50 CFR §402.05).

b. Reduce Wildfire Risk and Severity

Outside the proposed North Bank Habitat Management Area ACEC, the implementation of proposed management direction to reduce fire risk and severity (pages A-34 – A-35pages A-34 – A-35) *may affect, but would not be likely to adversely affect*, rough popcornflower because the species is not known or suspected to inhabit forest and woodland habitats where most fuels treatments would occur, the proposed management direction for Fire, Fuels, and Wildfire Response would require the BLM to maintain species habitat, and proposed management direction for Rare Plants and Fungi (pages A-47 – A-48) would require the BLM, prior to implementing actions that could result in habitat modification in the suitable habitat of any federally-listed plant species, to conduct surveys to determine species presence and **protect** new populations and their habitat. The effects of discovering and **protecting** populations would be *entirely beneficial*.

3. Invasive Species

The implementation of proposed management direction for Invasive Species (page A-36) would require the BLM to treat invasive plants and host species for invasive pathogens in accordance with the Records of Decision for the Northwest Area Noxious Weed Control Program Environmental Impact Statement and the Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in Oregon Environmental Impact Statement. Implementation of this proposed direction *may affect, but would not be likely to adversely affect*, rough popcornflower because it would help to control invasive plant species that could adversely affect the popcornflower and its habitat, rendering effects to the species *entirely beneficial*. Proposed management direction for Rare Plants and Fungi (pages A-47 – A-48) would require the BLM, prior to implementing actions that could result in habitat modification in the suitable habitat of any federally-listed plant species, to conduct surveys to determine species presence and **protect** new populations and their habitat. The effects of discovering and **protecting** populations would be *entirely beneficial*.

4. Rare Plants and Fungi

The implementation of proposed management direction for Rare Plants and Fungi (pages A-47 – A-48) *may affect, but would not be likely to adversely affect*, rough popcornflower because it would require the

BLM, prior to implementing actions that could result in habitat modification in the suitable habitat of any federally-listed plant species, to conduct surveys to determine species presence and **protect** new populations and their habitat. Although survey methods place individual plants at risk from handling and unintended trampling by surveyors, surveys would be conducted by professional botanists in accordance with approved protocols and the recovery plan, minimizing those risks to the extent practicable. The effects of discovering and **protecting** populations would be *entirely beneficial*.

5. Land Use Allocations and Other Resource Programs

The implementation of the proposed management direction for Land Use Allocations (pages A-1 – A-30), Fisheries (page A-35), Forest Management (page A-35), Livestock Grazing (pages A-39 - A-45), Hydrology (page A-36), those components of Lands, Realty, and Roads (pages A-38 - A-39), not already addressed under Determinations Common to all Species and Critical Habitats (Section IV A, above), Recreation and Visitor Services (pages A-48 - A-50), Trails and Travel Management (pages A-52 - A-53) and Wildlife (pages A-54 - A-61) would have *no effect* on the rough popcornflower because it is not known or suspected to occur in the **action area** outside the proposed North Bank Habitat Management Area ACEC.

F. KINCAID'S LUPINE

1. Areas of Critical Environmental Concern

The designation of Oak Basin 1, 2, 3, and Callahan Meadows ACECs *may affect, but would not be likely to adversely affect*, Kincaid's lupine because these areas would be designated and managed for the species rendering the effects to the species *entirely beneficial*. Although individual management actions needed to **protect** and maintain Kincaid's lupine in the ACECs might adversely affect the species, the proposed designations would not direct such actions. The BLM would address the effects of individual management actions needed to **protect** and maintain Kincaid's lupine during project-level ESA sec. 7 consultation. In accordance with proposed management direction for Rare Plants and Fungi (pages A-47 – A-48), future attempts to augment the extant populations would proceed in accordance with the approved recovery plan and would undergo separate ESA sec. 7 consultation.

2. Land Use Allocations

a. Late-Successional Reserve and Riparian Reserve

The proposed designation of these reserves *may affect, and would be likely to adversely affect*, Kincaid's lupine. Ten Kincaid's lupine sites would occur within the Late-Successional Reserve, indicating that other unknown populations probably also occur there. Kincaid's lupine requires sunlight to produce flowers and fruit and the implementation of proposed management direction for the reserves (pages A-1 – A- 4 and A-13 – A-30) would promote the development of canopy cover and structural-complexity in woodlands and forest stands, which could adversely affect unknown Kincaid's lupine populations along stand edges and in forest openings. Although proposed management direction under Rare Plants and Fungi (pages A-47 – A-48) would direct the BLM to **protect** known Kincaid's lupine populations, conduct pre-project surveys for Kincaid's lupine in suitable habitats prior to implementing projects, and **protect** newly-found populations, it would not direct the BLM to locate and **protect** unknown Kincaid's lupine populations in the absence of proposed projects. (Because the other land use allocations would be more actively managed, the loss in those allocations of unknown Kincaid's lupine populations to structural development would *not be reasonably certain to occur*.) That said, the BLM would **protect** the 10 known Kincaid's lupine sites in the **action area**, along with all newly discovered sites.

b. Harvest Land Base (all BLM field offices) and Eastside Management Area (BLM Klamath Falls Field Office only)
The proposed designations of these land use allocations *may affect, but would not be likely to adversely affect*, Kincaid's lupine because the implementation of proposed management direction for Rare Plants and Fungi (pages A-47 – A-48) would require the BLM, prior to implementing actions that could result in habitat modification in the suitable habitat of any federally-listed plant species, to conduct surveys to determine species presence and **protect** new populations and their habitat. The effects of discovering and **protecting** populations would be *entirely beneficial*.

3. Fire, Fuels and Wildfire Response

a. Response to Wildfire
The implementation of proposed management direction requiring the BLM to respond immediately to wildfire (pages A-34 – A-35) *may affect, but would not be likely to adversely affect*, Kincaid's lupine because, even though the species occurs in woodland and forest habitats subject to wildfire and, hence, the BLM response, the infrequency of past wildfires on BLM-administered land in the **action area**, the limited sizes of past fire footprints, and the limited acres of woodland and forest habitats with known fritillary sites, render the potential effects of a BLM response *discountable*. As warranted, the BLM would address the effects of such actions in accordance with emergency consultation procedures (50 CFR §402.05).

b. Reduce Wildfire Risk and Severity
The implementation of proposed management direction to reduce fire risk and severity (pages A-34 – A-35) *may affect, but would not be likely to adversely affect*, Kincaid's lupine because it would require the BLM to maintain species' habitats, and management direction for Rare Plants and Fungi (pages A-47 – A-48) would require the BLM, prior to implementing actions that could result in habitat modification in the suitable habitat of any federally-listed plant species, to conduct surveys to determine species presence and **protect** new populations and their habitat. The effects of discovering and **protecting** populations would be *entirely beneficial*.

4. Fisheries
The implementation of proposed management direction for Fisheries (page A-35) *may affect, but would not be likely to adversely affect*, Kincaid's lupine because management direction for Rare Plants and Fungi (pages A-47 – A-48) would require the BLM, prior to implementing actions that could result in habitat modification in the suitable habitat of any federally-listed plant species, to conduct surveys to determine species presence and **protect** new populations and their habitat. The effects of discovering and **protecting** populations would be *entirely beneficial*.

5. Forest Management
The implementation of proposed Forest Management direction (page A-35) *may affect, but would not be likely to adversely affect*, Kincaid's lupine because proposed management direction for Rare Plants and Fungi (pages A-47 – A-48) would require the BLM, prior to implementing actions that could result in habitat modification in the suitable habitat of any federally-listed plant species, to conduct surveys to determine species presence and **protect** new populations and their habitat. The effects of discovering and **protecting** populations would be *entirely beneficial*.

6. Hydrology
The implementation of proposed management direction for Hydrology (page A-36) *may affect, but would not be likely to adversely affect*, Kincaid's lupine because management direction for Rare Plants and Fungi (pages A-47 – A-48) would require the BLM, prior to implementing actions that could result in habitat modification in the suitable habitat of any federally-listed plant species, to conduct surveys to

determine species presence and **protect** new populations and their habitat. The effects of discovering and **protecting** populations would be *entirely beneficial*.

7. Invasive Species

The implementation of proposed management direction for Invasive Species (page A-36) would require the BLM to treat invasive plants and host species for invasive forest pathogens in accordance with the Records of Decision for the Northwest Area Noxious Weed Control Program Environmental Impact Statement and the Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in Oregon Environmental Impact Statement. Implementation of this direction *may affect, but would not be likely to adversely affect*, Kincaid's lupine because it would help to control invasive plant species that could adversely affect the species and the implementation of proposed management direction for Rare Plants and Fungi (pages A-47 – A-48) would require the BLM, prior to implementing actions that could result in habitat modification in the suitable habitat of any federally-listed plant species, to conduct surveys to determine species presence and **protect** new populations and their habitat. The effects of controlling invasive species and discovering and **protecting** populations would be *entirely beneficial*.

8. Lands, Realty, and Roads

The implementation of the following proposed management direction for Lands, Realty, and Roads (pages A-38 – A-39) would have *no effect* on Kincaid's lupine because proposed management direction for Rare Plants and Fungi (pages A-47 – A-48) would direct the BLM to **protect** known populations and conduct pre-project surveys for Kincaid's lupine in suitable habitats prior to implementing projects and **protect** newly-found populations:

- Construct new permanent/temporary roads where needed to meet resource management objectives, including major culverts and bridges as necessary, to established BLM engineering design standards. Apply road location, design, and construction best management practices as needed.
- Maintain existing roads, including major culverts and bridges, to provide access for both resource management and casual use activities while protecting water quality and facility investments and providing user safety, to established BLM maintenance standards. Apply road maintenance and wet weather road use best management practices as needed.
- Remove hazard trees and downed trees along roads for safety or operational reasons.
- Fully decommission or obliterate (permanent closure) roads with no future resource management need. Decommission (long-term closure) roads not currently needed for resource management but that will be operated and maintained again in the future. Apply road closure best management practices as needed. Close roads only with the approval of affected reciprocal right-of-way permittees.

9. Recreation and Visitor Services

The implementation of proposed management direction for Recreation and Visitor Services (pages A-48 - A-50) *may affect, but would not be likely to adversely affect*, Kincaid's lupine because it would reduce the acres in the **action area** exposed to such activities, and ensure that Extensive Recreation Management Areas would be managed to maintain and **protect** known Kincaid's lupine populations. (Lupine populations do not occur in Special Recreation Management Areas.) The proposed management direction also would reduce the potential risks to unknown populations and species' habitats, rendering the effects *entirely beneficial*.

10. Trails and Travel Management

The implementation of proposed management direction for Trails and Travel Management (pages A-52 - A-53) *may affect, but would not be likely to adversely affect*, Kincaid's lupine because it would reduce potential risks to unidentified species' populations and habitats, rending the effect *entirely beneficial*. Even though the BLM would maintain a road and trail network for public, resource management and

administrative access needs, the BLM would manage that network to protect fragile and unique resource values from damage by OHV use, and limit or eliminate OHV use where appropriate. The proposed closure of 156,036 acres would eliminate potential threats from OHV use to any unknown species' populations associated with those acres. The BLM also would eliminate 319,661 acres of open area and further evaluate and designate limited areas to protect resources.

11. Rare Plants and Fungi

The implementation of proposed management direction for Rare Plants and Fungi (pages A-47 – A-48) *may affect, but would not be likely to adversely affect*, Kincaid's lupine because it would require the BLM, prior to implementing actions that could result in habitat modification in the suitable habitat of any federally-listed plant species, to conduct surveys to determine species presence and **protect** new populations and their habitat. Although survey methods place individual plants at risk from handling and unintended trampling by surveyors, surveys would be conducted by professional botanists in accordance with approved protocols and the recovery plan, minimizing those risks to the extent practicable. The effects of discovering and **protecting** populations would be *entirely beneficial*.

12. Wildlife

The implementation of proposed management direction for Wildlife (pages A-54 - A-61) *may affect, and would be likely to adversely affect*, Kincaid's lupine because, it would promote the development of older and more structurally-complex forest stands, which could negatively affect or eliminate unknown populations along forest edges or in forest openings (see Sec. IV, B1a, above). Although proposed management direction under Rare Plants and Fungi (pages A-47 – A-48) would direct the BLM to **protect** known populations, conduct pre-project surveys for Kincaid's lupine in suitable habitats prior to implementing projects, and **protect** newly-found populations, it would not direct the BLM to locate and protect any unknown Kincaid's lupine populations in the absence of projects.

G. NELSON'S CHECKER-MALLOW

1. Areas of Critical Environmental Concern

The single Nelson's checker-mallow site known or suspected to occur in the **action area** is in the proposed Walker Flat ACEC and is one of the "relevant and important values" for which the ACEC would be designated and managed under the Proposed RMP. Therefore, the proposed designation of the Walker Flat ACEC *may affect, but would not be likely to adversely affect*, Nelson's checker-mallow because the effects of managing the site to **protect** and maintain the checker-mallow would be *entirely beneficial*. Although individual management actions needed to **protect** and maintain Nelson's checker-mallow in the ACEC might adversely affect the species, the proposed designation would not direct such actions. The BLM would address the effects of individual management actions needed to **protect** and maintain checker-mallow during project-level ESA sec. 7 consultation. In accordance with proposed management direction for Rare Plants and Fungi (pages A-47 – A-48), any future attempt to augment the extant population would proceed in accordance with the approved recovery plan and undergo separate ESA sec. 7 consultation.

2. Fire, Fuels and Wildfire Response

a. Response to Wildfire

The implementation of proposed management direction requiring the BLM to respond immediately to wildfire (pages A-34 – A-35) *may affect, but would not be likely to adversely affect*, Nelson's checker-mallow because, even though the Walker Flat ACEC is subject to wildfire and, hence, the BLM response, the infrequency of past wildfires on BLM-administered land, the limited sizes of past fire footprints, and the limited acres of the ACEC and, thus, the likelihood that BLM actions would be outside the ACEC, render the potential effects of a BLM response *discountable*. As warranted, the

BLM would address the effects of such actions in accordance with emergency consultation procedures (50 CFR §402.05).

b. Reduce Wildfire Risk and Severity

Outside the proposed Walker Flat ACEC, the implementation of proposed management direction to reduce fire risk and severity (pages A-34 – A-35) *may affect, but would not be likely to adversely affect*, Nelson's checker-mallow because the species is not known or suspected to inhabit forest and woodland habitats where most fuels treatments would occur, management direction for Fire, Fuels, and Wildfire Response would require the BLM to maintain species habitat, and management direction for Rare Plants and Fungi (pages A-47 – A-48) would require the BLM, prior to implementing actions that could result in habitat modification in the suitable habitat of any federally-listed plant species, to conduct surveys to determine species presence and **protect** new populations and their habitat. The effects of discovering and **protecting** populations would be *entirely beneficial*.

3. Rare Plants and Fungi

The implementation of proposed management direction for Rare Plants and Fungi (pages A-47 – A-48) *may affect, but would not be likely to adversely affect*, Nelson's checker-mallow because it would require the BLM, prior to implementing actions that could result in habitat modification in the suitable habitat of any federally-listed plant species, to conduct surveys to determine species presence and **protect** new populations and their habitat. Although survey methods place individual plants at risk from handling and unintended trampling by surveyors, surveys would be conducted by professional botanists in accordance with approved protocols and the recovery plan, rendering risks to the species *discountable*. The effects of discovering and **protecting** populations would be *entirely beneficial*.

4. Land Use Allocations and Other Resource Programs

The implementation of the remaining proposed management direction of the Proposed RMP (Appendix A), that is not already addressed under Determinations Common to All Species and Critical Habitats (Section IV A, above), would have *no effect* on Nelson's checker-mallow because it is not known or suspected to occur in the **action area** outside the proposed Walker Flat ACEC.

H. TAYLOR'S CHECKERSPOT

1. Disturbance

The implementation of proposed management direction for Wildlife (pages A-54 – A-55) would require the BLM, before implementing actions in suitable habitat that could **disturb** the Taylor's checkerspot, to conduct surveys to determine species presence and, if found to be present, to not approve, fund, or carry out actions that would adversely affect the species. Thus, implementation of proposed management direction *may affect, but would not be likely to adversely affect*, the checkerspot because the effects of **disturbances** would be *discountable* and the effects of identifying and **protecting** populations from **disruption** would be *entirely beneficial*.

2. Fire, Fuels and Wildfire Response

a. Response to Wildfire

The implementation of proposed management direction requiring the BLM to respond immediately to wildfire (pages A-34 – A-35) *may affect, but would not be likely to adversely affect*, Taylor's checkerspot because, even though the species is not known or suspected to occur in the **action area**, BLM-administered lands are interspersed with historically occupied habitat, making the effects of the BLM wildfire response either *discountable* or *entirely beneficial*. As warranted, the BLM would address the effects of such actions in accordance with emergency consultation procedures (50 CFR §402.05).

b. Reduce Wildfire Risk and Severity

The implementation of proposed management direction to reduce fire risk and severity (pages A-34 – A-35) would have *no effect* on Taylor's checkerspot because the species is not known or suspected to occur in the **action area** and the checkerspot does not occupy the forest and woodland (*i.e.*, non-oak savannah) habitats where most fuels treatments would occur. Proposed management direction for Fire, Fuels, and Wildfire Response would require the BLM to maintain species habitat if it is found in proposed treatment areas, and management direction for Wildlife (pages A-54 – A-55) would require the BLM, prior to implementing actions that could result in habitat modification in the suitable habitat of the checkerspot, to conduct surveys to determine species presence and **protect** new populations and their habitat. Although the effects of discovering and **protecting** populations would be *entirely beneficial*, such effects are *not reasonably certain to occur*.

3. Invasive Species

The implementation of proposed management direction for Invasive Species (page A-36) would require the BLM to treat invasive plants and host species for invasive forest pathogens in accordance with the Records of Decision for the Northwest Area Noxious Weed Control Program Environmental Impact Statement and the Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in Oregon Environmental Impact Statement. Implementation of this direction *may affect, but would not be likely to adversely affect*, the Taylor's checkerspot because, even though the checkerspot is not known or suspected to occur in the **action area**, it would help to control invasive plant species that could adversely affect potential grassland and oak savanna habitats in the **action area** and adjacent lands, rendering the effects of controlling invasive species either *discountable* of *entirely beneficial*.

4. Wildlife

The implementation of proposed management direction for Wildlife (pages A-54 – A-55) *may affect, but would not be likely to adversely affect*, the Taylor's checkerspot because, even though the species is not known or suspected to occur in the **action area**, it would require the BLM to survey suitable habitat for the checkerspot prior to implementing or approving habitat modifications or surface disturbances, and to not approve, fund, or carry out actions that could adversely affect the checkerspot, except when done in accordance with an approved recovery plan, conservation agreement, species management plan, survey and monitoring protocol, or critical habitat rule, and when the action is necessary for the conservation of the species. Although this proposed management direction still would allow adverse actions that are consistent with an approved conservation strategy and needed for species conservation, the proposed management direction would not require such actions. The BLM would address the effects of individual management actions needed to **protect** and maintain Taylor's checkerspot during project-level ESA sec. 7 consultation.

5. Survey and Monitoring

The implementation of proposed management direction for Wildlife (pages A-54 – A-55) to survey for, and monitor populations of, Taylor's checkerspot *may affect, and would be likely to adversely affect*, the species because it would injure/kill individual eggs on host plants. Even though survey and monitoring would be done by professional biologists, and in accordance with survey and monitoring protocols and the approved recovery plan, biologists cannot reasonably complete necessary work without dislodging some checkerspot eggs from host plants. The amount of injury/death would depend on the amount of survey and monitoring required. However, since the majority of eggs would remain undisturbed on host plants during survey and monitoring, the BLM does not anticipate that the level of injury/death to individuals would affect any local population.

6. Land Use Allocations and Other Resource Programs
The implementation of the remaining proposed management direction of the Proposed RMP (Appendix A), that is not already addressed under Determinations Common to All Species and Critical Habitats (Section IV A, above), would have *no effect* on the Taylor's checkerspot because it is not known or suspected to occur in the **action area**.

I. FENDER'S BLUE BUTTERFLY

1. Disturbance
The implementation of proposed management direction for Wildlife (pages A-54 – A-55) would require the BLM, before implementing actions in suitable habitat that could **disturb** the Fender's blue butterfly, to conduct surveys to determine species presence and, if found to be present, to not approve, fund, or carry out actions that would adversely affect the species. Thus, implementation of proposed management direction *may affect, but would not be likely to adversely affect*, the blue butterfly because the effects of **disturbances** would be *discountable* and the effects of identifying and **protecting** populations from **disruption** would be *entirely beneficial*.

2. Fire, Fuels and Wildfire Response

a. Response to Wildfire
The implementation of proposed management direction requiring the BLM to respond immediately to wildfire (pages A-34 – A-35) *may affect, but would not be likely to adversely affect*, the Fender's blue butterfly because the BLM has surveyed extensively for the blue butterfly's host plant, Kincaid's lupine and does not suspect the occurrence of either species outside of known sites. The limited acres of this habitat in the **action area**, coupled with the limited footprint of past wildfires in the **action area**, make the effects of wildfire suppression activities *discountable*. As warranted, the BLM would address the effects of such actions in accordance with emergency consultation procedures (50 CFR §402.05).

b. Reduce Wildfire Risk and Severity
The implementation of proposed management direction to reduce fire risk and severity (pages A-34 – A-35) *may affect, but would not be likely to adversely affect*, the Fender's blue butterfly because the species' host plant, Kincaid's lupine, is known to occur in woodland and forest communities prone to wildfire, proposed management direction for Fire, Fuels, and Wildfire Response would require the BLM to maintain species habitat if it is found in proposed treatment areas, and management direction for Wildlife (pages A-54 – A-55) would require the BLM, prior to implementing actions that could result in habitat modification in the suitable habitat of the blue butterfly, to conduct surveys to determine species presence and **protect** new populations and their habitat. The effects of discovering and **protecting** populations would be *entirely beneficial*.

3. Invasive Species
The implementation of proposed management direction for Invasive Species (page A-36) would require the BLM to treat invasive plants and host species for invasive forest pathogens in accordance with the Records of Decision for the Northwest Area Noxious Weed Control Program Environmental Impact Statement and the Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in Oregon Environmental Impact Statement. Implementation of this direction *may affect, and would be likely to adversely affect*, the Fender's blue butterfly because, even though it would help to control invasive plant species that could adversely affect the blue butterfly's host plant, Kincaid's lupine, in the **action area** and adjacent lands, it would be *reasonably certain* to injure/kill individual blue butterfly eggs or larvae in treatment areas. That said, the implementation of proposed management direction for Wildlife (pages A-54 – A-55) would require the BLM to manage the blue butterfly in a manner that is consistent

with its recovery plan, which limits the area of each population that could be treated during a single year to ensure the persistence of each population. Thus, in the long term, implementation of the proposed management direction for Invasive Species would be *entirely beneficial*.

4. Rare Plants and Fungi

The implementation of proposed management direction for Rare Plants and Fungi (pages A-47 – A-48) *may affect, but would not be likely to adversely affect*, the Fender's blue butterfly because it would require the BLM, prior to implementing actions that could result in habitat modification in the suitable habitat of Kincaid's lupine, the blue butterflies host plant, to conduct surveys to determine species' presence and **protect** new populations and their habitat. Although survey methods place individual plants at risk from handling and unintended trampling by surveyors, surveys would be conducted by professional botanists in accordance with approved protocols and the recovery plan, minimizing those risks to the extent practicable. The effects on the blue butterfly of discovering and **protecting** lupine populations would be *entirely beneficial*.

5. Wildlife

The implementation of proposed management direction for Wildlife (pages A-54 – A-55) *may affect, but would not be likely to adversely affect*, the Fender's blue butterfly because it would require the BLM to **protect** known sites, survey suitable habitat for the blue butterfly prior to implementing or approving habitat modifications or surface disturbances, and to not approve, fund, or carry out actions that could adversely affect the blue butterfly except when done in accordance with an approved recovery plan, conservation agreement, species management plan, survey and monitoring protocol, or critical habitat rule, and when the action is necessary for the conservation of the species. Although this proposed management direction still would allow adverse affects that are consistent with an approved conservation strategy and needed for species conservation, it would not direct such actions. The BLM would address the effects of individual management actions needed to **protect** and maintain Fender's blue butterfly during project-level ESA sec. 7 consultation.

6. Survey and Monitoring

The implementation of proposed management direction for Wildlife (pages A-54 – A-55) to survey for, and monitor populations of, Fender's blue butterfly *may affect, and would be likely to adversely affect*, the species because it would injure/kill individual eggs on host plants. Even though survey and monitoring would be done by professional biologists, and in accordance with survey and monitoring protocols and the approved recovery plan, biologists cannot reasonably complete necessary work without dislodging some blue butterfly eggs from host plants. The amount of injury/death would depend on the amount of survey and monitoring required. However, since the majority of eggs would remain undisturbed on host plants during survey and monitoring, the level of injury/death to individuals would not affect the persistence of any local population.

7. Land Use Allocations and Other Resource Programs

The implementation of the remaining proposed management direction of the Proposed RMP (Appendix A), that is not already addressed under Determinations Common to All Species and Critical Habitats (Section IV A, above), would have *no effect* on the Fender's blue butterfly because the BLM has surveyed extensively for its host plant, Kincaid's lupine, and the blue butterfly is not known or suspected to occur in the **action area** outside of known sites.

J. VERNAL POOL FAIRY SHRIMP AND ITS CRITICAL HABITAT

1. Disturbance

The implementation of proposed management direction for Wildlife (pages A-54 – A-55) would require the BLM, before implementing actions in suitable habitat that could **disturb** the vernal pool fairy shrimp,

to conduct surveys to determine species presence and, if found to be present, to not approve, fund, or carry out actions that would adversely affect the species. Thus, implementation of proposed management direction *may affect, but would not be likely to adversely affect*, the fairy shrimp because the effects of **disturbances** would be *discountable* and the effects of identifying and **protecting** populations from **disturbance** would be *entirely beneficial*.

2. Land Use Allocations

a. Riparian Reserve

The implementation of proposed management direction for the Riparian Reserve (pages A-19 - A-31) *may affect, but would not be likely to adversely affect*, the vernal pool fairy shrimp because it would require the BLM to maintain and restore the proper functioning condition of riparian areas, stream channels and wetlands, and contribute to the conservation of special status species, including the fairy shrimp. In addition, management direction for Wildlife (pages A-54 – A-55) would require the BLM, prior to implementing actions that could result in habitat modification in the suitable habitat of the fairy shrimp, to conduct surveys to determine species presence and **protect** populations and their habitat, rendering the effects to the species of allocating to the Riparian Reserve the 14 acres of fairy shrimp habitat outside the Table Rock ACEC *entirely beneficial*.

The proposed designation of the Riparian Reserve would have *no effect* on vernal pool fairy shrimp critical habitat because the BLM does not propose to allocate critical habitat to the Riparian Reserve.

b. Other Land Use Allocations

The implementation of proposed management direction for the other land use allocations would have *no effect* on the vernal pool fairy shrimp or its critical habitat because neither the shrimp nor its critical habitat are known or suspected to occur outside the Riparian Reserve and Table Rocks ACEC.

3. Areas of Critical Environmental Concern

Designation of the proposed Table Rocks ACEC *may affect, but would not be likely to adversely affect*, the vernal pool fairy shrimp and its critical habitat. The ACEC would include 293 acres of fairy shrimp habitat and 422 acres of critical habitat, and the fairy shrimp and its critical habitat would be among the "relevant and important values" for which the ACEC would be managed, rendering the effects of the designation on the fairy shrimp and its critical habitat *entirely beneficial*. Although individual management actions needed to **protect** and maintain fairy shrimp in the ACEC, that the BLM would implement consistently with the recovery plan and critical habitat rule, might adversely affect the species, the proposed designation would not direct such actions. The BLM would address the effects of individual management actions needed to **protect** and maintain vernal pool fairy shrimp during project-level ESA sec. 7 consultation.

4. Fire, Fuels, and Wildfire Response

a. Response to Wildfire

The implementation of proposed management direction requiring the BLM to respond immediately to wildfire (pages A-34 – A-35) *may affect, but would not be likely to adversely affect*, the vernal pool fairy shrimp and its critical habitat because, even though the Table Rocks ACEC and the 14 acres of habitat in the Riparian Reserve are subject to wildfire and, hence, the BLM response, the infrequency of past wildfires on BLM-administered land in the **action area**, the limited sizes of past fire footprints, and the limited acres of habitat and critical habitat, render the potential effects of a BLM response *discountable*. As warranted, the BLM would address the effects of such actions in accordance with emergency consultation procedures (50 CFR §402.05).

b. Reduce Wildfire Risk and Severity

The implementation of proposed management direction to reduce fire risk and severity *may affect, but would not be likely to adversely affect*, the vernal pool fairy shrimp and its critical habitat because the proposed management direction for Fire, Fuels, and Wildfire Response (pages A-34 – A-35) would require the BLM to **protect** and maintain species habitat, fuels reduction in areas adjacent to habitat could help **protect** and maintain that habitat, and management direction for Wildlife (pages A-54 – A-55) would require the BLM, prior to implementing actions that could result in habitat modification in the suitable habitat of the fairy shrimp, to conduct surveys to determine species presence and **protect** new populations and their habitat, rendering the effects to the species and its critical habitat *entirely beneficial*.

5. Forest Management

The implementation of proposed management direction for Forest Management (page A-35) would have *no effect* on the vernal pool fairy shrimp and its critical habitat because, even though 14 acres of fairy shrimp habitat would be allocated to the Riparian Reserve, those 14 acres are not forested and, therefore, would not be affected by the proposed management direction, and all acres of critical habitat in the **action area** would be allocated to the Table Rocks ACEC and **protected**.

6. Livestock Grazing (BLM Medford District and Klamath Falls Field Office only)

The implementation of proposed management direction for Livestock Grazing (pages A-39 - A-45) *may affect, but would not be likely to adversely affect*, the vernal pool fairy shrimp and its critical habitat because the BLM would exclude grazing from the Upper Table Rock allotment (**Table A-14**) which includes all vernal pool fairy shrimp habitat and critical habitat in the **action area**, rendering the effects *entirely beneficial*.

7. Hydrology

The implementation of proposed management direction for Hydrology (page A-36) *may affect, but would not be likely to adversely affect*, the vernal pool fairy shrimp and its critical habitat because the short term and long terms effects of restoring and maintaining hydrologic function would be *entirely beneficial* to the species and its critical habitat. Management direction for Wildlife (pages A-54 – A-55) would require the BLM, prior to implementing actions that could result in habitat modification in the suitable habitat of the fairy shrimp, to conduct surveys to determine species presence and **protect** new populations and their habitat.

8. Invasive Species

All critical habitat, and all but 14 acres of habitat, for the vernal pool fairy shrimp would be allocated to the Table Rocks ACEC. In the Table Rocks ACEC and on the additional 14 acres, the implementation of proposed management direction for Invasive Species (page A-36) *may affect, but would not be likely to adversely affect*, the vernal pool fairy shrimp and its critical habitat because, even though the immediate effects of human intrusion into habitats could be negative, such effects are *not reasonably certain to occur* based on how the BLM has implemented past control actions potentially affecting the fairy shrimp or it critical habitat. In addition, the long term effects of invasive species management on the fairy shrimp and its critical habitat would be *discountable* or *entirely beneficial* because it would reduce the risk of habitat modification from invasive species. Finally, the implementation of proposed management direction for Wildlife (pages A-54 – A-55) would require the BLM to survey suitable habitat for the vernal pool fairy shrimp prior to implementing or approving habitat modifications or surface disturbances, and to not approve, fund, or carry out actions that could adversely affect the fairy shrimp or its critical habitat, except when done in accordance with an approved recovery plan, conservation agreement, species management plan, survey and monitoring protocol, or critical habitat rule, and when the action is necessary for the conservation of the species. Although the ACEC designation would allow such adverse actions, the proposed designation would not direct such actions. The BLM would address the effects of

individual management actions needed to **protect** and maintain fairy shirmp during project-level ESA sec. 7 consultation.

9. Lands, Realty, and Roads

Implementation of the following proposed management direction for Lands, Realty, and Roads (pages A-38 - A-39) *may affect, but would not be likely to adversely affect*, the vernal pool fairy shrimp and vernal pool fairy shrimp critical habitat, due to the implementation of proposed management direction for Wildlife (pages A-54 - A-61):

- Construct new permanent/temporary roads where needed to meet resource management objectives, including major culverts and bridges as necessary, to established BLM engineering design standards. Apply road location, design, and construction best management practices as needed.
- Maintain existing roads, including major culverts and bridges, to provide access for both resource management and casual use activities while protecting water quality and facility investments and providing user safety, to established BLM maintenance standards. Apply road maintenance and wet weather road use best management practices as needed.
- Remove hazard trees and downed trees along roads for safety or operational reasons.
- Fully decommission or obliterate (permanent closure) roads with no future resource management need. Decommission (long-term closure) roads not currently needed for resource management but that will be operated and maintained again in the future. Apply road closure best management practices as needed. Close roads only with the approval of affected reciprocal right-of-way permittees.

Proposed management direction for Wildlife would require the BLM to survey suitable habitat for the vernal pool fairy shrimp prior to implementing or approving habitat modifications or surface disturbances, and to prohibit or deny actions that could adversely affect the fairy shrimp or its critical habitat, except when done in accordance with an approved recovery plan, conservation agreement, species management plan, survey and monitoring protocol, or critical habitat rule, and when the action is necessary for the conservation of the species (which are *not reasonably certain* to include rights-of-way). Additional management direction for Wildlife (page A-60) specifically would prevent the BLM from authorizing or constructing discretionary roads and trails within designated critical habitat for the vernal pool fairy shrimp or within vernal pool fairy shrimp habitat. The effects of surveying for new fairy shrimp populations, and **protecting** known and newly-discovered populations, would be *entirely beneficial*. Since vernal pool fairy shrimp critical habitat already is delineated, the effects of implementing proposed management direction for Lands, Realty, and Roads (when combined with direction for Wildlife) would be *discountable*.

10. Recreation and Visitor Services

Even though the vernal pool fairy shrimp and its critical habitat are potentially threatened by trampling from recreation activities, management direction for Recreation and Visitor Services (pages A-48 - A-50) *may affect, but would not be likely to adversely affect*, the fairy shrimp, and would have *no effect* on fairy shrimp critical habitat. All vernal pool fairy shrimp critical habitat, and all but 14 acres of its habitat, in the **action area** would be allocated to the Table Rocks ACEC and would be managed to **protect** and maintain the fairy shrimp and its habitat. Thus, in this area, management direction for Recreation and Visitor Services would have *no effect* on either the species or its critical habitat. The remaining 14 acres of habitat would be managed as an Extensive Recreation ManagementArea in which recreation would be managed commensurate with the needs of the species, rendering the effects *discountable* or *entirely beneficial*.

11. Trails and Travel Management
The implementation of proposed management direction for Travel and Travel Management (pages A-52 - A-53) would have *no effect* on the vernal pool fairy shrimp or its critical habitat because proposed management direction for Wildlife (page A-60) specifically would prevent the BLM from authorizing or constructing discretionary roads and trails within designated critical habitat for the vernal pool fairy shrimp or within vernal pool fairy shrimp habitat.

12. Wildlife
The implementation of proposed management direction for Wildlife (pages A-54 - A-55) *may affect, but would not be likely to adversely affect*, the vernal pool fairy shrimp and vernal pool fairy shrimp critical habitat. The proposed management direction would require the BLM to survey suitable habitat for the vernal pool fairy shrimp prior to implementing or approving habitat modifications or surface disturbances, and to not approve, fund, or carry out actions that could adversely affect the fairy shrimp or its critical habitat, except when done in accordance with an approved recovery plan, conservation agreement, species management plan, survey and monitoring protocol, or critical habitat rule, and when the action is necessary for the conservation of the species. Although this proposed management direction still would allow adverse actions that are consistent with an approved conservation strategy and needed for species conservation, the proposed management direction would not direct such actions. The BLM would address the effects of individual management actions needed to **protect** and maintain fairy shrimp during project-level ESA sec. 7 consultation. Thus, the effects of surveying for new fairy shrimp populations, and **protecting** known and newly-discovered populations, would be *discountable* or *entirely beneficial* depending on if new populations are found. Since vernal pool fairy shrimp critical habitat already is delineated, the proposed management direction would require the BLM to **protect critical habitat**, rendering the effects *entirely beneficial*.

13. Survey and Monitoring
BLM actions to survey for, and monitor populations of, vernal pool fairy shrimp *may affect, and would be likely to adversely affect*, the species because it would injure/kill individuals collected in water samples. Even though survey and monitoring would be done by professional biologists, and in accordance with survey and monitoring protocols and the approved recovery plan, biologists cannot reasonably complete necessary work without capturing and handling some individuals. The amount of injury/death would depend on the amount of survey and monitoring required. However, since the majority of fairy shrimp would remain undisturbed in water bodies during survey and monitoring, the BLM does not anticipate that the level of injury/death to individuals would affect the persistence of any local population.

14. Other Resource Programs
The implementation of the remaining proposed management direction of the Proposed RMP (Appendix A), that is not already addressed under Determinations Common to All Species and Critical Habitats (Section IV A, above), would have *no effect* on the vernal pool fairy shrimp or its critical habitat.

K. OREGON SPOTTED FROG AND ITS PROPOSED CRITICAL HABITAT

1. Disturbance
The implementation of proposed management direction for Wildlife (pages A-54 - A-55) would require the BLM, before implementing actions in suitable habitat that could **disturb** the Oregon spotted frog, to conduct surveys to determine species presence and, if found to be present, to not approve, fund, or carry out actions that would adversely affect the species. Thus, implementation of proposed management direction *may affect, but would not be likely to adversely affect*, the spotted frog because the effects of **disturbances** would be *discountable* and the effects of identifying and **protecting** populations from **disturbance** would be *entirely beneficial*.

2. Land Use Allocations

a. Late-Successional Reserve and Riparian Reserve

The implementation of proposed management direction for the Late-Successional Reserve (pages A-14 - A-19) and Riparian Reserve (pages A-19 - A-31) *may affect, but would not be likely to adversely affect*, the Oregon spotted frog because it would help protect forest wetland habitats within the allocations from sediment inflow and increased temperature, making the effects *entirely beneficial*. Although the proposed management direction would allow habitat modifications that potentially could affect the spotted frog, the implementation of proposed management direction for Wildlife (pages A-54 - A-55) would require the BLM to survey suitable habitat for the spotted frog prior to implementing or approving habitat modifications or surface disturbances, and to not approve, fund, or carry out actions that could adversely affect the spotted frog except when done in accordance with an approved recovery plan, conservation agreement, species management plan, survey and monitoring protocol, and when the action is necessary for the conservation of the species. Although the proposed Wildlife management direction still would allow adverse actions that are consistent with an approved conservation strategy and needed for species conservation, it would not direct adverse effects, and any adverse effects would be addressed through project-level ESA sec. 7 consultation.

The implementation of proposed management direction for the Late-Successional Reserve and Riparian Reserve would have *no effect* on Oregon spotted frog proposed critical habitat because no such habitat would be allocated to the reserves.

b. District-Designated Reserves

The implementation of proposed management direction for District-Designated Reserves (pages A-3 - A-4) would have *no effect* on the Oregon spotted frog or its proposed critical habitat because the species is not known or suspected to occur in these reserves, and the reserves contain no proposed critical habitat.

c. Harvest Land Base

The implementation of proposed management direction for the Harvest Land Base (pages A-8 - A-14) *may affect, but would not be likely to adversely affect*, the Oregon spotted frog because, even though the designation would direct the BLM to implement timber harvest adjacent to forest wetland habitats potentially occupied by spotted frogs, proposed management direction for Hydrology (page A-36) would require the BLM to apply best management practices to maintain water quality within the range of natural variability that meets Oregon Department of Environmental Quality water quality standards for drinking water, contact recreation, and aquatic biodiversity, and proposed management direction for Wildlife (pages A-54 - A-55) would require the BLM to survey suitable habitat for the spotted frog prior to implementing or approving habitat modifications or surface disturbances, and to not approve, fund, or carry out actions that could adversely affect the spotted frog except when done in accordance with an approved recovery plan, conservation agreement, species management plan, or survey and monitoring protocol, and when the action is necessary for the conservation of the species (which are *not reasonably certain* to include timber harvest). The effects of maintaining water quality, and surveying for new spotted frog populations and **protecting** known and newly-discovered populations, would be *entirely beneficial*.

1). Moderate Intensity Timber Area

The implementation of proposed management direction for the Moderate Intensity Timber Area (pages A-11 - A-13) would have *no effect* on Oregon spotted frog proposed critical habitat because the proposed delineation would not occur in this land use allocation.

2). Low Intensity Timber Area and Uneven-Aged Timber Area
The implementation of proposed management direction for the Low Intensity Timber Area (pages A-10 - A-11) and Uneven-Aged Timber Area (pages A-13 - A-14) *may affect, but would not be likely to adversely affect*, Oregon spotted frog proposed critical habitat because, even though the designation would direct timber harvest adjacent to proposed Unit 14, proposed management direction for Hydrology (page A-36) would require the BLM to apply best management practices to maintain water quality within the range of natural variability that meets Oregon Department of Environmental Quality water quality standards for drinking water, contact recreation, and aquatic biodiversity, rendering the effects to proposed critical habitat *discountable*.

d. Eastside Management Area (BLM Klamath Falls Field Office only)
The implementation of proposed management direction for the Eastside Management Area (pages A-4 - A-8) would have *no effect* on Oregon spotted frog proposed critical habitat because the proposed delineation would not occur in this land use allocation.

3. Areas of Critical Environmental Concern
The proposed designation of the Tunnel Creek ACEC *may affect, but would not be likely to adversely affect*, the Oregon spotted frog and its proposed critical habitat because the spotted frog is identified as one of the "relevant and important values" for which the ACEC would be managed. The 40 acres of spotted frog habitat, and 38 acres of spotted frog proposed critical habitat, that occur in the proposed ACEC would be **protected**, rendering the effects to the spotted frog and its proposed critical habitat *entirely beneficial*. Although individual management actions needed to **protect** and maintain the spotted frog in the ACEC might adversely affect the species, at this time such management actions are *not reasonably certain to occur*. The effects of individual management actions needed to **protect** and maintain Oregon spotted frog would be addressed through project-level ESA sec. 7 consultation.

4. Fire, Fuels and Wildfire Response

a. Response to Wildfire
The implementation of proposed management direction requiring the BLM to respond immediately to wildfire (pages A-34 – A-35) *may affect, but would not be likely to adversely affect*, the Oregon spotted frog and its proposed critical habitat because, even though forested stands adjacent to wetland habitats are subject to wildfire and, hence, the BLM response, the infrequency of past wildfires on BLM-administered land, the limited sizes of past fire footprints, the limited acres of habitat and proposed critical habitat, and the **protection** BLM intervention would provide to habitats adjacent to treatment areas, would render the potential effects of a BLM response *discountable*. As warranted, the BLM would address the effects of such actions in accordance with emergency consultation procedures (50 CFR §402.05).

b. Reduce Wildfire Risk and Severity
The implementation of proposed management direction to reduce fire risk and severity (pages A-34 – A-35) *may affect, but would not be likely to adversely affect*, the Oregon spotted frog and its proposed critical habitat because the proposed management direction for Fire, Fuels, and Wildfire Response would require the BLM to **protect** and maintain species habitat, and fuels reduction in areas adjacent to habitat could help **protect** and maintain that habitat. In addition, proposed management direction for Wildlife (pages A-54 - A-55) would require the BLM to survey suitable habitat for the spotted frog prior to implementing or approving habitat modifications or surface disturbances, and to not approve, fund, or carry out actions that could adversely affect the spotted frog except when done in accordance with an approved recovery plan, conservation agreement, species management plan, or survey and monitoring protocol, and when the action is necessary for the conservation of the species. Although the proposed management direction would allow such adverse actions, the proposed

management direction would not direct such actions. The BLM would address the effects of individual management actions needed to **protect** and maintain Oregon spotted frogs during project-level ESA sec. 7 consultation. The effects of maintaining water quality, and surveying for new spotted frog populations and **protecting** known and newly-discovered populations, would be *entirely beneficial*.

5. Fisheries

The implementation of proposed management direction for Fisheries (page A-35) *may affect, but would not be likely to adversely affect*, the Oregon spotted frog and its proposed critical habitat because, even though it would direct the BLM to implement fish restoration projects in proposed critical habitat and in habitats potentially occupied by spotted frogs, proposed management direction for Hydrology (page A-36) would require the BLM to apply best management practices to maintain water quality within the range of natural variability that meets Oregon Department of Environmental Quality water quality standards for drinking water, contact recreation, and aquatic biodiversity. In addition, proposed management direction for Wildlife (pages A-54 - A-55) would require the BLM to survey suitable habitat for the spotted frog prior to implementing or approving habitat modifications or surface disturbances, and to not approve, fund, or carry out actions that could adversely affect the spotted frog except when done in accordance with an approved recovery plan, conservation agreement, species management plan, or survey and monitoring protocol, and when the action is necessary for the conservation of the species (which are *not reasonably certain* to include fisheries projects). The effects to the species and its proposed critical habitat of maintaining water quality, and surveying for new spotted frog populations and **protecting** known and newly-discovered populations, would be *entirely beneficial*.

6. Forest Management

The implementation of proposed Forest Management direction (pages A-35) *may affect, but would not be likely to adversely affect*, the Oregon spotted frog because, even though it would direct the BLM to implement forest treatment and restoration projects that could occur adjacent to forest wetland habitats potentially occupied by spotted frogs, proposed management direction for Hydrology (page A-36) would require the BLM to apply best management practices to maintain water quality within the range of natural variability that meets Oregon Department of Environmental Quality water quality standards for drinking water, contact recreation, and aquatic biodiversity. In addition, proposed management direction for Wildlife (pages A-54 - A-55) would require the BLM to survey suitable habitat for the spotted frog prior to implementing or approving habitat modifications or surface disturbances, and to not approve, fund, or carry out actions that could adversely affect the spotted frog except when done in accordance with an approved recovery plan, conservation agreement, species management plan, or survey and monitoring protocol, and when the action is necessary for the conservation of the species. Although the proposed management direction would allow such adverse actions, the proposed designations would not direct such actions. The BLM would address the effects of individual management actions needed to **protect** and maintain spotted frogs during project-level ESA sec. 7 consultation. The effects of maintaining water quality, and surveying for new spotted frog populations and **protecting** known and newly-discovered populations, would be *entirely beneficial*.

The implementation of proposed Forest Management direction *may affect, but would not be likely to adversely affect*, Oregon spotted frog proposed critical habitat because, even though forest treatments and restoration could occur adjacent to proposed Unit 14, management direction for Hydrology would require the BLM to maintain water quality within the range of natural variability that meets Oregon Department of Environmental Quality water quality standards for drinking water, contact recreation and aquatic biodiversity. In addition, proposed management direction for Wildlife would require the BLM to manage critical habitat consistently with the critical habitat final rule (if published). This would render the potential effects to spotted frog proposed critical habitat *entirely beneficial*.

7. Hydrology
The implementation of proposed management direction for Hydrology (page A-36), *may affect, but would not be likely to adversely affect*, the Oregon spotted frog and its proposed critical habitat because it would require the BLM to apply best management practices to maintain water quality within the range of natural variability that meets Oregon Department of Environmental Quality water quality standards for drinking water, contact recreation, and aquatic biodiversity. In addition, the implementation of proposed management direction for Wildlife (pages A-54 - A-55) would require the BLM to manage naturally occurring special habitats to maintain their ecological function including: seeps, springs, wetlands, natural ponds and vernal pools/ponds. This would render the effect to the spotted frog and its proposed critical habitat *entirely beneficial*.

8. Invasive Species
The implementation of proposed management direction for Invasive Species (page A-36) *may affect, but would not be likely to adversely affect*, the Oregon spotted frog and its proposed critical habitat because control actions implemented in accordance with this direction would help control the potential infestation and modification of spotted frog habitats by reed canary grass and other invasive species. The Oregon Department of Fish & Wildlife, in its Oregon Conservation Strategy (ODFW 2006, p. 338), recommends controlling invasive species to benefit the Oregon spotted frog and its habitat. In addition, proposed management direction for Wildlife (pages A-54 - A-55) would require the BLM to survey suitable habitat for the spotted frog prior to implementing or approving control actions, and to not approve, fund, or carry out actions that could adversely affect the spotted frog or its habitat except when done in accordance with an approved recovery plan, conservation agreement, species management plan, or survey and monitoring protocol, and when the action is necessary for the conservation of the species. Although the proposed management direction would allow such adverse actions, the proposed management direction would not direct such actions. The BLM would address the effects of individual management actions needed to **protect** and maintain spotted frogs during project-level ESA sec. 7 consultation.

9. Lands, Realty, and Roads
Implementation of the following proposed management direction for Lands, Realty, and Roads (pages A-38 - A-39) *may affect, but would not be likely to adversely affect*, the Oregon spotted frog and its proposed critical habitat, due to the implementation of proposed management direction for Wildlife (pages A-54 - A-55):

- Construct new permanent/temporary roads where needed to meet resource management objectives, including major culverts and bridges as necessary, to established BLM engineering design standards. Apply road location, design, and construction best management practices as needed.
- Maintain existing roads, including major culverts and bridges, to provide access for both resource management and casual use activities while protecting water quality and facility investments and providing user safety, to established BLM maintenance standards. Apply road maintenance and wet weather road use best management practices as needed.
- Remove hazard trees and downed trees along roads for safety or operational reasons.
- Fully decommission or obliterate (permanent closure) roads with no future resource management need. Decommission (long-term closure) roads not currently needed for resource management but that will be operated and maintained again in the future. Apply road closure best management practices as needed. Close roads only with the approval of affected reciprocal right-of-way permittees.

Proposed management direction for Wildlife would require the BLM to survey suitable habitat (including proposed critical habitat) for the Oregon spotted frog prior to implementing or approving habitat modifications or surface disturbances, and to prohibit or deny actions that could adversely affect the spotted frog or its habitat, except when done in accordance with an approved recovery plan, conservation

agreement, species management plan, or survey and monitoring protocol, and when the action is necessary for the conservation of the species. Although the proposed management direction would allow such adverse actions, the proposed management direction would not direct such actions. The BLM would address the effects of individual management actions needed to **protect** and maintain spotted frogs during project-level ESA sec. 7 consultation. The effects of surveying for new spotted frog populations, and **protecting** known and newly-discovered populations, would be *entirely beneficial*. Since Oregon spotted frog proposed critical habitat already is delineated, the combination of proposed management direction for Lands, Realty, and Roads, and Wildlife, would require the BLM to **protect** proposed critical habitat if it is designated by the U.S. Fish and Wildlife Service, rendering the effects *entirely beneficial*.

10. Livestock Grazing (BLM Medford District and Klamath Falls Field Office only)
The implementation of proposed management direction for Livestock Grazing (pages A-39 - A-45) *may affect, but would not be likely to adversely affect*, the Oregon spotted frog because it would require the BLM to manage livestock grazing in accordance with the Standards for Rangeland Health and Guidelines for Livestock Grazing Management for Public Lands in Oregon and Washington included in Appendix K of the Proposed RMP. Standard #5 of the rangeland health standards (Native, T&E, and Locally Important Species; 1.j.) includes requirements to provide for the life cycle requirements, and maintain or restore the habitat elements of native (including Threatened and Endangered, special status, and locally important species) and desired plants and animals. This guidance would require the BLM to restrict the timing of livestock grazing to avoid impacts to Oregon spotted frogs at occupied sites. In addition, the implementation of proposed management direction for Wildlife (pages A-54 - A-55 and A-58) would require the BLM to manage livestock grazing at sites occupied by Oregon spotted frogs to prevent direct impacts to eggs, tadpoles and adults. The management of livestock grazing at sites occupied by spotted frogs is consistent with conservation actions recommended by the Oregon Department of Fish & Wildlife in the Oregon Conservation Strategy (ODFW 2006, p. 338). Thus, the effects of implementing proposed management direction for livestock grazing on the Oregon spotted frog would be *insignificant*.

The implementation of proposed management direction for Livestock Grazing would have *no effect* on Oregon spotted frog proposed critical habitat because proposed critical habitat is not delineated in any BLM grazing allotment.

11. Wildlife
The implementation of proposed management direction for Wildlife (pages A-54 - A-61) *may affect, but would not be likely to adversely affect*, the Oregon spotted frog because it would require the BLM to survey suitable habitat for the spotted frog prior to implementing or approving habitat modifications or surface disturbances, and to not approve, fund, or carry out actions that could adversely affect the spotted frog, except when done in accordance with an approved recovery plan, conservation agreement, species management plan, survey and monitoring protocol, or critical habitat final rule, and when the action is necessary for the conservation of the species. Although the proposed management direction would allow such adverse actions, the proposed management direction would not direct such actions. The BLM would address the effects of individual management actions needed to **protect** and maintain spotted frogs during project-level ESA sec. 7 consultation. The effects of surveying for new spotted frog populations, and **protecting** known and newly-discovered populations, would be *entirely beneficial*.

Proposed management direction for Wildlife (pages A-54 – A-55) would require the BLM to **protect** designated critical habitat but does not address proposed critical habitat. If the U.S. Fish and Wildlife Service designates critical habitat for the Oregon spotted frog, implementation of the proposed management direction for Wildlife *may affect, but would not be likely to adversely affect*, Oregon spotted frog critical habitat because it would extend to and include that critical habitat, rendering the effects *entirely beneficial*.

12. Survey and Monitoring
BLM actions to survey for, and monitor populations of, Oregon spotted frogs *may affect, and would be likely to adversely affect*, the species because it would **disrupt** the normal behavior of individuals in work areas. Even though survey and monitoring would be done by professional biologists, and in accordance with survey and monitoring protocols and the approved recovery plan, biologists cannot reasonably complete necessary work without **disturbing**, capturing, handling and releasing individuals, thus creating the likelihood of injury and **disrupting** normal behaviors. The amount of **disruption** would depend on the amount of survey and monitoring required. However, the majority of spotted frogs would remain undisturbed during survey and monitoring because relatively few would need to be affected to complete necessary work. Therefore, the BLM does not anticipate that the level of **disruption** of individuals would affect the persistence of any local population.

13. Other Resource Programs
The implementation of the remaining proposed management direction of the Proposed RMP (Appendix A), that is not already addressed under Determinations Common to All Species and Critical Habitats (Section IV A, above), would have *no effect* on the Oregon spotted frog or its proposed critical habitat.

L. GRAY WOLF

1. Disturbance
The implementation of proposed management direction for Wildlife (pages A-56 – A-57) *may affect, but would not be likely to adversely affect*, gray wolves from **disturbance** (see Section I D) because it would require the BLM to restrict activities that create noise or visual **disturbance**(s) above ambient conditions within one mile of known active gray wolf dens from April 1 to July 15. The effects of the proposed management direction on wolves would be *entirely beneficial* because it would help prevent **disturbances**.

The BLM does not propose management direction to address **disturbances** to gray wolves in other areas or at other times because wolves use a wide range of habitats and, outside denning areas, are highly mobile; i.e., implementation of the Proposed RMP is *not reasonably certain* to **disrupt** the normal behavior of gray wolves. The BLM would address the effects of project-level **disturbances** on gray wolves, if any, during project-level ESA sec. 7 consultation.

2. Livestock Grazing (BLM Medford District and Klamath Falls Field Office only)
The implementation of proposed management direction for Livestock Grazing (pages A-39 - A-45) *may affect, but would not be likely to adversely affect*, gray wolves because the management direction would reduce opportunities for conflicts between gray wolves and livestock, rendering the effects *entirely beneficial*. Under the Proposed RMP, the BLM would reduce the acres available for grazing by 27 percent (from 495,190 acres to 359,049 acres) although the acres that are actively grazed would not change substantively from current levels. This would substantively reduce the potential overlap between areas grazed by livestock and potentially occupied by wolves and would not substantively change the level of potential conflicts between livestock and wolves in active allotments. In addition, management direction for Wildlife (pages A-56 – A-57) would require the BLM to further reduce the potential for livestock-wolf conflicts in active allotments when wolves are determined to be present and the U.S. Fish and Wildlife Service recommends management intervention by the BLM for species conservation. The Proposed RMP does not address future actions by the U.S. Fish and Wildlife Service to address future livestock-wolf conflicts as such action is beyond the discretion of the BLM. In addition, future livestock-wolf conflicts would be symptomatic of an expanding wolf population.

3. Wild Horses
The implementation of proposed management direction for the free-roaming horses in the Pokegama Herd Management Area of the Klamath Falls Field Office (page A-61) *may affect, but would not be likely to adversely affect*, gray wolves because, even though there is the potential for **disturbance** to denning wolves within 1 mile of unknown and undiscovered den sites through horse gathers to maintain the Pokegama herd at appropriate management levels (the Pokegama Herd Management Area is coincident with the Keno pair of gray wolves), proposed management direction for Wildlife (pages A-56 – A-57) would require the BLM to restrict activities that create noise or visual **disturbance**(s) above ambient conditions within one mile of known active gray wolf dens from April 1 to July 15, rendering the effects of the proposed management direction *entirely beneficial*. The BLM does not propose management direction to address **disturbances** to gray wolves in other areas or at other times because wolves use a wide range of habitats and, outside denning areas, are highly mobile; i.e., implementation of the Proposed RMP is *not reasonably certain* to **disrupt** the normal behavior of gray wolves. The BLM would address the effects of project-level **disturbances** on gray wolves, if any, during project-level ESA sec. 7 consultation.

4. Land Use Allocations and Other Resource Programs
The implementation of the remaining proposed management direction of the Proposed RMP (Appendix A), that is not already addressed under Determinations Common to All Species and Critical Habitats (Section IV A, above), *may affect, but would not be likely to adversely affect*, the gray wolf, because the amount and distribution of gray wolf habitat in the **action area** would not change, given the plasticity of gray wolves in using the landscape and their resilience to different land-use management regimes, rendering the effects *discountable*.

M. LOWER COLUMBIA RIVER DISTINCT POPULATION SEGMENT OF THE COLUMBIAN WHITE-TAILED DEER
The implementation of proposed management direction of the Proposed RMP (Appendix A), that is not already addressed under Determinations Common to All Species and Critical Habitats (Section IV A, above), *may affect, but would not be likely to adversely affect*, the Lower Columbia River Distinct Population Segment of the Columbian white-tailed deer because the effect would be *entirely beneficial*. As stated in Section III M of this assessment, under the Proposed RMP the BLM would provide 2 to 4 times more white-tailed deer habitat to this population segment in 50 years (1,488 acres of early-successional, higher-quality forage habitat) than it does currently (459 acres). In addition, proposed management direction for Wildlife (pages A-54 - A-55) would require the BLM to survey suitable habitat for the Lower Columbia River distinct population segment of Columbian white-tailed deer prior to implementing actions that could result in habitat modification or species **disturbance** (see Section I D), and to not approve, fund, or carry out actions that would adversely affect white-tailed deer, except when done in accordance with an approved recovery plan, conservation agreement, species management plan, or survey and monitoring protocol, and when the action is necessary for the conservation of the species. Although the proposed management direction would allow such adverse actions, it would not direct such actions. The BLM would address the effects of individual management actions needed to **protect** and maintain white-tailed deer during project-level ESA sec. 7 consultation.

N. FISHER

1. Disturbance
The implementation of proposed management direction for Wildlife (page A-56) *may affect, but would not be likely to adversely affect*, the fisher because it would require the BLM to not approve, fund, or carry out actions that would **disrupt** normal fisher behaviors (*e.g*., foraging, resting or denning) associated with known natal or maternal denning sites, except when done in accordance with an approved recovery plan, conservation agreement, species management plan, survey and monitoring protocol, or

critical habitat rule, and when the action is necessary for the conservation of the species, rendering the effects to the species *insignificant* or *entirely beneficial*, depending on the project-level action taken.

The BLM does not propose management direction to address **disturbances** to fisher in other areas or at other times because, due to the mobility of fishers, the Proposed RMP is *not reasonably certain* to adversely affect fishers because such effects are speculative at this time. The BLM would address the effects of project-level **disturbances** on fisher, if any, during project-level ESA sec. 7 consultation.

2. Land Use Allocations

a. Late-Successional Reserve

The designation of, and implementation of proposed management direction for, the Late-Successional Reserve (pages A-14 - A-19) *may affect, but would not be likely to adversely affect*, the fisher because the direction would limit silvicultural activities in northern spotted owl nesting-roosting habitat to those that maintain nesting-roosting habitat function regardless of northern spotted owl occupancy. Such habitat encompasses all fisher resting and denning habitat. The treatment of northern spotted owl dispersal habitat would be limited to activities that speed the development, or improve the quality, of northern spotted owl habitat in the stand, or in the adjacent stand, or both, and do not preclude or delay by 20 years or more the development of northern spotted owl nesting-roosting habitat in the stand or in adjacent stands. Such stands include fisher foraging habitat. In conifer stands that currently are not older and more structurally-complex, the designation would limit activities to those that promote the development of structurally-complex forest. In addition, the implementation of proposed management direction for Wildlife (pages A-54 – A-56) would require the BLM, in forest stands with known fisher natal or maternal denning or dens, to maintain at least 80 percent canopy cover within at least 50 feet of known fisher natal and maternal dens, maintain sufficient canopy cover on the remainder of the stand to support fisher denning post-project, protect fisher denning structures at least 24" in diameter (snags, down woody material, and live trees with cavities) within the stand to the extent consistent with safety standards, **retain untreated portions within the stand** and, within 5th field-watersheds where fisher are documented to occur, favor retaining trees that have structures (e.g., cavities, mistletoe, rust brooms) that are typically used as denning or resting sites by fisher. Thus, the effects of the designation on the fisher would be *discountable* during the short term (within 20 years of treatments) and *entirely beneficial* during the long term.

b. Riparian Reserve

The designation of, and implementation of proposed management direction for, Riparian Reserve (pages A-19 - A-31) *may affect, and would be likely to adversely affect*, the fisher because the direction would allow the loss of fisher foraging, resting and denning habitat. Although management direction would prohibit the falling and removal of trees in the inner zone (i.e., within 120 feet of fish bearing streams and 50 feet of intermittent streams)—except for safety or operational reasons, or for stream restoration, disease treatments, or alder or brushfield conversion—between these distances and one site-potential tree height from the stream the designation would direct the application of silvicultural treatments to increase the diversity of riparian species, develop structurally-complex stands, and foster diverse understory plant communities and hardwood vigor and persistence. To accomplish this, the designation would allow existing canopy cover to drop to 30 percent with 60 trees per acre expressed as an average across the Riparian Reserve portion of the stand. Although additional direction would limit the size of forest openings and retain snags and course woody debris, and directed activities would be *entirely beneficial* to the fisher during the long term (more than 20 years), the short term modification and removal of fisher habitat would be *reasonably certain to occur*. Although the BLM cannot reasonably estimate the level of injury/death due to the difficulty of identifying occupied habitat, the large dispersal distances and home range sizes of the species, the fisher's habit of to not re-using denning sites, as shown in **Table II-2** the BLM anticipates treating

42,600 acres in the middle (50 – 120 feet from intermittent streams in Class I subwatersheds) and outer (120 feet – one site-potential tree height in all subwatersheds) zones during the next 50 years. Of these acres, about 10 – 20 percent (4,300 – 8,500 acres) would affect potential maternal denning habitat in the dry forest and no more than 5 percent (2,100 acres) would affect potential maternal denning habitat in the moist forest. Such treatments would potentially injure/kill denning fishers associated with these acres. Even though proposed management direction for Wildlife (pages A-54 – A-56) would require the BLM to protect known natal and maternal denning sites—except when done in accordance with an approved recovery plan, conservation agreement, species management plan, survey and monitoring protocol, or critical habitat rule, and when the action is necessary for the conservation of the species—there currently exists no survey protocol for fisher and the BLM does not propose management direction that would require it to complete pre-project surveys for fisher.

c. District-Designated Reserves

The designation of, and implementation of proposed management direction for, District-Designated Reserves (pages A-3 - A-4) *may affect, but would not be likely to adversely affect*, the fisher because these reserves would be designated for specific purposes and the proposed direction would continue current management practices to achieve those purposes. As such, existing facilities and infrastructure, and areas classified as unsuitable for timber production, are unlikely to be occupied by fishers, and lands managed for their wilderness characteristics would be managed in a manner that would not adversely affect the fisher. Thus, the effects to the species would be *discountable*.

d. Harvest Land Base

1). Moderate Intensity Timber Area

The designation of, and implementation of proposed management direction for, the Moderate Intensity Timber Area (pages A-11 - A-13), *may affect, and would be likely to adversely affect*, the fisher by directing the removal of fisher resting, foraging and denning habitats, making such removal *reasonably certain to occur*.

Standard thinning (*i.e.*, commercial thinning) would affect an estimated 96,000 acres of fisher habitat during the next 50 years (**Table II-2**). Standard thinning treatments *may affect, but would not be likely to adversely affect*, the fisher on about 90 percent of these acres (86,400 acres) because they would treat forest stands less than 80 years old (resting habitat), which is not limited in the **action area**, rendering the effects to the species *discountable*. Standard thinning treatments *may affect, and would be likely to adversely affect*, the fisher on the remaining 10 percent of these acres (9,600 acres) because they would treat forest stands 80 years old and older (fisher foraging and denning habitat) and result in a post-treatment canopy cover of 50 – 60 percent (foraging and denning habitat downgraded), causing the injury/death of individual fishers associated with those acres.

Salvage treatments, which would affect an estimated 700 acres of fisher habitat during the next 50 years (**Table II-2**), *may affect, but would not be likely to adversely affect*, the fisher because they would not remove resting, foraging or denning habitat and would comply with management standards to retain sufficient snags and coarse woody debris in treatment areas, rendering the effects *discountable*. Regeneration harvest would occur only in areas greater than 10 acres in size that had been modified by high-severity wildfire. In all other areas—areas less than 10 acres in size and areas not modified by high-severity wildfire—variable retention harvest would remove only dead material up to snag and coarse woody debris standards.

Regeneration harvest would affect an estimated 111,800 acres of fisher habitat during the next 50 years (**Table II-2**). Due to the current forest stand age distribution on BLM-administered lands,

and the target rotation schedule, about 60 percent of those acres (67,100 acres) would be forest stands 50 – 80 years old (fisher resting habitat) and the remaining 40 percent of those acres (44,700 acres) would be 80 years old or older (fisher foraging and denning habitat). In all cases, treatments would reduce the post-treatment canopy cover to less than 40 percent, resulting in the removal of fisher resting, foraging and denning habitat. However, treatments would be well dispersed and intermixed with forest stands in reserve land use allocations. Thus, regeneration harvest *may affect, but would not be likely to adversely affect*, fishers associated with 67,100 acres of resting habitat treated, *may affect, and* (through selection harvest) *would be likely to adversely affect*, fishers associated with 44,700 acres of foraging and denning habitat treated, and would cause the injury/death of any fishers denning in those 44,700 acres.

2). Low Intensity Timber Area

The designation of, and implementation of proposed management direction for, the Low Intensity Timber Area (pages A-10 - A-11), *may affect, and would be likely to adversely affect*, the fisher by directing the removal of fisher resting, foraging and denning habitats, making such removal *reasonably certain to occur*.

Standard thinning (*i.e*., commercial thinning) would affect an estimated 46,400 acres of fisher habitat during the next 50 years (**Table II-2**). Standard thinning treatments *may affect, but would not be likely to adversely affect*, the fisher on about 90 percent of these acres (41,800 acres) because they would treat forest stands less than 80 years old (resting habitat), which is not limited in the **action area**. Standard thinning treatments *may affect, and would be likely to adversely affect*, the fisher on the remaining 10 percent of these acres (4,600 acres) because they would treat forest stands 80 years old and older (fisher foraging and denning habitat) and result in a post-treatment canopy cover of 50 – 60 percent (fisher foraging and denning habitat removed), injuring/killing denning fishers associated with these acres.

Salvage treatments, which would affect an estimated 1,100 acres of fisher habitat during the next 50 years (**Table II-2**), *may affect, but would not be likely to adversely affect*, the fisher because they would not remove resting, foraging or denning habitat and would comply with management standards to retain sufficient snags and coarse woody debris in treatment areas. Regeneration harvest would occur only in areas greater than 10 acres in size that had been modified by high-severity wildfire. In all other areas—areas less than 10 acres in size and areas not modified by high-severity wildfire—variable retention harvest would remove only dead material up to snag and coarse woody debris standards.

Two-aged management would affect an estimated 41,300 acres of fisher habitat during the next 50 years (**Table II-2**). Due to the current forest stand age distribution on BLM-administered lands, and the target rotation schedule, about 60 percent of those acres (24,800 acres) would be forest stands 50 – 80 years old (resting habitat) and the remaining 40 percent of those acres (16,500 acres) would be 80 years old and older (foraging and denning habitat). In all cases, treatments would reduce the post-treatment canopy cover to less than 40 percent, resulting in the removal of resting, foraging and denning. However, treatments would be well dispersed, and intermixed with forest stands in reserve land use allocations. Thus, two-aged management *may affect, but would not be likely to adversely affect*, fishers associated with 24,800 acres of resting habitat treated, and *may affect, and would be likely to adversely affect*, fishers associated with 16,500 acres of foraging and denning habitat treated and would injure/kill any fishers denning in those 16,500 acres.

3). Uneven-Aged Timber Area

The designation of, and implementation of proposed management direction for, the Uneven-Aged Timber Area (pages A-13 - A-14), *may affect, and would be likely to adversely affect*, the fisher by directing the removal of fisher resting, foraging and denning habitats, making such removal *reasonably certain to occur*.

Selection harvest would affect about 193,800 acres of forest stands (**Table II-2**) during the next 50 years. Such treatments *may affect, and would be likely to adversely affect*, the fisher, and would injure/kill denning fishers associated with these acres, because treatments would affect forest stands that are 100 – 160 years old (but not yet structurally-complex), which is denning habitat, and would reduce the post-treatment canopy cover to less than 40 percent, resulting in the removal of denning habitat.

e. Eastside Management Area (BLM Klamath Falls Field Office only)

The implementation of proposed management direction for the Eastside Management Area (pages A-4 - A-8) would have *no effect* on the fisher because the species is not known or suspected to inhabit this area.

3. Areas of Critical Environmental Concern

The proposed designation of the Lake Creek Falls ACEC *may affect, but would not be likely to adversely affect*, the fisher because the fisher is identified as one of the "relevant and important values" for which the ACEC would be managed. All fisher habitat that occurs in the proposed ACEC would be protected, rendering the effects to the fisher *entirely beneficial*. Although individual management actions needed to protect and maintain fisher in the ACEC might adversely affect the species, the proposed designation would not direct such actions. The BLM would address the effects of individual management actions needed to **protect** and maintain fishers during project-level ESA sec. 7 consultation.

4. Fire, Fuels and Wildfire Response

a. Response to Wildfire

The implementation of proposed management direction requiring the BLM to respond immediately to wildfire (pages A-34 – A-35) *may affect, but would not be likely to adversely affect*, the fisher because, even though this species occurs in forest stands subject to wildfire and, hence, the BLM response, the infrequency of past wildfires on BLM-administered land, the limited sizes of past fire footprints, and the forests habitats that would be saved by the wildfire response, render the potential effects of a BLM response *discountable*. As warranted, the BLM would address the effects of such actions in accordance with emergency consultation procedures (50 CFR §402.05).

b. Reduce Wildfire Risk and Severity

The implementation of proposed management direction requiring the BLM to reduce wildfire risk and severity (pages A-34 – A-35) *may affect, but would not be likely to adversely affect*, the fisher because, even though such treatments could occur in fisher foraging, resting and denning habitat, the treatments would be localized and of short duration (days), and would not substantively modify habitat, making their effects *discountable*. In addition, proposed management direction for Wildlife (pages A-54 – A-56) would require the BLM to protect known fisher occupied habitat, and forest structures that typically are used as denning or resting sites in 5th-field watersheds that are known to be occupied.

5. Fisheries

The implementation of proposed management direction for Fisheries (page A-35) *may affect, but would not be likely to adversely affect*, the fisher because, although the direction to replace malfunctioning

stream crossings could potentially **disrupt** normal behaviors, such effects are *not reasonably certain to occur* given the infrequency of past such actions, the latitude local managers have to schedule activities outside the fisher denning period, which is well known, and the relatively large home range and mobility of the species. Proposed management direction that allows the BLM to fall trees into the stream channel from the Riparian Reserve, to create habitat for aquatic species, would not be likely to adversely affect the fisher because, based on past such actions, such isolated actions would not alter habitat functionality. Thus, the effects to the species would be *discountable*.

6. Forest Management

The implementation of proposed Forest Management direction (page A-35) *may affect, but would not be likely to adversely affect*, the fisher because, whereas it directs the BLM to treat forest stands for desired future outcomes, including timber production, to maintain safe stand conditions, to facilitate rights-of-way and tramways, and other purposes, which would be *reasonably certain* to modify fisher habitat, it does not require the BLM to implement actions that would cause effects to the species. In addition, the implementation of proposed management direction for Wildlife (pages A-54 – A-56) would direct the BLM to avoid **disrupting** normal fisher behaviors in known natal and maternal denning habitat, except when done in accordance with an approved recovery plan, conservation agreement, species management plan, survey and monitoring protocol, or critical habitat rule, and when the action is necessary for the conservation of the species and, within 5th field-watersheds where fishers are documented to occur, to favor retaining trees that have structures (*e.g*., cavities, mistletoe, rust brooms) that are typically used as denning or resting sites by fisher. Although the management direction would allow such adverse actions, it would not direct such actions. The BLM would address the effects of individual management actions needed to **protect** and maintain fishers during project-level ESA sec. 7 consultation. Thus, the effects of the proposed management direction to the species would be *discountable*.

7. Livestock Grazing (BLM Medford District and Klamath Falls Field Office only)

The implementation of proposed management direction for Livestock Grazing (pages A-39 - A-45) would have *no effect* on the fisher because there is not a known, identified mechanism of how livestock grazing would affect fisher where they are coincident with BLM proposed active grazing allotments. Livestock grazing and management direction specific to livestock grazing would not modify or remove habitat features that fishers use for denning, resting, or foraging. In addition, proposed management direction for Wildlife (pages A-54 – A-56) would require the BLM to protect known fisher occupied habitat, and forest structures that typically are used as denning or resting sites in 5th-field watersheds that are known to be occupied.

