Wildlife

Bald Eagle

Key Points
- All action alternatives and the Proposed RMP would lead to an increase in bald eagle nesting habitat in 50 years.
- All action alternatives and the Proposed RMP would have a slight loss of bald eagle habitat in the first decade or two, but additional habitat would develop in subsequent decades that would eventually surpass current conditions.

Background
Bald eagles (Haliaeetus leucocephalus) nest in large diameter trees within 2 miles of large, permanent water bodies (Isaacs and Anthony 2011).

There are 149 bald eagle nest trees amongst 89 breeding territories in the decision area (USDI BLM 2008). The number of occupied bald eagle breeding territories in Oregon increased from 65 in 1978, to 496 in 2007, and to 636 in 2010 (Isaacs 2011, Isaacs and Anthony 2011). Isaacs and Anthony (2011) suggest that the bald eagle population could double or triple before population growth stabilizes.

The bald eagle population in Oregon and along the lower Columbia River grew by 7.3 percent per year from 1978–2007 (Isaacs and Anthony 2011). Annual population growth from 2008 to 2010 was 3.5 percent per year (Isaacs 2011). The reduction in the rate of population growth may be an artifact of reduced monitoring efforts between the two time periods since statewide monitoring ended in 2007 (i.e., 96 percent of breeding areas were surveyed in the 1978–2007 period, whereas 67 percent were surveyed in the 2008–2010 period).

Under the 1995 RMPs, there are 176 Bald Eagle Management Areas designated in the decision area totaling 17,945 acres (Table 3-245), and they vary in size from 3 to 962 acres each. The 1995 RMPs included designations of Bald Eagle Management Areas to protect existing nest sites, winter and communal roosting areas, and potential nesting habitat.

### Table 3-245. Bald Eagle Management Areas within the decision area

<table>
<thead>
<tr>
<th>District/Field Office</th>
<th>Bald Eagle Management Areas (Number)</th>
<th>Bald Eagle Management Areas (Acres)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coos Bay</td>
<td>26</td>
<td>765</td>
</tr>
<tr>
<td>Eugene</td>
<td>73</td>
<td>8,254</td>
</tr>
<tr>
<td>Klamath Falls</td>
<td>21</td>
<td>1,921</td>
</tr>
<tr>
<td>Medford</td>
<td>20</td>
<td>1,057</td>
</tr>
<tr>
<td>Roseburg</td>
<td>25</td>
<td>3,731</td>
</tr>
<tr>
<td>Salem</td>
<td>11</td>
<td>2,217</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td><strong>176</strong></td>
<td><strong>17,945</strong></td>
</tr>
</tbody>
</table>
The U.S. Fish and Wildlife Service listed bald eagles as an endangered species under the Endangered Species Act on March 11, 1967 (32 FR 4001), reclassified them as a threatened species July 12, 1995 (60 FR 36000), and delisted them due to recovery on July 9, 2007 (72 FR 37346). Currently, bald eagles are protected under the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act. In response to the Bald and Golden Eagle Protection Act, the BLM issued policy guidance directing analysis of effects to bald eagles. The Analysis of the Management Situation for the RMPs for Western Oregon provides more information on the obligations of the BLM for bald eagles under these acts, which is incorporated here by reference (USDI BLM 2013, p. 144).

**Issue 1**
*What levels of habitat for the bald eagle would be available under each alternative?*

**Summary of Analytical Methods**
In this analysis, the BLM considered nesting habitat for bald eagle to be Mature Multi-layered Canopy and Structurally-complex stands within 2 miles of large water bodies (reservoirs or lakes greater than 10 acres or streams larger than 7th order). The Planning Criteria provides more detailed information on analytical assumptions, methods and techniques, and geographic and temporal scales, which is incorporated here by reference (USDI BLM 2014, pp. 195–196).

This issue presents both an analysis of the direct and indirect effects of alternative and Proposed RMP implementation on bald eagle habitat in the decision area and an analysis of the cumulative effects on bald eagle 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 discussion of analytical methods for the marbled murrelet describes GNN.

**Affected Environment and Environmental Consequences**
There are 247,393 acres of nesting habitat for bald eagles on BLM-administered lands (Figure 3-144). Of the forested lands capable of providing nesting habitat, 36 percent is currently nesting habitat in the decision area.
There are 1,146,532 acres of nesting habitat for bald eagles across all land-ownerships in the planning area (Figure 3-145). Of the forestlands capable of providing nesting habitat, 20 percent is currently nesting habitat in the planning area. BLM-administered lands currently provide 22 percent of the available nesting habitat for bald eagles.
Under the No Timber Harvest reference analysis, there would be 345,936 acres of bald eagle nesting habitat in 50 years in the decision area (Figure 3-145). Under all alternatives and the Proposed RMP, the amount of bald eagle habitat on BLM-administered lands would increase between 17 and 37 percent. Habitat development under the action alternatives and the Proposed RMP would be 83–98 percent of the habitat development as under the No Timber Harvest reference analysis. Of the action alternatives, Alternative D would provide the most bald eagle habitat development and Alternative C would provide the least development. The No Action alternative would produce 87 percent as much habitat as under No Timber Harvest. The Proposed RMP would provide 92 percent as much habitat as under No Timber Harvest. The action alternatives and the Proposed RMP would have a 1–4 percent loss of bald eagle habitat in the first decade (the first two decades for Alternative C and the No Action alternative), but additional habitat would develop in subsequent decades that would surpass current conditions (Appendix S). In addition, under the Proposed RMP, the BLM would retain large trees that were established prior to 1850 in the Harvest Land Base (Appendix B). These trees would serve as potential bald eagle nest trees where they occur within 2 miles of large bodies of water. The retention of these large trees is consistent with conservation actions recommended by the Oregon Department of Fish and Wildlife in the Oregon Conservation Strategy (ODFW 2006, p. 324).

At the planning area scale, the No Timber Harvest reference analysis would lead to 1,742,817 acres of bald eagle nesting habitat in 50 years (Figure 3-145). Bald eagle habitat would increase by 47–50 percent under the alternatives and the Proposed RMP in 50 years in the planning area. Differences in habitat development among Alternatives A, B, and D, and the Proposed RMP would be indistinguishable, since they are within 1 percent of the No Timber Harvest reference analysis. Alternative C and the No Action alternative would yield less bald eagle habitat at the planning area scale, but the difference is insubstantial (3 percent less than the No Timber Harvest reference analysis). The action alternatives and the Proposed RMP would decrease bald eagle habitat by less than 1 percent in the first decade (the first 2 decades for Alternative C and the No Action alternative), but additional habitat would develop in subsequent decades that would surpass current conditions (Appendix S).

Under all alternatives and the Proposed RMP, the BLM would restrict activities near bald eagle nests that would disrupt nesting during the breeding season. Therefore, the BLM assumed that there would not be any disruption effects to nesting bald eagles under any of the alternatives or the Proposed RMP.

Overall, the BLM concludes that bald eagle populations in the decision area and planning area would continue to grow under all alternatives and the Proposed RMP. Habitat availability for bald eagles would increase under all alternatives and the Proposed RMP, and there is no newly identified threat that the BLM expects to curtail the observed trend in population growth of bald eagles. There would be little differentiation in effects among the alternatives and the Proposed RMP, since habitat development would vary by no more than 3 percent, and seasonal restrictions would avoid disruption of nesting.

Appendix S contains additional information and supporting data on bald eagles.
References
Bureau Sensitive, Bureau Strategic, Survey and Manage Species, and Landbird Focal Species

Key Points

- All alternatives and the Proposed RMP would lead to an increase in habitat for a majority of Bureau Sensitive, Bureau Strategic, Survey and Manage wildlife species, and landbird focal species in 50 years.
- Under all alternatives and the Proposed RMP, the distribution of structural stages in the decision area in 50 years would be within the range of the average historic conditions, increasing the habitat availability for many Bureau Sensitive, Bureau Strategic, and Survey and Manage species.
- The lack of green tree retention or snag and down woody material retention under Alternatives A and C would lead to the least amount of habitat for species associated with legacy structures in younger stands in 50 years.
- Although none of the action alternatives or the Proposed RMP would include the Survey and Manage standards and guidelines, there would be sufficient habitat to support stable populations for most of the Survey and Manage wildlife species.

Summary of Notable Changes from the Draft RMP/EIS

The BLM revised the Bureau Sensitive and Bureau Strategic wildlife species considered in this analysis based on the updated State Director’s Special Status Species List (July 13, 2015). The BLM also included additional analysis and discussion of Survey and Manage species. The BLM reorganized the supporting appendix tables by species status (Bureau Sensitive, Bureau Strategic, Survey and Manage, and landbird focal species).

Background

Within the planning area, there are 71 Bureau Sensitive wildlife species and 61 Bureau Strategic wildlife species suspected or documented to occur on BLM-administered lands. There are 43 Survey and Manage wildlife species (December 2003 list (USDA FS and USDI BLM 2011)), but only 13 are suspected or documented to occur on BLM-administered lands within the planning area. Some, but not all, of the 43 Survey and Manage wildlife species are among the 71 Bureau Sensitive wildlife species and 61 Bureau Strategic wildlife species (Appendix S). There are 34 focal species of landbirds considered in this analysis (Appendix S).

Based on BLM Manual 6840 – Special Status Species Management (USDI BLM 2008), the BLM will address Bureau Sensitive species and their habitats in land use plans and will implement measures to conserve these species and their habitats, to promote their conservation, and reduce the likelihood and need for these species to be listed under the Endangered Species Act. Bureau Strategic species are not ‘special status’ for management purposes (IM-OR-2015-028). The only requirement for this group of species is that information for species sites located during any survey efforts will be entered into the BLM corporate database (GeoBOB). This analysis includes discussion of Bureau Strategic species to provide a more comprehensive analysis of wildlife species in the decision area; effects to these species are typically not analyzed in project-level analyses.

The BLM has the authority to update, amend, modify, change, or eliminate policies it uses to manage species within the Special Status Species program (USDA FS and USDI BLM 2004). The BLM updates its Special Status Species list on a regular schedule, when state heritage programs publish new rankings or when other information indicates a need.
The BLM conducts evaluations of the distribution, abundance, population trends, current threats, or habitat for Bureau Sensitive species using available information in regards to actions the BLM proposes to undertake, consistent with the BLM Special Status Species Management manual. The BLM may or may not conduct field surveys as part of these evaluations for Bureau Sensitive wildlife species.

The Survey and Manage measures are a feature of the No Action alternative. The Northwest Forest Plan adopted the Survey and Manage measures as a set of protections for species associated with late-successional and old-growth forests. The 2000 Final Supplemental EIS for Amendment to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines and the 2004 Final Supplemental EIS to Remove of Modify the Survey and Manage Mitigation Measure Standards and Guidelines discussed the origin and implementation of the Survey and Manage standards and guidelines (USDA FS and USDI BLM 2000, pp. 3–10, 16–24; USDA FS and USDI BLM 2004, pp. 3–9, 15–21), and those discussions are incorporated here by reference.

Those two supplemental EISs also described the Survey and Manage species and their habitat, distribution, and occurrence (USDA FS and USDI BLM 2000, pp. 213–394; USDA FS and USDI BLM 2004, pp. 141–208), and those descriptions are incorporated here by reference.

The 2012 Resource Management Plan Evaluation Report (USDI BLM 2012) summarized the history of proposed changes to the Survey and Manage standards and guidelines:

“The 1995 RMPs were amended by the January 2001, Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines in Forest Service and Bureau of Land Management Planning Documents within the Range of the northern spotted owl.

In March 2004, the BLM completed a supplemental environmental impact statement and issued a record of decision to remove the Survey and Manage mitigation measure. The U.S. District Court for the Western District of Washington found the Record of Decision invalid since it relied on a supplemental environmental impact statement that the Court found deficient. In 2006, the Court issued an order of relief which allowed the BLM to eliminate the Survey and Manage requirement for four types of activities, commonly called the ‘Pechman Exemptions.’

Another interagency supplemental environmental impact statement was prepared to address deficiencies in the 2004 supplemental environmental impact statement. The BLM issued a record of decision in July, 2007 to amend the plans within the Northwest Forest Plan area to remove the Survey and Manage mitigation measure.

In January 2008, a lawsuit was filed, and in December 2009, the presiding judge issued an Order granting Plaintiffs motion for partial summary judgment. The judge found that the SEIS violated NEPA due to a lack of a true No Action alternative; lack of new information warranting elimination of Survey and Manage; and lack of high-quality information and accurate scientific data related to fire and fuels treatments, costs, and species data.

A settlement agreement between the parties was approved by the court on July 6, 2011. The agreement stipulates that projects within the range of the northern spotted owl are subject to the survey and management standards and guidelines in the 2001 Record of Decision without subsequent 2001–2003 Annual Species Reviews as modified by the 2011 Settlement Agreement. The Settlement Agreement modifies the 2001 Survey and Manage species list; establishes a transition period for application of the species lists; acknowledges existing exemption categories
(2006 Pechman Exemptions); and, establishes exemptions from surveys for certain activities. The settlement agreement is in effect until the BLM conducts further analysis and decision making pursuant to the National Environmental Policy Act and issues a record of decision to supersede the Survey and Manage mitigation measure.

The 2008 RMP revision did not include management objectives or direction for Survey and Manage Species. A plan revision would provide an opportunity to determine whether to retain, modify, or eliminate the Survey and Manage mitigation measure.”

The Ninth Circuit Court of Appeals issued an opinion on April 25, 2013, that reversed the District Court for the Western District of Washington’s approval of the 2011 Survey and Manage Settlement Agreement. On February 18, 2014, the District Court for the Western District of Washington issued a remedy order in the case of Conservation Northwest et al. v. Bonnie et al., No. 08-1067- JCC (W.D. Wash.)/No.11-35729 (9th Cir.). This was the latest step in the ongoing litigation challenging the 2007 Record of Decision (ROD) to modify the Survey and Manage Standards and Guidelines.

The remedy order contained two components. The order—
- Vacated the 2007 ROD to Remove or Modify the Survey and Manage Mitigation Measures Standards and Guidelines; and
- Allowed for continued project planning and implementation for projects that relied on the 2011 Consent Decree that were being developed or implemented, on or before April 25, 2013 (the date of the Ninth Circuit Court ruling invalidating the 2011 Consent Decree).

The No Action alternative, as analyzed in this Proposed RMP/Final EIS and described in Chapter 2, includes the Survey and Manage measures, consistent with—
- The January 2001, Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines in Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl;
- The 2001, 2002, and 2003 Annual Species Review modifications to the Survey and Manage species list, except for the changes made for the red tree vole; and
- The Pechman exemptions.

Direction in the Memorandum of Understanding between the BLM and U.S. Fish and Wildlife Service to promote the conservation of migratory birds (BLM MOU WO-230-2010-04) states that the BLM shall address the conservation of migratory bird habitat and populations when developing, amending, or revising management plans for BLM-administered lands.

Oregon-Washington Partners in Flight, the American Bird Conservancy, and the Klamath Bird Observatory have prepared a series of conservation plans for landbirds intended to inform planning efforts and habitat management actions (Altman and Alexander 2012). The strategy for achieving functioning ecosystems for landbirds is described through the habitat requirements of ‘focal species.’ By managing for a suite of species representative of important habitat attributes in functioning ecosystems, many other species and elements of biodiversity could also be conserved. Inclusion of these focal species in the analysis could help inform what the differences in effects amongst the alternatives and the Proposed RMP are for landbirds, as well as the habitat attributes and forest stages and ecosystems they represent.
**Issue 1**

*What levels of habitat would be available under each alternative for Bureau Sensitive, Bureau Strategic, or Survey and Manage wildlife species, and landbird focal species?*

**Summary of Analytical Methods**

In this analysis, the BLM assumed that the structural stages used in the vegetation modeling represent habitat conditions for Bureau Sensitive, Bureau Strategic, or Survey and Manage wildlife species and landbird focal species; this modeling is based on structural stage output from the vegetation model and using the analytical assumptions of habitat relationships described in Appendix S. Based on existing data, the BLM delineated a range for each species based on county boundaries and occurrences within the planning area. The Planning Criteria provides more detailed information on analytical assumptions, methods and techniques, and geographic and temporal scales, which is incorporated here by reference (USDI BLM 2014, pp. 193–195).

The BLM combined the issues of habitat availability for Bureau Sensitive, Bureau Strategic, or Survey and Manage wildlife species, and landbird focal species into one issue, because the analytical procedures used were similar and the discussion of results would be similar for species with similar habitat associations (e.g., Early Successional habitat development under the alternatives and the Proposed RMP is the same, irrespective of a species’ status). However, the Proposed RMP/Final EIS reorganized the supporting tables in Appendix S by species status rather than by structural group.

In this analysis, the BLM assessed the number of known sites by land use allocation for Survey and Manage species but not for Bureau Sensitive, Bureau Strategic or landbird focal species. The BLM made this change from the analytical methodology described in the Planning Criteria (USDI BLM 2014, p. 194), because there is great disparity in survey efforts available among species, districts, and land use allocations. That is, survey efforts for these species have been biased in their location based on proposed land management projects, as is evident with the Survey and Manage species under the No Action alternative.

The BLM tabulated the amount of Early Successional, Stand Establishment, Young, Mature, and Structurally-complex structural stages that would be available in 50 years under the alternatives and the Proposed RMP. Appendix S contains species-specific information regarding the effects of forest habitat, as tabulated by the BLM. The BLM also generalized habitat associations for the species considered into one of seven broad categories: Early Successional or Stand Establishment habitat associate (early), Young habitat associate (mid), Mature or Structurally-complex habitat associate (late), non-forest associate (NF), oak woodland associate (oak), wetland associate (wet), and stream or near-stream associate with riparian (RR).