8. Hydrology

The implementation of proposed management direction for Hydrology (page A-36) *may affect, but would not be likely to adversely affect*, the fisher because actions either would be confined to existing rights-of-way or would be applied outside of rights-of-way to improve the BLM's management of other resources. In addition, proposed management direction for Wildlife (pages A-54 – A-56) would require the BLM to protect known fisher occupied habitat, and forest structures that typically are used as denning or resting sites in 5th-field watersheds that are known to be occupied. Thus, the effect to the species would be *discountable*.

9. Invasive Species

The implementation of proposed management direction for Invasive Species (page A-36) *may affect, and would be likely to adversely affect*, fisher during the short term (within 20 years of treatment) because it would direct the BLM to control Sudden Oak Death and other forest pathogens, and those treatments would be *reasonably certain* to remove or downgrade fisher foraging, resting and denning habitat through the removal of infected conifer trees. However, during the long term (more than 20 years after treatment) the proposed management direction to combat Sudden Oak Death and other pathogens would be *entirely*

beneficial because those pathogens are in the process of modifying key habitat components used by fisher (USDI FWS 2011:III-55) and treatments would stop those pathogens from spreading to infect additional habitat and critical habitat.

10. Lands, Realty, and Roads

Implementation of the following proposed management direction for Lands, Realty, and Roads (pages A-38 – A-39) *may affect, but would not be likely to adversely affect*, the fisher:

- Construct new permanent/temporary roads where needed to meet resource management objectives, including major culverts and bridges as necessary, to established BLM engineering design standards. Apply road location, design, and construction best management practices as needed.
- Maintain existing roads, including major culverts and bridges, to provide access for both resource management and casual use activities while protecting water quality and facility investments and providing user safety, to established BLM maintenance standards. Apply road maintenance and wet weather road use best management practices as needed.
- Remove hazard trees and downed trees along roads for safety or operational reasons.
- Fully decommission or obliterate (permanent closure) roads with no future resource management need. Decommission (long-term closure) roads not currently needed for resource management but that will be operated and maintained again in the future. Apply road closure best management practices as needed. Close roads only with the approval of affected reciprocal right-of-way permittees.

The effects of new road construction on the fisher are likely to be *discountable* based on the existing access network in the **planning area** and the associated low number of new requests for rights-of-way received by the BLM during the past 20 years, the ability of the BLM to route new rights-of-way to avoid or minimize impacts to other resource values and uses, and the low likelihood that a new road through fisher habitat would alter the functionality of the stand. In addition, proposed management direction for Wildlife (pages A-54 – A-56) would require the BLM to protect known fisher occupied habitat, and forest structures that typically are used as denning or resting sites in 5th-field watersheds that are known to be occupied. The effects of other management direction to maintain and decommission existing infrastructure also are likely to be *discountable* or *entirely beneficial* due to the management direction that would require the BLM to avoid **disrupting** fishers at known denning sites and, elsewhere, the ability of the BLM to schedule such activities outside the fisher denning period, which is well known.

11. Rare Plants and Fungi

The implementation of proposed management direction for Rare Plants and Fungi (pages A-47 – A-48) *may affect, but would not be likely to adversely affect*, the fisher because the effects would be *discountable* during both the short term and long term. Even though the BLM would direct the uses of prescribed fire, thinning and the removal of encroaching vegetation to **protect** rare plants and fungi, such treatments would be designed consistently with the recovery plans, conservation agreements and species management plans of species that are listed or candidates for listing, including the fisher; *i.e*., they *would not be reasonably certain* to adversely affect the fisher. In addition, proposed management direction for Wildlife (pages A-54 – A-56) would require the BLM to protect known fisher occupied habitat, and forest structures that typically are used as denning or resting sites in 5th-field watersheds that are known to be occupied.

12. Recreation and Visitor Services

The implementation of proposed management direction for Recreation and Visitor Services (pages A-48 - A-50) *may affect, but would not be likely to adversely affect*, the fisher because it would reduce the acres in the **action area** exposed to such activities, and ensure that Extensive Recreation Management Areas would be managed to maintain and protect known fisher denning sites and habitats. Even though Special

Recreation Management Areas, where the BLM would define recreation as a dominate use, potentially support fisher habitat, it is unlikely that the BLM designation would have more than a *discountable* effect on the fisher due to the level of extant human activity in these areas, the availability of fisher habitat outside these areas and the ability of the fisher to avoid human activity. The proposed management direction would reduce the potential risks to fisher habitats, rendering the effects *entirely beneficial*.

13. Trails and Travel Management
The implementation of proposed management direction for Trails and Travel Management (pages A-52 - A-53) *may affect, but would not be likely to adversely affect*, the fisher because it would reduce potential risks to the species' habitats, rending the effect *entirely beneficial*. Even though the BLM would maintain a road and trail network for public, resource management and administrative access needs, the BLM would manage that network to protect fragile and unique resource values from damage by OHV use, and limit or eliminate OHV use where appropriate. The proposed closure of 156,036 acres would eliminate potential threats from OHV use to fishers associated with those acres. The BLM also would eliminate an additional 319,661 acres of open area and further evaluate and designate limited areas to protect resources.

14. Wild Horses
The implementation of proposed management direction for the free-roaming horses in the Pokegama Herd Management Area of the Klamath Falls Field Office (page A-61) *may affect, but would not be likely to adversely affect*, fisher because the only cause of effect would be through **disturbances** associated with horse gathers to maintain the Pokegama herd at appropriate management levels. As explained in Section IV N 1 (above) proposed management direction for Wildlife would ensure that fisher are not adversely affected by such **disturbances**. The Pokegama Herd Management Area is coincident with modeled habitat for the fisher (although there are no known fisher observations within the herd management area).

15. Wildlife
The implementation of proposed management direction for Wildlife (pages A-54 – A-56) *may affect, but would not be likely to adversely affect*, the fisher because it would require the BLM to manage fisher habitat consistently with recovery plans, conservation agreements and species management plans, to protect known fisher occupied habitat, and to protect forest structures that typically are used as denning or resting sites in 5th-field watersheds that are known to be occupied. Thus, the effects on the species would be *entirely beneficial*.

O. MARBLED MURRELET AND ITS CRITICAL HABITAT

1. Disturbance
The implementation of proposed management direction for the Late-Successional Reserve land use allocation regarding **disturbance** (page A-15) *may affect, but would not be likely to adversely affect*, the marbled murrelet because it would prohibit the BLM from implementing actions that **disrupt** normal marbled murrelet behavior at occupied sites except in situations (Option 3, page A-59) where the U.S. Fish and Wildlife Service concurs that **disruption** is necessary to combat Sudden Oak Death. Proposed management direction for Wildlife (pages A-54 - A-59) would require the BLM to determine marbled murrelet occupancy of nesting habitat on all BLM-administered lands except in the Harvest Land Base in marbled murrelet Zone 2. In these areas, this management direction would prevent the **disruptions** of the normal behavior of nesting marbled murrelets except in the situations described above. Thus, the effects of implementing this management direction, even though it would not prevent **disruptions** in the Harvest Land Base of Zone 2, or in cases when **disruption** is determined to be a necessary to combat Sudden Oak Death, would be *entirely beneficial* because it would protect nesting murrelets from **disruptions** in all other situations. The BLM would address the effects of project-level **disturbance** on murrelets through project-level ESA sec. 7 consultation.

The BLM addresses the effects of **disturbance** associated with Sudden Oak Death treatments on the marbled murrelet under Invasive Species, below.

The BLM proposes no management direction pertaining to actions that **disturb**, or **disrupt** the normal behavior of, nesting marbled murrelets in the Harvest Land Base in marbled murrelet Zone 2. The absence of direction is not an *affirmative agency action* subject to the ESA. **Table III-13** shows the level of injury/death and **disruption** that the BLM anticipates from all management actions. The BLM addresses those activities and their effects in subsequent paragraphs in this section.

2. Land Use Allocations

a. Late-Successional Reserve

The designation of, and implementation of proposed management direction for, the Late-Successional Reserve (pages A-14 - A-19) *may affect, but would not be likely to adversely affect*, the marbled murrelet and its critical habitat because it would require the BLM to **maintain marbled murrelet habitat** (see Section I D) and promote the development of nesting habitat for marbled murrelets in stands that do not currently meet nesting habitat criteria. The BLM would **protect older, structurally-complex conifer forest** (see Section I D) and **protect marbled murrelet occupied stands** (see Section I D). Thus, the effects of the proposed designation and management direction on the marbled murrelet and the primary constituent elements of its critical habitat would be *discountable* during the short term (within 20 years of treatments) and *entirely beneficial* during the long term.

b. Riparian Reserve

The designation of, and implementation of proposed management direction for, the Riparian Reserve (pages A-19 - A-31), *may affect, and would be likely to adversely affect*, the marbled murrelet because, with the designation, the removal of marbled murrelet nesting habitat would be *reasonably certain to occur*. Although management direction would prohibit the falling and removal of trees in the inner zone (i.e., within 120 feet of fish bearing streams and 50 feet of intermittent streams)—except for safety or operational reasons, or for stream restoration, disease treatments, or alder or brushfield conversion—between these distances and one site-potential tree height from the stream the designation would direct the application of silvicultural treatments to increase the diversity of riparian species, develop structurally-complex stands, and foster diverse understory plant communities and hardwood vigor and persistence. To accomplish this, the designation would allow existing canopy cover to drop to 30 percent with 60 trees per acre expressed as an average across the riparian reserve portion of the stand. Although additional direction would limit the size of forest openings and retain snags and course woody debris, and directed activities would be *entirely beneficial* to the murrelet during the long term (more than 20 years after treatment), the short term modification and removal of murrelet nesting habitat would be *reasonably certain to occur*. As shown in **Table II-2**, the BLM anticipates treating 42,600 acres in the middle (50 – 120 feet from intermittent streams in Class I subwatersheds) and outer (120 feet – one site-potential tree height in all subwatersheds) zones during the next 50 years. Of these acres, about 10 – 20 percent (4,300 – 8,500 acres) would affect nesting habitat in the dry forest and about 5 percent (2,100 acres) would affect nesting habitat in the moist forest, causing the injury/death of individual nesting murrelets associated with these acres. However, the designation of, and implementation of proposed management direction for, the Riparian Reserve would not injure/kill the marbled murrelet because the proposed implementation of management direction for Wildlife (pages A-54 and A-57 - A-59) would require the BLM to survey nesting habitat to protocol prior to implementing proposed habitat modifications and **protect the stands associated with occupied sites**.

The designation of, and implementation of proposed management direction for, the Riparian Reserve *may affect, and would be likely to adversely affect*, marbled murrelet critical habitat because, as described in the previous paragraph, the designation would direct management actions that modify murrelet nesting habitat in the outer zone, making the modification and removal of the primary constituent elements of marbled murrelet critical habitat *reasonably certain to occur*. As shown in **Table III-5**, the BLM proposes to allocate 157,035 acres of marbled murrelet critical habitat to the Riparian Reserve. As shown in **Table II-2**, the BLM proposes to treat about 7 percent of the Riparian Reserve during the next 50 years. Thus, the BLM would treat about 10,500 acres of marbled murrelet critical habitat (most of it in the outer zone) during the next 50 years, or about 2,100 acres per decade. As described in the previous paragraph, about 10 – 20 percent (1,100 – 2,100 acres, or about 600 acres per decade) would affect nesting habitat in the dry forest and no more than 5 percent (500 acres, or about 100 acres per decade) would affect nesting habitat in the moist forest. However, because of the spatial arrangement of the outer zone of the Riparian Reserve (as evidenced by the limited acres affected during the next 50 years), the designation would not result in the modification of critical habitat function at any time at the critical habitat sub-unit or unit scales.

c. District-Designated Reserves

The implementation of proposed management direction for District-Designated Reserves (pages A-3 - A-4) *may affect, but would not be likely to adversely affect*, the marbled murrelet because these reserves are designated for specific purposes and the proposed direction would continue current management practices to achieve those purposes. As such, existing facilities and infrastructure, and areas classified as unsuitable for timber production, are unlikely to be occupied by murrelets, and lands managed for their wilderness characteristics would be managed in a manner that would not adversely affect the murrelet. In addition, management direction for Wildlife (pages A-54 and A-57 – A-59) would ensure that murrelets would not be adversely affected in District-Designated Reserves by **disruption** or habitat modification except in situations where the U.S. Fish and Wildlife Service concurs that **disruption** is necessary to combat Sudden Oak Death (Option 3, page A-59). However, the proposed management direction for District-Designated Reserves does not require the BLM to combat Sudden Oak Death in such reserves. Thus, the effects to the species would be *discountable*.

The implementation of proposed management direction for District-Designated Reserves *may affect, but would not be likely to adversely affect*, marbled murrelet critical habitat because, even though the BLM proposed to allocate 20,145 acres of critical habitat to these reserves (**Table III-5**), these reserves would be designated for specific purposes and the proposed direction would continue current management practices to achieve those purposes. Even though the BLM could modify primary constituent elements of critical habitat during local treatments, the BLM would manage existing facilities and infrastructure, areas classified as unsuitable for timber production, and lands managed for their wilderness characteristics, in a manner that would be unlikely to modify primary constituent elements at the stand scale, rendering the effects *insignificant*.

d. Harvest Land Base

1). Moderate Intensity Timber Area

The designation of, and implementation of proposed management direction for, the Moderate Intensity Timber Area (pages A-11 - A-13), *may affect, and would be likely to adversely affect*, the marbled murrelet and its critical habitat by directing the removal of murrelet nesting habitat and the primary constituent elements of critical habitat, making such removal *reasonably certain to occur*. In Zone 2, the implementation of this direction during the murrelet breeding period also would *disrupt* the normal behavior of nesting murrelets.

Standard thinning (*i.e*., commercial thinning) would affect an estimated 96,000 acres of forest during the next 50 years (**Table II-2**). About 41 percent of those acres (39,500 acres) would support stands less than 80 years old of which about 1 percent (550 acres) would constitute lower-quality nesting habitat (structural stages 3.1 and 3.3). Therefore, standard thinning treatments *may affect, and would be likely to adversely affect*, marbled murrelets associated with 550 acres by removing lower-quality nesting habitat and would have *no effect* on the remaining acres (38, 950 acres) of non-habitat. Standard thinning treatments *may affect, and would be likely to adversely affect*, marbled murrelets associated with the remaining 59 percent of these acres (56,600 acres) because they would treat forest stands 80 years old and older (high-quality marbled murrelet nesting habitat) and result in a post-treatment canopy cover of 50 – 60 percent (marbled murrelet nesting habitat removed).

Salvage treatments would affect an estimated 700 acres of forest during the next 50 years (**Table II-2**), of which about 41 percent would not occur in marbled murrelet habitat and, therefore, would have *no effect* on the marbled murrelet. Salvage treatment of the remaining 59 percent (400 acres) *may affect, but would not be likely to adversely affect*, the marbled murrelet because such treatments would occur in areas substantially modified by wildfire and, therefore, unlikely to support murrelet nesting, and the degree of salvage (400 acres over 50 years) would be *discountable*.

Regeneration harvest (two-age selection harvest) would affect an estimated 111,800 acres of forest during the next 50 years (**Table II-2**). Due to the current forest stand age distribution on BLM-administered lands, and the target rotation schedule, about 85 percent of those acres (94,600 acres) would be 80 years old or older. An additional 3,300 acres would be less than 80 years old but constitute lower-quality murrelet nesting habitat (structural stages 3.1 and 3.3). In all cases, treatments would reduce the post-treatment canopy cover to less than 40 percent, resulting in the removal of marbled murrelet nesting habitat. Thus, the treatment of 97,900 acres *may affect, and would be likely to adversely affect*, marbled murrelets associated with these acres by removing nesting habitat.

The implementation of proposed management direction for Wildlife (pages A-54 - A-59) would provide substantive protections to marbled murrelet nesting habitat in marbled murrelet Zone 1 and require the **protection of all occupied habitat** in Zone 1 (except in those situations when the U.S. Fish and Wildlife Service concurs that habitat modification is necessary to combat Sudden Oak Death, which the Proposed RMP allows but does not require; see Option 3, page A-59). Thus, the implementation of proposed management direction for the Moderate Intensity Timber Area would injure/kill marbled murrelets only in marbled murrelet Zone 2. Of the estimated 96,000 acres of marbled murrelet nesting habitat that would be treated by standard thinning, about 50 percent (48,000 acres) would occur in Zone 2. Of the 44,700 acres of murrelet nesting habitat that would be affected by regeneration harvest, about 10 percent (4,500 acres) would occur in Zone 2. Thus, the implementation of proposed management direction for the Moderate Intensity Timber Area would injure/kill nesting marbled murrelets associated with those acres (see **Table III-13** for the level of injury/death anticipated from all proposed activities). It is unlikely that murrelets nest in forest stands that would be affected by salvage treatments because these would be stands modified by wildfire and post-fire stands likely would be too open to be selected by nesting murrelets.

The designation of, and implementation of proposed management direction for, the Moderate Intensity Timber Area *may affect, and would be likely to adversely affect*, marbled murrelet critical habitat by removing primary constituent elements. As shown in **Table III-5**, the BLM proposes to allocate 15,301 acres of marbled murrelet critical habitat to the Moderate Intensity Timber Area, or 3 percent of the critical habitat in the **action area**. As shown in **Table II-2**, the BLM would treat about 23 percent on the Moderate Intensity Timber Area with either standard thinning or regeneration harvest per decade during the next 50 years. Thus, the BLM would treat less than 1 percent of the

marbled murrelet critical habitat in the **action area** with standard thinning or regeneration harvest in the Moderate Intensity Timber Area per decade during the next 50 years. Thus, due to the distribution of the Moderate Intensity Timber Area, this magnitude of treatment would be unlikely to affect the functionality of marbled murrelet critical habitat in the **action area** above the stand-scale at any time during the next 50 years. The BLM would verify this determination during project-level ESA sec. 7 consultation.

The BLM addresses the effects of other activities in the Moderate Intensity Timber Area under the appropriate sections.

2). Low Intensity Timber Area

The designation of, and implementation of proposed management direction for, the Low Intensity Timber Area (pages A-10 - A-11), *may affect, and would be likely to adversely affect*, the marbled murrelet and its critical habitat by directing the removal of murrelet nesting habitat and the primary constituent elements of critical habitat, making such removal *reasonably certain to occur*. In Zone 2, the implementation of this direction during the murrelet breeding period also would *disrupt* the normal behavior of nesting murrelets.

Standard thinning (*i.e.*, commercial thinning) would affect an estimated 46,400 acres of forest during the next 50 years (**Table II-2**). About 46 percent of those acres (21,300 acres) would support stands less than 80 years old of which less than 1 percent (160 acres) would constitute lower-quality nesting habitat (structural stages 3.1 and 3.3). Therefore, standard thinning treatments *may affect, and would be likely to adversely affect*, marbled murrelets associated with 160 acres by removing lower-quality nesting habitat and would have *no effect* on the remaining acres (21,100 acres) of non-habitat. Standard thinning treatments *may affect, and would be likely to adversely affect*, marbled murrelets associated with the remaining 54 percent of these acres (25,200 acres) because they would treat forest stands 80 years old and older (marbled murrelet nesting habitat) and result in a post-treatment canopy cover of 50 – 60 percent (marbled murrelet nesting habitat removed).

Salvage treatments would affect an estimated 1,100 acres of forest during the next 50 years (**Table II-2**), of which about 54 percent (600 acres) would not occur in marbled murrelet habitat and, therefore, would have *no effect* on the marbled murrelet. Salvage treatment of the remaining 46 percent (500 acres, of which 300 acres would be 80 years old or older) *may affect, but would not be likely to adversely affect*, the marbled murrelet because such treatments would occur in areas substantially modified by wildfire and, therefore, unlikely to support murrelet nesting, and the degree of salvage (500 acres over 50 years) would be *discountable*..

Regeneration (two-age retention) harvest would affect an estimated 41,300 acres of forest during the next 50 years (**Table II-2**). Due to the current forest stand age distribution on BLM-administered lands, and the target rotation schedule, about 85 percent of those acres (35,200 acres) would be 80 years old or older and an additional 300 acres would be lower-quality nesting habitat less than 80 years old (structural stages 3.1 and 3.3). In all cases, treatments would reduce the post-treatment canopy cover to less than 40 percent, resulting in the removal of marbled murrelet nesting habitat. Thus, the treatment of 35,500 acres *may affect, and would be likely to adversely affect*, marbled murrelet associated with these acres by removing nesting habitat.

The implementation of proposed management direction for Wildlife (pages A-54 - A-59) would provide substantive protections to marbled murrelet nesting habitat in marbled murrelet Zone 1 and require the **protection of all occupied habitat** in Zone 1 (except in those situations when the U.S. Fish and Wildlife Service concurs that habitat modification is necessary to combat Sudden Oak Death, which the Proposed RMP allows but does not require; see Option 3, page A-59). Thus, the

implementation of proposed management direction for the Low Intensity Timber Area would injure/kill marbled murrelets only in marbled murrelet Zone 2. Of the estimated 46,560 acres of marbled murrelet nesting habitat that would be treated by standard thinning, about 50 percent (23,300 acres) would occur in Zone 2. Of the 35,500 acres of murrelet nesting habitat that would be affected by regeneration harvest, about 10 percent (3,500 acres) would occur in Zone 2. Thus, the implementation of proposed management direction for the Low Intensity Timber Area would injure/kill nesting marbled murrelets associated with those acres (see **Table III-13** for the level of injury/death anticipated from all proposed activities). It is unlikely that murrelets nest in forest stands that would be affected by salvage treatments because these would be stands modified by wildfire and post-fire stands likely would be too open to be selected by nesting murrelets.

The designation of, and implementation of proposed management direction for, the Low Intensity Timber Area *may affect, and would be likely to adversely affect*, marbled murrelet critical habitat by removing primary constituent elements. As shown in **Table III-5**, the BLM proposes to allocate 23,877 acres of marbled murrelet critical habitat to the Low Intensity Timber Area, or 5 percent of the critical habitat in the **action area**. As shown in **Table II-2**, the BLM would treat about 20 percent of the Low Intensity Timber Area with either standard thinning or two-age thinning per decade during the next 50 years. Thus, the BLM would treat 1 – 2 percent of the marbled murrelet critical habitat in the **action area** with standard thinning or two-age thinning in the Low Intensity Timber Area per decade during the next 50 years. Thus, due to the distribution of the Low Intensity Timber Area, this magnitude of treatment would be unlikely to affect the functionality of marbled murrelet critical habitat in the **action area** above the stand-scale at any time during the next 50 years. The BLM would verify this determination during project-level ESA sec. 7 consultation.

The BLM addresses the effects of other activities in the Low Intensity Timber Area under the appropriate sections.

3). Uneven-Aged Timber Area

The designation of, and implementation of proposed management direction for, the Uneven-Aged Timber Area (pages A-13 - A-14), *may affect, and would be likely to adversely affect*, the marbled murrelet and its critical habitat by directing the removal of murrelet nesting habitat and the primary constituent elements of critical habitat, making such removal *reasonably certain to occur*. In Zone 2, the implementation of this direction during the murrelet breeding period also would *disrupt* the normal behavior of nesting murrelets.

Selection harvest would affect about 193,800 acres of forest during the next 50 years (**Table II-2**). About 22 percent of those acres (42,600 acres) would support stands less than 80 years old of which about 1 percent (500 acres) would constitute lower-quality nesting habitat (structural stages 3.1 and 3.3). Therefore, selection harvest *may affect, and would be likely to adversely affect*, marbled murrelets associated with 500 acres by removing lower-quality nesting habitat and would have *no effect* on the remaining acres (46,100 acres) of non-habitat.. Selection harvest treatments *may affect, and would be likely to adversely affect*, marbled murrelets associated with the remaining 78 percent of these acres (151,200 acres) because they would treat forest stands that are 100 – 160 years old (but not yet structurally complex), which is nesting habitat, and would reduce the post-treatment canopy cover of 40 percent (marbled murrelet nesting habitat removed).

Salvage treatments would affect an estimated 14,600 acres of forest during the next 50 years (**Table II-2**), of which about 28 percent (4,100 acres) would not occur in marbled murrelet habitat and, therefore, would have *no effect* on the marbled murrelet. Salvage treatment of the remaining 72 percent (10,500 acres) *may affect, and would be likely to adversely affect*, marbled murrelet associated with these acres because, even though these acres would have been modified by wildfire

and, therefore, likely would be too open to be selected by nesting murrelets, the number of acres treated likely would have more than *discountable* effects by increasing the openness of adjacent stands of nesting habitat.

The implementation of proposed management direction for Wildlife (pages A-54 - A-59) would provide substantive protections to marbled murrelet nesting habitat in marbled murrelet Zone 1 and require the **protection of all occupied habitat** in Zone 1 (except in those situations when the U.S. Fish and Wildlife Service concurs that habitat modification is necessary to combat Sudden Oak Death, which the Proposed RMP allows but does not require; see Option 3, page A-59).Thus, the implementation of proposed management direction for the Uneven-Aged Timber Area would injure/kill marbled murrelets only in marbled murrelet Zone 2. Of the estimated 162,200 acres of marbled murrelet nesting habitat that would be treated by selection harvest or salvage, about 50 percent (81,100 acres) would occur in Zone 2. Thus, the implementation of proposed management direction for the Uneven-Aged Timber Area would injure/kill nesting marbled murrelets associated with those acres (see **Table III-13** for the level of injury/death anticipated from all proposed activities).

The designation of, and implementation of proposed management direction for, the Uneven-Aged Timber Area *may affect, and would be likely to adversely affect*, marbled murrelet critical habitat by removing primary constituent elements. As shown in **Table III-5**, the BLM proposes to allocate 531 acres of marbled murrelet critical habitat to the Uneven-Aged Timber Area, or a negligible amount of the 480,398 acres of critical habitat in the **action area**. Thus, due to the distribution of the Uneven-Aged Timber Area and the timing of treatments, such treatments would be unlikely to affect the functionality of critical habitat above the stand scale. The BLM would verify this determination during project-level ESA sec. 7 consultation.

The BLM addresses the effects of other activities in the Uneven-Aged Timber Area under the appropriate sections.

e. Eastside Management Area (BLM Klamath Falls Field Office only)
The designation of, and implementation of proposed management direction for, the Eastside Management Area (pages A-4 - A-8) would have *no effect* on the marbled murrelet or its critical habitat because this area occurs outside the range of the species.

3. Areas of Critical Environmental Concern
The proposed designations of the Brownson Ridge, Cherry Creek RNA, Elk Creek, Euphoria Ridge, Grassy Mountain RNA, Heceta Sand Dunes ONA, High Peak–Moon Peak RNA, Lake Creek Falls, Mary's Peak ONA, Nestucca River, North Fork Chetco, North Fork Coquille River, North Spit, Rocky Peak, Saddle Bag Mountain RNA, Upper Rock Creek and Valley of the Giants ACECs *may affect, but would not be likely to adversely affect*, the marbled murrelet and its critical habitat because the murrelet is listed among the "relevant and important values" for each of these ACECs. Thus, the BLM would manage these areas to **protect marbled murrelet habitat and critical habitat**, rendering the effects to the species and its critical habitat *entirely beneficial*. Although individual management actions needed to protect and maintain murrelets in the ACECs might *adversely affect* the species, at this time such management actions are *not reasonably certain to occur* because the BLM's history does not support the need to conduct this management and the BLM does not anticipate implementing such actions. The effects of individual management actions needed to protect and maintain marbled murrelets would be addressed through project-level ESA sec. 7 consultation.

4. Fire, Fuels and Wildfire Response

a. Response to Wildfire

The implementation of proposed management direction requiring the BLM to respond immediately to wildfire (pages A-34 – A-35) *may affect, and would be likely to adversely affect*, the marbled murrelet because this species occurs in forest stands subject to wildfire and, hence, the BLM response. However, the infrequency of past wildfires on BLM-administered land, the limited sizes of past fire footprints, and the forests habitats that would be saved by the wildfire response, would limit the short term (within 20 years of the BLM response) adverse effects of a BLM response, and render the long term effects *entirely beneficial*.As warranted, the BLM would address the effects of such actions in accordance with emergency consultation procedures (50 CFR §402.05).

Implementation of the proposed management direction *may affect, and would be likely to adversely affect*, marbled murrelet critical habitat because the creation of fire breaks and other intervention would make the removal of primary constituent elements *reasonably certain to occur*. However, the removal only would be to the extent needed to protect adjacent forest stands, and, based on past interventions by the BLM, would cause adverse effects that are local and short term (within 20 years of intervention), have *discountable* effects to critical habitat during both the short term and long term, and not alter the functionality of critical habitat at any time at the critical habitat sub-unit or unit scales. As warranted, the BLM would address the effects of such actions in accordance with emergency consultation procedures (50 CFR §402.05).

b. Reduce Wildfire Risk and Severity

The implementation of proposed management direction requiring the BLM to reduce wildfire risk and severity (pages A-34 – A-35) *may affect, but would not be likely to adversely affect*, the marbled murrelet because BLM treatments would target younger forest stands that do not support murrelet nesting, and such stands support ground-level and ladder fuels that place them at higher risk of ignition and carrying fire to adjacent stands. BLM treatments would be unlikely to target older stands that could support murrelet nesting because the dense canopy cover tends to choke out ground-level and ladder fuels. In addition, the implementation of proposed management direction for Wildlife (pages A-54 - A-59) would provide substantive protections to marbled murrelet nesting habitat in marbled murrelet Zone 1 and require the **protection of all occupied habitat in Zone 1 and in all reserve lands use allocations in Zone 2**. Although some treatments could occur in nesting habitat, treatments would not remove live trees or remove nesting habitat. Thus, management actions that would adversely affect murrelets are *not reasonably certain to occur*.

The implementation of proposed management direction *may affect, but would not be likely to adversely affect*, marbled murrelet critical habitat because, even though it directs the BLM to reduce fuel loads, create fire breaks and take other actions necessary to reduce the likelihood and severity of future wildfires, such actions would be unlikely to remove the primary constituent elements of critical habitat. The implementation of proposed management direction for Wildlife (pages A-54 - A-59) would provide substantive protections to marbled murrelet nesting habitat in marbled murrelet Zone 1 and require the **protection of all occupied habitat in Zone 1 and in all reserve lands use allocations in Zone 2**. In addition, such impacts would be local and short term (within 20 years of treatment), would have *discountable* effects to critical habitat during the long term, and would be unlikely to alter the functionality of critical habitat at any time.

5. Fisheries

The implementation of proposed management direction for Fisheries (page A-35) *may affect, but would not be likely to adversely affect*, the marbled murrelet because the effects would be *discountable*.

Although the direction to replace malfunctioning stream crossings could potentially **disrupt** normal behaviors, such effects are *not reasonably certain to occur* given the infrequency of past such actions and the latitude local managers have to schedule activities outside the marbled murrelet breeding period, which is well known. Proposed management direction that allows the BLM to fall trees into the stream channel from the Riparian Reserve, to create habitat for aquatic species, would not be likely to adversely affect the marbled murrelet because, based on past such actions, the BLM would not choose trees with nesting structure, and such isolated actions would not alter habitat functionality.

The implementation of proposed management direction for Fisheries *may affect, but would not be likely to adversely affect*, marbled murrelet critical habitat because, even though the proposed direction would allow the BLM to fall trees into the stream channel from the Riparian Reserve to create habitat for aquatic species, which could alter primary constituent elements, such trees would be felled as stream edges, thus not modifying interior forest conditions. In addition, based on past management actions, the BLM would not choose trees with nesting structure, such impacts would be local and short term (within 20 years of treatment), would have *insignificant* effects to critical habitat during the long term, and would not alter the functionality of critical habitat at any time at the stand, critical habitat sub-unit or unit scales.

6. Forest Management

The implementation of proposed Forest Management direction (page A-35) *may affect, but would not be likely to adversely affect*, the marbled murrelet because, whereas it directs the BLM to treat forest stands for desired future outcomes, including timber production, to maintain safe stand conditions, to facilitate rights-of-way and tramways, and other purposes, which would be *reasonably certain* to modify marbled murrelet habitat, it does not direct or require the BLM to implement actions that would cause effects to the species that exceed *discountable, insignificant or entirely beneficial*. The effects of specific forest management actions would be verified through project-level ESA sec. 7 consultation, as warranted.

The implementation of proposed Forest Management direction *may affect, and would be likely to adversely affect*, marbled murrelet critical habitat because the BLM could not reasonably implement the direction without modifying primary constituent elements. Thus, such modifications are *reasonably certain to occur*. However, given the limited scale and patch sizes of proposed treatments, implementation of the management direction would not be likely to alter the functionality of critical habitat at the stand scale or above. The effects of specific forest management actions would be verified through project-level ESA sec. 7 consultation, as warranted.

7. Livestock Grazing (BLM Medford District and Klamath Falls Field Office only)

The implementation of proposed management direction for Livestock Grazing (pages A-39 - A-45) would have *no effect* on the marbled murrelet or its critical habitat because neither the species nor its critical habitat are known or suspected to occur in BLM grazing allotments.

8. Hydrology

The implementation of proposed management direction for Hydrology (page A-36) *may affect, but would not be likely to adversely affect*, the marbled murrelet and its critical habitat because the proposed direction only would reduce the potential for negative impacts to murrelets and critical habitat from new and existing rights-of-way, and other management actions and activities, making the effect to the species and its critical habitat *entirely beneficial*. The effects of new and existing rights-of-way, and the other actions and activities affected by the proposed management direction for hydrology, are addressed under the appropriate section.

9. Invasive Species

The implementation of proposed management direction for Invasive Species (page A-36) *may affect, and would be likely to adversely affect*, the marbled murrelet and its critical habitat during the short term

(within 20 years of treatment) because it would direct the BLM to control sudden oak death and other forest pathogens, and those treatments would be *reasonably certain* to remove or degrade marbled murrelet nesting habitat and primary constituent elements through the removal of infected conifer trees when they occur in treatment areas. In addition, proposed management direction for Wildlife (Option 3, page A-59) would allow the **disruption** of murrelets in occupied habitat when the U.S. Fish and Wildlife Service concurs that such **disruption** is necessary to protect habitat. However, during the long term (more than 20 years after treatment) the proposed management direction to combat sudden oak death and other pathogens would be *entirely beneficial* because those pathogens are in the process of modifying key habitat components used by marbled murrelets (USDI FWS 2011:III-55), including primary constituent elements, and treatments would stop those pathogens from spreading to infect additional habitat and critical habitat. .

10. Lands, Realty, and Roads

Implementation of the following proposed management direction for Lands, Realty, and Roads (pages A-38 - A-39) *may affect, but would not be likely to adversely affect*, the marbled murrelet:

- Construct new permanent/temporary roads where needed to meet resource management objectives, including major culverts and bridges as necessary, to established BLM engineering design standards. Apply road location, design, and construction best management practices as needed.
- Maintain existing roads, including major culverts and bridges, to provide access for both resource management and casual use activities while protecting water quality and facility investments and providing user safety, to established BLM maintenance standards. Apply road maintenance and wet weather road use best management practices as needed.
- Remove hazard trees and downed trees along roads for safety or operational reasons.
- Fully decommission or obliterate (permanent closure) roads with no future resource management need. Decommission (long-term closure) roads not currently needed for resource management but that will be operated and maintained again in the future. Apply road closure best management practices as needed. Close roads only with the approval of affected reciprocal right-of-way permittees.

The effects of new road construction on the marbled murrelet are unlikely to rise above the level of *discountable* based on the existing access network in the **planning area** and the associated low number of new requests for rights-of-way received by the BLM during the past 20 years, the ability of the BLM to route new rights-of-way to avoid occupied murrelet habitat and minimize impacts to other resource values and uses, and the low likelihood that a new road through marbled murrelet habitat would alter the functionality of the stand. The effects of other management direction to maintain and decommission existing infrastructure also is unlikely to rise above the level of *discountable* due to the ability of the BLM to schedule such activities outside the marbled murrelet breeding period, which is well known.

The implementation of this proposed management direction *may affect, and would be likely to adversely affect*, marbled murrelet critical habitat because the BLM would not close critical habitat to new requests for rights-of-way and, once it receives a request, the BLM could not reasonably route new access to always avoid the loss of primary constituent elements, which means that such losses are *reasonably certain to occur*. However, the scale of impact would be such that implementation of the management direction would not alter the functionality of critical habitat at any time. The BLM would verify the effects of specific realty actions during project-level ESA sec. 7 consultation.

11. Rare Plants and Fungi

The implementation of proposed management direction for Rare Plants and Fungi (pages A-47 – A-48) *may affect, but would not be likely to adversely affect*, the marbled murrelet and its critical habitat because the effects would be *discountable* to both species and the primary constituent elements of critical

habitats during both the short term and long term. Even though the BLM would direct the uses of prescribed fire, thinning and the removal of encroaching vegetation to **protect** rare plants and fungi, such treatments would be designed consistently with the recovery plans and critical habitat rules of all listed species, including for the marbled murrelet; *i.e.*, in forest communities, they would be limited to forest edges unlikely to be occupied by nesting murrelets, and they would not be *reasonably certain* to adversely affect marbled murrelet habitat or critical habitat.

12. Recreation and Visitor Services
The implementation of proposed management direction for Recreation and Visitor Services (pages A-48 - A-50) *may affect, and would be likely to adversely affect*, the marbled murrelet and its critical habitat because, even though the Proposed RMP would reduce overall recreational activities in the **action area**, it would redefine recreation as a dominate use in Special Recreation Management Areas (70,730 acres), potentially exposing nesting marbled murrelets and critical habitat to increased corvid presence and predation at nest sites that occur in or near these management areas.

13. Trails and Travel Management
The implementation of proposed management direction for Trails and Travel Management (pages A-52 - A-53) *may affect, but would not be likely to adversely affect*, the marbled murrelet and its critical habitat because it would not modify habitat and it would reduce the acres of BLM-administered lands that are open for travel and the associated **disturbances**,, rending the effect *entirely beneficial* because murrelets likely are acclimated to ambient **disturbances**. Even though the BLM would maintain a road and trail network for public, resource management and administrative access needs, the BLM would manage that network to protect fragile and unique resource values from damage by OHV use, and limit or eliminate OHV use where appropriate. The proposed closure of 156,036 acres would eliminate potential threats from OHV use to murrelets, and their habitat and critical habitat, associated with those acres. The BLM also would eliminate 319,661 acres of open area and further evaluate and designate limited areas to protect resources.

14. Wildlife
The implementation of proposed management direction for Wildlife (pages A-54 - A-59) *may affect, but would not be likely to adversely affect*, the marbled murrelet and its critical habitat because it would require the BLM to manage the murrelet and its critical habitat consistently with the marbled murrelet recovery plan and the final rule on critical habitat. In addition, the proposed management direction provides substantial protections to marbled murrelet nesting habitat, including nesting critical habitat, in reserve land use allocations in the **action area**, and in the Harvest Land Base land use allocation in the marbled murrelet Zone 1 portion of the **action area**. The effects of this management direction on the murrelet and its critical habitat would be *entirely beneficial*.

Although management direction for Options 1 and 3 (pages A-58 – 59) would allow adverse effects to the marbled murrelet and its critical habitat from other actions, the BLM addresses the effects of such actions in the appropriate sections.

The lack of proposed management direction requiring the BLM to survey nesting habitat in the Harvest Land Base of Zone 2 is an example of *unexercised agency discretion*, which is not subject to the ESA. *This statement does not pertain to the effects of BLM management actions in this portion of the Harvest Land Base. Those effects are addressed elsewhere in this section by land use allocation and resource program.*

The proposed management direction for Wildlife also would direct the BLM to survey marbled murrelet nesting habitat to protocol in most of the **action area** prior to modifying that habitat. The implementation of this proposed management direction would have *no effect* on the marbled murrelet because the survey

protocol relies on observation outside potentially **occupied stands** (*i.e.*, it is neither invasive nor requires a species response).

P. WESTERN SNOWY PLOVER AND ITS CRITICAL HABITAT

1. Survey and Monitoring

BLM actions to survey for, and monitor populations of, western snowy plover *may affect, and would be likely to adversely affect*, the species because it would **disrupt** the normal behavior of individuals in nesting areas. Even though survey and monitoring would be done by professional biologists, and in accordance with survey and monitoring protocols and the approved recovery plan, biologists cannot reasonably complete necessary work without intruding into nesting areas and flushing individual birds from nesting territories and nests. The amount of **disruption** would depend on the amount of survey and monitoring required. However, since the majority of nesting birds would remain undisturbed during work, and **disruptions** of normal behavior would be short term and temporary, the BLM does not anticipate that the level of **disturbance** to individuals would measurably affect any local population.

2. Land Use Allocations and Other Resource Programs

The implementation of proposed management direction of the Proposed RMP (Appendix A), that is not already addressed under Determinations Common to All Species and Critical Habitats (Section IV A, above), *may affect, but would not be likely to adversely affect*, the western snowy plover and its critical habitat because all of its known or suspected habitat, and all of its critical habitat, in the **action area** would be allocated to the New River and North Spit ACECs and managed for the conservation and recovery of the species, rendering the effects *entirely beneficial*. Although individual management actions needed to **protect** and maintain plovers in the ACECs might *adversely affect* the species, at this time such management actions are *not reasonably certain to occur*. The effects of individual management actions needed to **protect** and maintain plovers would be addressed through project-level ESA sec. 7 consultation. There would be no negative impacts from recreational activities or OHVs in snowy plover habitat or designated critical habitat due to the protections provided by the New River and North Spit ACECs. In addition, implementation of proposed management direction for Wildlife (page A-61) would ensure that actions to restore or maintain snowy plover habitat would be consistent with the conservation needs of the species, the BLM would not authorize or construct new trails or roads in snowy plover habitat, and the BLM would avoid **disrupting** the normal behaviors of nesting snowy plovers.

Q. NORTHERN SPOTTED OWL AND ITS CRITICAL HABITAT

1. Disturbance

The BLM proposes no management direction pertaining to actions that **disturb**, or **disrupt** the normal behavior of, northern spotted owls. As described in Section II H 3 of this assessment, an estimated 175 spotted owl known sites would occur in the Harvest Land Base under the Proposed RMP. Although management guidance described in Section II H 3 would delay habitat modifications and associated **disruptions** at these sites, the BLM anticipates that, during the next 50 years, all of these sites would be modified. Although not all of these sites would be occupied by northern spotted owls, the BLM feels that 175 known sites is a reasonable estimate of the number of spotted owl sites that currently exist in the Harvest Land Base and would be injured or **disrupted** by implementation of the Proposed RMP. The BLM would address the effects of project-level **disturbances** on northern spotted owls during project-level ESA sec. 7 consultation.

2. Land Use Allocations

a. Late-Successional Reserve

The designation of, and implementation of proposed management direction for, Late-Successional Reserve in the moist and dry forests (pages A-14 - A-19) *may affect, but would not be likely to adversely affect*, the northern spotted owl because they would **protect older, structurally-complex forest** (see Section I D) stands and limit silvicultural activities in other northern spotted owl nesting-roosting habitat to those that **maintain northern spotted owl nesting-roosting habitat** (see Section I D) regardless of northern spotted owl occupancy. The treatment of northern spotted owl dispersal habitat would be limited to activities that speed the development, or improve the quality, of northern spotted owl habitat in the stand, or in the adjacent stand, or both, and do not preclude or delay by 20 years or more the development of northern spotted owl nesting-roosting habitat in the stand or in adjacent stands. In conifer stands that currently are not older and more structurally-complex, the proposed management direction would limit activities to those that promote the development of structurally-complex forest. Habitat modifications would be limited to the falling of live or dead hazard trees and stream logs, and the construction of linear and nonlinear rights-of-way, spur roads, yarding corridors or other facilities, that allow the forest stand to continue to support the pre-treatment northern spotted owl life history requirements (*i.e*., northern spotted owl nesting-roosting habitat would continue to support northern spotted owl nesting-roosting and northern spotted owl dispersal habitat would continue to support northern spotted owl movement and survival). Although silvicultural activities—such as fire suppression, fuels reduction, insect and disease control, and other activities—would be allowed to downgrade or remove spotted owl habitat, the management direction would allow such activities only to control destructive or potentially-destructive conditions or processes in individual forest stands. Thus, the effects of reserve designation and implementation on the northern spotted owl would be *discountable* during the short term (within 20 years of treatments) and *entirely beneficial* during the long term.

The designation of, and implementation of proposed management direction for, Late-Successional Reserve *may affect, but would not be likely to adversely affect*, northern spotted owl critical habitat because the effects of directed activities (described in the previous paragraph) on primary constituent elements would be *discountable* during the short term (within 20 years of treatments), and *entirely beneficial* during the long term. The proposed management direction would not allow the modification of critical habitat function at any time at the scales of the critical habitat sub-unit or unit.

b. Riparian Reserve

The designation of, and implementation of proposed management direction for, Riparian Reserve (pages A-19 - A-31), *may affect, and would be likely to adversely affect*, the northern spotted owl because, with the designation, the downgrading of northern spotted owl nesting-roosting habitat would be *reasonably certain to occur*. Although management direction would prohibit the falling and removal of trees in the inner zone (i.e., within 120 feet of fish bearing streams and 50 feet of intermittent streams)—except for safety or operational reasons, or for stream restoration, disease treatments, or alder or brushfield conversion—between these distances and one site-potential tree height from the stream the designation would direct the application of silvicultural treatments to increase the diversity of riparian species, develop structurally-complex stands, and foster diverse understory plant communities and hardwood vigor and persistence. To accomplish this, the designation would allow existing canopy cover to drop to 30 percent with 60 trees per acre expressed as an average across the Riparian Reserve portion of the stand. Although additional direction would limit the size of forest openings and retain snags and course woody debris, and directed activities

would be *entirely beneficial* to the northern spotted owl during the long term (more than 20 years), the short term downgrading of northern spotted owl nesting-roosting habitat to dispersal habitat would be *reasonably certain to occur*. As shown in **Table II-2**, the BLM anticipates treating 42,600 acres in the middle (50 – 120 feet from intermittent streams in Class I subwatersheds) and outer (120 feet – one site-potential tree height in all subwatersheds) zones during the next 50 years. Of these acres, about 10 – 20 percent (4,300 – 8,500 acres) would downgrade nesting-roosting habitat in the dry forest and no more than 5 percent (2,100 acres) would downgrade nesting-roosting habitat in the moist forest, potentially causing injury/death to nesting northern spotted owls associated with these acres.

The designation of, and implementation of proposed management direction for, Riparian Reserve *may affect, and would be likely to adversely affect*, northern spotted owl critical habitat because, as described in the previous paragraph, the designation would direct management actions that downgrade northern spotted owl nesting-roosting habitat, or maintain northern spotted owl dispersal habitat, both in the outer zone, making the modification and removal of the primary constituent elements of northern spotted owl critical habitat *reasonably certain to occur*. The previous paragraph shows the anticipated acres affected. However, as shown in **Tables III-25** and **III-26**, the designation would not allow the modification of critical habitat function at any time at the critical habitat sub-unit or unit scales.

c. District-Designated Reserves

The implementation of proposed management direction for District-Designated Reserves (pages A-3 - A-4) *may affect, but would not be likely to adversely affect*, the northern spotted owl and its critical habitat because these reserved are designated for specific purposes and the proposed direction would continue current management practices to achieve those purposes. As such, existing facilities and infrastructure, and areas classified as unsuitable for timber production, are unlikely to be occupied by northern spotted owls, and lands managed for their wilderness characteristics would be managed in a manner that would not adversely affect the spotted owl or its critical habitat. Thus, the effects to the species and its critical habitat would be *discountable, insignificant or entirely beneficial*.

d. Harvest Land Base

1). Moderate Intensity Timber Area

The designation of, and implementation of proposed management direction for, the Moderate Intensity Timber Area (pages A-11 - A-13), *may affect, and would be likely to adversely affect*, the northern spotted owl by directing the removal of northern spotted owl dispersal and nesting-roosting habitats, making such removal *reasonably certain to occur*.

Standard thinning (*i.e*., commercial thinning) would affect an estimated 96,000 acres of northern spotted owl habitat during the next 50 years (**Table II-2**). Standard thinning treatments *may affect, but would not be likely to adversely affect*, the northern spotted owl on about 41 percent of these acres (39,500 acres) because they would treat forest stands less than 80 years old (dispersal habitat) and result in a post-treatment canopy cover of 50 – 60 percent (dispersal habitat maintained). Standard thinning treatments *may affect, and would be likely to adversely affect*, the northern spotted owl on the remaining 59 percent of these acres (56,600 acres) because they would treat forest stands 80 years old and older (northern spotted owl nesting-roosting habitat) and result in a post-treatment canopy cover of 50 – 60 percent (northern spotted owl nesting-roosting habitat downgraded), causing the injury/death of nesting northern spotted owls associated with those acres.

Salvage treatments, which would affect an estimated 700 acres of northern spotted owl habitat during the next 50 years (**Table II-2**), *may affect, but would not be likely to adversely affect*, the northern

spotted owl because they would not remove or downgrade dispersal or nesting-roosting habitat and would comply with management standards to retain sufficient snags and coarse woody debris in treatment areas.

Regeneration (two-age retention) harvest would affect an estimated 111,800 acres of northern spotted owl habitat during the next 50 years (**Table II-2**). Due to the current forest stand age distribution on BLM-administered lands, and the target rotation schedule, about 15 percent of those acres (17,100 acres) would be forest stands 50 – 79 years old (northern spotted owl dispersal habitat) and the remaining 85 percent of those acres (94.600 acres) would be 80 years old or older (northern spotted owl nesting-roosting habitat). In all cases, treatments would reduce the post-treatment canopy cover to less than 40 percent, resulting in the removal of spotted owl dispersal or nesting-roosting habitat. However, treatments would be sufficiently dispersed, and intermixed with forest stands in reserve land use allocations, that local filters or barriers to northern spotted owl movement and survival across the landscape *would not be reasonably certain to occur*. Thus, regeneration harvest *may affect, but would not be likely to adversely affect*, northern spotted owls associated with 17,100 acres of dispersal habitat treated, *may affect, and* (through selection harvest) *would be likely to adversely affect*, northern spotted owls associated with 94,600 acres of nesting-roosting habitat treated, and would injure/kill any nesting northern spotted owls associated with those 94,600 acres.

The designation of, and implementation of proposed management direction for, the Moderate Intensity Timber Area, *may affect, but would not be likely to adversely affect*, northern spotted owl critical habitat because, even though it would direct the modification or removal of primary constituent elements, making such removal *reasonably certain to occur*, the amount of habitat affected at any one time would be *insignificant* A comparison of **Table II-2** and **Table II-3** indicates that the BLM proposes to allocate 180,549 acres to the Moderate Intensity Timber Area, of which 895 acres is critical habitat, or a negligible amount of the 1,201,949 acres of critical habitat in the **action area**. As shown in **Table II-2**, the BLM also proposes to make multiple entries into the Moderate Intensity Timber Area, and harvest essentially all of that895 acres of critical habitat, during the next 50 years. However, as shown in **Tables III-25** and **III-26**, due to the timing and distribution of the proposed harvests, the designation would not cause the adverse modification of critical habitat function at any time at the critical habitat sub-unit or unit scales.

2). Low Intensity Timber Area

The designation of, and implementation of proposed management direction for, the Low Intensity Timber Area (pages A-10 - A-11), *may affect, and would be likely to adversely affect*, the northern spotted owl by directing the removal of northern spotted owl dispersal and nesting-roosting habitats, making such removal *reasonably certain to occur*.

Standard thinning (*i.e*., commercial thinning) would affect an estimated 46,400 acres of northern spotted owl habitat during the next 50 years (**Table II-2**). Standard thinning treatments *may affect, but would not be likely to adversely affect*, the northern spotted owl on about 46 percent of these acres (21,100 acres) because they would treat forest stands less than 80 years old (dispersal habitat) and result in a post-treatment canopy cover of 50 – 60 percent (dispersal habitat maintained). Standard thinning treatments *may affect, and would be likely to adversely affect*, the northern spotted owl on the remaining 54 percent of these acres (25,200 acres) because they would treat forest stands 80 years old and older (northern spotted owl nesting-roosting habitat) and result in a post-treatment canopy cover of 50 – 60 percent (northern spotted owl nesting-roosting habitat downgraded), causing the injury/death of nesting northern spotted owls associated with these acres.

Salvage treatments, which would affect an estimated 1,100 acres of northern spotted owl habitat during the next 50 years (**Table II-2**), *may affect, but would not be likely to adversely affect*, the

northern spotted owl because they would not remove or downgrade dispersal or nesting-roosting habitat and would comply with management standards to retain sufficient snags and coarse woody debris in treatment areas.

Regeneration (two-age retention) harvest would affect an estimated 41,300 acres of northern spotted owl habitat during the next 50 years (**Table II-2**). Due to the current forest stand age distribution on BLM-administered lands, and the target rotation schedule, about 15 percent of those acres (6,100 acres) would be forest stands 50 – 79 years old (dispersal habitat) and the remaining 85 percent of those acres (35,200 acres) would be 80 years old and older (nesting-roosting habitat). In all cases, treatments would reduce the post-treatment canopy cover to less than 40 percent, resulting in the removal of dispersal or nesting-roosting habitat. However, treatments would be sufficiently dispersed, and intermixed with forest stands in reserve land use allocations, that local filters to northern spotted owl movement and survival across the landscape would *not be reasonably certain to occur*. Thus, regeneration harvest *may affect, but would not be likely to adversely affect*, northern spotted owls associated with 6,100 acres of dispersal habitat treated, and *may affect, and would be likely to adversely affect*, northern spotted owls associated with 35,200 acres of nesting-roosting habitat treated and would injure/kill any nesting northern spotted owls associated with those 35,200 acres.

The designation of, and implementation of proposed management direction for, the Low Intensity Timber Area, *may affect, and would be likely to adversely affect*, northern spotted owl critical habitat because it would direct the modification or removal of primary constituent elements, making such removal *reasonably certain to occur*. A comparison of **Table II-2** and **Table II-3** indicates that the BLM proposes to allocate 89,125 acres to the Low Intensity Timber Area, of which 73,022 acres (82 percent) is critical habitat, or about 6 percent of the 1,201,949 acres of critical habitat in the **action area**. As shown in **Table II-2**, the BLM also proposes to make multiple entries into the Low Intensity Timber Area, and harvest essentially all of that 73,022 acres of critical habitat, during the next 50 years. However, as shown in **Tables III-25** and **III-26**, due to the timing and distribution of the proposed harvests, the designation would not cause the adverse modification of critical habitat function at any time at the critical habitat sub-unit or unit scales.

3). Uneven-Aged Timber Area

The designation of, and implementation of proposed management direction for, the Uneven-Aged Timber Area (pages A-13 - A-14), *may affect, and would be likely to adversely affect*, the northern spotted owl by directing the removal of northern spotted owl dispersal and nesting-roosting habitats, making such removal *reasonably certain to occur*.

Selection harvest would affect an estimated 193,800 acres of forest stands (**Table II-2**) during the next 50 years. Such treatments *may affect, and would be likely to adversely affect*, the northern spotted owl, and would injure/kill nesting northern spotted owl associated with about 151,100of those acres because treatments would affect forest stands at least 80 years old (but not yet structurally-complex), which is nesting-roosting habitat, and would reduce the post-treatment canopy cover to less than 40 percent, resulting in the removal of nesting-roosting habitat.

Salvage treatments, which would affect an estimated 14,600 acres of northern spotted owl habitat during the next 50 years (**Table II-2**), *may affect, but would not be likely to adversely affect*, the northern spotted owl because they would not remove or downgrade dispersal or nesting-roosting habitat and would comply with management standards to retain sufficient snags and coarse woody debris in treatment areas.

The designation of, and implementation of proposed management direction for, the Uneven-Aged Timber Area, *may affect, andwould be likely to adversely affect*, northern spotted owl critical habitat

because it would direct the modification or removal of primary constituent elements, making such removal *reasonably certain to occur*. A comparison of **Table II-2** and **Table II-3** indicates that the BLM proposes to allocate 199,541 acres to the Uneven-Aged Timber Area, of which 108,229 acres (54 percent) is critical habitat, or 9 percent of the 1,207, 949 acres of critical habitat in the **action area**. As shown in **Table II-2**, even though the BLM proposes to make multiple entries into the Uneven-Aged Timber Area, and harvest essentially all of that 108,229 acres of critical habitat during the next 50 years, due to the nature of uneven-aged treatments, and the timing and distribution of the proposed harvests, the designation would not cause the adverse modification of critical habitat function at any time at the critical habitat sub-unit or unit scales (**Tables III-25** and **III-26**).

e. Eastside Management Area (BLM Klamath Falls Field Office only)
The designation of, and implementation of proposed management direction for, the Eastside Management Area (pages A-4 - A-8) would have *no effect* on the northern spotted owl or its critical habitat because designated lands are outside the range of this species.

3. Areas of Critical Environmental Concern
The proposed designations of the Bobby Creek RNA, Brewer Spruce RNA, Brownson Ridge, Bushnell-Irwin Rocks RNA, Cherry Creek RNA, China Wall, Cottage Grove Old Growth, Crabtree Complex RNA/ONA, Elk Creek, Euphoria Ridge, Grass Mountain RNA, High Peak - Moon Creek RNA, Jordan Creek, Lake Creek Falls, Little North Fork Wilson River, Little Sink RNA, Low Elevation Headwaters of the McKenzie River, Mary's Peak, Mohawk RNA, Nails Creek, Nestucca River, North Fork Chetco, North Fork Coquille River, Red Ponds RNA, Rocky Peak, Saddle Bag Mountain RNA, Snow Peak, Steel Creek, Surveyor, Tioga Creek, Upper Klamath River, Upper Klamath River Addition, Upper Rock Creek, Valley of the Giants, Wassen Creek and Yellowstone Creek ACECs *may affect, but would not be likely to adversely affect*, the northern spotted owl and its critical habitat because the spotted owl and its critical habitat are among the "relevant and important values" of these proposed ACECs. Thus, the BLM would manage these areas to **maintain northern spotted owl habitat and critical habitat**, rendering the effects to the species and its critical habitat *entirely beneficial*. Although individual management actions needed to protect and maintain spotted owls in the ACECs might *adversely affect* the species, at this time such management actions are *not reasonably certain to occur*. The effects of individual management actions needed to protect and maintain spotted owls would be addressed through project-level ESA sec. 7 consultation.

4. Fire, Fuels and Wildfire Response

a. Response to Wildfire
The implementation of proposed management direction requiring the BLM to respond immediately to wildfire (pages A-34 – A-35) *may affect, but would not be likely to adversely affect*, the northern spotted owl because, even though this species occurs in forest stands subject to wildfire and, hence, the BLM response, the infrequency of past wildfires on BLM-administered land, the limited sizes of past fire footprints, and the forests habitats that would be saved by the wildfire response, render the potential effects of a BLM response *discountable*. As warranted, the BLM would address the effects of such actions in accordance with emergency consultation procedures (50 CFR §402.05).

Implementation of the proposed management direction *may affect, and would be likely to adversely affect*, northern spotted owl critical habitat because the creation of fire breaks and other intervention would make the removal of primary constituent elements *reasonably certain to occur*. However, the removal only would be to the extent needed to maintain adjacent forest stands, would cause adverse effects that are local and short term (within 20 years of intervention) (*discountable*), would have *entirely beneficial* effects to critical habitat during the long term, and, based on past responses on BLM-administered lands, would not alter the functionality of critical habitat at any time at the critical

habitat sub-unit or unit scales. As warranted, the BLM would address the effects of such actions in accordance with emergency consultation procedures (50 CFR §402.05).

b. Reduce Wildfire Risk and Severity

The implementation of proposed management direction requiring the BLM to reduce wildfire risk and severity (pages A-34 – A-35) *may affect, but would not be likely to adversely affect*, the northern spotted owl because, during the long term (more than 10 years after treatment), the effects would be *entirely beneficial*. Although some treatments could occur in nesting-roosting habitat, treatments would not downgrade or remove, or delay the attainment of, nesting habitat during the short term. In addition, proposed management direction for Wildlife (page A-59) would ensure that the BLM does not create a barrier or strong filter to northern spotted movement and survival across the landscape. Thus, management actions that would adversely affect these species are *not reasonably certain to occur*.

The implementation of proposed management direction *may affect, and would be likely to adversely affect*, northern spotted owl critical habitat because it directs the BLM to reduce fuel loads, create fire breaks and take other actions necessary to reduce the likelihood and severity of future wildfires. These would include the removal of snags and coarse woody debris from forest stands, which are primary constituent elements of critical habitat, to snag and coarse woody debris minimum requirements. However, as shown in **Tables III-25** and **III-26**, such impacts would be local and short term (within 20 years of treatment) (*discountable*), would have *entirely beneficial* effects to critical habitat during the long term by reducing fire risk and severity, and would not alter the functionality of critical habitat at any time at the critical habitat sub-unit or unit scales.

5. Fisheries

The implementation of proposed management direction for Fisheries (page A-35) *may affect, but would not be likely to adversely affect*, the northern spotted owl because the effects would be *discountable*. Although the direction to replace malfunctioning stream crossings could potentially **disrupt** normal nesting behavior, such effects are *not reasonably certain to occur* given the infrequency of past such actions, the small **disruption** footprint, and the latitude local managers have to schedule activities outside the northern spotted owl breeding period, which is well known. Proposed management direction that allows the BLM to fall trees into the stream channel from the Riparian Reserve, to create habitat for aquatic species, would not be likely to adversely affect the spotted owl because, based on past such actions, it is unlikely that such isolated actions would alter habitat functionality. The BLM would verify its determination during ESA sec. 7 consultation on individual projects.

The implementation of proposed management direction for Fisheries *may affect, and would be likely to adversely affect*, northern spotted owl critical habitat because the proposed direction would allow the BLM to fall trees into the stream channel from the Riparian Reserve to create habitat for aquatic species, which would alter primary constituent elements. However, such impacts would be local and short term (within 20 years of treatment) and would have *discountable* effects to critical habitat during the short term and long term, and would not alter the functionality of critical habitat at any time at the critical habitat sub-unit or unit scales.

6. Forest Management

The implementation of proposed Forest Management direction (page A-35) *may affect, but would not be likely to adversely affect*, the northern spotted owl because, whereas it directs the BLM to treat forest stands for desired future outcomes, including timber production, to maintain safe stand conditions, to facilitate rights-of-way and tramways, and other purposes, which would be *reasonably certain* to modify spotted owl habitat, it does not direct or require the BLM to implement actions that would cause effects to

the species that exceed *discountable, insignificant or entirely beneficial*. The effects of specific forest management actions would be verified through project-level ESA sec. 7 consultation, as warranted.

The implementation of proposed Forest Management direction *may affect, and would be likely to adversely affect*, northern spotted owl critical habitat because the BLM could not reasonably implement the direction without modifying primary constituent elements. However, as shown in **Tables III-25** and **III-26**, implementation of the management direction would not alter the functionality of critical habitat at any time at the critical habitat sub-unit or unit scales. The effects of specific forest management actions would be addressed through project-level ESA sec. 7 consultation.

7. Livestock Grazing (BLM Medford District and Klamath Falls Field Office only)
The implementation of proposed management direction for Livestock Grazing (pages A-39 - A-45) would have *no effect* on the northern spotted owl or its critical habitat because neither the species nor its critical habitat are known or suspected to occur in BLM grazing allotments.

8. Hydrology
The implementation of proposed management direction for Hydrology (page A-36) *may affect, but would not be likely to adversely affect*, the northern spotted owl and its critical habitat because the proposed direction only would reduce the potential for negative impacts to spotted owls and critical habitat from new and existing rights-of-way, and other management actions and activities, making the effect to the species and its critical habitat *entirely beneficial*. The effects of new and existing rights-of-way, and the other actions and activities affected by the proposed management direction for hydrology, are addressed under the appropriate section.

9. Invasive Species
The implementation of proposed management direction for Invasive Species (page A-36) *may affect, and would be likely to adversely affect*, the northern spotted owl and its critical habitat during the short term (within 20 years of treatment) because it would direct the BLM to control Sudden Oak Death and other forest pathogens, and those treatments would be *reasonably certain* to remove or downgrade spotted owl dispersal and nesting habitat, and primary constituent elements, through the removal of infected conifer trees when they occur in treatment areas. However, during the long term (more than 20 years after treatment) the proposed management direction to combat Sudden Oak Death and other pathogens would be *entirely beneficial* because those pathogens are in the process of modifying key habitat components used by spotted owls (USDI FWS 2011:III-55), including primary constituent elements, and treatments would stop those pathogens from spreading to infect additional habitat and critical habitat.

10. Lands, Realty, and Roads
Implementation of the following proposed management direction for Lands, Realty, and Roads (pages A-38 - A-39) *may affect, but would not be likely to adversely affect*, the northern spotted owl:

- Construct new permanent/temporary roads where needed to meet resource management objectives, including major culverts and bridges as necessary, to established BLM engineering design standards. Apply road location, design, and construction best management practices as needed.
- Maintain existing roads, including major culverts and bridges, to provide access for both resource management and casual use activities while maintaining water quality and facility investments and providing user safety, to established BLM maintenance standards. Apply road maintenance and wet weather road use best management practices as needed.
- Remove hazard trees and downed trees along roads for safety or operational reasons.
- Fully decommission or obliterate (permanent closure) roads with no future resource management need. Decommission (long-term closure) roads not currently needed for resource management but that will be operated and maintained again in the future. Apply road closure best management

practices as needed. Close roads only with the approval of affected reciprocal right-of-way permittees.

The effects of new road construction on the northern spotted owl are unlikely to rise above the level of *discountable* based on the existing access network in the **planning area** and the associated low number of new requests for rights-of-way received by the BLM during the past 20 years, the ability of the BLM to route new rights-of-way to avoid or minimize impacts to other resource values and uses, and the low likelihood that a new road through northern spotted owl habitat would alter the functionality of the stand. The effects of other management direction to maintain and decommission existing infrastructure also is unlikely to rise above the level of *discountable* during the short term, and *entirely beneficial* during the long term, due to the ability of the BLM to schedule such activities outside the northern spotted owl breeding period, which is well known. As warranted, the BLM would verify its determination during project level ESA sec. 7 consultation.

The implementation of this proposed management direction *may affect, and would be likely to adversely affect*, northern spotted owl critical habitat because the BLM would no close critical habitat to new requests for rights-of-way and, once it receives a request, the BLM could not reasonably route new access to always avoid the loss of primary constituent elements, which means that such losses are *reasonably certain to occur*. However, for the reasons stated in the previous paragraph, the scale of impact would be such that implementation of the management direction would not alter the functionality of critical habitat at any time at the critical habitat sub-unit or unit scales. As warranted, the BLM would verify its determination during project level ESA sec. 7 consultation.

11. Rare Plants and Fungi

The implementation of proposed management direction for Rare Plants and Fungi (pages A-47 – A-48) *may affect, but would not be likely to adversely affect*, the northern spotted owl or its critical habitat because the effects would be *discountable* to the species and the primary constituent elements of critical habitats during both the short term and long term. Even though the BLM would direct the uses of prescribed fire, thinning and the removal of encroaching vegetation to maintain rare plants and fungi, such treatments would be designed consistently with the recovery plans and critical habitat rules of all listed species, including for the northern spotted owl; *i.e.*, they *would not be reasonably certain* to adversely affect northern spotted owl habitat or critical habitat.

12. Recreation and Visitor Services

The implementation of proposed management direction for Recreation and Visitor Services (pages A-48 - A-50) *may affect, but would not be likely to adversely affect*, the northern spotted owl and its critical habitat because it would reduce the acres in the **action area** exposed to such activities, and ensure that Extensive Recreation Management Areas would be managed to **maintain spotted owl habitat** (see Section I D). Even though Special Recreation Management Areas, where the BLM would define recreation as a dominate use, potentially support spotted owl habitat, it is unlikely that the BLM designation would have more than a *discountable* effect on the spotted owl due to the level of extant human activity in these areas, the availability of spotted owl habitat outside these areas and the ability of the spotted owl to avoid human activity. The proposed management direction would reduce the potential risks to northern spotted owl habitat and critical habitat, rendering the effects *entirely beneficial*.

13. Trails and Travel Management

The implementation of proposed management direction for Trails and Travel Management (pages A-52 - A-53) *may affect, but would not be likely to adversely affect*, the northern spotted owl and its critical habitat because it would reduce potential risks to the species' habitats, rending the effect *entirely beneficial*. Even though the BLM would maintain a road and trail network for public, resource management and administrative access needs, the BLM would manage that network to maintain fragile

and unique resource values from damage by OHV use, and limit or eliminate OHV use where appropriate. The proposed closure of 156,036 acres would eliminate potential threats from OHV use to spotted owls, and their habitat and critical habitat, associated with those acres. The BLM also would eliminate 319,661 acres of open area and further evaluate and designate limited areas to protect resources.

14. Wildlife

The implementation of proposed management direction for Wildlife (pages A-54 - A-59) *may affect, but would not be likely to adversely affect*, the northern spotted owl and its critical habitat because it would require the BLM to manage the spotted owl and its critical habitat consistently with the northern spotted owl recovery plan and the final rule on critical habitat. The effects of this management direction on the northern spotted owl and its critical habitat would be *entirely beneficial*.

Under the Proposed RMP, the BLM would not authorize timber sales that cause the incidental taking of northern spotted owl territorial pairs or resident singles until the U.S. Fish and Wildlife Service has implemented a barred owl management program. This would require the BLM to establish whether the northern spotted owl is actually present in the area that would be affected by the timber harvest using the best available science at that time, such as through pre-project northern spotted owl surveys consistent with the current survey protocol. Such surveys of forest stands occupied by northern spotted owls would **disturb** (see Section I D) spotted owls but do not **disrupt** their normal behavior, rendering the effects of this management direction *entirely beneficial*.

15. Survey and Monitoring

BLM actions to survey for, and monitor populations of, northern spotted owl *may affect, and would be likely to adversely affect*, the species because it would **disrupt** the normal behavior of individuals in nesting territories. Even though survey and monitoring would be done by professional biologists, and in accordance with survey and monitoring protocols and the approved recovery plan, biologists cannot reasonably complete necessary work without intruding into nest territories and soliciting a response from territorial owls, thus creating a likelihood of injury by exposing them to barred owl displacement and **disrupting** their normal behavior. The amount of **disruption** would depend on the amount of survey and monitoring required. However, since human intrusions and **disruptions** of normal behavior would be short term and temporary, the BLM does not anticipate that the level of **disturbance** to individuals would affect any local population.

R. CUMULATIVE EFFECTS

The BLM anticipates that non-federal land management actions in western Oregon would continue at current levels. The BLM has no knowledge or expectation of any change in future State, tribal, local or private actions that are reasonably certain to occur or would be related to BLM approval of the Proposed RMP.

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Appendix A – Management Objectives and Direction

This section identifies the management objectives and direction that would apply under the Proposed RMP.

Under the Proposed RMP, the BLM would take actions that are specifically provided for in the management direction. In addition, the BLM may take actions that are not specifically mentioned in the management direction if they do not conflict with management direction and are consistent with the management objectives.

Proposed RMP

The Proposed RMP includes management objectives and management direction for land use allocations and for resource programs. The management objectives and management direction described for land use allocations apply only within that land use allocation. The management objectives and management direction described for resource programs apply across land use allocations, unless otherwise noted.

In the Proposed RMP, the Harvest Land Base and Late-Successional Reserve have specific, mapped sub-allocations, some of which have differing management objectives or management direction. For these sub-allocations, the management objectives and management direction of the broader allocation apply, as well as the management objectives or management direction specific to that sub-allocation. For example, the Harvest Land Base includes three sub-allocations: Low Intensity Timber Area, Moderate Intensity Timber Area, and Uneven-Aged Timber Area. In each of these three sub-allocations, both the management objectives and management direction described below for the Harvest Land Base and the individual sub-allocation applies.

In addition, the Riparian Reserve has differing management objectives and management direction for Riparian Reserve west of Highway 97 (i.e., in the Coos Bay, Eugene, Medford, Roseburg, and Salem Districts, and the portion of the Klamath Falls Field Office west of Highway 97) and Riparian Reserve east of Highway 97 (i.e., within the Eastside Management Area in the Klamath Falls Field Office). Although the management objectives are the same for all of the Riparian Reserve west of Highway 97, the management direction varies among three classes of subwatersheds. In addition, for the Riparian Reserve west of Highway 97, some management direction varies for the sub-allocations of the Riparian Reserve – Moist and Riparian Reserve – Dry.

The Proposed RMP requires the future allocation of marbled murrelet occupied stands[1] to the Late-Successional Reserve for occupied sites identified[2] after March 26, 2015 as a result of BLM marbled murrelet surveys in (1) all land use allocations within 35 miles of the Pacific Coast, and (2) Late-Successional Reserve and Riparian Reserve between 35–50 miles from the Pacific Coast and outside of exclusion Areas C and D (shown in **Figure III-9**). In addition, the Proposed RMP requires the future allocation of red tree vole "habitat areas"[3] to the Late-Successional Reserve for occupied sites identified as a result of BLM red tree vole surveys within the range of the North Oregon Coast Distinct Population Segment of the red tree vole north of Highway 20.

[1] Marbled murrelet occupied stand refers to all forest stands, regardless of age or structure, within ¼ mile (1,320 feet) of the location of marbled murrelet behavior indicating occupancy and not separated from the location of marbled murrelet behavior indicating occupancy by more than 328 feet of non-forest.

[2] In this context, "identified after March 26, 2015" means that survey data for occupied marbled murrelet sites was entered into the BLM corporate database after March 26, 2015.

[3] Red tree vole "habitat areas" are described in the management direction below.

Land Use Allocations

Congressionally Reserved Lands and the National Landscape Conservation System

Management Objectives

- Conserve, protect, and restore the identified outstanding cultural, ecological, and scientific values of the National Landscape Conservation System and other congressionally designated lands.
- Preserve the wilderness character of designated Wilderness Areas.
- Preserve wilderness characteristics in Wilderness Study Areas in accordance with non-impairment standards as defined under the management policy for Wilderness Study Areas (BLM Manual 6330 – Management of BLM Wilderness Study Areas; USDI BLM 2012), until Congress either designates these lands as Wilderness or releases them for other purposes.
- Protect and enhance the free-flowing condition, water quality, and outstandingly remarkable values of eligible, suitable, and designated Wild and Scenic River corridors.[4]
- Provide protection to Wild and Scenic River corridors[1] that are suitable for inclusion as components of the National Wild and Scenic Rivers system until Congress makes a decision on designation.
- Provide protection to Wild and Scenic River corridors[1] that are eligible but have not yet been studied for suitability as components of the National Wild and Scenic Rivers system pending suitability evaluations.

Management Direction

- In designated Wilderness Areas, exclude all prohibited uses of Wilderness (as defined in the Wilderness Act of 1964 and BLM Manual 6340 – Management of Designated Wilderness (USDI BLM 2012)), unless they have been demonstrated to be the minimum necessary (using the minimum requirements decision guide) to administer the area for the purposes of the Wilderness Act.
- Provide for the enjoyment and appreciation of the resources, qualities, values, and associated settings and primary uses within National Trail rights-of-way (including those classified as Scenic, Historical, and Recreational) and for which National Trails are designated.
- Enhance, promote, and protect the scenic, natural, and cultural resource values associated with current and future designated National Scenic and Historic Trails.
- Conduct silvicultural treatments in National Trail management corridors (including those classified as Scenic, Historical, and Recreational) only as needed to protect or maintain recreation setting characteristics or to achieve recreation objectives.
- Conduct management actions, including but not limited to fuels treatments, invasive species management, riparian or wildlife habitat improvements, forest management, and trail construction, in Wild and Scenic River corridors only if consistent with designated or tentative classifications and if any reductions in outstandingly remarkable values would be temporary and outstandingly remarkable values would be protected or enhanced over the long term.
- Do not use ground-disturbing equipment or aerial application of non-fugitive retardant in areas visible from the river within Wild and Scenic River corridors during wildfire management operations, except where the wildfire is deemed a threat to human safety or private property, or where use is essential for wildfire control.
- Conserve and develop the scenic, natural, and historic values of the Yaquina Head Outstanding Natural Area, and allow the continued use of the area for the purposes for which it was designated.

[4] These corridors include all of the river classifications – Wild, Scenic, and Recreational.

District-Designated Reserves

Management Objectives

- Maintain the values and resources for which the BLM has reserved these areas from sustained-yield timber production.

Management Direction

- Manage constructed facilities and infrastructure, such as seed orchards, roads, buildings, quarries, communication sites, pump chances, heliponds, and maintenance yards, as needed for the purposes for which the BLM constructed them.
- Maintain access to roads and facilities by removing hazard trees and blowdown. Logs may be retained as down woody debris, moved for placement in streams for fish habitat restoration, or removed through a commercial harvest.
- Manage seed orchards consistent with the Seed Orchard Records of Decision for Integrated Pest Management (Salem, Eugene, Medford Districts; USDI BLM 2005c, 2005d, 2006).

District-Designated Reserve – Timber Production Capability Classification

Management Objectives

- *See District-Designated Reserves management objectives.*

Management Direction

- Manage areas identified as unsuitable for sustained-yield timber production through the Timber Production Capability Classification system, for other uses if those uses are compatible with the reason for which the BLM has reserved these lands (as identified by the Timber Production Capability Classification codes).
- Apply silvicultural or fuels treatments, including prescribed fire, that restore or maintain community-level structural characteristics, promote desired species composition, and emulate ecological conditions produced by historic fire regimes, in areas identified as unsuitable for sustained-yield timber production through the Timber Production Capability Classification system,
- Designate additional lands as District-Designated Reserve – Timber Production Capability Classification through updates to the Timber Production Capability Classification system and remove those lands from the Harvest Land Base when examinations indicate that those lands meet the criteria for reservation.
- Un-designate lands as District-Designated Reserve – Timber Production Capability Classification and return those lands to the Harvest Land Base through updates to the Timber Production Capability Classification system when examinations indicate that those lands do not meet the criteria for reservation.

District-Designated Reserve – Lands Managed for their Wilderness Characteristics[5]

Management Objectives

- Protect wilderness characteristics (i.e., roadlessness, naturalness, opportunities for solitude and primitive unconfined recreation, and identified supplemental values), while allowing competing resource demands that do not conflict with preserving long-term wilderness characteristics.

[5] These objectives and direction apply to lands outside of designated Wilderness Areas and Wilderness Study Areas that the BLM has identified as having wilderness characteristics and for which the BLM is proposing to manage for the protection of those wilderness characteristics.

Management Direction

- Allow mechanical vegetation treatment consistent with Visual Resource Management Class II for the purpose of improving ecological condition, contributing to threatened or endangered species recovery, or enhancing long-term wilderness characteristics.
- Do not construct new buildings or new temporary or permanent roads.
- Allow fuels treatments, invasive species management, riparian or wildlife habitat improvements, forest management, and other vegetation management only if any reductions in wilderness characteristics are temporary and wilderness characteristics are protected over the long term.
- Do not use ground-disturbing equipment or aerial application of non-fugitive retardant during wildfire management operations, except where the wildfire is deemed a threat to human safety or private property or where use is essential for wildfire control.
- For lands identified for protection of wilderness characteristics where the BLM-administered lands rely on adjoining Federal lands being managed to protect the same values to meet the size criteria (BLM Manual 6310 – Conducting Wilderness Characteristics Inventory on BLM Lands; USDI BLM 2012) and the agency managing the adjoining lands revises its land use plan to no longer protect wilderness characteristics, the BLM-administered lands will no longer meet the minimum size criteria and thus will no longer possess wilderness characteristics.
    - Wilderness characteristics will no longer be protected on these lands and the accompanying land use plan allocations (e.g., right-of-way exclusion, Visual Resource Management Class II) applied specifically to protect the wilderness characteristics will automatically be dropped as part of plan maintenance.
    - These lands will then be managed consistent with the land use allocations, management objectives, and management direction of comparable or adjacent BLM-administered lands.

Eastside Management Area

Eastside Management Area – Forested Lands

Management Objectives

- Manage forested lands on a sustainable basis for multiple uses including wildlife and riparian habitats, recreational needs, cultural resources, community stability, and commodity production, including commercial timber and other forest products.
- Promote development of fire-resilient forests.
- Offer for sale the probable sale quantity of 350 Mbf of timber per year.

Management Direction

- Utilize uneven-aged management when managing forest stands. This will include use of a combination of harvesting methods including thinning, single tree selection harvest, and group selection harvest.
- Conduct uneven-aged management harvests for the removal and sale of timber or biomass. Harvests will be applied to stands of any age, and throughout all diameters, for any of the following purposes:
    - Maintain growth and vigor of the stand.
    - Adjust stand composition or structure.
    - Recover anticipated mortality.
    - Reduce stand susceptibility to natural disturbance such as fire, windstorm, disease, or insect infestation.
    - Improve merchantability and value.
    - Promote multi-structural conditions in forest stands.
- Retain an overstory component of trees in uneven-aged management harvest units to provide shade, reduce wind speed, and promote overall fire resiliency in the stand. Maintain relative density between 15 and 55, but allow relative density to vary outside of this range based on vegetative type, site productivity, and fire risk factors such as slope, aspect, and elevation.

- Incorporate group selection harvest of up to 5 acres in size individually, and an aggregate level of up to 25 percent of the area of the treated stand within uneven-aged management harvest units when needed to maintain or develop desired species composition, achieve desired diameter distribution, or address natural disturbances.
- Implement timber salvage harvest after disturbances as needed to recover economic value and to minimize commercial loss or deterioration of damaged trees. Retain overstory trees as needed within regeneration harvest areas to provide for shade, frost protection, seeding, or other silvicultural needs.
- Convert lands historically supporting conifer species (other than juniper) that are currently growing primarily brush or hardwoods to conifer species suitable to the site.
- Conduct prescribed burns, and mechanical or hand fuels treatments to reduce the potential for uncharacteristic wildfires. Apply maintenance treatments at appropriate intervals to retain or improve fire resilient conditions.
- Apply pre-commercial thinning to forest stands to achieve long-term management objectives.
- Apply pruning to enhance timber value and for fuels and disease management.
- During silvicultural treatment of stands, retain existing—
  - snags ≥ 6" dbh
  - down woody material ≥ 6" in diameter at the large end and > 20' in length

  except for safety, operational, or fuels reduction reasons. Retain snags ≥ 6" dbh felled for safety or operational reasons as down woody material, unless they would also pose a safety hazard as down woody material.
- Create new snags when the existing level of snags > 16" DBH is less than 2 snags per acre on the average over the treatment stand, to meet this level. When the existing level of down woody debris over 12" in diameter and 12 feet in length is less than a total of 40 feet per acre over the treatment stand, create new down woody debris to meet this level. Also:
  - Snag and down woody material levels described above will be met by any combination of the creation of new snags and down woody material from live conifer trees and the retention of existing levels of snags (Class I and Class II) and down woody material (Class I and Class II). If existing levels of snags and down woody material are insufficient to meet these levels in a thinning project, the desired levels can be satisfied by including in the project decision the creation of snags and down woody material within 5 years to meet these levels after completion of the harvest or associated fuels treatment.
  - Snag and down woody material retention or creation levels will be met at the scale of the harvest unit and are not intended to be attained on every acre. Snag and down woody material retention will be variable per acre throughout the treatment area.
  - If the pre-harvest quadratic mean diameter of the stand is less than 16", then the snags to be created or retained will be 2 snags per acre with a diameter larger than the quadratic mean diameter of the stand.

<u>Eastside Management Area – Non-forested Lands</u>

Management Objectives

- Manage non-forested lands with the intent of maintaining or improving wildlife habitat and rangeland conditions based on ecological site parameters. Where conditions are currently late seral or potential natural community, maintain these conditions. Where conditions are early or mid seral, improve conditions towards late seral or potential natural community.
- Manage non-forested lands for multiple uses in addition to those listed above including recreational needs, community stability, and commodity production. Commodities include firewood, logs, biomass, chips, and other products and byproducts from juniper woodlands and rangelands.
- Promote development of fire-resilient woodlands and rangelands.
- Provide for the conservation of Bureau Special Status Species.

Management Direction

- Treat vegetation communities encroached by invasive juniper using prescribed fire, mechanical, chemical, and manual juniper removal treatments.
- Manage and retain juniper woodlands on sites they occupied historically (pre-European settlement), as identified by ecological site inventories or other methods.
- Cut encroaching juniper that hinders attainment of desired forage conditions to maintain and restore forage for big game and to restore unoccupied or historic greater sage-grouse habitat. Remove, utilize, or pile and burn cut juniper.
- Plant or seed native species to improve unoccupied or historic greater sage-grouse habitat.
- Retain old-growth 'legacy' juniper when it meets the following definition: Individual trees that likely originated in the pre-settlement period, before 1870. These trees are commonly found in rocky areas where vegetation is sparse and fire frequency is naturally low. Characteristics of old-growth juniper include some or all of the following:
    - Flat, rounded, broad at top, or irregular crown (as opposed to the more pointed tops of younger trees) or dead "spike" top
    - Numerous dead branches
    - Coarse, bright yellow-green lichen (*Letharia* or wolf lichen) covered branches
    - Large diameter lower branches
    - Large diameter trunk relative to height
    - Spirally twisted bark and deep furrows on the trunk
    - Hollow trunk
- Apply prescribed burns, mechanical or hand fuels treatments to reduce the potential for uncharacteristic wildfires. Apply maintenance treatments at appropriate intervals to retain or improve fire-resilient conditions.
- Manage unoccupied or historic greater sage-grouse habitat consistent with the Greater Sage-Grouse Conservation Assessment and Strategy for Oregon and with the Oregon Sage-Grouse Action Plan.
- Maintain or enhance wildlife habitat on rangelands.
- Continue the existing road closures to motorized vehicles, except for administrative purposes, between November 1 and April 15 in the designated closure areas within the Interstate and Klamath Deer Winter Ranges. These seasonal road closures include South Gerber, Willow Valley, Harpold Ridge, Bryant Mountain, North Bryant, Windy Ridge, Stukel Mountain, and Lorella.
- Plant or seed native forage species for deer and elk along roadsides, skid trails, and on disturbed areas, or create forage plots when forage quality is determined to be a limiting factor in achieving the management goals of the Oregon Department of Fish and Wildlife. Include forage retention requirements for wildlife when implementing silvicultural treatments or habitat management activities.

<u>Eastside Management Area – Riparian Reserve</u>

Management Objectives

- Provide for conservation of Bureau Special Status fish and other Bureau Special Status riparian-associated species.
- Provide for the riparian and aquatic conditions that supply stream channels with shade, sediment filtering, leaf litter and large wood sources, and stream bank stability.
- Maintain and restore water quality and hydrologic functions.
- Maintain and restore access to stream channels for all life stages of aquatic species.
- Maintain and restore the proper functioning condition and ecological site potential of riparian and wetland areas.

Management Direction

Table A-1. Eastside Management Area - Riparian Reserve distances by water feature.

Feature	Riparian Reserve Distance*
Fish-bearing streams and/or perennial streams	150 feet on each side of a stream channel from the ordinary high water line or from the outer edge of the channel migration zone for low-gradient alluvial shifting channels.
Non-fish-bearing intermittent streams, all lakes, all natural ponds, constructed water impoundments > 1 acre, constructed ponds > 1 acre, and wetlands > 1 acre	100 feet on each side of the water feature from the ordinary high water line.
Wetlands < 1 acre, constructed water impoundments < 1 acre, and constructed ponds < 1 acre.	25 feet on each side of the water feature from the ordinary high water line.

* Reported distances are measured as slope distance.

All Water Features

- Implement instream and riparian restoration activities, such as gravel augmentation, aspen restoration, or placement of boulders and large wood in streams, including tree lining from adjacent riparian areas for all streams. Use manual or ground-based methods. Place an emphasis on streams that have high intrinsic potential for fish, high priority fish populations (such as those defined in recovery plans), or high levels of chronic sediment inputs.
- Remove or modify human-caused fish passage barriers to restore access to stream channels for all life stages of aquatic species.
- Fall and move trees as needed for safety or operational reasons, including, but not limited to, hazard tree removal, creation of yarding corridors, and road construction, improvement, or maintenance.
- Retain existing snags and down woody material during silvicultural treatment of stands, except for safety, operational, or fuels reduction reasons. Retain snags felled for safety or operational reasons as down woody material.
- Apply vegetation treatments and prescribed burns as needed to reduce the potential for uncharacteristic wildfires.
- Do not conduct timber salvage, except when necessary to protect public safety, or to keep roads and other infrastructure clear of debris.
- Manage livestock grazing at a level that meets Rangeland Health Standards (USDI BLM 1997) and allows for maintenance or development of an upward trend toward the proper functioning condition of riparian and wetland plant communities. Implement practices such as installing and maintaining livestock exclosures, managing season of use and intensity, developing off-stream watering facilities, and other techniques to attain this condition.
- Remove conifer encroachment where conifers are interfering with the natural vegetation community type, or where excessive erosion may occur.
- Apply Best Management Practices (BMPs) for roads, stream and riparian restoration work, and vegetation management as needed to maintain or restore water quality and hydrologic function (**Appendix J** of the Proposed RMP).

Fish-bearing Streams and Perennial Streams

- Conduct thinning and other vegetation treatments to accelerate the development of potential natural forest stand conditions including late-successional stand characteristics and native riparian shrub communities.

- Do not conduct thinning and other vegetation treatments using ground-based machinery within 75 feet (slope distance) on either side of the edge of the stream channel, as measured from the ordinary high water line.
- Do not conduct thinning and other vegetation treatments using ground-based machinery on slopes > 35 percent, soils sensitive to displacement, rutting, or compaction, or in slide-prone areas.
- Retain and promote long-term site-potential shade conditions.

Non-fish-bearing Intermittent Streams

- Conduct thinning and other vegetation treatments to speed the development of large trees to provide an eventual source of large woody material to stream channels.
- Do not conduct thinning and other vegetation treatments using ground-based machinery on slopes > 35 percent, soils sensitive to displacement, rutting, or compaction, or in slide-prone areas.

Lakes, Natural Ponds, and Wetlands

- Conduct thinning and other vegetation treatments within the Riparian Reserve to speed the development of potential natural vegetation communities.
- Do not conduct thinning and other vegetation treatments using ground-based machinery within 50 feet (slope distance) on each side of the ordinary high water line of the water feature, or seasonally saturated soils (whichever is greatest).

Constructed Water Impoundments and Constructed Ponds

- Follow inspection guidelines for BLM infrastructure (e.g., dams and spillway structures), and implement maintenance and repair as needed.
- Dredge constructed water impoundments as necessary to maintain capacity.
- Maintain vegetation, access, and plumbing associated with fire water sources for all types of firefighting equipment (e.g., engines, aircraft, and tenders).

Harvest Land Base

Management Objectives

- Manage forest stands to achieve continual timber production that can be sustained through a balance of growth and harvest.
- Offer for sale the declared Allowable Sale Quantity of timber.
- Recover economic value from timber following disturbances, such as fires, windstorms, disease, or insect infestations.
- In harvested or disturbed areas, ensure the establishment and survival of desirable trees appropriate to the site and enhance their growth.
- Enhance the economic value of timber in forest stands.

Management Direction

- Conduct silvicultural treatments to contribute timber volume to the Allowable Sale Quantity.
- Conduct silvicultural treatments to enhance timber values and to reduce fire risks and insect and disease outbreaks.
- Implement timber salvage harvest after disturbances to recover economic value and to minimize commercial loss or deterioration of damaged trees.
- Employ site preparation methods such as mechanical treatments (e.g., machine piling), manual treatments (e.g., brushing), and prescribed burns to prepare newly harvested and inadequately stocked areas for the regeneration of desirable tree species.
- Manually apply supplemental nutrients where necessary to enhance vigor and growth of desired vegetation. Do not use aerial application methods.

- During commercial thinning, selection harvest,[6] or regeneration harvest treatments of stands, retain existing—
  - Snags > 20” DBH
  - Snags 6-20” DBH in decay classes III, IV, and V (BLM Manual H-5250-1 Forest Survey Handbook)
  - Down woody material > 20” in diameter at the large end and > 20’ in length
  - Down woody material 6-20” in diameter at the large end and > 20’ in length in decay classes III, IV, and V (BLM Manual H-5250-1 Forest Survey Handbook)

  except for safety, operational, or fuels reduction reasons. Retain snags ≥ 6” DBH felled for safety or operational reasons as down woody material, unless they would also pose a safety hazard as down woody material.
- If not suitable for commercial removal, make felled hazard trees available for habitat restoration purposes in any land use allocation.
- When implementing commercial harvest,[7] except timber salvage, create new snags in the amounts and sizes specified in **Table A-2** within 1 year of completion of yarding the timber in the timber sale. If insufficient trees are available in the size class specified, use trees from the largest size class available. Meet snag creation levels as an average at the scale of the harvest unit; snag creation levels are not required to be attained on every acre. When creating the required number of snags, locate them according to the following criteria:
  - Create snags in a variety of spatial patterns, including aggregated groups, stringers, and individual trees.
  - Do not create snags within falling distance of power lines, structures, or roads that will remain open after harvesting activities are complete.
  - Concentrate the creation of snags in areas of the stand where the BLM does not anticipate skidding or yarding will occur within 20 years. Meet snag creation levels with trees from any species.

[6] **Selection harvest** is a type of commercial harvesting. Selection harvesting generally involves removing individual trees or groups of trees up to four acres in size and is used as part of an uneven-aged management regime, or to create uneven-aged stands.

[7] In the context of management direction for the Harvest Land Base, **commercial harvest** means stand harvesting in which some or all of the cut trees are removed from the stand for timber volume and a monetary value assessed. Commercial harvest in this context does not include the following:

- Individual tree falling
- Stand thinning in which all of the cut trees are left in the stand for restoration purposes or the cut trees are removed for firewood or other non-commercial harvest
- Fuels reduction treatments in which cut trees are burned, chipped, or otherwise disposed of without removal from the stand for timber

Commercial harvest may be implemented through a variety of mechanisms, including timber sale contracts, stewardship agreements, or other types of contracts.

Table A-2. Snag creation levels within the Harvest Land Base.

District/ Field Office	Province	Number of Snags/Acre Created Within 1 Year of Yarding the Timber in the Timber Sale		
		> 20" DBH	> 10" DBH	Total Snags
Coos Bay	All	1	-	1
Eugene	OR Coast Range	1	-	1
	Western Cascades	1	-	1
Klamath Falls	All	1	-	1
Medford	All	-	-	-
Roseburg	OR Coast Range	3	-	3
	Western Cascades	3	3	6
	Klamath	-	-	-
Salem	OR Coast Range	1	-	1
	Western Cascades	1	-	1

Harvest Land Base – Low Intensity Timber Area (LITA)

Management Objectives

- *See Harvest Land Base management objectives.*
- Provide complex early successional ecosystems.
- Develop diverse late-successional ecosystems for a portion of the rotation.
- Provide a variety of forest structural stages distributed both spatially and temporally.

Management Direction

- *See Harvest Land Base management direction.*
- Apply regeneration harvest for any of the following reasons:
  - Produce timber to contribute to the attainment of the declared Allowable Sale Quantity.
  - Adjust the age class distribution in the LITA in each sustained-yield unit.
  - Manage insect and disease infestations.
  - Convert stands capable of supporting conifer species that are currently growing primarily hardwoods or shrubs to a mix of conifer and hardwood species suitable to the site.
  - Increase or maintain vegetative species diversity.
  - Restore and maintain habitat for Bureau Special Status Species.
  - Create growing space for hardwood and pine species persistence and regeneration.
  - Produce complex early successional ecosystems.
  - Reset stand development in overly dense stands that would not respond well to commercial thinning.
- In each regeneration harvest unit, retain 15–30 percent of pre-harvest stand basal area in live trees. Retain trees in a variety of spatial patterns, including aggregated groups, stringers, and individual trees. Include among retained trees all trees that are both ≥ 40" DBH and that the BLM identifies were established prior to 1850, except where removal is necessary for safety or operational reasons. The BLM identification of trees established prior to 1850 may be based on any of a variety of methods, such as evaluation of bark, limb, trunk, or crown characteristics or increment coring, at the discretion of the BLM.
- After regeneration harvest, use natural or artificial regeneration to reforest a mixture of species appropriate to the site to a stand-level average of at least 130 trees per acre within 5 years of harvest.
- Conduct commercial thinning for any of the following reasons:
  - Produce timber to contribute to the attainment of the declared Allowable Sale Quantity.

- Recover anticipated mortality.
- Adjust stand composition or dominance.
- Reduce stand susceptibility to disturbances such as a fire, windstorm, disease, or insect infestation.
- Improve stand merchantability and value.
- Increase or maintain vegetative species diversity.
- Promote or enhance the development of structural complexity.
- Create growing space for the creation or augmentation of Bureau Special Status plant populations.
- Create growing space for hardwood and pine persistence and regeneration.

- Maintain stand densities through commercial thinning above densities needed to occupy the site, but below densities that will result in loss of stand vigor and health.
  - Conduct thinning to result in a stand average relative density between 25 percent and 45 percent after harvest.
  - Leave untreated areas (skips) and group selection openings[8] to provide increased structural complexity in the post-treatment stand. Do not exceed 10 percent of the thinned portion of the stand in group selection openings after harvest. Leave at least 5 percent of the planned harvest unit in untreated skips.
  - Include among retained trees all trees that are both ≥ 40" DBH and that the BLM identifies were established prior to 1850, except where removal is necessary for safety or operational reasons. The BLM identification of trees established prior to 1850 may be based on any of a variety of methods, such as evaluation of bark, limb, trunk, or crown characteristics or increment coring, at the discretion of the BLM.
- Implement timber salvage harvest after disturbance events to recover economic value and to minimize commercial loss or deterioration of damaged trees where the BLM determines that removal is economically viable.
  - In timber salvage harvest units, retain at least 15 percent of pre-harvest stand basal area in live trees or snags in individual harvest units. Retain trees and snags in a variety of spatial patterns, including aggregated groups, stringers, and individual trees.
  - After salvage harvest, use natural or artificial regeneration to reforest a mixture of species appropriate to the site to a stand-level average of at least 130 trees per acre within 5 years of harvest.
- For areas without timber salvage harvest after disturbance events, use natural or artificial regeneration to reforest a mixture of species appropriate to the site to a stand-level average of at least 130 trees per acre (including surviving green trees) within 10 years of the disturbance event, to the extent possible given safety and operational constraints.

Harvest Land Base – Moderate Intensity Timber Area (MITA)

Management Objectives

- *See Harvest Land Base management objectives.*
- Provide complex early successional ecosystems.
- Develop diverse late-successional ecosystems for a portion of the rotation.
- Provide a variety of forest structural stages distributed both temporally and spatially.

Management Direction

- *See Harvest Land Base management direction.*

[8] **Group selection openings** are defined as areas with ≤ 2 live trees ≥ 7" DBH per acre. Roads, landings, yarding corridors, and skid trails do not count as group selection openings.

- Conduct regeneration harvest for any of the following reasons:
  - Produce timber to contribute to the attainment of the declared Allowable Sale Quantity.
  - Adjust the age class distribution in the MITA in each sustained-yield unit.
  - Manage insect and disease infestations.
  - Convert stands capable of supporting conifer species that are currently growing primarily hardwoods or shrubs to a mix of conifer and hardwood species suitable to the site.
  - Increase or maintain vegetative species diversity.
  - Restore and maintain habitat for Bureau Special Status Species.
  - Create growing space for hardwood and pine species persistence and regeneration.
  - Produce complex early successional ecosystems.
  - Reset stand development in overly dense stands that would not respond well to commercial thinning.
- In each regeneration harvest unit, retain 5–15 percent of pre-harvest stand basal area in live trees. Retain trees in a variety of spatial patterns, including aggregated groups, stringers, and individual trees. Include among retained trees all trees that are both ≥ 40" DBH and that the BLM identifies were established prior to 1850, except where removal is necessary for safety or operational reasons. The BLM identification of trees established prior to 1850 may be based on any of a variety of methods, such as evaluation of bark, limb, trunk, or crown characteristics or increment coring, at the discretion of the BLM.
- After regeneration harvest, use natural or artificial regeneration to reforest a mixture of species appropriate to the site to a stand-level average of at least 150 trees per acre within 5 years of harvest.
- Conduct commercial thinning for any of the following reasons:
  - Produce timber to contribute to the attainment of the declared Allowable Sale Quantity.
  - Recover anticipated mortality.
  - Adjust stand composition or dominance.
  - Reduce stand susceptibility to disturbances such as a fire, windstorm, disease, or insect infestation.
  - Improve stand merchantability and value.
  - Increase or maintain vegetative species diversity.
  - Promote or enhance the development of structural complexity.
  - Create growing space for the creation or augmentation of Bureau Special Status plant populations.
  - Create growing space for hardwood and pine persistence and regeneration.
- Maintain stand densities through commercial thinning above densities needed to occupy the site, but below densities that will result in loss of stand vigor and health.
  - Conduct thinning to result in stand average relative density between 25 percent and 45 percent after harvest.
  - Leave untreated areas (skips) and group selection openings to provide increased structural complexity in the post-treatment stand. Do not exceed 10 percent of the thinned portion of the stand in group selection openings after harvest. Leave at least 5 percent of the planned harvest unit in untreated skips.
  - Include among retained trees all trees that are both ≥ 40" DBH and that the BLM identifies were established prior to 1850, except where removal is necessary for safety or operational reasons. The BLM identification of trees established prior to 1850 may be based on any of a variety of methods, such as evaluation of bark, limb, trunk, or crown characteristics or increment coring, at the discretion of the BLM.
- Implement timber salvage harvest after disturbance events to recover economic value and to minimize commercial loss or deterioration of damaged trees where the BLM determines that removal is economically viable.

- In timber salvage harvest units, retain at least 5 percent of pre-harvest stand basal area in live trees or snags in individual harvest units. Retain trees and snags in a variety of spatial patterns, including aggregated groups, stringers, and individual trees.
- After salvage harvest, use natural or artificial regeneration to reforest a mixture of species appropriate to the site to a stand-level average of at least 150 trees per acre within 5 years of harvest.

- For areas without timber salvage harvest after disturbance events, use natural or artificial regeneration to reforest a mixture of species appropriate to the site to a stand-level average of at least 150 trees per acre (including surviving green trees) within 10 years of the disturbance event, to the extent possible given safety and operational constraints.

Harvest Land Base – Uneven-aged Timber Area (UTA)

Management Objectives

- *See Harvest Land Base management objectives.*
- Increase diversity of stocking levels and size classes within and among the stands.

Management Direction

- *See Harvest Land Base management direction.*
- Utilize integrated vegetation management[9] in designing and implementing treatments. Conduct integrated vegetation management for any of the following:
  - Produce timber to contribute to the attainment of the declared Allowable Sale Quantity.
  - Promote the development and retention of large, open grown trees and multi-cohort stands.
  - Develop diverse understory plant communities.
  - Increase or maintain vegetative species diversity.
  - Restore and maintain habitat for Bureau Special Status Species.
  - Promote or enhance the development of structural complexity and heterogeneity.
  - Create growing space for hardwood and pine persistence and regeneration.
  - Create and maintain areas for hardwood and shrub dominance.
  - Adjust stand composition or dominance.
  - Reduce stand susceptibility to disturbances such as a fire, windstorm, disease, or insect infestation.
- In forest stands ≥ 10 acres treated with selection harvest or commercial thinning, harvest to result in stand average relative density between 20 percent and 45 percent after harvest.
  - Do not create group selection openings more than 4 acres in size.
  - Do not create group selection openings on more than 30 percent of the stand area.
  - Leave untreated areas (skips) on at least 10 percent of the stand area.
- When regenerating group selection openings created from selection harvest or commercial thinning, use natural or artificial regeneration to reforest a mixture of species appropriate to the site to an average density across the opening of at least 150 trees per acre within 5 years of harvest.
- 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 removal is necessary for safety or operational reasons.

[9] **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.

- The BLM identification of Douglas-fir and pine trees established prior to 1850 may be based on any of a variety of methods, such as evaluation of bark, limb, trunk, or crown characteristics or increment coring, at the discretion of the BLM.
- Protect and develop these retained trees by reducing competition to improve vigor and resistance to fire, drought, disease, and other disturbances and removing adjacent fuels to reduce risk of fire-related mortality.

- Apply prescribed fire for any of the following:
  - Promote the development and retention of large, open-grown trees and multi-cohort stands.
  - Develop diverse understory plant communities.
  - Increase or maintain vegetative species diversity.
  - Restore and maintain habitat for Bureau Special Status Species.
  - Promote or enhance the development of stand structural complexity and heterogeneity.
  - Create growing space for hardwood and pine persistence and regeneration.
  - Create and maintain areas for hardwood and shrub dominance.
  - Adjust stand composition or dominance.
  - Reduce stand susceptibility to disturbances such as a fire, windstorm, disease, or insect infestation.
- Treat fuels to improve, enhance, or maintain landscape and ecosystem resilience. Identify sites for fuels treatments based on risk of large-scale, high-intensity fire, operationally strategic locations, and near highly valued resources and assets.
- Modify fuel loading to produce fire behavior and fire effects representative of the natural fire regime. Implement interim fuels treatments (e.g., hand pile and burn) in areas that are highly departed from natural conditions in order to facilitate prescribed fire in the future.
- Implement prescribed fire in low/mixed severity or high-frequency fire regimes to emulate historic fire function and processes. Apply prescribed fire across the landscape to create a mosaic of spatial and temporal stand conditions and patterning (appropriate to the fire regime).
- Implement timber salvage harvest after disturbance events to recover economic value and to minimize commercial loss or deterioration of damaged trees where the BLM determines that removal is economically viable.
  - In timber salvage harvest units, retain at least 5 percent of pre-harvest stand basal area in live trees or snags in individual harvest units. Retain trees and snags in a variety of spatial patterns, including aggregated groups, stringers, and individual trees.
  - After salvage harvest, use natural or artificial regeneration to reforest a mixture of species appropriate to the site to a stand-level average of at least 150 trees per acre within 5 years of harvest.

Late-Successional Reserve

Management Objectives

- Maintain[10] nesting-roosting habitat for the northern spotted owl and nesting habitat for the marbled murrelet.

[10] **Maintain northern spotted owl nesting-roosting habitat** refers to a silvicultural activity that changes a conifer forest stand but maintains structural characteristics such that the stand continues to support the same northern spotted owl life history requirements: nesting-roosting habitat continues to support northern spotted owl nesting-roosting. Scientific findings support the idea that conifer forest stands can be altered in a manner that does not necessarily change their use by northern spotted owls (see the summary in the Revised Recovery Plan for the Northern Spotted Owl, USDI FWS 2011, p. III-15). Although structural characteristics vary across the northern spotted owl's range, northern spotted owl nesting-roosting habitat generally is characterized by conifer stands with a multi-layered, multispecies canopy dominated by large (> 30" DBH) conifer overstory trees, and an understory of shade-tolerant conifers or hardwoods, ≥ 60 percent canopy cover, substantial decadence in the form of large, live

- Promote the development of nesting-roosting habitat for the northern spotted owl in stands that do not currently support northern spotted owl nesting and roosting.
- Promote the development of nesting habitat for the marbled murrelet in stands that do not currently meet nesting habitat criteria.
- Promote the development and maintenance of foraging habitat for the northern spotted owl, including creating and maintaining habitat to increase diversity and abundance of prey for the northern spotted owl.

Management Direction

- Manage for large blocks of northern spotted owl nesting-roosting habitat that support clusters of reproducing spotted owls, are distributed across the variety of ecological conditions, and are spaced to facilitate the movement and survival of spotted owls dispersing between and through the blocks.
- In stands that are currently northern spotted owl nesting-roosting habitat, maintain nesting-roosting habitat function, regardless of northern spotted owl occupancy.
- Protect[11] stands of older, structurally-complex conifer forest. Such stands are a subset of, and represent the highest value, northern spotted owl nesting-roosting habitat.
- Undertake activities such as individual tree removal, including the felling of hazard trees and stream logs, and the construction of linear and non-linear rights-of-way or other facilities, including communication sites, as long as northern spotted owl nesting-roosting habitat continues to support northern spotted owl nesting and roosting at the stand level, and northern spotted owl dispersal habitat continues to support northern spotted owl movement and survival at the landscape level.
- Protect marbled murrelet occupied stands. In this context, **protect marbled murrelet occupied stands** means to prohibit activities in the occupied stand except for the following: felling of live or dead hazard trees, felling trees for habitat restoration, and the construction or maintenance of linear and nonlinear rights-of-way, spur roads, yarding corridors or other facilities, as long as the occupied stand continues to support marbled murrelet nesting. Implement wildfire management actions and activities needed to protect the overall health of the stand or adjacent stands, such as fuels reduction and insect and disease control, as long as the occupied stand continues to support marbled murrelet nesting.

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conifer trees with deformities (such as cavities, broken tops, and dwarf mistletoe infections; numerous large snags), ground cover characterized by large accumulations of logs and other woody debris, and a canopy that is open enough to allow northern spotted owls to fly within and beneath it. Activities needed to protect the overall health of the stand or adjacent stands, such as fuels reduction and insect and disease control, and wildfire management actions/activities may occur even if they downgrade or remove northern spotted owl habitat.

Maintain marbled murrelet habitat refers to a silvicultural activity that changes a conifer forest stand but maintains structural characteristics such that the stand continues to support marbled murrelet nesting opportunities. Activities needed to protect the overall health of the stand or adjacent stands, such as fuels reduction and insect and disease control, and wildfire management actions/activities may occur even if they remove marbled murrelet habitat.

[11] **Protect older, structurally-complex conifer forest** means to prohibit harvesting activities in a conifer forest stand except as provided in this definition. Harvesting activities are limited to the following: felling of live or dead hazard trees and logs for streams, the construction, modification, maintenance and removal of linear and nonlinear rights-of-way, spur roads, yarding corridors or other facilities, as long as the forest stand continues to support the same northern spotted owl and marbled murrelet life history requirements: nesting-roosting habitat continues to support northern spotted owl nesting-roosting; dispersal habitat continues to support northern spotted owl movement and survival; and marbled murrelet nesting habitat continues to support marbled murrelet nesting. Activities needed to protect the overall health of the stand or adjacent stands, such as fuels reduction and insect and disease control, and wildfire management actions/activities may occur even if they downgrade or remove northern spotted owl habitat or remove marbled murrelet habitat.

- During silvicultural treatment of stands, retain existing—
  - snags ≥ 6” dbh
  - down woody material ≥ 6” in diameter at the large end and > 20’ in length

  except for safety, operational, or fuels reduction reasons. Retain snags ≥ 6” dbh felled for safety or operational reasons as down woody material, unless they would also pose a safety hazard as down woody material.
- Cut individual green trees in the Late-Successional Reserve and move for placement in streams for fish habitat restoration.
- Maintain access to roads and facilities by removing hazard trees and blowdown. Logs may be retained as down woody debris, moved for placement in streams for fish habitat restoration, or removed through a commercial harvest.
- In stands that are not northern spotted owl nesting-roosting habitat, apply silvicultural treatments to speed the development of northern spotted owl nesting-roosting habitat or improve the quality of northern spotted owl nesting-roosting habitat in the stand or in the adjacent stand in the long term. Limit such silvicultural treatments (other than forest pathogen treatments) to those that do not preclude or delay by 20 years or more the development of northern spotted owl nesting-roosting habitat in the stand and in adjacent stands, as compared to development without treatment. Allow silvicultural treatments that do not meet the above criteria if needed to treat infestations or reduce the spread of forest pathogens.
- Utilize integrated vegetation management[12] in designing and implementing treatments. Conduct integrated vegetation management for any of the following:
  - Promote the development and retention of large, open grown trees and multi-cohort stands.
  - Develop diverse understory plant communities.
  - Increase or maintain vegetative species diversity.
  - Restore and maintain habitat for Bureau Special Status species.
  - Promote or enhance the development of structural complexity and heterogeneity.
  - Create growing space for hardwood and pine persistence and regeneration.
  - Create and maintain areas for hardwood and shrub dominance.
  - Adjust stand composition or dominance.
  - Reduce stand susceptibility to disturbances such as a fire, windstorm, disease, or insect infestation.
- In stands ≥ 10 acres treated with selection harvest or commercial thinning,
  - Conduct harvest to result in stand average relative density percent between 20 percent and 45 percent after harvest.
  - Do not create group selection openings[13] more than 4 acres in size.
  - Do not create group selection openings on more than 25 percent of the stand area.
  - Leave untreated skips on at least 10 percent of the stand area.
- In stands < 10 acres treated with selection harvest or commercial thinning, do not create group selection openings more than 2.5 acres in size.
- When regenerating group selection openings created from selection harvest or commercial thinning, use natural or artificial regeneration to reforest a mixture of species appropriate to the site to an average density across the group selection openings of at least 75 trees per acre within 5 years of harvest.

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

[13] **Group selection openings** are defined as areas with ≤ 2 live trees ≥ 7” DBH per acre. Roads, landings, yarding corridors, and skid trails do not count as group selection openings.

- When conducting commercial harvest, create new snags in the amounts and sizes specified in **Table A-3** within one year of completion of yarding the timber in the timber sale. If insufficient trees are available in the size class specified, use trees from the largest size class available. Meet snag creation levels as an average at the scale of the harvest unit; snag creation levels need not be attained on every acre. When creating the required number of snags, locate them according to the following criteria:
  - Create snags in a variety of spatial patterns, including aggregated groups, stringers, and individual trees.
  - Do not create snags within falling distance of power lines, structures, or roads that will remain open after harvesting activities are complete.
  - Concentrate created snags in areas of the stand where the BLM does not anticipate skidding or yarding will occur within 20 years.

Table A-3. Snag creation levels within the Late-Successional Reserve and Riparian Reserve.

District/ Field Office	Province	Snags/Acre		
		> 20” DBH	> 10” DBH	Total Snags
Coos Bay	All	5	5	10
Eugene	OR Coast Range	5	5	10
	Western Cascades	5	20	25
Klamath Falls	All	2	5	7
Medford	All	1	1	2
Roseburg	OR Coast Range	6	7	13
	Western Cascades	6	25	31
	Klamath	1	1	2
Salem	OR Coast Range	5	5	10
	Western Cascades	5	20	25

- When conducting fuels reduction or prescribed fire treatments, retain down woody material at levels specified in **Table A-4** post-treatment. Meet down wood levels as an average at the scale of the treatment area following the treatment; down wood levels need not be attained on every acre.

Table A-4. Down woody material retention levels when implementing fuels reduction or prescribed fire treatments within the Late-Successional Reserve and Riparian Reserve.

District/ Field Office	Province	Down Wood Percent Cover*
Coos Bay	All	6%
Eugene	OR Coast Range	6%
	Western Cascades	10%
Klamath Falls	All	3%
Medford	All	2%
Roseburg	OR Coast Range	6%
	Western Cascades	10%
	Klamath	2%
Salem	OR Coast Range	6%
	Western Cascades	10%

* Percent cover of down wood > 4" diameter.

- Do not conduct timber salvage, except when necessary to protect public safety, or to keep roads and other infrastructure clear of debris.

Late-Successional Reserve – Dry

Management Objectives

- *See Late-Successional Reserve management objectives.*
- Enable forests to: (1) recover from past management measures, (2) respond positively to climate-driven stresses, wildfire and other disturbance with resilience, (3) ensure positive or neutral ecological impacts from wildfire, and (4) contribute to northern spotted owl recovery.
- Reduce the risk of loss of key late-successional structure through the development of vertical and horizontal heterogeneity.
- Increase diversity of stocking levels and size classes within the stand and the landscape.

Management Direction

- *See Late-Successional Reserve management direction.*
- Apply selection harvest or commercial thinning treatments in Late-Successional Reserve – Dry in the South River Field Office of Roseburg District to at least 4,500 acres per decade.
- Apply selection harvest or commercial thinning treatments in Late-Successional Reserve – Dry in the Medford District to at least 17,000 acres per decade.
- When treating stands with integrated vegetation management, retain dominant Douglas-fir (*Pseudotsuga menziesii*) and pine (*Pinus* spp.) trees that are ≥ 36" DBH and were established prior to 1850 and madrone (*Arbutus menziesii*), bigleaf maple (*Acer macrophyllum*), and oak (*Quercus* spp.) trees > 24" DBH, except where removal is necessary for safety or operational reasons.
  - Identify Douglas-fir and pine trees established prior to 1850 for retention based on a BLM evaluation of bark, limb, trunk, and crown characteristics.
  - Protect and develop these retained trees by reducing competition to improve vigor and resistance to fire, drought, disease, and other disturbances and removing adjacent fuels to reduce risk of fire related mortality.
- Treat fuels to improve, enhance, or maintain landscape and ecosystem resilience. Identify sites for fuels treatments based on risk of large-scale crown fire, operationally strategic locations, and potential for hazard reduction near highly valued resources.

- Modify fuel beds to produce characteristic fire behavior and fire effects representative of the fire regime. Implement interim fuels treatments (e.g., hand pile and burn) in areas that are highly departed from natural conditions in order to facilitate prescribed fire in the future.
- Apply prescribed fire in low/mixed severity or high-frequency fire regimes to emulate historic fire function and processes. Apply prescribed fire across the landscape to create a mosaic of spatial and temporal stand conditions and patterning (appropriate to the fire regime). Based on site-specific considerations, take measures to prevent and control fire regime altering species.
- Apply prescribed fire and mechanical or hand fuels treatments to reduce the potential for uncharacteristic wildfires. Apply maintenance treatments at appropriate intervals to retain or improve fire-resilient conditions.
- Maintain access to roads and facilities by removing hazard trees and blowdown. Logs may be retained as down woody debris, moved for placement in streams for fish habitat restoration, removed through a commercial timber sale, or treated as necessary for fuels reduction.

Riparian Reserve (West of Highway 97)

Riparian Reserve – Moist

Management Objectives

- Contribute to the conservation and recovery of ESA-listed fish species and their habitats and provide for conservation of Bureau Special Status fish and other Bureau Special Status riparian-associated species.
- Maintain and restore natural channel dynamics, processes, and the proper functioning condition of riparian areas, stream channels, and wetlands by providing forest shade, sediment filtering, wood recruitment, stream bank and channel stability, water storage and release, vegetation diversity, nutrient cycling, and cool and moist microclimates.
- Maintain water quality and streamflows within the range of natural variability, to protect aquatic biodiversity, provide quality water for contact recreation and drinking water sources.
- Meet ODEQ water quality criteria.
- Maintain high quality water and contribute to the restoration of degraded water quality for 303(d) listed streams.
- Maintain high quality waters within ODEQ designated Source Water Protection watersheds.

Management Direction

- Maintain access to roads and facilities by removing hazard trees and blowdown. Retain logs as down woody material or move for placement in streams for fish habitat restoration, unless removal of logs, including through commercial harvest, is necessary to accomplish removal of hazard trees or blowdown to maintain access to roads and facilities.
- Allow yarding corridors, skid trails, road construction, stream crossings, and road maintenance and improvement where there is no operationally feasible and economically viable alternative to accomplish other resource management objectives.
- Use site-specific BMPs (**Appendix J** of the Proposed RMP) to maintain water quality during land management actions, including discretionary actions of others crossing BLM-administered lands.
- In new recreational developments, install sanitation systems that maintain water quality (e.g., sealed vault or similar).
- Do not operate ground-based machinery for timber harvest within 50 feet of streams (slope distance), except where machinery is on improved roads, designated stream crossings, or where equipment entry into the 50-foot zone would not increase the potential for sediment delivery into the stream.
- Do not operate ground-based machinery on slopes > 35 percent. Mechanical equipment with tracks (e.g., excavators, loaders, forwarders, and harvesters) may be used on short pitch slopes of greater than 35 percent but less than 45 percent when necessary to access benches of lower gradient (length determined on a site-specific basis, generally less than 50 feet (slope distance)).

- During silvicultural treatment of stands, retain existing—
  - snags ≥ 6” dbh
  - down woody material ≥ 6” in diameter at the large end and > 20’ in length

  except for safety, operational, or fuels reduction reasons. Retain snags ≥ 6” dbh felled for safety or operational reasons as down woody material, unless they would also pose a safety hazard as down woody material.
- Prohibit timber salvage, except when necessary to protect public safety, or to keep roads and other infrastructure clear of debris.
- Implement Sudden Oak Death (SOD) eradication activities that do not exceed (at the watershed scale (HUC 10))—
  - The removal of > 30 percent canopy cover over a contiguous 0.5 mile stream length or removal of > 50 percent canopy cover over a contiguous 0.25 mile stream length for small perennial streams (active channel width < 27 feet) where a 4,600-foot separation of non-treatment between sequential contiguous treatments would be maintained;
  - The removal of > 50 percent canopy cover over a contiguous 0.5 mile stream length for medium-large perennial streams (active channel width > 27 feet) where a 4,600-foot separation of non-treatment between sequential contiguous treatments would be maintained; and
  - A limit of 3 miles of treatment for any 5-year period and 3 percent of the total Federal perennial stream miles.

  Implement SOD eradication activities that exceed these limitations only consistent with existing ESA consultation documents that address SOD eradication activities in the decision area.
- Cut or tip individual green trees and move for fish habitat restoration.
- Cut or tip individual trees directly into the stream channel for fish habitat restoration.
- Tree-tipping: When conducting commercial thinning[14] in any portion of the Outer Zone in a stand in all watershed classes, fall or tip up to 15 square feet of basal area per acre of live trees, averaged across the Riparian Reserve portion of the treated stand. Leave felled or tipped trees on site or yard, deck, and make felled or tipped trees available for fish habitat restoration. The felled or tipped trees can be of any size and come from any zone.
- Promote beaver habitat restoration where the presence of beaver and their associated dams would improve fish and aquatic habitat.
- Along ponds and wetlands < 1 acre and constructed water impoundments of any size, treat vegetation as needed for habitat restoration, access, or safety.
- For constructed water impoundments and constructed ponds:
  - Follow inspection guidelines for BLM infrastructure (e.g., dams and spillway structures), and implement maintenance and repair as needed.
  - Dredge constructed water impoundments as necessary to maintain capacity.
  - Maintain vegetation, access, and plumbing associated with fire water sources for all types of firefighting equipment (e.g., engines, aircraft, and tenders).
- Mining operators with an accepted Notice or approved Plan of Operations will comply with performance standards (43 CFR 3809.420), including all applicable State and Federal water quality standards.

[14] In the context of management direction for the Riparian Reserve, **commercial thinning** means stand thinning in which any of the cut trees are removed from the stand for timber volume. Commercial thinning in this context does not include individual tree falling or tipping or stand thinning in which all of the cut trees are left in the stand for restoration purposes, or fuels reduction treatments in which cut trees are burned, chipped, or otherwise disposed of without removal from the stand for timber. Commercial thinning may be implemented through a variety of mechanisms, including timber sale contracts, stewardship agreements, or other types of contracts.

Table A-5. Riparian Reserve distance by water feature.

Feature	Riparian Reserve Distance*
Fish-bearing streams and perennial streams	One site-potential tree height distance from the ordinary high water line or from the outer edge of the channel migration zone for low-gradient alluvial shifting channels, whichever is greatest, on each side of a stream
Intermittent, non-fish-bearing streams	Class I and II subwatersheds: One site-potential tree height distance from the ordinary high water line on each side of a stream
	Class III subwatersheds: 50’ from the ordinary high water line on each side of a stream
Unstable areas that are above or adjacent to stream channels and are likely to deliver material such as sediment and logs to the stream if the unstable area fails	The extent of the unstable area. Where there is a stable area between such an unstable area and a stream, and the unstable area has the potential to deliver material such as sediment and logs to the stream, extend the Riparian Reserve from the stream to include the intervening stable area as well as the unstable area.
Lakes, natural ponds > 1 acre, and wetlands > 1 acre	100’ extending from the ordinary high water line
Natural ponds < 1 acre and wetlands < 1 acre (including seeps and springs), and constructed water impoundments of any size	25’ extending from the ordinary high water line

* Reported distances are measured as slope distance.

Table A-6. Zone-specific management direction for streams in Class I subwatersheds.

Fish-bearing streams and perennial streams
Inner Zone (0–120 feet)
Do not thin stands, except for— • SOD treatments and • Individual tree falling or tipping for restoration, or to meet the tree-tipping management direction associated with outer zone commercial thinning.
Outer Zone (120 feet to one site-potential tree height)
Thin stands as needed to ensure that stands are able to provide trees that would function as stable wood in the stream. Maintain at least 30 percent canopy cover and 60 trees per acre expressed as an average at the scale of the portion of the harvest unit within the Riparian Reserve. Merchantable timber from thinning and other silvicultural treatments may be made available for sale. When conducting commercial thinning, create new snags in the amounts and sizes specified in **Table A-3** within one year of completion of yarding the timber in the timber sale. If trees are not available in the size class specified, use trees from the largest size class available. Snag creation amounts would be met as an average at the scale of the portion of the harvest unit within the Riparian Reserve, and need not be attained on every acre. For implementation: • Create snags in a variety of spatial patterns, including aggregated groups, stringers, and individual trees. • Concentrate created snags in areas of the stand where the BLM does not anticipate skidding or yarding will occur within 20 years. Snag creation levels can be met with trees from any species. Do not create snags within falling distance of power lines, structures, or roads that will remain open

after harvesting activities are complete.
Intermittent, non-fish-bearing streams
Inner Zone (0–50 feet)
Do not thin stands, except for— • SOD treatments; and • Individual tree falling or tipping for restoration, or to meet the tree-tipping management direction associated with outer zone commercial thinning.
Middle Zone (50–120 feet)
Thin stands as needed to ensure that stands are able to provide trees that would function as stable wood in the stream. Maintain at least 30 percent canopy cover and 60 trees per acre expressed as an average at the scale of the portion of the harvest unit within the Riparian Reserve. Remove cut trees only as needed for safety or operational reasons, or to meet the tree-tipping management direction described above.
Outer Zone (120 feet to one site-potential tree height)
Thin stands as needed to ensure that stands are able to provide trees that would function as stable wood in the stream. Maintain at least 30 percent canopy cover and 60 trees per acre expressed as an average at the scale of the harvest unit within the Riparian Reserve. Merchantable timber from thinning and other silvicultural treatments may be made available for sale. When conducting commercial thinning, create new snags in the amounts and sizes specified in **Table A-3** within one year of completion of yarding the timber in the timber sale. If trees are not available in the size class specified, use trees from the largest size class available. Snag creation amounts would be met as an average at the scale of the portion of the harvest unit within the Riparian Reserve, and need not be attained on every acre. For implementation: • Create snags in a variety of spatial patterns, including aggregated groups, stringers, and individual trees. • Concentrate created snags in areas of the stand where the BLM does not anticipate skidding or yarding will occur within 20 years. Snag creation levels can be met with trees from any species. Do not create snags within falling distance of power lines, structures, or roads that will remain open after harvesting activities are complete.

Table A-7. Zone-specific management direction for streams in Class II subwatersheds.

Fish-bearing streams and perennial streams
Inner Zone (0–120 feet)
Do not thin stands, except for— • SOD treatments; and • Individual tree falling or tipping for restoration, or to meet the tree-tipping management direction associated with outer zone commercial thinning.
Outer Zone (120 feet to one site-potential tree height)
Thin stands as needed to promote the development of large, open grown trees, develop layered canopies and multi-cohort stands, develop diverse understory plant communities, and allow for hardwood vigor and persistence. Apply silvicultural treatments to increase diversity of riparian species and develop structurally-complex stands. Maintain at least 30 percent canopy cover and 60 trees per acre expressed as an average at the scale of the portion of the harvest unit within the Riparian Reserve. Merchantable timber from thinning and other silvicultural treatments may be made available for sale. When conducting commercial thinning, create new snags in the amounts and sizes specified in **Table A-3** within one year of completion of yarding the timber in the timber sale. If trees are not available in the size class specified, use trees from the largest size class available. Snag creation amounts would be met as an average at the scale of the portion of the harvest unit within the Riparian Reserve, and need not be attained on every acre. For implementation: • Create snags in a variety of spatial patterns, including aggregated groups, stringers, and individual trees. • Concentrate created snags in areas of the stand where the BLM does not anticipate skidding or yarding will occur within 20 years. Snag creation levels can be met with trees from any species. Do not create snags within falling distance of power lines, structures, or roads that will remain open after harvesting activities are complete.
Intermittent, non-fish-bearing streams
Inner Zone (0–50 feet)
Do not thin stands, except for— • SOD treatments • Individual tree falling or tipping for restoration, or to meet the tree-tipping management direction associated with outer zone commercial thinning.
Outer Zone (50 feet to one site-potential tree height)
Thin stands as needed to promote the development of large, open grown trees, develop layered canopies and multi-cohort stands, develop diverse understory plant communities, and allow for hardwood vigor and persistence. Apply silvicultural treatments to increase diversity of riparian species and develop structurally-complex stands. Maintain at least 30 percent canopy cover and 60 trees per acre expressed as an average at the scale of the portion of the harvest unit within the Riparian Reserve. Merchantable timber from thinning and other silvicultural treatments may be made available for sale. When conducting commercial thinning, create new snags in the amounts and sizes specified in **Table A-3** within one year of completion of yarding the timber in the timber sale. If trees are not available in the size class specified, use trees from the largest size class available. Snag creation amounts would be met as an average at the scale of the portion of the harvest unit within the Riparian Reserve, and need not be attained on every acre. For implementation: • Create snags in a variety of spatial patterns, including aggregated groups, stringers, and individual trees.

• Concentrate created snags in areas of the stand where the BLM does not anticipate skidding or yarding will occur within 20 years. Snag creation levels can be met with trees from any species. Do not create snags within falling distance of power lines, structures, or roads that will remain open after harvesting activities are complete.

Table A-8. Zone-specific management direction for streams in Class III subwatersheds.

Fish-bearing streams and perennial streams
Inner Zone (0–120 feet)
Do not thin stands, except for— • SOD treatments; and • Individual tree falling or tipping for restoration, or to meet the tree-tipping management direction associated with outer zone commercial thinning.
Outer Zone (120 feet to one site-potential tree height)
Thin stands as needed to promote the development of large, open grown trees, develop layered canopies and multi-cohort stands, develop diverse understory plant communities, and allow for hardwood vigor and persistence. Apply silvicultural treatments to increase diversity of riparian species and develop structurally-complex stands. Maintain at least 30 percent canopy cover and 60 trees per acre expressed as an average at the scale of the portion of the harvest unit within the Riparian Reserve. Merchantable timber from thinning and other silvicultural treatments may be made available for sale. When conducting commercial thinning, create new snags in the amounts and sizes specified in **Table A-3** within one year of completion of yarding the timber in the timber sale. If trees are not available in the size class specified, use trees from the largest size class available. Snag creation amounts would be met as an average at the scale of the portion of the harvest unit within the Riparian Reserve, and need not be attained on every acre. For implementation: • Create snags in a variety of spatial patterns, including aggregated groups, stringers, and individual trees. • Concentrate created snags in areas of the stand where the BLM does not anticipate skidding or yarding will occur within 20 years. Snag creation levels can be met with trees from any species. Do not create snags within falling distance of power lines, structures, or roads that will remain open after harvesting activities are complete.
Intermittent, non-fish-bearing streams (0-50 feet)
Do not thin stands, except for— • SOD treatments; and • Individual tree falling or tipping for restoration, or to meet the tree-tipping management direction associated with outer zone commercial thinning.

Riparian Reserve – Dry

Management Objectives

- Contribute to the conservation and recovery of ESA-listed fish species and their habitats and provide for conservation of Bureau Special Status fish and other Bureau Special Status riparian-associated species.
- Maintain and restore natural channel dynamics and processes and the proper functioning condition of riparian areas, stream channels and wetlands by providing forest shade, sediment filtering, wood

recruitment, stability of stream banks and channels, water storage and release, vegetation diversity, nutrient cycling and cool and moist microclimate.

- Maintain water quality and streamflows within the range of natural variability, to protect aquatic biodiversity, provide quality water for contact recreation and drinking water sources.
- Meet ODEQ water quality criteria.
- Maintain high quality water and contribute to the restoration of degraded water quality for 303(d) listed streams.
- Maintain high quality waters within ODEQ designated Source Water Protection watersheds.

Management Direction

- Maintain access to roads and facilities by removing hazard trees and blowdown. Retain logs as down woody material, move for placement in streams for fish habitat restoration, or treat as necessary for fuels reduction, unless removal of logs, including through commercial harvest, is necessary to accomplish removal of hazard trees or blowdown to maintain access to roads and facilities.
- Allow yarding corridors, skid trails, road construction, stream crossings, and road maintenance and improvement where there is no operationally feasible and economically viable alternative to accomplish other resource management objectives.
- Use site-specific BMPs (**Appendix J** of the Proposed RMP) to maintain water quality during land management actions, including discretionary actions of others crossing BLM-administered lands.
- In new recreational developments, install sanitation systems that maintain water quality (e.g., sealed vault or similar).
- Do not operate ground-based machinery within 50 feet of streams (slope distance), except where machinery is on improved roads, designated stream crossings, or where equipment entry into the 50-foot zone would not increase the potential for sediment delivery into the stream.
- Do not operate ground-based machinery on slopes > 35 percent. Mechanical equipment with tracks (e.g., excavators, loaders, forwarders, and harvesters) may be used on short pitch slopes of greater than 35 percent but less than 45 percent when necessary to access benches of lower gradient (length determined on a site-specific basis, generally less than 50 feet (slope distance)).
- During silvicultural treatment of stands, retain existing—
  - snags ≥ 6” dbh
  - down woody material ≥ 6” in diameter at the large end and > 20’ in length

  except for safety, operational, or fuels reduction reasons. Retain snags ≥ 6” dbh felled for safety or operational reasons as down woody material, unless they would also pose a safety hazard as down woody material.
- In all subwatershed classes:
  - 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 area of Riparian Reserve subwatershed (HUC 12) each year.
  - Apply non-commercial tree thinning to adjust fuel loads as necessary to achieve desired fire effects prior to prescribed burning.
- When conducting fuels or prescribed fire treatments, retain down woody material at levels specified in

- **Table A-4**. Down woody material retention standards would be met as an average at the scale of the treatment area, and is not intended to be attained on every acre.
- Do not conduct timber salvage, except when necessary to protect public safety, or to keep roads and other infrastructure clear of debris.
- Cut or tip individual green trees and move as necessary for fish habitat restoration.
- Cut or tip individual green trees directly into the stream channel for fish habitat restoration.
- Tree-tipping: When conducting commercial thinning[15] in any portion of the Outer Zone in a stand in all subwatershed classes, fall or tip up to 15 square feet of basal area per acre of live trees, averaged across the Riparian Reserve portion of the treated stand. Leave felled or tipped trees on site or yard, deck, and make felled or tipped trees available for fish habitat restoration. The felled or tipped trees can be of any size and come from any zone within the Riparian Reserve.
- Promote beaver habitat restoration where the presence of beaver and their associated dams would improve fish and aquatic habitat.
- Along ponds and wetlands < 1 acre and constructed water impoundments of any size, treat vegetation as needed for habitat restoration, access, or safety.
- For constructed water impoundments and constructed ponds:
  - Follow inspection guidelines for BLM infrastructure (e.g., dams and spillway structures), implement maintenance, and repair as needed.
  - Dredge constructed water impoundments as necessary to maintain capacity.
  - Maintain vegetation, access, and plumbing associated with fire water sources for all types of firefighting equipment (e.g., engines, aircraft, and tenders).
- Mining operators with an accepted Notice or approved Plan of Operations will comply with performance standards (43 CFR 3809.420), including all applicable State and Federal water quality standards.

Table A-9. Riparian Reserve distance by water feature.

Feature	Riparian Reserve Distance*
Fish-bearing streams and perennial streams	One site-potential tree height distance from the ordinary high water line or from the outer edge of the channel migration zone for low-gradient alluvial shifting channels, whichever is greatest, on each side of a stream
Intermittent, non-fish-bearing streams	Class I and II subwatersheds: One site-potential tree height distance from the ordinary high water line on each side of a stream
	Class III subwatersheds: 50’ from the ordinary high water line on each side of a stream
Unstable areas that are above or adjacent to stream channels and are likely to deliver material such as sediment and logs to the stream if the unstable area fails	The extent of the unstable area. Where there is a stable area between such an unstable area and a stream, and the unstable area has the potential to deliver material such as sediment and logs to the stream, extend the Riparian Reserve from the stream to include the intervening stable area as well as the unstable area.

[15] In the context of management direction for the Riparian Reserve, ‘**commercial thinning’** means stand thinning in which some or all of the cut trees are removed from the stand for timber. Commercial thinning in this context does not include individual tree falling or tipping or stand thinning in which all of the cut trees are left in the stand for restoration purposes, or fuels reduction treatments in which cut trees are burned, chipped, or otherwise disposed of without removal from the stand for timber. Commercial thinning may be implemented through a variety of mechanisms, including timber sale contracts, stewardship agreements, or other types of contracts.

Feature	Riparian Reserve Distance*
Lakes, natural ponds > 1 acre, and wetlands > 1 acre	100’ extending from the ordinary high water line
Natural ponds < 1 acre and wetlands < 1 acre (including seeps and springs), and constructed water impoundments of any size	25’ extending from the ordinary high water line

* Reported distances are measured as slope distance.

Table A-10. Zone-specific management direction for streams in Class I subwatersheds.

Fish-bearing streams and perennial streams
Inner Zone (0–120 feet)
Do not thin stands, except for— • Fuels treatments as needed to reduce the risk of stand-replacing crown fires. Do not conduct fuels treatments within 60 feet of fish-bearing or perennial streams. Retain at least 50 percent canopy cover per acre. Do not cut trees > 12” DBH; and • as described above in management direction for prescribed burns, individual tree falling/tipping for restoration, or to meet the tree-tipping management direction associated with outer zone commercial thinning.
Outer Zone (120 feet to one site-potential tree height)
Thin stands as needed to ensure that stands are able to provide trees that would function as stable wood in the stream. Maintain at least 30 percent canopy cover and 60 trees per acre expressed as an average at the scale of the portion of the harvest unit within the Riparian Reserve. Apply fuels reduction treatments, including prescribed fire, as needed to reduce the risk of stand-replacing crown fires. Retain at least 30 percent canopy cover and 60 trees per acre, expressed as an average across the treated portion of the Riparian Reserve. Make available for sale the merchantable timber from thinning and other silvicultural treatments. When conducting commercial thinning, create new snags in the amounts and sizes specified in **Table A-3** within one year of completion of yarding the timber in the timber sale. If trees are not available in the size class specified, use trees from the largest size class available. Meet the snag creation amounts as an average at the scale of the portion of the harvest unit within the Riparian Reserve, but may not be attained on every acre. For implementation: • Create snags in a variety of spatial patterns, including aggregated groups, stringers, and individual trees. • Concentrate created snags in areas of the stand where the BLM does not anticipate skidding or yarding will occur within 20 years. Use trees from any species to meet snag creation levels. Do not create snags within falling distance of power lines, structures, or roads that will remain open after harvesting activities are complete.
Intermittent, non-fish-bearing streams
Inner Zone (0–50 feet)
Do not thin stands, except as described above in management direction for prescribed burns, individual tree falling/tipping for restoration, or to meet the tree-tipping management direction associated with outer zone commercial thinning.
Middle Zone (50–120 feet)

Thin stands as needed to ensure that stands are able to provide trees that would function as stable wood in the stream. Maintain at least 30 percent canopy cover and 60 trees per acre expressed as an average at the scale of the portion of the harvest unit within the Riparian Reserve. Apply fuels reduction treatments, including prescribed fire, as needed to reduce the risk of stand-replacing, crown fires. Retain at least 30 percent canopy cover and 60 trees per acre expressed as an average across the treated portion of the Riparian Reserve. Remove cut trees as needed for safety or operational reasons, to reduce the risk of stand-replacing, crown fires, or to meet the tree-tipping management direction described above. Merchantable timber from thinning, fuels reduction, and other silvicultural treatments that must be removed for safety or operational reasons, to reduce the risk of stand-replacing, crown fires, or to meet the tree-tipping management direction described above may be made available for sale.
Outer Zone (120 feet to one site-potential tree height)
Thin stands as needed to ensure that stands are able to provide trees that would function as stable wood in the stream. Maintain at least 30 percent canopy cover and 60 trees per acre expressed as an average at the scale of the portion of the harvest unit within the Riparian Reserve. Apply fuels reduction treatments, including prescribed fire, as needed to reduce the risk of stand-replacing, crown fires. Retain at least 30 percent canopy cover and 60 trees per acre expressed as an average across the treated portion of the Riparian Reserve. Merchantable timber from thinning and other silvicultural treatments may be made available for sale. When conducting commercial thinning, create new snags in the amounts and sizes specified in **Table A-3** within one year of completion of yarding the timber in the timber sale. If trees are not available in the size class specified, use trees from the largest size class available. Snag creation amounts would be met as an average at the scale of the portion of the harvest unit within the Riparian Reserve, and need not be attained on every acre. For implementation: • Create snags in a variety of spatial patterns, including aggregated groups, stringers, and individual trees. • Concentrate created snags in areas of the stand where the BLM does not anticipate skidding or yarding will occur within 20 years. Snag creation levels can be met with trees from any species. Do not create snags within falling distance of power lines, structures, or roads that will remain open after harvesting activities are complete.

Table A-11. Zone-specific management direction for streams in Class II subwatersheds.

Fish-bearing streams and perennial streams
Inner Zone (0–120 feet)
Do not thin stands, except for— • Fuels treatments as needed to reduce the risk of stand-replacing crown fires. Do not conduct fuels treatments within 60 feet of fish-bearing or perennial streams. Retain at least 50 percent canopy cover per acre. Do not cut trees > 12” DBH; and • as described above in management direction for prescribed burns, individual tree falling/tipping for restoration, or to meet the tree-tipping management direction associated with outer zone commercial thinning.
Outer Zone (120 feet to one site-potential tree height)
Thin stands as needed to promote the development of large, open grown trees, develop layered canopies and multi-cohort stands, develop diverse understory plant communities, and allow for hardwood vigor and persistence. Apply silvicultural treatments to increase diversity of riparian species and develop structurally complex stands. Maintain at least 30 percent canopy cover and 60 trees per acre expressed as an average at the scale of the portion of the harvest unit within the Riparian Reserve. Apply fuels reduction treatments, including prescribed fire, as needed to reduce the risk of stand-replacing, crown fires. Retain at least 30 percent canopy cover and 60 trees per acre expressed as an average across the treated portion of the Riparian Reserve. Merchantable timber from thinning and other silvicultural treatments may be made available for sale. When conducting commercial thinning, create new snags in the amounts and sizes specified in **Table A-3** within one year of completion of yarding the timber in the timber sale. If trees are not available in the size class specified, use trees from the largest size class available. Snag creation amounts would be met as an average at the scale of the portion of the harvest unit within the Riparian Reserve, and need not be attained on every acre. For implementation: • Create snags in a variety of spatial patterns, including aggregated groups, stringers, and individual trees. • Concentrate created snags in areas of the stand where the BLM does not anticipate skidding or yarding will occur within 20 years. Snag creation levels can be met with trees from any species. Do not create snags within falling distance of power lines, structures, or roads that will remain open after harvesting activities are complete.
Intermittent, non-fish-bearing streams
Inner Zone (0–50 feet)
Do not thin stands, except for— • Fuels treatments as needed to reduce the risk of stand-replacing crown fires. Do not conduct fuels treatments within 60 feet of fish-bearing or perennial streams. Retain at least 50 percent canopy cover per acre. Do not cut trees > 12” DBH; and • as described above in management direction for prescribed burns, individual tree falling/tipping for restoration, or to meet the tree-tipping management direction associated with outer zone commercial thinning.
Outer Zone (50 feet to one site-potential tree height)
Thin stands as needed to promote the development of large, open grown trees, develop layered canopies and multi-cohort stands, develop diverse understory plant communities, and allow for hardwood vigor and persistence. Apply silvicultural treatments to increase diversity of riparian species and develop structurally complex stands. Maintain at least 30 percent canopy cover and 60 trees per acre expressed as

an average at the scale of the portion of the harvest unit within the Riparian Reserve.

Apply fuels reduction treatments, including prescribed fire, as needed to reduce the risk of stand-replacing, crown fires. Retain at least 30 percent canopy cover and 60 trees per acre expressed as an average across the treated portion of the Riparian Reserve.

Merchantable timber from thinning and other silvicultural treatments may be made available for sale. When conducting commercial thinning, create new snags in the amounts and sizes specified in **Table A-3** within one year of completion of yarding the timber in the timber sale. If trees are not available in the size class specified, use trees from the largest size class available. Snag creation amounts would be met as an average at the scale of the portion of the harvest unit within the Riparian Reserve, and need not be attained on every acre. For implementation:

- Create snags in a variety of spatial patterns, including aggregated groups, stringers, and individual trees.
- Concentrate created snags in areas of the stand where the BLM does not anticipate skidding or yarding will occur within 20 years. Snag creation levels can be met with trees from any species.

Do not create snags within falling distance of power lines, structures, or roads that will remain open after harvesting activities are complete.

Table A-12. Zone-specific management direction for streams in Class III subwatersheds.

Fish-bearing streams and perennial streams
Inner Zone (0–120 feet)
Do not thin stands, except as described above in management direction for prescribed burns, individual tree falling/tipping for restoration, or to meet the tree-tipping management direction associated with outer zone commercial thinning.
Outer Zone (120 feet to one site-potential tree height)
Thin stands as needed to promote the development of large, open grown trees, develop layered canopies and multi-cohort stands, develop diverse understory plant communities, and allow for hardwood vigor and persistence. Apply silvicultural treatments to increase diversity of riparian species and develop structurally complex stands. Maintain at least 30 percent canopy cover and 60 trees per acre expressed as an average at the scale of the portion of the harvest unit within the Riparian Reserve. Apply fuels reduction treatments, including prescribed fire, as needed to reduce the risk of stand-replacing, crown fires. Retain at least 30 percent canopy cover and 60 trees per acre expressed as an average across the treated portion of the Riparian Reserve. Merchantable timber from thinning and other silvicultural treatments may be made available for sale. When conducting commercial thinning, create new snags in the amounts and sizes specified in **Table A-3** within one year of completion of yarding the timber in the timber sale. If trees are not available in the size class specified, use trees from the largest size class available. Snag creation amounts would be met as an average at the scale of the portion of the harvest unit within the Riparian Reserve, and need not be attained on every acre. For implementation: • Create snags in a variety of spatial patterns, including aggregated groups, stringers, and individual trees. • Concentrate created snags in areas of the stand where the BLM does not anticipate skidding or yarding will occur within 20 years. Snag creation levels can be met with trees from any species. Do not create snags within falling distance of power lines, structures, or roads that will remain open after harvesting activities are complete.
Intermittent, non-fish-bearing streams (0-50 feet)
Do not thin stands, except as described above in management direction for prescribed burns, individual tree falling/tipping for restoration, or to meet the tree-tipping management direction associated with outer zone commercial thinning.

Administrative Actions

Management Objective

- Provide for the orderly and efficient management of resources.

Management Direction

- Implement administrative actions in any land use allocation to the extent consistent with land use allocation management direction. Administrative actions include but are not limited to the following actions:
    - Competitive and commercial recreation activities
    - Special forest product collection permit issuance
    - Lands and realty actions (e.g., the issuance of grants, leases, and permits)
    - Trespass resolution
    - Facility maintenance
    - Facility improvements
    - Road maintenance
    - Hauling permit issuance
    - Recreation site maintenance
    - Recreation site improvement
    - Hazardous materials removal
    - Abandoned Mine Land physical closure or removal and environmental remedial actions
    - Law enforcement
    - Legal land or mineral estate ownership surveys
    - Cadastral and engineering surveys
    - Field visits for the design of projects (including clearance inventories) and contract administration
    - Tree sampling (including using the 3P fall, buck, and scale sampling method)
    - Project implementation monitoring and plan effectiveness monitoring
    - Incidental live or dead tree removal for safety or operational reasons
    - Wildlife, fisheries, or plant community and population survey or monitoring

Resource Programs

Air Quality

Management Objectives

- Protect air quality related values in Federal mandatory Class I areas.
- Prevent exceedances of national, State, or local ambient air quality standards.

Management Direction

- Comply with the Oregon Smoke Management Plan when implementing prescribed burning activities.
- Use BMPs (**Appendix J** of the Proposed RMP) to reduce dust from unpaved road surfaces during extended management operations, such as timber sales and wildfire management actions/activities. Example practices include applying dust suppressants.
- Follow State Implementation Plan requirements for activities that could negatively affect the status of air quality non-attainment or maintenance areas.

Areas of Critical Environmental Concern

Management Objective

- Maintain or restore relevant and important values in Areas of Critical Environmental Concern, including Research Natural Areas and Outstanding Natural Areas.

Management Direction

- Implement activities as necessary to maintain, enhance, or restore relevant and important values (**Appendix F** of the Proposed RMP).
- Do not use ground-disturbing equipment or aerial application of non-fugitive retardant that would compromise important and relevant values during wildfire management operations, except where the wildfire is deemed a threat to human safety or private property, or where use is essential for wildfire control.