Early Successional stands vary in their structural complexity. A complex Early Successional stand has abundant large trees, large snags, and large down woody material that originated during the development of a previous stand (i.e., prior to the event that triggered reforestation of the stand into an Early Successional stage; DellaSala et al. 2014, pp. 313–314; Swanson et al. 2011). Complex Early Successional stands also have high vegetative diversity (in both the understory and overstory) and long development times for Early Successional vegetation. In contrast, simple Early Successional stands have fewer (if any) residual large trees, large snags, and large down woody material. Complex Early Successional stands also have high vegetative diversity (in both the understory and overstory) and long development times for Early Successional vegetation. In contrast, simple Early Successional stands have fewer (if any) residual large trees, large snags, and large down woody material. Complex Early Successional stands are typically produced following natural disturbances events (e.g., mixed-severity wildfire), while simple Early Successional stands are typically produced following intensive timber harvest (e.g., clear-cutting; Swanson et al. 2011). Simple Early Successional stands that originate from timber harvest typically are rapidly replanted in order to reclaim the site for future production of crop trees. As a result, simple Early Successional stands typically do not have the vegetative diversity of
complex Early Successional stands (DellaSala et al. 2014, Swanson et al. 2011). In addition, the use of herbicides to limit competition with desired crop species further reduces the vegetative diversity in simple Early Successional stands (Swanson et al. 2011).

The structural stages used throughout the analyses in the Proposed RMP/Final EIS have two categories of Early Successional stands: Early Successional with Structural Legacies (1.1) and Early Successional without Structural Legacies (1.2). The BLM regards the Early Successional with Structural Legacies structural stage as comparable to complex early successional stands as described by DellaSala et al. (2014) and Swanson et al. (2011). The BLM regards Early Successional without Structural Legacies as comparable to simple early successional habitat. The BLM carried the presence (or absence) of structural legacies throughout the structural stage classification and vegetation modeling. In the wildlife analysis, the effects and development of complex early successional stand development are discussed under Snags and Down Woody Material (e.g., effect to species associated with snags and down woody material in younger stands). See Appendix C for additional details on the Forest Structural Stage Classification.

This issue presents both an analysis of the direct and indirect effects of alternative and Proposed RMP implementation on habitat for Bureau Sensitive, Bureau Strategic, or Survey and Manage wildlife species and landbird focal species in the decision area and an analysis of the cumulative effects on habitat for Bureau Sensitive, Bureau Strategic, or Survey and Manage wildlife species and landbird focal species 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.

The BLM modeled BLM-administered non-forested lands using the 2012 GNN ecological systems description (LEMA 2014). The BLM assumed that non-forested lands would remain constant over time under the alternatives and the Proposed RMP, because there is no management direction that would substantively alter the structural characteristics of this habitat.

The BLM calculated the average number of snags (trees per acre) and amount of down woody material (percent cover) per structural stage and structural group using data from BLM’s current vegetation survey (CVS) plots. Appendix S contains snags and down woody debris values. The BLM did not model future snag or down woody material abundance on a per acre basis. However, the BLM assumed that Early Successional, Stand Establishment, and Young structural stages ‘with Structural Legacies’ would provide greater amounts of snags and down woody material than those stages ‘without Structural Legacies’ on BLM-administered lands. The BLM also assumed that Mature and Structurally-complex structural stages would provide snag and down woody material as habitat components for wildlife but did not distinguish among them for modeling purposes.

In this analysis, the BLM assumed that the effects of BLM management on special habitats, and the Bureau Sensitive, Bureau Strategic, Survey and Manage, or landbird species that use them would not differ amongst the alternatives and the Proposed RMP. This is because the BLM would manage naturally occurring special habitats—seeps, springs, wetlands, natural ponds, streams, natural meadows, rock outcrops, caves, cliffs, talus slopes, mineral licks, oak savannah/woodlands, sand dunes, and marine habitats—to maintain their ecological function. The BLM would manage human-made special habitats—bridges, buildings, quarries, pump chances/heliponds, abandoned mines, and reservoirs—as special habitats when compatible with their engineered function. The Planning Criteria provides more detailed information on the wildlife species that are associated with special habitats, which is incorporated here by reference (USDI BLM 2014, pp. 198–199, 213–225).

Survey and Manage species are, by definition, species that are closely associated with late-successional or old-growth forest (USDA FS and USDI BLM 1994a, p. 3&4-115; USDA FS and USDI BLM 2004, p. 3). The BLM assumes in this analysis that the Mature and Structurally-complex forest structural stages are
representative of the late-successional or old-growth forest with which Survey and Manage species are closely associated.

It is not possible for the BLM to analyze quantitatively the effect of the alternatives or the Proposed RMP on populations of Survey and Manage species. There is incomplete and unavailable information about the current populations of these species, life history requirements of these species, and the relationship between habitat and population for these species. With such information, the BLM would have been able to project future populations of Survey and Manage species under each alternative and the Proposed RMP, quantitatively comparing the efficacy of the largely habitat-based management approaches of the action alternatives and Proposed RMP to the species-specific and site-specific approach of the Survey and Manage measures in the No Action alternative. However, the BLM has only partial information on the current populations of Survey and Manage species, largely based on survey results over the past two decades. Many of these species were included on the Survey and Manage list specifically because of a lack of scientific information about their habitat, distribution, and population (USDA FS and USDI BLM 2000, pp. 180–182). While the survey results over the past two decades have increased the information on these species (and the BLM uses these survey results in this analysis), the survey efforts for these species have been biased in their location based on proposed land management projects. The current information remains inadequate to project current population size for Survey and Manage species. Furthermore, there are no quantified scientific relationships developed between habitat and population for these species. For some species, there are non-habitat factors affecting species’ populations. Finally, it is not possible to forecast the extent to which increased habitat availability would result in an increase in population numbers, since some species have limited ranges or low mobility and may not be able to quickly expand into newly developed habitat.

The 2000 Final Supplemental EIS for Amendment to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines and the 2004 Final Supplemental EIS to Remove of Modify the Survey and Manage Mitigation Measure Standards and Guidelines described the existing credible scientific information on Survey and Manage species and their habitat, distribution, and occurrence (USDA FS and USDI BLM 2000, pp. 213–394; USDA FS and USDI BLM 2004, pp. 141–208), and those descriptions are incorporated here by reference.

In this Proposed RMP/Final EIS, the BLM quantitatively analyzes the effects of the alternatives and the Proposed RMP on Survey and Manage species by evaluating the amount of habitat for these species, assuming habitat relationships based on the structural stages used in the vegetation modeling.

The analytical methodology in this Proposed RMP/Final EIS is not the same as the methodology in the analysis for the Northwest Forest Plan. The Final Supplemental EIS for the Northwest Forest Plan evaluated effects of the alternatives on Survey and Manage species by a species-specific assessment of generalized judgments of habitat sufficiency by a panel of experts (USDA FS and USDI FS 1994a, pp. 3&4-116 – 3&4-121). The Record of Decision for the Northwest Forest Plan explicitly stated that this analytical methodology was not the only appropriate methodology for evaluating effects on these species, even in the context of the U.S. Forest Service viability regulation:

“The fish-and-wildlife-resource regulation does not require species-specific assessments. Rather, in accord with the theme of ecosystem management, a decisionmaker may place reasonable reliance upon assessments of (1) species with habitat needs that are roughly the same; (2) a group of species generally thought to perform the same or similar ecosystem functions; and/or (3) the continued integrity and function of ecosystem(s) in which a species is found. Flexibility in selecting methodology is especially appropriate in this context, given the expertise and knowledge of local forest officials concerning the lands they manage, the variety of complex issues involved, and the often-limited resources available. For example, the Assessment Team’s
approach to evaluating the alternatives, while sound, is not a controlling precedent for how such assessments need to be conducted in the future” (USDA FS and USDI BLM 1994b, p. 45).

In this Proposed RMP/Final EIS, the BLM is analyzing effects on Survey and Manage species by grouping species with habitat needs that are roughly the same and evaluating the amount of habitat in which these species are found. Given the incomplete and unavailable information about the current populations of these species, life history requirements of these species, and relationship between habitat and population for these species, it is appropriate for the BLM to analyze the effects of the alternatives and the Proposed RMP on Survey and Manage species by evaluating the amount of habitat for these species.

It is similarly not possible for the BLM to analyze quantitatively the effect of the alternatives or the Proposed RMP on populations of Bureau Sensitive, Bureau Strategic, and the suite of landbird focal species because of the incomplete and unavailable information about the current populations of these species, life history requirements of these species, and relationship between habitat and population for these species. The BLM is analyzing effects on Bureau Sensitive, Bureau Strategic, and the suite of focal landbird species by grouping species with habitat needs that are roughly the same and evaluating the amount of habitat in which these species are found.

**Affected Environment and Environmental Consequences**

Of BLM-administered lands, 96 percent is forested. Young forest habitat is the most prevalent type (28 percent), with slightly smaller acreages of Structurally-complex and Mature forest habitat. Stand Establishment habitat is less abundant (17 percent), and Early Successional habitat is the least abundant (2 percent) on BLM-administered lands. Table 3-246 displays the acreages of non-forested lands, Early Successional, Stand Establishment, Young, Mature, and Structurally-complex forest habitat in the decision and planning areas.

**Table 3-246.** Current condition in 2013 of habitat expressed by structural stage

<table>
<thead>
<tr>
<th>Structural Stage</th>
<th>BLM-administered Lands</th>
<th>All Ownerships</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(Acres)</td>
<td>(Percentage)</td>
</tr>
<tr>
<td>Non-forested lands</td>
<td>91,752</td>
<td>4%</td>
</tr>
<tr>
<td>Early Successional</td>
<td>53,459</td>
<td>2%</td>
</tr>
<tr>
<td>Stand Establishment</td>
<td>387,247</td>
<td>17%</td>
</tr>
<tr>
<td>Young</td>
<td>619,631</td>
<td>27%</td>
</tr>
<tr>
<td>Mature</td>
<td>517,893</td>
<td>23%</td>
</tr>
<tr>
<td>Structurally-complex</td>
<td>583,459</td>
<td>26%</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td><strong>2,253,442</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

For all ownerships, Young forest is the predominant habitat stage comprising 45 percent of the planning area. Early Successional forest is the least abundant habitat stage at 5 percent, and 18 percent is currently Mature or Structurally-complex forest.

The 2008 FEIS summarized the average historical conditions of forest structural stages in Western Oregon from two sources Nonaka and Spies (2005) and Wimberly (2002), which are incorporated here by reference (USDI BLM 2008, pp. 211–212). The summarization of average historical conditions from the 2008 FEIS combined the Stand Establishment and Early Successional stages described in this Proposed RMP/Final EIS into a single stage of ‘Stand Establishment.’ This characterization of average historical conditions correlates to 5 percent Stand Establishment, 15 percent Young, 25 percent Mature, and 55

836 | P a g e
percent Structurally-complex, and is displayed in Figure 3-146 and Figure 3-147. In comparison, the average historic conditions adapted from Wimberly (2002) correlate to approximately 17 percent Stand Establishment, 21 percent Young, 16 percent Mature, and 42 percent Structurally-complex (BLM 2008, p. 211).
Figure 3-146. Structural stage development in the decision area compared with average historic condition.
Figure 3-147. Structural stage development in the planning area compared with average historic condition.
Compared against the average historic conditions, the current combined amount of Mature and Structurally-complex forest in the decision area (51 percent) is less than the average historical condition (58–80 percent) \(\text{(Figure 3-146)}\). The prevalence of Stand Establishment and Young stands is greater in the decision area than average historic conditions. Under all alternatives and the Proposed RMP, the combined amount of Mature and Structurally-complex forest habitat in the decision area in 50 years (68–80 percent) would be within the range of the average historic conditions, as would the amount of Stand Establishment and Young forests. In 50 years, the amount of Mature and Structurally-complex forest in the decision area under the No Timber Harvest reference analysis (84 percent) would exceed the average historic condition.

At the planning area scale, the amount of Mature and Structurally-complex habitat currently (23 percent) is substantially less than the average historical condition (58–80 percent) \(\text{(Figure 3-147)}\). There is a preponderance of Young habitat (56 percent) that is well above the average historic condition (15–21 percent). However, the amount of Stand Establishment habitat in the planning area currently (21 percent) is currently near average historic condition (5–17 percent). In 50 years, all alternatives and the Proposed RMP would move the distribution of structural stages towards the average historic conditions, but there would still be considerable disparity.

At the planning area scale, there would be little difference (less than 1 percent) in the distribution of structural stages in 50 years among the alternatives, the Proposed RMP, or the No Timber Harvest reference analysis \(\text{(Figure 3-147)}\). Currently within the planning area, 6 percent is Early Successional, 14 percent is Stand Establishment, 56 percent is Young, 14 percent is Mature, and 9 percent is Structurally-complex. In 50 years under the Proposed RMP within the planning area, there would be 6 percent Early Successional, 12 percent Stand Establishment, 48 percent Young, 21 percent Mature, and 14 percent Structurally-complex. The proportion of structural stages would vary by 3 percent or less among any of the alternatives or the Proposed RMP.

Overall, Alternatives A, B, and D, and the Proposed RMP would lead to the development of the largest amount of Mature and Structurally-complex habitat, and Alternative C would lead to the largest amount of Early Successional, Stand Establishment, and Young stands \(\text{(Figure 3-146 and Figure 3-147)}\). \text{Appendix S} provides more detailed information on the development of structural stages in the decision and planning areas, by decade through 2063.

**Early Successional and Stand Establishment Habitats**

Early Successional habitat in the decision area would decrease from 2 to 1 percent of the 2,161,690 habitat-capable acres under the No Timber Harvest reference analysis in 50 years \(\text{(Figure 3-146)}\). Under all alternatives and the Proposed RMP, the amount of Early Successional habitat would increase in abundance in 50 years. Alternative D would result in the smallest increase of Early Successional habitat in 50 years (2 percent of habitat-capable acres), and Alternative C would result in the largest development of Early Successional forest habitat (6 percent of habitat-capable acres). The No Action alternative, Alternatives A and B, and the Proposed RMP would result in 5, 4, 5, and 3 percent, respectively, of habitat-capable acres in an Early Successional condition in 50 years. Of the available Early Successional habitat in the planning area, 4 percent is currently on BLM-administered lands, and that proportion would increase to 4–12 percent under the alternatives and the Proposed RMP, from regeneration timber harvest on BLM-administered lands.

Stand Establishment forest habitat in the decision area would decrease from 18 percent to 1 percent of the 2,161,690 habitat-capable acres under the No Timber Harvest reference analysis in 50 years \(\text{(Figure 3-146)}\). Under all alternatives and the Proposed RMP, the amount of Stand Establishment habitat would decrease from 18 percent of habitat-capable currently to 1–8 percent of habitat-capable acres in 50 years.
Alternative C would result in the least reduction of Young habitat in 50 years (8 percent of habitat-capable acres), while Alternative B would result in the largest reduction in 50 years (1 percent of habitat-capable acres). Of the available Stand Establishment habitat in the planning area, 16 percent is currently on BLM-administered lands, and that proportion would decrease to 1–8 percent under the alternatives and the Proposed RMP, as BLM-administered lands continue to develop and mature.

Under the No Action alternative, Alternative B, and the Proposed RMP, 69–73 percent of species associated with Early Successional habitats would have an increase in habitat availability. Under Alternative D, 31 percent of Early Successional associates would have an increase in habitat availability. Alternatives A and C would provide an increase in habitat for approximately half of Early Successional-associated species. For comparison, only 8 percent of Early Successional-associated species would have an increase in habitat availability under the No Timber Harvest reference analysis (Table 3-248).

**Young Forest Habitat**

Young forest habitat in the decision area would decrease from 29 percent to 14 percent of the 2,161,690 habitat-capable acres under the No Timber Harvest reference analysis in 50 years (Figure 3-146). Under all alternatives and the Proposed RMP, there would be little difference in the loss of Young habitat, as it would decrease from 29 percent to 15–18 percent of habitat-capable acres in 50 years. Alternative C would result in the least reduction of Young habitat in 50 years (18 percent of habitat-capable acres) but would still represent a decrease below current conditions (29 percent of habitat-capable acres). The Proposed RMP would result in a decrease of Young forest habitat to 17 percent of habitat-capable acres in 50 years. Of the available Young habitat in the planning area, 6 percent is currently on BLM-administered lands and that proportion would decrease slightly to 4–5 percent under the alternatives (including the No Action alternative) and the Proposed RMP as BLM-administered lands continue to develop and mature.

Under all alternatives and the Proposed RMP, 92 percent of wildlife species that BLM modeled as using Young habitat would have increased availability of that habitat as compared to current conditions. The No Timber Harvest reference analysis would provide an increase in Young habitat for slightly fewer wildlife species (85 percent; Table 3-248).

**Mature and Structurally-complex Habitats**

Mature forest habitat in the decision area would increase from 24 percent to 48 percent of the 2,161,690 habitat-capable acres under the No Timber Harvest reference analysis in 50 years (Figure 3-146). Under the No Action alternative, and Alternatives A, B, and D, there would be little difference in the development of Mature habitat, as it would increase from 24 percent of habitat-capable to 42, 41, 42, and 45 percent of habitat-capable acres, respectively, in 50 years. Alternative C would result in the least amount of Mature habitat in 50 years (37 percent of habitat-capable acres) but would still represent an increase over current conditions. The Proposed RMP would result in an increase of Mature forest habitat to 42 percent of habitat-capable acres in 50 years. Of the available Mature habitat in the planning area, 21 percent is currently on BLM-administered lands and that proportion would increase to 23–27 percent under all alternatives and the Proposed RMP as additional non-BLM-administered lands mature.

Structurally-complex forest habitat in the decision area would increase from 27 percent to 36 percent of the 2,161,690 habitat-capable acres under the No Timber Harvest reference analysis in 50 years (Figure 3-146). Under Alternatives A, B, and D, there would be little difference in the development of Structurally-complex habitat, as it would increase from 27 percent of habitat-capable currently to 35, 34, and 35 percent of habitat-capable, respectively, in 50 years. The No Action alternative and Alternative C would result in the least amount of Structurally-complex habitat in 50 years (30 and 31 percent of habitat-capable acres, respectively) but would still represent an increase over current conditions. The Proposed...
RMP would result in an increase of Structurally-complex forest habitat to 34 percent of habitat-capable acres in 50 years. Of the current Structurally-complex forest in the planning area, 37 percent is on BLM-administered lands. In 50 years, the contribution of BLM-administered lands to Structurally-complex habitat in the planning area would increase to 27–31 percent under the alternatives and the Proposed RMP, as additional non-BLM-administered lands, especially reserves on U.S. Forest Service lands, develop into Structurally-complex habitat.

Olson et al. (2012) identify that late-seral forests would function as refugia for forest-dwelling species from ongoing climate change due to their structural complexity, vegetative-species diversity, and ability to retain moisture. The Mature and Structurally-complex habitat modeled in this Proposed RMP/Final EIS are comparable to the late-seral forests referred to by Olson et al. (2012), and therefore they would also serve as refugia for wildlife species during climate change events. These refugia would increase in abundance under all alternatives and the Proposed RMP.

Under the action alternatives, the amount of existing Mature or Structurally-complex habitat within the reserves would increase (from 65 percent under the No Action Alternative to at least 72 percent). The Proposed RMP would reserve 83 percent of existing Mature or Structurally-complex habitat, while only 65 percent is reserved under the No Action Alternative (Table 3-247). Therefore, despite the absence of Survey and Manage measures, more habitat for species associated with older forests would be reserved and protected under the Proposed RMP than under the No Action alternative.

Table 3-247. Land use allocations of existing (2013) Mature or Structurally-complex habitat in the decision area

<table>
<thead>
<tr>
<th>Alternative/ Proposed RMP</th>
<th>Reserves (Acres)</th>
<th>Reserves (Percent)</th>
<th>Harvest Land Base (Acres)</th>
<th>Harvest Land Base (Percent)</th>
<th>Total (Acres)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Action</td>
<td>721,072</td>
<td>65%</td>
<td>382,690</td>
<td>35%</td>
<td>1,103,758</td>
</tr>
<tr>
<td>Alt. A</td>
<td>991,318</td>
<td>90%</td>
<td>112,440</td>
<td>10%</td>
<td>1,103,758</td>
</tr>
<tr>
<td>Alt. B</td>
<td>894,932</td>
<td>81%</td>
<td>208,830</td>
<td>19%</td>
<td>1,103,758</td>
</tr>
<tr>
<td>Alt. C</td>
<td>789,988</td>
<td>72%</td>
<td>313,771</td>
<td>18%</td>
<td>1,103,758</td>
</tr>
<tr>
<td>Alt. D</td>
<td>834,528</td>
<td>76%</td>
<td>269,230</td>
<td>24%</td>
<td>1,103,758</td>
</tr>
<tr>
<td>PRMP</td>
<td>912,541</td>
<td>83%</td>
<td>188,816</td>
<td>17%</td>
<td>1,101,357*</td>
</tr>
</tbody>
</table>

* Includes loss from fires in 2013–2014

Under the action alternatives and the Proposed RMP, the proportion of wildlife species that the BLM modeled as using Mature and Structurally-complex habitat would have increased availability compared to the No Action alternative. The action alternatives and the Proposed RMP would result in an increase in Mature or Structurally-complex habitat for at least 97 percent of the species, while under the No Action alternative 94 percent of species would have increased habitat availability (Table 3-248).
Table 3-248. Number of species* that would have an increase in habitat by 2063 by structural stage association† (percent of species in group)

<table>
<thead>
<tr>
<th>Alternative/ Proposed RMP</th>
<th>Early (n=26) (Percent)</th>
<th>Mid (n=13) (Percent)</th>
<th>Late (n=34) (Percent)</th>
<th>Riparian Reserves (n=43) (Percent)</th>
<th>Totals (n=116) (Percent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Action</td>
<td>19 (73%)</td>
<td>12 (92%)</td>
<td>32 (94%)</td>
<td>43 (100%)</td>
<td>106 (91%)</td>
</tr>
<tr>
<td>Alt. A</td>
<td>13 (50%)</td>
<td>12 (92%)</td>
<td>34 (100%)</td>
<td>43 (100%)</td>
<td>102 (88%)</td>
</tr>
<tr>
<td>Alt. B</td>
<td>18 (69%)</td>
<td>12 (92%)</td>
<td>33 (97%)</td>
<td>43 (100%)</td>
<td>106 (91%)</td>
</tr>
<tr>
<td>Alt. C</td>
<td>12 (46%)</td>
<td>12 (92%)</td>
<td>33 (97%)</td>
<td>43 (100%)</td>
<td>100 (86%)</td>
</tr>
<tr>
<td>Alt. D</td>
<td>8 (31%)</td>
<td>12 (92%)</td>
<td>34 (100%)</td>
<td>43 (100%)</td>
<td>97 (84%)</td>
</tr>
<tr>
<td>PRMP</td>
<td>18 (69%)</td>
<td>12 (92%)</td>
<td>33 (97%)</td>
<td>43 (100%)</td>
<td>106 (91%)</td>
</tr>
<tr>
<td>No Timber Harvest</td>
<td>2 (8%)</td>
<td>11 (85%)</td>
<td>34 (100%)</td>
<td>43 (100%)</td>
<td>90 (78%)</td>
</tr>
</tbody>
</table>

* Appendix S contains information on species-specific effects.
† Structural stage associations include Early (Early Successional and Stand Establishment), Mid (Young), and Late (Mature and Structurally-complex).

Snags and Down Woody Material

Current snag density is greater in Mature and Structurally-complex stands (28.1 and 19.8 snags per acre, respectively) than in Early Successional, Stand Establishment, and Young stands (15.7, 7.8, and 18.1 snags per acre, respectively; Appendix S). Similarly, the amount of down woody material in Mature and Structurally-complex stands (5.0 and 4.9 percent cover, respectively) is greater than in Early Successional, Stand Establishment, and Young stands (3.8, 4.1, and 3.6 percent, respectively). The abundance of snags and down wood also is greater in the coastal/north (22.0 snags per acre and 5.2 percent cover in the Coos Bay, Eugene, and Salem Districts) than in the interior/south (16.1 snags per acre and 3.7 percent cover in the Klamath Falls Field Office and the Medford and Roseburg Districts). The more frequent wildfire return interval and greater wildfire intensity in the interior/south likely is responsible for this observed trend, as more dead woody material is consumed.

Habitat for species associated with snags and down woody material in younger stands,127 would increase under the No Action alternative, Alternatives B, and D, and the Proposed RMP. The retention and creation of down woody material and snags in these alternatives and the Proposed RMP would be consistent with actions recommended by the Oregon Department of Fish and Wildlife in the Oregon Conservation Strategy (ODFW 2006, p. 13). There would be loss of habitat for species associated with snags and down woody material in younger stands under Alternatives A and C, and the No Timber Harvest reference analysis (Figure 3-148). The lack of green tree retention or snag and down woody material retention in Alternative A and C would result in the least amount of habitat for species associated with legacy structure in younger stands, because legacy structure would not be retained. Under the No Timber Harvest reference analysis, there would be a reduction of snags and down woody material in younger stands, because there would be relatively fewer acres of younger stands.

127 For this discussion, species associated with ‘younger stands’ refers to those that use some combination of the Early Successional, Stand Establishment, or Young structural stages but do not typically use Mature or Structurally-complex stages.
Habitat for species associated with legacy structures in older stands would have an increase in habitat under all alternatives, the Proposed RMP, and the No Timber Harvest reference analysis (Figure 3-149). This trend is due to larger reserves resulting increased development of Mature and Structurally-complex habitat that contain snag and down woody material legacy structures.

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Figure 3-148. Early Successional, Stand Establishment, and Young stands with Structural Legacies in the decision area

Figure 3-149. Mature and Structurally-complex stands with Structural Legacies within the decision area

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128 For this discussion, species associated with ‘older stands’ refers to those that use Young, Mature, or Structurally-complex structural stages but do not typically use the Early Successional or Stand Establishment stages.
Wildlife Associated with Riparian or Wetland Habitats

The alternatives and the Proposed RMP would have similar effects on wildlife species associated with stream or riparian habitats, as they would for fish species and would increase the potential large wood and small functional wood contribution to streams over time. Sediment production from road construction and use would increase by less than 1 percent under all alternatives and the Proposed RMP, and the effects would not differ meaningfully. Under the No Action alternative, Alternatives A and D, and the Proposed RMP, less than 0.5 percent of all perennial and fish-bearing reaches in the decision area would currently be susceptible to shade reductions that could affect stream temperature if the BLM applies thinning in the outer zone of the Riparian Reserve. Under Alternatives B and C, approximately 5 percent of all perennial and fish-bearing reaches in the decision area would currently be susceptible to shade reductions that could affect stream temperature if the BLM applies thinning in the outer zone of the Riparian Reserve (see the Fisheries and Hydrology sections in this chapter).

Under all alternatives, the Proposed RMP, and the No Timber Harvest reference analysis, all species associated with stream or riparian habitats would have an increase in habitat quality (Table 3-248). Availability of wetland habitat (non-flowing water habitats) would remain unchanged over the 50-year analysis period, because the BLM would include such habitats within the Riparian Reserve, thereby protecting the wetlands.

Bureau Sensitive Species

All alternatives and the Proposed RMP would lead to an increase in habitat in 50 years for roughly half of the 66 Bureau Sensitive species for whom habitat was modeled (Table 3-249). The No Action alternative would provide the most species (35) with increased habitat abundance in 50 years, while Alternative C would provide increased habitat abundance for the fewest species (31). The Proposed RMP would provide increased habitat availability for 34 of the species modeled. Approximately 45 percent of Bureau Sensitive species would have no change in habitat availability, because they are associated with special habitats (e.g., coastal dunes and oak woodlands) that would be protected under all alternatives and the Proposed RMP.

Table 3-249. Number of species* that would have an increase in habitat by 2063 (percent of species in group)

<table>
<thead>
<tr>
<th>Alternative/Proposed RMP</th>
<th>Bureau Sensitive Species (n=66) (Percent)</th>
<th>Bureau Strategic Species (n=51) (Percent)</th>
<th>Survey and Manage Species (n=13) (Percent)</th>
<th>Landbird Focal Species (n=34) (Percent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Action</td>
<td>35 (53%)</td>
<td>34 (67%)</td>
<td>13 (100%)</td>
<td>26 (76%)</td>
</tr>
<tr>
<td>Alt. A</td>
<td>33 (50%)</td>
<td>34 (67%)</td>
<td>13 (100%)</td>
<td>23 (68%)</td>
</tr>
<tr>
<td>Alt. B</td>
<td>34 (52%)</td>
<td>34 (67%)</td>
<td>13 (100%)</td>
<td>27 (79%)</td>
</tr>
<tr>
<td>Alt. C</td>
<td>31 (47%)</td>
<td>34 (67%)</td>
<td>13 (100%)</td>
<td>23 (68%)</td>
</tr>
<tr>
<td>Alt. D</td>
<td>33 (50%)</td>
<td>34 (67%)</td>
<td>12 (92%)</td>
<td>18 (53%)</td>
</tr>
<tr>
<td>PRMP</td>
<td>34 (52%)</td>
<td>34 (67%)</td>
<td>13 (100%)</td>
<td>26 (76%)</td>
</tr>
<tr>
<td>No Timber Harvest</td>
<td>32 (48%)</td>
<td>34 (67%)</td>
<td>12 (92%)</td>
<td>13 (38%)</td>
</tr>
</tbody>
</table>

* Appendix S contains information on species-specific effects.

Bureau Strategic Species

All alternatives and the proposed RMP would lead to an increase in habitat in 50 years for 67 percent of the 51 Bureau Strategic species for which habitat was modeled (Table 3-249). Approximately one-third
of Bureau Sensitive species (17) would have no change in habitat availability, because they are associated with special habitats (e.g., coastal dunes and oak woodlands) that would be protected under all alternatives and the proposed RMP.

Survey and Manage Species

Of the 43 wildlife species on the current Survey and Manage species list (USDA, USDI 2011), 13 occur within the decision area; the other 30 species are found in Washington, California, or portions of Oregon east of the decision area. All of the 13 species for which habitat was modeled in this analysis would have an increase in Mature or Structurally-complex habitat available under the No Action alternative, Alternatives A, B, and C, and the Proposed RMP. Under Alternative D, 12 of the 13 Survey and Manage species would have an increase in habitat availability (Table 3-249).

There is incomplete and unavailable information relevant to the effects of the action alternatives and the Proposed RMP on Survey and Manage species. With complete and species-specific survey information on the location of habitat and species sites for all Survey and Manage species, the BLM would be able to analyze the effects of all alternatives and the Proposed RMP on Survey and Manage species and compare the effects to the No Action alternative, which would continue to implement the Survey and Manage measures. However, the BLM lacks complete and species-specific survey information for most Survey and Manage species. It would be exorbitantly expensive and time-consuming to conduct random surveys across the decision area for all Survey and Manage species. Consistent with Council on Environmental NEPA regulations at 43 CFR 1502.22, this analysis summarizes the information that is currently available on the effects of the alternatives and the Proposed RMP on Survey and Manage species. The 2004 Final SEIS to Remove or Modify the Survey and Manage Mitigation Measure Standards and Guidelines (USDA FS and USDI BLM 2004, pp. 141–183) and the 2007 Final Supplement to the 2004 SEIS (USDA FS and USDI BLM 2007, pp. 162–244) analyzed the removal of Survey and Manage measures for known site management and pre-disturbance surveys. The species descriptions and discussions of known site management and pre-disturbance surveys from those analyses are incorporated here by reference. The U.S. District Court in Conservation Northwest et al. v. Rey et al. (Case No. C08-1067- JCC) found that the analysis of effects to species in the 2004 Final SEIS and the 2007 Final SEIS was insufficient to support the conclusion that the Survey and Manage measure was no longer necessary to meet the goals of the Northwest Forest Plan. The discussions of the 2004 SEIS and 2007 SEIS are incorporated by reference here only to the extent those portions of the analyses were not found invalid by the court.

Nevertheless, the information in the 2004 SEIS and 2007 SEIS does present analysis based on the incomplete survey information available that concludes that most Survey and Manage species would have sufficient habitat to support stable populations under the No Action alternative without the Survey and Manage measures.

The 13 Survey and Manage wildlife species modeled in this analysis were also considered in the 2007 Final Supplement to the 2004 Supplemental Environmental Impact Statement to Remove or Modify the Survey and Manage Mitigation Measure Standards and Guidelines (June 2007). The 2007 Supplement analyzed the effects of removing Survey and Manage measures. The 2007 Supplement concluded that, without Survey and Manage measures, nine of these taxa would have sufficient habitat to support stable populations rangewide\footnote{Red tree vole (outside of the North Oregon Coast DPS), Puget Oregonian, evening fieldslug, Klamath Rim pebblesnail, Fredenberg pebblesnail, warty jumping-slug, Malone jumping-slug, Columbia duskysnail, and Crater Lake tightcoil (Appendix S)} and five taxa—the Larch Mountain salamander, Siskiyou Mountains salamander, great gray owl, North Oregon Distinct Population Segment of the red tree vole, and Chace sideband—would be likely to have sufficient habitat rangewide but insufficient habitat in a portion of their range (USDA FS and USDI BLM 2007).
It is not possible to compare directly the effects of the alternatives and the Proposed RMP to the outcomes
described in the 2007 SEIS. The determinations about species outcomes in the 2007 SEIS were based on
the evaluation of experts and were more qualitative than quantitative in nature. These qualitative expert
opinions were based on assumptions of continuing application of the land use allocations of the
Northwest Forest Plan, and are therefore only directly applicable to the No Action alternative. Finally, the
conclusion in the 2007 SEIS of “insufficient habitat to support stable populations in a portion of the
Northwest Forest Plan area” did not specify the areas of “insufficient habitat” beyond broad geographic
areas. Thus, these general and qualitative conclusions are difficult to re-evaluate in light of these
alternatives and the Proposed RMP, which would alter only management on BLM-administered lands in
Oregon (USDA FS and USDI BLM 2007, pp. 118–119).

Furthermore, the threshold determination of whether there is sufficient habitat to support stable
populations of the Survey and Manage species is not necessary to provide a “hard look” in this Proposed
RMP/Final EIS at the environmental effects of the alternatives and the Proposed RMP. The determination
related to stable populations is tied to the species viability goal of the Northwest Forest Plan, which is not
part of the purpose for this RMP revision. The Survey and Manage measures were identified in the Final
Supplemental EIS for the Northwest Forest Plan as a potential mitigation measure to increase the
likelihood of achieving “viable populations, well-distributed across their current range, of species known
(or reasonably expected) to be associated with old-growth forest conditions” (USDA FS and USDI BLM,
1994a, p. 3&4-129) – a goal which was founded on a U.S. Forest Service planning regulation which, as
explained above, did not and does not apply to the BLM. Finally, to the extent that the Survey and
Manage measures were intended to prevent disruptions to sustained-yield timber production that would
result from future listing of species under the ESA, the Survey and Manage measures are unnecessary
under the action alternatives and the Proposed RMP (see the Relationship of the RMPs to Other Plans and
Programs section of Chapter 1).