Cultural Resources

Management Objectives

- Preserve and protect significant cultural resources and ensure that they are available for appropriate uses by present and future generations.
- Reduce imminent threats and resolve potential conflicts from natural or human-caused deterioration or potential conflict with other resources by ensuring that all authorizations for land and resource use will comply with Section 106 of the National Historic Preservation Act.

Management Direction

- Evaluate all documented cultural resources for National Register of Historic Places eligibility. For all sites that are listed or eligible for listing on the National Register of Historic Places, protect sites through avoidance or other protection measures.
- Conduct public education and outreach activities, and develop materials in order to educate and interpret for the public the cultural and historic resources within the decision area.
- Assign all cultural resources into one of the use allocations in **Table A-13**.

Table A-13. Cultural use allocations with desired outcomes and management actions.

Use Allocation	Desired Outcome	Management Action
Scientific use	Preserved until research potential is realized	Permit appropriate research including data recovery
Conservation for future use	Preserved until conditions for use are met	Propose protection measures/designations
Traditional use	Long-term preservation	Consult with Tribes; determine limitations
Public use	Long-term preservation, on-site interpretation	Determine limitations, permitted uses
Experimental use	Protected until used	Determine nature of experiments
Discharged from management	No use after recordation, not preserved	Remove protective measures

Fire, Fuels, and Wildfire Response

Management Objectives

- Respond to wildfires in a manner that provides for public and firefighter safety while meeting land management objectives by utilizing the full range of fire management options.
- Fire management strategies would be risk-based decisions that consider firefighter and public safety, values at risk, management objectives, and costs that are commensurate with the identified risk.
- Actively manage the land to restore and maintain resilience of ecosystems to wildfire and decrease the risk of uncharacteristic, large, high-intensity/high-severity wildfires.
- Manage fuels to reduce wildfire hazard, risk, and negative impacts to communities and infrastructure, landscapes, ecosystems, and highly valued resources.
- Manage fire, fuels, and wildfire response consistent with the National Cohesive Wildland Fire Management Strategy.
- Participate with communities bordering Federal lands in partnership with local, State, and Federal stakeholders to reduce the risks and threats from wildland fire.

Management Direction

- Take immediate action to suppress all human-caused ignitions at the lowest cost commensurate with the protection of firefighter and public safety and welfare, and resulting in the fewest negative consequences to natural and cultural resources.
- Apply the full range of fire management options in responding to natural ignitions or escaped prescribed fires. These fires may be used to achieve management objectives when expected fire behavior and potential effects of a fire, or a part of a fire, are aligned with the management objectives and direction of the underlying land use allocation and affected resources.
- Conduct wildfire rehabilitation and restoration efforts to protect and sustain ecosystems, ecosystem services, public health and safety, and infrastructure adversely affected by fire management operations or direct fire effects.
- Treat both management activity fuels and natural hazardous fuels for any of the following reasons:
  - Modify the fuel profile (e.g., raise canopy base heights or reduce surface and ladder fuels and crown bulk density)
  - Reduce potential fire behavior (e.g., crown fire activity, wildfire spread, or intensity)
  - Reduce potential fire severity

- Improve effective fire management opportunities within the Wildland Urban Interface[16] or in close proximity to other highly valued resources
- Treat fuels in a way that increase intervals between future maintenance treatments.
- Create fuel beds or fuel breaks that reduce the potential for high-intensity fire spread within the wildland urban interface and in close proximity to other highly valued resources.
- Prior to applying prescribed fire, take necessary mitigation actions to reduce impacts to Bureau Special Status Species wildlife and plants and their habitats.
- Conduct necessary vegetation maintenance treatments to ensure that fire management operations are able to access existing natural and human-made strategic infrastructure (e.g., communication sites, pump chances and other wildfire management actions/activities water sources, key road systems, containment lines, fuel breaks, and helispots).

Fisheries

Management Objectives

- Improve the distribution and quantity of high-quality fish habitat across the landscape for all life stages of ESA-listed, BLM Special Status Species, and other fish species.
- Maintain and restore access to stream channels for all life stages of aquatic species.

Management Direction

- Restore degraded spawning, rearing, and holding habitat for fish using a combination of accepted techniques including but not limited to log and boulder placement in stream channels, tree tipping, and gravel enhancement.
- Remove or modify human-caused fish passage barrier to restore access to stream channels for all life stages for aquatic species.

Forest Management

Management Objectives

- Enhance the health, stability, growth, and vigor of forest stands.
- In harvested or disturbed areas, ensure the establishment and survival of desirable vegetation appropriate to the site.
- Facilitate safe and efficient forestry operations for the BLM, reciprocal right-of-way agreement holders, and permittees.

Management Direction

- Promote the establishment and survival of desirable vegetation through stand maintenance treatments.
- Apply thinning or prescribed fire to forest stands to achieve appropriate stocking and density levels.
- Use genetically improved native trees for reforestation when available.
- Fall and move live or dead trees as needed for safety or operational reasons, including, but not limited to, the creation of yarding corridors or skid trails adjacent to nearby harvest units, hazard tree removal, and road construction, improvement, or maintenance.
- Allow road construction, maintenance, improvement, and decommissioning as well as construction of skid trails and yarding corridors based on operational needs and consistent with valid existing rights.
- Allow management activities in density management study sites (Cissel *et al.* 2006) that are compatible with study objectives.

[16] The Wildland Urban Interface includes wildland developed areas.

Hydrology

Management Objective

- Maintain water quality within the range of natural variability that meets ODEQ water quality standards for drinking water, contact recreation, and aquatic biodiversity.

Management Direction

- Select and implement site-level BMPs to maintain water quality for BLM actions (including, but not limited to, road construction, road maintenance, silvicultural treatments, recreation management, prescribed burning, and wildfire management actions/activities) and discretionary actions of others crossing BLM-administered lands.
- Design culverts, bridges, and other stream crossings for the 100-year flood event, including allowance for bed load and anticipated floatable debris. Culverts will be of adequate width to preclude ponding of water higher than the top of the culvert. Design stream crossings with ESA-listed fish to meet design standards consistent with existing ESA consultation documents that address stream crossings in the decision area.
- Implement road improvements, storm proofing, maintenance, or decommissioning to reduce or eliminate chronic sediment inputs to stream channels and water bodies. This could include maintaining vegetated ditch lines, improving road surfaces, and installing cross drains at appropriate spacing.
- Suspend commercial road use where the road surface is deteriorating due to vehicular rutting or standing water, or where turbid runoff is likely to reach stream channels.
- Decommission roads no longer needed for resource management and are at risk of failure or are contributing sediment to streams, consistent with valid existing rights.

Invasive Species

Management Objectives

- Prevent the introduction of invasive species and the spread of existing invasive species infestations.
- Prevent the introduction and spread of sudden oak death (*Phytophthora ramorum*) infections.

Management Direction

- Implement measures to prevent, detect, and rapidly control new invasive species infestations.
- Use manual, mechanical, cultural, chemical, and biological treatments to manage invasive species infestations.
- Treat invasive plants and host species for invasive forest pathogens in accordance with the Records of Decision (RODs) for the Northwest Area Noxious Weed Control Program Environmental Impact Statement and the Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in Oregon Environmental Impact Statement (USDI BLM 2010).
- Apply state-of-the art, integrated pest management prescriptions for the treatment of all identified sudden oak death (*Phytophthora ramorum*) infection sites.

Lands, Realty, and Roads

Management Objectives

- Make land tenure adjustments to facilitate the management of resources and enhance public resource values.
- Provide legal access to BLM-administered lands and facilities to support resource management programs.
- Provide needed rights-of-way, permits, leases, and easements over BLM-administered lands in a manner that is consistent with Federal and State laws.

- Protect lands that have important resource values or substantial levels of investment by withdrawing them, where necessary, from the implementation of nondiscretionary public land and mineral laws.
- Provide a road transportation system that serves resource management needs (administrative/commercial) and casual use needs (recreational/domestic) for both BLM-administered lands and adjacent privately owned lands.

Management Direction

- Retain lands in Land Tenure Zone 1 (Zone 1) under BLM administration. Lands in Zone 1 include existing and future:
  - Designated and suitable Wild and Scenic River corridors
  - Wilderness Areas
  - Wilderness Study Areas
  - National Trail management corridors
  - District-Designated Reserve – Lands managed for their Wilderness Characteristics
  - Areas of Critical Environmental Concern (including Research Natural Areas and Outstanding Natural Areas)
  - Congressionally designated Outstanding Natural Areas
  - Lands acquired with Land and Water Conservation Funds
- Make lands in Land Tenure Zone 2 (Zone 2) available for exchange to enhance public resource values, improve management capabilities, or reduce the potential for land use conflict. Zone 2 lands consist of all lands not listed in the descriptions of the other two Land Tenure Zones.
- Make lands in Land Tenure Zone 3 (Zone 3) available for disposal (identified in **Appendix K** of the Proposed RMP) using appropriate disposal mechanisms. These lands include:
  - Lands that are either not practical to manage, or are uneconomical to manage (because of their intermingled location and non-suitability for management by another Federal agency)
  - Survey hiatuses
  - Unintentional encroachments
- Assign to Zone 3 survey hiatuses and unintentional encroachments discovered in the future.
- Assign to Zone 3 patented lands with reversionary interests reserved by the United States that are relinquished back to Federal ownership.
- Assign to Zone 3 land boundary adjustments due to river movement discovered in the future, which meets the disposal criteria defined in **Appendix K** of the Proposed RMP.
- The BLM may dispose of lands designated in Zones 2 and 3 that provide habitat for ESA-listed species, including critical habitat, only following consultation with the U.S. Fish and Wildlife Service or National Marine Fisheries Service and upon a determination that such action is consistent with relevant law and maximizes public resource values.
- As required by the Oregon Public Lands Transfer and Protection Act (Public Law 105-321), do not reduce through disposal, exchange, or sale the acres of O&C lands of all classifications, and the acres of O&C and public domain lands that are available for harvesting.
- Acquire or dispose of lands to facilitate resource management objectives as opportunities occur. See the Land Tenure Adjustment Criteria section in **Appendix K** of the Proposed RMP.
- Make available for disposal the public domain lands in Zones 2 and 3 that have been classified under Section 7 of the Taylor Grazing Act.
- Manage newly acquired lands for the purpose for which they were acquired or in a manner that is consistent with management objectives for adjacent BLM-administered lands or other BLM-administered lands having similar resource values. See Acquisition Criteria section in **Appendix K** of the Proposed RMP.
- Where the BLM has administrative responsibility on lands managed by other agencies, the BLM will administer those lands in accordance with interagency agreements.

- Issue permits, as identified under the FLPMA (Section 302), for a variety of uses, such as, but not limited to, stockpile and storage sites and as tools to authorize unintentional trespass situations pending final resolution.
- Do not issue land use authorizations for landfills or other waste disposal facilities.
- Use land-use authorizations to resolve agricultural or occupancy trespasses, where appropriate.
- Recognize existing rights-of-way, permits, leases, and easements as valid uses.
- Limit withdrawals to the area needed and restrict only those activities needed to accomplish the purposes of the withdrawal.
- Process formal land withdrawals being relinquished by the BLM or other Federal agency according to the procedures stated under 43 CFR 2372. If the lands are found suitable for return to the public domain, the revocation order will recommend the management prescriptions developed in the environmental review. Manage the lands according to management prescriptions for those lands having the same or similar resource values in the same general area of the land withdrawal.
- Designate Right-Of-Way Exclusion Areas in—
  - Lands designated as Wilderness;
  - District-Designated Reserve – Lands Managed for their Wilderness Characteristics;
  - Wilderness Study Areas;
  - Designated and suitable Wild and Scenic Rivers classified as Wild; and
  - Visual Resource Management Class I areas.

  In right-of-way exclusion areas, do not grant rights-of-way, except when mandated by law.
- Designate right-of-way avoidance areas in—
  - Areas of Critical Environmental Concern (including Research Natural Areas and Outstanding Natural Areas);
  - Recreation Management Areas (Special and Extensive);
  - Designated and suitable Wild and Scenic Rivers classified as Scenic and Recreational; and
  - Visual Resource Management Class II areas not included in right-of-way exclusion areas.

  In right-of-way avoidance areas, grant rights-of-way if the BLM determines that the right-of-way proposals are compatible with the protection of the values for which the land use was designated, or when no feasible alternative route or designated right-of-way corridor is available as applicable with BLM laws and policy.
- Grant rights-of-way in utility corridors as the preferred location for energy transmission or distribution facilities. Corridors would generally be 1,000 feet on each side of the centerline. Grant the rights-of-way as the minimum necessary to accommodate a specific request. Do not permit development or management activities that would conflict with the construction, operation, or maintenance of facilities corresponding to the purpose of the utility corridor.
- Construct communication facilities on existing developed communication sites where they do not conflict with other management objectives. Require a site plan for applications for communication facilities on undeveloped communication sites (**Appendix K**, **Table K-14** through **Table K-19** of the Proposed RMP).
- Expand existing communication sites and develop new sites. Prioritize the use of existing sites and facilities for accommodating the need for additional capacity.
- Construct new permanent or temporary roads, which may include major culverts and bridges, where needed to meet resource management objectives, to established BLM engineering design standards. Apply road location, design, and construction BMPs as needed (**Appendix J** of the Proposed RMP).
- Maintain existing roads, including major culverts and bridges, to provide access for both resource management and casual use activities while protecting water quality and facility investments, and providing user safety, to established BLM maintenance standards. Apply road maintenance and wet weather road use BMPs as needed (**Appendix J** of the Proposed RMP).
- Remove hazard and downed trees along roads for safety or operational reasons.

- Fully decommission or obliterate (permanent closure) roads with no future resource management need. Decommission (long-term closure) roads not currently needed for resource management but that will be used and maintained again in the future. Apply road closure BMPs as needed (**Appendix J** of the Proposed RMP). Close roads only with the approval of affected permittees consistent with valid existing rights.

Livestock Grazing

Management Objectives

- Provide for livestock grazing consistent with other resource objectives while maintaining or improving the health of public rangelands.
- Prevent livestock from causing trampling disturbance to fish spawning beds where ESA-listed or Bureau Sensitive species occur.

Management Direction (All Districts)

- Authorize livestock grazing through management agreements, non-renewable grazing permits or leases, or special use permits on lands not available for livestock grazing through the issuance of a grazing lease or permit to control invasive plants, reduce fire danger, or accomplish other management objectives.
- Restrict livestock from streams with ESA-listed or Bureau Sensitive fish species during spawning, incubation, and until 30 days following the emergence of juveniles from spawning areas.

Management Direction (Coos Bay District)

- Lands within the grazing allotments identified on **Table A-14** will not be available for livestock grazing through the issuance of a grazing lease. The BLM will not authorize grazing under Section 15 of the Taylor Grazing Act. The BLM may authorize grazing through management agreements, nonrenewable grazing permits or leases, or special use permits consistent with the grazing regulations.

Table A-14. Allotments unavailable for livestock grazing, Coos Bay District.

Allotment Name	Allotment Number	Public Land (Acres)	Forage Allocation (AUMs)
Bullock	20006	6	12
Kellogg	20007	2	6
Middle Creek	20001	5	5
New River	30001	530	97
	Totals	**543**	**120**

Management Direction (Klamath Falls Field Office)

- Manage livestock grazing in accordance with the Standards for Rangeland Health and Guidelines for Livestock Grazing Management for Public Lands in Oregon and Washington (USDI BLM 1997). **Appendix D** of this assessment lists allotments available for livestock grazing.
- Maintain current livestock grazing levels and management practices for the allotments shown in **Appendix D** of this assessment. Make adjustments when rangeland health assessments and evaluations of monitoring data identify that livestock grazing is a contributing factor toward not meeting one or more of the Standards for Rangeland Health and Guidelines for Grazing Management for Public Lands in Oregon and Washington.

- Develop range improvements when needed to achieve the Standards for Rangeland Health and Guidelines for Grazing Management for Public Lands in Oregon and Washington, RMP objectives, or other allotment-specific objectives.
- Implement range improvement projects in adherence with the following:
  - Conduct inventories and surveys for cultural resources, ESA-listed species, and Bureau Special Status Species prior to authorization of any project construction. Implement appropriate mitigations to reduce or eliminate potential effects to these resources.
  - Design projects to minimize surface disturbance at all project sites.
  - Rehabilitate disturbed soil to blend into the surrounding soil surface. Re-vegetate using seeds and plant materials that are genetically appropriate and native to the plant community or region, to the extent practicable, to replace ground cover, reduce soil loss from wind and water erosion, and discourage the potential establishment of any invasive plant species.
  - Use existing roads and trails to access areas for range improvement construction to the extent practicable. If needed, create unimproved trails and tracks to reach construction sites and provide access for future maintenance of the improvements. Locate unimproved trails or tracks outside riparian management areas where workable.
  - Limit brushing and tree limb removal to only that necessary for surveying, placement, and construction of improvements.
- Design livestock fencing to prevent the passage of livestock without stopping the movement of wildlife. Wire and post spacing would follow these specifications where practicable:
  - Construct 4-wire fences, with the bottom wire 16-18” off the ground with the sequence of the remaining 3-wires above this being 6”, 6”, and 12”. Do not exceed 42” total height (ground to top wire).
  - Install 2-strand smooth wire, not barbed, for the bottom wire to facilitate antelope crossings.
  - Install steel ‘t-posts’ no less than 16’ and no more than 24’ apart, depending on local conditions.
  - Construct a brace post, tree scab, or rock jack (rock crib) at least every 0.25 mile to enhance fence integrity.
- Do not construct woven wire ‘sheep’ livestock fences on public lands.
- Install gates or cattle guards where livestock fences cross existing roads.
- Construct livestock fences outside of perennially or seasonally saturated soils, such as occur in wet meadows and alongside stream banks, to provide fence longevity and stability, where practicable.
- Fence spring sources to prevent livestock grazing and trampling, when necessary.
- Install escape ramps in all livestock water troughs to allow wildlife to escape.
- Install piping to divert overflow from livestock troughs away from the developed source area.
- Construct pit or dam livestock reservoirs to impound water for livestock and wildlife use in adherence with the following:
  - Do not exceed water storage capacity of 3.0 acre-feet.
  - Construct pits in dry lakebeds or other natural depressions. Pile excavated material from pits adjacent to the pit in a manner that eliminates potential for erosion of the excavated material into the pit. Stockpile topsoil to use to rehabilitate the borrow areas.
  - Construct dams in drainages or to one side of a drainage, with a diversion ditch constructed into the impoundment area. Locate dams, when possible, to take advantage of natural spillway sites. When a natural spillway is not available, construct a spillway around the dam for the reservoir. Design spillway to withstand the 50-year flood flow without overtopping the dam and to direct the pass flow downstream to prevent erosion of the embankment.
  - Construct dams a minimum ratio of 3:1 on the upstream face and minimum ratio of 2:1 on the downstream face. Minimum width of the top of all dams would be 12’.
  - Clear all brush, stumps, roots, and organic matter from borrow areas and beneath dams.

- Use material from dam impoundment areas or borrow areas as fill material. Use only fill materials consisting of non-organic and cohesive soils adjusted in moisture to optimum water content for dam construction.
- Place fill material in thin layers parallel with the long axis of the dam. Do not exceed individual layer thickness of 8”. Compact layers with a sheepsfoot roller or similar equipment.

- Obtain necessary water right permits from the Oregon Water Resources Department prior to construction. Coordinate water right applications with applicable agencies, irrigation districts, and interested parties.
- Rest from livestock grazing those areas disturbed by natural and human-induced events (e.g., wildland fire, prescribed burns, timber management treatments, juniper cuts, and rehabilitation projects). Resume livestock grazing after determining that soil and vegetation have recovered from the initial disturbance to support livestock grazing and maintain recovery from the initial disturbance. Exceptions would be for cases where such grazing would not impede site recovery, or where livestock are used as a tool to aid in achieving certain recovery objectives.
- Lands within the grazing allotments identified in **Table A-15** will not be available for livestock grazing through the issuance of a grazing lease or permit. The BLM will not authorize grazing under Section 3 permits or Section 15 leases under the Taylor Grazing Act. The BLM may authorize grazing through management agreements, nonrenewable grazing permits or leases, or special use permits consistent with the grazing regulations.

Table A-15. Allotments unavailable for livestock grazing, Klamath Falls Field Office.

Allotment Name	Allotment Number	Public Land (Acres)	Forage Allocation (AUMs)
Edge Creek*	00102	42	-
Plum Hills	00813	163	20
	Totals	205	**20**

* This portion of the Upper Klamath Wild and Scenic River corridor within the Edge Creek Allotment will be made unavailable to livestock grazing. This portion of the allotment is not allocated any AUMs. The remainder of the allotment will be available for livestock grazing.

- Close exclosures and other areas identified on **Table A-16** to livestock grazing.

Table A-16. Exclosures or other areas previously closed to livestock grazing, Klamath Falls Field Office.

Allotment Name	Allotment Number	Area Closed
Edge Creek	00102	Hayden Creek Exclosures (2) Fox Lake Exclosure
Buck Lake	00104	Tunnel Creek Exclosure Surveyor Campground Exclosure
Dixie	00107	Dixie (Long Prairie Creek) Exclosure
Jeld-Wen	00822	Aspen Exclosure
Rodgers	00852	Van Meter Flat Reservoir Exclosure
Yainax	00861	Bull Spring Exclosure Timothy Spring Exclosure
Bear Valley	00876	Holbrook Spring Exclosure
Bumpheads	00877	Bumpheads Reservoir Outlet Exclosure Antelope Creek Exclosure
Horsefly	00882	Long Branch Exclosure Caseview Spring Exclosure Norcross Spring Exclosure Boundary Spring Exclosure
Pankey Basin	00884	Pankey Creek Riparian Exclosure
Horse Camp Rim	00886	21 Reservoir Exclosure
Pitchlog	00887	Pitchlog Creek Exclosure Willow Spring Exclosure CCC Spring Exclosure
Willow Valley	00890	Duncan Spring Exclosure Antelope Creek Exclosure East Fork Lost River Exclosure

Management Direction (Medford)

- Manage livestock grazing in accordance with the Standards for Rangeland Health and Guidelines for Livestock Grazing Management for Public Lands in Oregon and Washington (USDI BLM 1997). **Appendix D** of this assessment lists allotments available for livestock grazing.
- Maintain current livestock grazing levels and management practices for the allotments shown in **Appendix D** of this assessment. Make adjustments when rangeland health assessments and evaluations of monitoring data identify that livestock grazing is a contributing factor toward not meeting one or more of the Standards for Rangeland Health and Guidelines for Grazing Management for Public Lands in Oregon and Washington.
- Develop range improvements when needed to achieve the Standards for Rangeland Health and Guidelines for Grazing Management for Public Lands in Oregon and Washington, RMP objectives, or other allotment-specific objectives.
- Implement range improvement projects in adherence with the following:
  - Conduct inventories and surveys for cultural resources, ESA-listed species, and Bureau Special Status Species prior to authorization of any project construction. Implement appropriate mitigations to reduce or eliminate potential effects to these resources.
  - Design projects to minimize surface disturbance at all project sites.
  - Rehabilitate disturbed soil to blend into the surrounding soil surface. Re-vegetate using seeds and plant materials that are genetically appropriate and native to the plant community or region, to the

extent practicable, to replace ground cover, reduce soil loss from wind and water erosion, and discourage the potential establishment of any invasive plant species.
    - Use existing roads and trails to access areas for range improvement construction to the extent practicable. If needed, create unimproved trails and tracks to reach construction sites and provide access for future maintenance of the improvements. Locate unimproved trails or tracks outside riparian management areas where workable.
    - Limit brushing and tree limb removal to only that necessary for surveying, placement, and construction of improvements.
- Design livestock fencing to prevent the passage of livestock without stopping the movement of wildlife. Wire and post spacing would follow these specifications where practicable:
    - Construct 4-wire fences, with the bottom wire 16-18" off the ground with the sequence of the remaining 3-wires above this being 6", 6", and 12". Do not exceed 42" total height (ground to top wire).
    - Install 2-strand smooth wire, not barbed, for the bottom wire to facilitate antelope crossings.
    - Install steel 't-posts' no less than 16' and no more than 24' apart, depending on local conditions.
    - Construct a brace post, tree scab, or rock jack (rock crib) at least every 0.25 mile to enhance fence integrity.
- Do not construct woven wire 'sheep' livestock fences on public lands.
- Install gates or cattle guards where livestock fences cross existing roads.
- Construct livestock fences outside of perennially or seasonally saturated soils, such as occur in wet meadows and alongside stream banks, to provide fence longevity and stability, where practicable.
- Fence spring sources to prevent livestock grazing and trampling, when necessary.
- Install escape ramps in all livestock water troughs to allow wildlife to escape.
- Install piping to divert overflow from livestock troughs away from the developed source area.
- Construct pit or dam livestock reservoirs to impound water for livestock and wildlife use in adherence with the following:
    - Do not exceed water storage capacity of 3.0 acre-feet.
    - Construct pits in dry lakebeds or other natural depressions. Pile excavated material from pits adjacent to the pit in a manner that eliminates potential for erosion of the excavated material into the pit. Stockpile topsoil to use to rehabilitate the borrow areas.
    - Construct dams in drainages or to one side of a drainage, with a diversion ditch constructed into the impoundment area. Locate dams, when possible, to take advantage of natural spillway sites. When a natural spillway is not available, construct a spillway around the dam for the reservoir. Design spillway to withstand the 50-year flood flow without overtopping the dam and to direct the pass flow downstream to prevent erosion of the embankment.
    - Construct dams a minimum ratio of 3:1 on the upstream face and minimum ratio of 2:1 on the downstream face. Minimum width of the top of all dams would be 12'.
    - Clear all brush, stumps, roots, and organic matter from borrow areas and beneath dams.
    - Use material from dam impoundment areas or borrow areas as fill material. Use only fill materials consisting of non-organic and cohesive soils adjusted in moisture to optimum water content for dam construction.
    - Place fill material in thin layers parallel with the long axis of the dam. Do not exceed individual layer thickness of 8". Compact layers with a sheepsfoot roller or similar equipment.
- Obtain necessary water right permits from the Oregon Water Resources Department prior to construction. Coordinate water right applications with applicable agencies, irrigation districts, and interested parties.
- Rest from livestock grazing those areas disturbed by natural and human-induced events (e.g., wildland fire, prescribed burns, timber management treatments, juniper cuts, and rehabilitation projects). Resume livestock grazing after determining that soil and vegetation have recovered from the initial disturbance to support livestock grazing and maintain recovery from the initial disturbance.

Exceptions would be for cases where such grazing would not impede site recovery, or where livestock are used as a tool to aid in achieving certain recovery objectives.

- Lands with grazing allotments identified in **Table A-17** will not be available for livestock grazing through the issuance of a grazing lease. The BLM will not authorize grazing under Section 15 of the Taylor Grazing Act. The BLM may authorize grazing through management agreements, nonrenewable grazing permits or leases, or special use permits consistent with the grazing regulations.

Table A-17. Allotments unavailable for livestock grazing, Medford District.

Allotment Name	Allotment Number	Public Land (Acres)	Forage Allocation (AUMs)
Pickett Mountain	00302	802	30
Glade Creek	00315	564	17
Cherry Gulch	00316	40	6
Trail Creek	10003	3,211	113
Longbranch	10004*	11,124	71
Antioch Road	10005	40	4
Roundtop Evans	10006	26,204	110
West Perry Road	10010	40	10
East Perry Road	10011	80	7
Upper Table Rock	10012	714	66
Clear Creek	10013	3,794	45
Obenchain Mountain	10014	121	12
Nichols Gap	10018	283	18
Eagle Point Canal	10020	443	55
Shady Branch	10025	321	32
Stiehl	10026	277	18
Fielder Creek	10028	83	5
Derby Station	10030	516	36
West Derby	10034	1,125	89
Emigrant Creek	10111	40	7
Baldy	10120	201	87
Lost Creek	10123	78	6
Cartwright	10127	40	4
Bybee Peak	10144	322	36
Sugarloaf/Greensprings	10158	3,008	210
Sterling Spring	10207	27,179	190
Del Rio	10216	42	5
Jump Off Joe	10303	55	8
Deer Creek	10308	1,172	77
Q Bar X	10310	13	3
Applegate	20201	25,415	294
Tunnel Ridge	20202	2,177	14
Timber Mountain	20204	3,202	70
Sardine and Galls Creek	20205	3,323	158

Allotment Name	Allotment Number	Public Land (Acres)	Forage Allocation (AUMs)
Spencer Gulch	20208	2,109	150
Quartz Gulch	20209	670	9
Burton Butte	20212	10	2
Chapman Creek	20213	3,758	81
Ecker	20217	40	6
Stage Road	20218	40	4
Lomas Road	20222	643	50
Star	20223	121	24
Ferns Lease	20224	249	28
Reeves Creek	20309	1,665	95
Esterly Creek	20312	3,641	152
	Totals	**128,994**	**2,514**

* These portions of the Longbranch Allotment will be made unavailable to livestock grazing. The remainder of the allotment will be available for livestock grazing (see **Appendix D** of this assessment).

- All areas that are currently without allotments will remain closed to livestock grazing through the issuance of a grazing lease.

Minerals

Management Objectives

- Manage the development of leasable (including conventional and non-conventional hydrocarbon resources) minerals, locatable mineral entry, and salable mineral material disposal in an orderly and efficient manner.
- Maintain availability of mineral material sites needed for development and maintenance of access roads for forest management, timber harvest, local communities, rights-of-way for energy production and transmission, and other uses.

Management Direction

- Pursuant to 43 CFR 3809.11(c)(6), the BLM is creating two exceptions to the requirement that a Plan of Operations is required for any mining activities that are greater than casual use (such as notice-level operations) when the activities are located within lands or waters known to contain federally proposed or listed threatened or endangered species or their proposed or designated critical habitat. An operator is not required to submit a Plan of Operations for notice-level activities in the following two situations:
    - When pursuant to Section 7 of the ESA, the BLM determines that the notice-level activity will have no effect on federally proposed or listed threatened or endangered species or their proposed or designated critical habitat.
    - When BLM has completed consultation to the extent required under section 7(a)(2) of the ESA and the U.S. Fish and Wildlife Service or National Marine Fisheries Service has concurred with the BLM's finding that the notice-level activity is not likely to adversely affect federally proposed or listed threatened or endangered species or their proposed or designated critical habitat.
- A Plan of Operations will be required for mining proposals that the BLM determines would be likely to adversely affect federally proposed or listed threatened or endangered species or their proposed or designated critical habitat.

- Proposals that require a Plan of Operations and are located within lands or waters known to contain federally proposed or listed threatened or endangered species or their proposed or designated critical habitat continue to be governed by the standards in 43 CFR 3809 *et seq*.
- Pursuant to 43 CFR 3809.31(b)(2), the operator must contact the BLM before beginning operations that involve the use of a suction dredge to determine whether the operator needs to submit a notice or a plan to BLM, or whether the activities constitute casual use. It is the operator's burden to determine the location of their activity relative to the location of lands or waters that contain federally proposed or listed threatened or endangered species or their proposed or designated critical habitat, in light of the operator's potential liability under Section 9 of the ESA.
    - Suction dredging activity proposed within lands or waters that contain federally proposed or listed threatened or endangered species or their proposed or designated critical habitat, regardless of the level of disturbance, must not begin until BLM has completed consultation to the extent required under section 7(a)(2) of the ESA.
- Energy and mineral development can occur concurrently with some resource uses.

Leasable Minerals: Oil, Gas, or Coalbed Natural Gas Resources[17]

- Maintain all lands as open to leasable mineral development except where closed by legislation.
- Apply site-specific stipulations, such as no surface occupancy or conditional surface uses, based on resource protection needs in—
    - Designated and suitable Wild and Scenic River segments (where not already closed by legislation);
    - National Trail management corridors;
    - District-Designated Reserve – Lands Managed for their Wilderness Characteristics;
    - Areas of Critical Environmental Concern (including Research Natural Areas and Outstanding Natural Areas where not already closed by legislation); and
    - Recreation Management Areas (Special Recreation Management Area/Extensive Recreation Management Area).
- Apply site-specific stipulations as needed to protect ESA-listed species and their critical habitats.

Locatable Minerals

- Recommend for withdrawal from locatable mineral entry—
    - Designated and suitable Wild and Scenic River segments (where not already closed by legislation);
    - National Trail management corridors; and
    - District-Designated Reserve – Lands Managed for their Wilderness Characteristics.
- Recommend for withdrawal from locatable mineral entry Special Recreation Management Areas and Extensive Recreation Management Areas when mineral entry is not compatible with meeting recreation objectives or maintaining recreation setting characteristics.
- Recommend for withdrawal from locatable mineral entry Areas of Critical Environmental Concern with identified special management needs associated with locatable mineral entry (**Appendix F** of the Proposed RMP).
- Retain all other areas not congressionally or secretarially withdrawn as open for locatable mineral entry.

Salable Minerals

- Close to salable mineral material disposal—

[17] The Sustainable Energy section addresses Geothermal Resources.

- Designated and suitable Wild and Scenic River segments (where not already closed by legislation);
- National Trail management corridors; and
- District-Designated Reserve – Lands Managed for their Wilderness Characteristics.

- Close Special Recreation Management Areas and Extensive Recreation Management Areas to salable mineral material disposal when not compatible with meeting recreation objectives or maintaining recreation setting characteristics.
- Close Areas of Critical Environmental Concern with identified special management needs to salable mineral material disposal (**Appendix F** of the Proposed RMP).
- Maintain all other areas not closed through legislation as open to salable mineral material disposal.
- **Appendix M** of the Proposed RMP provides a trends analysis that will be applied to disposals.

Paleontological Resources

Management Objectives

- Protect and preserve significant localities from natural or human-caused deterioration or potential conflict with other resources.
- Provide appropriate scientific, educational, and recreational uses, such as research and interpretive opportunities, for paleontological resources.

Management Direction

- Protect all paleontological resources through avoidance or other protection measures, consistent with BLM Handbook 8270-1 – General Procedural Guidance for Paleontological Resource Management, Chapter III (USDI BLM 1998).
- Conduct public education, outreach activities, and develop materials to educate the public on paleontological resources existing within the decision area.

Rare Plants and Fungi

Management Objectives

- Provide for conservation and contribute toward the recovery of plant species that are ESA-listed or candidates.
- Support the persistence and resilience of natural communities, including those associated with forests, oak woodlands, shrublands, grasslands, cliffs, rock outcrops, talus slopes, meadows, and wetlands. Support ecological processes and disturbance mechanisms to allow for a range of seral conditions.
- Provide for the conservation of Bureau Special Status plant and fungi species.
- Support the persistence and resilience of oak species within oak woodlands and within mixed hardwood/conifer communities.

Management Direction

- Manage ESA-listed species consistent with recovery plans, conservation agreements, species management plans, and designated critical habitat, and species-specific or project-specific conservation measured developed with the U.S. Fish and Wildlife Service, including the protection and restoration of habitat, altering the type, timing, and intensity of actions, and implementing other strategies designed to recover populations of species.
- 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.
- Manage habitat to maintain populations of ESA-listed, proposed, and candidate plant species.
- Prior to implementing actions that could result in habitat modification or species **disturbance** in the suitable habitat of any ESA-listed, proposed, or candidate plant species, or Bureau Sensitive plant species, conduct surveys to determine species presence. In addition to pre-project surveys, conduct

additional surveys on BLM-administered lands for ESA-listed, proposed, and candidate plant species within suitable habitat as needed to find new populations.

- Maintain or restore natural processes, native species composition, and vegetation structure in natural communities through actions such as applying prescribed fire, thinning, removing encroaching vegetation, treating non-native invasive species, retaining legacy components (e.g., large trees, snags, and down logs), maintaining water flow to wetlands, and planting or seeding native species.
- When re-vegetating degraded or disturbed areas, utilize locally adapted seeds and native plant materials appropriate to the location and site-specific conditions, and meeting management objectives for vegetation management and restoration activities. Use seeds and plant materials that are genetically appropriate and native to the plant community or region, to the extent practicable.
- Manage mixed hardwood/conifer communities to maintain and enhance oak (*Quercus* spp.) persistence and structure by removing competing conifers, thinning, and prescribed fire, to the extent consistent with management direction for the land use allocation.
- Manage mixed conifer communities to maintain and enhance ponderosa, Jeffrey, and sugar pine persistence and structure by removing competing conifers, thinning, and applying prescribed fire, to the extent consistent with management direction for the land use allocation.
- Create new and augment existing populations of ESA-listed, proposed, and candidate plant species and Bureau Sensitive plant and fungi species to meet recovery plan or conservation strategy objectives.

Recreation and Visitor Services

Management Objectives

- Provide a diversity of quality recreational opportunities.
- Meet legal requirements for visitor health and safety and mitigate resource user conflicts.
- Mitigate recreational impacts on natural and cultural resources. In land use allocations where management of other resources is dominant, provide recreational opportunities where they can be managed consistent with the management of these other resources.
- Develop new recreation opportunities (e.g., trails, trailheads, restrooms) to address recreation activity demand created by growing communities, activity groups, or recreation-tourism if—
    - Recreation development is consistent with interdisciplinary land use plan objectives; and
    - The BLM has secured commitments from partners (e.g., a cooperative management agreement, adopt-a-trail agreement, memorandum of understanding).

Management Direction

- Manage Special Recreation Management Areas and Extensive Recreation Management Areas, identified in **Appendix O** of the Proposed RMP, in accordance with their planning frameworks.
- Protect recreation setting characteristics within Special Recreation Management Areas to prohibit activities that would degrade identified characteristics.
- Pursue and prioritize public access to BLM-administered lands that have high recreational potential consistent with BLM designations and allocations.
- Allow the discharge of firearms for recreational target shooting on BLM-administered lands, outside areas with firearm use restrictions described in the RMA frameworks, if the firearm is discharged toward a proper backstop sufficient to stop the projectile's forward progress.
- Issue discretionary Special Recreation Permits for a variety of uses that are consistent with resource and program objectives.
- Issue vending permits that complement visitor use or contribute to resource protection.
- Monitor activity participation and recreation setting characteristics annually during the primary use season of June through October.
- Use recreation management tools such as establishing an allocation system, applying group size limits for private and commercial recreation use, or implementing seasonal closures, if monitoring indicates

that social recreation setting characteristics are not being protected, resource damage is occurring, or user conflicts need to be addressed.

- Develop and maintain partnerships with recreation-based organizations and service providers. These partnerships should engage partners in the planning, implementation and monitoring of recreation opportunities and facilities on BLM-administered public lands.

Recreation and Visitor Services – Significant Caves[18]

Management Objective

- Manage significant caves to allow for appropriate access while protecting pristine and fragile resources, wildlife values, scientific and research values, and visitor safety.

Management Direction

- Manage significant caves to maintain the current level of remoteness from motorized and mechanized vehicles and to preserve the natural appearance of the cave. Prohibit construction of new facilities, roads, or trails to access the caves. Allow minor modifications (e.g., use of tape and signage, and placing rescue caches) only for scientific purposes and to accommodate safe use. Maintain low evidence of use and other people.
- Manage visitor frequency, visitor numbers, and season of use through monitoring and subsequent implementation decisions described through cave management plans for each significant cave, group of caves, or complex of caves.
- Focus all management actions on specific activity outcomes for caving and research. Outcomes will be for participants to enjoy and learn about cave and karst resources. Specific benefit outcomes will be for environmental benefits, such as increased environmental stewardship, and the preservation and protection of unique biological, paleontological, archaeological, and mineralogical aspects. Social benefits will be to provide environmental education and appreciation of cave and karst systems.
- Provide appropriate access while addressing issues and concerns relating to visitor safety and preservation of the caves' values. If issues or concerns arise, apply necessary managerial controls, such as closures, permits, trip requirements, and gating. Administer and authorize research, inventory, work projects, and digging trips. Provide informational and educational materials to authorized visitors. Do not market or promote cave and karst resources.

Recreation and Visitor Services – Formerly Used Defense Sites

Management Objective

- Prevent and reduce risks to public health and the environment where hazards may exist resulting from military defense activities.

Management Direction

- Manage the portion of the Modoc Aerial Gunnery and Bombing Range located within the Klamath Falls Field Office to avoid or limit exposure to areas that may contain hazards associated with munitions and explosives of concern. Munitions and explosives of concern may include unexploded ordnance, discarded military munitions, and munitions constituents when munitions constituents are present in high enough concentrations to pose an explosive hazard. The site may also be contaminated with munitions constituents that are not present in high enough concentrations to represent an explosive hazard, but in high enough concentrations to be a toxicity hazard in soil, groundwater, surface water, or air.
- Coordinate uses on BLM-administered lands within formerly used defense sites with State and Federal military agencies to prevent and reduce risks to public health and the environment. Develop,

[18] The Federal Cave Resources Protection Act of 1988 describes significant caves.

as needed, cooperative agreements or Memorandums of Understanding to ensure communication, coordination, and safe use of public lands within formerly used defense sites.

- Take appropriate measures, such as signing, fencing, removal, and remediation, to protect the public from known unexploded ordnance locations on BLM-administered lands.

Soil Resources

Management Objectives

- Maintain or enhance the inherent soil functions (e.g., ability of soil to take in water, store water, regulate outputs for vegetative growth and stream flow, and resist erosion or compaction) of managed ecosystems.
- Provide landscapes that stay within natural soil stability failure rates during and after management activities.

Management Direction

- Apply BMPs (**Appendix J** of the Proposed RMP) as needed to maintain or restore soil functions and soil quality, and limit detrimental soil disturbance.
- Limit detrimental soil disturbance from forest management operations to a total of < 20 percent of the harvest unit area. Where the combined detrimental soil disturbance from implementation of current forest management operations and detrimental soil disturbance from past management operations exceeds 20 percent of the unit area, apply mitigation or amelioration to reduce the total detrimental soil disturbance to < 20 percent of the harvest unit area. Detrimental soil disturbance can occur from erosion, loss of organic matter, severe heating to seeds or microbes, soil displacement, or compaction.
- Avoid road construction and timber harvest on unstable slopes where there is a high probability to cause a shallow, rapidly moving landslide that would likely damage infrastructure (e.g., BLM or privately owned roads, State highways, or residences) or threaten public safety.
- Do not till soils where tillage will cause soils to become unstable due to increasing the soil moisture content.

Sustainable Energy

Management Objectives

- Develop sustainable energy resources to the maximum extent possible without precluding other land uses.

Management Direction

- Exclude from sustainable energy development areas that are part of the National Landscape Conservation System (e.g., Wilderness Areas, Wilderness Study Areas, Wild and Scenic Rivers, and National Historic and Scenic Trails), Areas of Critical Environmental Concern, and District-Designated Reserve – Lands Managed for their Wilderness Characteristics.
- Site development will include practices as needed to reduce or avoid impacts to other resource uses. Appropriate practices will be applied based on site-specific conditions and include, but are not limited to, the following:
    - Control outdoor lighting with motion or heat sensors to the maximum extent practicable.
    - Use hooded outdoor lighting directed downward to minimize horizontal and skyward illumination to the maximum extent practicable.
    - Minimize the use of high-intensity lighting.
    - Establish non-disturbance buffer zones to protect sensitive habitats or areas of high risk for species of concern.
    - Control any pets of operations staff kept on-site to avoid harassment and **disturbance** of wildlife.
    - Use existing roads and utility corridors to the maximum extent feasible; minimize the number and length/size of new roads, lay-down areas, and borrow areas.

- Minimize traffic volumes to the maximum extent practicable; maintain roads adequately to minimize associated impacts.
- Install and maintain permanent fencing around electrical substations, emergency generators, and other areas potentially hazardous to human health.
- Consolidate necessary infrastructure requirements wherever possible, including electric power transmission lines, pipelines and market access corridors, and support utility infrastructure.
- Keep energy conversion sites clean of debris, garbage, fugitive trash or waste, and graffiti; minimize the accumulation of scrap heaps, dumps, and storage yards.
- Design facilities used for sustainable energy harvesting, conversion, and transmission to discourage the perching or nesting by birds.
- Integrate facilities used for sustainable energy harvesting, conversion and transmission with the surrounding landscape including minimizing the profile of ancillary structures, burial of cables, prohibition of commercial symbols, and lighting.
- Provide secondary containment for all on-site hazardous materials and waste storage, including fuel.

<u>Sustainable Energy – Biomass Energy Development</u>

Management Objectives

- *See Sustainable Energy management objectives.*

Management Direction

- Offer slash in excess of soil stabilization needs as biomass energy feedstock.

<u>Sustainable Energy – Wind Energy Development</u>

Management Objectives

- *See Sustainable Energy management objectives*

Management Direction

- Site development will include practices as needed to reduce or avoid impacts to other resource uses. Appropriate practices will be applied based on site-specific conditions and include, but are not limited to, the following:
  - Lock turbine tower access doors to limit public access.
  - Locate turbines away from landscape features known to attract raptors.
  - Locate turbines away from colonies where bats hibernate, breed, and raise their young; locate turbines outside of bat migration corridors or flight paths between colonies and feeding areas
  - Encompass specific design elements for turbine arrays and turbine design including visual uniformity, use of tubular towers, proportion and color of turbines, non-reflective paints, and prohibition of commercial messages on turbines.
  - Repair, replace, or remove inoperative turbines in a timely manner.
  - Exclude designated areas that are part of the National Landscape Conservation System (e.g., Wilderness Areas, Wilderness Study Areas, Wild and Scenic Rivers, and National Historic and Scenic Trails) and Areas of Critical Environmental Concern from wind energy site monitoring and testing and development.
  - Incorporate wildlife-compatible design standards when fencing is necessary.
  - Avoid the use of guy wires on communication towers and meteorological towers at wind energy project sites.
  - Keep the installation of meteorological towers on a project site to a minimum; do not locate these towers in sensitive habitats or in areas where ecological resources known to be sensitive to human are present.

- Light only a portion of the turbines within a wind project; fix all pilot warning lights to fire synchronously.
- Do not add any wildlife habitat enhancements or improvements (e.g., ponds, guzzlers, rock piles, brush piles, bird nest boxes, nesting platforms, wildlife food plots) that would attract small mammals to wind energy facilities.
- Use only shielded, separated, or insulated electrical conductors that minimize electrocution risk to avian wildlife.

Sustainable Energy – Geothermal Energy Development

Management Objectives

- *See Sustainable Energy management objectives.*

Management Direction

- Site development will include practices as needed to reduce or avoid impacts to other resource uses. Appropriate practices will be applied based on site-specific conditions and include, but are not limited to, the following:
  - Minimize impacts to livestock operations from geothermal energy drilling and development.
  - Incorporate certified weed-free mulch into the reclamation of the land disturbed during the development of geothermal resources.
  - Raise above-ground piping on-site for sufficient wildlife passage.
  - Isolate any liquid that is at elevated temperatures or contains contaminants that are toxic or harmful to fur or feathers from wildlife access with fencing, netting or complete enclosure.

Sustainable Energy – Sustainable Energy Transmission Corridors

Management Objectives

- *See Sustainable Energy management objectives.*

Management Direction

- Site development will include practices as needed to reduce or avoid impacts to other resource uses. Appropriate practices will be applied based on site-specific conditions and include, but are not limited to, the following:
  - Site overhead lines away from areas where bird crossings are frequent.
  - Mark overhead lines in accordance with Avian Power Line Interaction Committee collision guidelines.
  - Install overhead lines such that the conductors parallel tree lines, employ bird flight diverters, or are otherwise screened so that bat and bird collision risk is reduced.
  - Where pipeline right-of-way clearings can be incorporated into a strategic system of fire breaks, make clearings sufficiently wide to be effective as fire breaks.
  - Raise pipelines constructed above ground sufficiently high enough to allow wildlife passage where needed and avoid potential alterations to predator/prey dynamics.

Trails and Travel Management

Management Objectives

- Maintain a comprehensive travel network that best meets the full range of public use, resource management, and administrative access needs.
- Protect fragile and unique resource values from damage by public motorized vehicle use.
- Provide public motorized vehicle use opportunities where appropriate.

Management Direction

- Develop public motorized and non-motorized travel routes and trails in a manner designed to minimize conflicts between public motorized vehicle use and other existing (or proposed) recreational uses of the same, or neighboring, public lands. Design in a manner to ensure the compatibility of such uses with existing conditions in populated areas, taking into account noise and other factors.
- Manage public motorized vehicle use in Recreation Management Areas (Special Recreation Management Area/Extensive Recreation Management Area) according to interim management guidelines until subsequent comprehensive implementation-level travel management plans are completed.
- Develop closed or abandoned roads to provide additional public motorized and non-motorized trail opportunities, where feasible and compatible with other resource objectives.
- Prohibit public motor vehicle travel within areas designated as *closed* for public motorized access. Where the BLM has public access, allow public access by means other than motorized vehicle, such as mechanized or non-motorized use. Allow travel required for valid existing rights.
- Restrict public motorized vehicle travel within areas designated as *limited* for public motorized access. Until completion of implementation-level travel management planning, limit public motorized vehicle travel to existing routes where the BLM has public access. After completion of implementation-level travel management planning, limit public motorized vehicle travel in conformance with the resultant Travel Management Plan. Allow travel required for valid existing rights.

Visual Resource Management

Management Objectives

- Protect scenic values on public lands where visual resources are an issue or where high-value visual resources exist.
- Prohibit activities that would disrupt the existing character of the landscape in Visual Resource Management Class I areas.
- Retain the existing character of the landscape in Visual Resource Management Class II areas.
- Partially retain the existing character of the landscape in Visual Resource Management Class III areas.
- Allow for major modification of the existing character of the landscape in Visual Resource Management Class IV areas.

Management Direction

- Only allow activities that are found to meet visual management objectives using the Visual Resource Contrast Rating system.
- Visual Resource Management Class I includes—
  - Wilderness Areas;
  - Wilderness Study Areas; and
  - Designated and suitable Wild and Scenic Rivers that are classified as Wild.

  Manage Visual Resource Management Class I areas in accordance with natural ecological changes. Prohibit activities that would lower the Visual Resources Inventory class of Visual Resource Management Class I areas. The level of change to the characteristic landscape will be very low and will not attract attention. Changes will repeat the basic elements of form, line, color, texture, and scale found in the predominant natural features of the characteristic landscape.
- Visual Resource Management Class II includes—
  - Designated and suitable Wild and Scenic Rivers that are classified as Scenic;
  - Eligible Wild and Scenic Rivers that are classified as Scenic outside of the Harvest Land Base;
  - National Trail management corridors;
  - District-Designated Reserve – Lands Managed for their Wilderness Characteristics;

- Special Recreation Management Areas that fall within the Primitive and Backcountry category of the Recreation Opportunity Spectrum; and
- Areas of Critical Environmental Concern in Visual Resource Inventory Class II outside of the Harvest Land Base.

Manage Visual Resource Management Class II areas for low levels of change to the characteristic landscape. Management activities will be seen but will not attract the attention of the casual observer. Changes will repeat the basic elements of form, line, color, texture, and scale found in the predominant natural features of the characteristic landscape.

- Visual Resource Management Class III includes—
  - Designated, suitable, and eligible Wild and Scenic Rivers that are classified as Recreational;
  - Eligible Wild and Scenic Rivers that are classified as Scenic within the Harvest Land Base;
  - Special Recreation Management Areas and Extensive Recreation Management Areas that fall within the Middle country category of the Recreation Opportunity Spectrum; and
  - Areas of Critical Environmental Concern in Visual Resource Inventory Class III, and in Visual Resource Inventory Class II inside the Harvest Land Base.

  Manage Visual Resource Management Class III 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. Changes will repeat the basic elements of form, line, color, texture, and scale found in the predominant natural features of the characteristic landscape.
- Visual Resource Management Class IV includes all lands that are not designated as Visual Resource Management Class I, II, or III. Manage Visual Resource Management Class IV areas for high levels of change to the characteristic landscape. Management activities may dominate the view and will be the major focus of viewer attention.

Wildlife

Management Objectives

- Conserve and recover species that are ESA-listed, proposed, or candidates, and the ecosystems on which they depend.
- 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.
- Conserve or create habitat for species addressed by the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act and the ecosystems on which they depend.

Management Direction

- Manage habitat for species that are ESA-listed, or are candidates for listing, consistent with recovery plans, conservation agreements, and designated critical habitat.
  - Existing conservation agreements include:
    - Conservation Agreement for the Oregon Spotted Frog (*Rana pretiosa*) in the Klamath Basin of Oregon (May 7, 2010).
- Implement conservation measures to mitigate specific threats to Bureau Sensitive species during the planning of activities and projects. Conservation measures include altering the type, timing, location, and intensity of management actions.
- Manage naturally occurring special habitats to maintain their ecological function including seeps, springs, wetlands, natural ponds, vernal pools/ponds, natural meadows, rock outcrops, caves, cliffs, talus slopes, mineral licks, oak savannah/woodlands, sand dunes, and marine habitats.
- Manage human-made special habitats as wildlife habitat when compatible with their engineered function, including bridges, buildings, quarries, pump chances/heliponds, abandoned mines, and reservoirs, to the extent possible consistent with safety and legal requirements.
- Klamath Falls Field Office and Medford District: maintain or enhance Bureau Special Status Species wildlife habitat on rangelands.

- Prior to implementing actions that could result in habitat modification or species **disturbance** in habitat for the Fender's blue butterfly, Oregon silverspot butterfly, Taylor's checkerspot butterfly, streaked horned lark, vernal pool fairy shrimp, Oregon spotted frog, Lower Columbia River distinct population segment of Columbian white-tailed deer, or western snowy plover, conduct surveys to determine species presence.
- Do not approve, fund, or implement actions that would adversely affect the Fender's blue butterfly, Oregon silverspot butterfly, Taylor's checkerspot butterfly, streaked horned lark, vernal pool fairy shrimp, Oregon spotted frog, Lower Columbia River distinct population segment of Columbian white-tailed deer, or western snowy plover, except when done in accordance with an approved recovery plan, conservation agreement, species management plan, survey and monitoring protocol, or critical habitat rule, and when the action is necessary for the conservation of the species.
- Do not approve, fund, or implement actions that would adversely affect the designated critical habitats of the vernal pool fairy shrimp, Oregon spotted frog, or western snowy plover, except when done in accordance with an approved recovery plan, conservation agreement, species management plan, survey and monitoring protocol, or critical habitat rule, and when the action is necessary for the conservation of the species.

<u>Wildlife – Bald and Golden Eagles</u>

- Protect known bald eagle or golden eagle nests (including active nests and alternate nests) and bald eagle winter roosting areas. Prohibit activities that will disrupt bald eagles or golden eagles that are actively nesting.
  - Continue routine use and maintenance of existing roads and other facilities to where such use pre-dates the eagles' successful nesting activity.
  - Do not remove overstory trees within 330 feet of bald eagle or golden eagle nests.
  - Do not conduct timber harvest operations (including road construction, tree felling, and yarding) during the breeding season within 660 feet of bald eagle or golden eagle nests. Decrease the distance to 330 feet around alternate nests within a particular territory, including nests that were attended during the current breeding season but not used to raise young, or after eggs laid in another nest within the territory have hatched.
  - Prohibit operation of off-highway vehicles within 330 feet of bald eagle or golden eagle nests during the breeding season. In areas without forest cover or topographic relief to provide visual and auditory screening, prohibit operation of off-highway vehicles within 660 feet of bald eagle or golden eagle nests during the breeding season.
  - Prohibit activities that will disrupt roosting bald eagles or golden eagles at communal winter roosts.

<u>Wildlife – Bats</u>

- Protect known maternity colonies and hibernacula for Bureau Sensitive bat species within caves, abandoned mines, bridges, and buildings with a 250-foot buffer:
  - Maintain existing habitat conditions and protect the site from destruction or species disturbance, to the extent possible consistent with safety and legal requirements.
  - Prohibit blasting
  - Implement hazard fuel reduction treatments to protect the site from wildfire or to maintain site conditions conducive to the colony.
- Prohibit blasting during periods of reproduction and hibernation within 1 mile of known maternity colonies and hibernacula for Bureau Sensitive bat species within caves, abandoned mines, bridges, and buildings.
- Where white-nose syndrome is found in the bats residing within caves and abandoned mines, bridges, and buildings, prohibit human access except for monitoring, education, or research purposes.

Wildlife – Deer or Elk Management Areas (Klamath Falls Field Office, Medford District, and Salem District)

- For the Medford and Salem Districts, restrict motor vehicle use within designated deer or elk management areas between November 1 and April 15. For the Klamath Falls Field Office, restrict motor vehicle use within the Pokegama management area between November 20 and April 1. Use techniques such as gating or signing to impose the restrictions. Allow administrative use of roads, as needed, on a year-round basis.
- Plant native forage species along roadsides, skid trails, and on disturbed areas, or create forage plots where forage for deer or elk is limited within designated deer or elk management areas.
- For the Klamath Falls Field Office and Medford District:
  - Cut encroaching juniper that hinders attainment of desired forage conditions to maintain and improve forage for big game. Remove, utilize, or pile and burn cut juniper.
  - Retain old-growth 'legacy' juniper when it meets the following definition: Individual trees that likely originated in the pre-settlement period, before 1870. These trees are commonly found in rocky areas where vegetation is sparse and fire frequency is naturally low. Characteristics of old-growth juniper include some or all of the following:
    - Crown is flat, rounded, broad at top, or irregular crown (as opposed to the more pointed tops of younger trees) or dead "spike" top
    - Numerous dead branches
    - Branches covered with coarse, bright yellow-green lichen (*Letharia* or wolf lichen)
    - Large diameter lower branches
    - Large diameter trunk relative to height
    - Spirally twisted bark and deep furrows on the trunk
    - Hollow trunk

Wildlife – Fisher

- Do not approve, fund, or carry out actions that would **disrupt** normal fisher behaviors (e.g., foraging, resting, or denning) associated with known natal or maternal denning sites, except when done in accordance with an approved recovery plan, conservation agreement, species management plan, survey and monitoring protocol, or critical habitat rule, and when the action is necessary for the conservation of the species.
- Within stands where fisher natal or maternal denning or dens are documented, do the following:
  - Maintain ≥ 80 percent canopy cover within at least 50 feet of documented fisher natal and maternal dens.
  - Maintain sufficient canopy cover on the remainder of the stand to support fisher denning post-project.
  - Protect fisher denning structures ≥ 24" diameter (snags, down woody material, and live trees with cavities) within the stand. In this context, **protect fisher denning structures** means to retain the structure in the stand and if, for safety concerns, it is necessary to fall snags or live trees with cavities then those structures would remain on-site as additional down woody material.
  - Retain untreated portions within the stand.
- Within 5th field-watersheds (HUC 10) where fisher are documented to occur, favor retaining trees that have structures (e.g., cavities, mistletoe, rust brooms) that are typically used as denning or resting sites by fisher.
- The above management direction may be modified in conference or consultation with the U.S. Fish and Wildlife Service based on new information.

Wildlife – Gray Wolf

- Restrict activities that create noise or visual **disturbance**(s) above ambient conditions within one mile of known active gray wolf dens from April 1 to July 15.

- In accordance with 43 CFR 4110, modify grazing leases, as appropriate, to include the following measures when the U.S. Fish and Wildlife Service (1) determines gray wolf occupancy of a BLM grazing allotment, and (2) recommends the implementation of these measures as part of its wolf conservation strategy:
    - Remove, bury, or otherwise dispose of livestock carcasses found on areas of the allotment where they would attract wolves to a potential conflict situation with other livestock (such as a salting ground, water source, or holding corral) such that the carcass will not attract wolves.
    - Move sick or injured livestock from the allotment so they are not targeted by wolves.
    - Limit allotment management activities by humans near active wolf den sites during the denning period (April 1 to July 15) to avoid human disturbance of the site. Determine the distance on a site-specific basis, depending primarily on topography around the den site.
    - Do not place salt or other livestock attractants near known wolf dens or rendezvous sites to minimize livestock use of these sites. If a new den or rendezvous site is discovered, relocate any previously established salt or attractant location as necessary to minimize livestock use of these sites.

Wildlife – Marbled Murrelet

- Except as stated under Option 3, below, and except when needed to protect human safety and property, prohibit activities that **disrupt**[19] marbled murrelet nesting at occupied sites within 35 miles of the Pacific Coast within all land use allocations and between 35–50 miles of the Pacific Coast within reserved land use allocations.
- Before modifying nesting habitat or removing nesting structure in (1) all land use allocations within 35 miles of the Pacific Coast, and (2) Late-Successional Reserve and Riparian Reserve between 35–50 miles from the Pacific Coast and outside of exclusion Areas C and D (shown in **Figure III-9**),—
    - Assess the analysis area for **marbled murrelet nesting structure.**[20] The analysis area consists of the proposed project and lands within 726 feet of the project boundary. This area includes all habitat that would be examined by a 5-acre moving circle (526 feet in diameter) whose inner edge (i.e., the edge closest to the center of the project area) is within 200 feet of the project area boundary. The analysis area includes all nesting structures that could be affected by habitat modification.

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[19] **Disruption** is a type of **disturbance** that that creates the likelihood of injury to listed species to such an extent as to significantly **disrupt** normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering (see 50 § CFR 17.3). An action that would **disrupt** the normal behavior of a listed species may affect, and would be likely to adversely affect, the species and would cause the taking of affected individual(s). In contrast, **disturbance** is a human action that may affect a federally-listed animal species by the addition, above ambient condition, of noise or human intrusion, or the mechanical movement of habitat (e.g., the shaking of the forest canopy from helicopter rotor wash). **Disturbance** is temporary/short term (minutes to days) and does not modify habitat structure, or water/air flow or quality. (**Disturbance** should not be confused with "surface disturbance," which refers to an action that modifies soil, water or vegetation). **Disturbance** requires the presence of a listed animal. **Disruption** is a subset of **disturbance**.

[20] **Marbled murrelet nesting structure** is a conifer tree with all of the following characteristics (which are not always visible from the ground):

- A DBH of at least 19.1" and a height greater than 107'.
- A nest platform at least 32.5' above the ground. A nest platform is a relatively flat surface at least 4" wide, with nesting substrate (e.g., moss, epiphytes, duff), and an access route through the canopy that a murrelet could use to approach and land on that platform.
- A tree branch or foliage, either on the tree with potential structure or on an adjacent tree, which provides protective cover over the platform.

Note: Nesting structure does not have to be occupied by nesting marbled murrelets.

- If the analysis area contains no nesting structure, no further consideration of marbled murrelet habitat is required.

- Before modifying forest stands in any 5-acre portion of the analysis area that contains at least 6 trees with nesting structure, implement Option 1, 2, or 3.

  Option 1. Survey for the marbled murrelet using a protocol with a defined methodology and a resultant probability of detection.
  - If no occupancy is determined, no further consideration of marbled murrelet habitat is required.
  - If occupancy is determined, do not conduct activities within the **occupied stand**[21] and all forest within 300 feet of the occupied stand.
  - The following are exceptions that may be implemented as long as the stand continues to support nesting:
    - Felling of hazard trees and trees for instream restoration projects.
    - Construction of linear and nonlinear rights-of-way, spur roads, yarding corridors, or other facilities.
  - As needed to protect the overall health of the **occupied stand**, the following activities would be implemented as long as the stand continues to support nesting:
    - Wildfire suppression.
    - Fuels reduction.
    - Insect and disease control.
    - Other activities to improve the health of the stand or adjacent stands.

  Option 2. Exclude nesting structure from the project area by doing all of the following:
  - Do not remove or damage nesting structure. This includes trees with nesting structure and adjacent trees with branches that interlock the branches of any tree with nesting structure.
  - Do not conduct timber harvest and associated ground disturbing activities during the murrelet nesting period (April 1 – September 15) unless the U.S. Fish and Wildlife Service concurs that disturbances would not adversely affect nesting marbled murrelets.
  - Maintain a 150-foot un-thinned buffer around all trees with nesting structure. Within this buffer, do not remove trees for any reason associated with timber harvest, including the placement of roads, landings, or yarding corridors. Other activities are permitted if the U.S. Fish and Wildlife Service concurs that such activities would not adversely affect nesting marbled murrelet.
  - Maintain an average canopy cover of at least 60 percent post-project (averaged over each 40-acre area) in the zone between 150 feet and 300 feet of all trees with nesting structure.
  - Include additional, site-specific prescriptive measures to maintain or enhance habitat conditions, as needed, in the zone between 150 feet and 300 feet from all trees with nesting structure. In this context, **maintain marbled murrelet habitat** means to maintain stand structural characteristics such that, following habitat modification, the stand could support marbled murrelet nesting.

[21] Marbled murrelet occupied stand refers to all forest stands, regardless of age or structure, within ¼ mile (1,320 feet) of the location of marbled murrelet behavior indicating occupancy and not separated from the location of marbled murrelet behavior indicating occupancy by more than 328 feet of non-forest.

- Maintain an average canopy cover of at least 40 percent post-project (averaged over each 40-acre area) within the project area beyond 300 feet from all trees with nesting structure.

Option 3. With concurrence from the U.S. Fish and Wildlife Service, manage nesting structure in a manner that would not adversely affect nesting marbled murrelets, except when taking actions that are necessary to treat or protect stands from sudden oak death. Take actions necessary to treat or protect stands from sudden oak death, including actions that may adversely affect nesting marbled murrelets.

- Before modifying forest stands in any 5-acre portion of the analysis area that contain 1–5 trees with nesting structure, implement Options 1, 2, 3, or 4.

Option 4. Protect nesting structure within the project area by doing all of the following:

- If the nesting structure is within 20 miles of the coast—
  - Between April 1 and August 5, stand modification would not occur;
  - Between August 6 and September 15, stand modification activities would not begin until 2 hours after sunrise and would conclude 2 hours before sunset.
- Design projects in accordance with Late-Successional Reserve management direction.
- Do not remove or damage nesting structure.
- Design habitat modifications that occur within one site-potential tree height of nesting structure to protect and improve future habitat conditions. Examples include—
  - Protecting the roots of trees with nesting structure;
  - Removing suppressed trees;
  - Removing trees that might damage nesting structure during wind storms;
  - Removing trees that compete with key adjacent trees that are, or will be, providing cover to potential nest platforms.
- Implement management actions that aid development of limbs and adjacent cover.
- Prohibit the creation of any opening (i.e., a gap ≥ 0.25 acre in size) within a distance equal to one site-potential tree height of nesting structure.

Wildlife – Northern Spotted Owl

- Manage habitat conditions for northern spotted owl movement and survival between and through large blocks of northern spotted owl nesting-roosting habitat.
- Do not authorize timber sales that would cause the incidental take of northern spotted owl territorial pairs or resident singles from timber harvest until implementation of a barred owl management program consistent with the assumptions contained in the Biological Opinion on the RMP has begun.

Wildlife – North Oregon Coast Distinct Population Segment of the Red Tree Vole

- Survey proposed projects within the range of the North Oregon Coast Distinct Population Segment of the red tree vole north of Highway 20 that could degrade or remove habitat using a protocol with a defined methodology that includes detection probabilities. Habitat that requires surveys prior to modification includes stands containing Douglas-fir, grand fir, Sitka spruce, or western hemlock and meet the following:
  - Stands with a QMD ≥ 16” based on the Survey Protocol for the Red Tree Vole, Version 3.0 (Huff *et al.* 2012, p. 9); and are

- **Either** (a) conifer-dominated stands that are ≥ 80 years old **<u>or</u>** (b) conifer-dominated stands that have ≥ 60 percent canopy cover and have ≥ 2 superdominant conifer trees[22] per acre.

- The following types of projects are exempt from the above direction to survey for red tree voles prior to project implementation:
  - Projects in stands < 80 years old.
  - Culvert replacements on roads that are in use and part of the road system; culvert removals if the road is temporary or to be decommissioned.
  - Riparian and stream improvement projects where the work is riparian planting, obtaining material for placing in-stream, and road or trail decommissioning; and where the stream improvement work is the placement of large wood, channel and flood plain reconstruction, or removal of channel diversions.
  - Portions of hazardous fuels treatments where prescribed fire is applied. Any portion of a hazardous fuels treatment project involving commercial logging will remain subject to survey requirements except for projects in stands < 80 years old.
- If surveys north of Highway 20 indicate that habitat is occupied by red tree voles from the North Oregon Coast Distinct Population Segment, establish a 'habitat area' for each cluster of nests that are not isolated from one another by more than 330 feet and includes at least one active nest.
  - Establish habitat areas at least 10 acres in size and include 1.0 acre per nest if there are more than 10 red tree vole nests (e.g., establish a 15-acre habitat area for a cluster with 15 red tree vole nests).
  - Within habitat areas, do not remove or modify nest trees.
  - Within habitat areas, do not create barriers or strong filters to red tree vole movement through the canopy by—
    - Maintaining at least 75 percent canopy cover within habitat areas;
    - Retaining all nest trees (including active and inactive nest trees); and
    - Retaining trees with crowns directly interlocking the crowns of nest trees.

    Allow routine maintenance of existing infrastructure and facilities in habitat areas (including the felling of hazard trees) that does not meet the above criteria.
- South of Highway 20 within the North Oregon Coast Distinct Population Segment, establish and manage habitat areas as described above for known sites of red tree voles in the Late-Successional Reserve and Riparian Reserve.

<u>Wildlife – Oregon Spotted Frog</u>

- Manage livestock grazing at sites occupied by Oregon spotted frogs to prevent direct impacts to eggs, tadpoles, or adults.

<u>Wildlife – Siskiyou Mountains Salamander</u>

- Manage the Siskiyou Mountains salamander consistent with the Conservation Agreement for the Siskiyou Mountains Salamander (*Plethodon stormi*) in Jackson and Josephine Counties of Southwest Oregon; and in Siskiyou County of Northern California (Aug. 17, 2007), as amended and as long as in effect.

<u>Wildlife – Vernal Pool Fairy Shrimp</u>

- Do not authorize or construct additional discretionary roads and trails within designated critical habitat for the vernal pool fairy shrimp or within vernal pool fairy shrimp habitat.

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[22] **Superdominant conifer trees** typically have crowns that extend above the general stand canopy and have large branches in the upper canopy of the dominant trees in the stand. Superdominant trees may be remnant trees from an earlier cohort, or they may be trees from the dominant cohort that were more open grown and have become much larger than the rest of the trees in the stand.

Wildlife – Pacific Coast Distinct Population Segment of the Western Snowy Plover

- Do not authorize or construct additional discretionary roads and trails within designated critical habitat or within western snowy plover habitat.
- Restore snowy plover nesting habitat.
- Restrict the timing and location of beach access or activities to avoid **disruption** of normal snowy plover nesting and nesting behaviors.

Wild Horses

Management Objective

- Manage and maintain a healthy population of wild and free-roaming horses in the Pokegama Herd Management Area of the Klamath Falls Field Office.

Management Direction

- Gather horses to maintain the appropriate management level of 30–50 head. During gathers, the number of horses will normally be reduced to the low end of the appropriate management level, and then allowed to increase to the top end of the appropriate management level before another gather occurs. Horses will be removed from private land per private landowner request. Horses straying outside the herd management area will be removed or returned to the herd management area.
- Maintain existing water developments to provide season-long water for wild horses within the herd management area. Consider new developments to assist in meeting the herd management objectives.
- Provide periodic repair and maintenance of fences to protect riparian areas from concentrated use by wild horses.
- Protect Bureau Sensitive plant habitat from concentrated use by wild horses, including constructing and maintaining fences as necessary.
- Adjust the appropriate management level if monitoring data identifies a change in long-term forage availability or rangeland health assessments and evaluations determine that wild horse numbers or patterns of grazing use are a contributing factor toward not meeting one or more of the Standards for Rangeland Health and Guidelines for Grazing Management for Public Lands in Oregon and Washington.
- Introduce wild horses from other herd areas periodically to maintain the viable genetic diversity of the herd.

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Subunit TOTAL

Total subunit = 1,334,910 acres
BLM-administered lands within subunit = 480,369 acres (36% of subunits)

- BLM Harvest Land Base = 39,718 acres (3% of subunits)
- BLM Reserves = 440,652 acres (33% of subunits)

Habitat-capable BLM-administered lands within subunit = 459,666 acres (34% of subunits)
Other landowners within subunit = 854,541 acres (64% of subunits)

Table B-1. Land Use Allocations and current marbled murrelet habitat conditions within **Subunit TOTAL**.

Habitat Type	Zone 1 *(acres)*			Zone 2 *(acres)*			Total *(acres)*		
	HLB	Reserve	Subtotal	HLB	Reserve	Subtotal	HLB	Reserve	Subtotal
High-Quality Nesting[1]	811	123,908	124,719	409	29,203	29,612	1,220	153,111	154,331
Nesting[2]	11,804	218,960	230,764	2,693	39,718	42,410	14,496	258,678	273,174
Recruitment[3]	17,210	143,707	160,917	8,005	17,571	25,576	25,215	161,278	186,493
Non-Forest	7	17,595	17,602	-	3,101	3,101	7	20,696	20,703
Total[4]	29,020	380,262	409,283	10,698	60,389	71,087	39,718	440,652	480,369

Table B-2. Proposed RMP Harvest Scenario in **Subunit TOTAL**.

(acres treated by end of decade)	2013	2023	2033	2043	2053	2063
HLB						
High-Quality Nesting Habitat [1]		702	93	22	24	1
Nesting Habitat [2]		4,223	2,189	3,000	3,728	4,962
Reserve						
High-Quality Nesting Habitat [1]		683	394	1	102	68
Nesting Habitat [2]		3,918	4,275	1,687	3,991	5,581
Total						
High-Quality Nesting Habitat [2]		1,385	487	24	126	69
Nesting Habitat [3]		8,141	6,464	4,687	7,719	10,543

Table B-3. Marbled murrelet habitat development in **Subunit TOTAL**.

(acres)	2013	2023	2033	2043	2053	2063
BLM-administered lands						
High-Quality Nesting Habitat [1]	54,331	53,963	72,803	80,202	89,464	196,106
Nesting Habitat [2]	273,174	280,409	312,068	354,548	403,145	422,306
Other land owners						
High-Quality Nesting Habitat [1]	182,674	182,674	182,674	182,674	316,271	316,271
Total[5]						
High-Quality Nesting Habitat [1]	337,005	336,637	355,476	362,875	505,734	512,377

Footnotes:

[1] High-Quality Nesting Habitat = structural stages 5.1, 5.2 or 5.3.

[2] Nesting Habitat = structural stages 3.1, 3.3, 4.1, 4.2, 5.1, 5.2 or 5.3.

[3] Recruitment Habitat = structural stages 1.1, 1.2, 2.1, 2.2, 3.2, or 3.4.

[4] Total in Table B-1 = sum of nesting habitat, recruitment habitat, and non-forest.