There are no known sites or observations of the Larch Mountain salamander on BLM-administered lands
in the planning area based on GeoBOB (2015). In addition, the Larch Mountain salamander is not
documented or suspected on BLM-administered lands within the planning area based on the updated State
Director’s Special Status Species List (IM-OR-2015-028). Given that the species is not documented or
suspected on BLM-administered lands in the planning area, there is no meaningful or measureable effect
from the alternatives or the Proposed RMP on the Larch Mountain salamander or its habitat.

Since the 2007 supplement, the BLM has entered into a conservation agreement for the Siskiyou
salamander with the U.S. Fish and Wildlife Service and U.S. Forest Service (August 2007), under which
the BLM would manage high-priority sites for the benefit of the salamanders and their habitat. Effects of
the alternatives and the Proposed RMP to Siskiyou salamander are discussed further in the Issues
Considered but not Analyzed in Detail section.

The 2007 supplement identified that the great gray owl would be likely to have sufficient habitat
rangewide, but insufficient habitat in a portion of its range, because it would not be included on the BLM
or U.S. Forest Service sensitive species lists and protection of known nest sites was uncertain based on
‘inconsistent’ protections in individual management plans (USDA FS and USDI BLM 2007, pp. 285–
286). Although it is not possible to compare directly the effects of the alternatives and the Proposed RMP
on great gray owl to the outcomes described in the 2007 SEIS as explained above, it is possible to
evaluate where known sites occur and how habitat would change over time under the alternatives and the
Proposed RMP. Under all action alternatives and the Proposed RMP, more BLM-administered lands
would be allocated to reserves than under the No Action alternative, and therefore more great gray owl
observations (and presumably more nest sites) would occur within reserves (discussed in more detail
below). Out of a total of 1,228 great gray owl observations in the decision area, 247 observations were in
locations that would lie within reserves under the No Action alternative, 726–1,014 observations were in
locations that would lie within reserves under the action alternatives, and 800 observations were in locations that would lie within reserves under the Proposed RMP (Appendix S). The No Action alternative, Alternatives A, B, and C, and the Proposed RMP, would result in an increase in habitat for the great gray owl over current conditions in 50 years. Alternative D would result in a decrease in great gray owl habitat over 50 years.

The effects to the North Oregon Coast Distinct Population Segment of the red tree vole are discussed later in Chapter 3 as a separate issue.

The 2007 supplement identified that the Chace sideband would be likely to have sufficient habitat rangewide but insufficient habitat in a portion of its range, because it would not be included on the BLM or U.S. Forest Service sensitive species lists throughout its range (USDA FS and USDI BLM 2007, p. 261). Currently, the Chace sideband is a Bureau Strategic species. As identified in the 2007 supplement, loss of sites would reduce population interaction, connectivity, and could result in habitat (including known sites) insufficient to support stable populations in a portion of the species range (USDA FS and USDI BLM 2007, pp. 261–262). Although it is not possible to compare directly the effects of the alternatives and the Proposed RMP on Chace sideband to the outcomes described in the 2007 SEIS as explained above, it is possible to evaluate where known sites occur and how habitat would change over time under the alternatives and the Proposed RMP. Under all action alternatives and the Proposed RMP, there would be more BLM-administered lands, and therefore more Chace sideband sites, protected within reserves (discussed in more detail below). Out of a total of 114 Chace sideband sites in the decision area, 26 sites would lie within reserves under the No Action alternative, 62–95 sites would lie within reserves under the action alternatives, and 91 sites would lie within reserves under the Proposed RMP (Appendix S). The No Action alternative, action alternatives, and the Proposed RMP would result in an increase in habitat for the Chace sideband over current conditions in 50 years.

Under all action alternatives and the Proposed RMP, there would be no timber harvest of older and more structurally-complex multi-layered conifer forests, which is the forest condition that the BLM assumes provides high-quality habitat for Survey and Manage species (see Analytical Methods above). Although each action alternative and the Proposed RMP uses a different definition to identify older and more structurally-complex multi-layered conifer forests, all action alternatives and the Proposed RMP would protect much of what was considered late-successional forest and essentially all of what was considered old growth in the Northwest Forest Plan (FEMAT 1993, p. IX-32; USDA FS and USDI BLM 1994a, Glossary-11). Therefore, all of the action alternatives and the Proposed RMP, in contrast to the No Action alternative, would protect from timber harvest the forest conditions with which the Survey and Manage species are most closely associated.

In addition to reserving existing older and more structurally-complex multi-layered conifer forests, the acreage of Mature and Structurally-complex forest (which is a broader category than older and more structurally-complex multi-layered conifer forests) in the decision area would increase over time under all alternatives and the Proposed RMP (Figure 3-150). Therefore, the amount of habitat for Survey and Manage wildlife species would also increase under all alternatives and the Proposed RMP. Development of Mature and Structurally-complex habitat under Alternatives A, B, and D, and the Proposed RMP would exceed that under the No Action alternative in each decade. Alternative C would result in less increase in Mature and Structurally-complex habitat development than the No Action alternative for the first four decades, but exceed it in the fifth decade (Figure 3-150).

Under the No Action alternative, sites not in reserve allocations would be protected consistent with the Survey and Manage measure. To the extent that the percentage of sites in reserve allocations indicates the extent of habitat for this species in reserve allocations, the No Action alternative would provide less habitat within reserve allocations than the action alternatives or the Proposed RMP.

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Figure 3-150. Mature and Structurally-complex habitat development in the decision area

Under the action alternatives and the Proposed RMP, 64–80 percent of BLM-administered lands would be included in the reserves (Table 3-250; see Chapter 2 for additional detail). The action alternatives and the Proposed RMP would remove the Survey and Manage measures that require pre-disturbance surveys and protection of known sites, but even in the absence of such measures, habitat and sites of Survey and Manage species that fall within the reserves would generally be protected by the management direction of the reserve land use allocations, which would generally protect existing and foster the development of Mature and Structurally-complex habitat. Not all sites within reserve land use allocation would necessarily be protected by buffers comparable to the No Action alternative. However, management actions in reserves could occur within these sites, but there would be a minimal effect to the species based on the type and intensity of allowable treatments. Under all action alternatives and the Proposed RMP, management direction in reserves would largely limit stand treatments to thinning to improve habitat conditions and fuels treatments to reduce the risk of uncharacteristic wildfire, and would generally preclude stand treatments that would remove or degrade Mature and Structurally-complex habitat (Appendix B). Under the No Action alternative, 36 percent of known sites of Survey and Manage wildlife species would fall within the reserves. Under the action alternatives and the Proposed RMP, the proportion of sites that would fall within the reserves would increase substantially: 86 percent under Alternative A, 68 percent under Alternative B, 66 percent under Alternative C, 70 percent under Alternative D, and 73 percent under the Proposed RMP (Appendix S).
### Table 3-250. Size of the reserves within the decision area

<table>
<thead>
<tr>
<th>Alternative/Proposed RMP</th>
<th>LSR (Acres)</th>
<th>LSR (Percent)*</th>
<th>Riparian Reserve (Acres)</th>
<th>Riparian Reserve (Percent)*</th>
<th>Other Reserves (Acres)</th>
<th>Other Reserves (Percent)*</th>
<th>Total Reserves (Acres)</th>
<th>Total Reserves (Percent)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Action</td>
<td>478,860†</td>
<td>19%†</td>
<td>927,721</td>
<td>38%</td>
<td>233,410</td>
<td>9%</td>
<td>1,639,991</td>
<td>66%</td>
</tr>
<tr>
<td>Alt. A</td>
<td>1,147,527</td>
<td>46%</td>
<td>676,917</td>
<td>27%</td>
<td>170,540</td>
<td>7%</td>
<td>1,994,984</td>
<td>80%</td>
</tr>
<tr>
<td>Alt. B</td>
<td>1,127,320</td>
<td>46%</td>
<td>382,805</td>
<td>15%</td>
<td>260,510</td>
<td>11%</td>
<td>1,770,635</td>
<td>72%</td>
</tr>
<tr>
<td>Alt. C</td>
<td>949,279</td>
<td>38%</td>
<td>372,739</td>
<td>15%</td>
<td>267,678</td>
<td>11%</td>
<td>1,589,696</td>
<td>64%</td>
</tr>
<tr>
<td>Alt. D</td>
<td>714,292</td>
<td>29%</td>
<td>714,629</td>
<td>29%</td>
<td>250,523</td>
<td>10%</td>
<td>1,679,444</td>
<td>68%</td>
</tr>
<tr>
<td>PRMP</td>
<td>948,466</td>
<td>38%</td>
<td>647,555</td>
<td>26%</td>
<td>263,647</td>
<td>11%</td>
<td>1,859,668</td>
<td>75%</td>
</tr>
</tbody>
</table>

* Percent of total BLM-administered lands in the planning area (2,478,853 acres) that are within the reserves
† Under the No Action alternative, the acreage of the Late-Successional Reserve (LSR) allocation is 879,031 acres (36 percent). However, the Northwest Forest Plan land use allocation hierarchy includes the Riparian Reserve as LSR. For direct comparison with action alternatives, the No Action alternative Riparian Reserve acreage within LSR was separated from the LSR and the resultant amount of LSR is displayed in the table.

Under the No Action alternative, the BLM would continue to implement the Survey and Manage measures to conduct pre-disturbance surveys and protect known sites for the Survey and Manage species. Therefore, the No Action alternative would provide habitat and known sites sufficient to support stable populations on most wildlife species in patterns similar to their historic reference distributions, with varying levels of certainty (USDA FS and USDI BLM 2000). In addition, Mature and Structurally-complex habitats for Survey and Manage wildlife species would increase under the No Action alternative in the decision area (Figure 3-146) and in the planning area (Figure 3-147).

In summary, all action alternatives and the Proposed RMP would remove the Survey and Manage measures that require pre-disturbance surveys and protection of known sites. There is incomplete and unavailable information relevant to the effects of the action alternatives and the Proposed RMP on Survey and Manage species. The 2004 FSEIS provides an incomplete analysis, but supports the conclusion that most Survey and Manage species would have sufficient habitat to support stable populations under the No Action alternative without the Survey and Manage measures. All action alternatives and the Proposed RMP allocate more acres to the Late-Successional Reserve than the No Action alternative, protect older and more structurally-complex multi-layered conifer forests, and would result in an increase in Mature and Structurally-complex habitat over time. In addition, all action alternatives and the Proposed RMP would continue to provide management for many of the Survey and Manage species as Bureau Sensitive species. As a result, in light of the incomplete information available to the BLM, all action alternatives and the Proposed RMP would protect most of the existing habitat for Survey and Manage species and would result in an increase in the total amount of habitat for Survey and Manage species over time.

### Landbird Focal Species

All alternatives and the Proposed RMP would lead to an increase in habitat in 50 years for a majority of the 34 landbird focal species for whom habitat was modeled (Table 3-249). Alternative B would provide the most species (27) with increased habitat abundance in 50 years, while Alternative D would provide increased habitat abundance for the fewest species (18). For comparison, the No Timber Harvest reference analysis would result in increased habitat availability for 13 landbird focal species. There are many focal landbird species that are associated with Early Successional habitat; this habitat would become less abundant under Alternative D and the No Timber Harvest reference analysis.

The landbird focal species have a broad range of habitat associations, including many species associated with Early Successional habitats, which decrease in abundance under the No Timber Harvest reference
analysis. Thus, landbird focal species and the total species with increased habitat abundance would be lowest under the No Timber Harvest reference analysis. The BLM would manage landbird species under the Migratory Bird Treaty Act and following guidance provided by WO IB 2010-110, the Memorandum of Understanding between the BLM and U.S. Fish and Wildlife Service to promote the conservation of migratory birds (August 31, 2010). The BLM would follow migratory bird conservation measures as appropriate and consistent with agency missions. The BLM anticipates that these measures, which are currently under development by the BLM and the U.S. Fish and Wildlife Service, would contain information and recommendations regarding how to avoid disturbing raptors and other migratory birds and how to avoid negatively affecting their populations. At the project level, the BLM would implement measures to lessen ‘take’ of migratory birds under the Migratory Bird Treaty Act focusing on species of concern as identified by the BLM and U.S. Fish and Wildlife Service.

Appendix S contains additional information and supporting data on Bureau Sensitive, Bureau Strategic, Survey and Manage wildlife species, and landbird focal species.
References
Columbian White-tailed Deer

Key Points

- The No Action alternative and Alternatives A, B, and C would increase the amount of high-quality forage habitat for Columbian white-tailed deer on BLM-administered lands in 50 years.

Summary of Notable Changes from the Draft RMP/EIS

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.

Background

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\(^\text{131}\) 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 (USFWS 2013a). 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 2013b). Currently, the range of the Lower Columbia River DPS is reduced to approximately 93 square miles and includes portions of Clatsop and Columbia 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 ESA-listed as endangered. The U.S. Fish and Wildlife Service has not designated critical habitat for the Columbian white-tailed deer.

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 2013a). In 1996, the Lower Columbia River DPS suffered heavy losses due to extensive flooding of its habitat. However, the U.S. Fish and Wildlife Service expect this population segment to recover to pre-flood numbers within a few years. 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 2013b).

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 2013b). Habitat for Columbian white-tailed deer in the Douglas County DPS includes predominantly oak-madrone woodland.

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\(^{131}\) 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.
and riparian cover types. Columbian white-tailed deer concentrate their habitat use near streams or rivers (within 650 feet). The distance to streams 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 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. Currently, the BLM has not documented Columbian white-tailed deer on BLM-administered lands within the Salem District (R. Price, BLM, Salem District Wildlife Biologist, personal communication, June 17, 2015).

The Oregon Department of Fish and Wildlife associates differences in the quality of habitat with forage quality and forest structural stage for other 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 10–15 years following a clearcut or stand-replacing natural disturbance (ODFW 2014, 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 2014).

**Issue 1**

*What levels of habitat for the Columbian white-tailed deer would be available under each alternative?*

**Summary of Analytical Methods**

In this 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 3-151). In cooperation 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 the 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 lands. 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, personal communication, July 14, 2015). The Scappoose Block parcels are up to 17 miles from the Columbia River.

In this 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, personal communication, May 2015) (Figure 3-151).
In this analysis, the BLM also assumed that Early Successional habitat 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 habitat would similarly provide high-quality forage habitat for Columbian white-tailed deer. 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) to test if using the Early Successional structural stage 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 stage (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 than in the other structural stages. Based on these results from the sample watersheds, the absolute difference in forage quality between Early Successional and the other structural stages is not dramatically different, but the Early Successional stage does appear 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 this analysis that oak woodland would provide higher-quality forage habitat for Columbian white-tailed deer than Early Successional forest habitat. 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. Therefore, while the acreage of oak woodland is informative of relative conditions of deer forage habitat, it is not wholly additive with the Early Successional stage acreage.

This issue presents both an analysis of the direct and indirect effects of alternative and Proposed RMP implementation on Columbia white-tailed deer habitat in the decision 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 influence populations outside the scope of BLM land management decisions, such as harvest levels of deer authorized by Oregon Department of Fish and Wildlife and mortality from predators or vehicle collisions.

Under all alternatives and the Proposed RMP, the BLM management direction for the Columbian white-tailed deer includes 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 Area for white-tailed deer habitat is consistent with conservation actions recommended by the Oregon Department of Fish and Wildlife in the Oregon Conservation Strategy (ODFW 2006, p. 320).

**Affected Environment and Environmental Consequences**

There are 459 acres of high-quality Early Successional forage habitat (Figure 3-152) 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. As noted above, the BLM has not documented Columbian white-tailed deer on BLM-administered lands within the Salem District. There are 55,952 acres of high-quality Early Successional forage habitat (Figure 3-153) 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.
Table 3-152. Columbian white-tailed deer high-quality Early Successional forage habitat for the Lower Columbia River population on BLM-administered lands

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</thead>
<tbody>
<tr>
<td>Current</td>
<td>459</td>
<td>987</td>
<td>3,220</td>
<td>3,779</td>
<td>5,316</td>
<td>1,688</td>
<td>1,488</td>
</tr>
<tr>
<td>Condition</td>
<td>2013</td>
<td>2063</td>
<td>2063</td>
<td>2063</td>
<td>2063</td>
<td>2063</td>
<td>2063</td>
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</tbody>
</table>

Figure 3-152. Columbian white-tailed deer high-quality Early Successional forage habitat for the Lower Columbia River population on BLM-administered lands

Table 3-153. Columbian white-tailed deer high-quality Early Successional forage habitat for the Lower Columbia River population across all land ownerships

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<tr>
<td>Current</td>
<td>459</td>
<td>987</td>
<td>3,220</td>
<td>3,779</td>
<td>5,316</td>
<td>1,688</td>
<td>1,488</td>
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<tr>
<td>Condition</td>
<td>2013</td>
<td>2063</td>
<td>2063</td>
<td>2063</td>
<td>2063</td>
<td>2063</td>
<td>2063</td>
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</tbody>
</table>

Figure 3-153. Columbian white-tailed deer high-quality Early Successional forage habitat for the Lower Columbia River population across all land ownerships
Under all alternatives and the Proposed RMP, high-quality forage habitat would increase substantially for the Lower Columbia River population on BLM-administered lands in 50 years (Figure 3-152). Alternatives A, B, and C would provide from 7 to 12 times as much high-quality forage habitat in 50 years than there is currently. Alternative D, the No Action alternative, and the Proposed RMP would provide from 2 to 4 times the amount of high-quality forage habitat than there is currently. In contrast, the No Timber Harvest reference analysis would decrease the amount of habitat provided, dropping to zero in 50 years.

The alternatives and the Proposed RMP would increase in high-quality, Early Successional forage habitat across all ownerships for the Lower Columbia River population; Alternative C would provide the largest increase (9 percent) and the No Action alternative would provide the least increase (1 percent) over current conditions (Figure 3-153). Under the No Timber Harvest reference analysis, the amount of high-quality Early Successional forage habitat for the Lower Columbia River population would decrease by 1 percent. In 50 years, the BLM-administered lands would contribute between 2–9 percent of the available high-quality forage habitat for the Lower Columbia River population in the planning area with Alternative C the most and the No Action alternative the least.

There are 767 acres of high-quality Early Successional forage habitat (Figure 3-154) for the Douglas County population of Columbian white-tailed deer on BLM-administered lands, which is 6 percent of the 13,308 habitat-capable acres. There are 19,439 acres of high-quality Early Successional forage habitat (Figure 3-155) for the Douglas County population across all ownerships, which is 9 percent of the 205,266 habitat-capable acres. The current BLM contribution to high-quality forage habitat for the Douglas County population is 4 percent of the available high-quality forage habitat available across all ownerships. There are 1,545 additional acres of oak woodlands available on BLM-administered lands as high-quality forage habitat for the Douglas County population. There are 52,548 acres of oak woodlands available currently across all ownerships for the Douglas County population.
Figure 3-154. Columbian white-tailed deer high-quality Early Successional forage habitat for the Douglas County population on BLM-administered lands

Figure 3-155. Columbian white-tailed deer high-quality Early Successional forage habitat for the Douglas County population across all ownerships
Under Alternatives A, B, and C, high-quality Early Successional forage habitat would decrease slightly (by less than 200 acres) for the Douglas County population on BLM-administered lands in 50 years (Figure 3-154). Alternative D, the Proposed RMP, and the No Action alternative would provide approximately half the amount of high-quality Early Successional forage habitat as there is currently. However, the BLM assumed that the amount of oak woodlands high-quality forage habitat would remain approximately the same in 50 years. For the Douglas County population, oak woodlands would provide approximately twice the abundance of high-quality forage habitat (1,545 acres) for white-tailed deer as forage habitat from Early Successional coniferous stands.

Across all ownerships for the Douglas County population, high-quality Early Successional forage habitat would remain essentially unchanged (2 percent decrease or less) from current conditions under the all alternatives and the Proposed RMP over 50 years (Figure 3-155). In 50 years, the BLM-administered lands would contribute between 2–4 percent of the available high-quality Early Successional forage habitat for the Douglas County population. As on BLM-administered lands, oak woodlands would offer roughly twice the abundance of high-quality forage habitat (52,458 acres) for white-tailed deer as forage habitat from Early Successional coniferous forests across all ownerships under all alternatives and the Proposed RMP. In 50 years, the No Timber Harvest reference analysis would result in no Early Successional forage habitat on BLM-administered lands, and oak woodlands would gradually be lost to coniferous encroachment in the absence of management to maintain or restore these woodlands.

Within the Lower Columbia River DPS, flooding is a threat to Columbian white-tailed deer habitat when inundated for prolonged periods of time (USFWS 2013b). The risk of prolonged flooding could increase with the effects of climate change but the U.S. Fish and Wildlife Service does not expect that increased flooding would put the Lower Columbia River DPS at risk of extinction. Increased flooding could force deer to move into more human-developed areas.

Overall, for the Lower Columbia River population, while the action alternatives and the Proposed RMP would increase the amount of high-quality forage habitat for Columbian white-tailed deer on BLM-administered lands in 50 years, there would be marked differences (approximately 3,800 acres). Among the action alternatives, Alternative C would increase high-quality forage habitat the most for the Lower Columbia River population while the Proposed RMP would provide the least amount of forage habitat increase (Figure 3-152). Greater availability of high-quality forage would improve ungulate survival and reproduction (e.g., pregnancy rates, fetal survival, neonatal survival, juvenile growth rates, vulnerability to overwinter starvation, and age at first breeding) (Cook et al. 2013, p. 37). In contrast, for the Douglas County population, there would be little to no decrease (2 percent or less) under the action alternatives and little meaningful difference among the alternatives and the Proposed RMP (less than 350 acres difference). Therefore, there would be little to no change in survival and reproduction as a result of changes in forage habitat for the Douglas County population. As noted above under Analytical Methods, it is not possible in this analysis to equate changes in forage habitat to changes in populations in either the Columbia River or the Douglas County populations, because there are other factors that influence Columbian white-tailed deer populations outside the scope of BLM land management decisions.

Appendix S contains additional information and supporting data on Columbian white-tailed deer.
References


Deer and Elk

Key Points

- The No Action alternative, Alternatives A, B, and C, and the Proposed RMP would increase the amount of high-quality forage habitat for deer and elk on BLM-administered lands in 50 years, but there would be an overall decrease in forage habitat in the planning area.

Summary of Notable Changes from the Draft RMP/EIS

The BLM expanded this analysis to consider all deer and elk species in the planning area, not just black-tailed deer and Roosevelt elk. The BLM also updated deer and elk population estimates using 2014 data from Oregon Department of Fish and Wildlife. Finally, the BLM added discussion pertaining to predation of deer and elk by gray wolves.

Background

There are three species of deer in the planning area: black-tailed deer (*Odocoileus hemionus*), mule deer (*O. hemionus hemionus*), and Columbian white-tailed deer (*O. virginianus*). The Columbian white-tailed deer is discussed separately in the previous pages. There is also one species of elk (*Cervus elaphus*) in the planning area, which occurs in two subspecies: Roosevelt elk west of the Cascades Mountains and Rocky Mountain elk east of the Cascade Mountains (ODFW 2015a). In this analysis, ‘deer and elk’ will refer to this assemblage of black-tailed deer, mule deer, Roosevelt elk, and Rocky Mountain elk.

Populations of black-tailed deer in western Oregon have been declining since the 1980s (ODFW 2014a). The Oregon Department of Fish and Wildlife estimates that the black-tailed deer population in Oregon declined from 452,000 animals in 1979 to 320,000 animals in 2004 (ODFW 2014a, p. 10). Declines in the population of black-tailed deer are likely due to reductions in the quantity and quality of habitat, disease, and increased predation. The Oregon Department of Fish and Wildlife estimates that the population of mule deer in 2014 was 231,241 animals within eastern Oregon (ODFW 2015b). Based on these figures, there were approximately 550,000 deer in Oregon in 2014.

In the Oregon Wolf Conservation and Management Plan, the Oregon Department of Fish and Wildlife assumes that gray wolves would consume 23.4 deer per wolf per year (ODFW 2010, p. 100). Based on the population of 7 gray wolves in the planning area and 77 gray wolves in the State, as of 2014 (see the gray wolf section for details), the BLM assumes that wolves would consume 164 deer in planning area (< 0.1 percent of the deer population) and 1,802 deer in the State (0.3 percent of the deer population) annually. For context, regulated hunting harvested 22,371 deer in the planning area (7.0 percent of the deer population) and 46,057 deer in the State (8.4 percent of the deer population) in 2014 (ODFW 2015c).

The 2014 estimate of elk populations was 58,504 elk in the planning area and 131,296 elk in the State. Elk populations are below the management objectives established by the Oregon Department of Fish and Wildlife in 18 of 20 wildlife management units in the planning area and in 31 of 53 wildlife management units (ODFW 2015d and 2015e).

In the Oregon Wolf Conservation and Management Plan, the Oregon Department of Fish and Wildlife assumed that gray wolves would consume 7.8 elk per wolf per year (ODFW 2010, p. 100). Based on the population of 7 gray wolves in the planning area (*Figure 3-165*) and 77 gray wolves in the State, as of 2014, the BLM assumes that wolves would consume 55 elk in the planning area (0.1 percent of the elk population) and 601 elk in the State (0.5 percent of the elk population) annually. For context, regulated
hunting harvested 5,998 elk in the planning area (10.3 percent of the elk population) and 18,777 elk in the State (14.3 percent of the elk population) in 2014 (ODFW 2015f).

The Oregon Department of Fish and Wildlife associates differences in habitat quality for black-tailed deer and elk with differences in forage quality and forest structural stages. 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 clearcut or stand-replacing natural disturbance (ODFW 2008, 2014a). Black-tailed deer densities are higher in Early Successional forests. The Oregon Department of Fish and Wildlife identifies availability of Early Successional forest stages as a potential limiting factor for black-tailed deer (ODFW 2014a). These high-quality forage conditions persist until the canopy from regenerating conifer seedlings restricts sunlight to the low-lying forbs and shrubs.

Similarly, the Oregon Department of Fish and Wildlife identified that Federal forestlands in western Oregon are lacking in adequate forage conditions for elk due to drastic reductions in timber harvest under the Northwest Forest Plan (ODFW 2003). Summarizing results from the elk nutrition model by Rowland et al. (2013), White (2015) found that with lower canopy closure and higher elevations, the abundance of high-quality forage for elk increases. Forage nutrition for elk in the Coast Range and many areas of the Cascades is relatively poor; even in Early Successional structural stages (e.g., clearcuts) the nutritional value of the forage is below maintenance levels for lactating elk. However, Early Successional habitat provides much better nutritional benefits to elk than large areas of closed-canopy forest. Elk benefit from forest management activities that reduce forest cover, but usage of the additional forage that develops depends on nearby cover and human disturbance.

Use of high-quality foraging habitat by elk depends on the management of human disturbance, particularly along roads. Road management (e.g., seasonal road closures) can improve habitat quality for elk (White 2015). The Oregon Department of Fish and Wildlife identified that open road density is a contributing factor to illegal poaching, and open roads may limit use of forest habitats by black-tailed deer (ODFW 2014a, pp. 38, 64). However, the effect of human disturbance (including open roads) on black-tailed deer is not well-understood (ODFW2014a, p. 64). Unregulated roads cause an increase in elk vulnerability during hunting seasons, increases the potential for poaching, provides opportunities for other disturbances during critical calving periods and winter, and causes elk to move away from available forage (BLM 2008, p. 329).

**Issue 1**

*What levels of habitat for deer and elk would be available under each alternative?*

**Summary of Analytical Methods**

In this analysis, the BLM considered that all forested lands provide habitat for deer and elk within the planning area. The BLM assumed that Early Successional stage forest represents high-quality forage habitat for deer and elk in this analysis. The BLM tested this assumption against the elk nutrition model by Rowland et al. (2013) and found that using the Early Successional structural stage as high-quality forage habitat was reasonable.

This issue presents both an analysis of the direct and indirect effects of alternative and Proposed RMP implementation on deer and elk habitat in the decision area and an analysis of the cumulative effects on deer and elk 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 deer or elk populations, because there are other factors that influence populations outside the scope of BLM land management decisions, such as regulated harvest levels of deer and elk authorized by Oregon Department of Fish and Wildlife and mortality from predators or vehicle collisions.

**Affected Environment and Environmental Effects**

There are 53,459 acres of high-quality forage habitat for deer and elk in the decision area (Figure 3-156), which is 2 percent of the 2,161,690 habitat-capable acres. There are 1,119,906 acres of high-quality forage habitat for deer and elk in the planning area (Figure 3-157), which is 6 percent of the 17,403,114 habitat-capable acres. The BLM-administered lands contribute 5 percent of the available high-quality forage habitat available in the planning area.
Under the No Action alternative and Alternatives A, B, and C, high-quality forage habitat would increase substantially for deer and elk populations on BLM-administered lands in 50 years (Figure 3-156). The No Action alternative and Alternatives B and C, and would provide two to three times as much high-quality forage habitat in 50 years. Alternative A would increase the amount of high-quality forage habitat in 50 years by 50 percent. The amount of foraging habitat would increase (by 22 percent) under the Proposed RMP but would decrease by 14 percent under Alternative D in 50 years. The No Timber
Harvest reference analysis would decrease the amount of habitat; in 50 years, there would be 27 percent of the current amount of high-quality forage habitat available.

At the planning area scale, Alternative C would maintain the amount of high-quality forage habitat for deer and elk. The other alternatives would lead to a 1–8 percent decrease in high-quality forage habitat (Figure 3-157), while the No Timber Harvest reference analysis would decrease by 11 percent. The reduction in high-quality forage habitat across all ownerships would be a result of the loss of Early Successional forest from the reserve land use allocations in Federal ownership, as these stands develop and mature. In 50 years, BLM-administered lands under the Proposed RMP would contribute 6 percent of the available high-quality forage habitat in the planning area, while the No Action alternative and Alternatives A and B would result in contributions of 10, 8, and 11 percent, respectively. Alternative D (4 percent) and the No Timber Harvest reference analysis (1 percent) would result in smaller contributions from BLM-administered lands to high-quality forage habitat in the planning area in 50 years.

The No Action alternative and Alternatives A, B, and C, and the Proposed RMP would increase the amount of high-quality forage habitat for deer and elk on BLM-administered lands in 50 years, but there would be an overall decrease in forage habitat in the planning area due to stand development in the reserve land use allocations on BLM-administered and U.S. Forest Service lands. Alternative D would maintain current amounts of high-quality forage habitat available in 50 years on BLM-administered lands. Greater availability of high-quality forage would improve ungulate survival and reproduction (e.g., pregnancy rates, fetal survival, neonatal survival, juvenile growth rates, vulnerability to overwinter starvation, and age at first breeding).

Under Alternative D, livestock grazing would be eliminated from BLM-administered lands in the planning area. Gray wolves are known to prey upon livestock in the State and, in the absence of livestock on BLM-administered lands, wolves would presumably compensate for the loss of domesticated prey by preying more heavily on deer and elk. However, the confirmed kill rates of livestock by wolves in Oregon are 0.7 livestock per wolf per year (see the Gray Wolf section in this chapter). Given the current gray wolf population in the planning area of seven wolves, the BLM assumes that wolves would consume approximately five livestock annually. Therefore, under Alternative D, wolves would presumably consume an additional five deer or elk to compensate for the loss of potential livestock prey in the planning area. Given the background levels of loss of deer and elk from consumption by wolves (BLM estimates 164 deer and 55 elk annually) and from regulated harvest (22,371 deer and 5,998 elk in 2014) in the planning area, compensatory predation of 5 additional deer and elk would represent such a minor increase in the loss of deer and elk that it would have no discernible effect on deer and elk populations.

Under the action alternatives and the Proposed RMP, there would be 202,196 acres of deer habitat management areas in the Klamath Falls Field Office and in the Medford District (Table 3-251, Figure 3-158) and 129,051 acres of elk management areas in the Medford and Salem Districts (Table 3-252, Figure 3-158). Under the Proposed RMP, motor vehicle use within deer or elk management areas would be regulated with seasonal road closures as specified in the management direction (Appendix B). In addition, the Proposed RMP would improve forage habitat for deer and elk by planting native forage species in disturbed areas, creating forage plots where forage is limited, and removing encroaching junipers.

As noted above under Analytical Methods, it is not possible in this analysis to equate changes in forage habitat to changes in populations, because there are other factors that influence deer and elk populations outside the scope of BLM land management decisions, such as regulated harvest levels of deer and elk authorized by Oregon Department of Fish and Wildlife and mortality from predators or vehicle collisions.
### Table 3-251. Deer management areas on BLM-administered lands

<table>
<thead>
<tr>
<th>District/Field Office</th>
<th>Deer Management Area (Name)</th>
<th>BLM-administered Lands (Acres)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Klamath Falls</td>
<td>Bly</td>
<td>4,526</td>
</tr>
<tr>
<td></td>
<td>Bly Mt.</td>
<td>6,310</td>
</tr>
<tr>
<td></td>
<td>Hogback</td>
<td>2,309</td>
</tr>
<tr>
<td></td>
<td>Horton Windy</td>
<td>8,198</td>
</tr>
<tr>
<td></td>
<td>Keno Worden</td>
<td>1,370</td>
</tr>
<tr>
<td></td>
<td>Lorella</td>
<td>4,069</td>
</tr>
<tr>
<td></td>
<td>South Bryant</td>
<td>2,719</td>
</tr>
<tr>
<td></td>
<td>South Gerber</td>
<td>30,047</td>
</tr>
<tr>
<td></td>
<td>Stukel</td>
<td>1,813</td>
</tr>
<tr>
<td></td>
<td>Swan Lake</td>
<td>6,547</td>
</tr>
<tr>
<td></td>
<td>Topsy Pokegama</td>
<td>13,721</td>
</tr>
<tr>
<td></td>
<td><strong>Klamath Falls Subtotal</strong></td>
<td><strong>81,629</strong></td>
</tr>
<tr>
<td>Medford</td>
<td>Little Applegate</td>
<td>11,083</td>
</tr>
<tr>
<td></td>
<td>Little Butte Creek South</td>
<td>25,545</td>
</tr>
<tr>
<td></td>
<td>Elk Creek</td>
<td>18,814</td>
</tr>
<tr>
<td></td>
<td>Salt Creek</td>
<td>17,487</td>
</tr>
<tr>
<td></td>
<td>Shady Cove West</td>
<td>7,670</td>
</tr>
<tr>
<td></td>
<td>Camel Hump</td>
<td>8,876</td>
</tr>
<tr>
<td></td>
<td>Williams</td>
<td>29,161</td>
</tr>
<tr>
<td></td>
<td>Monument</td>
<td>159</td>
</tr>
<tr>
<td></td>
<td>Burnt Peak</td>
<td>1,773</td>
</tr>
<tr>
<td></td>
<td><strong>Medford Subtotal</strong></td>
<td><strong>120,567</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Totals</strong></td>
<td><strong>202,196</strong></td>
</tr>
</tbody>
</table>

### Table 3-252. Elk management areas on BLM-administered lands

<table>
<thead>
<tr>
<th>District</th>
<th>Elk Management Areas (Name)</th>
<th>BLM-administered Lands (Acres)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medford</td>
<td>Burnt Peak</td>
<td>1,773</td>
</tr>
<tr>
<td></td>
<td>Camel Hump</td>
<td>8,876</td>
</tr>
<tr>
<td></td>
<td>Elk Creek</td>
<td>18,814</td>
</tr>
<tr>
<td></td>
<td>Salt Creek</td>
<td>17,479</td>
</tr>
<tr>
<td></td>
<td>Shady Cove West</td>
<td>7,670</td>
</tr>
<tr>
<td></td>
<td>Glendale Mule Creek</td>
<td>19,404</td>
</tr>
<tr>
<td></td>
<td>Far-Out</td>
<td>8,868</td>
</tr>
<tr>
<td></td>
<td>Peavine</td>
<td>26,315</td>
</tr>
<tr>
<td></td>
<td>Elk Valley</td>
<td>14,239</td>
</tr>
<tr>
<td></td>
<td><strong>Medford Subtotal</strong></td>
<td><strong>123,437</strong></td>
</tr>
<tr>
<td>Salem</td>
<td>Bummer Ridge</td>
<td>3,638</td>
</tr>
<tr>
<td></td>
<td>Luckiamute</td>
<td>1,975</td>
</tr>
<tr>
<td></td>
<td><strong>Salem Subtotal</strong></td>
<td><strong>5,614</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Totals</strong></td>
<td><strong>129,051</strong></td>
</tr>
</tbody>
</table>
Figure 3-158. Deer and elk management areas

Appendix S contains additional information and supporting data on black-tailed deer and elk.
References


Fisher

Key Points

- The No Action alternative would lead to a continual loss of fisher habitat over 50 years.
- All action alternatives and the Proposed RMP would have a slight loss of fisher habitat in the first two decades, but additional habitat would develop in subsequent decades that would eventually surpass current conditions.