[5] Total in Table B-3 = sum of High-Quality Nesting Habitat only across all land owners; as discussed in the DEIS using the GNN structural condition categories was not effective for estimating lower-quality nesting habitat.

Subunit OR-01-b

Total subunit = 32,477 acres
BLM-administered lands within subunit = 1 acre (0% of subunit)

- BLM Harvest Land Base = < 1 acre (0% of subunit)
- BLM Reserves = < 1 acre (0% of subunit)

Habitat-capable BLM-administered lands within subunit = < 1 acres (0% of subunit)
Other landowners within subunit = 32,476 acres (100% of subunit)

Table B-4. Land Use Allocations and current marbled murrelet habitat conditions within **Subunit OR-01-b**.

Habitat Type	Zone 1 *(acres)*			Zone 2 *(acres)*			Total *(acres)*		
	HLB	Reserve	Subtotal	HLB	Reserve	Subtotal	HLB	Reserve	Subtotal
High-Quality Nesting[1]	-	-	-	-	-	-	-	-	-
Nesting[2]	0	0	1	-	-	-	0	0	1
Recruitment[3]	-	-	-	-	-	-	-	-	-
Non-Forest	-	-	-	-	-	-	-	-	-
Total[4]	0	0	1	-	-	-	0	0	1

Table B-5. Proposed RMP Harvest Scenario in **Subunit OR-01-b**.

(acres treated by end of decade)	2013	2023	2033	2043	2053	2063
HLB						
High-Quality Nesting Habitat [1]		-	-	-	-	-
Nesting Habitat [2]		-	-	-	-	-
Reserve						
High-Quality Nesting Habitat [1]		-	-	-	-	-
Nesting Habitat [2]		-	-	-	-	-
Total						
High-Quality Nesting Habitat [2]		-	-	-	-	-
Nesting Habitat [3]		-	-	-	-	-

Table B-6. Marbled murrelet habitat development in **Subunit OR-01-b**.

(acres)	2013	2023	2033	2043	2053	2063
BLM-administered lands						
High-Quality Nesting Habitat [1]	-	-	-	1	1	1
Nesting Habitat [2]	1	1	1	1	1	1
Other land owners						
High-Quality Nesting Habitat [1]	1,011	1,011	1,011	1,011	1,011	1,011
Total[5]						
High-Quality Nesting Habitat [1]	1,011	1,011	1,011	1,011	1,011	1,011

Footnotes:
[1] High-Quality Nesting Habitat = structural stages 5.1, 5.2 or 5.3.
[2] Nesting Habitat = structural stages 3.1, 3.3, 4.1, 4.2, 5.1, 5.2 or 5.3.
[3] Recruitment Habitat = structural stages 1.1, 1.2, 2.1, 2.2, 3.2, or 3.4.
[4] Total in Table B-4 = sum of nesting habitat, recruitment habitat, and non-forest.
[5] Total in Table B-6 = sum of High-Quality Nesting Habitat only across all land owners; as discussed in the DEIS using the GNN structural condition categories was not effective for estimating lower-quality nesting habitat.

Subunit OR-01-c

Total subunit = 33,535 acres
BLM-administered lands within subunit = 7,725 acres (23% of subunit)

- BLM Harvest Land Base = 2,030 acres (6% of subunit)
- BLM Reserves = 5,695 acres (17% of subunit)

Habitat-capable BLM-administered lands within subunit = 7,207 acres (21% of subunits)
Other landowners within subunit = 25,810 acres (77% of subunits)

Table B-7. Land Use Allocations and current marbled murrelet habitat conditions within **Subunit OR-01-c**.

Habitat Type	Zone 1 *(acres)*			Zone 2 *(acres)*			Total *(acres)*		
	HLB	Reserve	Subtotal	HLB	Reserve	Subtotal	HLB	Reserve	Subtotal
High-Quality Nesting[1]	102	1,024	1,126	-	-	-	102	1,024	1,126
Nesting[2]	1,191	4,090	5,281	-	-	-	1,191	4,090	5,281
Recruitment[3]	833	1,093	1,926	-	-	-	833	1,093	1,926
Non-Forest	7	512	519	-	-	-	7	512	519
Total[4]	2,030	5,695	7,725	-	-	-	2,030	5,695	7,725

Table B-8. Proposed RMP Harvest Scenario in **Subunit OR-01-c**.

(acres treated by end of decade)	2013	2023	2033	2043	2053	2063
HLB						
High-Quality Nesting Habitat [1]		3	-	-	4	-
Nesting Habitat [2]		31	-	-	24	156
Reserve						
High-Quality Nesting Habitat [1]		-	-	-	-	-
Nesting Habitat [2]		-	21	-	-	56
Total						
High-Quality Nesting Habitat [2]		3	-	-	4	-
Nesting Habitat [3]		31	21	-	24	212

Table B-9. Marbled murrelet habitat development in **Subunit OR-01-c**.

(acres)	2013	2023	2033	2043	2053	2063
BLM-administered lands						
High-Quality Nesting Habitat [1]	1,126	1,205	2,104	2,451	2,658	2,842
Nesting Habitat [2]	5,281	5,257	5,165	5,818	6,651	7,013
Other land owners						
High-Quality Nesting Habitat [1]	1,672	1,672	1,672	1,672	1,674	1,674
Total[5]						
High-Quality Nesting Habitat [1]	2,798	2,877	3,776	4,123	4,332	4,516

Footnotes:
[1] High-Quality Nesting Habitat = structural stages 5.1, 5.2 or 5.3.
[2] Nesting Habitat = structural stages 3.1, 3.3, 4.1, 4.2, 5.1, 5.2 or 5.3.
[3] Recruitment Habitat = structural stages 1.1, 1.2, 2.1, 2.2, 3.2, or 3.4.
[4] Total in Table B-7 = sum of nesting habitat, recruitment habitat, and non-forest.
[5] Total in Table B-9 = sum of High-Quality Nesting Habitat only across all land owners; as discussed in the DEIS using the GNN structural condition categories was not effective for estimating lower-quality nesting habitat.

Subunit OR-02-b

Total subunit = 32,496 acres
BLM-administered lands within subunit = 4 acres (0% of subunits)

- BLM Harvest Land Base = 1 acres (0% of subunit)
- BLM Reserves = 3 acres (0% of subunits)

Habitat-capable BLM-administered lands within subunit = 4 acres (0% of subunit)
Other landowners within subunit = 32,492 acres (100% of subunit)

Table B-10. Land Use Allocations and current marbled murrelet habitat conditions within **Subunit OR-02-b**.

Habitat Type	Zone 1 *(acres)*			Zone 2 *(acres)*			Total *(acres)*		
	HLB	Reserve	Subtotal	HLB	Reserve	Subtotal	HLB	Reserve	Subtotal
High-Quality Nesting[1]	-	0	0	-	-	-	-	0	0
Nesting[2]	-	0	0	-	-	-	-	0	0
Recruitment[3]	1	3	4	-	-	-	1	3	4
Non-Forest	-	0	0	-	-	-	-	0	0
Total[4]	1	3	4	-	-	-	1	3	4

Table B-11. Proposed RMP Harvest Scenario in **Subunit OR-02-b**.

(acres treated by end of decade)	2013	2023	2033	2043	2053	2063
HLB						
High-Quality Nesting Habitat [1]		-	-	-	-	-
Nesting Habitat [2]		0	-	-	-	1
Reserve						
High-Quality Nesting Habitat [1]		-	-	-	-	-
Nesting Habitat [2]		-	-	-	-	0
Total						
High-Quality Nesting Habitat [2]		-	-	-	-	-
Nesting Habitat [3]		0	-	-	-	1

Table B-12. Marbled murrelet habitat development in **Subunit OR-02-b**.

(acres)	2013	2023	2033	2043	2053	2063
BLM-administered lands						
High-Quality Nesting Habitat [1]	0	0	0	0	0	0
Nesting Habitat [2]	0	0	0	4	4	3
Other land owners						
High-Quality Nesting Habitat [1]	6,922	6,922	6,922	6,922	8,118	8,118
Total[5]						
High-Quality Nesting Habitat [1]	6,922	6,922	6,922	6,922	8,118	8,118

Footnotes:
[1] High-Quality Nesting Habitat = structural stages 5.1, 5.2 or 5.3.
[2] Nesting Habitat = structural stages 3.1, 3.3, 4.1, 4.2, 5.1, 5.2 or 5.3.
[3] Recruitment Habitat = structural stages 1.1, 1.2, 2.1, 2.2, 3.2, or 3.4.
[4] Total in Table B-10 = sum of nesting habitat, recruitment habitat, and non-forest.
[5] Total in Table B-12 = sum of High-Quality Nesting Habitat only across all land owners; as discussed in the DEIS using the GNN structural condition categories was not effective for estimating lower-quality nesting habitat.

Subunit OR-02-c

Total subunit = 31,484 acres
BLM-administered lands within subunit = 3,605 acres (11% of subunit)

- BLM Harvest Land Base = 306 acres (1% of subunits)
- BLM Reserves = 3,300 acres (10% of subunits)

Habitat-capable BLM-administered lands within subunit = 3,490 acres (11% of subunit)
Other landowners within subunit = 27,879 acres (89% of subunit)

Table B-13. Land Use Allocations and current marbled murrelet habitat conditions within **Subunit OR-02-c**.

Habitat Type	Zone 1 *(acres)*			Zone 2 *(acres)*			Total *(acres)*		
	HLB	Reserve	Subtotal	HLB	Reserve	Subtotal	HLB	Reserve	Subtotal
High-Quality Nesting[1]	1	458	459	-	-	-	1	458	459
Nesting[2]	45	1,978	2,023	-	-	-	45	1,978	2,023
Recruitment[3]	260	1,206	1,467	-	-	-	260	1,206	1,467
Non-Forest	-	115	115	-	-	-	-	115	115
Total[4]	306	3,300	3,605	-	-	-	306	3,300	3,605

Table B-14. Proposed RMP Harvest Scenario in **Subunit OR-02-c**.

(acres treated by end of decade)	2013	2023	2033	2043	2053	2063
HLB						
High-Quality Nesting Habitat [1]		1	-	-	-	-
Nesting Habitat [2]		1	-	-	56	114
Reserve						
High-Quality Nesting Habitat [1]		-	-	-	-	-
Nesting Habitat [2]		36	51	-	17	111
Total						
High-Quality Nesting Habitat [2]		1	-	-	-	-
Nesting Habitat [3]		36	51	-	73	225

Table B-15. Marbled murrelet habitat development in **Subunit OR-02-c**.

(acres)	2013	2023	2033	2043	2053	2063
BLM-administered lands						
High-Quality Nesting Habitat [1]	459	655	880	1,048	1,261	1,246
Nesting Habitat [2]	2,023	1,936	2,000	2,448	3,030	3,194
Other land owners						
High-Quality Nesting Habitat [1]	5,353	5,353	5,353	5,353	10,610	10,610
Total[5]						
High-Quality Nesting Habitat [1]	5,812	6,008	6,233	6,401	11,871	11,856

Footnotes:
[1] High-Quality Nesting Habitat = structural stages 5.1, 5.2 or 5.3.
[2] Nesting Habitat = structural stages 3.1, 3.3, 4.1, 4.2, 5.1, 5.2 or 5.3.
[3] Recruitment Habitat = structural stages 1.1, 1.2, 2.1, 2.2, 3.2, or 3.4.
[4] Total in Table B-13 = sum of nesting habitat, recruitment habitat, and non-forest.
[5] Total in Table B-15 = sum of High-Quality Nesting Habitat only across all land owners; as discussed in the DEIS using the GNN structural condition categories was not effective for estimating lower-quality nesting habitat.

Subunit OR-02-d

Total subunit = 27,220 acres
BLM-administered lands within subunit = 26,557 acres (98% of subunit)

- BLM Harvest Land Base = 9,370 acres (34% of subunit)
- BLM Reserves = 17,188 acres (63% of subunit)

Habitat-capable BLM-administered lands within subunit = 25,342 acres (93% of subunit)
Other landowners within subunit = 443 acres (2% of subunit)

Table B-16. Land Use Allocations and current marbled murrelet habitat conditions within **Subunit OR-02-d**.

Habitat Type	Zone 1 *(acres)*			Zone 2 *(acres)*			Total *(acres)*		
	HLB	Reserve	Subtotal	HLB	Reserve	Subtotal	HLB	Reserve	Subtotal
High-Quality Nesting[1]	69	2,900	2,969	-	-	-	69	2,900	2,969
Nesting[2]	4,645	8,463	13,108	-	-	-	4,645	8,463	13,108
Recruitment[3]	5,303	6,931	12,234	-	-	-	5,303	6,931	12,234
Non-Forest	-	1,216	1,216	-	-	-	-	1,216	1,216
Total[4]	**9,948**	**16,610**	**26,557**	**-**	**-**	**-**	**9,948**	**16,610**	**26,557**

Table B-17. Proposed RMP Harvest Scenario in **Subunit OR-02-d**.

(acres treated by end of decade)	2013	2023	2033	2043	2053	2063
HLB						
High-Quality Nesting Habitat [1]		0	-	-	-	-
Nesting Habitat [2]		303	595	603	1,013	532
Reserve						
High-Quality Nesting Habitat [1]		-	-	-	-	-
Nesting Habitat [2]		54	32	21	107	32
Total						
High-Quality Nesting Habitat [1]		0	-	-	-	-
Nesting Habitat [2]		357	626	624	1,120	563

Table B-18. Marbled murrelet habitat development in **Subunit OR-02-d**.

(acres)	2013	2023	2033	2043	2053	2063
BLM-administered lands						
High-Quality Nesting Habitat [1]	2,969	2,968	3,236	3,274	3,704	4,176
Nesting Habitat [2]	13,108	13,623	16,622	18,886	20,101	21,049
Other land owners						
High-Quality Nesting Habitat [1]	12	12	12	12	12	12
Total[5]						
High-Quality Nesting Habitat [1]	2,980	2,980	3,247	3,285	3,716	4,188

Footnotes:
[1] High-Quality Nesting Habitat = structural stages 5.1, 5.2 or 5.3.
[2] Nesting Habitat = structural stages 3.1, 3.3, 4.1, 4.2, 5.1, 5.2 or 5.3.
[3] Recruitment Habitat = structural stages 1.1, 1.2, 2.1, 2.2, 3.2, or 3.4.
[4] Total in Table B-16 = sum of nesting habitat, recruitment habitat, and non-forest.
[5] Total in Table B-18 = sum of High-Quality Nesting Habitat only across all land owners; as discussed in the DEIS using the GNN structural condition categories was not effective for estimating lower-quality nesting habitat.

Subunit OR-02-e

Total subunit = 89,747 acres
BLM-administered lands within subunit = 41,185 acres (46% of subunit)

- BLM Harvest Land Base = 772 acres (1% of subunit)
- BLM Reserves = 40,413 acres (45% of subunit)

Habitat-capable BLM-administered lands within subunit = 38,585 acres (43% of subunit)
Other landowners within subunit = 48,562 acres (54% of subunit)

Table B-19. Land Use Allocations and current marbled murrelet habitat conditions within **Subunit OR-02-e**.

Habitat Type	Zone 1 *(acres)*			Zone 2 *(acres)*			Total *(acres)*		
	HLB	Reserve	Subtotal	HLB	Reserve	Subtotal	HLB	Reserve	Subtotal
High-Quality Nesting[1]	80	8,203	8,284	-	-	-	80	8,203	8,284
Nesting[2]	520	20,199	20,719	-	-	-	520	20,199	20,719
Recruitment[3]	252	17,613	17,866	-	-	-	252	17,613	17,866
Non-Forest	-	2,600	2,600	-	-	-	-	2,600	2,600
Total[4]	772	40,413	41,185	-	-	-	772	40,413	41,185

Table B-20. Proposed RMP Harvest Scenario in **Subunit OR-02-e**.

(acres treated by end of decade)	2013	2023	2033	2043	2053	2063
HLB						
High-Quality Nesting Habitat [1]		54	-	1	0	-
Nesting Habitat [2]		275	135	25	38	2
Reserve						
High-Quality Nesting Habitat [1]		-	0	1	-	-
Nesting Habitat [2]		3	397	122	432	805
Total						
High-Quality Nesting Habitat [2]		54	0	2	0	-
Nesting Habitat [3]		278	531	146	469	806

Table B-21. Marbled murrelet habitat development in **Subunit OR-02-e**.

(acres)	2013	2023	2033	2043	2053	2063
BLM-administered lands						
High-Quality Nesting Habitat [1]	8,284	8,316	11,069	12,117	13,931	14,371
Nesting Habitat [2]	20,719	21,523	23,355	27,366	33,964	37,039
Other land owners						
High-Quality Nesting Habitat [1]	8,325	8,325	8,325	8,325	8,511	8,511
Total[5]						
High-Quality Nesting Habitat [1]	16,609	16,641	19,395	20,442	22,442	22,882

Footnotes:
[1] High-Quality Nesting Habitat = structural stages 5.1, 5.2 or 5.3.
[2] Nesting Habitat = structural stages 3.1, 3.3, 4.1, 4.2, 5.1, 5.2 or 5.3.
[3] Recruitment Habitat = structural stages 1.1, 1.2, 2.1, 2.2, 3.2, or 3.4.
[4] Total in Table B-19 = sum of nesting habitat, recruitment habitat, and non-forest.
[5] Total in Table B-21 = sum of High-Quality Nesting Habitat only across all land owners; as discussed in the DEIS using the GNN structural condition categories was not effective for estimating lower-quality nesting habitat.

Subunit OR-03-a

Total subunit = 1,469 acres
BLM-administered lands within subunit = 38 acres (3% of subunit)

- BLM Harvest Land Base = 0 acres (0% of subunit)
- BLM Reserves = 38 acres (3% of subunit)

Habitat-capable BLM-administered lands within subunit = 37 acres (3% of subunit)
Other landowners within subunit = 1,431acres (97% of subunit)

Table B-22. Land Use Allocations and current marbled murrelet habitat conditions within **Subunit OR-03-a**.

Habitat Type	Zone 1 *(acres)*			Zone 2 *(acres)*			Total *(acres)*		
	HLB	Reserve	Subtotal	HLB	Reserve	Subtotal	HLB	Reserve	Subtotal
High-Quality Nesting[1]	-	22	22	-	-	-	-	22	22
Nesting[2]	0	37	37	-	-	-	0	37	37
Recruitment[3]	-	-	-	-	-	-	-	-	-
Non-Forest	-	1	1	-	-	-	-	1	1
Total[4]	0	38	38	-	-	-	0	38	38

Table B-23. Proposed RMP Harvest Scenario in **Subunit OR-03-a**.

(acres treated by end of decade)	2013	2023	2033	2043	2053	2063
HLB						
High-Quality Nesting Habitat [1]		0	-	-	-	-
Nesting Habitat [2]		0	-	-	-	-
Reserve						
High-Quality Nesting Habitat [1]		-	-	-	-	-
Nesting Habitat [2]		-	-	-	-	-
Total						
High-Quality Nesting Habitat [2]		0	-	-	-	-
Nesting Habitat [3]		0	-	-	-	-

Table B-24. Marbled murrelet habitat development in **Subunit OR-03-a**.

(acres)	2013	2023	2033	2043	2053	2063
BLM-administered lands						
High-Quality Nesting Habitat [1]	22	22	22	22	22	22
Nesting Habitat [2]	37	37	37	37	37	37
Other land owners						
High-Quality Nesting Habitat [1]	117	117	117	117	117	117
Total[5]						
High-Quality Nesting Habitat [1]	139	139	139	139	139	139

Footnotes:
[1] High-Quality Nesting Habitat = structural stages 5.1, 5.2 or 5.3.
[2] Nesting Habitat = structural stages 3.1, 3.3, 4.1, 4.2, 5.1, 5.2 or 5.3.
[3] Recruitment Habitat = structural stages 1.1, 1.2, 2.1, 2.2, 3.2, or 3.4.
[4] Total in Table B-22 = sum of nesting habitat, recruitment habitat, and non-forest.
[5] Total in Table B-24 = sum of High-Quality Nesting Habitat only across all land owners; as discussed in the DEIS using the GNN structural condition categories was not effective for estimating lower-quality nesting habitat.

Subunit OR-03-c

Total subunit = 20,569 acres
BLM-administered lands within subunit = 8,747 acres (43% of subunit)

- BLM Harvest Land Base = 2,648 acres (13% of subunit)
- BLM Reserves = 6,099 acres (30% of subunit)

Habitat-capable BLM-administered lands within subunit = 8,404 acres (41% of subunit)
Other landowners within subunit = 11,822 acres (57% of subunit)

Table B-25. Land Use Allocations and current marbled murrelet habitat conditions within **Subunit OR-03-c**.

Habitat Type	Zone 1 *(acres)*			Zone 2 *(acres)*			Total *(acres)*		
	HLB	Reserve	Subtotal	HLB	Reserve	Subtotal	HLB	Reserve	Subtotal
High-Quality Nesting[1]	27	2,194	2,221	-	75	75	27	2,269	2,296
Nesting[2]	734	3,767	4,501	-	75	75	734	3,842	4,576
Recruitment[3]	1,898	1,898	3,796	16	17	32	1,913	1,914	3,828
Non-Forest	-	339	339	-	4	4	-	343	343
Total[4]	2,632	6,003	8,636	16	96	111	2,648	6,099	8,747

Table B-26. Proposed RMP Harvest Scenario in **Subunit OR-03-c**.

(acres treated by end of decade)	2013	2023	2033	2043	2053	2063
HLB						
High-Quality Nesting Habitat [1]		0	-	-	-	-
Nesting Habitat [2]		156	162	112	255	482
Reserve						
High-Quality Nesting Habitat [1]		-	-	-	-	-
Nesting Habitat [2]		41	-	9	16	12
Total						
High-Quality Nesting Habitat [2]		0	-	-	-	-
Nesting Habitat [3]		197	162	121	271	494

Table B-27. Marbled murrelet habitat development in **Subunit OR-03-c**.

(acres)	2013	2023	2033	2043	2053	2063
BLM-administered lands						
High-Quality Nesting Habitat [1]	2,296	2,296	2,718	2,718	2,806	2,771
Nesting Habitat [2]	4,576	4,422	5,114	5,739	6,934	7,228
Other land owners						
High-Quality Nesting Habitat [1]	1,751	1,751	1,751	1,751	1,751	1,751
Total[5]						
High-Quality Nesting Habitat [1]	4,047	4,047	4,470	4,470	4,557	4,523

Footnotes:
[1] High-Quality Nesting Habitat = structural stages 5.1, 5.2 or 5.3.
[2] Nesting Habitat = structural stages 3.1, 3.3, 4.1, 4.2, 5.1, 5.2 or 5.3.
[3] Recruitment Habitat = structural stages 1.1, 1.2, 2.1, 2.2, 3.2, or 3.4.
[4] Total in Table B-25 = sum of nesting habitat, recruitment habitat, and non-forest.
[5] Total in Table B-27 = sum of High-Quality Nesting Habitat only across all land owners; as discussed in the DEIS using the GNN structural condition categories was not effective for estimating lower-quality nesting habitat.

Subunit OR-04-a

Total subunit = 92,227 acres
BLM-administered lands within subunit = 1,303 acres (1% of subunit)

- BLM Harvest Land Base = 40 acres (0% of subunit)
- BLM Reserves = 1,263 acres (1% of subunit)

Habitat-capable BLM-administered lands within subunit = 1,265 acres (1% of subunit)
Other landowners within subunit = 90,924 acres (99% of subunit)

Table B-28. Land Use Allocations and current marbled murrelet habitat conditions within **Subunit OR-04-a**.

Habitat Type	Zone 1 *(acres)*			Zone 2 *(acres)*			Total *(acres)*		
	HLB	Reserve	Subtotal	HLB	Reserve	Subtotal	HLB	Reserve	Subtotal
High-Quality Nesting[1]	0	501	501	-	-	-	0	501	501
Nesting[2]	0	769	769	-	-	-	0	769	769
Recruitment[3]	39	457	496	-	-	-	39	457	496
Non-Forest	-	38	38	-	-	-	-	38	38
Total[4]	40	1,263	1,303	-	-	-	40	1,263	1,303

Table B-29. Proposed RMP Harvest Scenario in **Subunit OR-04-a**.

(acres treated by end of decade)	2013	2023	2033	2043	2053	2063
HLB						
High-Quality Nesting Habitat [1]		0	-	-	-	-
Nesting Habitat [2]		0	-	-	12	24
Reserve						
High-Quality Nesting Habitat [1]		-	-	-	-	-
Nesting Habitat [2]		-	-	0	7	22
Total						
High-Quality Nesting Habitat [2]		0	-	-	-	-
Nesting Habitat [3]		0	-	0	19	46

Table B-30. Marbled murrelet habitat development in **Subunit OR-04-a**.

(acres)	2013	2023	2033	2043	2053	2063
BLM-administered lands						
High-Quality Nesting Habitat [1]	501	503	552	559	576	599
Nesting Habitat [2]	769	769	808	943	1,193	1,214
Other land owners						
High-Quality Nesting Habitat [1]	33,667	33,667	33,667	33,667	48,055	48,055
Total[5]						
High-Quality Nesting Habitat [1]	34,169	34,171	34,219	34,227	48,631	48,654

Footnotes:
[1] High-Quality Nesting Habitat = structural stages 5.1, 5.2 or 5.3.
[2] Nesting Habitat = structural stages 3.1, 3.3, 4.1, 4.2, 5.1, 5.2 or 5.3.
[3] Recruitment Habitat = structural stages 1.1, 1.2, 2.1, 2.2, 3.2, or 3.4.
[4] Total in Table B-28 = sum of nesting habitat, recruitment habitat, and non-forest.
[5] Total in Table B-30 = sum of High-Quality Nesting Habitat only across all land owners; as discussed in the DEIS using the GNN structural condition categories was not effective for estimating lower-quality nesting habitat.

Subunit OR-04-b

Total subunit = 149,771 acres
BLM-administered lands within subunit = 1,118 acres (1% of subunit)

- BLM Harvest Land Base = 5 acres (0% of subunit)
- BLM Reserves = 1,113 acres (1% of subunit)

Habitat-capable BLM-administered lands within subunit = 1,117 acres (1% of subunit)
Other landowners within subunit = 148,653 acres (99% of subunit)

Table B-31. Land Use Allocations and current marbled murrelet habitat conditions within **Subunit OR-04-b**.

Habitat Type	Zone 1 *(acres)*			Zone 2 *(acres)*			Total *(acres)*		
	HLB	Reserve	Subtotal	HLB	Reserve	Subtotal	HLB	Reserve	Subtotal
High-Quality Nesting[1]	-	872	872	-	-	-	-	872	872
Nesting[2]	5	1,005	1,009	-	-	-	5	1,005	1,009
Recruitment[3]	-	108	108	-	-	-	-	108	108
Non-Forest	-	0	0	-	-	-	-	0	0
Total[4]	5	1,113	1,118	-	-	-	5	1,113	1,118

Table B-32. Proposed RMP Harvest Scenario in **Subunit OR-04-b**.

(acres treated by end of decade)	2013	2023	2033	2043	2053	2063
HLB						
High-Quality Nesting Habitat [1]		-	-	-	-	-
Nesting Habitat [2]		-	-	-	-	-
Reserve						
High-Quality Nesting Habitat [1]		-	-	-	-	-
Nesting Habitat [2]		-	-	-	-	-
Total						
High-Quality Nesting Habitat [2]		-	-	-	-	-
Nesting Habitat [3]		-	-	-	-	-

Table B-33. Marbled murrelet habitat development in **Subunit OR-04-b**.

(acres)	2013	2023	2033	2043	2053	2063
BLM-administered lands						
High-Quality Nesting Habitat [1]	872	872	872	887	904	932
Nesting Habitat [2]	1,009	1,009	1,037	1,057	1,063	1,063
Other land owners						
High-Quality Nesting Habitat [1]	51,953	51,953	51,953	51,953	79,542	79,542
Total[5]						
High-Quality Nesting Habitat [1]	52,825	52,825	52,826	52,840	80,446	80,474

Footnotes:
[1] High-Quality Nesting Habitat = structural stages 5.1, 5.2 or 5.3.
[2] Nesting Habitat = structural stages 3.1, 3.3, 4.1, 4.2, 5.1, 5.2 or 5.3.
[3] Recruitment Habitat = structural stages 1.1, 1.2, 2.1, 2.2, 3.2, or 3.4.
[4] Total in Table B-31 = sum of nesting habitat, recruitment habitat, and non-forest.
[5] Total in Table B-33 = sum of High-Quality Nesting Habitat only across all land owners; as discussed in the DEIS using the GNN structural condition categories was not effective for estimating lower-quality nesting habitat.

Subunit OR-04-c

Total subunit = 82,252 acres
BLM-administered lands within subunit = 14,478 acres (18% of subunit)

- BLM Harvest Land Base = 0 acres (0% of subunit)
- BLM Reserves = 14,477 acres (18% of subunit)

Habitat-capable BLM-administered lands within subunit = 13,914 acres (17% of subunit)
Other landowners within subunit = 67,774 acres (82% of subunit)

Table B-34. Land Use Allocations and current marbled murrelet habitat conditions within **Subunit OR-04-c**.

Habitat Type	Zone 1 *(acres)*			Zone 2 *(acres)*			Total *(acres)*		
	HLB	Reserve	Subtotal	HLB	Reserve	Subtotal	HLB	Reserve	Subtotal
High-Quality Nesting[1]	-	6,925	6,925	-	-	-	-	6,925	6,925
Nesting[2]	-	8,291	8,291	-	-	-	-	8,291	8,291
Recruitment[3]	0	5,623	5,623	-	-	-	0	5,623	5,623
Non-Forest	-	563	563	-	-	-	-	563	563
Total[4]	0	14,477	14,478	-	-	-	0	14,477	14,478

Table B-35. Proposed RMP Harvest Scenario in **Subunit OR-04-c**.

(acres treated by end of decade)	2013	2023	2033	2043	2053	2063
HLB						
High-Quality Nesting Habitat [1]		-	-	-	-	-
Nesting Habitat [2]		-	-	-	-	-
Reserve						
High-Quality Nesting Habitat [1]		-	-	-	-	-
Nesting Habitat [2]		142	93	-	158	224
Total						
High-Quality Nesting Habitat [2]		-	-	-	-	-
Nesting Habitat [3]		142	93	-	158	224

Table B-36. Marbled murrelet habitat development in **Subunit OR-04-c**.

(acres)	2013	2023	2033	2043	2053	2063
BLM-administered lands						
High-Quality Nesting Habitat [1]	6,925	6,884	7,392	7,434	7,403	7,503
Nesting Habitat [2]	8,291	8,449	9,834	11,045	12,500	13,432
Other land owners						
High-Quality Nesting Habitat [1]	21,353	21,353	21,353	21,353	40,262	40,262
Total[5]						
High-Quality Nesting Habitat [1]	28,277	28,236	28,744	28,787	47,666	47,765

Footnotes:
[1] High-Quality Nesting Habitat = structural stages 5.1, 5.2 or 5.3.
[2] Nesting Habitat = structural stages 3.1, 3.3, 4.1, 4.2, 5.1, 5.2 or 5.3.
[3] Recruitment Habitat = structural stages 1.1, 1.2, 2.1, 2.2, 3.2, or 3.4.
[4] Total in Table B-34 = sum of nesting habitat, recruitment habitat, and non-forest.
[5] Total in Table B-36 = sum of High-Quality Nesting Habitat only across all land owners; as discussed in the DEIS using the GNN structural condition categories was not effective for estimating lower-quality nesting habitat.

Subunit OR-04-d

Total subunit = 47,091 acres
BLM-administered lands within subunit = 21,070 acres (45% of subunit)

- BLM Harvest Land Base = 1 acre (0% of subunit)
- BLM Reserves = 21,069 acres (45% of subunit)

Habitat-capable BLM-administered lands within subunit = 19,995 acres (42% of subunit)
Other landowners within subunit = 26,021 acres (55% of subunit)

Table B-37. Land Use Allocations and current marbled murrelet habitat conditions within **Subunit OR-04-d**.

Habitat Type	Zone 1 *(acres)*			Zone 2 *(acres)*			Total *(acres)*		
	HLB	Reserve	Subtotal	HLB	Reserve	Subtotal	HLB	Reserve	Subtotal
High-Quality Nesting[1]	-	7,403	7,403	-	-	-	-	7,403	7,403
Nesting[2]	-	12,349	12,349	-	-	-	-	12,349	12,349
Recruitment[3]	1	7,646	7,646	-	-	-	1	7,646	7,646
Non-Forest	-	1,075	1,075	-	-	-	-	1,075	1,075
Total[4]	1	21,069	21,070	-	-	-	1	21,069	21,070

Table B-38. Proposed RMP Harvest Scenario in **Subunit OR-04-d**.

(acres treated by end of decade)	2013	2023	2033	2043	2053	2063
HLB						
High-Quality Nesting Habitat [1]		-	-	-	-	-
Nesting Habitat [2]		-	-	-	0	0
Reserve						
High-Quality Nesting Habitat [1]		-	-	-	-	-
Nesting Habitat [2]		117	18	-	198	214
Total						
High-Quality Nesting Habitat [2]		-	-	-	-	-
Nesting Habitat [3]		117	18	-	198	215

Table B-39. Marbled murrelet habitat development in **Subunit OR-04-d**.

(acres)	2013	2023	2033	2043	2053	2063
BLM-administered lands						
High-Quality Nesting Habitat [1]	7,403	7,403	7,834	8,472	9,729	9,934
Nesting Habitat [2]	12,349	12,728	14,619	16,504	18,320	19,434
Other land owners						
High-Quality Nesting Habitat [1]	7,976	7,976	7,976	7,976	19,930	19,930
Total[5]						
High-Quality Nesting Habitat [1]	15,379	15,379	15,810	16,448	29,659	29,865

Footnotes:
[1] High-Quality Nesting Habitat = structural stages 5.1, 5.2 or 5.3.
[2] Nesting Habitat = structural stages 3.1, 3.3, 4.1, 4.2, 5.1, 5.2 or 5.3.
[3] Recruitment Habitat = structural stages 1.1, 1.2, 2.1, 2.2, 3.2, or 3.4.
[4] Total in Table B-37 = sum of nesting habitat, recruitment habitat, and non-forest.
[5] Total in Table B-39 = sum of High-Quality Nesting Habitat only across all land owners; as discussed in the DEIS using the GNN structural condition categories was not effective for estimating lower-quality nesting habitat.

Subunit OR-04-e

Total subunit = 53,809 acres
BLM-administered lands within subunit = 53,183 acres (99% of subunit)

- BLM Harvest Land Base = 1,735 acres (3% of subunit)
- BLM Reserves = 51,448 acres (96% of subunit)

Habitat-capable BLM-administered lands within subunit = 50,978 acres (95% of subunit)
Other landowners within subunit = 626 acres (1% of subunit)

Table B-40. Land Use Allocations and current marbled murrelet habitat conditions within **Subunit OR-04-e**.

Habitat Type	Zone 1 *(acres)*			Zone 2 *(acres)*			Total *(acres)*		
	HLB	Reserve	Subtotal	HLB	Reserve	Subtotal	HLB	Reserve	Subtotal
High-Quality Nesting[1]	61	20,278	20,339	5	4,572	4,577	66	24,850	24,916
Nesting[2]	186	24,743	24,928	41	4,821	4,862	227	29,564	29,791
Recruitment[3]	1,372	16,633	18,005	136	3,046	3,182	1,508	19,679	21,187
Non-Forest	-	1,932	1,932	-	273	273	-	2,205	2,205
Total[4]	1,558	43,308	44,866	177	8,141	8,317	1,735	51,448	53,183

Table B-41. Proposed RMP Harvest Scenario in **Subunit OR-04-e**.

(acres treated by end of decade)	2013	2023	2033	2043	2053	2063
HLB						
High-Quality Nesting Habitat [1]		39	-	-	-	-
Nesting Habitat [2]		158	14	75	212	169
Reserve						
High-Quality Nesting Habitat [1]		-	-	-	-	-
Nesting Habitat [2]		170	299	9	258	445
Total						
High-Quality Nesting Habitat [2]		39	-	-	-	-
Nesting Habitat [3]		328	313	85	470	614

Table B-42. Marbled murrelet habitat development in **Subunit OR-04-e**.

(acres)	2013	2023	2033	2043	2053	2063
BLM-administered lands						
High-Quality Nesting Habitat [1]	24,916	24,876	25,363	25,461	25,483	25,618
Nesting Habitat [2]	29,791	30,680	32,994	37,894	44,443	46,761
Other land owners						
High-Quality Nesting Habitat [1]	35	35	35	35	35	35
Total[5]						
High-Quality Nesting Habitat [1]	24,951	24,911	25,398	25,497	25,518	25,653

Footnotes:
[1] High-Quality Nesting Habitat = structural stages 5.1, 5.2 or 5.3.
[2] Nesting Habitat = structural stages 3.1, 3.3, 4.1, 4.2, 5.1, 5.2 or 5.3.
[3] Recruitment Habitat = structural stages 1.1, 1.2, 2.1, 2.2, 3.2, or 3.4.
[4] Total in Table B-40 = sum of nesting habitat, recruitment habitat, and non-forest.
[5] Total in Table B-42 = sum of High-Quality Nesting Habitat only across all land owners; as discussed in the DEIS using the GNN structural condition categories was not effective for estimating lower-quality nesting habitat.

Subunit OR-04-f

Total subunit = 21,129 acres
BLM-administered lands within subunit = 20,743 acres (98% of subunit)

- BLM Harvest Land Base = 5,532 acres (26% of subunit)
- BLM Reserves = 15,211 acres (72% of subunit)

Habitat-capable BLM-administered lands within subunit = 20,030 acres (95% of subunit)
Other landowners within subunit = 391 acres (2% of subunit)

Table B-43. Land Use Allocations and current marbled murrelet habitat conditions within **Subunit OR-04-f**.

Habitat Type	Zone 1 *(acres)*			Zone 2 *(acres)*			Total *(acres)*		
	HLB	Reserve	Subtotal	HLB	Reserve	Subtotal	HLB	Reserve	Subtotal
High-Quality Nesting[1]	-	-	-	326	8,234	8,560	326	8,234	8,560
Nesting[2]	-		-	1,586	11,605	13,191	1,586	11,605	13,191
Recruitment[3]			-	3,945	2,894	6,839	3,945	2,894	6,839
Non-Forest	-	-	-	-	712	712	-	712	712
Total[4]	**-**	**-**	**-**	**5,532**	**15,211**	**20,743**	**5,532**	**15,211**	**20,743**

Table B-44. Proposed RMP Harvest Scenario in **Subunit OR-04-f**.

(acres treated by end of decade)	2013	2023	2033	2043	2053	2063
HLB						
High-Quality Nesting Habitat [1]		326	-	-	-	-
Nesting Habitat [2]		1,321	208	492	54	605
Reserve						
High-Quality Nesting Habitat [1]		-	-	-	-	-
Nesting Habitat [2]		-	-	50	27	13
Total						
High-Quality Nesting Habitat [1]		326	-	-	-	-
Nesting Habitat [2]		1,321	208	542	82	618

Table B-45. Marbled murrelet habitat development in **Subunit OR-04-f**.

(acres)	2013	2023	2033	2043	2053	2063
BLM-administered lands						
High-Quality Nesting Habitat [1]	8,560	8,241	9,450	9,450	9,450	9,790
Nesting Habitat [2]	13,191	11,745	12,541	13,364	14,121	15,370
Other land owners						
High-Quality Nesting Habitat [1]	20	20	20	20	20	20
Total[5]						
High-Quality Nesting Habitat [1]	8,580	8,262	9,470	9,470	9,470	9,810

Footnotes:
[1] High-Quality Nesting Habitat = structural stages 5.1, 5.2 or 5.3.
[2] Nesting Habitat = structural stages 3.1, 3.3, 4.1, 4.2, 5.1, 5.2 or 5.3.
[3] Recruitment Habitat = structural stages 1.1, 1.2, 2.1, 2.2, 3.2, or 3.4.
[4] Total in Table B-43 = sum of nesting habitat, recruitment habitat, and non-forest.
[5] Total in Table B-45 = sum of High-Quality Nesting Habitat only across all land owners; as discussed in the DEIS using the GNN structural condition categories was not effective for estimating lower-quality nesting habitat.

Subunit OR-04-g

Total subunit = 16,547 acres
BLM-administered lands within subunit = 16,227 acres (98% of subunit)

- BLM Harvest Land Base = 1,004 acres (6% of subunit)
- BLM Reserves = 15,223 acres (92% of subunit)

Habitat-capable BLM-administered lands within subunit = 15,333 acres (93% of subunit)
Other landowners within subunit = 320 acres (2% of subunit)

Table B-46. Land Use Allocations and current marbled murrelet habitat conditions within **Subunit OR-04-g**.

Habitat Type	Zone 1 *(acres)*			Zone 2 *(acres)*			Total *(acres)*		
	HLB	Reserve	Subtotal	HLB	Reserve	Subtotal	HLB	Reserve	Subtotal
High-Quality Nesting[1]	36	5,086	5,122	2	1,549	1,551	38	6,635	6,673
Nesting[2]	87	5,865	5,952	2	1,610	1,612	89	7,475	7,564
Recruitment[3]	139	5,998	6,137	776	856	1,632	915	6,854	7,769
Non-Forest	-	774	774	-	120	120	-	894	894
Total[4]	226	12,637	12,863	778	2,586	3,364	1,004	15,223	16,227

Table B-47. Proposed RMP Harvest Scenario in **Subunit OR-04-g**.

(acres treated by end of decade)	2013	2023	2033	2043	2053	2063
HLB						
High-Quality Nesting Habitat [1]		2	-	-	-	-
Nesting Habitat [2]		3	69	80	0	40
Reserve						
High-Quality Nesting Habitat [1]		-	-	-	-	-
Nesting Habitat [2]		14	333	9	105	119
Total						
High-Quality Nesting Habitat [2]		2	-	-	-	-
Nesting Habitat [3]		16	402	89	105	159

Table B-48. Marbled murrelet habitat development in **Subunit OR-04-g**.

(acres)	2013	2023	2033	2043	2053	2063
BLM-administered lands						
High-Quality Nesting Habitat [1]	6,673	6,671	6,751	6,751	6,751	6,778
Nesting Habitat [2]	7,564	8,826	10,291	11,803	13,280	13,805
Other land owners						
High-Quality Nesting Habitat [1]	14	14	14	14	14	14
Total[5]						
High-Quality Nesting Habitat [1]	6,687	6,685	6,765	6,765	6,765	6,792

Footnotes:
[1] High-Quality Nesting Habitat = structural stages 5.1, 5.2 or 5.3.
[2] Nesting Habitat = structural stages 3.1, 3.3, 4.1, 4.2, 5.1, 5.2 or 5.3.
[3] Recruitment Habitat = structural stages 1.1, 1.2, 2.1, 2.2, 3.2, or 3.4.
[4] Total in Table B-46 = sum of nesting habitat, recruitment habitat, and non-forest.
[5] Total in Table B-48 = sum of High-Quality Nesting Habitat only across all land owners; as discussed in the DEIS using the GNN structural condition categories was not effective for estimating lower-quality nesting habitat.

Subunit OR-04-i

Total subunit = 83,996 acres
BLM-administered lands within subunit = 82,458 acres (98% of subunit)

- BLM Harvest Land Base = 3,486 acres (4% of subunit)
- BLM Reserves = 78,972 acres (94% of subunit)

Habitat-capable BLM-administered lands within subunit = 79,763 acres (95% of subunit)
Other landowners within subunit = 1,538 acres (2% of subunit)

Table B-49. Land Use Allocations and current marbled murrelet habitat conditions within **Subunit OR-04-i**.

Habitat Type	Zone 1 *(acres)*			Zone 2 *(acres)*			Total *(acres)*		
	HLB	Reserve	Subtotal	HLB	Reserve	Subtotal	HLB	Reserve	Subtotal
High-Quality Nesting[1]	33	15,155	15,188	3	10,997	11,000	36	26,152	26,188
Nesting[2]	1,195	29,359	30,554	499	16,377	16,876	1,694	45,736	47,430
Recruitment[3]	988	22,169	23,157	804	8,372	9,175	1,792	30,541	32,333
Non-Forest	-	1,798	1,798	-	897	897	-	2,695	2,695
Total[4]	2,183	53,326	55,509	1,302	25,646	26,948	3,486	78,972	82,458

Table B-50. Proposed RMP Harvest Scenario in **Subunit OR-04-i**.

(acres treated by end of decade)	2013	2023	2033	2043	2053	2063
HLB						
High-Quality Nesting Habitat [1]		3	33	-	5	-
Nesting Habitat [2]		683	398	641	762	546
Reserve						
High-Quality Nesting Habitat [1]		8	-	-	-	-
Nesting Habitat [2]		922	965	522	667	1,404
Total						
High-Quality Nesting Habitat [2]		11	33	-	5	-
Nesting Habitat [3]		1,605	1,363	1,163	1,429	1,951

Table B-51. Marbled murrelet habitat development in **Subunit OR-04-i**.

(acres)	2013	2023	2033	2043	2053	2063
BLM-administered lands						
High-Quality Nesting Habitat [1]	26,188	26,026	31,237	32,067	32,960	34,934
Nesting Habitat [2]	47,430	48,659	54,958	63,553	72,311	75,890
Other land owners						
High-Quality Nesting Habitat [1]	62	62	62	62	62	62
Total[5]						
High-Quality Nesting Habitat [1]	26,250	26,088	31,299	32,129	33,022	34,996

Footnotes:
[1] High-Quality Nesting Habitat = structural stages 5.1, 5.2 or 5.3.
[2] Nesting Habitat = structural stages 3.1, 3.3, 4.1, 4.2, 5.1, 5.2 or 5.3.
[3] Recruitment Habitat = structural stages 1.1, 1.2, 2.1, 2.2, 3.2, or 3.4.
[4] Total in Table B-49 = sum of nesting habitat, recruitment habitat, and non-forest.
[5] Total in Table B-51 = sum of High-Quality Nesting Habitat only across all land owners; as discussed in the DEIS using the GNN structural condition categories was not effective for estimating lower-quality nesting habitat.

Subunit OR-04-j

Total subunit = 67,858 acres
BLM-administered lands within subunit = 58,203 acres (86% of subunit)

- BLM Harvest Land Base = 4,835 acres (7% of subunit)
- BLM Reserves = 53,368 acres (79% of subunit)

Habitat-capable BLM-administered lands within subunit = 56,226 acres (83% of subunit)
Other landowners within subunit = 9,655 acres (14% of subunit)

Table B-52. Land Use Allocations and current marbled murrelet habitat conditions within **Subunit OR-04-j**.

Habitat Type	Zone 1 *(acres)*			Zone 2 *(acres)*			Total *(acres)*		
	HLB	Reserve	Subtotal	HLB	Reserve	Subtotal	HLB	Reserve	Subtotal
High-Quality Nesting[1]	98	14,798	14,896	59	153	212	158	14,950	15,108
Nesting[2]	1,568	31,330	32,898	139	164	303	1,707	31,494	33,201
Recruitment[3]	2,903	19,858	22,760	224	40	264	3,127	19,897	23,025
Non-Forest	-	1,957	1,957	-	19	19	-	1,977	1,977
Total[4]	4,471	53,145	57,616	363	223	586	4,835	53,368	58,203

Table B-53. Proposed RMP Harvest Scenario in **Subunit OR-04-j**.

(acres treated by end of decade)	2013	2023	2033	2043	2053	2063
HLB						
High-Quality Nesting Habitat [1]		60	58	4	10	-
Nesting Habitat [2]		650	295	420	805	1,084
Reserve						
High-Quality Nesting Habitat [1]		-	-	-	-	-
Nesting Habitat [2]		922	916	326	214	971
Total						
High-Quality Nesting Habitat [2]		60	58	4	10	-
Nesting Habitat [3]		1,572	1,212	746	1,019	2,055

Table B-54. Marbled murrelet habitat development in **Subunit OR-04-j**.

(acres)	2013	2023	2033	2043	2053	2063
BLM-administered lands						
High-Quality Nesting Habitat [1]	15,108	15,032	16,926	17,842	19,357	20,922
Nesting Habitat [2]	33,201	33,326	36,998	43,084	50,388	52,498
Other land owners						
High-Quality Nesting Habitat [1]	2,665	2,665	2,665	2,665	4,128	4,128
Total[5]						
High-Quality Nesting Habitat [1]	17,773	17,697	19,591	20,507	23,485	25,050

Footnotes:
[1] High-Quality Nesting Habitat = structural stages 5.1, 5.2 or 5.3.
[2] Nesting Habitat = structural stages 3.1, 3.3, 4.1, 4.2, 5.1, 5.2 or 5.3.
[3] Recruitment Habitat = structural stages 1.1, 1.2, 2.1, 2.2, 3.2, or 3.4.
[4] Total in Table B-52 = sum of nesting habitat, recruitment habitat, and non-forest.
[5] Total in Table B-54 = sum of High-Quality Nesting Habitat only across all land owners; as discussed in the DEIS using the GNN structural condition categories was not effective for estimating lower-quality nesting habitat.

Subunit OR-04-k

Total subunit = 43,287 acres
BLM-administered lands within subunit = 26,665 acres (62% of subunit)

- BLM Harvest Land Base = 1,155 acres (3% of subunit)
- BLM Reserves = 25,510 acres (59% of subunit)

Habitat-capable BLM-administered lands within subunit = 25,609 acres (59% of subunit)
Other landowners within subunit = 16,622 acres (38% of subunit)

Table B-55. Land Use Allocations and current marbled murrelet habitat conditions within **Subunit OR-04-k**.

Habitat Type	Zone 1 *(acres)*			Zone 2 *(acres)*			Total *(acres)*		
	HLB	Reserve	Subtotal	HLB	Reserve	Subtotal	HLB	Reserve	Subtotal
High-Quality Nesting[1]	57	5,865	5,923	-	-	-	57	5,865	5,923
Nesting[2]	210	16,212	16,423	-	-	-	210	16,212	16,423
Recruitment[3]	944	8,242	9,186	-	-	-	944	8,242	9,186
Non-Forest	-	1,056	1,056	-	-	-	-	1,056	1,056
Total[4]	1,155	25,510	26,665	-	-	-	1,155	25,510	26,665

Table B-56. Proposed RMP Harvest Scenario in **Subunit OR-04-k**.

(acres treated by end of decade)	2013	2023	2033	2043	2053	2063
HLB						
High-Quality Nesting Habitat [1]		42	-	-	5	-
Nesting Habitat [2]		123	34	110	286	321
Reserve						
High-Quality Nesting Habitat [1]		-	-	-	-	-
Nesting Habitat [2]		300	257	176	130	140
Total						
High-Quality Nesting Habitat [2]		42	-	-	5	-
Nesting Habitat [3]		423	290	286	416	461

Table B-57. Marbled murrelet habitat development in **Subunit OR-04-k**.

(acres)	2013	2023	2033	2043	2053	2063
BLM-administered lands						
High-Quality Nesting Habitat [1]	5,923	5,827	8,338	9,528	10,057	9,953
Nesting Habitat [2]	16,423	16,704	18,478	20,254	23,920	24,412
Other land owners						
High-Quality Nesting Habitat [1]	5,405	5,405	5,405	5,405	7,912	7,912
Total[5]						
High-Quality Nesting Habitat [1]	11,328	11,232	13,744	14,933	17,969	17,865

Footnotes:
[1] High-Quality Nesting Habitat = structural stages 5.1, 5.2 or 5.3.
[2] Nesting Habitat = structural stages 3.1, 3.3, 4.1, 4.2, 5.1, 5.2 or 5.3.
[3] Recruitment Habitat = structural stages 1.1, 1.2, 2.1, 2.2, 3.2, or 3.4.
[4] Total in Table B-55 = sum of nesting habitat, recruitment habitat, and non-forest.
[5] Total in Table B-57 = sum of High-Quality Nesting Habitat only across all land owners; as discussed in the DEIS using the GNN structural condition categories was not effective for estimating lower-quality nesting habitat.

Subunit OR-06-a

Total subunit = 39 acres
BLM-administered lands within subunit = 39 acres (100% of subunit)

- BLM Harvest Land Base = 0 acres (0% of subunit)
- BLM Reserves = 39 acres (100% of subunit)

Habitat-capable BLM-administered lands within subunit = 38 acres (97% of subunit)
Other landowners within subunit = 0 acres (0% of subunit)

Table B-58. Land Use Allocations and current marbled murrelet habitat conditions within **Subunit OR-06-a**.

Habitat Type	Zone 1 *(acres)*			Zone 2 *(acres)*			Total *(acres)*		
	HLB	Reserve	Subtotal	HLB	Reserve	Subtotal	HLB	Reserve	Subtotal
High-Quality Nesting[1]	-	1	1	-	-	-	-	1	1
Nesting[2]	-	26	26	-	-	-	-	26	26
Recruitment[3]	0	12	12	-	-	-	0	12	12
Non-Forest	-	1	1	-	-	-	-	1	1
Total[4]	0	39	39	-	-	-	0	39	39

Table B-59. Proposed RMP Harvest Scenario in **Subunit OR-06-a**.

(acres treated by end of decade)	2013	2023	2033	2043	2053	2063
HLB						
High-Quality Nesting Habitat [1]		-	-	-	-	-
Nesting Habitat [2]		-	-	-	-	-
Reserve						
High-Quality Nesting Habitat [1]		-	-	-	-	-
Nesting Habitat [2]		7	-	-	-	6
Total						
High-Quality Nesting Habitat [2]		-	-	-	-	-
Nesting Habitat [3]		7	-	-	-	6

Table B-60. Marbled murrelet habitat development in **Subunit OR-06-a**.

(acres)	2013	2023	2033	2043	2053	2063
BLM-administered lands						
High-Quality Nesting Habitat [1]	1	1	1	1	1	1
Nesting Habitat [2]	26	19	19	25	31	38
Other land owners						
High-Quality Nesting Habitat [1]	-	-	-	-	-	-
Total[5]						
High-Quality Nesting Habitat [1]	1	1	1	1	1	1

Footnotes:
[1] High-Quality Nesting Habitat = structural stages 5.1, 5.2 or 5.3.
[2] Nesting Habitat = structural stages 3.1, 3.3, 4.1, 4.2, 5.1, 5.2 or 5.3.
[3] Recruitment Habitat = structural stages 1.1, 1.2, 2.1, 2.2, 3.2, or 3.4.
[4] Total in Table B-58 = sum of nesting habitat, recruitment habitat, and non-forest.
[5] Total in Table B-60 = sum of High-Quality Nesting Habitat only across all land owners; as discussed in the DEIS using the GNN structural condition categories was not effective for estimating lower-quality nesting habitat.

Subunit OR-06-b

Total subunit = 52,851 acres
BLM-administered lands within subunit = 52,314 acres (99% of subunit)

- BLM Harvest Land Base = 71 acres (0% of subunit)
- BLM Reserves = 52,243 acres (99% of subunit)

Habitat-capable BLM-administered lands within subunit = 49,763 acres (94% of subunit)
Other landowners within subunit = 537 acres (1% of subunit)

Table B-61. Land Use Allocations and current marbled murrelet habitat conditions within **Subunit OR-06-b**.

Habitat Type	Zone 1 *(acres)*			Zone 2 *(acres)*			Total *(acres)*		
	HLB	Reserve	Subtotal	HLB	Reserve	Subtotal	HLB	Reserve	Subtotal
High-Quality Nesting[1]	-	21,374	21,374	-	-	-	-	21,374	21,374
Nesting[2]	2	31,016	31,017	-	-	-	2	31,016	31,017
Recruitment[3]	69	18,677	18,746	-	-	-	69	18,677	18,746
Non-Forest	-	2,551	2,551	-	-	-	-	2,551	2,551
Total[4]	71	52,243	52,314	-	-	-	71	52,243	52,314

Table B-62. Proposed RMP Harvest Scenario in **Subunit OR-06-b**.

(acres treated by end of decade)	2013	2023	2033	2043	2053	2063
HLB						
High-Quality Nesting Habitat [1]		-	-	-	-	-
Nesting Habitat [2]		2	1	16	1	34
Reserve						
High-Quality Nesting Habitat [1]		-	-	-	-	-
Nesting Habitat [2]		192	193	222	862	769
Total						
High-Quality Nesting Habitat [2]		-	-	-	-	-
Nesting Habitat [3]		193	193	238	863	803

Table B-63. Marbled murrelet habitat development in **Subunit OR-06-b**.

(acres)	2013	2023	2033	2043	2053	2063
BLM-administered lands						
High-Quality Nesting Habitat [1]	21,374	21,374	22,627	23,081	25,091	25,953
Nesting Habitat [2]	31,017	33,389	38,403	42,663	46,578	47,236
Other land owners						
High-Quality Nesting Habitat [1]	48	48	48	48	48	48
Total[5]						
High-Quality Nesting Habitat [1]	21,422	21,422	22,675	23,130	25,139	26,002

Footnotes:
[1] High-Quality Nesting Habitat = structural stages 5.1, 5.2 or 5.3.
[2] Nesting Habitat = structural stages 3.1, 3.3, 4.1, 4.2, 5.1, 5.2 or 5.3.
[3] Recruitment Habitat = structural stages 1.1, 1.2, 2.1, 2.2, 3.2, or 3.4.
[4] Total in Table B-61 = sum of nesting habitat, recruitment habitat, and non-forest.
[5] Total in Table B-63 = sum of High-Quality Nesting Habitat only across all land owners; as discussed in the DEIS using the GNN structural condition categories was not effective for estimating lower-quality nesting habitat.

Subunit OR-06-c

Total subunit = 4,762 acres
BLM-administered lands within subunit = 4,717 acres (99% of subunit)

- BLM Harvest Land Base = 742 acres (16% of subunit)
- BLM Reserves = 3,975 acres (83% of subunit)

Habitat-capable BLM-administered lands within subunit = 4,590 acres (96% of subunit)
Other landowners within subunit = 45 acres (1% of subunit)

Table B-64. Land Use Allocations and current marbled murrelet habitat conditions within **Subunit OR-06-c**.

Habitat Type	Zone 1 *(acres)*			Zone 2 *(acres)*			Total *(acres)*		
	HLB	Reserve	Subtotal	HLB	Reserve	Subtotal	HLB	Reserve	Subtotal
High-Quality Nesting[1]	-	826	826	-	-	-	-	826	826
Nesting[2]	217	3,409	3,626	-	-	-	217	3,409	3,626
Recruitment[3]	525	439	964	-	-	-	525	439	964
Non-Forest	-	127	127	-	-	-	-	127	127
Total[4]	742	3,975	4,717	-	-	-	742	3,975	4,717

Table B-65. Proposed RMP Harvest Scenario in **Subunit OR-06-c**.

(acres treated by end of decade)	2013	2023	2033	2043	2053	2063
HLB						
High-Quality Nesting Habitat [1]		-	-	-	-	-
Nesting Habitat [2]		24	25	-	4	200
Reserve						
High-Quality Nesting Habitat [1]		-	-	-	-	-
Nesting Habitat [2]		-	-	-	-	12
Total						
High-Quality Nesting Habitat [2]		-	-	-	-	-
Nesting Habitat [3]		24	25	-	4	211

Table B-66. Marbled murrelet habitat development in **Subunit OR-06-c**.

(acres)	2013	2023	2033	2043	2053	2063
BLM-administered lands						
High-Quality Nesting Habitat [1]	826	786	1,155	1,804	2,249	2,330
Nesting Habitat [2]	3,626	3,605	3,571	4,132	4,337	4,343
Other land owners						
High-Quality Nesting Habitat [1]	10	10	10	10	10	10
Total[5]						
High-Quality Nesting Habitat [1]	836	796	1,165	1,814	2,259	2,340

Footnotes:
[1] High-Quality Nesting Habitat = structural stages 5.1, 5.2 or 5.3.
[2] Nesting Habitat = structural stages 3.1, 3.3, 4.1, 4.2, 5.1, 5.2 or 5.3.
[3] Recruitment Habitat = structural stages 1.1, 1.2, 2.1, 2.2, 3.2, or 3.4.
[4] Total in Table B-64 = sum of nesting habitat, recruitment habitat, and non-forest.
[5] Total in Table B-66 = sum of High-Quality Nesting Habitat only across all land owners; as discussed in the DEIS using the GNN structural condition categories was not effective for estimating lower-quality nesting habitat.

Subunit OR-06-d

Total subunit = 17,721 acres
BLM-administered lands within subunit = 17,430 acres (98% of subunit)

- BLM Harvest Land Base = 3,576 acres (20% of subunit)
- BLM Reserves = 13,853 acres (78% of subunit)

Habitat-capable BLM-administered lands within subunit = 16,050 acres (91% of subunit)
Other landowners within subunit = 304 acres (2% of subunit)

Table B-67. Land Use Allocations and current marbled murrelet habitat conditions within **Subunit OR-06-d**.

Habitat Type	Zone 1 *(acres)*			Zone 2 *(acres)*			Total *(acres)*		
	HLB	Reserve	Subtotal	HLB	Reserve	Subtotal	HLB	Reserve	Subtotal
High-Quality Nesting[1]	2	2,948	2,949	10	3,142	3,152	12	6,089	6,101
Nesting[2]	128	3,833	3,961	422	4,519	4,942	550	8,352	8,902
Recruitment[3]	922	2,103	3,025	2,104	2,018	4,123	3,026	4,121	7,147
Non-Forest	-	332	332	-	1,048	1,048	-	1,380	1,380
Total[4]	**1,050**	**6,268**	**7,318**	**2,527**	**7,585**	**10,112**	**3,576**	**13,853**	**17,430**

Table B-68. Proposed RMP Harvest Scenario in **Subunit OR-06-d**.

(acres treated by end of decade)	2013	2023	2033	2043	2053	2063
HLB						
High-Quality Nesting Habitat [1]		9	2	-	-	0
Nesting Habitat [2]		217	69	215	185	442
Reserve						
High-Quality Nesting Habitat [1]		-	-	-	-	-
Nesting Habitat [2]		63	-	92	76	76
Total						
High-Quality Nesting Habitat [1]		9	2	-	-	0
Nesting Habitat [2]		280	69	307	261	519

Table B-69. Marbled murrelet habitat development in **Subunit OR-06-d**.

(acres)	2013	2023	2033	2043	2053	2063
BLM-administered lands						
High-Quality Nesting Habitat [1]	6,101	6,092	6,281	6,368	6,466	6,462
Nesting Habitat [2]	8,902	8,884	9,348	10,191	11,449	12,023
Other land owners						
High-Quality Nesting Habitat [1]	14	14	14	14	14	14
Total[5]						
High-Quality Nesting Habitat [1]	6,115	6,106	6,295	6,382	6,480	6,476

Footnotes:
[1] High-Quality Nesting Habitat = structural stages 5.1, 5.2 or 5.3.
[2] Nesting Habitat = structural stages 3.1, 3.3, 4.1, 4.2, 5.1, 5.2 or 5.3.
[3] Recruitment Habitat = structural stages 1.1, 1.2, 2.1, 2.2, 3.2, or 3.4.
[4] Total in Table B-67 = sum of nesting habitat, recruitment habitat, and non-forest.
[5] Total in Table B-69 = sum of High-Quality Nesting Habitat only across all land owners; as discussed in the DEIS using the GNN structural condition categories was not effective for estimating lower-quality nesting habitat.

Subunit OR-07-a

Total subunit = 148,081 acres
BLM-administered lands within subunit = 2,401 acres (2% of subunit)

- BLM Harvest Land Base = 477 acres (0% of subunit)
- BLM Reserves = 1,924 acres (1% of subunit)

Habitat-capable BLM-administered lands within subunit = 2,355 acres (2% of subunit)
Other landowners within subunit = 145,680 acres (98% of subunit)

Table B-70. Land Use Allocations and current marbled murrelet habitat conditions within **Subunit OR-07-a**.

Habitat Type	Zone 1 *(acres)*			Zone 2 *(acres)*			Total *(acres)*		
	HLB	Reserve	Subtotal	HLB	Reserve	Subtotal	HLB	Reserve	Subtotal
High-Quality Nesting[1]	56	1,264	1,320	-	-	-	56	1,264	1,320
Nesting[2]	156	1,564	1,719	-	-	-	156	1,564	1,719
Recruitment[3]	321	315	636	-	-	-	321	315	636
Non-Forest	-	45	45	-	-	-	-	45	45
Total[4]	477	1,924	2,401	-	-	-	477	1,924	2,401

Table B-71. Proposed RMP Harvest Scenario in **Subunit OR-07-a**.

(acres treated by end of decade)	2013	2023	2033	2043	2053	2063
HLB						
High-Quality Nesting Habitat [1]		1	0	-	-	-
Nesting Habitat [2]		1	0	48	15	64
Reserve						
High-Quality Nesting Habitat [1]		1	-	-	-	1
Nesting Habitat [2]		2	-	-	-	10
Total						
High-Quality Nesting Habitat [2]		2	0	-	-	1
Nesting Habitat [3]		3	0	48	15	73

Table B-72. Marbled murrelet habitat development in **Subunit OR-07-a**.

(acres)	2013	2023	2033	2043	2053	2063
BLM-administered lands						
High-Quality Nesting Habitat [1]	1,320	1,319	1,371	1,449	1,449	1,449
Nesting Habitat [2]	1,719	1,754	1,878	2,010	2,169	2,124
Other land owners						
High-Quality Nesting Habitat [1]	19,728	19,728	19,728	19,728	50,376	50,376
Total[5]						
High-Quality Nesting Habitat [1]	21,048	21,047	21,099	21,177	51,825	51,825

Footnotes:
[1] High-Quality Nesting Habitat = structural stages 5.1, 5.2 or 5.3.
[2] Nesting Habitat = structural stages 3.1, 3.3, 4.1, 4.2, 5.1, 5.2 or 5.3.
[3] Recruitment Habitat = structural stages 1.1, 1.2, 2.1, 2.2, 3.2, or 3.4.
[4] Total in Table B-70 = sum of nesting habitat, recruitment habitat, and non-forest.
[5] Total in Table B-72 = sum of High-Quality Nesting Habitat only across all land owners; as discussed in the DEIS using the GNN structural condition categories was not effective for estimating lower-quality nesting habitat.

Subunit OR-07-b

Total subunit = 46,291 acres
BLM-administered lands within subunit = 2,208 acres (5% of subunit)

- BLM Harvest Land Base = 203 acres (0% of subunit)
- BLM Reserves = 2,004 acres (4% of subunit)

Habitat-capable BLM-administered lands within subunit = 2,180 acres (5% of subunit)
Other landowners within subunit = 44,083 acres (95% of subunit)

Table B-73. Land Use Allocations and current marbled murrelet habitat conditions within **Subunit OR-07-b**.

Habitat Type	Zone 1 *(acres)*			Zone 2 *(acres)*			Total *(acres)*		
	HLB	Reserve	Subtotal	HLB	Reserve	Subtotal	HLB	Reserve	Subtotal
High-Quality Nesting[1]	1	474	475	-	-	-	1	474	475
Nesting[2]	138	1,485	1,623	-	-	-	138	1,485	1,623
Recruitment[3]	65	492	557	-	-	-	65	492	557
Non-Forest	-	27	27	-	-	-	-	27	27
Total[4]	203	2,004	2,208	-	-	-	203	2,004	2,208

Table B-74. Proposed RMP Harvest Scenario in **Subunit OR-07-b**.

(acres treated by end of decade)	2013	2023	2033	2043	2053	2063
HLB						
High-Quality Nesting Habitat [1]		-	-	-	-	-
Nesting Habitat [2]		-	65	65	-	-
Reserve						
High-Quality Nesting Habitat [1]		-	-	-	-	-
Nesting Habitat [2]		-	-	-	-	-
Total						
High-Quality Nesting Habitat [2]		-	-	-	-	-
Nesting Habitat [3]		-	65	65	-	-

Table B-75. Marbled murrelet habitat development in **Subunit OR-07-b**.

(acres)	2013	2023	2033	2043	2053	2063
BLM-administered lands						
High-Quality Nesting Habitat [1]	475	475	475	599	599	599
Nesting Habitat [2]	1,623	1,623	1,623	1,559	1,688	1,688
Other land owners						
High-Quality Nesting Habitat [1]	3,082	3,082	3,082	3,082	7,916	7,916
Total[5]						
High-Quality Nesting Habitat [1]	3,557	3,557	3,557	3,681	8,515	8,515

Footnotes:
[1] High-Quality Nesting Habitat = structural stages 5.1, 5.2 or 5.3.
[2] Nesting Habitat = structural stages 3.1, 3.3, 4.1, 4.2, 5.1, 5.2 or 5.3.
[3] Recruitment Habitat = structural stages 1.1, 1.2, 2.1, 2.2, 3.2, or 3.4.
[4] Total in Table B-73 = sum of nesting habitat, recruitment habitat, and non-forest.
[5] Total in Table B-75 = sum of High-Quality Nesting Habitat only across all land owners; as discussed in the DEIS using the GNN structural condition categories was not effective for estimating lower-quality nesting habitat.

Subunit OR-07-d

Total subunit = 86,790 acres
BLM-administered lands within subunit = 1,865 acres (2% of subunit)

- BLM Harvest Land Base = 747 acres (1% of subunit)
- BLM Reserves = 1,118 acres (1% of subunit)

Habitat-capable BLM-administered lands within subunit = 1,826 acres (2% of subunit)
Other landowners within subunit = 84,925 acres (98% of subunit)

Table B-76. Land Use Allocations and current marbled murrelet habitat conditions within **Subunit OR-07-d**.

Habitat Type	Zone 1 *(acres)*			Zone 2 *(acres)*			Total *(acres)*		
	HLB	Reserve	Subtotal	HLB	Reserve	Subtotal	HLB	Reserve	Subtotal
High-Quality Nesting[1]	11	64	75	-	-	-	11	64	75
Nesting[2]	533	520	1,052	-	-	-	533	520	1,052
Recruitment[3]	214	559	774	-	-	-	214	559	774
Non-Forest	-	38	38	-	-	-	-	38	38
Total[4]	747	1,118	1,865	-	-	-	747	1,118	1,865

Table B-77. Proposed RMP Harvest Scenario in **Subunit OR-07-d**.

(acres treated by end of decade)	2013	2023	2033	2043	2053	2063
HLB						
High-Quality Nesting Habitat [1]		-	-	-	-	-
Nesting Habitat [2]		112	81	59	-	40
Reserve						
High-Quality Nesting Habitat [1]		-	-	-	-	-
Nesting Habitat [2]		4	14	-	-	4
Total						
High-Quality Nesting Habitat [2]		-	-	-	-	-
Nesting Habitat [3]		115	95	59	-	43

Table B-78. Marbled murrelet habitat development in **Subunit OR-07-d**.

(acres)	2013	2023	2033	2043	2053	2063
BLM-administered lands						
High-Quality Nesting Habitat [1]	75	184	151	271	271	271
Nesting Habitat [2]	1,052	769	748	910	978	1,049
Other land owners						
High-Quality Nesting Habitat [1]	7,919	7,919	7,919	7,919	18,099	18,099
Total[5]						
High-Quality Nesting Habitat [1]	7,994	8,102	8,069	8,190	18,371	18,371

Footnotes:
[1] High-Quality Nesting Habitat = structural stages 5.1, 5.2 or 5.3.
[2] Nesting Habitat = structural stages 3.1, 3.3, 4.1, 4.2, 5.1, 5.2 or 5.3.
[3] Recruitment Habitat = structural stages 1.1, 1.2, 2.1, 2.2, 3.2, or 3.4.
[4] Total in Table B-76 = sum of nesting habitat, recruitment habitat, and non-forest.
[5] Total in Table B-78 = sum of High-Quality Nesting Habitat only across all land owners; as discussed in the DEIS using the GNN structural condition categories was not effective for estimating lower-quality nesting habitat.

Subunit OR-07-f

Total subunit = 49,126 acres
BLM-administered lands within subunit = 13,879 acres (13% of subunit)

- BLM Harvest Land Base = 1 acres (0% of subunit)
- BLM Reserves = 13,878 acres (13% of subunit)

Habitat-capable BLM-administered lands within subunit = 13,499 acres (27% of subunit)
Other landowners within subunit = 35,247 acres (72% of subunit)

Table B-79. Land Use Allocations and current marbled murrelet habitat conditions within **Subunit OR-07-f**.

Habitat Type	Zone 1 *(acres)*			Zone 2 *(acres)*			Total *(acres)*		
	HLB	Reserve	Subtotal	HLB	Reserve	Subtotal	HLB	Reserve	Subtotal
High-Quality Nesting[1]	0	4,686	4,687	-	246	246	0	4,932	4,932
Nesting[2]	1	7,648	7,649	-	274	274	1	7,922	7,922
Recruitment[3]	0	5,305	5,305	-	272	272	0	5,577	5,577
Non-Forest	-	379	379	-	-	-	-	379	379
Total[4]	1	13,332	13,333	-	546	546	1	13,878	13,879

Table B-80. Proposed RMP Harvest Scenario in **Subunit OR-07-f**.

(acres treated by end of decade)	2013	2023	2033	2043	2053	2063
HLB						
High-Quality Nesting Habitat [1]		0	-	-	-	-
Nesting Habitat [2]		1	-	-	-	0
Reserve						
High-Quality Nesting Habitat [1]		607	330	-	102	-
Nesting Habitat [2]		834	470	121	717	62
Total						
High-Quality Nesting Habitat [2]		607	330	-	102	-
Nesting Habitat [3]		835	470	121	717	62

Table B-81. Marbled murrelet habitat development in **Subunit OR-07-f**.

(acres)	2013	2023	2033	2043	2053	2063
BLM-administered lands						
High-Quality Nesting Habitat [1]	4,932	4,932	4,878	5,275	5,014	5,379
Nesting Habitat [2]	7,922	9,013	9,969	11,528	11,886	12,564
Other land owners						
High-Quality Nesting Habitat [1]	3,556	3,556	3,556	3,556	8,039	8,039
Total[5]						
High-Quality Nesting Habitat [1]	8,488	8,488	8,434	8,831	13,053	13,418

Footnotes:
[1] High-Quality Nesting Habitat = structural stages 5.1, 5.2 or 5.3.
[2] Nesting Habitat = structural stages 3.1, 3.3, 4.1, 4.2, 5.1, 5.2 or 5.3.
[3] Recruitment Habitat = structural stages 1.1, 1.2, 2.1, 2.2, 3.2, or 3.4.
[4] Total in Table B-79 = sum of nesting habitat, recruitment habitat, and non-forest.
[5] Total in Table B-81 = sum of High-Quality Nesting Habitat only across all land owners; as discussed in the DEIS using the GNN structural condition categories was not effective for estimating lower-quality nesting habitat.