Summary of Notable Changes from the Draft RMP/EIS

The BLM added analysis of the fisher population in the planning area under the alternatives and the Proposed RMP.

Background

Historically, fishers (*Pekania pennanti*) occurred in Oregon throughout the Coastal and Cascade mountains (USDI FWS 2013). 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 2014). 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 subbasins 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. 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. Fishers use foraging habitat to locate and capture prey (Lofroth et al. 2010).

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, p. 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 critical to fishers; the most consistent predictor of fisher occurrence at large spatial scales is moderate to high amounts of contiguous canopy cover. Several studies reported that females used sites for denning that had relatively high amounts of overhead canopy cover. Mean overhead canopy cover at 373 random points was only 67 percent compared to 80 percent at natal sites and 88 percent at maternal den sites (Lofroth et al. 2011).

The main threats to fisher are habitat loss and fragmentation due to wildfire, 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 2013, 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. Core habitat is habitat located more than 328 feet from a habitat edge. Fisher are detected more in habitat that has a greater amount of Douglas-fir, a greater amount of 51–75 percent canopy cover, less barren areas, a higher density of low use roads (closed to public or seasonal use only), and fewer disjunct core habitat (Lofroth et al. 2011).

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). 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. 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).

**Issue 1**  
*What levels of habitat for the fisher would be available under each alternative?*

**Summary of Analytical Methods**  
In this analysis, the BLM assumed that total habitat for the fisher is comprised of Young, Mature, or Structurally-complex stands within the 11 subbasins that represent the current range of the species (Figure 3-159).
The BLM identified the current range of the fisher in this analysis based on subbasins where there are documented, reliable observations. For the purpose of this analysis, the BLM considered observations to be reliable if they are noted as having ‘excellent’ reliability in GeoBOB or ORBIC.132 For this analysis, the 11 subbasins currently representing the current range of fisher include the 10 listed in the background discussion above and the Lower Rogue subbasin. Even though the Lower Rogue subbasin does not have reliable observations, the BLM included this subbasin within the current range of the fisher in this analysis because of the arrangement of the other subbasins and the fisher’s ability to disperse. The Lower Rogue subbasin is approximately 11–20 miles across, north to south, generally within the fisher’s dispersal range (an average of 3.7–18.0 miles) of subbasins with reliable sightings to the north, east, and south.

The Planning Criteria described seven subbasins representing the range of the fisher using the GeoBOB data (BLM 2014, pp. 190–192), but subsequent inclusion of additional reliable observations from ORBIC

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132 Observations in the GeoBOB database are ranked as having excellent, good, fair, poor, or unknown reliability.
Figure 3-159. Range of the fisher

The BLM identified the current range of the fisher in this analysis based on subbasins where there are documented, reliable observations. For the purpose of this analysis, the BLM considered observations to be reliable if they are noted as having ‘excellent’ reliability in GeoBOB or ORBIC.132 For this analysis, the 11 subbasins currently representing the current range of fisher include the 10 listed in the background discussion above and the Lower Rogue subbasin. Even though the Lower Rogue subbasin does not have reliable observations, the BLM included this subbasin within the current range of the fisher in this analysis because of the arrangement of the other subbasins and the fisher’s ability to disperse. The Lower Rogue subbasin is approximately 11–20 miles across, north to south, generally within the fisher’s dispersal range (an average of 3.7–18.0 miles) of subbasins with reliable sightings to the north, east, and south.

The Planning Criteria described seven subbasins representing the range of the fisher using the GeoBOB data (BLM 2014, pp. 190–192), but subsequent inclusion of additional reliable observations from ORBIC

132 Observations in the GeoBOB database are ranked as having excellent, good, fair, poor, or unknown reliability.
data has yielded an additional three subbasins in the planning area: North Umpqua, South Umpqua, and Williamson subbasins.

The BLM defined fisher habitat as Young, Mature, and Structurally-complex stands in the 11 subbasins 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:

- Denning habitat = Structurally-complex
- Resting habitat = Mature Multi-layered Canopy
- Foraging habitat = Young with Structural Legacies

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 issue presents both an analysis of the direct and indirect effects of alternative and Proposed RMP implementation on fisher habitat in the decision area and an analysis of the cumulative 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, pp. Appendix F-183 – F-187), as suggested by the U.S. Fish and Wildlife Service (B. White, USFWS Oregon State Office, Consultation Branch Manager, personal communication, 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. Other factors influence fisher populations, which are not predictable and are unaffected by BLM land management actions (e.g., mortality from toxicants and vehicle collisions) and were not included in estimating fisher populations. Therefore, these estimates of the fisher population are 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 alternatives and the Proposed RMP.

**Affected Environment and Environmental Consequences**

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 decision area (Table 3-253). Approximately 54 percent of the BLM-administered lands capable of providing fisher habitat is currently providing habitat function: 30 percent as denning habitat, 15 percent as resting habitat, and 9 percent as foraging habitat.
Table 3-253. Current fisher habitat in the decision and planning areas

<table>
<thead>
<tr>
<th>Fisher Habitat Type</th>
<th>Decision Area</th>
<th>Planning Area</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(Acres)</td>
<td>(Acres)</td>
</tr>
<tr>
<td>(Percent)</td>
<td>(Percent)</td>
<td></td>
</tr>
<tr>
<td>Denning, Resting, Foraging</td>
<td>319,503</td>
<td>634,595</td>
</tr>
<tr>
<td>30%</td>
<td>10%</td>
<td></td>
</tr>
<tr>
<td>Resting, Foraging</td>
<td>156,657</td>
<td>828,658</td>
</tr>
<tr>
<td>15%</td>
<td>13%</td>
<td></td>
</tr>
<tr>
<td>Foraging Only</td>
<td>95,100</td>
<td>3,018,519</td>
</tr>
<tr>
<td>9%</td>
<td>49%</td>
<td></td>
</tr>
<tr>
<td>Total Fisher Habitat</td>
<td>571,355</td>
<td>4,481,891</td>
</tr>
<tr>
<td>54%</td>
<td>72%</td>
<td></td>
</tr>
<tr>
<td>Total Habitat-capable</td>
<td>1,057,676</td>
<td>6,224,237</td>
</tr>
<tr>
<td>100%</td>
<td>100%</td>
<td></td>
</tr>
</tbody>
</table>

In the planning area, there is currently 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 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 No Timber Harvest reference analysis, there would be 644,357 acres of total fisher habitat, 398,633 acres of denning habitat, and 160,996 acres of resting habitat on BLM-administered lands in 50 years (Figure 3-160). Under all action alternatives and the Proposed RMP, the amount of total habitat, denning habitat, and resting habitat on BLM-administered lands would increase from current levels in 50 years. The action alternatives would provide 8–15 percent more total fisher habitat, 13–20 percent more denning habitat, and 5–26 percent more resting habitat on BLM-administered lands than current amounts. Alternative B would result in the largest increase in total fisher habitat (662,866 acres) and resting habitat (193,001 acres), Alternative D would result in the largest increase in denning habitat (389,533 acres) and Alternative C the smallest increase of either (620,639 and 365,611 acres, respectively) among the action alternatives. The Proposed RMP would result in an increase in total fisher habitat (612,265 acres) and denning habitat (366,541 acres) on BLM-administered lands in 50 years. In contrast to all action alternatives and the Proposed RMP, the No Action alternative would decrease the amount of total habitat, denning habitat, and resting habitat from current levels on BLM-administered lands in 50 years.

133 Foraging habitat would decrease under all alternatives, including the No Timber Harvest reference analysis (Figure 3-160). The reduction of foraging habitat would not represent a loss of overall habitat, but rather the development of foraging-only habitat into denning habitat or resting habitat, which provide foraging functions as well.
The action alternatives and the Proposed RMP would have a 1–3 percent loss of denning habitat in the first decade (and in the second decade for Alternative C), but additional habitat would develop in subsequent decades that would surpass current conditions by 2033 (Appendix S). Similarly, total fisher habitat and resting habitat would decrease in the first two decades under the action alternatives (3–5 percent) and the Proposed RMP (10–15 percent), but additional habitat would develop in subsequent decades that would surpass current conditions by the year 2043. In contrast, the No Action alternative would have less total fisher habitat, denning habitat, and resting habitat in 50 years than there is currently (Figure 3-160).

Currently, the average patch size of fisher habitat is 31.0 acres (Table 3-254). Under the No Timber Harvest reference analysis, average patch size would increase to 35.9 acres in 50 years. The average patch size would decrease slightly from current conditions under Alternative C (30.1 acres) and the Proposed RMP (27.3 acres) in 50 years. Under the No Action alternative, average patch size would decrease more substantially from current conditions (20.4 acres). In contrast, average patch size would increase slightly under Alternatives A, B, and D. Using patch size as an index of habitat fragmentation, there would be some fragmentation of fisher habitat under the No Action alternative, Alternative C, and the Proposed RMP. The No Action alternative would result in a more substantial fragmentation of fisher habitat based on patch size. Alternatives A, B, and D would result in a slight reduction of fisher habitat fragmentation or, conversely, an increase in connectivity between habitat patches.
Table 3-254. Fisher habitat patch metrics

<table>
<thead>
<tr>
<th>Alternative/Proposed RMP</th>
<th>Mean Patch Size (Acres)</th>
<th>Edge vs. Core Habitat</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Edge Habitat (Acres)</td>
</tr>
<tr>
<td>Current Condition (2013)</td>
<td>31.0</td>
<td>403,186</td>
</tr>
<tr>
<td>No Action (2063)</td>
<td>20.4</td>
<td>381,360</td>
</tr>
<tr>
<td>Alt. A (2063)</td>
<td>31.4</td>
<td>428,759</td>
</tr>
<tr>
<td>Alt. B (2063)</td>
<td>32.3</td>
<td>450,183</td>
</tr>
<tr>
<td>Alt. C (2063)</td>
<td>30.1</td>
<td>420,919</td>
</tr>
<tr>
<td>Alt. D (2063)</td>
<td>32.6</td>
<td>441,553</td>
</tr>
<tr>
<td>PRMP (2063)</td>
<td>27.3</td>
<td>450,508</td>
</tr>
<tr>
<td>No Timber Harvest (2063)</td>
<td>35.9</td>
<td>433,931</td>
</tr>
</tbody>
</table>

Currently, 29 percent of total fisher habitat is core habitat (Table 3-254). Under the No Timber Harvest reference analysis, core habitat would increase to 33 percent of total fisher habitat in 50 years. Under all action alternatives, core habitat would increase to 30–32 percent of total fisher habitat in 50 years. The Proposed RMP would provide the smallest increase in core habitat (30 percent) compared to the action alternatives. In contrast, the No Action alternative would reduce the amount of core habitat to 28 percent of total fisher habitat in 50 years. These results are similar to changes in average patch size. It is unknown whether a slight reduction in the proportion of core habitat (1 percent) would lead to a perceptible decrease in use by fisher.

These results show slightly less habitat development for fisher under the Proposed RMP than under Alternative B, even though the Proposed RMP has larger reserves. This difference in analytical results is a result of the BLM update of baseline forest structural conditions resulting from 2013/2014 wildfires, which has resulted in changes to the affected environment description (i.e., the current condition), as described at the beginning of Chapter 3. The difference in the changes in the baseline are noticeably illustrated in changes to the average patch size under current conditions previously reported in the Draft RMP/EIS (33.0 acres, p. 706) compared to that reported here in the Proposed RMP/Final EIS (31.0 acres, Table 3-254). The 2013/2014 wildfires altered habitat in the decision area, particularly within the range of the fisher, and resulted in the loss of fisher habitat and an increase in habitat fragmentation. There are 2,864 acres less total fisher habitat under the updated current condition of the Proposed RMP incorporating the effect of the 2013/2014 wildfires than under the current condition previously modeled for the other alternatives (Appendix S). This difference in starting condition continues to alter analytical results for the habitat availability for the Proposed RMP for an unknown duration in future decades. Despite this slight difference in analytical results, the BLM concludes that the Proposed RMP would provide habitat development for fisher comparable to Alternative B.

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 modeled under the action alternatives and the Proposed RMP would result in any meaningful decrease in habitat use by the fisher. Similarly, it is unknown whether the slight increases in core habitat would result in any meaningful increase in habitat use by the fisher. However, the effects from fragmentation under the No Action alternative would be more pronounced and more likely to result in a meaningful decrease in habitat use by fisher than the action alternatives and the Proposed RMP, because of the more substantial decrease in average patch size and decrease of core habitat.
At the planning area scale, total fisher habitat would increase slightly from current amounts under the all alternatives and the Proposed RMP in 50 years (Figure 3-161). Under the No Action alternative, total fisher habitat would increase at the planning area scale, even though it would decrease on BLM-administered lands because of the increase in fisher habitat on U.S. Forest Service reserve lands. At the planning area scale, there is little differentiation in fisher habitat development among the action alternatives and the Proposed RMP. Under the action alternatives and the Proposed RMP, BLM-administered lands would contribute 13–14 percent of the total fisher habitat and 38–39 percent of the denning habitat in the planning area in 50 years. Under the No Action alternative, BLM-administered lands would contribute 12 percent of the total fisher habitat and 33 percent of denning habitat in the planning area in 50 years.
Figure 3-161. Fisher habitat on BLM-administered lands and across all ownerships for foraging, resting, and denning.
The BLM estimates there are 1,292 fishers in the planning area, based on the habitat available in 2013. Under the No Action alternative, the fisher population would decrease by 9 individuals in the first decade due to the loss of habitat but would increase by 26 individuals in 50 years due to subsequent habitat development. Under the action alternatives and the Proposed RMP, the fisher population would initially decrease by 2-5 individuals in the first decade but would increase by 53–65 individuals in 50 years (Table 3-255). Alternative B would provide a slight decrease in the population (2 fisher) the first decade but the largest increase (65 fisher) over 50 years. Alternative C would provide a slight decrease in the population (5 fisher) the first decade and the smallest increase to the population (53 fisher) over 50 years (Appendix S). For context, the No Timber Harvest reference analysis would result in a population decrease of 1 fisher in the first decade and a population increase of 60 fishers in 50 years. The loss of a few individuals under the all the alternatives in the first decade would be offset by population growth in subsequent decades as habitat development continues. The forecast reduction in the fisher population in the first decade (up to 9 individuals under the No Action alternative) would constitute a loss of < 1 percent of the current estimated population in the decision area (1,292 fishers) and would not reduce the fisher population below any known, critical population thresholds. The trends in population forecast follow a similar pattern as that for habitat development in the planning area discussed above. Overall, all alternatives and the Proposed RMP would result in a slight increase in fisher populations in 50 years. The No Action alternative would result in a 2 percent increase in 50 years, all of the action alternatives and the Proposed RMP would result in 4–5 percent increases in the fisher population in 50 years. Given the very coarse assumptions regarding the effect of habitat of populations and the inability to account for non-habitat factors affecting fisher populations, these small differences in the fisher populations over time, including the losses during the first decade, are substantially smaller than the likely error in these estimates. Thus, it is possible to conclude from this analysis that the action alternatives and Proposed RMP would contribute to fisher population increases over time and would contribute to larger population increases than the No Action alternative. However, it is not possible to conclude that there are meaningful differences among the action alternatives and Proposed RMP on fisher populations.

Table 3-255. Fisher population in the planning area in 50 years

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Condition (2013)</td>
<td>4,484,755</td>
<td>956</td>
<td>336</td>
<td>1,292</td>
<td>-</td>
</tr>
<tr>
<td>No Action (2063)</td>
<td>4,574,905</td>
<td>975</td>
<td>343</td>
<td>1,318</td>
<td>26</td>
</tr>
<tr>
<td>Alt. A (2063)</td>
<td>4,679,739</td>
<td>997</td>
<td>351</td>
<td>1,348</td>
<td>56</td>
</tr>
<tr>
<td>Alt. B (2063)</td>
<td>4,710,269</td>
<td>1,004</td>
<td>353</td>
<td>1,357</td>
<td>65</td>
</tr>
<tr>
<td>Alt. C (2063)</td>
<td>4,668,042</td>
<td>995</td>
<td>350</td>
<td>1,345</td>
<td>53</td>
</tr>
<tr>
<td>Alt. D. (2063)</td>
<td>4,700,745</td>
<td>1,002</td>
<td>353</td>
<td>1,355</td>
<td>63</td>
</tr>
<tr>
<td>PRMP (2063)</td>
<td>4,692,992</td>
<td>1,000</td>
<td>352</td>
<td>1,352</td>
<td>60</td>
</tr>
<tr>
<td>No Timber Harvest (2063)</td>
<td>4,691,760</td>
<td>1,000</td>
<td>352</td>
<td>1,352</td>
<td>60</td>
</tr>
</tbody>
</table>

Figure 3-162 shows the amount of each type of fisher habitat within the planning area in 50 years.
Appendix S contains additional information and supporting data on fisher.

References


Golden Eagle

Key Points
- All alternatives and the Proposed RMP would lead to an increase in golden eagle nesting habitat in 50 years.
- All alternatives and the Proposed RMP would have a slight loss of golden eagle habitat in the first two or three decades, but additional habitat would develop in subsequent decades that would eventually surpass current conditions.

Background
Golden eagles (*Aquila chrysaetos canadensis*) nest in open and semi-open habitat; they may also nest in coniferous habitat when open space is available (e.g., fire breaks, clear-cuts, burned areas, and pastureland) (Pagel et al. 2010) or there are “broad expanses of open country” available for foraging (Johnsgard, 1990). Golden eagles nest on cliffs, the largest trees in forested stands, or artificial structures. In Oregon, golden eagles built 82 percent of their nests on cliffs, 16 percent in trees, and 1 percent on electrical poles/pylons (Isaacs 2014).

Previously, Isaacs (2011) reported that golden eagle populations in the western U.S. are suspected of a long-term decline. A consistent and statewide survey effort for golden eagles was conducted in 2011, and the results suggest that there is a long-term loss of potential breeding areas of 14.2 percent in Oregon. However, three years of monitoring data (2011–2013) suggest that the nesting population of golden eagles in Oregon may be stable (Isaacs 2014). The minimum statewide estimate for golden eagles was 459 nesting pairs in 2011, 571 nesting pairs in 2012, and 573 nesting pairs in 2013. Estimates of the nesting population from the 1980s were 500 pairs, which is comparable to the current estimates, suggesting no substantive changes in population size. The northwestern and southwestern portions of Oregon have not been fully searched for golden eagle nests, and therefore the population size of nesting golden eagles may be underestimated. Potential threats to golden eagles in Oregon include reduced prey abundance (e.g., jackrabbits), increased off-road recreation, increased rodent shooting, and loss of potential nest trees (Isaacs 2011).

Within the planning area, there are 95 golden eagle breeding areas (Table 3-256) concentrated mainly in the Klamath Falls Field Office, and the Medford and Roseburg Districts (Klamath, Jackson, and Douglas counties). Based on Isaacs’ 2011 data, 45 percent of the 38 breeding areas surveyed in the planning area were occupied by golden eagles. Golden eagles nested historically within nine counties in the planning area (Clackamas, Coos, Curry, Douglas, Jackson, Josephine, Klamath, Lane, and Linn Counties).
Table 3-256. Golden eagle breeding areas within the planning area

<table>
<thead>
<tr>
<th>County*</th>
<th>Historical Breeding Areas (Pre-2011) (Number)</th>
<th>Breeding Areas Surveyed in 2011 (Number)</th>
<th>Breeding Areas Occupied in 2011 (Number)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clackamas</td>
<td>2</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Coos</td>
<td>2</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>Curry</td>
<td>5</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Douglas</td>
<td>19</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Jackson</td>
<td>17</td>
<td>10</td>
<td>4</td>
</tr>
<tr>
<td>Josephine</td>
<td>2</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Klamath</td>
<td>44</td>
<td>22</td>
<td>9</td>
</tr>
<tr>
<td>Lane</td>
<td>2</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Linn</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td><strong>95</strong></td>
<td><strong>38</strong></td>
<td><strong>17</strong></td>
</tr>
</tbody>
</table>

* The remaining counties in the planning area (Benton, Clatsop, Columbia, Lincoln, Marion, Multnomah, Polk, Tillamook, Washington, and Yamhill) do not have historical golden eagle breeding areas.

Over 98 percent of golden eagle observations are within 4 miles of the center of their territory center (McGrady et al. 2002). The U.S. Fish and Wildlife Service (Pagel et al. 2010) and Isaacs (2014) recommend that the inventory of nesting habitat should be conducted within 10 miles of project boundaries to ascertain habitat use by golden eagles.

Golden eagles are protected under the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act. In response to the Bald and Golden Eagle Protection Act, the BLM issued policy guidance directing analysis of effects to golden eagles. The Analysis of the Management Situation for the RMPs for Western Oregon provides more information on the obligations of BLM for golden eagles under these acts, which is incorporated here by reference (USDI BLM 2013).

**Issue 1**

*What levels of habitat for the golden eagle would be available under each alternative?*

**Summary of Analytical Methods**

In this analysis, the BLM considered nesting habitat for golden eagles to be Mature Multi-layered Canopy and Structurally-complex stands within the nine counties with historical breeding territories. During preliminary analyses, the BLM considered nesting habitat only within proximity of large patches of open habitat. The BLM evaluated nesting habitat within 4, 6, and 10 miles of open habitat that was at least 100 acres; results indicated that each of these distances encompassed most of the BLM-administered lands within the counties with historic golden eagle nesting. Based on these preliminary results, and to simplify analytical procedures, the BLM assumed that all BLM-administered lands within the nine counties could provide nesting habitat for golden eagles, irrespective of distance to open habitat.

This issue presents both an analysis of the direct and indirect effects of alternative and Proposed RMP implementation on golden eagle nesting habitat in the decision area and an analysis of the cumulative effects on golden eagle nesting 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 nesting habitat on non-BLM-administered lands within the planning area using the 2012 GNN structural condition.

The Planning Criteria provides more detailed information on analytical assumptions, methods and techniques, and geographic and temporal scales, which is incorporated here by reference (USDI BLM 2014, pp. 196–197).

**Affected Environment and Environmental Consequences**

There are 789,751 acres of nesting habitat for golden eagles on BLM-administered lands in the decision area (Figure 3-163). Of the forested lands capable of providing nesting habitat, 41 percent is currently nesting habitat in the decision area.
There are 3,225,904 acres of nesting habitat for golden eagles across all land-ownerships in the planning area (Figure 3-164). Of the forestland capable of providing nesting habitat, 24 percent is currently nesting habitat in the planning area. BLM-administered lands provide 24 percent of the available nesting habitat for golden eagles.
Under the No Timber Harvest reference analysis, there would be 1,018,234 acres of golden eagle nesting habitat in 50 years in the decision area (Figure 3-163). Under all alternatives and the Proposed RMP, the amount of golden eagle nesting habitat on BLM-administered lands would increase between 7–30 percent. Nesting habitat development under the action alternatives and the Proposed RMP would be 86–101 percent of the nesting habitat development as under the No Timber Harvest reference analysis. Alternative D would provide the most golden eagle nesting habitat development and would actually surpass nesting habitat development under the No Timber Harvest reference analysis. Alternative C would provide the least nesting habitat development. The No Action alternative would produce 83 percent as much nesting habitat as under the No Timber Harvest reference analysis. Alternatives A, B, C, the No Action alternative, and the Proposed RMP would have a 1–8 percent loss of golden eagle nesting habitat in the first two decades (the three decades for the No Action alternative), but additional nesting habitat would develop in subsequent decades that would surpass current conditions (Appendix S).

At the planning area scale, the No Timber Harvest reference analysis would lead to 4,782,572 acres of golden eagle nesting habitat in 50 years (Figure 3-164). Golden eagle nesting habitat would increase by 43–49 percent under the alternatives and the Proposed RMP in 50 years in the planning area. Differences in habitat development among Alternatives A, B, and D and the Proposed RMP would be indistinguishable, because they would be within 1 percent of the No Timber Harvest reference analysis. Alternative C and the No Action alternative would yield less golden eagle nesting habitat at the planning area scale, but the difference is insubstantial (3–4 percent less than the No Timber Harvest reference analysis). The action alternatives and the Proposed RMP would have a less than a 2 percent loss of golden eagle habitat in the first two decades (the first three decades for the No Action alternative), but additional habitat would develop in subsequent decades that would surpass current conditions (Appendix S).

Under all alternatives and the Proposed RMP, the BLM would restrict activities near golden eagle nests that would disrupt nesting during the breeding season; therefore, there would not be any disruption effects to nesting golden eagles.

Overall, the BLM concludes that increases in nesting habitat coupled with management direction would avoid disruption of breeding and nesting activities would encourage golden eagle population growth within the decision and planning areas. There would be little difference in effects among the alternatives and the Proposed RMP, since habitat development would vary by no more than 4 percent.

Overall, the BLM concludes that golden eagle populations in the decision area and planning area would remain stable under the alternatives and the Proposed RMP. Habitat availability for golden eagles would increase, and there is no newly identified threat that BLM expects to lead to a downward trend in the population of nesting golden eagles.

Appendix S contains additional information and supporting data on golden eagles.
References
Greater Sage-grouse

**Key Points**
- There would be no discernable difference in effects to greater sage-grouse among the No Action alternative, Alternatives A, B, and C, or the Proposed RMP, and effects from livestock grazing would remain the same as under the current conditions. Alternative D, which would eliminate livestock grazing, would remove the risk of livestock trampling greater sage-grouse individuals and disrupting lekking behaviors.

**Summary of Notable Changes from the Draft RMP/EIS**
The BLM updated information regarding greater sage-grouse status and population and habitat trends.

**Background**
On March 23, 2010, the U.S. Fish and Wildlife determined that the greater sage-grouse (*Centrocercus urophasianus*) warrants the protection under the Endangered Species Act, but listing of the species is precluded by the need to address higher priority species (75 FR 13910). Subsequently, on October 2, 2015, the U.S. Fish and Wildlife Service determined that listing the greater sage-grouse is not warranted, because the threats faced by the species have been ameliorated by the conservation efforts by Federal, State, and private landowners (80 FR 59858).

There are five populations of greater sage-grouse in Oregon: Northern Great Basin, Western Great Basin, Baker, Central Oregon, and Klamath Falls (USDI BLM 2015). Only the Klamath Falls population is within the planning area. Oregon populations of the greater sage-grouse have been in decline since the 1940s, with an overall rate of decline of 3.5 percent per year from 1965 to 2003. Statewide population trends were relatively stable from 1980–2010, with an estimate of 24,000 birds in 2010 (USDI BLM 2015, p. 3-22). However, reproduction rates (e.g., lek attendance and chicks per hen) were low in 2012–2013, and there were several large wildfires in sage-grouse habitat in the summer of 2012 (USDI BLM 2015, p. 3-22). The 10-year average population for 2006–2015 is 21,331 birds, and the minimum Statewide population estimate was 17,520 birds, which is down 27 percent since 2010 (Sage-Grouse Conservation Partnership 2015, pp. 40–41). The Klamath Falls population had few birds at four leks in 1993 (BLM 2008), but there have been no more recent sightings of individuals of this population despite periodic surveys (USDI BLM 2015, p. 3-4).

The U.S. Fish and Wildlife Service identified that overhunting in the late 1800s and early 1900s, habitat loss, habitat degradation, and habitat fragmentation have led to the decline of greater sage-grouse populations (75 FR 13962). However, there is no basis that recreational hunting is currently poses a threat to the species. Current threats to greater sage-grouse include loss of habitat through urbanization, energy development, invasive species encroachment (e.g., cheatgrass, juniper, and other conifer species), intensive livestock grazing, and wildland fire (ODFW 2015, 75 FR 13962).

Habitat for the greater sage-grouse is large, intact expanses of any vegetation type that has at least 5 percent sagebrush cover and less than 5 percent tree cover. In Oregon, the amount of greater sage-grouse habitat has declined 21 percent from pre-settlement times (17.8 million acres) to current conditions (14 million acres). This loss of habitat is largely attributable to conversion to agriculture, encroachment by juniper and conifers, and wildfire. Prior to 2012, 3 percent of habitat loss was attributable to wildfire. However, 6.4 percent of sage-grouse habitat burned in Oregon in 2012 (USDI BLM 2015, p. 3-24).
Treatment of encroaching juniper and other conifers (e.g., pine species) can improve the quantity and quality of greater sage-grouse habitat (USDI BLM 2015, p. 4-15). Juniper and conifer encroachment lowers the quantity and quality of habitat, because mature trees displace the shrubs, grasses, and forbs necessary for sage-grouse habitat, and trees provide perches for avian predators (e.g., raptors and ravens).

The effects on greater sage-grouse from livestock grazing depend on site-specific management. Livestock grazing can benefit greater sage-grouse habitat by reducing fuel loading, protecting intact sagebrush habitat, and increasing habitat extent and continuity (USDI BLM 2015, p. 4-17). Livestock grazing can reduce the spread of invasive grasses if applied annually before the grasses have cured. Light to moderate livestock grazing does not appear to reduce perennial bunchgrass cover, which is important to maintain as cover from predation of greater sage-grouse during nesting (USDI BLM 2015, p. 4-17). However, heavy livestock grazing can reduce perennial bunchgrass cover, which would increase risk of predation and facilitate cheatgrass invasion (USDI BLM 2015, p. 4-17). Livestock may also trample birds or nests or disrupt lekking or nesting behavior (USDI BLM 2015, p. 4-18). When all rangeland health standards have been met, then livestock grazing management is adequate to maintain herbaceous vegetation to provide cover for greater sage-grouse (USDI BLM 2015, p. 4-112).

**Issue 1**

*What levels of habitat for the greater sage-grouse would be available under each alternative?*

**Summary of Analytical Methods**

For this analysis, the BLM considered habitat for the greater sage-grouse to be sagebrush habitat within Klamath County in the planning area (78 FR 61459). The BLM tabulated the amount of sagebrush habitat acres using 2012 GNN ecological systems codes for non-forest on all lands. Appendix S contains more details on classifying habitat for this species. The Analysis of the Management Situation for the RMPs for Western Oregon provides more information on habitat trends and threats to the species, which is incorporated here by reference (USDI BLM 2013, p. 145).

**Affected Environment and Environmental Consequences**

There are 244,934 acres of greater sage-grouse habitat within the planning area; 63,877 acres is within the decision area. However, greater sage-grouse have not occupied habitat in the decision area since 1993. Management direction common to all alternatives and the Proposed RMP would similarly treat and remove encroaching, invasive juniper within greater sage-grouse habitat.

Under Alternatives A, B, and C, and the Proposed RMP, the BLM would reduce the acreage available for livestock grazing by 27 percent (from 495,190 acres to 359,049 acres). However, the acreage with active livestock grazing in allotments would not change substantially. In 2013, there were 354,633 acres of allotments actively grazed; the BLM assumes that this approximate level of livestock grazing would continue under Alternatives A, B, and C, and the Proposed RMP, as detailed in the Livestock Grazing section of this chapter. Therefore, there would be no discernable difference in effects from livestock grazing to greater sage-grouse among the No Action alternative, Alternatives A, B, and C, or the Proposed RMP, and those effects from livestock grazing would remain the same as under the current conditions. Under Alternative D, livestock grazing would be eliminated on BLM-administered lands. The elimination of permitted livestock grazing would remove one method by which BLM could treat invasive annual grasses, although other methods would still remain available (e.g., mechanical treatment). However, elimination of livestock grazing would also benefit greater sage-grouse by removing the risk of livestock trampling sage-grouse and disrupting lekking and nesting behaviors.


Gray Wolf

**Key Points**

- The amount of habitat for gray wolves would not change under the alternatives and the Proposed RMP, given the plasticity of gray wolves in using the landscape and their resilience to different land-use management regimes.
- The opportunities for conflicts between gray wolves and livestock would be reduced under the action alternatives and the Proposed RMP.

**Summary of Notable Changes from the Draft RMP/EIS**

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.

**Background**

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 Endangered Species Act 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). Because of litigation, the listing status of the gray wolf in 2010 was the same as it was in 1978. 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* and proposed to delist gray wolves, including those in the Pacific Northwest, on June 13, 2013 (78 FR 35664). The U.S. Fish and Wildlife Service has not designated critical habitat for the gray wolf in Oregon (USDI FWS 2014).

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 3-165). 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 3-165).
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). 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). At least 14 dispersing adult wolves not associated with a pack 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 2 areas of known wolf activity in southwestern Oregon (the Rogue pack and Keno pair); however, spatial descriptions for the two most recent designations are not available and are not shown in Figure 3-165. As of 2014, there are 7 wolves in the planning area (the Rogue Pack and the Keno pair) and 77 wolves in Oregon. The population of wolves in the State has increased five-fold from
2009–2014. It is reasonably foreseeable that gray wolves will establish additional packs in the planning area in the future, given the observed increase in the wolf population in Oregon (Appendix S).