Subunit OR-07-g

Total subunit = 2,286 acres
BLM-administered lands within subunit = 2,210 acres (97% of subunit)

- BLM Harvest Land Base = 405 acres (18% of subunit)
- BLM Reserves = 1,805 acres (79% of subunit)

Habitat-capable BLM-administered lands within subunit = 2,064 acres (90% of subunit)
Other landowners within subunit = 76 acres (3% of subunit)

Table B-82. Land Use Allocations and current marbled murrelet habitat conditions within **Subunit OR-07-g**.

Habitat Type	Zone 1 *(acres)*			Zone 2 *(acres)*			Total *(acres)*		
	HLB	Reserve	Subtotal	HLB	Reserve	Subtotal	HLB	Reserve	Subtotal
High-Quality Nesting[1]	176	588	764	4	237	240	179	825	1,004
Nesting[2]	242	1,003	1,246	4	271	275	246	1,275	1,521
Recruitment[3]	159	328	487	-	56	56	159	384	543
Non-Forest	-	118	118	-	27	27	-	146	146
Total[4]	401	1,450	1,851	4	355	359	405	1,805	2,210

Table B-83. Proposed RMP Harvest Scenario in **Subunit OR-07-g**.

(acres treated by end of decade)	2013	2023	2033	2043	2053	2063
HLB						
High-Quality Nesting Habitat [1]		161	-	18	-	0
Nesting Habitat [2]		162	39	40	4	107
Reserve						
High-Quality Nesting Habitat [1]		68	64	-	-	68
Nesting Habitat [2]		97	216	8	2	76
Total						
High-Quality Nesting Habitat [2]		229	64	18	-	68
Nesting Habitat [3]		258	255	48	6	182

Table B-84. Marbled murrelet habitat development in **Subunit OR-07-g**.

(acres)	2013	2023	2033	2043	2053	2063
BLM-administered lands						
High-Quality Nesting Habitat [1]	1,004	1,004	1,118	1,270	1,270	1,270
Nesting Habitat [2]	1,521	1,658	1,658	1,731	1,768	1,799
Other land owners						
High-Quality Nesting Habitat [1]	3	3	3	3	3	3
Total[5]						
High-Quality Nesting Habitat [1]	1,007	1,007	1,121	1,273	1,273	1,273

Footnotes:
[1] High-Quality Nesting Habitat = structural stages 5.1, 5.2 or 5.3.
[2] Nesting Habitat = structural stages 3.1, 3.3, 4.1, 4.2, 5.1, 5.2 or 5.3.
[3] Recruitment Habitat = structural stages 1.1, 1.2, 2.1, 2.2, 3.2, or 3.4.
[4] Total in Table B-82 = sum of nesting habitat, recruitment habitat, and non-forest.
[5] Total in Table B-84 = sum of High-Quality Nesting Habitat only across all land owners; as discussed in the DEIS using the GNN structural condition categories was not effective for estimating lower-quality nesting habitat.

Table B-85. Predicted Fire within Marbled Murrelet **Designated Critical Habitat Subunits** on BLM-administered lands.

CHU Name	Acres of BLM within CHU *(acres)*	Predicted Fire on BLM-administered lands within MAMU CHU Subunits *(acres)*					
		1st Decade	2nd Decade	3rd Decade	4th Decade	5th Decade	Total*
OR-01-b	1	-	-	-	-	-	-
OR-01-c	7,725	-	-	-	-	-	-
OR-02-a	0	-	-	-	-	-	-
OR-02-b	4	-	-	-	-	-	-
OR-02-c	3,605	-	-	-	-	-	-
OR-02-d	26,557	-	-	-	-	-	-
OR-02-e	41,185	-	300	-	-	-	300
OR-03-a	38	-	-	-	-	-	-
OR-03-c	8,747	-	-	-	-	-	-
OR-04-a	1,303	-	-	-	-	-	-
OR-04-b	1,118	-	-	-	-	-	-
OR-04-c	14,478	-	-	-	-	-	-
OR-04-d	21,070	-	-	-	-	-	-
OR-04-e	53,183	-	650	-	-	-	650
OR-04-f	20,743	-	-	-	-	-	-
OR-04-g	16,227	-	-	-	-	-	-
OR-04-i	82,458	-	-	-	1,231	1,364	2,595
OR-04-j	58,203	-	920	-	-	-	920
OR-04-k	26,665	-	-	-	-	-	-
OR-06-a	39	-	-	-	-	-	-
OR-06-b	52,314	-	-	-	-	-	-
OR-06-c	4,717	-	-	-	-	-	-
OR-06-d	17,430	-	-	-	-	-	-
OR-07-a	2,401	-	5	-	-	-	5
OR-07-b	2,208	-	-	-	-	-	-
OR-07-d	1,865	-	-	-	-	-	-
OR-07-f	13,879	-	3,453	-	1,795	1,576	6,223
OR-07-g	2,210	-	-	-	-	-	-
Grand Total	**480,369**	**-**	**5,328**	**-**	**3,026**	**2,940**	**10,693**

*For OR-07-f, the total does not equal the sum of the decadal fires because ~601 acres re-burned in the 4th decade that had previously burned in the 2nd decade.

The USFWS raised the question/concern regarding the modeled harvest of high-quality marbled murrelet nesting habitat within critical habitat and within reserved land-use allocations during discussions on 11-30-2015. The USFWS had specific questions about the disposition of the 683 acres of high-quality nesting habitat in critical habitat in reserves modeled for harvest in the 1st decade (ending 2023) and the 394 acres modeled for harvest in the 2nd decade (ending 2033).

1st Decade (2013-2023)

There are three subunits that have harvest of high-quality nesting habitat in the reserves in the **1st decade totaling 683 acres**:

- OR-04-i
  - 8 acres of thinning harvest.
  - Thinning in the 1st decade changed the structural stage from high-quality nesting (5.1) to nesting habitat (3.1) for 2 decades. By 2043, these 8 acres develop back into high-quality nesting habitat (5.1).
- OR-07-f
  - 607 acres of selection harvest.
  - Selection harvest did not change the function (or the structural stage) of the of the high-quality nesting habitat. These 607 acres were a mix of stages 5.1 and 5.2 prior to harvest in the 1st decade and following selection harvest they remain a mix of stages 5.1 and 5.2 (i.e. the 607 acres was maintained as high-quality nesting habitat).
- OR-07-g
  - 68 acres of selection harvest.
  - Selection harvest did not change the function (or the structural stage) of the of the high-quality nesting habitat. These 68 acres were a mix of stages 5.1 and 5.2 prior to harvest in the 1st decade and following selection harvest they remain a mix of stages 5.1 and 5.2 (i.e. the 68 acres was maintained as high-quality nesting habitat).

Table B-86. Structural stage development of the **683 acres** of high-quality nesting habitat[1] in Reserves "harvested" under the Proposed RMP Harvest Scenario (**1st decade**) within marbled murrelet critical habitat.

Structural Stage	2013	2023 *(harvest)*	2033	2043	2053	2063
1.1	-	-	-	-	-	-
1.2	-	-	-	-	-	-
2.1	-	-	-	-	-	-
2.2	-	-	-	-	-	-
3.1	-	8	8	-	-	-
3.2	-	-	-	-	-	-
3.3	-	-	-	-	-	-
3.4	-	-	-	-	-	-
4.1	-	-	-	-	-	-
4.2	-	-	-	-	-	-
5.1	315	307	307	315	315	315
5.2	368	368	368	368	368	368
5.3	-	-	-	-	-	-
Total	**683**	**683**	**683**	**683**	**683**	**683**

2nd Decade (2023-2033)

There are two subunits that have harvest of high-quality nesting habitat in the reserves in the **2nd decade totaling 394 acres**:

- OR-07-f
  - 330 acres of selection harvest.
  - Selection harvest did not change the function (or the structural stage) of the of the high-quality nesting habitat. These 330 acres were a mix of stages 5.1 and 5.2 prior to harvest in the 2nd decade and following selection harvest they remain a mix of stages 5.1 and 5.2 (i.e. the 330 acres was maintained as high-quality nesting habitat).
- OR-07-g
  - 64 acres of selection harvest.
  - Selection harvest did not change the function (or the structural stage) of the of the high-quality nesting habitat. These 64 acres were stage 5.2 prior to harvest in the 2nd decade and following selection harvest they remain stage 5.2 (i.e. the 64 acres was maintained as high-quality nesting habitat).

Table B-87. Structural stage development of the **394 acres** of high-quality nesting habitat[1] in Reserves "harvested" under the Proposed RMP Harvest Scenario (**2nd decade**) within marbled murrelet critical habitat.

Structural Stage	2013	2023	2033 *(harvest)*	2043	2053	2063
1.1	-	-	-	-	-	-
1.2	-	-	-	-	-	-
2.1	-	-	-	-	-	-
2.2	-	-	-	-	-	-
3.1	-	-	-	-	-	-
3.2	-	-	-	-	-	-
3.3	-	-	-	-	-	-
3.4	-	-	-	-	-	-
4.1	-	-	-	-	-	-
4.2	-	-	-	-	-	-
5.1	114	114	114	114	114	114
5.2	280	280	280	280	280	280
5.3	-	-	-	-	-	-
Total	**394**	**394**	**394**	**394**	**394**	**394**

Footnotes:
[1] High-Quality Nesting Habitat = structural stages 5.1, 5.2 or 5.3.
[2] Nesting Habitat = structural stages 3.1, 3.3, 4.1, 4.2, 5.1, 5.2 or 5.3.
[3] Recruitment Habitat = structural stages 1.1, 1.2, 2.1, 2.2, 3.2, or 3.4.

Appendix C – Northern Spotted Owl

Forecasting Habitat Change, and Northern Spotted Owl Population Responses, in Washington, Oregon and California

The U.S. Fish and Wildlife Service (FWS) used HexSim (Schumaker 2011)—a spatially-explicit, individual-based, population model—to help inform its decisions on northern spotted owl recovery and the delineation of northern spotted owl critical habitat. The FWS described the development and parameterization of its HexSim model in USDI FWS 2011 (Appendix C) and USDI FWS 2012.

Early in its planning process, the BLM sought the advice of federal experts familiar with the applications of HexSim and other population models to inform management decisions. Based on its review, the BLM chose to use the northern spotted owl HexSim model developed by the FWS to inform its decisions on northern spotted owl recovery and the delineation of northern spotted owl critical habitat (see USDI FWS 2011:Appendic C and 2012). The BLM did this because:

- Federal experts familiar with similar models had found HexSim to be as reliable as those models while requiring less calibration and time to operate.
- The FWS had developed its HexSim model through a peer-reviewed process and with the advice and assistance of northern spotted owl experts from throughout the northern spotted owl's range.
- The range-wide scale of the FWS HexSim model suited the BLM's analytical needs.
- The BLM was one of the cooperators that had advised the FWS during the development of its HexSim model and, thus, already was familiar with its operation and applications.
- The BLM determined that it could use the FWS's model, fully parameterized, to meet its specific planning needs with considerable savings in cost and time.
- The FWS already was familiar with the development and applications of its model. Since the FWS would advise the BLM during the development of the RMP, and the FWS eventually would render a biological opinion on the Proposed RMP, the BLM determined that the FWS's HexSim model would best suit its requirements for evaluating the potential effects of its management alternatives on northern spotted owl populations.

The BLM did not modify any of the population parameters in the FWS's HexSim model. The only difference between the FWS's use of its HexSim model and the BLM's use was that the BLM recalibrated the time step that corresponded to the year 2013.

The FWS calibrated its HexSim model to run with northern spotted owl relative habitat suitability surfaces (i.e., digitized geospatial datasets used for computer analyses), which it derived using 1996 and 2006 Gradient Nearest Neighbor (GNN) data developed by the U.S. Forest Service (USFS) (Ohmann and Gregory 2002). Relative habitat suitability values range from 0 to 100, with higher numbers signifying better habitat value. The values themselves are derived from a variety of biotic and abiotic variables, such as the amount of forest canopy cover, mean tree diameter, and degree and direction of terrain slope. To create its relative habitat suitability surfaces, the FWS used MaxEnt (Phillips *et al*. 2006) to compare variables present on broad landscapes with those associated with known northern spotted owls nest sites.

Concurrent with the FWS process, the USFS created a separate set of northern spotted owl relative habitat suitability surfaces to evaluate implementation of the Northwest Forest Plan (Davis *et al*. 2011). The

USFS based its surfaces on a unique set of MaxEnt models that it also derived using 1996 and 2006 GNN data (Davis *et al*. 2011, pp. 27 and 28).[1] Differences between the two processes included:

- The two agencies used different variable scales to create their MaxEnt models. The USFS variables were specific to 30 × 30-m pixels (Davis *et al*. 2011, p. 28) whereas the FWS variables were at the scale of 200 ha (USDI FWS 2012, p. 84).
- The two agencies trained their MaxEnt models to geographically-different modeling regions (Davis *et al*. 2011, p. 35 and USDI FWS 2011, p. C-13).
- Whereas the USFS trained its MaxEnt models primarily on discrete variable values, which could change independently (Davis *et al*. 2011, p. 99), the FWS trained its MaxEnt models on a combination of discrete and compositional variables. Compositional variables are combinations of discrete variables, all of which must be present (USDI FWS 2012, p. C-38).
- The USFS used LandTrendr to examine changes in forest stand conditions during 1996 – 2006 from timber harvest, insects and disease, and wildfire (Davis *et al*. 2011, p. 28, 29, 121-125).

Before the BLM northern spotted owl modeling process began, the BLM decided—for its planning process—to use Woodstock to forecast changes in forest stand growth and timber yield variables on its administered lands in the planning area (see the Vegetation Modeling Section in Chapter 3 of USDI BLM 2015). Therefore, for the northern spotted owl modeling, the BLM created relative habitat suitability surfaces for its administered lands in the planning area, that changed each decade for five decades (see Chapter 3, Northern Spotted Owl), using Woodstock variable outputs. In addition, to generate credible range-wide simulations of northern spotted owl demographic responses to the BLM alternatives using HexSim, the BLM:

- Created relative habitat suitability surfaces for all "other lands" (i.e., lands other than BLM-administered lands in the planning area) within the northern spotted owl's range so simulated northern spotted owls could move across planning area boundaries and respond to habitat conditions on all land ownerships inside and outside the planning area, and;
- Forecasted changes to those surfaces from forest ingrowth, timber harvest and wildfire at the same decadal increments as its Woodstock model, something not done by either the USFS or FWS.

Thus, to simulate habitat conditions on BLM-administered lands in the planning area, the BLM could not use the USFS or FWS relative habitat suitability surfaces because the BLM needed to vary the relative habitat suitability surfaces according to each of its alternatives and over time, using variables derived from Woodstock.

To simulate habitat conditions on other lands within the northern spotted owl's range, the BLM originally hoped to build upon the relative habitat suitability surfaces developed by the USFS because:

[1] Both the FWS and USFS trained their MaxEnt models using 1996 GNN data because the intent was to develop models that predicted the relative habitat suitability for northern spotted owls when competitive interactions with barred owl still were relatively uncommon. For this purpose, 1996 GNN data are better than 2006 and 2012 GNN data because, when associated with northern spotted owl nesting-roosting location data, they better represent the association between habitat conditions and northern spotted owl occupancy before later displacements of northern spotted owls by barred owls. Once the models were trained, both agencies projected their models to 2006 GNN data, the most recent data available. Hence, throughout the remainder of Section A, when the BLM refers to FWS 2006 GNN MaxEnt models or USFS 2006 GNN MaxEnt models it always means models developed with 1996 GNN data and applied to 2006 data.

- The similarity of scale between the BLM Woodstock variables and the USFS GNN variables potentially made it easier for the BLM to merge its relative habitat suitability surfaces for BLM-administered lands with those generated by the USFS for other lands;
- Since Woodstock generates individual variable values, instead of compositional variable values, the BLM could more-directly compare its MaxEnt models to those created by the USFS, and;
- Woodstock could generate the same variable values used by the USFS to create its relative habitat suitability surfaces, which potentially made the BLM and USFS surfaces more compatible.

In addition, the BLM initially hoped that unpublished USFS LandTrendr results could help it forecast habitat changes on other lands.

Therefore, the BLM programmed Woodstock to generate the same variables used by the USFS GNN MaxEnt models (see Davis *et al*. 2011, p. 99) and, using those variables, planned to apply the USFS's MaxEnt models to BLM-administered lands in the planning area. The BLM initially hoped that there would be sufficient compatibility between the relative habitat suitability surfaces generated from the Woodstock and GNN datasets so that the BLM could use the Woodstock variable outputs for BLM-administered lands in the planning area and the GNN variable outputs for all other lands. If the two sets of variable outputs were insufficiently compatible, the BLM could add a stand age variable to the Woodstock outputs to correlate the two relative habitat suitability surfaces.

Unfortunately, as described below under Model 1, the BLM found that the USFS MaxEnt models would not work in this way. Subsequently, the BLM went through an iterative process (described under models 1 – 13) to identify and account for design differences between the USFS and FWS GNN MaxEnt models so that the BLM could use the HexSim model developed by the FWS—with little or no recalibration—with relative habitat suitability surfaces that utilized both Woodstock data for BLM-administered lands in the planning area and GNN data for other lands.

A. Developing MaxEnt Models for BLM-Administered Lands in the Planning Area

Objectives and Selection Criteria

Since the BLM initially sought to use the USFS's GNN MaxEnt models, it first evaluated whether doing so was reasonable for its planning purposes. The BLM used three model assessment criteria to evaluate the utility of the USFS, and subsequently other, MaxEnt models:

1) Whether the current–year relative habitat suitability surface generated by the MaxEnt models had a strong correlation[2] with that generated by the FWS's MaxEnt models. The FWS calibrated its northern spotted owl HexSim model to its own relative habitat suitability surface. If the new relative habitat suitability surfaces were strongly correlated to the FWS's surface, the BLM could use the FWS's HexSim model with the new surfaces with relatively little recalibration of the HexSim model. However, if they were not strongly correlated, a long and detailed recalibration of the HexSim model would be needed. The BLM preferred to avoid a lengthy recalibration.

[2] Strong correlation: The BLM, knowing the substantive differences between the origins of the Woodstock and GNN datasets, did not choose an *a priori* minimum correlation coefficient. Instead, the BLM sought for the highest correlation coefficient it could achieve with the available datasets, and then determined if the coefficient were sufficiently strong to allow the BLM to proceed with its analyses.

2) Whether the relative habitat suitability models applied to BLM-administered lands performed similarly[3] to those applied to non-BLM lands. The spatial scale for evaluating the effects of various BLM alternatives on the northern spotted owl population was to occur over the entire geographic range of the northern spotted owl, within modeling regions, and at smaller scales. Hence, the BLM needed the models to perform similarly on BLM-administered lands in the planning area and all other lands within the northern spotted owl's range.
3) Relative habitat suitability surfaces developed for BLM-administered lands in the planning area had to be derived from the forest growth and timber yield variables generated by Woodstock, the most accurate data for those lands.

To determine if criterion 2 were met, the BLM evaluated how its models worked under the No Timber Harvest Reference Analysis by evaluating the portions of BLM-administered lands in the planning area that occurred in various relative habitat suitability value bins and strength-of-selection bins (see Model 8, below, the first model so evaluated, for more information). This was a heuristic evaluation of the "reasonableness" of the model(s) applied to decadal changes according to the No Timber Harvest Reference Analysis. The BLM forecasted changes at decadal intervals for 50 years. If the model(s) worked well, there would be a steady decrease in the portion of BLM-administered land in low relative habitat suitability value bins and increases in the proportion of that land in higher relative habitat suitability value bins. This evaluation was heuristic because the BLM knew the general trajectory that would be seen if the model(s) worked reasonably well, even though it did not know the specific extent of that change.

Here, the BLM describes its process to develop relative habitat suitability surfaces that met its three assessment criteria. **Figure C-1** outlines the process.

Model 1

The BLM first conducted range-wide comparisons of the USFS (Davis *et al*. 2011) and FWS (USDI FWS 2011, Appendix C) relative habitat suitability surfaces. The BLM overlaid the geographic range of the northern spotted owl with a grid of 86.6-ha hexagons—the grid used by the FWS's HexSim model (USDI FWS 2012, p. 24)—and compared the relative habitat suitability values of both sets of models in each hexagon. As shown in **Figure C-2**, the two sets of models produced dissimilar results; the USDI FWS 2006 GNN MaxEnt models estimated more of the landscape to be in the lowest (relative habitat suitability values 0 to 10) and highest (values greater than 40) bins, whereas the USDA FS 2006 GNN MaxEnt models estimated more of the landscape to be in the middle (values 11 to 40) bins. These results were not unexpected because, as described above, the USFS and FWS calculated relative habitat suitability values at different scales.

The correlation (Pearson r) between hexagon relative habitat suitability values for the two sets of models was 0.765. The BLM sought a stronger relationship as well as greater similarity in the distribution of relative habitat suitability scores. The BLM determined that the USFS 2006 GNN MaxEnt models failed assessment criterion 1.

[3] In this context, models "performed similarly" in terms of their relative progressions, over time, through relative habitat suitability bins and strength-of-selection bins. See Model 8, below, the first model so evaluated, for descriptions of these analyses.

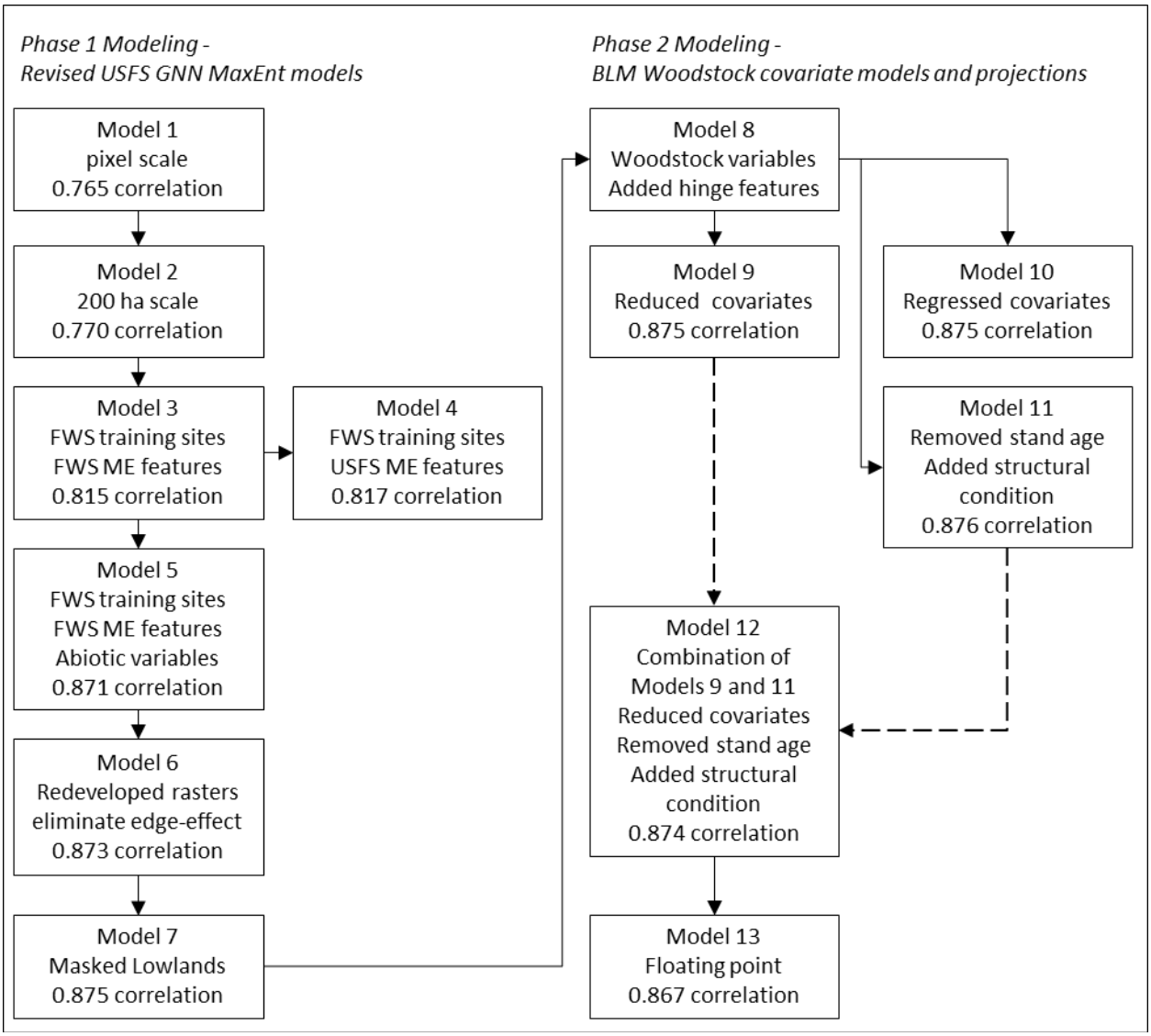


Figure C-1. Flowchart of the BLM MaxEnt modeling sequence. ME refers to MaxEnt.

Model 2

The Model 1 results suggested the influence of an artifact-of-scale; i.e., the correlation would have been stronger if the two sets of MaxEnt models had been calculated at the same scale. Therefore, the BLM ran the comparison again at the 200-ha scale used by the FWS because the GNN data in part were derived from satellite imagery, the spatial accuracy of which increases with scale. Stated another way, although the GNN variable data reasonably describe forest conditions on a landscape, they are less accurate at the 30 × 30-m pixel-scale used by the USFS (see Ohmann and Gregory 2002 and http://www.fs.fed.us/wwetac/projects/ohmann.html). The BLM chose the 200-ha scale, because the BLM intended to use its relative habitat suitability surfaces with the FWS's HexSim model, in which simulated northern spotted owls "select" habitat from a relative habitat suitability surface, and the scale at which northern spotted owls are known to strongly select habitat is the 200-ha (i.e., ~ 500 ac) core use area (see USDI BLM 2015, Chapter 3, Northern Spotted Owl).

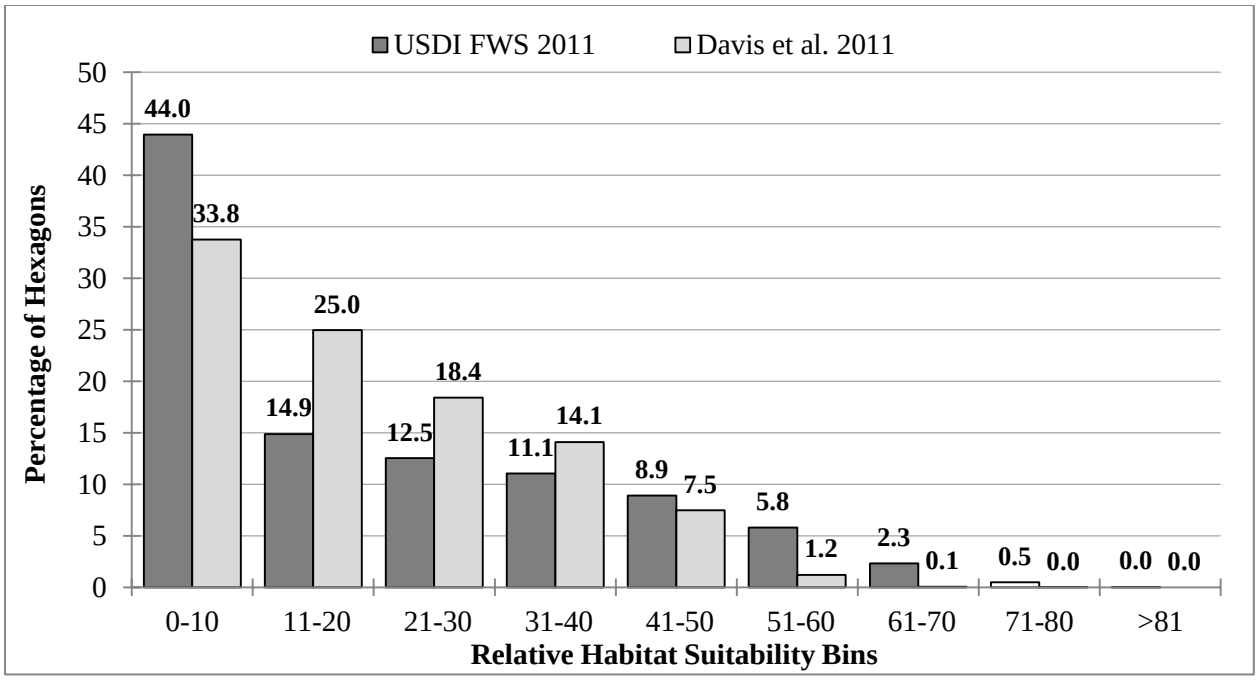


Figure C-2. Distribution of hexagons relative habitat suitability scores among various bins from 2006 GNN MaxEnt models developed by the FWS (USDI FWS 2011, Appendix C) and the USFS (Davis *et al*. 2011).

MaxEnt examines a variety of variables associated with known northern spotted owl nest locations and identifies those variables and combinations of variables, and the relative importance of each variable/combination, that best discriminate between occupied and available locations. The USFS (Davis *et al*. 2011) divided the northern spotted owl range into six modeling regions and used MaxEnt to identify and weigh the best variables/combinations in each region, creating a unique MaxEnt model for each region. To alter the scale of the USFS relative habitat suitability surface, the BLM ran MaxEnt on the same modeling regions defined by the USFS, using the USFS 1996 GNN MaxEnt model for each region, but at the 200-ha scale. In other words, the BLM created a new set of MaxEnt models (Model 2) by running MaxEnt, with the region-specific models developed by the USFS, to calculate new relative habitat suitability values for each 30 × 30-m pixel based on the mean of the values of each variable within the 200-ha circle around each pixel.

The correlation between the FWS 2006 GNN MaxEnt model and the Model 2 estimated relative habitat suitability for hexagons was 0.770. To meet assessment criterion 1, the BLM sought a stronger relationship.

Model 3

Keeping in mind that the USFS (Davis *et al*. 2011) and the FWS (USDI FWS 2011) developed their MaxEnt models for different purposes, the BLM addressed another difference between the two model sets. The USFS MaxEnt models used northern spotted owl nest and pair roost sites from the demographic study areas supplemented by a random subset of northern spotted owl pair sites from the 10-year monitoring report training data set (Davis and Lint 2005) that were outside of the study area boundaries and spaced no nearer to each other than the mean nearest neighbor distance for that modeling region (Ray Davis, USFS, personal communication via e-mail to Eric Greenquist, October 21, 2014). In contrast, the FWS MaxEnt models considered a subset of all known sites (USDI FWS 2011, p. C-21). Because northern spotted owl *known* nest sites tend to occur at greater densities in better habitat, and in areas that

received more survey, when MaxEnt considers all sites, it calculates formulas that can be biased by the similarity of the variables around proximal sites. To help control for this, the USFS and FWS used different approaches to limit the number of known sites MaxEnt could consider (i.e., aware of biased datasets, the agencies took different steps to reduce the bias). For Model 3, and all subsequent models, the BLM used the same northern spotted owl locations used by the FWS.

The BLM also used the same MaxEnt feature sets used by the FWS. Features, in MaxEnt, refer to the functional forms or shapes of relationships evaluated in MaxEnt. The BLM did this to determine if it could use variables used by the USFS (albeit, at the different scale) and that the BLM could estimate with Woodstock, while, at the same time, minimizing other differences between the USFS and the FWS models so that the differences in the respective relative habitat suitability surfaces would not be a function of the differences in either training location or MaxEnt specifications (e.g., the features used).

The correlation between the FWS 2006 GNN MaxEnt models and the Model 3 estimated relative habitat suitability for hexagons was 0.815, an improvement from previous models. Although the BLM determined that this correlation coefficient was sufficiently strong to meet assessment criterion 1, it sought a stronger relationship.[4]

Model 4

Model 4 was identical to Model 3 except that the BLM returned to the MaxEnt features used by the USFS (Davis *et al*. 2011). The correlation between the FWS 2006 GNN MaxEnt models and the Model 4 estimated relative habitat suitability for hexagons was 0.817, nearly identical to that of Model 3, indicating that models 3 and 4 were nearly identical in their predictive capabilities.

Model 5

Model 5 was identical to Model 3 except that the BLM added the abiotic variables elevation, curvature, and relative slope position index (USDI FWS 2011, p. C-25 and Table C9). The correlation between the FWS 2006 GNN MaxEnt models and the Model 5 estimated relative habitat suitability for hexagons increased to 0.871. The BLM determined that this correlation coefficient met criterion 1, but it evaluated whether a stronger relationship was possible.

Model 6

Model 6 was identical to Model 5 except that the BLM redeveloped the variable rasters to match the methods used by the FWS (USDI FWS 2011, p. C-60). The BLM generated GNN variable rasters using buffered USFS modeling regions to eliminate edge effect. Because variable values reflect the mean of all values within a 200-ha circle, the MaxEnt model for a modeling region can be influenced by the lack of data beyond the regional boundary (i.e., up to 800 m beyond the boundary, the area potentially within the radius of a 200-ha circle). Buffering the modeling region caused MaxEnt to clip data at the regional boundary and calculate mean values from only variable values within the region.

The correlation between the FWS 2006 GNN MaxEnt models and the Model 6 estimated relative habitat suitability for hexagons was 0.873. The BLM evaluated whether a stronger relationship was possible.

[4] Although the BLM did not set an *a priori* correlation coefficient to evaluate model assessment criterion 1, statisticians commonly consider a Pearson r coefficient above 8.0 to be strong or very strong (e.g., Dancey & Reidy 2004).

Model 7

Model 7 was identical to Model 6 except that the BLM masked those portions of western Oregon, such as the Willamette Valley and Puget Lowlands that, due to limited habitat, support few, if any, northern spotted owls. This forced MaxEnt to consider more subtle associations between northern spotted owl sites and the habitat variables associated with those sites. In the BLM MaxEnt analyses, masked areas became unavailable to be included in the random subset of available locations to which MaxEnt compared locations occupied by northern spotted owls. Masking these areas resulted in MaxEnt formulas based on forests in which northern spotted owls occurred compared to other, available, forested areas rather than to the broader array of habitat types, some of which were unoccupied by northern spotted owls. This eliminated major areas of non-potential habitat from the models.

The correlation between the FWS 2006 GNN MaxEnt models and the Model 7 estimated relative habitat suitability for hexagons was 0.875.

Through the development of Model 7, the BLM had worked to refine the compatibility of the BLM regional MaxEnt models with those used by the FWS in its HexSim model. As stated earlier, the BLM saw the opportunity to use the unpublished USFS (Davis *et al*. 2011) LandTrendr data to help it forecast changes in relative habitat suitability values on other lands within the northern spotted owl range (lands other than BLM-administered lands in the planning area), and the BLM saw the opportunity to use the FWS's HexSim model to forecast northern spotted owl population responses. With a 0.875 correlation between the Model 7 relative habitat suitability surfaces and those developed by the FWS (both of which used 2006 GNN data), the BLM was confident of its reconciliation.

Model 8

Beginning with Model 8, the BLM replaced the 2006 GNN variable values for BLM-administered lands in the planning area with those produced by Woodstock for 2013. Because the BLM, at this stage, was developing relative habitat suitability surfaces for its administered lands within the planning area, the BLM also begin limiting this, and subsequent models, to the three western Oregon modeling regions defined by the USFS: the Oregon Coast Range, Oregon and California Cascades, and Oregon and California Klamath modeling regions (Davis *et al*. 2011, p. 35). Finally, the BLM added the hinge feature to MaxEnt, adding this feature to the threshold, quadratic and linear features the BLM had added to Model 3. Adding the hinge feature allowed MaxEnt to consider more subtle associations between variables, an attempt to improve its predictive capability.

With these changes, the BLM began an iterative modeling process to—

1. Project the current MaxEnt model for each of the three western Oregon modeling regions to the Woodstock variables (i.e., beginning with Model 8, apply the Model 8 MaxEnt formulas to the 2013 Woodstock-generated variable values for BLM-administered lands in the planning area) by using the MaxEnt .lamdas files from the model developed with the 1996 GNN data;[5]
2. Evaluate the projected MaxEnt outputs by (a) relative habitat suitability bins and (b) strength-of-selection habitat class distributions[6] through the decadal time-series (2013-2063);
3. Refine the model variables (i.e., generate new models, beginning with Model 9), and;

[5] To clarify: The BLM developed all of its Maxent models using 1996 GNN data, then projected those models to 2006 GNN, 2012 GNN and 2013 Woodstock data.

[6] Based on its modeling needs (see USDI BLM 2015, Chapter 3, Northern Spotted Owl), the BLM divided northern spotted owl habitat into categories based on strength-of-selection. This was similar to the process used by the FWS (USDI FWS 2011, pp. C-31 – C-39) but, in the BLM's case, the BLM used four categories: (1) "strongly selected against," (2) "selected against," (3) "selected for," and (4) "strongly selected for." For additional information, see Section A, C, 1 of this appendix.

4. Repeat steps 1 through 3 with each set of new and refined MaxEnt models until all three assessment criteria were met.

As further explanation, MaxEnt is a multivariate model; i.e., its predictions are influenced by both the state of individual variables and how each variable co-varies with the other model variables. The FWS (USDI FWS 2011) and USFS (Davis *et al*. 2011) MaxEnt models were projected to 2006 GNN data. In contrast, for BLM-administered lands in the planning area, the BLM would use the variable values derived from Woodstock. Thus, the BLM began evaluating how the 2006 GNN- and 2013 Woodstock-derived variables co-varied.

Figure C-3 shows scatterplots of the relationship between each pair of the biotic variables from 2006 GNN data (left) and 2013 Woodstock data (right) for BLM-administered lands in the planning area. The BLM did not evaluate abiotic variables because the sources of those variables are the same for both models. For the initial comparisons, the BLM evaluated 2006 GNN data (the most recent dataset available at the time) and Woodstock's estimates for 2013 conditions on BLM-administered lands in the planning area. It is important to note that the GNN and Woodstock datasets were derived through substantively different processes, so the BLM anticipated substantive, albeit undefined, differences between the two datasets.

The comparisons revealed very different relationships between stand age (AGE in **Figure C-3**) and canopy cover of all conifers (CCC), stand age and stand height (STNDHT), stand age and the number of large conifer trees per hectare (TPHC), canopy cover of all conifers and stand height, canopy cover of all conifers and stand diameter diversity index (DDI), canopy cover of all conifers and quadratic mean trunk diameter of conifers (QMDC), and canopy cover of all conifers and the number large conifer trees per hectare. Most disconcerting were the differences in the relationships of conifer canopy cover to stand height, diameter diversity index, mean conifer trunk diameter, and the number of large conifer trees per hectare. In all cases, Woodstock estimated that, as canopy cover increased beyond approximately 70 percent, each of these variables would decrease. In contrast, GNN represented these same relationships as increasing in all cases, though the rate of increase varied from slight (number of large conifer trees per hectare) to rapid (stand height and stand diameter diversity index).

In accordance with assessment criterion 2 the BLM also compared the models in terms of decadal progressions of relative habitat suitability. To this point, the correlations the BLM had calculated were between the FWS's 2006 GNN MaxEnt models and the BLM 2006 GNN MaxEnt models at both modeling region and range-wide scales. For the BLM Woodstock models, the focus of the evaluation was the temporal trend in relative habitat suitability and habitat distributions. Given that the first projection of habitat change in the BLM's Woodstock model was the No Timber Harvest Reference Analysis, the BLM expected that the percentage of BLM-administered land with low relative habitat suitability would decrease while the percentage in intermediate and higher relative habitat suitability would increase. The BLM based this expectation on its knowledge that northern spotted owls preferentially select areas with larger trees and more structural complexity and, as trees get older, they get larger and such forests acquire more structural diversity. The BLM did not have a specific expectation on the exact quantity or percentage of BLM-administered land in lower, intermediate, and high relative habitat suitability bins, only of the trends over time in each of those bins. The BLM's evaluations were meant to check on the trends.

However, as shown in **Figure C-4**, although the temporal trends in relative habitat suitability showed a reduction over time in the percentage of the landscape in the lowest relative habitat suitability categories and an increase in the highest relative habitat suitability category, the trend in the intermediate categories (40-50, 50-60, 60-70) were in the opposite direction than what was expected, particularity in the Oregon and California Cascades Modeling Region (**Figure C-4 B**).

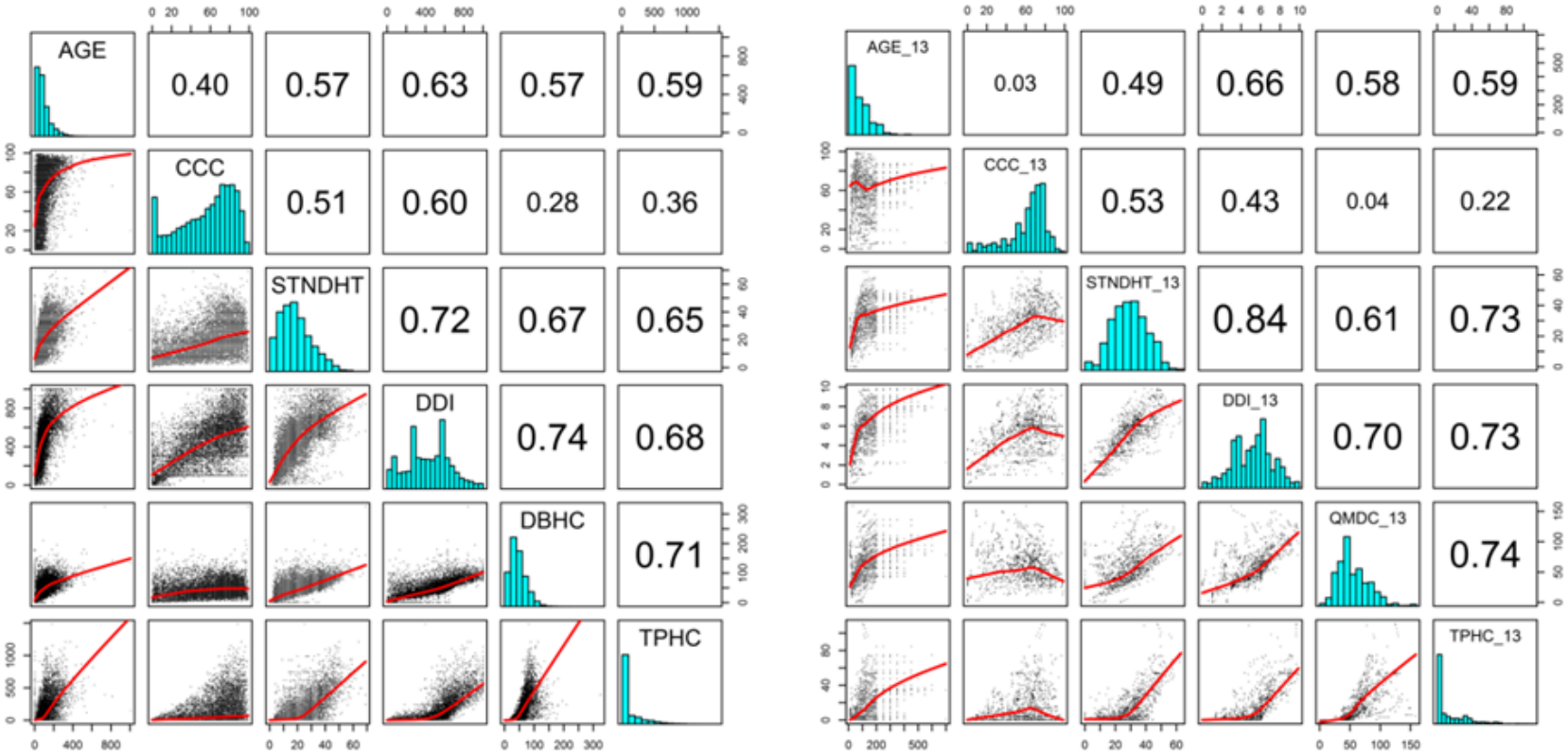


Figure C-3. Bivariate scatterplots for select 2006 GNN variables for the three western Oregon modeling regions (left) and 2013 Woodstock variables for BLM-administered lands in the planning area (right). Both matrices display the XY scatter plots for each pair of variables, using a non-linear LOWESS smoother (locally-weighted scatterplot smoothing, a type of non-parametric regression) for the fitted line, in the lower left, the covariate histogram for each pair of variables across the diagonal, and the Pearson's correlation coefficient for each pair of variables in the upper right. Variable abbreviations are defined in the text, below, except DBHC which refers to the mean trunk diameter of conifers, similar to quadratic mean trunk diameter of dominate and co-dominate conifers (QMDC_13).

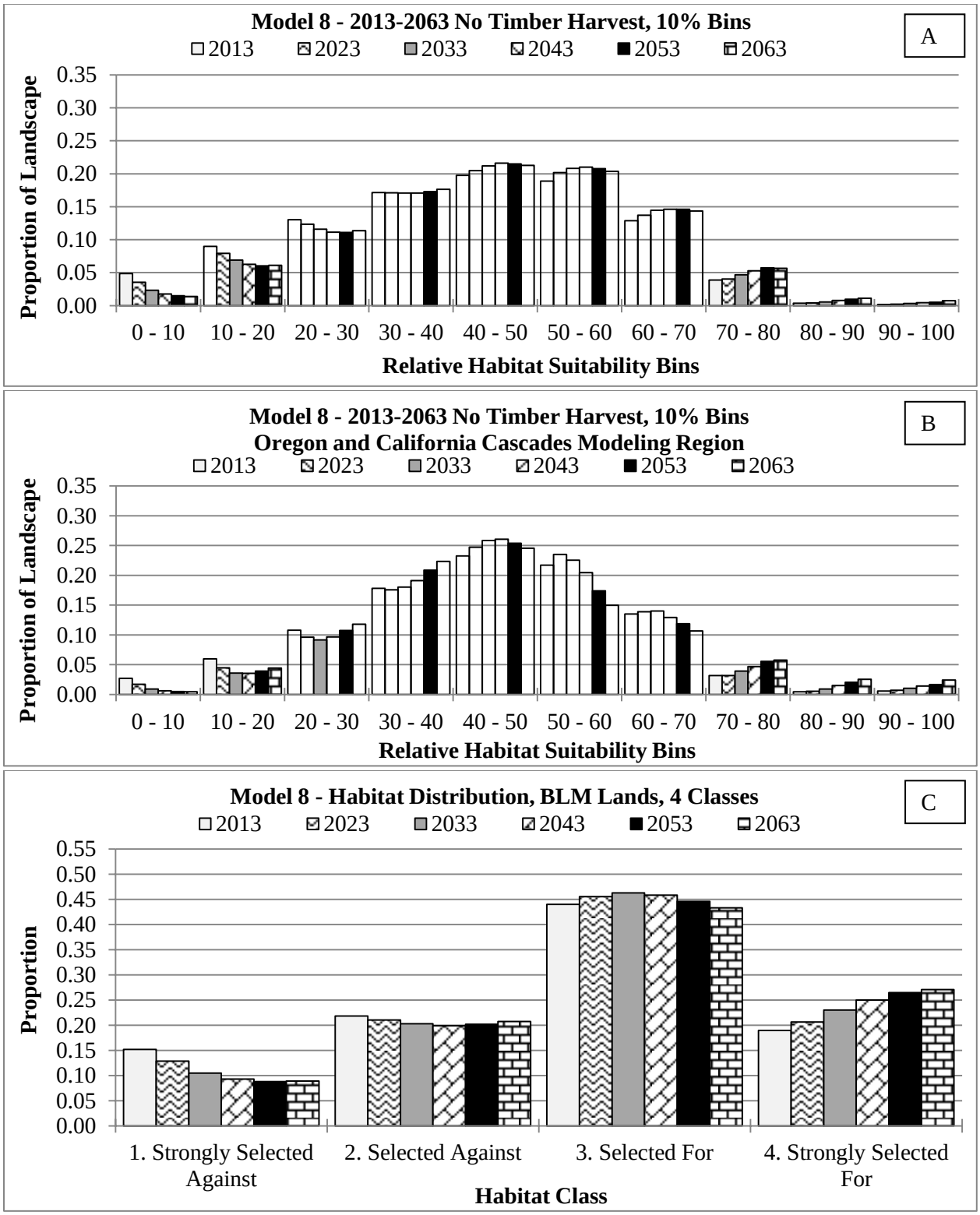


Figure C-4. No Timber Harvest: distribution of relative habitat suitability by decade for Model 8, on BLM-administered lands in the planning area (A and C), and on BLM-administered lands in the Oregon and California Cascades Modeling Region (B). Histograms A and B show the portion of BLM-administered lands in each relative habitat suitability bin at the start of each of six decades. Histogram C

shows the portion of BLM-administered lands in each strength-of-selection bin at the start of each of six decades.

In part, these trends in variable value with age and relative habitat suitability progression arose because the models generated from Woodstock variable data were not always indicative of how forests on BLM-administered lands develop. For example, an existing 140-year-old stand on BLM-administered land does not exhibit the structural characteristics that an existing 40-year-old stand would be expected to exhibit in one-hundred years. The 40-year old stand might have received commercial thinning and other silvicultural practices that would result in different stand metrics when it eventually becomes 140 years old. Timber harvests before 1960 tended to be more extensive and intensive than later harvests, and subsequent regeneration commonly occurred through natural seeding. In contrast, timber harvests after 1960 more likely left legacy trees and riparian buffers, and the subsequent regeneration more commonly was the result of planting, fertilization, and thinning. Thus, younger stands on BLM-administered lands commonly exhibit some structural characteristics, such as canopy cover, that are greater than those of some older stands.

This analysis revealed that the BLM could not simply use Model 8 with the Woodstock-derived variable values. For example, as shown in **Figure C-3**, in the BLM 2013 Woodstock MaxEnt model, stand height was very influential. In the 2006 GNN data, stand height increased nearly linearly with stand age (**Figure C-3**, left matrix, STNDHT/AGE). In contrast, according to the 2013 Woodstock data, stand height increased rapidly with increasing age for young stands, but then the rate of increase decreased dramatically (**Figure C-3**, right matrix, STNDHT_13/AGE_13). The effect of these many differences was that, when the BLM used the Model 8 MaxEnt formulas (which were derived from 1996 GNN data) with the 2013 Woodstock variable values, relative habitat suitability decreased as stands got older, or, at least, their rate of increase was less than represented by the GNN data. Therefore, the BLM had to further modify its MaxEnt model to better reconcile how the 2013 Woodstock and 2006 GNN variables co-varied.

The BLM dealt with the appreciably different forms of relationships between the 2006 GNN and 2013 Woodstock variables by removing some of those variables, as described below. At this point, the BLM questioned whether it could meet model assessment criteria 2 and 3, especially given that age was an influential variable in the models. Additionally, similar to previous models, the BLM evaluated whether it could find stronger relationships between its newly-developed models and the model developed by the USDI FWS (2011).

Model 9

Model 9 was identical to Model 8 except that the BLM reduced the variable set of each modeling region based on its evaluation of differences in 2006 GNN and 2013 Woodstock variable distributions observed in the scatterplots and histograms generated by Model 8. The BLM removed those variables that strongly influenced a model's predictions and co-varied with other variables substantially differently within the 2006 GNN and 2013 Woodstock data. For the Oregon and California Klamath Region the BLM removed canopy cover of all conifers (CCC in **Figure C-3**) and the number of large conifer trees per hectare (TPHC); for the Oregon and California Cascades Region the BLM removed stand height (STNDHT) and the number of large conifer trees per hectare; and for the Oregon Coast Range Region the BLM removed stand height. Removing these variables allowed other variables to become more influential in the models. The reduced sets of variables produced what the BLM interpreted as a more reasonable distribution of changes in relative habitat suitability by decade, given the habitat change under the No Timber Harvest Reference Analysis.

Figures C-5 and **C-6** compare the results of Models 9 and 8; Model 9 demonstrated a more-expected distribution of relative habitat suitability by decade.

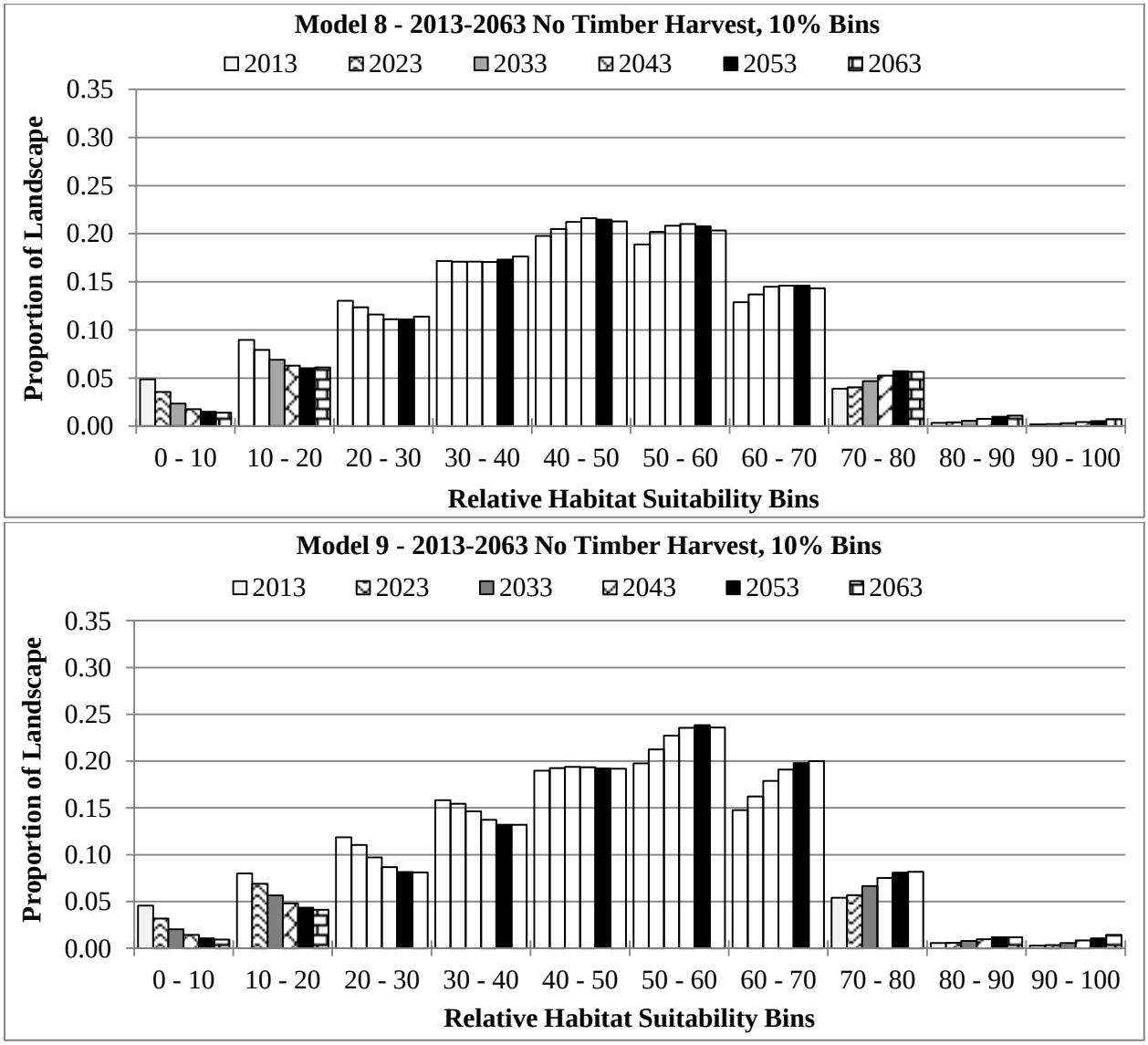
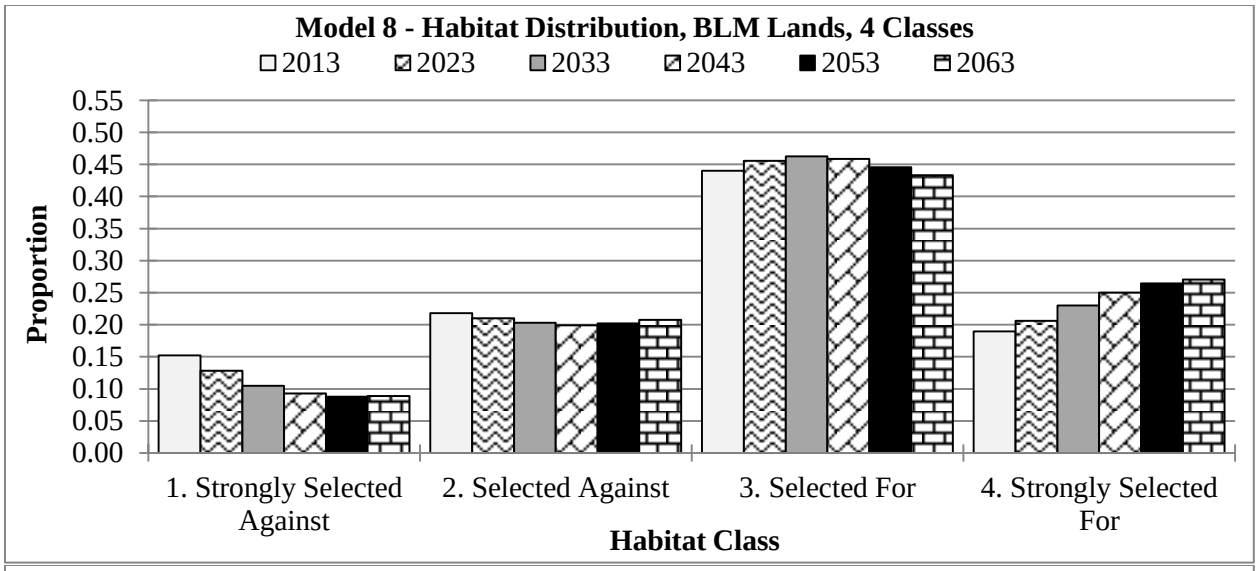


Figure C-5. No Timber Harvest: distributions of relative habitat suitability by decade for Model 8 and Model 9 on BLM-administered lands in the planning area. The histograms show the portion of BLM-administered lands in each relative habitat suitability bin at the beginning of each of six decades.



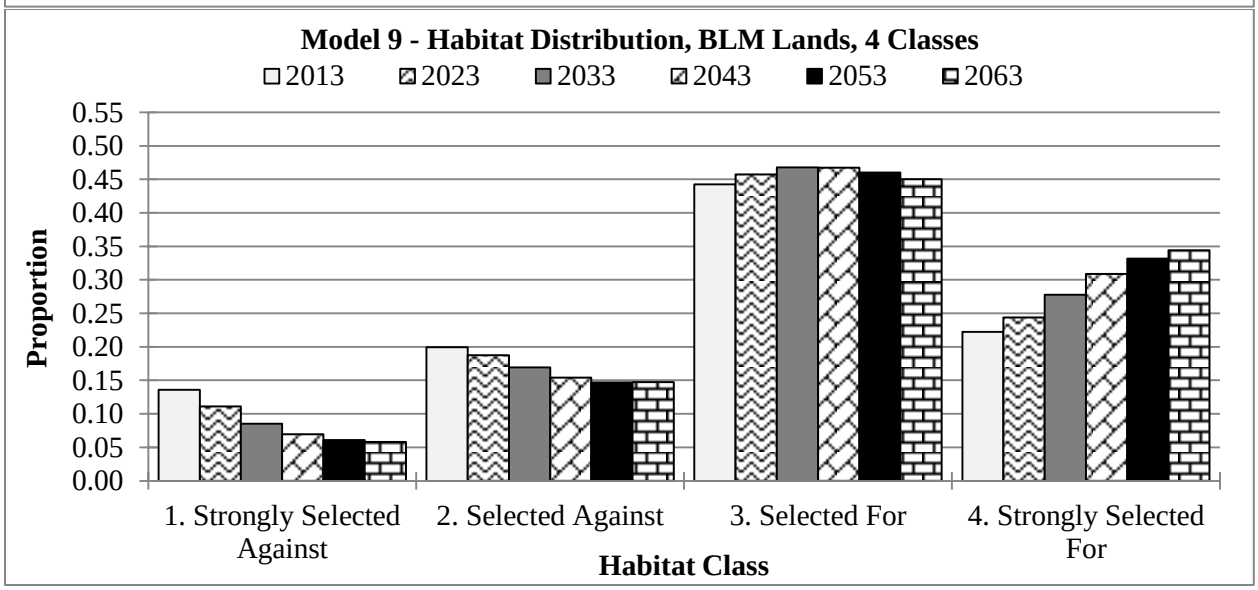


Figure C-6. No Timber Harvest: distribution of relative habitat suitability by decade for Model 8 and Model 9, on BLM-administered lands in the planning area. The histograms show the portion of BLM-administered lands in each strength-of-selection bin at the beginning of each of six decades.

The correlation between the FWS 2006 GNN MaxEnt models and the Model 9 estimated relative habitat suitability for hexagons was 0.875, identical to that of Model 7. Nonetheless, the lack of the expected increase in the selected-for habitat class in **Figure C-6** indicated the need for further refinement. The BLM still questioned whether it could meet model assessment criteria 2 and 3, given that age was an influential variable in the models.

Model 10

Model 10 was identical to Model 8 except that, for those modeling regions and for those variables that showed declines with age, the BLM created regression equations to predict each of those variables as a function of age. The regression equations that best fit the data always were logarithmic (threshold) relationships and had the effect of smoothing the associations. The BLM did this because these variables

appeared in the original 2006 GNN MaxEnt models, but, for the 2013 Woodstock representation of BLM-administered lands, they sometimes showed counter-intuitive relationships—such as mean tree diameter and stand height declining as stands aged—only to sometimes increase at older ages. In part, these relationships probably were an artifact of limited data; relatively few BLM inventory plots exist in forest stands with very old trees. The BLM developed these regression equations within each of the three western Oregon modeling regions. The BLM also removed canopy cover of all conifers from the set of modeling covariates, because the distribution relative to age, even when regressed, was highly inconsistent with GNN canopy cover distributions.

As shown in **Figure C-7**, when compared to Model 9, Model 10 generated a more-expected and logical trend in relative habitat suitability change over time. The correlation between the FWS 2006 GNN MaxEnt models and the Model 10 estimated relative habitat suitability for hexagons again was 0.875. However, the BLM subsequently determined that Model 10 was not viable due to issues with the stand age variable.

Woodstock, when it forecasts the treatment of a stand, does not threat stand age consistently. Instead, when Woodstock forecasts a treatment, it retains the original stand age or resets the stand age to 0, depending on the nature of the treatment (e.g., light thinning versus regeneration harvest). Thus, over time, forest stands of the same age value could have substantially different values for other variables. Since the BLM was creating relative habitat suitability surfaces for different decadal time steps, it could not rely on stand age as a variable. For this reason, Model 10 was not viable.

Model 11

Model 11 was identical to Model 8 (using non-regressed covariates) except that the BLM removed age as a variable for the reason described under Model 10. Instead, the BLM added the Woodstock "structural condition" variable because structural condition is a GNN-defined categorical variable that also can be derived from Woodstock data. The GNN structural condition classes included: sparse, open, sapling/pole, small/medium tree, large tree, and large/giant tree.

The correlation between the FWS 2006 GNN MaxEnt models and the Model 11 estimated relative habitat suitability for hexagons was 0.876, almost identical to that of Model 9. Nonetheless, as shown in **Figure C-8**, regarding model assessment criterion 2, the modified set of variables resulted in relative habitat suitability progressions that the BLM interpreted as less logical than expected.

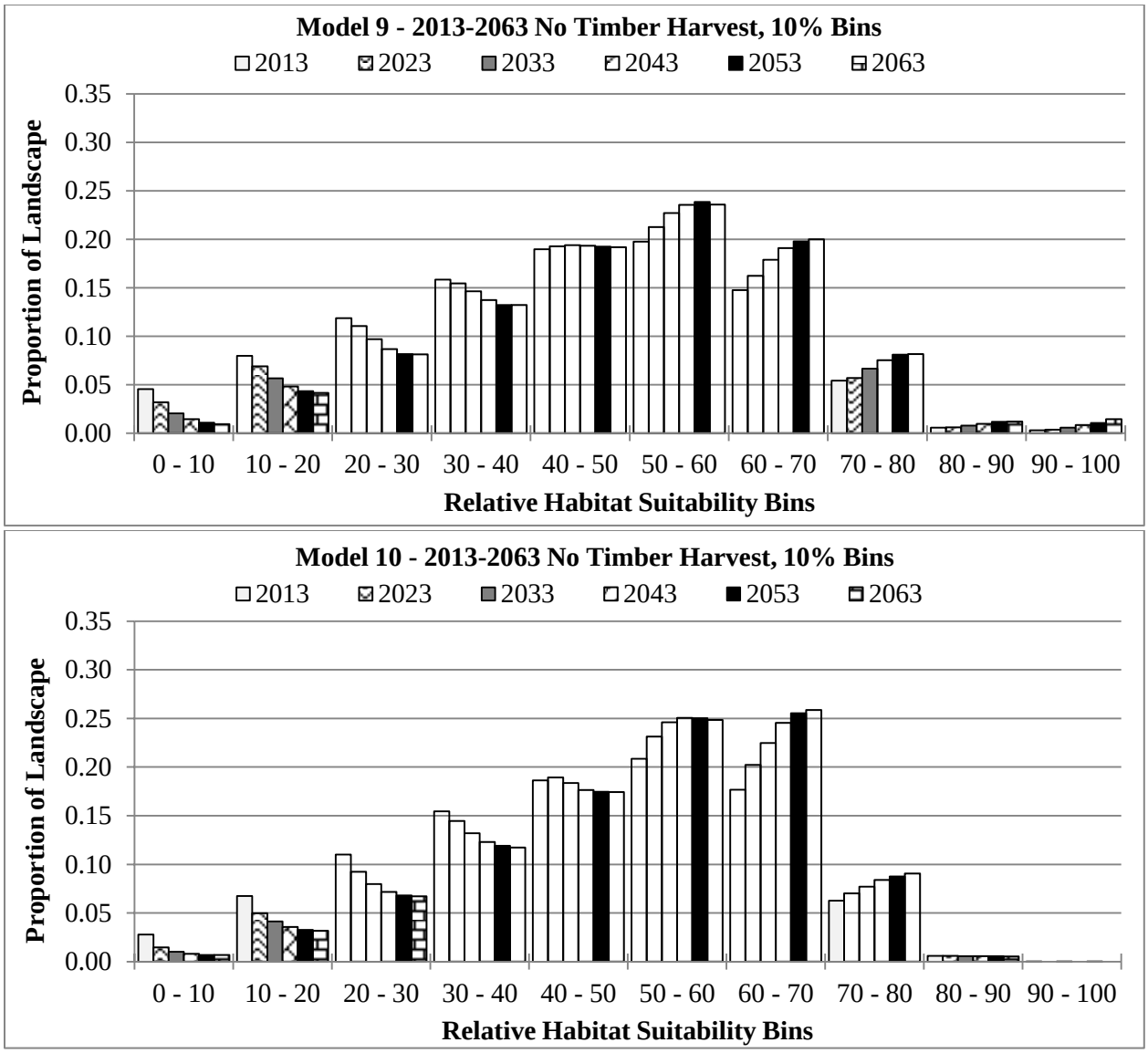


Figure C-7. No Timber Harvest: distributions of relative habitat suitability by decade for Model 9 and Model 10 on BLM-administered lands in the planning area. The histograms show the portion of BLM-administered lands in each relative habitat suitability bin at the beginning of each of six decades.

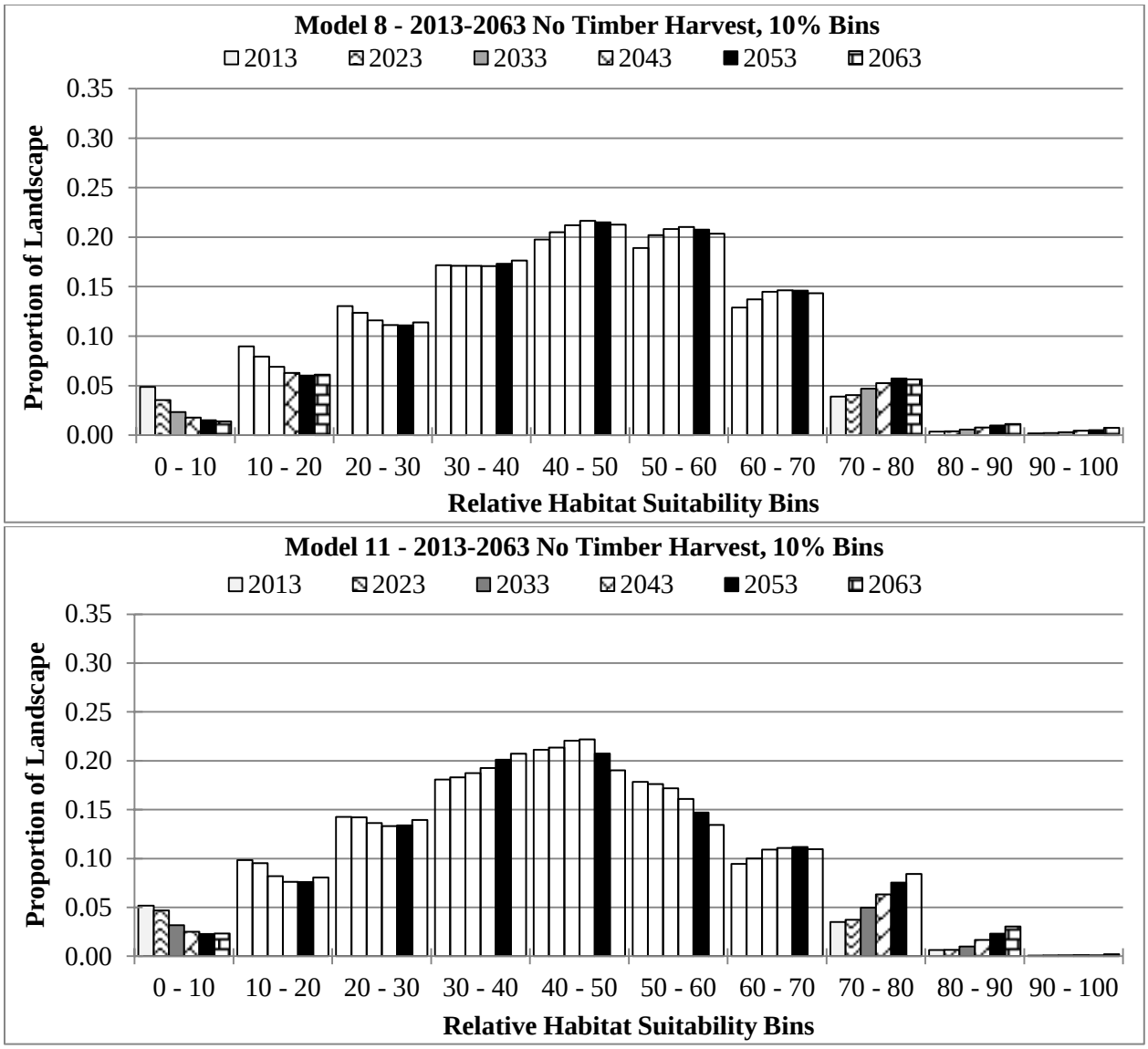


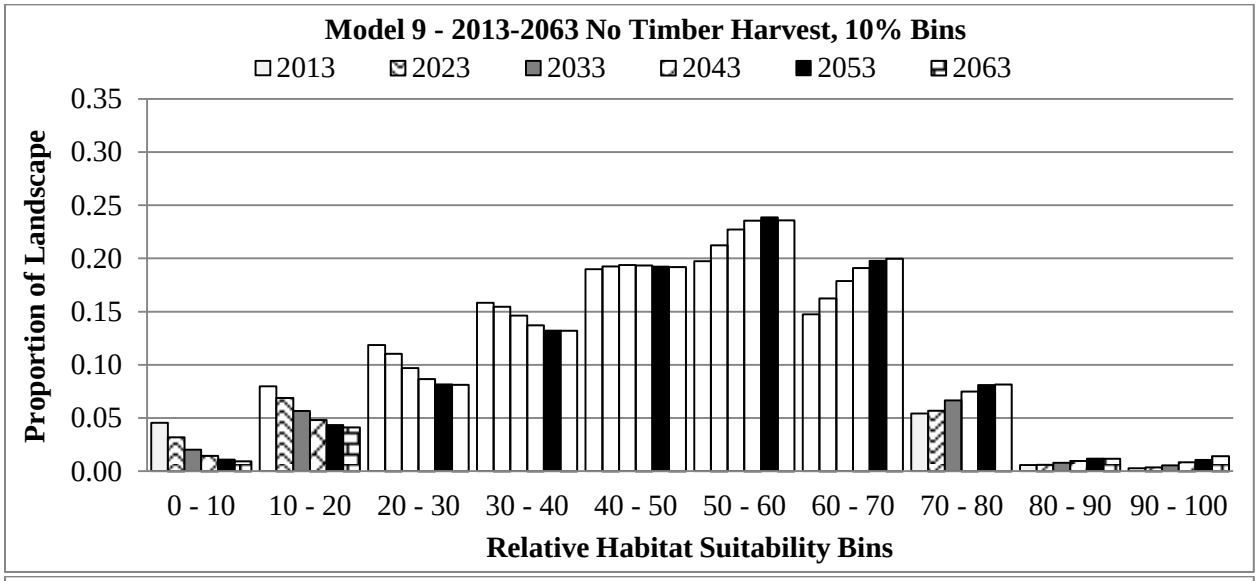
Figure C-8. No Timber Harvest: distributions of relative habitat suitability by decade for Model 8 and Model 11 on BLM-administered lands in the planning area. The histograms show the portion of BLM-administered lands in each relative habitat suitability bin at the beginning of each of six decades.

Model 12

Model 12 was a combination of the refinements implemented in models 9 and 11. The BLM used the same reduced set of variables used in Model 9, and removed age (because of the age-related issues described under Model 10) and added structural condition as it had in Model 11.

Figures C-9 and **C-10** compare the decadal relative habitat suitability progressions under Models 9 and 12. Although Model 9 had generated the best previous distribution, it also included stand age as a variable, which Woodstock did not treat in a consistent manner. Model 12 was the best set of revised variables the BLM was able to develop. The Model 12 relative habitat suitability progressions were very similar to those for Model 9 in terms of showing the expected progression of relative habitat suitability by decade, but also showed slightly lower relative habitat suitability values overall (as seen in the higher suitability bins).

The correlation between the FWS 2006 GNN MaxEnt models and the Model 12 estimated relative habitat suitability for hexagons was 0.874. Based on this correlation coefficient and the progressions shown in **Figures C-9** and **C-10**, the BLM determined that Model 12 fulfilled its three model assessment criteria.



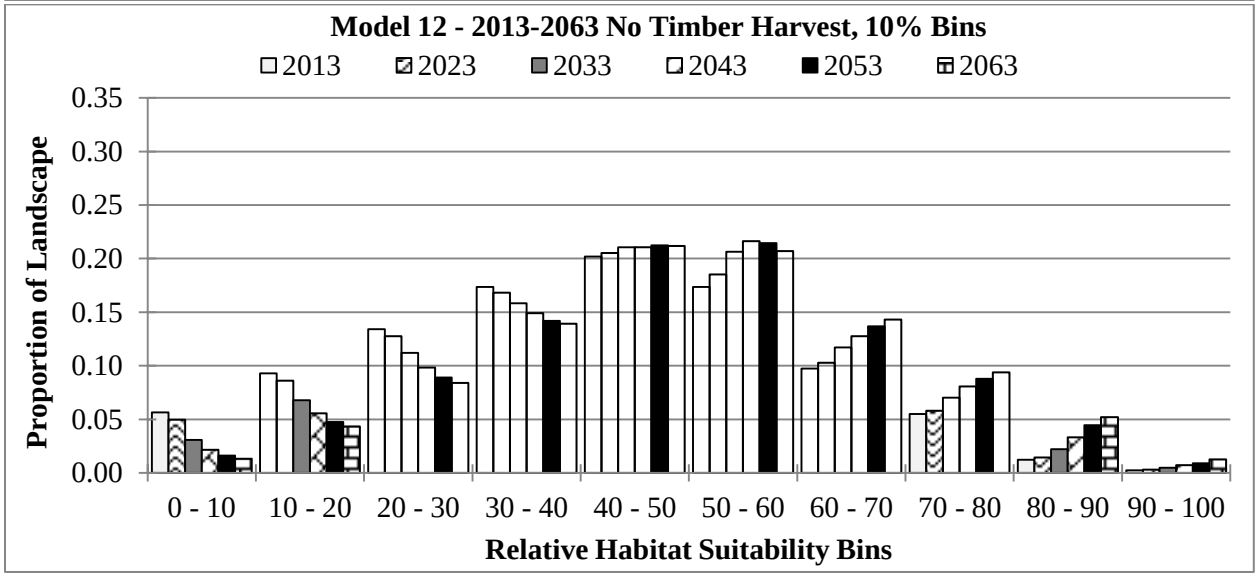
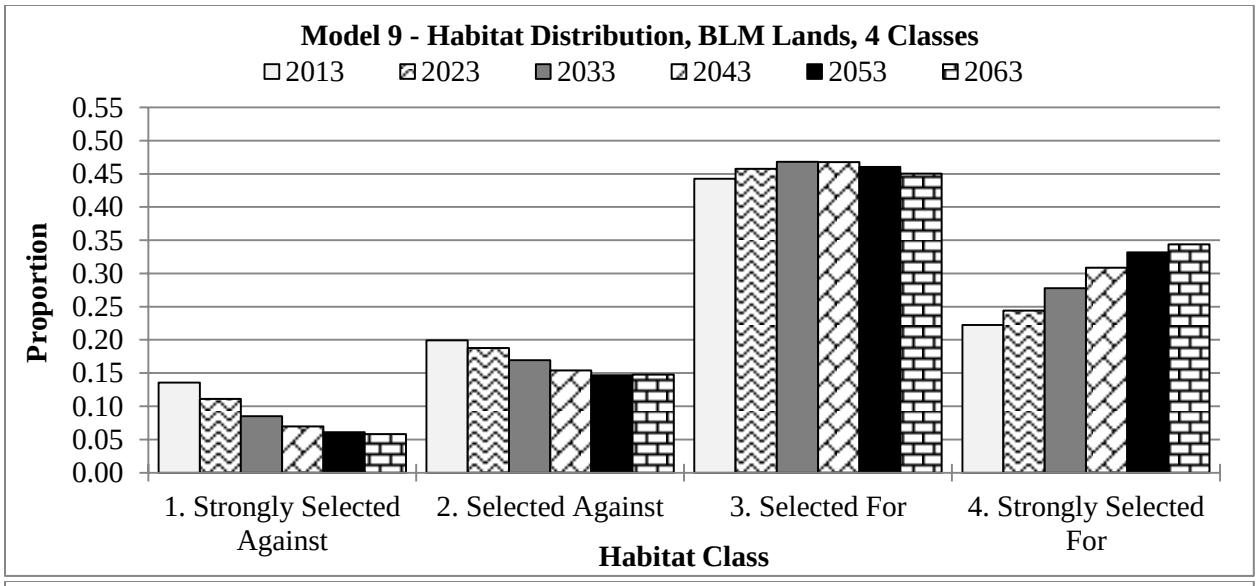


Figure C-9. No Timber Harvest: distributions of relative habitat suitability by decade for Model 9 and Model 12 on BLM-administered lands in the planning area. The histograms show the portion of BLM-administered lands in each relative habitat suitability bin at the beginning of each of six decades.



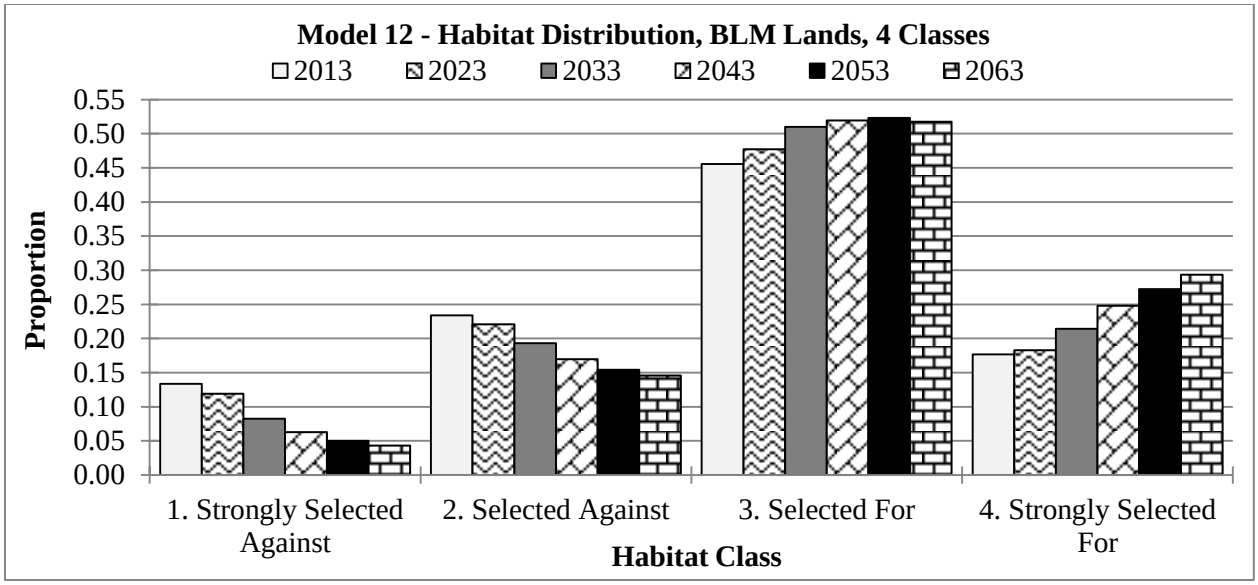


Figure C-10. No Timber Harvest: distribution of relative habitat suitability by decade for Model 9 and Model 12 on BLM-administered lands in the planning area. The histograms show the portion of BLM-administered lands in each strength-of-selection bin at the beginning of each of six decades.

Model 13

Model 13 became the final BLM model. It was identical to Model 12, except that the BLM used floating point values, rather than integer values, to conform GNN covariate values to Woodstock output precision (i.e., to better reconcile the data going into the 2006 GNN and 2013 Woodstock models). Floating point values include decimals; integers are whole numbers.

The correlation between the FWS 2006 GNN MaxEnt models and the Model 13 estimated relative habitat suitability for hexagons was 0.867. For the three western Oregon modeling regions, this set of models included eleven variables for each of the modeling regions. **Table C-1** shows the variables and their relative contributions. As described below, the BLM determined that Model 13 fulfilled its three model assessment criteria. The BLM's earlier attempts to fine-tune models so as to increase the correlation between its newly-developed models and those of the USDI FWS (2011) were reasonable but, by this

point, the BLM recognized that hexagon correlations of 0.860 to 0.870 were as strong as it likely would get, given inherent differences in the sources of the 2006 GNN and 2013 Woodstock variables.[7]

Table C-1. Model 13 variables and percent contributions by modeling region. Missing values indicate that the BLM did not use the variable for the modeling region. The modeling regions are the Oregon and California Klamath (KLAMT), the Oregon and California Cascades (ORCAS), and Oregon Coast Range (ORCOA), described by Davis *et al*. (2011).

Covariate	Covariate Description	KLAMT	ORCAS	ORCOA
ccc	Canopy cover of all conifers		0.45	1.0213
curv	Topographic curvature	5.0242	3.122	2.3622
dbhc	Basal-area weighted mean diameter of all live conifers	1.0851	11.3159	0.2664
ddi	Diameter diversity index	5.5428	40.1345	12.9418
elev	Elevation	1.1043	4.1592	2.6962
evghwd	Evergreen hardwood composition type	2.4068	4.1657	7.8237
oak	Oak composition type	6.6165	0.8094	
pine	Pine composition type	2.0507	13.552	6.4613
rpi	Relative position index (% slope position in 200 ha window)	29.631	12.8439	9.5835
stndht	Stand height, computed as average of heights of all dominant and codominant trees	44.6563		
struccond	Structural condition (lumping of Johnson and O'Neil's (2001) SIZECL and COVCL	0.3544	4.4098	0.2031
subalp	Sub-alpine composition type	1.528	5.0377	1.6429
tphc	Density of all live conifers ≥ 75 cm DBH			54.9975

Before accepting Model 13, the BLM compared the Model 13 distribution of hexagons among relative habitat suitability bins with that of the FWS (USDI FWS 2011) 2006 GNN MaxEnt model for: 1) BLM-administered lands in the planning area within the three western Oregon modeling regions and 2) all lands within those regions. To do this, the BLM "updated" the FWS relative habitat suitability surfaces by projecting the FWS's MaxEnt models, which the FWS had trained on 1996 GNN data (see footnote on p. 1), to newly-available 2012 GNN data (http://lemma.forestry.oregonstate.edu/data/structure-maps). (For brevity, these new models hereafter are referred to as the FWS 2012 GNN MaxEnt models, even though the BLM created them.) The BLM did this to reduce the temporal differences between the 2006 GNN and the 2013 Woodstock datasets.

The BLM evaluated relative habitat suitability distributions among eight relative habitat suitability bins (the largest bin being greater than 70, because so little of the landscape existed above that value). Thus, for the three modeling regions and eight bins, there were 24 modeling region by bin comparisons for the two sets of models. As shown in **Figure C-11**, the largest absolute value of difference was 5 percentage points and the smallest difference was 0 percentage points. Of the 24 comparisons, the most frequent difference was an absolute value of 1 percentage point (nine times), followed by 5 percentage points and 4 percentage points (four times each), 2 percentage points and 0 percentage points (three times each), and 3 percentage points (one time). Thus, the two sets of models predicted similar amounts of the landscape

[7] GNN variables are derived from vegetation measurements from regional networks of field plots and Landsat imagery data to characterize forest vegetation across a region; see Ohmann and Gregory (2002). Woodstock variables are derived from BLM Forest Operations Inventory (forest stand exam) data and USFS/BLM Current Vegetation Survey (https://www.fbo.gov/index?s=opportunity&mode=form&id=bed33e38414e6986bc3dbada90bde22a&tab=core&_cview=1) data.

(all lands within each modeling region or only BLM-administered lands within each modeling region) within each of the relative habitat suitability bins.

As shown in **Figure C-12**, the BLM also found, when mapped, a strong similarity in the spatial distribution of relative habitat suitability values between the two sets of models. Most differences were minor rather than one model predicting very high suitability for an area while the other model predicted very low suitability for that area.

Also, before accepting Model 13, the BLM examined the distribution of the northern spotted owl known sites used to train Model 13 (training sites) with those known sites withheld from model development (test sites) as described in the description of Model 3. There were 2,465 training sites in the northern spotted owl range (of which 490 occurred on BLM-administered lands in the planning area) and 925 test sites in the northern spotted owl range (of which 164 occurred on BLM-administered lands).

Figure C-13 compares the range-wide distributions of training sites among relative habitat suitability bins for the FWS 1996 GNN MaxEnt models and the BLM 1996 GNN Model 13,[8] The distributions are similar. **Figure C-14** makes the same comparison of the test sites. The distributions are not as similar as for the training sites, which are expected because the models were trained on the training sites. Nonetheless, the two distributions in **Figure C-14** follow similar trends.

The BLM made similar comparisons for BLM-administered lands in the planning area, this time using the FWS 2012 GNN MaxEnt models and the BLM 2013 Woodstock Model 13. **Figure C-15** shows the distributions for training sites on BLM-administered lands in the planning area; **Figure C-16** shows the distributions for test sites on the same lands. As expected, the distributions are less similar than the range-wide distributions shown in **Figures C-13** and **C-14** because of the smaller numbers of sites associated with BLM-administered lands in the planning area and because of substantive differences in the origins of the 2012 GNN and 2013 Woodstock data. Because the Woodstock variables were derived from forest stand exam and Current Vegetation Survey plot data (i.e., on-the-ground examination and measurement), the BLM is confident of the accuracy of the Woodstock variables for BLM-administered lands in the planning area. Nonetheless, **Figures C-13** to **C-16** suggest that Model 13, as used by the BLM, inflates relative habitat suitability values. As explained below, this almost certainly is an artifact of truncating Model 13 to BLM-administered lands.

As described above, MaxEnt calculates relative habitat suitability based on variable values within a 200-ha circle. GNN data, used in the FWS MaxEnt models, were available for all lands within the northern spotted owl range. However, the BLM developed Woodstock data only for BLM-administered lands in the planning area. The BLM uses Woodstock data, because it is the most accurate data for BLM-administered lands. However, an artifact arises when the BLM applies Model 13 to BLM-administered lands that abut other lands (i.e., lands within 800 m of BLM-administered lands, which is the radius of a 200-ha circle). In this case, the BLM could use Model 13 to calculate relative habitat suitability values for 2013 based on 2013 Woodstock data for BLM-administered lands and 2012 GNN data for other lands. However, the BLM cannot do this for subsequent decades, because there are no reliable data on how individual GNN values vary and co-vary over time. As described below, the BLM simulated changes in relative habitat suitability values on other lands by developing a 2012 relative habitat suitability surface for each modeling region, and then changing relative habitat suitability values according to the calculated effects of ingrowth, wildfire, and timber harvest on those values at decadal increments. However, the BLM could not do the same for the underlying GNN variable values used to calculate relative habitat suitability. Stated another way, Woodstock generates new variable values for BLM-administered lands at

[8] As explained in the footnote on page 1, the FWS used 1996 GNN data to train its MaxEnt models. The BLM developed Model 13 using the same data for the comparison.

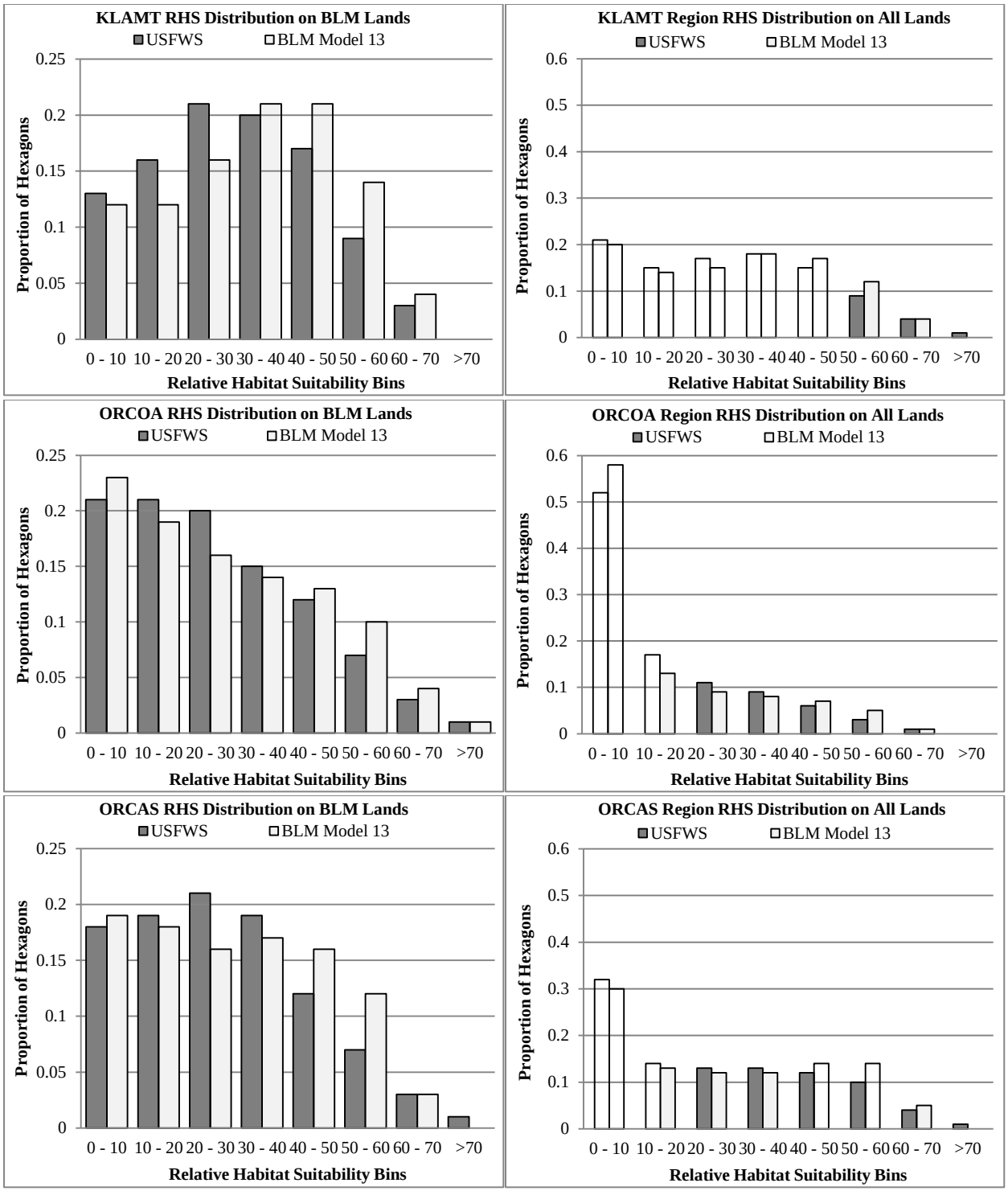


Figure C-11. Comparisons of the distribution of relative habitat suitability at the hexagon scale, on BLM-administered lands (left column), and all lands (right column), in the Oregon and California Klamaths, Oregon Coast Range and the Oregon and California Cascades modeling regions (described by Davis *et al*. 2011). The FWS relative habitat suitability surfaces are based on the FWS's 2012 GNN MaxEnt model. The BLM surfaces are based on the BLM 2013 Woodstock Model 13.

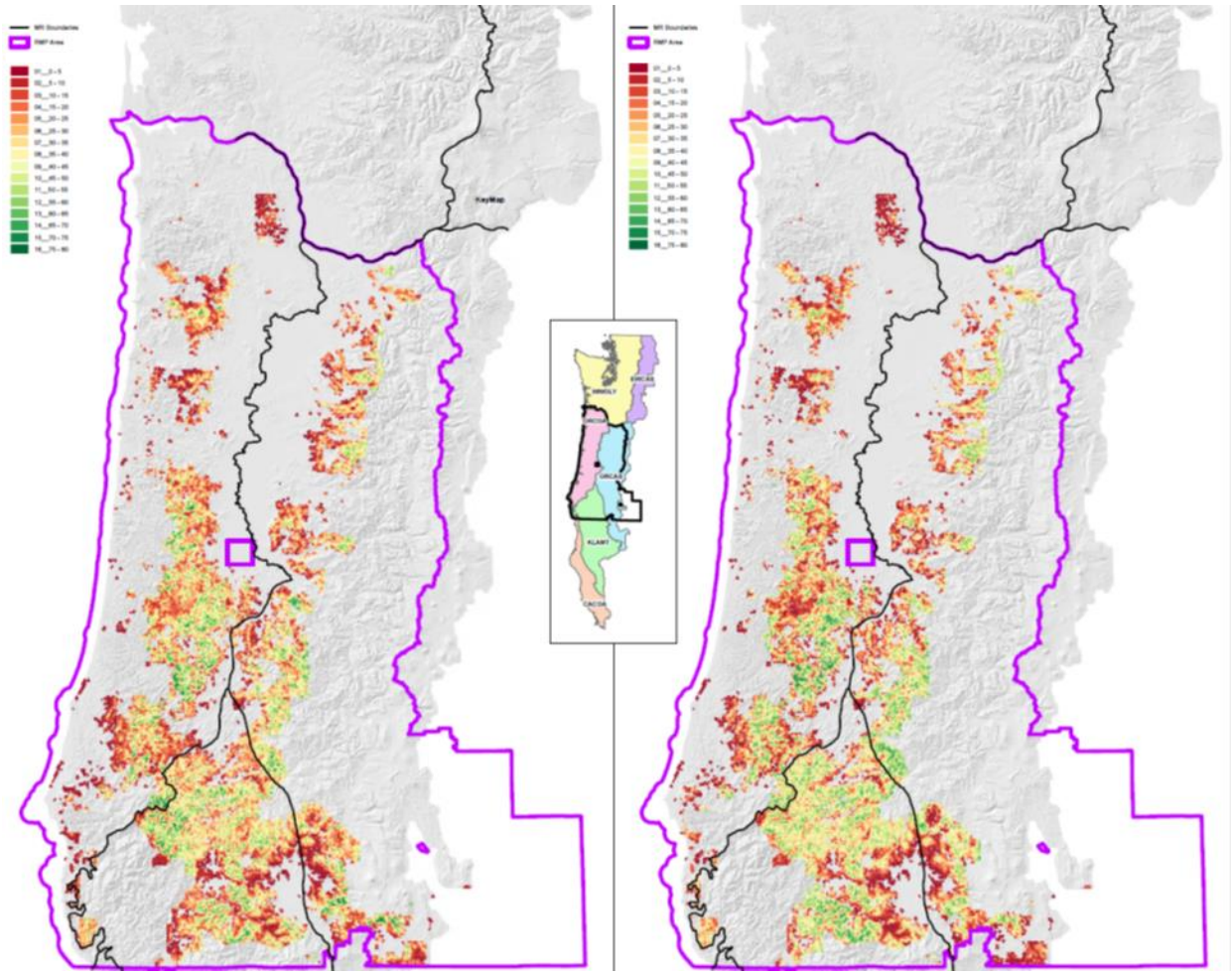


Figure C-12. Spatial distribution of relative habitat suitability for the FWS 2012 GNN MaxEnt model (left) and the BLM 2013 Woodstock Model 13 (right). Greener areas represent higher relative habitat suitability whereas redder colors represent lower relative habitat suitability

decadal increments. However, after 2012, there are no comparable GNN values available for other lands abutting BLM-administered lands. Thus, after 2013, Model 13 must calculate relative habitat suitability values for BLM-administered land using only Woodstock data. Since forest conditions on BLM-administered lands commonly support northern spotted owls better than those on adjacent lands, which frequently are industrial timber lands, the BLM method appears to inflate relative habitat suitability values on its own administered lands. This is not a weakness of Model 13. Instead, it is an artifact of data limitations for other lands within 800 m of BLM-administered lands in the planning area. After publishing the Draft RMP/EIS, the BLM further refined its relative habitat suitability forecasts (see Section A, D of this appendix).

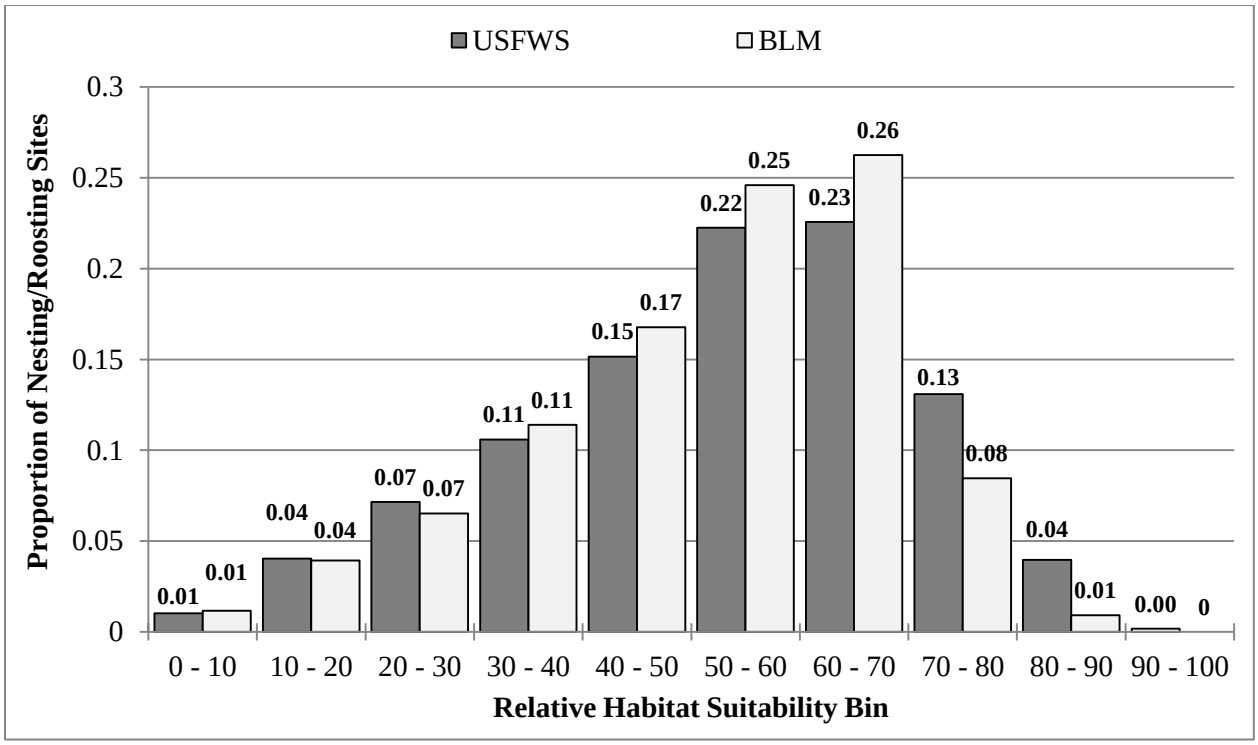


Figure C-13. Range-wide distribution of relative habitat suitability values among training northern spotted owl sites for the FWS's 1996 GNN MaxEnt model and BLM's 1996 GNN Model 13.

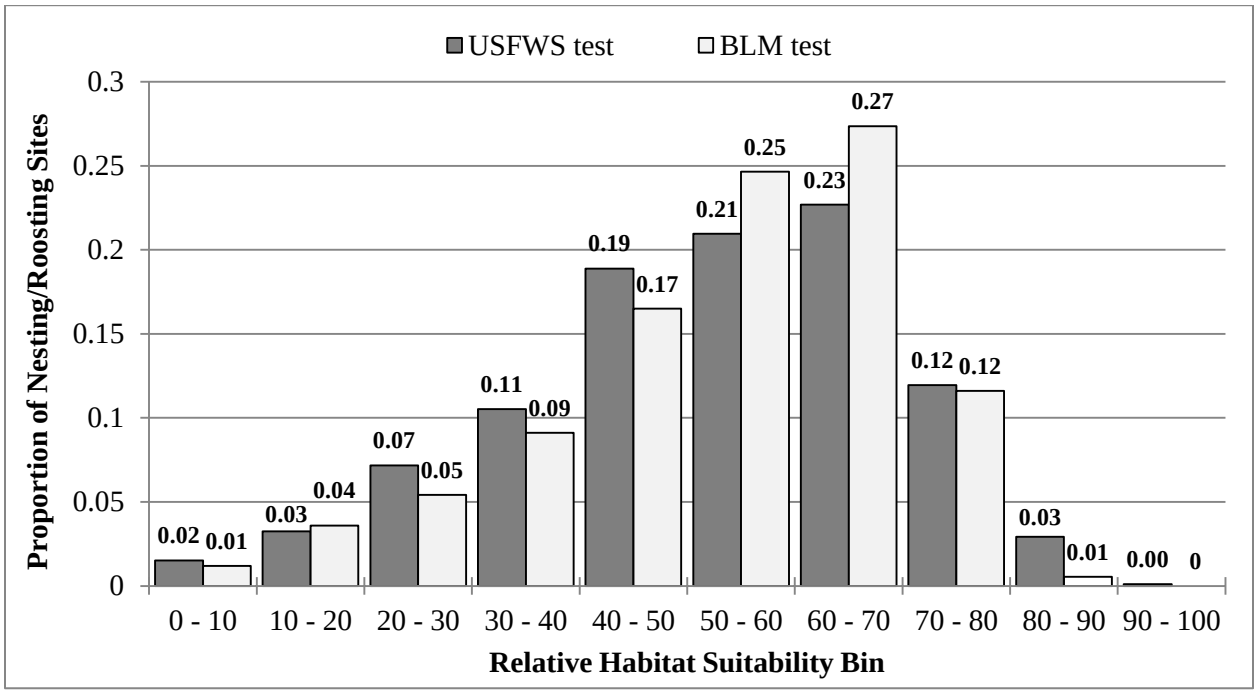


Figure C-14. Range-wide distribution of relative habitat suitability values among test northern spotted owl sites for the FWS's 1996 GNN MaxEnt model and BLM's 1996 GNN Model 13.

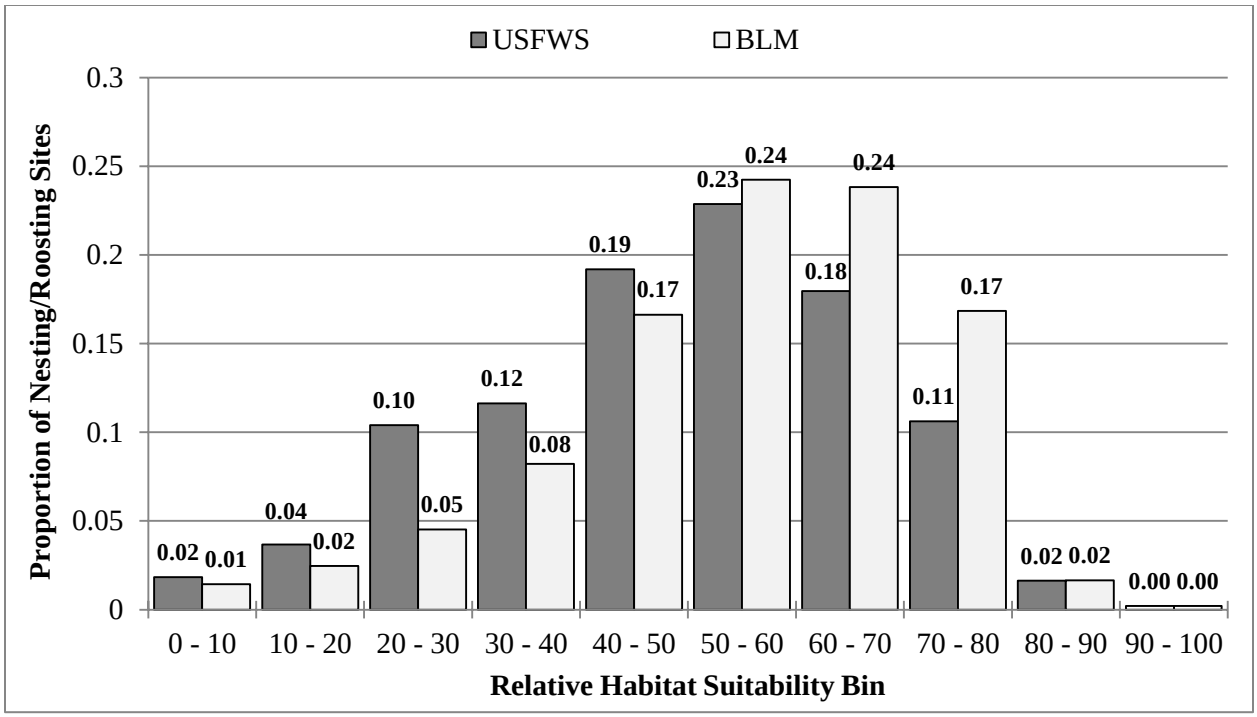


Figure C-15. Distribution of relative habitat suitability values among training northern spotted owl sites on BLM-administered lands in the planning area for the FWS's 2012 GNN MaxEnt model and BLM's 2013 Woodstock Model 13.

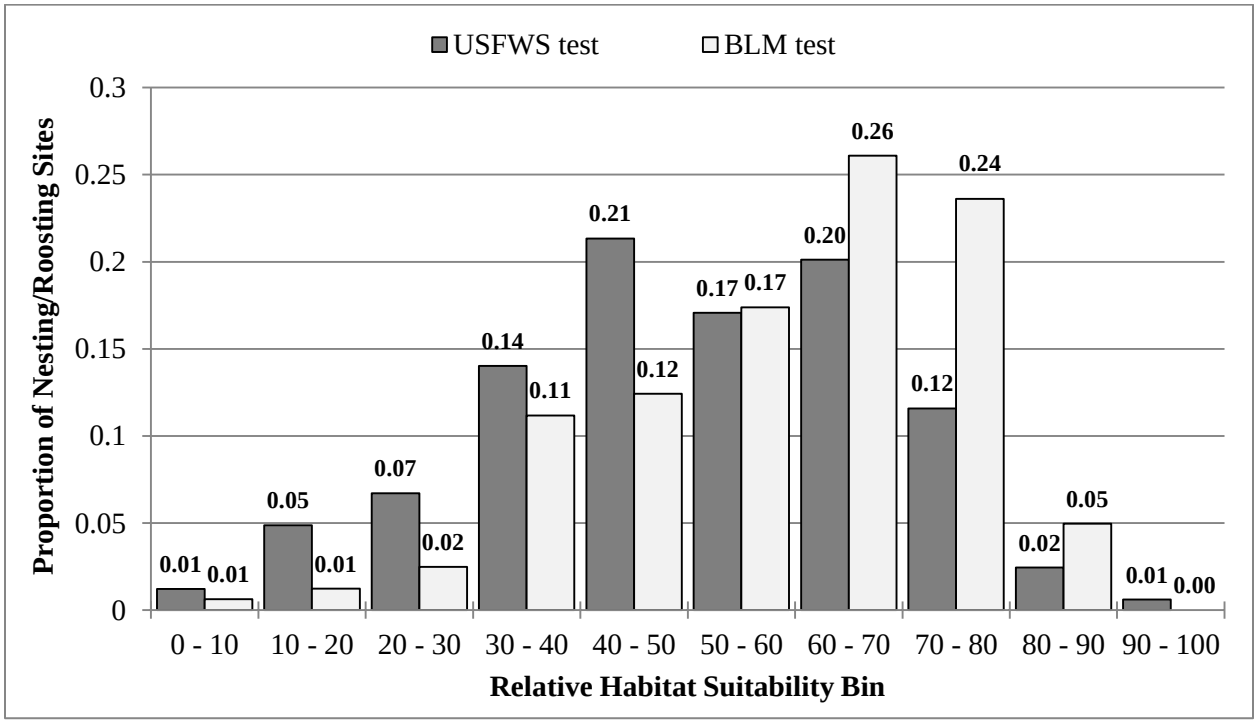


Figure C-16. Distribution of relative habitat suitability values among test northern spotted owl sites on BLM-administered lands in the planning area for the FWS's 2012 GNN MaxEnt model and BLM's 2013 Woodstock Model 13.

B. Forecasting Change in Relative Habitat Suitability on Other Lands in Washington, Oregon and California for the Draft RMP/EIS

The BLM forecasted changes in relative habitat suitability from ingrowth, large (1,000+ ac) wildfires, and timber harvests for all lands within the U.S. portion of the northern spotted owl range. Modifications in forest structure and composition at decadal increments on BLM-administered lands in the planning area were incorporated in the Woodstock models and reflected in the BLM's Model 13 relative habitat suitability surfaces. The BLM based its forecasted magnitudes of change on all other lands on differences between the FWS's 1996 and 2006 GNN-based relative habitat suitability surfaces. That is, BLM assumed that the decadal change in relative habitat suitability from 1996 to 2006 would be realized during subsequent decades.

To estimate rates-of-change from forest ingrowth in decadal increments, the BLM calculated the mean difference between 1996 and 2006 for each integer relative habitat suitability value (i.e., the analysis determined the mean value in 2006 for all pixels with the same value in 1996). The BLM generated rates-of-change statistics separately for each physiographic province and, within each province, further stratified by Congressionally Reserved lands (e.g., designated Wilderness Areas), federal reserved lands (e.g., Late-Successional Reserves under the Northwest Forest Plan), federal non-reserved lands (e.g., Matrix lands under the Northwest Forest Plan), and non-federal lands. The BLM excluded pixels from the analysis within Monitoring Trends in Burn Severity (http://www.mtbs.gov/) fire perimeters and unpublished USFS LandTrendr harvest patches (see Davis *et al*. 2011) to minimize the influence of other agents of change on the ingrowth rates.

Initially, the BLM included only pixels showing positive or no change between 1996 and 2006 in the calculations. The BLM did this because negative change does not reflect forest ingrowth. The BLM used those derived rates-of-change to generate projected decadal relative habitat suitability surfaces for other lands, combined with the decadal Woodstock projections for BLM-administered lands. However, after examining the results, the BLM determined that the rate of ingrowth for forests in the drier portion of the northern spotted owl's range (i.e., most of California, and the eastern Cascades of Washington and Oregon) appeared to exceed observed rates. After additional consideration and testing, the BLM truncated all negative changes to 0 and all positive changes to 10 because negative changes in relative habitat suitability were not indicative of ingrowth and, knowing how habitat develops, rates higher than 10 were unrealistic. Although relatively few values exceeded 10, they were sufficiently high to affect mean rates-of-change. The final results were sets of range-wide ingrowth forecasts for strata within each physiographic province.[9]

[9] The BLM subsequently tested methods to refine its forecasts; see Section D of this appendix. Because the USFS LandTrendr analysis was based on a 200-ha scale relative habitat suitability surface—i.e., relative habitat suitability values are based on the means of variable values within 800 m of each pixel, the radius of a 200-ha circle—any negative change in burn and timber harvest areas would affect the relative habitat suitability values within 800 m, and not just within the treatment or burn area. The BLM tested masking areas within 800 m of burn and treatment areas, and recalculating relative habitat suitability change, and found that this eliminated much of the negative change the BLM had detected outside burn and harvest areas. However, the degree of change did not cause the BLM to replace its analyses for the Draft RMP/EIS. As described in Section D of this appendix, the BLM subsequently tested additional methods to refine its relative habitat suitability surfaces during its preparation of the Proposed RMP/Final EIS.

The BLM used results from Davis *et al*. (2014) to forecast changes in relative habitat suitability values following wildfires. The BLM applied changes only for moderate and high severity fires by habitat class, because Davis *et al*. (2014) determined that low severity fires have a negligible effect on northern spotted owl habitat. These findings are supported by Manley's (2014) descriptions of the effects of fire on northern spotted owls. The BLM modeled the spatial locations, extents, and severity of future wildfires using the same predicted wildfire dataset included in the Woodstock models, which extends over the non-BLM portions of the northern spotted owl's range (see Appendix D).

Expanding on the methods described by Davis *et al*. (2011, pp. 28-30), the BLM used the unpublished USFS LandTrendr change detection data to develop range-wide forecasts of decadal rates of negative change in relative habitat suitability values following timber harvests. To create potential timber harvest patches on other lands, the BLM segmented the USFS 2006 GNN-based relative habitat suitability model using eCognition Developer 8 (Trimble Navigation Ltd., Westminster, CO). The BLM parameterized the software's segmentation routine to iteratively group neighboring pixels with similar relative habitat suitability values into discrete patches until the mean patch size ± 1 SD within each physiographic province and strata most closely approximated those observed in the LandTrendr dataset between 1996 and 2006 (**Tables C-2** and **C-3**). Segmenting the USFS 2006 GNN-based surface resulted in more realistic representations of harvest treatment patch shapes and dimensions than those created using the smoother, 200-ha-scale FWS relative habitat suitability surfaces.

Starting with the 2012 relative habitat suitability surface (i.e., the surface the BLM created using 2012 GNN data with the FWS 1996 GNN MaxEnt models), the BLM forecasted changes on other lands from ingrowth, wildfire, and timber treatments before advancing in decadal increments for five decades (2013-2063). Modeling each decade in sequence was necessary because estimating change in future decadal intervals depended on adjusted values from the previous decade.

At the beginning of each decade, the BLM applied the rates-of-change in relative habitat suitability value from ingrowth and categorized the results into the four habitat suitability classes using the previously derived strength-of-selection class breaks: strongly-selected-against, selected-against, selected-for, and strongly-selected-for. Next, the BLM adjusted pixel values within the wildfire perimeters predicted to occur within the decade depending on the fire severity and corresponding relative habitat suitability class. The BLM categorized the resulting continuous surface into habitat classes a second time before adding the effects of timber harvests. Finally, the BLM calculated the median habitat class within each candidate harvest treatment patch (i.e., the results of the image segmentations described above), and randomly selected treatment patches in each province and strata until the area harvested approached, but did not exceed, the total decadal treatment area calculated from the LandTrendr data. The BLM then repeated the process for the next and subsequent decades.

The BLM applied the following four selection criteria when selecting timber harvest patches for the purpose of forecasting change in relative habitat suitability on lands other than BLM-administered lands:

- All modeled harvest patches had to exceed 10 acres in size because the BLM anticipated smaller timber harvests would be commercially inviable.
- The BLM did not allow the selection of patches that were more than 500 m from a road because of anticipated limitations to commercial access.
- Patches classified as "strongly-selected-against" were not considered because such stands generally would be too young for commercial timber harvest.
- The BLM did not allow a patch to be selected for treatment twice during the 50-year forecast period. Once selected, the rates of change from harvest were applied to the relative habitat suitability values within each patch. After harvesting a patch, the BLM allowed ingrowth within modeled harvests to progress uninterrupted for the remainder of the planning horizon.

The BLM applied changes in relative habitat suitability to all lands before updating the pixel values on BLM-administered lands in the planning area with the results from Model 13 for the same decade.

Table C-2. Metrics, calculated from data developed by Davis *et al*. (2011), used to forecast decadal (1996 – 2006) losses of northern spotted owl dispersal and nesting-roosting habitat from timber harvest on lands other than BLM-administered lands in the planning area.

Physiographic Province	Dispersal Habitat in 1996 (Acres)	Dispersal Habitat Harvested (Acres)	Dispersal Habitat Harvested (Percent)	Nesting-Roosting Habitat in 1996 (Acres)	Nesting-Roosting Habitat Harvested (Acres)	Nesting-Roosting Habitat Harvested (Percent)	Habitat Harvested that was Nesting-Roosting (Percent)	10-Year Mean Loss of Habitat to Harvest	Mean Harvest Patch Size (Acres)	Stand Harvest Patch Size (Acres)
Federal Non Reserved Lands										
Washington										
Eastern Cascades	128,810	1,208	1%	207,310	1,819	1%	60%	1.0%	20	10
Olympic Peninsula	39,038	128	0%	37,275	47	0%	27%	0.2%	19	9
Western Cascades	143,116	404	0%	288,691	1,025	0%	72%	0.3%	19	8
Western Lowlands	11	-	0%	-	-	-	-	0.0%	-	-
Oregon										
Coast Range	34,732	265	1%	34,722	135	0%	34%	0.6%	21	11
Eastern Cascades	109,494	1,725	2%	145,704	1,756	1%	50%	1.4%	23	13
Klamath	111,577	628	1%	135,992	737	1%	54%	0.6%	18	7
Western Cascades	478,515	3,972	1%	844,548	6,669	1%	63%	0.9%	19	9
Willamette Valley	4	-	0%	-	-	-	-	0.0%	-	-
California										
Cascades	110,507	1,386	1%	63,151	1,858	3%	57%	2.1%	33	23
Coast Range	25,543	12	0%	11,191	-	0%	0%	0.0%	12	-
Klamath	576,849	2,482	0%	657,433	1,845	0%	43%	0.4%	17	7
Federal Reserved Lands										
Washington										
Eastern Cascades	139,270	606	0%	268,674	1,618	1%	73%	0.8%	17	8
Olympic Peninsula	89,086	73	0%	277,151	308	0%	81%	0.1%	16	5
Western Cascades	182,939	234	0%	486,969	443	0%	65%	0.1%	18	7
Oregon										
Coast Range	118,696	598	1%	266,301	1,103	0%	65%	0.5%	20	9
Eastern Cascades	73,898	397	1%	159,868	347	0%	47%	0.4%	19	8
Klamath	218,679	103	0%	210,418	232	0%	69%	0.1%	20	10
Western Cascades	264,104	328	0%	740,398	487	0%	60%	0.1%	18	7
California										
Cascades	67,741	267	0%	85,839	239	0%	47%	0.3%	22	15
Coast Range	30,071	31	0%	25,486	22	0%	42%	0.1%	13	3
Klamath	335,682	536	0%	579,128	526	0%	50%	0.1%	16	5
Non Federal Lands										

Physiographic Province	Dispersal Habitat in 1996 (Acres)	Dispersal Habitat Harvested (Acres)	Dispersal Habitat Harvested (Percent)	Nesting-Roosting Habitat in 1996 (Acres)	Nesting-Roosting Habitat Harvested (Acres)	Nesting-Roosting Habitat Harvested (Percent)	Habitat Harvested that was Nesting-Roosting (Percent)	10-Year Mean Loss of Habitat to Harvest	Mean Harvest Patch Size (Acres)	Stand Harvest Patch Size (Acres)
Washington										
Eastern Cascades	319,729	18,536	6%	362,291	24,540	7%	57%	6.3%	30	20
Olympic Peninsula	275,885	33,068	12%	192,741	23,153	12%	41%	12.0%	41	27
Western Cascades	212,118	23,573	11%	120,707	11,207	9%	32%	10.2%	39	27
Western Lowlands	524,668	73,413	14%	149,848	19,729	13%	21%	13.6%	40	27
Oregon										
Coast Range	659,641	104,393	16%	483,985	106,584	22%	51%	18.9%	44	30
Eastern Cascades	132,149	15,728	12%	114,531	11,061	10%	41%	10.8%	37	25
Klamath	300,416	26,920	9%	244,411	23,492	10%	47%	9.3%	33	22
Western Cascades	411,318	63,999	16%	260,687	45,250	17%	41%	16.5%	46	33
Willamette Valley	50,477	3,220	6%	37,962	3,553	9%	52%	7.9%	22	12
California										
Cascades	184,094	9,049	5%	109,434	6,310	6%	41%	5.3%	20	9
Coast Range	1,189,363	41,598	3%	967,484	36,891	4%	47%	3.7%	20	9
Klamath	382,099	10,094	3%	353,724	10,157	3%	50%	2.8%	19	8
Non Federal Land Totals by State†††										
Washington	1,332,399	148,590	11%	825,587	78,629	10%	35%	10.3%	38	26
Oregon	1,554,001	214,260	14%	1,141,576	189,940	17%	47%	15.2%	42	30
California	1,755,556	60,741	3%	1,430,642	53,358	4%	47%	3.6%	20	9

† Congressionally Reserved and BLM-administered lands in the planning area not included.
†† BLM-administered lands in the planning area not included.
††† Mean harvest patch sizes on non-federal lands by state are NOT averages of the above physiographic province averages.

Table C-3. Changes, calculated from data developed by Davis *et al*. (2011), in relative habitat suitability values from timber harvests occurring in northern spotted owl habitat between 1996 and 2006 by physiographic province and Northwest Forest Plan land-use allocation.

Physiographic Province	Federal Reserved Lands†			Federal Non-Reserved Lands††			Non-Federal Lands		
	Selected Against	Selected For	Strongly Selected For	Selected Against	Selected For	Strongly Selected For	Selected Against	Selected For	Strongly Selected For
Washington									
Eastern Cascades	-2	-2	-	-2	-4	-2	-3	-6	-10
Olympic Peninsula	4	3	-	5	-8	4	-7	-12	-13
Western Cascades	4	2	4	3	-1	-1	-9	-15	-19
Western Lowlands	-	-	-	-	-	-	-7	-12	-16
Oregon									
Coast Range	2	-2	-	-3	1	1	-5	-10	-13
Eastern Cascades	1	1	-4	-	-1	-2	-3	-7	-16
Klamath	-1	1	-10	-	-1	-	-3	-5	-4
Western Cascades	-	-2	-5	1	-	-1	-7	-9	-6
Willamette Valley	-	-	-	-	-	-	-6	-7	-27
California									
Cascades	4	-6	-4	-5	-13	-13	-3	-7	-13
Coast Range	-2	-3	-	-2	-	-	1	1	-1
Klamath	0	1	-1	-1	-	1	-1	-1	-3

† Congressionally Reserved and BLM-administered lands in the planning area not included
†† BLM-administered lands in the planning area not included

The BLM created only one set of decadal relative habitat suitability surfaces for non-BLM lands across the northern spotted owl's range. The BLM used this single set of surfaces for all evaluations of the alternatives and the No Timber Harvest Reference Analysis (i.e., only the relative habitat surfaces for BLM-administered lands in the planning area changed by alternative). The BLM used this final set of relative habitat suitability surfaces, one for each decade between 2013 and 2063, for the HexSim population dynamics models.

C. Additional Notes on the BLM's Northern Spotted Owl Modeling and Analyses for the Draft RMP/EIS

Sections A and B appeared in Appendix S of the Draft RMP/EIS (USDI BLM 2015). However, the BLM did not intend those narratives to be sufficient to allow someone to duplicate BLM processes, only to help reviewers better understand the BLM's analytical processes so they could better interpret results. The BLM recorded the steps of its processes in its administrative record.

The BLM requested review of Appendix S of the Draft RMP/EIS by Drs. Bruce Marcot and Peter Singleton of the U.S. Forest Service—experts on northern spotted owl biology and modeling. The following section provides additional explanation of the BLM processes through responses to the comments of Drs. Bruce Marcot and Peter Singleton.

Relative Habitat Suitability Surfaces

Comment: As it explained in its development of models 1 – 13, the BLM worked to achieve a strong correlation between its relative habitat suitability surfaces and those prepared by the FWS on the apparent assumption that the FWS's surfaces were a near-perfect representation of northern spotted owl

habitat. However, the BLM's process likely compounded the error inherent in FWS's surfaces with the error inherent in the BLM's process.

BLM response: The BLM did not assume that the FWS's relative habitat suitability surfaces represented a near-perfect representation of northern spotted owl habitat. Instead, the BLM reviewed the FWS's data and methods for surface development and determined that those surfaces (actually, the MaxEnt models developed by the FWS to create its surfaces, which the BLM then applied to 2012 GNN data to generate updated surfaces) most likely were the most credible range-wide northern spotted owl surfaces available. The reviewing scientists appear to have misunderstood the BLM process; they did not suggest that this process was not credible or offer an alternative process. Second, as described above in this appendix, the BLM derived its MaxEnt models independently of the FWS's MaxEnt models, and then examined the degree of fit between the relative habitat suitability surfaces derived from the two sets of models to help ensure that HexSim would work with the merged surfaces. As described under Model 8, the BLM determined that it could not use stand age as a variable in its MaxEnt models because Woodstock calculates stand age differently over time based on simulated stand treatment. Since stand age typically is an important variable in the modeling of northern spotted owl habitat, the BLM compared the results of its MaxEnt models against those of the most-similar and credible models available for the same land base. Although the relative habitat suitability surfaces developed by the FWS contain inherent uncertainty, the BLM used a rational process to refine and test its models. Again, the reviewing scientists did not question the BLM's process; they only suggested, incorrectly, that the BLM tailored its models to generate surfaces similar to the FWS's surface.

That said, at the time the BLM prepared its northern spotted owl relative habitat suitability surfaces, only two comparable range-wide surfaces existed: one produced by the FWS (2011:Appendix C) and one by the USFS (Davis et al. 2011). Since preparation of the Draft RMP/EIS, the USFS updated its surfaces using 2012 GNN data (Davis et al. 2015). **Table C-4** compares the acres of northern spotted owl nesting-roosting habitat on federal lands as calculated by the USFS using 2012 GNN data (Davis et al. 2015, Table 6) and by the BLM using 2013 Woodstock data for BLM-administered lands in the planning area and 2012 GNN data (FWS 1996 GNN MaxEnt models applied to 2012 GNN data) for other federal lands. Even though these acres were calculated using different datasets, MaxEnt models and analytical scales, the estimates are similar.

Table C-4. A comparison of the acres of northern spotted owl nesting-roosting habitat on federal lands as calculated by the USFS and the BLM.

Physiographic Province	Estimated Acres of Nesting-Roosting Habitat	
	USFS	BLM
Washington		
Olympic Peninsula	737,600	972,223
Western Lowlands	12,900	6,278
Western Cascades	1,169,500	1,238,477
Eastern Cascades	779,400	753,264
Washington Totals	**2,699,400**	**2,970,242**
Oregon		
Coast Range	506,200	867,550
Willamette Valley	7,500	8,194
Western Cascades	2,371,400	2,112,585
Klamath	932,100	828,637
Eastern Cascades	339,600	508,885
Oregon Totals	**4,156,800**	**4,325,851**
California		
Coast Range	123,800	103,130
Klamath	1,764,700	1,606,645
Cascades	209,300	142,265
California Totals	**2,097,800**	**1,852,040**

Comment: Developing relative habitat suitability surfaces that combine GNN and BLM Woodstock data compounds the uncertainty inherent in both datasets, making the surfaces, and the BLM analyses that use those surfaces, less reliable.

BLM response: The GNN/CVS data are the most reliable range-wide data available for other (non-BLM-administered) lands in the northern spotted owl's range. As described in this appendix, the BLM used the GNN-derived relative habitat suitability surfaces developed by the FWS (see USDI FWS 2011:C-16 – C-43) for all lands within the northern spotted owl range except BLM-administered lands in the planning area. (Again, the BLM used the FWS's 1996 GNN MaxEnt models but applied them to 2012 GNN data, so the BLM did not actually use the FWS's relative habitat suitability surfaces, only its MaxEnt models.)

The Woodstock (BLM data) variable values, which are derived from BLM field operations inventory and CVS plot data, are the most reliable data available for BLM-administered lands in the planning area. Since the BLM used GNN- or Woodstock-derived relative habitat suitability surfaces appropriate to land base, and ensured, at multiple steps, that those surfaces were compatible, the uncertainty inherent in the GNN data does not compound the uncertainty inherent in the Woodstock data. Even though there is uncertainty inherent in the merged surfaces, because the surfaces are based on the best data available for each land base, the merged surfaces likely are more reliable than those derived from only GNN data.

Because biases or uncertainties in the underlying GNN/Woodstock layers and subsequent relative habitat suitability surfaces are used for comparing all land use alternatives, and because BLM interprets the HexSim model results as relative among alternatives, any over- or under-estimation of northern spotted owl habitat changes or population responses that may exist would exist for all alternatives and would not

influence the relative difference(s) among alternatives .The BLM acknowledges that the uncertainty inherent in its relative habitat suitability surfaces compounds the uncertainty inherent in modeling that relies on those surfaces. But that compounding effect is inherent in all modeling.

Comment: MaxEnt, which the BLM used to create relative habitat suitability surfaces for its administered lands, is prone to over-fitting the data, especially when too many variables are used.

BLM response: The BLM did not employ the full range of fitting features available in MaxEnt. The BLM MaxEnt models relied on 11 covariates specific to each of the western Oregon modeling regions (**Table C-1**). In addition, as described under Model 13, the BLM tested its MaxEnt models with data that had not been used to train the models to help ensure that the models did not over-fit the data.

Comment: How did the BLM use strength-of-selection thresholds to classify northern spotted owl habitat?

BLM response: Based on its modeling needs (see USDI BLM 2015, Chapter 3, Northern Spotted Owl), the BLM divided northern spotted owl habitat into categories based on strength-of-selection. This was similar to the process used by the FWS (USDI FWS 2011, pp. C-31 – C-39) but, in the BLM's case, the BLM used four categories: (1) strongly selected against, (2) selected against, (3) selected for and (4) strongly selected for.

To summarize strength-of-selection: If the relative habitat suitability values greater than 45 represent 10 percent of a modeling region, and 50 percent of the northern spotted owl nests in that region are in areas with relative habitat suitability greater than 45, the strength-of-selection value would be 5.0 (50 percent of the nests divided by 10 percent of the area, which means that the area was used for nesting five times more than would be expected based on its availability). Similarly, if 50 percent of the landscape is in areas with relative habitat suitability less than 15, and 10 percent of the nests in that region are in areas with relative habitat suitability less than 15, the strength-of-selection would be -5.0 (10 percent of the nest sites divided by 50 percent of the area—and multiplied by -1 because the percent of nest sites is less than the percent of the area), which means the area was used five times less than would be expected based on its availability).

The BLM created strength-of-selection curves separately for each modeling region. These strength-of-selection-defined categories provided a relatively simple and consistent way to track changes in the amount of area containing habitats of differing value to northern spotted owls; with value being defined by the owls' relative attraction or avoidance. The BLM then classified northern spotted owl habitat according to strength-of-selection curves following a process used by the USFS (Davis et al. 2011:36-40) but with its own relative habitat suitability surfaces. Examining the results for each modeling region, the BLM found that strength-of-selection curves between -2.75 and 2.75 were relatively flat in each modeling region, and then deviated sharply downward (below -2.75) or upward (above 2.75) beyond those values. Therefore, values below -2.75 were strongly selected against, values -2.75 – 0 were selected against, values 0 – 2.75 were selected for and values greater than 2.75 were strongly selected for.

Among the modeling regions, the "strongly selected for" category accounted for 3.48 – 12.1 percent of the landscape and 15.4 – 72.0 percent of the known northern spotted owl sites; combining it with the "selected for" category accounted for 18.7 – 35.4 percent of the landscape and 78.4 – 89.9 percent of the known northern spotted owl sites. Range-wide, 28.6 percent of the landscape was categorized as either "selected for" or "strongly selected for" and 83.8 percent of the known owl sites occurred on that landscape. Conversely, ~72 percent of the area was "selected against" or "strongly selected against" and contained ~17 percent of the known owl sites. So, although the BLM could have chosen other values to define categories, the values it chose have real meaning for how northern spotted owls select habitat.

The BLM determined that the "selected against" category in western Oregon described habitat that the BLM previously had classified as habitat used only for northern spotted owl dispersal. As described above (**Table C-4**), the BLM also determined that "selected for" and "strongly selected for" were reliable predictors of nesting-roosting habitat. Given that northern spotted owls show strongest selection for nesting and roosting habitat, less strong selection for foraging habitat, and still weaker selection for dispersal habitat, the BLM determined that the "strongly selected for," "selected for" and "selected against" categories, combined, were a reasonable description of habitats that supported dispersing northern spotted owls.

In **Table C-4** the BLM compared the acres of nesting-roosting habitat on federal lands derived by the USFS (Davis et al. 2015) and the BLM using their separate models and data sets. In **Table C-5** the BLM compares the acres of northern spotted owl dispersal habitat on all lands in western Oregon (the BLM evaluated dispersal capability and flux only in western Oregon) as calculated by the USFS (Davis *et al*. 2015, Table 12) from 2012 GNN data, and by the BLM using 2013 Woodstock data for BLM-administered lands and 2012 GNN data for other lands. Even though the two agencies used different datasets and MaxEnt models, the results are similar. And, again, the BLM is confident that its 2013 data for BLM-administered lands in western Oregon are more reliable than the 2012 GNN data for those same lands.

Table C-5. A comparison of the acres of northern spotted owl dispersal habitat on all lands in western Oregon as calculated by the USFS and by the BLM.

Oregon Physiographic Province	**Estimated Acres of Northern Spotted Owl Dispersal Habitat**	
	Acres from Davis *et al*. 2015, Table 12	**Acres calculated by the BLM**
Coast Range	2,589,300	1,961,636
Western Cascades	4,082,000	3,728,991
Klamath	1,918,100	1,960,445
Eastern Cascades	1,307,700	1,035,568
Totals	**9,897,100**	**8,686,640**

<u>Comment</u>: The BLM should plot response curves for the range of potential values for each MaxEnt model covariate, with other covariates fixed at the mean for each habitat suitability class, to evaluate the efficacy of the MaxEnt models for capturing plausible changes in habitat suitability in response to changes in forest structure from forest growth or management activities.

<u>BLM response</u>: The FWS also was asked to provide response curves but purposefully did not. Although relative habitat suitability values are intended to predict the relative suitability of an area (based on conditions within 800 m of the focal pixel), the individual variable values are not meant to reflect all factors that influence northern spotted owls. Thus, the FWS sought a model with good predictive abilities and that was robust and well-calibrated. In this, it succeeded. Since the BLM's models are highly correlated with the FWS's models, as verified by the BLM, they should have similar attributes. The BLM is confident that its models have good predictive ability and are robust because they predicted both the original data and independent data well.

HexSim

<u>Comment</u>: The BLM did not perform a sensitivity analysis to determine which covariate values most influence its HexSim results.

BLM response: The BLM relied on the sensitivity analyses performed by the FWS during the development of its model (USDI FWS 2012:13-17).The BLM did not modify any of the population parameters in the FWS's HexSim model. The only difference between the FWS's use of its HexSim model and the BLM's use was that the BLM updated northern spotted owl survival and reproduction rates, and barred owl encounter rates, according to the results of the 2016 northern spotted owl meta-analysis (Dugger et al. 2016) and recommendations by the FWS, and recalibrated the simulation start time to the year 2013.

Comment: The BLM approach for simulating competitive interactions between barred owls and northern spotted owls misrepresents the ecological mechanism that contributes to spotted owls being displaced from sites, which many experts believe is interference competition. If interference competition and competitive displacement are the mechanisms which contribute to spotted owl site abandonment, then total habitat carrying capacity becomes extremely important because much of that habitat is occupied by barred owls. If that is the case, then relatively small changes in habitat amount could produce disproportionate changes in northern spotted owl numbers. That relationship is currently masked within the BLM HexSim model because encounters with barred owls are represented as a random predation effect that has the potential to suppress the northern spotted owl population well below habitat carrying capacity.

BLM response: Northern spotted owl survival, as used in the FWS's HexSim model, and subsequently by the BLM, was derived from Forsman et al. 2011 (see USDI FWS 2011:C-59, C-68 and C-69, and 1012:10 and 13) and, for preparation of the Proposed RMP/Final EIS, from the 2016 meta-analysis (Dugger et al. 2016). Although survival, as it is used in the model, might not reflect the ecological processes, such as interference competition, that cause northern spotted owls to react to barred owls in specific ways, it is based on scientific research.

As explained in the Northern Spotted Owl section of USDI BLM 2015, Chapter 3, BLM simulations indicate that, within the range of the alternatives examined by the BLM, limited carrying capacity is not a basis for BLM decision-making because there are no substantive differences in the northern spotted owl responses among alternatives. In addition, all alternatives show essentially identical northern spotted owl responses as would occur under the BLM's No Timber Harvest Reference Analysis.

Neither the FWS nor the BLM have suggested that barred owl effects are random predation effects and not competition effects. And, in fact, the reviewing scientists do not suggest the mechanism. The northern spotted owl HexSim model used by both the FWS and BLM simply assumes that, if a barred owl is present in a northern spotted owl's territory, survivorship of the spotted owl would decrease according to observed rates and probabilities. Neither agency assumed that this decrease was due to predation, starvation, competition or any other specific mechanism because current research does not indicate the mechanism. The encounters with barred owls in the HexSim model are represented only as reductions in survival; scientists have not identified a specific mechanism. Among potential causes, displacement from nest sites (competition for nest sites), direct predation of spotted owls by barred owls (predation) and competition for food are ideas that have varying levels of support in the scientific community, and it is likely that more than one mechanism occurs.

When barred owl encounters are treated like predation effects, there may be little or no response to changes in habitat availability. The FWS found this to be the case when barred owl encounter rates exceeded 0.5. However, with barred owl encounter rates at 0.25 or 0.0, the FWS found a relatively strong effect of habitat on northern spotted owl populations. Those results are logical regardless of whether the actual mechanism is predation, competition or some combination.

Comment: On page 774 of the Draft RMP/EIS, the BLM notes that there is relatively broad consensus among northern spotted owl experts that competition with barred owls is a primary contributor to northern spotted owl population declines, and the BLM cites Dugger et al. (2011) and Wiens et al. (2014) regarding the importance of habitat conservation in the face of competition with barred owls. Unfortunately, the HexSim modeling in the BLM analysis does not capture that competitive displacement mechanism. This is a particularly difficult problem because representing spatial displacement of northern spotted owls by barred owls requires spatially explicit predictions of barred owl occupancy, and such information is probably not available for most of the range. One approach for addressing this problem would be to run HexSim scenarios both with and without additive mortality from barred owl interactions and interpret the outputs from model runs without barred owl impacts as estimates of total owl habitat carrying capacity, then compare carrying capacity across management alternatives with the understanding that the carrying capacity is in reality likely to be split between spotted owls and barred owls due to the displacement pressures of barred owls on spotted owl populations. Even using the modified barred owl encounter rates is likely to reduce the sensitivity of the HexSim model to changes in habitat amount and distribution.

BLM response: The suggestion that northern spotted owl population responses to the management alternatives are "likely to be split" between the effects of habitat and barred owl encounters is too suppositional for BLM decision-making processes. Furthermore, the National Environmental Policy Act requires the BLM to examine reasonably foreseeable northern spotted owl responses to its alternate management scenarios.

The BLM saw no value in determining if spotted owls would respond better under one alternative than another in the absence of barred owls when such absence was not reasonably foreseeable, even if the FWS were to implement a control program. Due to the known breeding and dispersal capabilities of the barred owl, even if the FWS implements an effective and long term control program, the barred owl will not be eradicated from any region of current occupancy, a fact supported by subject matter experts. That said, the BLM discussed the reasonableness of reduced barred owl encounter rates with the FWS, and worked with the FWS to simulate regional northern spotted owl population responses to what the FWS determined, based on current information, was a realistic barred owl control scenario. The BLM recognizes that both habitat and barred owls have impacts on northern spotted owl populations.

D. How the BLM Refined its Relative Habitat Suitability Surfaces between the Draft RMP/EIS and the Proposed RMP/Final EIS

As explained in Appendix S of the Draft RMP/EIS (USDI BLM 2015), the BLM developed, through separate processes, northern spotted owl relative habitat suitability surfaces for (1) BLM-administered lands in the planning area (using BLM Woodstock covariates) and (2) all lands in the United States' portion of the northern spotted owl range (using GNN covariates). The BLM then deleted those portions of the range-wide surfaces that pertained to BLM-administered lands in the planning area and replaced them with the surfaces it developed specifically for those lands. Here, the BLM describes how it further refined its relative habitat suitability surfaces since publication of the Draft RMP/EIS.

All Lands in the United States' Portion of the Northern Spotted Owl's Range

For the Draft RMP/EIS, the BLM forecasted decadal changes in relative habitat suitability over time from three causes: large (at least 1,000-ac) wildfires, timber harvest and forest ingrowth. (See USDI BLM 2015:1480 – 1485.)

- To forecast large wildfires, the BLM developed the method described in Appendix D of the Draft RMP/EIS.
- To forecast timber harvest, the BLM used unpublished LandTrendr data developed by the USFS for 1996 – 2006 (see Davis et al. 2011:28 – 30) and projected changes calculated from 1996 to 2006, specific to modeling region and land classification, into the future at decadal increments.
- To forecast forest ingrowth, the BLM initially masked out (1) 1996 – 2006 wildfire burn patches, (2) 1996 – 2006 calculated timber harvest units (based on the 1996 – 2006 LandTrendr data) and (3) lands within 800 m of those areas (because the BLM relative habitat suitability values of each pixel are based on the means of covariate values within 800 m of the pixel; see USDI BLM 2015:1480 and 1481). In theory, masking out these lands would eliminate all lands that experienced, or were influenced by, habitat losses during 1996 – 2006, leaving only those lands that had experienced positive or neutral changes (i.e., forest ingrowth) during that period.

The BLM verified the reliability of its wildfire methodology through expert review and continued to use it for the Proposed RMP/Final EIS. The BLM also determined that its use of LandTrendr was the most reliable method for forecasting timber harvest. However, to forecast forest ingrowth, the BLM found that, even after it had masked out the lands described above, the remaining lands still exhibited substantial habitat loss during 1996 – 2006 (i.e., the LandTrendr analysis did not account for much of the observed habitat loss that occurred during that period). Because the BLM needed to forecast changes in relative habitat suitability values from forest ingrowth, and habitat losses during 1996 – 2006 clearly did not result from ingrowth, the BLM compensated by changing all negative changes in relative habitat suitability values on unmasked lands during 1996 – 2006 to 0. In addition, because the BLM felt that positive changes in relative habitat suitability values during 1996 – 2006 greater than 10 were unrealistic, based on how northern spotted owl habitat is known to develop, the BLM truncated change values greater than 10 to 10. However, even though the BLM determined analytically that the resulting forecasts in forest ingrowth realistically followed observed forest structural progressions, it felt that its estimates of forest ingrowth in some areas, primarily in northern California, were optimistic and could be improved.

Following publication of the Draft RMP/EIS, the BLM experimented with dropping the 1996 – 2006 LandTrendr analysis. Instead, the BLM used GNN data to estimate changes (both positive and negative) from all causes other than large wildfires. Since the 2012 GNN data now were available, the BLM estimated such changes during 1996 – 2012 by:

- Masking out BLM-administered lands in the planning area, because the BLM was estimating temporal changes in relative habitat suitability on other lands in this process;
- Masking out 1996 – 2012 wildfire burn patches of at least 1,000 acres, because the BLM would forecast habitat changes from large wildfires using its wildfire model;
- Masking out all lands within 800 m of the BLM-administered lands and the 1996 – 2012 large wildfire patches.
- Calculating the observed mean change in each relative habitat suitability value during 1996 – 2012 for the remaining lands (*i.e*., for all 30 × 30-m pixels with the same relative habitat suitability value in 1996, calculating the mean change in that value between 1996 and 2012); and
- Dividing the mean rate-of-change for each relative habitat suitability value by 1.6 to prorate the 16-year (1996 – 2012) change to a decadal change (e.g., a mean change in relative habitat suitability value during 1996 – 2012 of +16 was prorated to +10; a mean change of -16 was prorated to -10).

The BLM calculated such mean changes by land division; i. e., for each physiographic province and, within each province, for Congressionally Reserved lands, all other federal reserved lands, federal non-

reserved lands, and non-federal lands. Since there are 12 physiographic provinces within the northern spotted owl's range, the BLM calculated 48 sets of mean changes in relative habitat suitability values.

Because the GNN data were derived from Landsat imagery, the BLM still was concerned that calculated mean changes (both positive and negative) for some relative habitat suitability values could be unrealistic given how forest structure develops. Although satellite imagery is reliable at the landscape scale, it is less reliable at the scale of a 200-ha circle (which has a radius of 800 m), the scale at which the BLM calculated relative habitat suitability values. Thus, the BLM anticipated that the values of some individual pixels could change to such a degree that they would bias the mean change for certain pixel values (e.g., a positive change that exceeds the rate at which forest stands are known to develop). This especially would be likely for relative habitat suitability values that were uncommon on the landscape in 1996.

To address this, the BLM compared, for each land division, decadal rates of change for all data and for subsets of data within 1.0, 1.5 and 2.0 standard deviations from the mean change for each relative habitat suitability value. The BLM found no appreciable differences between any of the resulting data sets, i.e., no evidence that one dataset projected habitat change more accurately than the other datasets. Therefore, the BLM chose to use the full dataset for each land division.

Table C-6 shows, for each physiographic province, forecasts of northern spotted owl habitat change during 2013 – 2063 on non-federal lands using different methods. Habitat is classified by strength-of-selection, with "selected for" and "strongly selected for" corresponding to northern spotted owl nesting-roosting habitat, and these two classes plus "selected against" corresponding to northern spotted owl dispersal habitat. Column 1shows the forecasts that the BLM developed for its Draft RMP/EIS. Column 2 shows the forecasts according to the full 1996 – 2012 GNN datasets described in the previous paragraph.

Regarding the method reflected in **Table C-6**, Column 2, in the Oregon Coast Range and Oregon Western Cascades provinces, the two largest provinces in the decision area, unfiltered rates of change during 1996 – 2012 resulted in forecasted losses of 97 - 99 percent of selected-for and strongly-selected-for habitat during the next 50 years. (Not shown in **Table C-6**, the forecast for the Oregon Coast Range Province also showed a 43 percent loss in these classes during 2013 – 2023.) However, although these forecasts reflect observed rates of non-federal timber harvests that began in the early to mid-1990s and extended to the 2008 recession (see Gale et al. 2012, pp. 3 – 11), they cannot continue at this rate in the future and, thus, are not reliable for making 50-year forecasts. Stated another way: to lose 97 – 99 percent of such habitat on non-federal lands during the next 50 years, it would have to be harvested from steep slopes, fragile soils, riparian areas, private house lots, state parks and other areas not reasonably subject to timber harvest, or burned on unprecedented numbers of acres by unprecedented levels of high-intensity wildfire (see Gale et al. 2012). Thus, the BLM determined that habitat changes that occurred on non-federal lands during 1996 – 2012, although real, were not indicative of future change, because they cannot continue at that rate and, therefore, could not be used in their raw form to forecast future change.

Table C-6. A comparison of decadal rates of change in relative habitat suitability value on non-federal lands from large wildfires, timber harvest and forest ingrowth, by strength-of-selection category and physiographic province, using four methods described in the text.

Physiographic Province	Strength-of-Selection Class	1	2	3	4
Oregon Coast Range	Strongly Selected Against	-12.29%	25.04%	-10.55%	-10.74%
	Selected Against	63.46%	-76.17%	58.22%	59.20%
	Selected For	3.56%	-99.43%	-4.43%	-5.09%
	Strongly Selected For	-31.30%	-97.46%	-33.36%	-30.35%
Oregon Eastern Cascades	Strongly Selected Against	-60.02%	-78.70%	-45.31%	-56.83%
	Selected Against	45.81%	170.10%	37.22%	24.64%
	Selected For	126.66%	47.75%	97.81%	144.29%
	Strongly Selected For	49.63%	-59.68%	25.50%	60.72%
Oregon Klamath	Strongly Selected Against	-21.69%	1.34%	-10.39%	-13.53%
	Selected Against	31.99%	9.71%	23.47%	8.46%
	Selected For	31.53%	4.39%	8.39%	43.55%
	Strongly Selected For	82.08%	-85.47%	23.03%	24.36%
Oregon Western Cascades	Strongly Selected Against	-22.98%	34.72%	-6.75%	-6.62%
	Selected Against	69.89%	-89.10%	29.41%	28.99%
	Selected For	42.91%	-96.96%	-3.31%	-4.11%
	Strongly Selected For	47.27%	-98.79%	-6.29%	-3.05%
California Cascades	Strongly Selected Against	-29.12%	-35.58%	-14.78%	-21.78%
	Selected Against	51.60%	147.96%	19.78%	28.56%
	Selected For	62.70%	-44.34%	44.03%	54.01%
	Strongly Selected For	59.34%	-100.00%	27.89%	100.62%
California Coast Range	Strongly Selected Against	-50.55%	-81.80%	-26.80%	-48.05%
	Selected Against	-5.61%	-25.23%	-1.35%	-7.84%
	Selected For	10.15%	36.55%	7.08%	31.98%
	Strongly Selected For	114.60%	176.84%	51.87%	57.35%
California Klamath	Strongly Selected Against	-41.91%	-41.00%	-28.23%	-41.42%
	Selected Against	-15.98%	-0.56%	-14.50%	0.96%
	Selected For	36.88%	61.08%	39.05%	17.84%
	Strongly Selected For	97.68%	-12.72%	39.76%	96.46%
Washington Eastern Cascades	Strongly Selected Against	-21.66%	0.26%	-20.77%	-21.08%
	Selected Against	26.13%	66.58%	41.42%	24.98%
	Selected For	41.69%	-69.28%	25.84%	44.19%
	Strongly Selected For	45.30%	-97.29%	12.86%	36.73%
Washington Western Lowlands	Strongly Selected Against	-6.75%	10.56%	-5.92%	-5.86%
	Selected Against	74.88%	-100.00%	65.36%	63.91%
	Selected For	9.98%	-100.00%	9.98%	13.19%
	Strongly Selected For	26.60%	-100.00%	29.64%	47.83%
Washington Olympic Peninsula	Strongly Selected Against	-16.48%	24.65%	-14.82%	-15.08%
	Selected Against	63.15%	-43.84%	56.59%	49.07%
	Selected For	-3.57%	-99.79%	5.44%	25.85%
	Strongly Selected For	29.10%	-100.00%	-8.14%	-10.01%
Washington Western Cascades	Strongly Selected Against	-5.24%	9.31%	-4.81%	-4.73%
	Selected Against	51.10%	-37.64%	47.10%	45.98%
	Selected For	0.29%	-88.08%	0.26%	0.45%
	Strongly Selected For	-2.62%	-99.78%	-3.34%	-2.16%

Given these results, the BLM returned to the method it used for the Draft RMP/EIS, with the following revisions:

- To forecast forest ingrowth, the BLM tested limiting positive changes in relative habitat suitability values to 1.0, 1.5 and 2.0 standard deviations from the mean instead of simply +10.
- To forecast timber harvest, the BLM replaced the 2006 LandTrendr analysis with the newly-available 2012 LandTrendr analysis.

The results of these changes are shown in columns 3 and 4 of **Table C-6**; Column 3 is based on limiting forest ingrowth rates to 1 standard deviation from the mean; Column 4 is based on limiting ingrowth rates to 2 standard deviations from the mean. Because columns 1 – 4 include the effects of forest ingrowth, timber harvest and wildfire on non-federal lands, the forecasted change values are directly comparable.

Comparing the values in columns 1, 3 and 4 of **Table C-6**, the BLM determined that the values in columns 3 and 4 likely were more reliable forecasts of habitat change on non-federal lands given past harvest rates and the fact that both sets of values reflected sustainable rates of timber harvest. In addition, the values in Column 3 were more conservative than the values in Column 4. After conferring with experts who were familiar with the original data and how forests develop in western Oregon (Craig Ducey, BLM, Jeffrey Dunk, Humboldt State University, Betsy Glenn, FWS, and David LaPlante, Natural Resource Geospatial, pers. com. to Eric Greenquist, various dates during 2015) , the BLM determined that the more-conservative Column 3 values, in terms of northern spotted owl habitat change on non-federal lands, were the most realistic forecasts it could make from the available data.

in summary, the BLM determined analytically that the 1996 – 2012 GNN data, the most accurate data for non-BLM-administered lands in the range of the northern spotted owl, could not be used in their raw form to forecast habitat changes on those lands during 2013 – 2063, because observed rates of habitat loss on non-federal lands during 1996 – 2012 were not indicative of future change. As described above, this finding by the BLM accords well with the findings of Gale et al. (2012). Therefore, the BLM explored methods to filter the GNN data to generate forecasts that better accord with projections of timber harvest on non-federal lands at rates that could continue into the future. In refining its methods, the BLM chose the more conservative of its reliable forecasts: the forecast that showed the greatest habitat losses on non-federal lands that still could still continue into the future. To be clear, the BLM does not intend its forecasts of range-wide habitat changes to be precise and accurate predictions of future habitat conditions. Instead, they are intended only as reasonable and credible approximations of future habitat conditions in each province and land classification that can be used to compare northern spotted owl habitat and population responses to the different management alternatives.

BLM-administered Lands in the Planning Area

For the Draft RMP/EIS, the BLM used only the covariate values derived by Woodstock to calculate relative habitat suitability values for BLM-administered lands. This was problematic because, normally, the relative habitat suitability value of each 30 × 30-m pixel is calculated from the means of the covariate values within 800 m of the pixel. However, for the years 2023, 2033, 2043, 2053 and 2063 no GNN covariate values existed for lands that were within 800 m of BLM-administered lands. Although the BLM can forecast decadal changes in relative habitat suitability values for other lands, as described above, it cannot forecast decadal changes in the GNN covariate values that are used to calculate relative habitat suitability values. Since Woodstock derives future covariate values only for BLM-administered lands, there existed no future covariate values for other lands within 800 m of BLM-administered lands that the BLM could use to calculate relative habitat suitability values on BLM-administered lands for the years 2023, 2033, 2043, 2053 and 2063.

For the Draft RMP/EIS, the BLM used only Woodstock-derived covariate values to calculate relative habitat suitability on BLM-administered lands, effectively ignoring the influence of other lands within 800 m of BLM-administered lands. The only option the BLM had to ignoring the influences of other lands within 800 m of BLM-administered lands was to assume that habitat conditions on those other lands would remain static over time (i.e., calculate decadal relative habitat suitability values for BLM-administered lands using the decadal Woodstock covariate values for BLM-administered lands and the 2012 GNN covariate values for other lands within 800 m of BLM-administered lands). The BLM chose to ignore the influence of other lands, because it determined that the effects of ignoring the other lands were negligible where BLM-administered lands abutted reserves on other federal lands. However, where BLM-administered lands abutted non-federal lands, especially private industrial timberlands, and to a lesser extent, federal non-reserved lands, the BLM determined that its process tended to overestimate the relative habitat suitability of the BLM-administered lands.

With its more-conservative forecasts of habitat changes on other lands within the range of the northern spotted owl, as described above, the BLM determined that the latter of the two options described above—use the decadal Woodstock covariate values for BLM-administered lands and the 2012 GNN covariate values for other lands within 800 m of BLM-administered lands—was likely more realistic than using only the decadal Woodstock covariates to calculate relative habitat suitability values for BLM-administered lands. The BLM tested modeling relative habitat suitability values on BLM-administered lands in two ways:

1. Non-weighted covariate values

- The BLM identified BLM-administered lands within 800 m of Congressionally Reserved lands and other federal reserves (e.g., Late-Successional Reserves on USFS lands). On those BLM-administered lands, the BLM calculated relative habitat suitability values using only the Woodstock covariates within 800 m of each pixel to account for the likelihood that habitat development on BLM-administered lands would best represent habitat development on the adjacent reserved lands.
- On all other BLM-administered lands, the BLM calculated relative habitat suitability values using the decadal Woodstock covariates for the BLM-administered lands within 800 m of each pixel and the 2012 GNN covariate values within 800 m of each pixel.

2. Weighted covariate values

- The BLM masked Congressionally Reserved lands and other federal reserves within 800 m of BLM administered lands and excluded the GNN covariate values for those lands from its analysis.
- Within the 800 m circle around each pixel, the BLM calculated the area of (1) BLM-administered land plus Congressionally Reserved lands and other federal reserves, and (2) federal non-reserved lands and nonfederal lands.
- The BLM then weighted the decadal Woodstock covariate values and 2012 GNN covariate values within 800 m of each pixel according to the area of each of the two land classifications; i.e., the BLM weighted the decadal Woodstock covariate values according to the portion of the 800 m circle represented by BLM-administered lands, Congressionally Reserved lands and other federal reserves, and the 2012 GNN covariate values according to the portion represented by federal non-reserved lands and nonfederal lands.

The BLM found no substantive difference between the two methods in its habitat forecasts for BLM-administered lands over time. Therefore, the BLM chose not to weigh the covariate values, because that was the analytically simpler and quicker of the two methods.

E. Developing and Calibrating the BLM HexSim Model

As described above, the BLM determined that the HexSim model developed by the FWS to inform its decisions on northern spotted owl recovery and critical habitat (USDI FWS 2011, Appendix C; and USDI FWS 2012), with specific changes, could help the BLM meet its planning needs. Therefore, the BLM took the FWS's northern spotted owl HexSim model, fully parameterized, and modified it as necessary. The BLM made the following changes:

- The BLM developed different range-wide relative habitat suitability surfaces that reflected spatially-explicit estimates of how forest stands would respond over time to forest ingrowth, timber harvest and wildfire on all lands, and also to forest restoration treatments on BLM-administered lands in the planning area.
- Although the BLM altered relative habitat suitability values by decade on all lands, as described above, the BLM did not otherwise augment or suppress those values. In effect, unlike some FWS simulations that limited northern spotted owl nesting to potential critical habitat units, the BLM always allowed simulated northern spotted owls to move, forage and establish nest territories on all lands according to local relative habitat suitability values.
- Because the BLM required both stochastic and non-stochastic simulations of northern spotted owl response for the reasons described in USDI BLM 2015, Chapter 3 (Northern Spotted Owl, Issue 4), the BLM completed 500 replicate simulations of each alternative. In contrast, after its Phase 1 modeling, the FWS used only stochastic simulations, with 100 replicates per alternative (USDI FWS 2012, p. 29).
- Although the BLM calibrated the BLM model using the same method used by the FWS (USDI FWS 2011, pp. C-71 – C-74), the BLM calibration, described below, yielded unique numbers and locations of female northern spotted owls to begin each of the replicate simulations.
- The BLM used observed barred owl encounter rates (for the Draft RMP: Forsman *et al*. 2011, Appendix B; and USDI FWS 2011, p. C-66 and Table C-25; for the Proposed RMP/Final EIS: the 2016 meta-analysis data from Dugger et al. 2016 and as recommended by the FWS) for reasons described in Chapter 3 (Northern Spotted Owl Issue 4).
- Also for reasons described in Chapter 3 (Northern Spotted Owl Issue 4), the BLM simulated 50 years (2013-2063) with relative habitat suitability values changing every 10 years according to the BLM forecasts, and then held habitat values constant for an additional 50 years.

Calibration for the Draft RMP/EIS

The northern spotted owl HexSim model developed by the FWS (see USDI FWS 2011 and Schumaker *et al*. 2014) is an individual-based, spatially-explicit, population simulation model. The FWS parameterized the model based on empirically-derived estimates of age-specific survival, fecundity, territory and home-range size, and dispersal (USDI FWS 2011 and Schumaker *et al*. 2014). The FWS used its relative habitat suitability surface in HexSim to represent resource quality (higher values were of greater quality than lower values). Each of the eleven modeling regions (USDI FWS 2011, p. C-13) had different resource targets for northern spotted owls, and resource targets varied in relation to home range size (larger targets in areas with larger home ranges). For home range size variation, many empirical studies existed and the FWS used them to guide its decisions in the development of HexSim (USDI FWS 2011, Appendix C and Schumaker *et al*. 2014). However, other than variation in home range size, no empirical information existed to guide specific decisions on resource targets. Because resource targets—as represented by relative habitat suitability—are not real, on-the-ground quantities, they can have no empirical basis; they only can be associated with on-the-ground resources. Thus, the authors of the FWS's northern spotted owl HexSim models varied resource targets until resulting simulated population sizes were similar to empirically-estimated populations of northern spotted owls (USDI FWS 2011, Appendix C and Schumaker *et al*. 2014). This model calibration happened by "tuning" (i.e., varying) resource targets by modeling region. The FWS (USDI FWS 2011, Appendix C) also calibrated its HexSim model for

dispersal such that simulated northern spotted owls that dispersed did so in a way that resulted in similar dispersal distance profiles to those estimated from empirical studies. For this portion of the calibration, the FWS tuned the model by varying the attraction/repulsion of various habitats (relative habitat suitability values) as well as the maximum number of 86.6-ha hexagons a dispersing owl could move through while attempting to find a territory (see USDI FWS 2011 and Schumaker *et al*. 2014).

The BLM initially intended to use the 2012 GNN version of Model 13 for other lands within the northern spotted owl's range. However, as the BLM evaluated how Model 13 would be used for HexSim population dynamics modeling, it evaluated a range of factors that, instead, suggested using the FWS MaxEnt model projected to newly-available 2012 GNN variables for other lands:

- The FWS HexSim model had been developed to work with and calibrated to the FWS 2006 GNN MaxEnt relative habitat suitability model, and had been demonstrated to be well-calibrated to those data (USDI FWS 2011, Appendix C).
- The BLM's 2006 GNN version of Model 13 demonstrated a high degree of correlation to the FWS's 2006 GNN model (correlation coefficient of 0.867).
- BLM-administered lands in the planning area account for about 4 percent of lands in the northern spotted owl's range. As such, relative habitat suitability values on BLM-administered lands would likely have a proportionally small effect on overall population response.
- The FWS initially calibrated its HexSim model by adjusting model parameters (i.e., resource targets) separately for each of its eleven modeling regions. BLM-administered lands in the planning area are constrained to four of those regions. This meant that, by using the FWS's 2006 GNN MaxEnt relative habitat suitability surface, five of the eleven modeling regions would require no recalibration at all. And, because of the high degree of correlation between the FWS's model and Model 13, the other modeling regions probably would require only minor recalibration.

Given these conditions, the BLM determined that using the FWS's 2012 GNN model for other lands was reasonable and would require less calibration and re-development of HexSim than would be required using the BLM 2012 GNN Model 13 relative habitat suitability surfaces for those lands.

The USFS released its 2012 GNN data at about the same time the BLM reached this phase in the project; up to this point, the latest release of these data was for 2006. To create the new 2012 version of the FWS MaxEnt model, the BLM generated a full set of model variable surfaces from the 2012 GNN data, using the same GNN attributes and methods used by FWS to generate the original 1996 and 2006 covariate rasters (USDI FWS 2011, Appendix C). The BLM then projected the original FWS 1996 MaxEnt model to the 2012 covariate rasters separately for each of the eleven FWS modeling regions and merged them into a single, seamless, range-wide relative habitat suitability surface.

To derive the relative habitat suitability surface needed to calibrate HexSim, the BLM then replaced the pixels in the FWS 2012 GNN model for BLM-administered lands in the planning area with data from the final BLM 2013 Woodstock Model 13 raster.

Because the BLM created new MaxEnt surfaces for BLM-administered lands in the planning area, the BLM sought to evaluate whether the "default settings" of HexSim, as used by the FWS, would work well for the BLM, or whether further calibration (fine tuning) was needed before running population simulations. In its calibration/tuning of the northern spotted owl HexSim model, the FWS (USDI FWS 2011, Appendix C) found that time-step 50 represented a reasonable approximation of the present (at the time the FWS did its work). The only differences between the data feeding into the northern spotted owl HexSim models by the FWS and this effort by the BLM were that:

- The FWS and the BLM used different MaxEnt relative habitat suitability surfaces for BLM-administered lands in the planning area, and;
- The relative habitat suitability surface for BLM-administered lands in the planning area was estimated for 2013. The BLM projected the FWS 1996 GNN MaxEnt models using GNN data from 2012 (as opposed to 2006, as used by the FWS) for other lands.

Thus, this new "base" relative habitat suitability surfaces used by the BLM used the identical MaxEnt models for all lands except BLM-administered lands in the planning area, and, for those lands, the BLM developed a new MaxEnt model (Model 13). Since the correlation between the relative habitat suitability surfaces developed by the FWS and Model 13 was so high, the BLM anticipated that its HexSim model would require minor, or no, recalibration.

The BLM began recalibration by using the FWS default HexSim settings, and evaluated population estimates for the same eight demographic study areas for which the FWS had data (USDI FWS 2011, pp. C-71 – C-75). The BLM ran 20 replicates of HexSim (without environmental stochasticity; see Northern Spotted Owl, USDI BLM 2015, Chapter 3) for 70 time-steps. Replicates refer to the number of distinct simulations that are run. Because HexSim is not a deterministic model, several replicates are needed to get an estimate of mean responses (i.e., different replicates will almost always vary in their specific population responses). The BLM chose 70 time-steps because it initially wanted to evaluate whether, using default settings, simulated demographic study area population sizes were more/less similar to empirically-estimated populations before, during, or after time-step 50: the time-step that the FWS (USDI FWS 2011, pp. C-71 – C-75) found to be a good approximation of "now." The BLM used the mean population among the 20 replicates to estimate simulated population size. For the eight demographic study areas, the BLM used the mean of the three years with the largest population to estimate population size (see USDI FWS 2011, pp. C-71 – C-75).

Using default parameters in the northern spotted owl HexSim model, the BLM found that mean population size of territorial owls on the eight demographic study areas at time-step 59 corresponded most closely with the empirical population estimates. For the demographic study areas, empirical estimates of populations ranged from 30 to 130, with the total population on the eight study areas being 756. At time-step 59, mean simulated estimates of populations ranged from 32 to 145, with a total population of 763. The pairwise percent differences between empirical and simulated populations on each of the study areas varied from 0.54 percent to 41.75 percent, with a mean percentage difference of 4.7 percent. Time-step 55 had the smallest mean percent difference (-2.3 percent) but the estimate of total population size on the eight study areas was 6 percent higher than the empirical estimates. In contrast, the time-step 59 estimated total population size on the eight study areas was 0.95 percent larger than the empirical estimate. **Figure C-17** compares empirical and time-step 59 population estimates in each of the study areas.

Because the default parameters worked well, the BLM did not further attempt to fine-tune any parameter settings and used the default settings. The only difference between the FWS's (2011) and BLM's use of the spotted owl HexSim model was that the FWS used time-step 50 to represent the current year and the BLM used time-step 59.

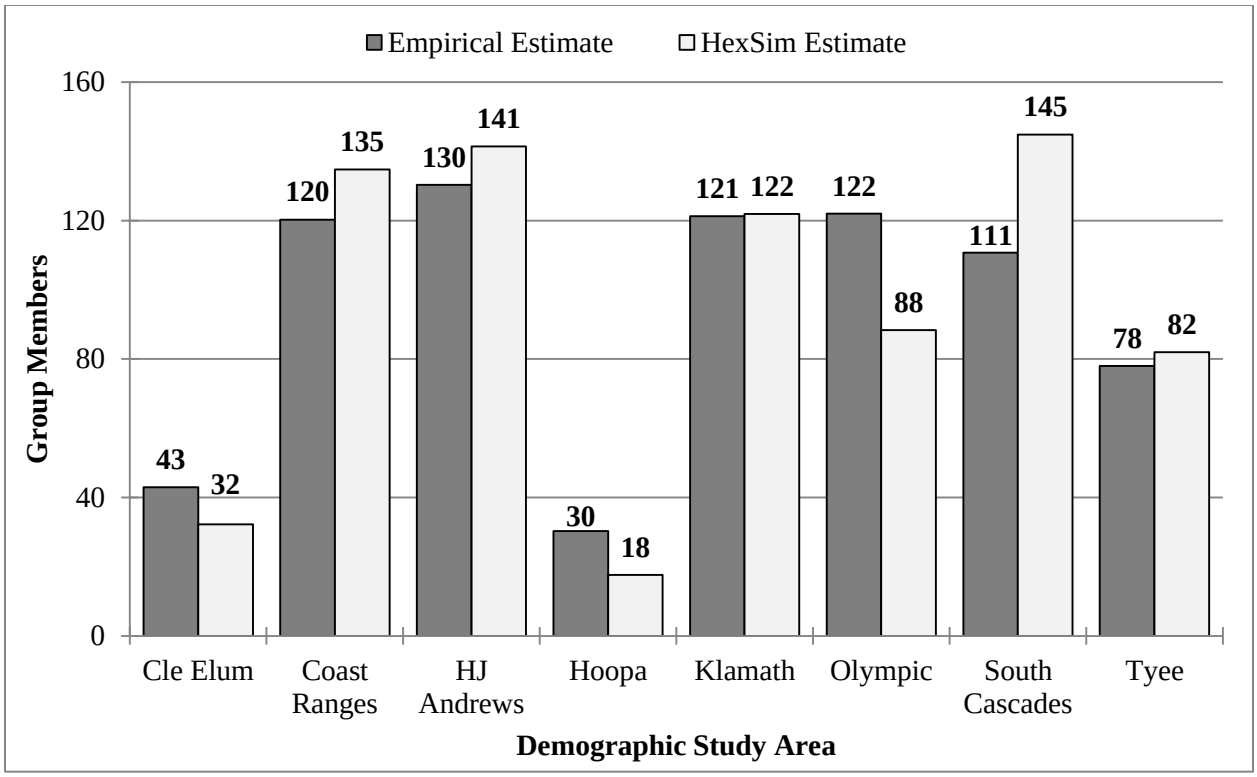


Figure C-17. Comparison of the mean of estimates of territorial northern spotted owls on eight demographic study areas estimated in the field (empirical estimates, n = mean of three highest years between 1996 and 2006) and estimated using the BLM northern spotted owl HexSim model (mean from 20 replicates of HexSim at time-step 59).

Additional Calibration for the Proposed RMP/Final EIS

The northern spotted owl HexSim model that the BLM used for its Draft RMP/EIS was essentially identical to that used by the FWS to inform its decisions on northern spotted owl recovery and the delineation of northern spotted owl critical habitat. The FWS model relied heavily on demographic parameters from the 2011 northern spotted owl meta-analysis (Forsman *et al*. 2011). Since publication of the Draft RMP/EIS, Dugger et al. (2016) provided five additional years of meta-analysis results on northern spotted owl adult fecundity and survival, and barred owl encounter rates.

Fecundity

Dugger et al. (2016) provided meta-analysis results for the eight northern spotted owl demographic study areas on federal land that are used to monitor the Northwest Forest Plan. Fecundity data were stratified among three northern spotted owl age classes: 1-year olds (S1), 2-year olds (S2), and greater than or equal to 3-year olds (adults). The northern spotted owl HexSim model that the BLM used for the Draft RMP/EIS , which relied on fecundity data from Forsman *et al*. 2011, assumed mean fecundity values of 0.070, 0.202, and 0.330 for S1, S2, and adults, respectively. Mean (un-weighted) fecundity values among the eight demographic study areas from the 2016 meta-analysis were 0.068, 0.215, and 0.326 for S1, S2, and adults, respectively. Since these values for each age class were nearly identical, the BLM did not change fecundity values in its HexSim model for the Proposed RMP/Final EIS.

Survival

The FWS used data from Forsman et al. 2011 (p. 32, Table 12) to stratify survival rates among S1, S2, and adult owls. The authors of the 2016 meta-analysis did not use the same analytic approach used by

Forsman et al. (2011). Forsman et al. based their estimates of age-specific survival on model-averaging. In contrast, for the 2016 meta-analysis, Dugger et al. (2016) based their results on the best random effects model for each demographic study area. In addition, Dugger et al. estimated only adult survival whereas Forsman et al. estimated survival for each age class. As with the fecundity data, Dugger et al. provided estimates of adult survival for the eight federal land demographic study areas.

For each of the eight demographic study areas, the BLM estimated mean annual survival from the 2016 meta-analysis and compared them to the model-averaged rates estimated by Forsman et al. (2011) for the same demographic study areas. For the eight demographic study areas, the estimates by Forsman et al. were larger for three demographic study areas, smaller for three demographic study areas, and identical for two demographic study areas. The average difference between the Dugger et al. (2016) and Forsman et al. estimates was 0.0039 (range -0.003 to 0.025). The grand mean of estimates according to Dugger et al. and Forsman et al. were 0.8502 and 0.8463, respectively.

The BLM did not change survival values in its HexSim model for the Proposed RMP/Final EIS, because (1) estimates of adult survival by Dugger et al. (2016) and Forsman et al. (2011) were so similar, (2) both sets of authors used different approaches to calculate survival, and (3) Dugger et al. did not calculate survival for all age classes.

Barred Owl Encounter Rates

Dugger et al. (2016) provided updated estimates of barred owl encounter rates (the proportion of northern spotted owl territories on which surveyors detected barred owls) for each of the eight federal land demographic study areas. They provided the estimates for each year since the studies began (or when barred owls first were recorded) through 2013. For the eight demographic study areas, the highest barred owl encounter rates occurred in 2013 for four demographic study areas. Seven of the eight demographic study areas show very strong linear time trends in barred owl encounter rates.

For each demographic study area, the BLM compared the mean barred owl encounter rate for the years 2007 – 2009 and 2011 – 2013. The mean percent change for all demographic study areas between these two means was 24.04 percent (range 8.37 – 83.33). Mean change for 2008 – 2013 was 36.87 percent, and for 2009 – 2013 was 26.48 percent. Slopes of individual demographic study area linear regressions (barred owl encounter rate × time) averaged 0.02 (range = 0.004 – 0.041). Thus, the barred owl encounter rates, on average, increased by about 2 percent per year in the eight demographic study areas from approximately 1990to 2013.

In the FWS's HexSim model, the FWS based barred owl encounter rates on demographic study area data provided by Forsman et al. (2011). Some demographic study areas are completely within one of the FWS's modeling regions, whereas other demographic study areas straddle multiple modeling regions, and some modeling regions have no demographic study area. Thus, the FWS used a combination of empirical data and professional judgment to ascribe barred owl encounter rates to each of the eleven FWS modeling regions.

For those demographic study areas within a single discrete modeling region, the BLM used the 2013 barred owl encounter rate from the demographic study area. For those modeling regions where it was less clear, the BLM applied the 26.48 percent increase (i.e., the average observed rate of change for all demographic study areas during 2009 – 2013) to the rates used by FWS in its HexSim model. Forsman et al. (2011) presented data on barred owl encounter rates through 2008. Thus, the BLM determined that using the average percentage increase on demographic study areas from 2009 to 2013, as the inflation factor was warranted. **Table C-7** compares the barred owl encounter rates used by the BLM for the Draft RMP/EIS and the Proposed RMP/Final EIS.

Table C-7. Barred owl encounter rates used by the BLM for the Draft RMP/EIS and Proposed RMP/Final EIS.

Modeling Region	Estimated Barred Owl Encounter Rates Used for the Draft RMP	Estimated Barred Owl Encounter Rates Used for the Proposed RMP/Final EIS
North Coast and Olympics**	0.505	0.515
East Cascades-North	0.296	0.374
West Cascades-North	0.320	0.405
West Cascades-Central	0.325	0.411
Oregon Coast**	0.710	0.831
West Cascades-South**	0.364	0.442
Inner California Coast Range	0.213	0.269
East Cascades-South**	0.180	0.228
Klamath-Siskiyou-East**	0.245	0.411
Klamath-Siskiyou-West**	0.315	0.398
Redwood Coast	0.205	0.259

** Modeling regions entirely or partially in the planning area.

Mean barred owl encounter rates for the eleven modeling regions are 0.334 (Draft RMP/EIS) and 0.413 (Proposed RMP/Final EIS). Among the eight demographic study areas, Dugger et al. (2016) calculated a mean barred owl encounter rate in 2013 of 0.449.

Hypothetical Barred Owl Control Areas

For the Draft RMP/EIS, the BLM evaluated northern spotted owl population responses to all alternatives, and to the No Timber Harvest Reference Analysis, using the observed estimated barred owl encounter rates shown in **Table 3-263** of the Draft RMP/EIS (USDI BLM 2015, p. 778). The BLM also evaluated Alternative C and the No Timber Harvest Reference Analysis using modified barred owl encounter rates developed by the FWS, also shown in **Table 3-263**. The BLM did the supplemental analyses to evaluate the degree to which BLM land use allocations could affect northern spotted owl population responses if the FWS implemented a barred owl control program.

As shown on pp. 783 – 804 of the Draft RMP/EIS, the BLM determined that northern spotted owl population responses to all of the alternatives, and to the No Timber Harvest Reference Analysis, were virtually identical because they primarily were determined by the observed estimated barred owl encounter rates (i.e., the degree of observed competitive interactions between northern spotted owls and barred owls). Since observed estimated barred owl encounter rates from the 2016 meta-analysis increased in all modeling regions (**Table C-7**), the BLM determined that it would learn nothing more by using the increased rates for the Proposed RMP/Final EIS.

Instead, the BLM simulated northern spotted owl population responses under Alternative C, the Proposed RMP, and the No Timber Harvest Reference Analysis using modified barred owl encounter rates in simulated barred owl control areas and observed estimated barred owl encounter rates (**Table C-7**, Column 3) in the remainder of each modeling region. The BLM did this to simulate range-wide northern spotted owl population responses under each scenario if the FWS were to implement a barred owl control program. Applying the modified barred owl encounter rates only in control areas more realistically

simulates the true effects of a hypothetical barred owl control program. This was a refinement to how the BLM simulated a barred owl control program for the Draft RMP/EIS, in which the BLM applied the modified barred owl encounter rate specific to each modeling region to all lands in the modeling region.

The BLM delineated hypothetical barred owl control areas and modified barred owl encounter rates with assistance from Jeffrey Dunk, Humboldt State University, David LaPlante, Natural Resource Geospatial, and Betsy Glenn, FWS, who helped the BLM develop its analytical assumptions. The BLM began with the assumptions that barred owl control would occur:

- Throughout the northern spotted owl's range;
- On approximately 10 percent of the forested landscape in each modeling region;
- In Federal Late-Successional Reserves, on State lands, and in northern spotted owl critical habitat on Federal and State lands;
- In aggregations of the best northern spotted owl habitat; and
- Within one mile of an improved road.

To delineate hypothetical control areas, the BLM segregated all lands in each modeling region into 20 resource bins according to relative habitat suitability value (i.e., those pixels with a relative habitat suitability value of 96 or higher were placed in Bin 1; those with values 91 – 95 were placed in Bin 2, etc.). The BLM then confined its analysis to those bins with relative habitat suitability values of 35 or higher (i.e., nesting-roosting habitat in 13 resource bins).

The BLM delineated Federal Late-Successional Reserves, State lands, and northern spotted owl critical habitat on Federal and State lands into five distance bins based on their distance from an improved road (i.e., those lands within 0.25 mile, 0.50 mile, 0.75 mile and 1.0 mile of an improved road, and beyond 1.0 mile of an improved road). The BLM then confined its analysis to those bins within 1.0 mile of an improved road (i.e., four distance bins).[10]

This generated a digital map of Federal and State lands segregated into 52 bins (13 resource bins × 4 distance bins) based on relative habitat suitability value and distance to an improved road. That is, the 30 × 30-m pixels with highest habitat suitability values and lands nearest roads were placed in lower-numbered bins, respectively, and the BLM multiplied the two bin values for each pixel to rank the pixels, with the lowest multiples receiving the highest rank. The BLM then used the zonation model developed by the FWS (USDI FWS 2011, Appendix C and 2012) to aggregate Federal and State lands into barred owl control areas based on relative habitat suitability value and nearness to an improved road until 10 percent of the forested landscape in each modeling region had been delineated. This process led to the highest value habitat areas within appropriate land allocation categories and closest to a road being included in the "target area" first, followed by successively lower value habitats down to a value of 35 and greater distances out to 1.0 mile.

However, in the North Coast and Olympics and West Cascades-North modeling regions, zonation delineated only 4.8 percent of the forested landscape in each modeling region, due primarily to the acres of roadless lands, such as in Olympic National Park. The BLM conferred with the FWS, which recommended that the BLM expand the control areas in other modeling regions until it achieved a range-wide total of 10 percent (Betsy Glenn, FWS, pers. com. to Eric Greenquist, September 11, 2015). The FWS made this recommendation because the added acres mostly would occur in regions with the largest

[10] The BLM used a Fibonacci sequence where 0.25 and 0.5-mile bands equaled 1, 0.7- mile bands equaled 2, and 1.0-mile bands equaled 3.

northern spotted owl populations, which is how the FWS most likely would design a control program. **Figure C-18** shows the hypothetical control areas delineated by zonation.

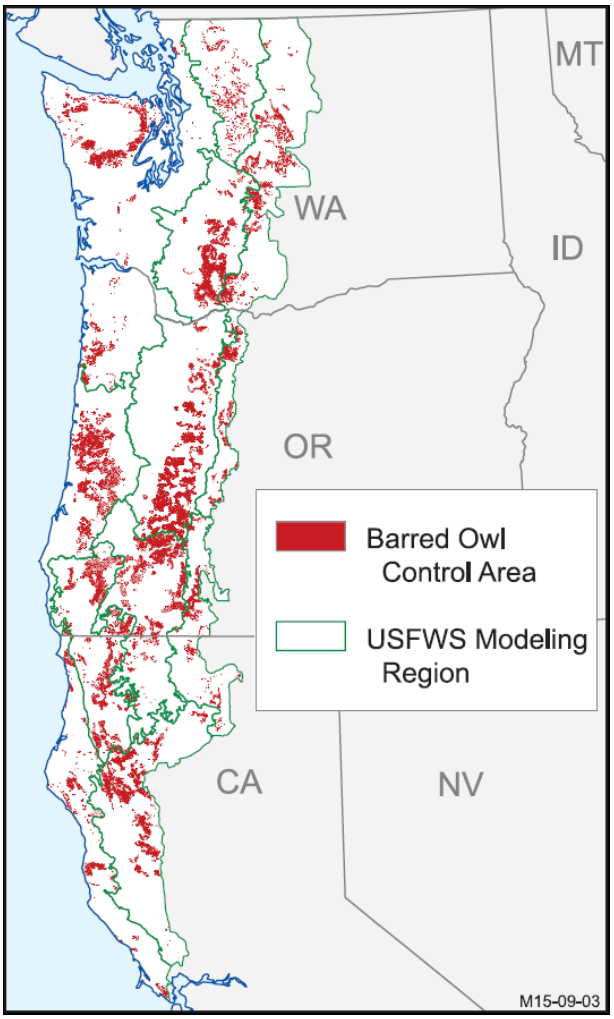


Figure C-18. Hypothetical barred owl control areas in the United States' portion of the northern spotted owl's range. TO BE ADDED

Modified Barred Owl Encounter Rates

As the BLM explained on pp. 778 – 780 of the Draft RMP/EIS, when simulating northern spotted owl responses to a hypothetical barred owl control program, the BLM used the estimated observed barred owl encounter rates (**Table 3-263**, p. 778 of the Draft RMP) during the first decade (2013 – 2023) and the modified barred owl encounter rates (same table) during 2023 – 2063. In two modeling regions with the highest estimated observed encounter rates, the BLM phased in the modified rates over the first two decades (2013 – 2033) (see the Draft RMP/EIS, p. 779).

However, with the delineation of hypothetical control areas for the Proposed RMP/Final EIS, the BLM, based on the recommendation of the FWS (Betsy Glenn, FWS, pers. com. to Eric Greenquist, September 1, 2015), used the observed estimated barred owl encounter rates shown in the third column of **Table C-7** but, beginning with the second decade (i.e., during 2023 - 2063), reduced the barred owl encounter rate in each of the hypothetical control areas to 0.15 to simulate the effects of a targeted barred owl control program (i.e., the BLM continued to use the observed estimated encounter rates outside the hypothetical control areas).

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Appendix D – Livestock Grazing

This appendix summarizes the information for allotments in the Klamath Falls Field Office and the Medford District. **Table D-1** and **Table D-2** contain detailed information about these livestock grazing allotments including acres derived from the BLM allotment and pasture boundary (GRA) theme. See **Appendix A** for all allotments the BLM would make unavailable to livestock grazing.

Table D-1. Available Klamath Falls Field Office grazing allotments.

Allotment Name	Allotment Number	BLM Acres	Active Use (AUMs)†	Suspended (AUMs)	Season-of-Use	Selective Management Category‡	Rangeland Health Assessment Completed	Rangeland Health Assessment Finding§	Grazing System	Wildlife AUM's	Other Information
Chase Mountain	00101	9,283	195	-	5/15-8/13	C	2001	Not Meeting Standards; Grazing is not a factor.	Yearly	Deer 1,681, Horses 100	Critical deer winter range habitat occurs within the allotment. Allotment contains a portion of the HMA.
Edge Creek	00102	5,975	207	-	5/1-9/1	I	2000	Not Meeting Standards; Grazing is not a factor.	Deferred-Rotation		Range Improvement Potential, common allotment, exclosures or other areas closed to grazing, portion proposed for closure.
Buck Mountain*	00103	7,416	204	-	5/15-9/1	I	2000	Not Meeting Standards; Grazing is not a factor.	Yearly	Deer 1,643	None
Buck Lake	00104	12,019	280	-	6/15-10/15	C	2000	Not Meeting Standards; Grazing is not a factor.	Yearly	Deer 2,129	Range Improvement Potential, common allotment, exclosures or other areas closed to grazing.
Johnson Prairie	00105	119	12	-	5/1-10/1	C	2000	Not Meeting Standards; Grazing is not a factor.	Yearly		None
Dixie*	00107	4,439	320	100	5/1-8/15	I	2002	Not Meeting Standards; Grazing is a factor.	Yearly	Deer 928, Elk 100, Horses 50	Range Improvement Potential, exclosures or other areas closed to grazing. Allotment contains portion of the HMA. Continue monitoring grazing and make adjustments to improve rangeland health.
Dry Lake	00140	101	10	-	5/1-6/30	C	2001	Not Meeting Standards; Grazing is not a factor.	Yearly	Deer 10	None
Chicken Hills	00141	3,520	80	-	5/15-9/15	C	2001	Not Meeting Standards; Grazing is not a factor.	Yearly	Deer 931	None
Long Lake	00142	367	18	-	6/16-9/30	C	2000	Meeting All Standards	Yearly		None

Allotment Name	Allotment Number	BLM Acres	Active Use (AUMs)†	Suspended (AUMs)	Season-of-Use	Selective Management Category‡	Rangeland Health Assessment Completed	Rangeland Health Assessment Finding§	Grazing System	Wildlife AUM's	Other Information
Grubb Springs	00147	3,564	130	-	5/1-9/30	C	2000	Not Meeting Standards; Grazing is not a factor.	Yearly	Deer 650	None
Adams	00800	40	6	-	4/15-7/15	C	2005	Not Meeting Standards, Grazing is a factor	Yearly		Continue monitoring grazing and make adjustments to improve rangeland health.
Haught	00801	401	27	-	5/1-7/31	C	Not Completed	Not Completed	Yearly	Deer 7	None
Stock Drive	00802	40	2	-	5/1-6/30	C	2006	Meeting All Standards	Yearly		None
J Spring	00803	241	7	-	5/1-6/30	C	2003	Meeting All Standards	Yearly	Deer 6 Antelope 2	None
Bar CL	00804	481	20	22	5/1-5/31	C	Not Completed	Not Completed	Yearly	Deer 10	None
SE 80	00805	80	8	-	5/1-10/31	C	2006	Meeting All Standards	Yearly	Deer 1	None
Two Mile	00806	659	56	-	5/1-9/30	C	2006	Not Meeting Standards; Grazing is not a factor.	Yearly	Deer 16 Elk 16	None
Barnwell	00807	1,635	75	-	5/1-6/15	C	Not Completed	Not Completed	Yearly	Deer 80	Range Improvement Potential
Lee	00808	40	10	-	6/1-8/15	C	Not Completed	Not Completed	Yearly		None
Brown	00809	81	30	-	6/1-8/30	C	Not Completed	Not Completed	Yearly	Deer 1	None
Brenda	00810	120	18	-	5/16-6/30	C	2006	Meeting All Standards	Yearly	Deer 24 Elk 24	None
Cheyne	00811	809	51	-	5/1-6/15	C	2004	Meeting All Standards	Yearly	Deer 40	None
Stukel-Coffin	00812	730	55	-	5/1-7/1	C	2002	Meeting All Standards	Yearly	Deer 14, Elk 5	None
Cunningham	00814	839	108	-	5/1-6/15	C	Not Completed	Not Completed	Yearly	Deer 14	None
Stukel-Dehlinger C.	00815	1,684	240	-	4/15-8/8	I	2002	Meeting All Standards	Yearly	Deer 31, Elk 11	None

Allotment Name	Allotment Number	BLM Acres	Active Use (AUMs)†	Suspended (AUMs)	Season-of-Use	Selective Management Category‡	Rangeland Health Assessment Completed	Rangeland Health Assessment Finding§	Grazing System	Wildlife AUM's	Other Information
Stukel-Dehlinger H.	00816	388	30	-	5/10-8/10	C	2002	Meeting All Standards	Yearly	Deer 8	None
Drew	00817	766	72	-	5/1-6/30	C	2005	Meeting All Standards	Yearly	Deer 34, Elk 14	None
Duncan	00818	202	15	-	5/1-6/15	C	Not Completed	Not Completed	Yearly	Deer 4	None
Dupont	00819	78	7	-	4/15-6/1	C	Not Completed	Not Completed	Yearly		None
North Horsefly	00821	1,287	68	-	5/1-6/15	C	2007	Meeting All Standards	Yearly	Deer 18	None
Stukel-O'Neill	00822	3,405	210	-	5/1-7/15	I	2002	Meeting All Standards	Yearly	Deer 59, Elk 20	Exclosures or other areas closed to grazing
North Horsefly	00823	569	60	-	6/16-8/1	C	2007	Meeting All Standards	Yearly	Deer 17	None
Jeld-Wen	00824	313	36	-	6/1-7/15	C	2006	Meeting All Standards	Yearly	Deer 7	None
Naylox	00825	757	76	-	5/1-6/30	C	2005	Meeting All Standards	Yearly	Deer 14	None
Haskins	00826	567	80	-	5/1-7/15	C	2004	Meeting All Standards	Yearly	Deer 11	None
Stukel-High	00827	348	17	-	5/1-6/15	C	2003	Meeting All Standards	Yearly	Deer 5	None
Stukel-Hill	00828	975	60	-	5/1-6/15	C	2002	Meeting All Standards	Yearly	Deer 18, Elk 7	None
Horton	00829	758	26	-	4/21-6/30	C	Not Completed	Not Completed	Yearly	Deer 36	Range Improvement Potential
Hungry Hollow	00830	281	40/H	-	6/1-8/30	C	2005	Meeting All Standards	Yearly	Deer 5	Proposed for conversion from horse to livestock
Warlow	00831	560	50	-	5/1-9/30	C	2007	Meeting All Standards	Yearly	Deer 8, Elk 3	None
Jesperson	00832	1,559	158	-	5/1-7/1	C	Not Completed	Not Completed	Yearly	Deer 30, Elk 30	None
Johnson	00833	25	6	--	5/1-6/30	C	Not Completed	Not Completed	Yearly		None
Kellison	00834	352	19	-	5/1-6/13	C	2004	Not Meeting Standards; Grazing is not a factor.	Yearly	Deer 6	None

Allotment Name	Allotment Number	BLM Acres	Active Use (AUMs)†	Suspended (AUMs)	Season-of-Use	Selective Management Category‡	Rangeland Health Assessment Completed	Rangeland Health Assessment Finding§	Grazing System	Wildlife AUM's	Other Information
Ketcham	00835	281	20	-	5/1-6/15	C	Not Completed	Not Completed	Yearly	Deer 16	Range Improvement Potential
Harpold Chaining	00836	851	96	-	5/1-5/30	C	2007	Not Meeting Standards; Grazing is a factor.	Yearly	Deer 101	Range Improvement Potential. Continue monitoring grazing and make adjustments to improve rangeland health.
Bryant-Horton	00837	1,211	130	-	6/1-7/9	C	2006	Meeting All Standards	Yearly	Deer 24, Elk 8	None
Windy Ridge	00838	602	52	-	5/1-5/31	C	Not Completed	Not Completed	Yearly	Deer 11	Range Improvement Potential
Bryant-Loveness	00839	3,307	490	-	5/1-6/30	C	Not Completed	Not Completed	Yearly	Deer 161 Elk 21	Range Improvement Potential
Bryant-Lyon	00840	569	38	-	5/1-9/30	C	Not Completed	Not Completed	Yearly	Deer 11	None
Marshall	00841	351	14	-	4/21-5/30	C	Not Completed	Not Completed	Yearly	Deer 17	None
Short Lake	00842	428	40	-	5/1-6/30	C	2005	Not Meeting Standards; Grazing is a factor.	Yearly	Deer 42	Range Improvement Potential. Continue monitoring grazing and make adjustments to improve rangeland health.
McAuliffe	00843	87	10	-	4/16-6/15	C	Not Completed	Not Completed	Yearly	Deer 1	None
Paddock	00844	399	31	-	5/1-6/30	M	2003	Meeting All Standards	Deferred-Rotation	Deer 8, Antelope 3	None
Klamath Hills	00845	198	55	-	4/1-5/31	C	Not Completed	Not Completed	Yearly	Deer 10	None
OK	00846	1,290	105	35	5/1-6/15	C	Not Completed	Not Completed	Yearly	Deer 24	Range Improvement Potential
Swede Cabin	00847	2,018	108	-	5/1-6/15	I	2007	Meeting All Standards	Yearly	Deer 36	Range Improvement Potential
Pope	00848	446	48	-	5/1-7/31	C	2007	Meeting All Standards	Yearly	Deer 19	None
Rajnus Bros.	00849	239	16	-	5/1-6/17	C	Not Completed	Not Completed	Yearly	Deer 10	None
Wilkinson	00850	398	18	-	5/1-6/5	C	Not Completed	Not Completed	Yearly	Deer 6	None
Harpold Ridge	00851	1,049	108	-	4/21-6/30	M	2006	Meeting All Standards	Yearly	Deer 49	None
Rodgers	00852	2,449	235	-	5/1-7/1	I	2003	Meeting All Standards	Yearly	Deer 48, Elk 17	Exclosures or other areas closed to grazing.

Allotment Name	Allotment Number	BLM Acres	Active Use (AUMs)†	Suspended (AUMs)	Season-of-Use	Selective Management Category‡	Rangeland Health Assessment Completed	Rangeland Health Assessment Finding§	Grazing System	Wildlife AUM's	Other Information
7C	00853	646	104	-	5/1-6/30	C	2007	Meeting All Standards	Yearly	Deer 13	None
Jump	00854	200	20	-	5/1-5/30	C	2007	Meeting All Standards	Yearly	Deer 4	None
Bryant-Smith	00855	1,217	109	-	5/15-8/31	C	2007	Meeting All Standards	Yearly	Deer 22, Elk 7	None
Bryant-Stastny	00856	444	70	-	5/10-9/30	C	2007	Meeting All Standards	Yearly	Deer 8, Elk 3	None
Bryant-Taylor	00857	765	74	-	4/15-9/30	C	2007	Meeting All Standards	Yearly	Deer 14, Elk 4	None
Swan Lake Rim	00858	6,524	300	-	5/1-6/30	M	2006	Meeting All Standards	Rest-Rotation	Deer 121, Elk 116	Common allotment
Cunard	00859	468	60/H	-	5/1-7/31	C	2002	Meeting All Standards	Rest-Rotation	Deer 7	Proposed for conversion from horse to livestock.
McCartie	00860	556	83	-	5/1-5/30	C	2004	Meeting All Standards	Rest-Rotation	Deer 25	None
Yainax Butte	00861	2,920	120	-	7/1-9/30	M	2005	Meeting All Standards	Deferred-Rotation	Deer 119	Exclosures or other areas closed to grazing.
Klamath Forest Estates	00862	2,743	47	-	5/1-5/31	M	2005	Meeting All Standards	Yearly	Deer 47	None
Wirth	00863	1,361	100	-	4/15-10/15	C	Not Completed	Not Completed	Yearly	Deer 25	None
Rajnus & Son	00864	1,460	110	-	5/1-6/30	C	2007	Not Meeting Standards Grazing is not a factor	Yearly	Deer 28	None
Mills Creek	00865	283	40	-	5/1-6/14	C	Not Completed	Not Completed	Yearly	Deer 5	Range Improvement Potential
Bear Valley	00876	5,054	415	-	7/1-8/9	I	2000/2003	Meeting All Standards	Deferred-Rotation	Deer 94, Antelope 34	Common allotment, exclosures or other areas closed to grazing
Bumpheads	00877	9,385	420	265	4/21-6/30	I	2003	Not Meeting Standards; Grazing is a factor.	Deferred-Rotation	Deer 173, Antelope 63	Exclosures or other areas closed to grazing
Campbell	00878	1,371	47/H	13	5/1-10/26	C	2002	Meeting All Standards	Yearly	Deer 28, Antelope 10	Proposed for conversion from horse to livestock.

Allotment Name	Allotment Number	BLM Acres	Active Use (AUMs)†	Suspended (AUMs)	Season-of-Use	Selective Management Category‡	Rangeland Health Assessment Completed	Rangeland Health Assessment Finding§	Grazing System	Wildlife AUM's	Other Information
DeVaul	00879	378	12	15	5/1-8/30	C	2003	Meeting All Standards	Yearly	Deer 5, Antelope 2	None
Goodlow	00881	349	32	52	5/1-8/31	C	2003	Meeting All Standards	Yearly	Deer 6, Antelope 2	None
Horsefly	00882	26,906	2,656	2,075	4/15-6/30, 10/1-11/15	I	1999/2003	Meeting All Standards	Rest-Rotation/ High Intensity-Short Duration	Deer 495, Elk 30, Antelope 181	Exclosures or other areas closed to grazing, common allotment
Horton	00883	1,005	58	211	4/21-5/20	C	2002	Meeting All Standards	Yearly	Deer 41, Antelope 6	None
Pankey Basin	00884	309	43	38	5/15-8/31	C	2003	Not Meeting Standards; Grazing is a factor.	Yearly	Deer 5, Antelope 2	Range Improvement Potential, exclosures or other areas closed to grazing
Dry Prairie	00885	8,026	642	358	5/1-9/30	I	1999/2003	Meeting All Standards	Rest-Rotation	Deer 149, Antelope 55	Exclosures or other areas closed to grazing, common allotment, proposed range improvement.
Horse Camp Rim	00886	8,822	445	281	5/1-7/31	I	2003	Meeting All Standards	Rest-Rotation	Deer 172, Antelope 63	Exclosures or other areas closed to grazing
Pitchlog	00887	9,376	434	796	5/10-6/30	I	1999/2003	Meeting All Standards	Rest-Rotation/ High Intensity-Short Duration	Deer 174, Elk 37, Antelope 64	Exclosures or other areas closed to grazing
Rock Creek	00888	2,522	216	639	5/1-5/31	I	2003	Meeting All Standards	Rest-Rotation	Deer 130, Antelope 19	None
Timber Hill	00889	2,542	270	134	6/21-7/31	I	1999/2003	Meeting All Standards	Yearly	Deer 55, Antelope 20	None
Willow Valley	00890	19,925	1,225	506	4/15-6/30	I	2000/2003	Not Meeting Standards, Grazing is a factor	Rest-Rotation	Deer 960, Antelope 141	Exclosures or other areas closed to grazing, common allotment.

Allotment Name	Allotment Number	BLM Acres	Active Use (AUMs)†	Suspended (AUMs)	Season-of-Use	Selective Management Category‡	Rangeland Health Assessment Completed	Rangeland Health Assessment Finding§	Grazing System	Wildlife AUM's	Other Information
Williams	00892	1,854	75	-	5/1-5/31	M	2004	Meeting All Standards	Yearly	Deer 34, Antelope 12	None
Fields	00893	26	6	-	4/21-5/20	C	2005	Meeting All Standards	Yearly	Deer 4, Antelope 1	None
Voight	00894	112	8	-	5/1-6/15	C	2003	Meeting All Standards	Yearly	Deer 2	None
Harpold Canyon	00895	1,085	76	-	5/1-9/30	C	2006	Meeting All Standards	Yearly	Deer 20	None
McFall	00896	577	60	-	5/1-6/30	C	2006	Meeting All Standards	Yearly	Deer 11	Common allotment
Bly Mountain	01800	120	9	-	6/1-8/31	C	Not Completed	Not Completed	Yearly		None

* All or a portion of the allotment is located within the Cascade-Siskiyou National Monument

† Active Use is livestock AUMs, unless specified as H for domestic horse use.

‡ Selective Management Categories: Improve (I)-managed to resolve a high level of resource conflicts and concerns and receive the highest priority for funding and management actions; Maintain (M)-managed to maintain satisfactory resource conditions and will be actively managed to ensure that resource values do not decline; Custodial (C)-managed custodially to protect resource conditions and values.

§ In allotments where grazing was a factor to nonattainment of a RHA standard, within one year of the assessment, a change to livestock grazing was implemented to eliminate livestock grazing as a contributing factor.

Table D-2. Available Medford District grazing allotments.

Allotment Name	Allotment Number	BLM Acres	Active Use (AUMs)†	Suspended (AUMs)	Season-of-Use‡	Selective Management Category§	Rangeland Health Assessment Completed	Rangeland Health Assessment Finding‖	Grazing System	Other Information
Heppsie Mountain	00126	4,105	294	-	Sp, Su, F	I	2007	Not Meeting Standards, Grazing is not a factor	Yearly	Combined with South Heppsie Mountain Allotment (10125, 800 acres). Continue to collect utilization data to establish combined stocking level.
Lost Creek	10001	9,962	382	-	Sp, Su, F	I	2001	Not Meeting Standards, Grazing is not a factor	Yearly	Common Allotment
Flat Creek	10002	12,066	328	-	Sp, Su, F	C	2000	Not Meeting Standards, Grazing is not a factor	Yearly	None
Longbranch	10004	324	22	-	Sp	C	2002	Meeting All Standards	Yearly	Portion Proposed for Closure
Meadows	10007	1,563	92	-	Sp, Su	I	2003	Meeting All Standards	Yearly	None
Neil-Tarbell	10008	518	56	-	Sp, Su	C	2015	Meeting All Standards	Yearly	None
North Sams Valley	10009	120	8	-	Su	C	2002	Not Meeting Standards, Grazing is not a factor	Yearly	None
Lick Creek	10015	201	15	-	Sp, Su	C	2003	Meeting All Standards	Yearly	None
Brownsboro Park	10016	382	68	-	Sp, Su	I	2002	Not Meeting Standards, Grazing is not a factor	Yearly	None
Kanutchan Fields	10017	2,427	177	-	Sp, Su	I	2002	Not Meeting Standards, Grazing is not a factor	Yearly	None
Sugarloaf	10019	1,570	15	-	Sp, Su	C	2002	Meeting All Standards	Yearly	None
Section 9	10021	404	25	-	Sp, Su	C	2003	Meeting All Standards	Yearly	None
Section 7	10022	374	11	-	Sp, Su	C	2003	Not Meeting Standards, Grazing is not a factor	Yearly	None
Bull Run	10023	40	5	-	Sp, Su	C	2011	Meeting All Standards	Yearly	None
Big Butte	10024	21,802	1,663	-	Sp, Su, F	I	2000	Not Meeting Standards, Grazing is not a factor	Deferred-Rotation	Common Allotment
Reese Creek	10027	40	7	-	Sp, Su	C	1999	Meeting All Standards	Yearly	Common Allotment
Derby Road Sawmill	10029	524	45	-	Sp, Su	C	2003	Meeting All Standards	Yearly	None
Summit Prairie	10031	30,579	1,165	-	Sp, Su, F	I	2000	Not Meeting Standards, Grazing is not a factor	Deferred-Rotation	Common Allotment
Vestal Butte	10035	2,243	120	-	Sp, Su	I	2015	Meeting all Standards	Yearly	None
Bear Mountain	10037	1,006	81	-	Sp, Su	I	2015	Meeting All Standards	Yearly	None
Crowfoot	10038	7,400	365	-	Sp, Su	I	2015	Meeting All Standards	Yearly	None

Allotment Name	Allotment Number	BLM Acres	Active Use (AUMs)†	Suspended (AUMs)	Season-of-Use‡	Selective Management Category§	Rangeland Health Assessment Completed	Rangeland Health Assessment Finding‖	Grazing System	Other Information
Crowfoot Creek	10039	516	70	-	Sp, Su	C	2008	Meeting All Standards	Yearly	None
Cobleigh Road	10040	89	14	-	Sp, Su	C	2003	Meeting All Standards	Yearly	None
Moser Mountain	10041	40	3	-	Sp	C	2011	Meeting All Standards	Yearly	None
Devon South	10043	412	33	-	Sp, Su	C	2008	Meeting All Standards	Yearly	None
Salt Creek	10044	463	85	-	Sp, Su	I	2002	Meeting All Standards	Yearly	None
Cove Creek	10112	1,290	88	-	Sp, Su	I	2011	Not Meeting Standards, Grazing is a factor	Yearly	Continue to monitor grazing and make adjustments to improve rangeland health.
Buckpoint	10114	3,845	150	-	Su	C	2008	Not Meeting Standards, Grazing is not a factor	Yearly	Permit bought-out/retired Feb. 2015.
Howard Prairie	10116	24	61	-	F, W	M	2012	Not Meeting Standards, Grazing is not a factor	Yearly	None
Grizzly	10119	5,153	378	225	Sp, Su, F	I	1999	Not Meeting Standards, Grazing is not a factor	Yearly	Common Allotment, Continue to monitor to set stocking level.
Lake Creek Spring	10121	4,250	447	-	Sp, Su	I	2009	Not Meeting Standards, Grazing is not a factor	Yearly	None
Lake Creek Summer	10122	4,442	550	-	Su, F	I	2009	Not Meeting Standards, Grazing is not a factor	Yearly	None
Deer Creek-Reno Lease	10124	4,062	314	-	Sp, Su, F	C	2009	Not Meeting Standards, Grazing is not a factor	Yearly	None
Hunger Flat	10129	1,089	220				Not Completed	Not Completed	Yearly	Currently Vacant Allotment
Antelope Road	10132	403	19	-	Sp, Su	C	2003	Not Meeting Standards, Grazing is not a factor	Yearly	None
Brownsboro	10133	80	8	-	Sp, Su	C	2003	Not Meeting Standards, Grazing is not a factor	Yearly	Continue to monitor grazing and make adjustments to improve rangeland health
Yankee Reservoir	10134	121	15	-	Sp	C	2003	Not Meeting Standards, Grazing is a factor	Yearly	Continue to monitor grazing and make adjustments to improve rangeland health.
Canal	10136	442	58	-	Sp	C	2003	Not Meeting Standards, Grazing is a factor	Yearly	Continue to monitor grazing and make adjustments to improve rangeland health
Cove Ranch	10143	80	20	-	Sp, Su, F	C	2009	Not Meeting Standards, Grazing is not a factor	Yearly	None

Allotment Name	Allotment Number	BLM Acres	Active Use (AUMs)†	Suspended (AUMs)	Season-of-Use‡	Selective Management Category§	Rangeland Health Assessment Completed	Rangeland Health Assessment Finding‖	Grazing System	Other Information
North Cove Creek	10148	284	20	-	Su, F	C	2009	Not Meeting Standards, Grazing is not a factor	Yearly	None
Deadwood *	20106	7,967	788	-	Su	I	2008	Not Meeting Standards, Grazing is a factor	Yearly	Common Allotment
Poole Hill	20113	1,731	50	-	F	C	2007	Not Meeting Standards, Grazing is not a factor	Yearly	None
Conde Creek	20117	5,491	592	-	Sp, Su, F	I	2009	Not Meeting Standards, grazing is a factor	Yearly	Common Allotment, continue to monitor livestock grazing and make adjustments to improve rangeland health
Billy Mountain	20203	4,977	175	-	Sp, Su	I	1999	Not Meeting Standards, Grazing is not a factor	Yearly	None
Lower Big Applegate	20206	11,909	258	-	Sp, Su	I	2012	Not Meeting Standards, Grazing is not a factor.	Yearly	Continue to monitor livestock grazing and make adjustments to improve rangeland health
Foots Creek	20219	115	12	-	Sp, Su	C	2009	Meeting All Standards	Yearly	None

* A portion of the allotment is located within the Cascade-Siskiyou National Monument.
† Active Use is livestock AUMs.
‡ Season of use categories for Medford W= winter (Nov–Jan), Sp=spring (Feb–Apr), Su=summer (May–Aug), F=fall (Sept–Oct)
§ Selective Management Categories: Improve (I)-managed to resolve a high level of resource conflicts and concerns and receive the highest priority for funding and management actions; Maintain (M)-managed to maintain satisfactory resource conditions and will be actively managed to ensure that resource values do not decline; Custodial (C)-managed custodially to protect resource conditions and values.
‖ In allotments where grazing was a factor to nonattainment of a RHA standard, within one year of the assessment, a change to livestock grazing was implemented to eliminate livestock grazing as a contributing factor.

Appendix E – Progression of Marbled Murrelet Habitat and Occupied Site Forecast in Conservation Zone 3 and Conservation Zone 4 Under the Proposed RMP and Kappa Analysis of Marbled Murrelet Habitat Models

Table E-1. Land use allocations of marbled murrelet nesting habitat under the Proposed RMP on BLM-administered lands within Conservation Zone 3.

Year	Within the HLB		Within Reserves		Total Nesting Habitat (Acres)
	(Acres)	(%)	(Acres)	(%)	
2013	34,268	11%	280,331	89%	314,599
2023	28,150	9%	293,265	91%	321,415
2033	29,383	8%	337,721	92%	367,104
2043	29,297	7%	391,470	93%	420,767
2053	34,833	7%	449,588	93%	484,421
2063	42,070	8%	471,158	92%	513,228

Table E-2. Land use allocations of high-quality marbled murrelet nesting habitat under the Proposed RMP on BLM-administered lands within Conservation Zone 3.

Year	Within the HLB		Within Reserves		Total Nesting Habitat (Acres)
	(Acres)	(%)	(Acres)	(%)	
2013	2,837	2%	136,471	98%	139,308
2023	1,552	1%	136,935	99%	138,487
2033	2,170	1%	158,684	99%	160,854
2043	2,291	1%	166,487	99%	168,778
2053	3,284	2%	175,416	98%	178,700
2063	5,184	3%	187,622	97%	192,805

Table E-3. Decadal forecast (2013-2063) of marbled murrelet occupied sites expected under the Proposed RMP within Conservation Zone 3.

Decade[1]	Nesting Habitat in the Action Area Conservation Zone 3 (Acres)	Occupied Sites Forecast in the Action Area (Number)
Current	314,599	1,615
1st	321,415	1,652
2nd	367,104	1,866
3rd	420,767	2,153
4th	484,421	2,501
5th	513,228	2,652

[1] Habitat acreage based on the start of the decade (i.e. 2023, 2033, 2043, 2053, 2063).

Table E-4. Land use allocations of marbled murrelet nesting habitat under the Proposed RMP on BLM-administered lands within Conservation Zone 4.

Year	Within the HLB		Within Reserves		Total Nesting Habitat (Acres)
	(Acres)	(%)	(Acres)	(%)	
2013	14,950	8%	163,886	92%	178,835
2023	11,874	6%	172,322	94%	184,197
2033	12,675	6%	190,081	94%	202,757
2043	15,542	7%	212,105	93%	227,647
2053	19,431	8%	230,942	92%	250,373
2063	25,411	10%	239,537	90%	264,947

Table E-5. Land use allocations of high-quality marbled murrelet nesting habitat under the Proposed RMP on BLM-administered lands within Conservation Zone 4.

Year	Within the HLB		Within Reserves		Total Nesting Habitat (Acres)
	(Acres)	(%)	(Acres)	(%)	
2013	2,752	3%	90,433	97%	93,185
2023	2,228	2%	89,791	98%	92,018
2033	2,248	2%	95,693	98%	97,941
2043	2,571	3%	100,147	97%	102,718
2053	2,841	3%	106,350	97%	109,191
2063	3,253	3%	112,805	97%	116,058

Table E-6. Decadal forecast (2013-2063) of marbled murrelet occupied sites expected under the Proposed RMP within Conservation Zone 4.

Decade[1]	Nesting Habitat in the Action Area Conservation Zone 4 (Acres)	Occupied Sites Forecast in the Action Area (Number)
Current	178,835	843
1st	184,197	872
2nd	202,757	971
3rd	227,647	1,093
4th	250,373	1,209
5th	264,947	1,280

[1] Habitat acreage based on the start of the decade (i.e. 2023, 2033, 2043, 2053, 2063).

Kappa Analysis for Marbled Murrelet Habitat

The BLM calculated the kappa statistic to quantitatively compare the level of agreement between two different models of marbled murrelet habitat in the decision area. The two models compared include the one used by BLM in this Proposed RMP/Final EIS (refer to Chapter 3, Marbled Murrelet – Summary of Analytical Methods) and the one described in Chapter 2 of *Northwest Forest Plan – the First Twenty Years (1994-2013): Status and Trend of Marbled Murrelet Populations and Nesting Habitat* (Falxa and Raphael 2015).

The BLM modeled marbled murrelet nesting habitat in the Proposed RMP/Final EIS using the structural stage output from WoodStock vegetation modelling for 2013 and assumed:

- High-Quality Nesting Habitat = structural stages 5.1, 5.2, or 5.3;
- Nesting Habitat = structural stages 3.1, 3.3, 4.1, 4.2, 5.1, 5.2, or 5.3; and
- Non-Habitat = structural stages 1.1, 1.2, 3.2, or 3.4.

The model from Falxa and Raphael (2015), used habitat classes generated from a Maxent analysis that utilized GNN from 2012 for the vegetation covariate as well as several other data sources (Falxa and Raphael 2015, pp. 68-76) and used four classes of habitat suitability (p. 84):

- Class 1 = Lowest Suitability;
- Class 2 = Marginal Suitability;
- Class 3 = Moderate Suitability; and
- Class 4 = Highest Suitability.

Raphael *et al*. (2015) often combined Class 3 and Class 4 habitat, which they reported as "higher suitability" habitat.

The two models are coincident on 847,826 acres of BLM-administered lands (3,812,258 pixels that are 30 x 30 meters in size). Table E-7 presents the cross-tabulation of structural stages and habitat classes from the two models.

Table E-7. Cross-tabulation of structural stages used in the FEIS compared with habitat classes from Falxa and Raphael (2015). Values are counts of individual pixels (30 x 30 meters).

Structural Stage (from FEIS Analysis)		Habitat Class (from Raphael et al. 2015)				Row Totals
Name	**Code**	**1**	**2**	**3**	**4**	
Early-successional with Structural Legacies	1.1	14,633	4,952	452	7	20,044
Early-successional without Structural Legacies	1.2	21,036	3,420	248	7	24,711
Stand Establishment with Structural Legacies	2.1	24,355	14,007	684	133	39,179
Stand Establishment without Structural Legacies	2.2	406,373	125,748	13,106	1,182	546,409
Young – High Density, with Structural Legacies	3.1	93,008	72,946	27,690	5,876	199,520
Young – High Density, without Structural Legacies	3.2	692,148	283,847	36,187	3,119	1,015,301
Young – Low Density, with Structural Legacies	3.3	2,732	5,009	4,783	441	12,965
Young – Low Density, without Structural Legacies	3.4	18,735	14,434	4,276	400	37,845
Mature, Single-layered Canopy	4.1	213,186	212,971	65,814	11,690	503,661
Mature, Multi-layered Canopy	4.2	140,777	179,385	67,034	18,935	406,131
Structurally-complex, Developed Structurally-complex	5.1	74,871	170,670	93,228	26,936	365,705
Structurally-complex, Existing Old Forest	5.2	124,569	315,393	119,725	18,040	577,727
Structurally-complex, Existing Very Old Forest	5.3	4,965	29,940	25,102	3,053	63,060
Column Totals	-	1,831,388	1,432,722	458,329	89,819	3,812,258

Using the information from Table E-7, the BLM calculated the kappa statistic for three different categorical combinations of model output:

- higher-quality nesting habitat and not high-quality nesting habitat (Kappa Run #1);
- higher-quality nesting habitat, lower-quality nesting habitat, and non-nesting habitat (Kappa Run #2); and
- nesting habitat and non-nesting habitat (Kappa Run #3).

The results of the three different runs calculating kappa are summarized below.

The BLM calculated the kappa statistic following Fowler *et al*. (1998) and Veira and Garret (2005). Competing models can produce results that agree (or disagree) simply by chance, and the kappa statistic is a measure of this agreement. While interpretations of the kappa statistic vary, the BLM used the interpretation summarized by Viera and Garret (2005, p. 362):

Table E-8. Interpretation of the kappa statistic (from Viera and Garret 2005).

Kappa	Agreement
< 0	less than chance agreement (potential systematic disagreement)
0.01-0.20	Slight Agreement
0.21-0.40	Fair Agreement
0.41-0.60	Moderate Agreement
0.61-0.80	Substantial Agreement
0.81-0.99	Almost Perfect Agreement
1.00	Perfect Agreement

<u>Kappa Run #1</u>

For comparison of the two models in regards to higher-quality nesting habitat versus all other habitat qualities (i.e. high-quality vs. not-high quality), the BLM assumed:

- Raphael et al. (2015) Habitat Classes:
  - Higher-Quality Nesting Habitat = Class 3 or Class 4; and
  - Not-High = Class 1 or Class 2.
- BLM Structural Stages:
  - Higher-Quality Nesting Habitat = structural stages 5.1, 5.2, or 5.3; and
  - Not-High = structural stages 1.1, 1.2, 3.1, 3.2, 3.3, 3.4, 4.1, or 4.2.

The results suggest that there is "*fair agreement*" (kappa = 0.22) between the two murrelet habitat models in discerning higher-quality nesting habitat from non-high quality nesting habitat (Table E-9). The overall accuracy is 74 percent between the two models (i.e., the two models produced the same analytical result in 74 percent of the pixels).

Table E-9. Cross-tabulation of high-quality vs. not-high quality nesting habitat. Values are counts of individual pixels (30 x 30 meters).

Structural Stage (from FEIS Analysis)	Habitat Class (from Raphael et al. 2015)		Row Totals
	Not High-Quality	Higher-Quality Nesting Habitat	
Not High-Quality	2,543,702	262,064	2,805,766
Higher-Quality Nesting Habitat	720,408	286,084	1,006,492
Column Totals	3,264,110	548,148	3,812,258

<u>Kappa Run #2</u>

For comparison of the two models in regards to higher-quality nesting habitat, lower-quality nesting habitat, and non-habitat, the BLM assumed:

- Raphael et al. (2015) Habitat Classes:
  - Higher-Quality Nesting Habitat = Class 3 or Class 4;
  - Lower-Quality Nesting Habitat = Class 2; and
  - Non-Nesting Habitat = Class 1.
- BLM Structural Stages:
  - Higher-Quality Nesting Habitat = structural stages 5.1, 5.2, or 5.3; and
  - Lower-Quality Nesting Habitat = structural stages 3.1, 3.3, 4.1, or 4.2; and
  - Non-Nesting Habitat = structural stages 1.1, 1.2, 3.2, or 3.4.

The results suggest that there is "*fair agreement*" (kappa = 0.23) between the two murrelet habitat models in discerning higher-quality nesting habitat, lower-quality nesting habitat, and non-nesting habitat from one another (Table E-10). The overall accuracy is 51 percent between the two models (i.e., the two models produced the same analytical result in 51 percent of the pixels).

Table E-10. Cross-tabulation of higher-quality nesting habitat, lower-quality nesting habitat, and non-habitat. Values are counts of individual pixels (30 x 30 meters).

Structural Stage (from FEIS Analysis)	**Habitat Class (from Raphael et al. 2015)**			**Row Totals**
	Non-Habitat	Lower-Quality Nesting Habitat	Higher-Quality Nesting Habitat	
Not-Habitat	1,177,280	446,408	59,801	1,683,489
Lower-Quality Nesting Habitat	449,703	470,311	202,263	1,122,277
Higher-Quality Nesting Habitat	204,405	516,003	286,084	1,006,492
Column Totals	1,831,388	1,432,722	548,148	3,812,258

<u>Kappa Run #3</u>

For comparison of the two models in regards to nesting habitat versus all non-habitat, the BLM assumed:

- Raphael et al. (2015) Habitat Classes:
  - Nesting Habitat = Class 2, Class 3, or Class 4; and
  - Non-Habitat = Class 1.
- BLM Structural Stages:
  - Nesting Habitat = structural stages 3.1, 3.3, 4.1, 4.2, 5.1, 5.2, or 5.3; and
  - Non-Habitat = structural stages 1.1, 1.2, 3.2, or 3.4.

The results suggest that there is "*fair agreement*" (kappa = 0.39) between the two murrelet habitat models in discerning nesting habitat from non-habitat (Table E-11). The overall accuracy is 70 percent between the two models (i.e., the two models produced the same analytical result in 70 percent of the pixels).

Table E-11. Cross-tabulation of nesting habitat vs. non-habitat. Values are counts of individual pixels (30 x 30 meters).

Structural Stage (from FEIS Analysis)	**Habitat Class (from Raphael et al. 2015)**		**Row Totals**
	Non-Habitat	Nesting Habitat	
Non-Habitat	1,177,280	506,209	1,683,489
Nesting Habitat	654,108	1,474,661	2,128,769
Column Totals	1,831,388	1,980,870	3,812,258

Overall, the marbled murrelet habitat model in the Proposed RMP/Final EIS appears to have "*fair agreement*" with the habitat model described in Falxa and Raphael (2015). The models seem to agree in discerning nesting habitat from non-habitat and high-quality habitat from other stand conditions (either non-habitat or lower-quality nesting habitat). There is relatively less agreement between the two models in discerning higher-quality from lower-quality habitat as evidenced by lower kappa statistics and overall accuracy. However, the BLM detected no systematic disagreement between the two models.

References

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