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. There is no known future condition that would cause a decline in the ungulate population to affect the gray wolf throughout its range. As part of their economic considerations, the Oregon Department of Fish and 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. Conversely, low forest cover, high human density, and year-round livestock presence makes lands unsuitable as wolf habitat. 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. However, it is unlikely that increased land development will affect wolves for the following reasons:

- Wolves are habitat generalists and one of the most adaptable large predators in the world. They were extirpated in the southern portion of the subspecies’ range only because of sustained, deliberate, human-targeted elimination.
- 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.
- Vast areas of suitable wolf habitat and the current wolf population are secure in the subspecies’ range (e.g., national parks, wilderness, and roadless areas) and are not available for intensive levels of land development.

Because gray wolves are 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. 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. National parks and monuments provide refugia from hunting, trapping, and control activities and may act as a source for dispersing wolves. 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). Pups eventually leave their parents’ pack and either establish a new territory or join another 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. 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).
The BLM assumed in this analysis that habitat changes in the decision area would not affect wolf populations and did not specifically model habitat for the gray wolf in the decision 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 alternatives or the Proposed RMP, given the plasticity of gray wolves in using the landscape. Thus, a gray wolf habitat model would not be informative or discerning among the alternatives and the Proposed RMP.

The BLM assumed in this analysis that opportunities for wolf-livestock conflict would be the only meaningful effect of BLM management on wolf populations in the decision area. Wolf-livestock conflicts potentially could adversely affect wolf populations from human interaction. Any potential loss of individual wolves through lethal removal (agency control actions) to address livestock depredation issues in the planning area would be the result of decisions made by the U.S. Fish and Wildlife Service and Oregon Department of Fish and Wildlife.

Between 2009 and 2014, wolves killed 111 livestock in Oregon, and the Oregon Department of Fish and Wildlife lethally removed 4 wolves to address wolf-livestock conflicts (Appendix S). Within the Northern Rocky Mountain population of gray wolves (which includes Montana, Wyoming, Idaho, Oregon, and Washington), wolves killed 3,426 livestock, and agency control actions removed 1,293 wolves between 2009 and 2014. Agency control removed 7–13 percent of the minimum wolf population in each year within the Northern Rocky Mountains. 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 (Appendix S). Based on the trends in agency control actions in the Northern Rocky Mountain population and in Oregon overall, removal of wolves could range from 0 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 kills or wolf removals within the planning area. There is no reasonable basis on which the BLM could predict when individual wolves would become chronic livestock predators, or when the subsequent control actions would occur.

**Issue 1**

*How would the alternatives affect opportunities for wolf-livestock conflict on BLM-administered lands?*

**Summary of Analytical Methods**

The BLM assumed that the acreage available for livestock grazing would generally correspond to the opportunities for wolf-livestock conflict. However, there are no quantifiable metrics to equate a specific acreage available for livestock grazing to a specific rate of wolf-livestock conflicts. Therefore, this analysis is limited to a qualitative comparison of the relative effects of the alternatives and the Proposed RMP. A reduction in the opportunities for wolf-livestock conflict would reduce potential adverse effects on wolves in the planning area, but there is no reasonable basis to describe quantifiably a difference in effects among the alternatives or the Proposed RMP or on the gray wolf population.

**Affected Environment and Environmental Consequences**

Under Alternatives A, B, and C, and the Proposed RMP, the BLM would reduce the acreage available for livestock grazing by 27 percent (from 495,190 acres to 359,049 acres), but the acreage in allotments that is actively grazed would not change substantively. In 2013, there were 354,633 acres of allotments actively grazed and the BLM assumes that this approximate level of livestock grazing would continue under Alternatives A, B, and C and the Proposed RMP and is roughly the same level of active grazing.
currently under the No Action alternative (see the Livestock Grazing section in this chapter). Therefore, the opportunities for wolf-livestock conflict would remain the same as under current conditions, and there would be no discernable difference in effects among the Alternatives A, B, C, the No Action alternative, or the Proposed RMP. Under Alternative D, the elimination of livestock grazing on BLM-administered lands would reduce opportunities for wolf-livestock conflict.

References


Marbled Murrelet

Key Points
- All alternatives and the Proposed RMP would result in an increase in the amount of marbled murrelet high-quality nesting habitat and total nesting habitat in 50 years in the decision and planning areas.
- In the first decade, all alternatives and the Proposed RMP would result in a slight decrease of high-quality nesting habitat. However, sufficient high-quality nesting habitat would develop by the second decade to surpass current amounts.
- Under the No Action alternative and Alternative D, the BLM would identify and protect all future marbled murrelet sites. Alternatives A, B, and C would result in the loss in the first decade of 4 percent (106 sites), 1 percent (23 sites), and 8 percent (189 sites), respectively, of the estimated carrying capacity of BLM-administered lands from timber harvest in the absence of surveys. The Proposed RMP would result in the loss in the first decade of less than 1 percent (13 sites) of the estimated carrying capacity of BLM-administered lands from timber harvest in the absence of surveys.

Summary of Notable Changes from the Draft RMP/EIS
The BLM updated marbled murrelet detection rates from additional BLM survey data and refined 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 marbled murrelet 20-year monitoring report (Falxa and Raphael 2015).

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; and
- 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. Even though implementation of the Northwest Forest Plan had reduced some threats to the marbled murrelet, threats from habitat loss, high predation rates, mortality from oil spills and entanglement in fishing nets continued (USDI FWS 2004 pp. 11–12 and 2009, 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 (PCBs) 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. The authors concluded that—

- 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 marbled murrelets 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 2008, pp. 301–302).

Falxa and Raphael (2015, p. 165) suggest that the amount and pattern of high-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, pp. 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 marbled 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). They also reported that 21.1 percent of higher-suitability nesting habitat on non-federal lands in Oregon was lost from 1993 to 2012. Timber harvest accounted for 98 percent of nesting habitat loss on non-federal lands. On Federal lands, 0.3 percent of higher-suitability nesting habitat on non-reserved Federal lands was lost from 1993 to 2012, and 3.8 percent was lost on Federal reserved lands. Wildland fire (80 percent), timber harvest (18 percent), insects and disease (1 percent), and other natural disturbances (< 1 percent) accounted for the loss of higher-suitability habitat from Federal lands in Oregon, respectively. 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. 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 wildland fire but also insects and disease and other natural disturbances, contributed to the loss of higher-suitability nesting habitat for the marbled murrelet from 1993 to 2012. 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; see the Climate Change section in this chapter).

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.

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. 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; and
- 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 3-166). Recovery zones are the functional equivalent of recovery units as defined by U.S. Fish and Wildlife Service policy.
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. The Recovery Plan includes the suggestion 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).

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 3-166).

Systematic surveys in the Medford District have indicated that the marbled murrelet is 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 3-166.

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, pp. 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). 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 the marbled murrelet was 7,896 birds in Conservation Zone 3 and 5,993 birds in Conservation Zone 4. The 2013 population estimate for all 5 conservation zones is 19,617 marbled murrelets. The annual rate of population change from 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 from 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 from 2001 to 2010 was 3.7 percent. It is unknown what is driving recent population levels. It is premature to conclude that the observations from 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 from 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).

**Issue 1**

*What levels of nesting habitat for the marbled murrelet would be available under each alternative?*

**Summary of Analytical Methods**

In this analysis, the BLM considered nesting habitat for the marbled murrelet to be Young with Structural Legacies, Mature, and Structurally-complex structural stages within the range of the marbled murrelet in the planning area (Figure 3-166).

The BLM divided nesting habitat for the marbled murrelet into two categories: high-quality nesting habitat and low-quality nesting habitat. In this analysis, the BLM assumed that Structurally-complex 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. Young with Structural Legacies and Mature stands represent low-quality nesting habitat, which may have trees and platforms suitable for nesting murrelet, but the frequency and density of such structures is lower. The BLM estimates the average platform density in low-quality nesting habitat is 18.1 platforms/acre in Zone 1 and 15.3 platforms/acre in Zone 2.
This issue presents both an analysis of the direct and indirect effects of alternative and Proposed RMP implementation on marbled murrelet habitat in the decision area and an analysis of the cumulative effects on marbled murrelet 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.

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 U. S. Forest Service reserves (i.e., Late-Successional Reserve and Congressionally Reserved lands). The BLM modeled structural conditions continuing to develop on U.S. Forest Service reserve lands through time (Appendix S). This modeling of U.S. Forest Service reserve lands assumed that habitat would not develop on U.S. Forest Service reserve lands that experience wildfire in the modeling (see the Vegetation Modeling section in this chapter). For the purpose of this analysis, the BLM assumed that the future distribution of habitat conditions on non-BLM-administered lands and on U.S. 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 and 2012. On State and U.S. 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 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 FEIS, which describes the limitations on analyzing future changes on non-BLM-administered lands and is incorporated here by reference (USDI BLM 2008, 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 does not provide coverage for all BLM-administered lands in the planning area. The BLM quantitatively compared the level of agreement between the two different models of marbled murrelet habitat in the decision area. 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 high-quality from lower-quality habitat. However, the BLM identified no systematic disagreement between the two models. Appendix S contains additional details on the comparison of the marbled murrelet habitat 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 within 295 feet of non-habitat. The distance to edge or core habitat is based on findings that the marbled murrelet has 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 the marbled murrelet or the effects of changes in patch size, the BLM assumed in this analysis that the quality of nesting habitat would increase as the proportion of available habitat in core habitat increases and as patch size increases.

**Affected Environment and Environmental Consequences**

There are 493,434 acres of nesting habitat for the marbled murrelet on BLM-administered lands in the decision area, of which 232,493 acres are high-quality nesting habitat (Table 3-257). Of the forested lands capable of providing nesting habitat in the decision area, 56 percent is nesting habitat, and 26 percent is high-quality nesting habitat.

<table>
<thead>
<tr>
<th>Marbled Murrelet Habitat</th>
<th>Decision Area</th>
<th>Planning Area</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(Acres)</td>
<td>Habitat Capable (Percent)</td>
</tr>
<tr>
<td>High-quality Nesting Habitat</td>
<td>232,493</td>
<td>26%</td>
</tr>
<tr>
<td>Low-quality Nesting Habitat</td>
<td>260,942</td>
<td>29%</td>
</tr>
<tr>
<td><strong>Total Nesting Habitat</strong></td>
<td><strong>493,434</strong></td>
<td><strong>56%</strong></td>
</tr>
<tr>
<td><strong>Total Habitat-capable Acres</strong></td>
<td><strong>885,590</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

Under the No Timber Harvest reference analysis, there would be 840,024 acres of total nesting habitat and 319,070 acres of high-quality nesting habitat on BLM-administered lands in 50 years (Figure 3-167).

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134 These acreages for the current condition represent the BLM update of baseline forest structural conditions resulting from 2013/2014 wildfires, as described at the beginning of this chapter. There are 726 acres less high-quality nesting habitat under the updated current condition of the Proposed RMP incorporating the effect of the 2013/2014 wildfires than under the current condition previously modeled for the alternatives (Appendix S). This difference in starting condition represents a difference of less than 1 percent and does not alter the comparative analytical results.
The total amount of marbled murrelet nesting would increase incrementally in each decade under the No Action alternative, Alternatives A, B, and D, and the Proposed RMP. Only under Alternative C would total nesting habitat decrease in the first decade (Figure 3-168). The amount of total nesting habitat and the amount of high-quality nesting habitat would continue to increase after the second decade under Alternative C (Figure 3-167). The temporary loss of nesting habitat under Alternative C from Conservation Zones 3 and 4 could arrest, or possibly reverse, the observed upwards population trends in Conservation Zones 3 and 4. Because the marbled murrelet may respond to the loss of nesting habitat by moving out of the area (Falxa and Raphael 2015), there could be a decrease in observed at-sea murrelet abundance corresponding with the losses of nesting habitat. As noted above under Background, such an effect is speculative. If such an effect were to occur, the marbled murrelet would return to Conservation Zones 3 and 4 as nesting habitat continues to develop in subsequent decades.
In the first decade, all alternatives and the Proposed RMP would reduce the amount of high-quality nesting habitat. The No Action alternative would have a 3 percent loss, Alternatives A, B, and D would have a 1 percent loss, and Alternative C would have a 4 percent loss (Figure 3-169). The Proposed RMP would have a 1 percent loss of high-quality nesting habitat in the first decade. However, sufficient high-quality nesting habitat would develop by the second decade to surpass current amounts under all alternatives and the Proposed RMP (Appendix S).
Under the No Action alternative, 83 percent of existing total nesting habitat and 91 percent of existing high-quality nesting habitat would be within the reserves; the remainder would be within the Matrix and Adaptive Management Areas (comparable to the Harvest Land Base). Under Alternatives A, B, and D, and the Proposed RMP, there would be more nesting habitat within reserves than under the No Action alternative (Table 3-258). Alternative C would contain less nesting habitat in reserves than under the No Action alternative (Table 3-258). All action alternatives and the Proposed RMP would include more existing high-quality nesting habitat in reserves than the No Action alternative (Table 3-259). The Proposed RMP would include 93 percent of existing total nesting habitat within reserves and 99 percent of existing high-quality nesting habitat within reserves.

Figure 3-169. Marbled murrelet high-quality nesting habitat trends in the decision area
Table 3-258. Land use allocations of marbled murrelet total nesting habitat in 2013

<table>
<thead>
<tr>
<th>Alternative/Proposed RMP</th>
<th>Within the Harvest Land Base</th>
<th>Within Reserves</th>
<th>Total Nesting Habitat (Acres)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(Acres)</td>
<td>(Percent)</td>
<td>(Acres)</td>
</tr>
<tr>
<td>No Action</td>
<td>82,869</td>
<td>17%</td>
<td>411,099</td>
</tr>
<tr>
<td>Alt. A</td>
<td>42,139</td>
<td>9%</td>
<td>451,829</td>
</tr>
<tr>
<td>Alt. B</td>
<td>46,899</td>
<td>9%</td>
<td>447,069</td>
</tr>
<tr>
<td>Alt. C</td>
<td>115,544</td>
<td>23%</td>
<td>378,424</td>
</tr>
<tr>
<td>Alt. D</td>
<td>72,062</td>
<td>15%</td>
<td>421,906</td>
</tr>
<tr>
<td>PRMP</td>
<td>34,362</td>
<td>7%</td>
<td>459,072</td>
</tr>
</tbody>
</table>

Table 3-259. Land use allocations of high-quality marbled murrelet nesting habitat in 2013

<table>
<thead>
<tr>
<th>Alternative/Proposed RMP</th>
<th>Within the Harvest Land Base</th>
<th>Within Reserves</th>
<th>Total Nesting Habitat (Acres)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(Acres)</td>
<td>(Percent)</td>
<td>(Acres)</td>
</tr>
<tr>
<td>No Action</td>
<td>20,902</td>
<td>9%</td>
<td>212,317</td>
</tr>
<tr>
<td>Alt. A</td>
<td>2,839</td>
<td>1%</td>
<td>230,380</td>
</tr>
<tr>
<td>Alt. B</td>
<td>4,070</td>
<td>2%</td>
<td>229,149</td>
</tr>
<tr>
<td>Alt. C</td>
<td>18,479</td>
<td>8%</td>
<td>214,740</td>
</tr>
<tr>
<td>Alt. D</td>
<td>6,887</td>
<td>3%</td>
<td>226,332</td>
</tr>
<tr>
<td>PRMP</td>
<td>3,425</td>
<td>1%</td>
<td>229,067</td>
</tr>
</tbody>
</table>

Currently, the average patch size of marbled murrelet nesting habitat is 33.2 acres. Under the No Timber Harvest reference analysis, average patch size would increase to 69.7 acres in 50 years. The average patch size of marbled murrelet nesting habitat would decrease under Alternative C, but would increase under all other alternatives and the Proposed RMP in 50 years (Table 3-260).

Table 3-260. Marbled murrelet nesting habitat patch metrics

<table>
<thead>
<tr>
<th>Alternative/Proposed RMP</th>
<th>Mean Patch Size (Acres)</th>
<th>Edge vs. Core Habitat</th>
<th>Core (Percent)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Edge Habitat (Acres)</td>
<td>Core Habitat (Acres)</td>
</tr>
<tr>
<td>Current Condition (2013)</td>
<td>33.2</td>
<td>320,463</td>
<td>172,969</td>
</tr>
<tr>
<td>No Action (2063)</td>
<td>44.3</td>
<td>467,594</td>
<td>306,258</td>
</tr>
<tr>
<td>Alt. A (2063)</td>
<td>43.2</td>
<td>451,883</td>
<td>304,911</td>
</tr>
<tr>
<td>Alt. B (2063)</td>
<td>45.1</td>
<td>460,710</td>
<td>310,848</td>
</tr>
<tr>
<td>Alt. C (2063)</td>
<td>29.6</td>
<td>405,013</td>
<td>249,975</td>
</tr>
<tr>
<td>Alt. D (2063)</td>
<td>56.5</td>
<td>468,768</td>
<td>344,953</td>
</tr>
<tr>
<td>PRMP (2063)</td>
<td>42.3</td>
<td>481,482</td>
<td>296,690</td>
</tr>
<tr>
<td>No Timber Harvest (2063)</td>
<td>69.7</td>
<td>472,978</td>
<td>367,046</td>
</tr>
</tbody>
</table>

Currently, 35 percent of nesting habitat is core habitat, and this percentage would increase in 50 years under all alternatives and the Proposed RMP (Table 3-260). Alternative C would provide the least amount of core habitat in 50 years in terms of gross acres. Alternative C and the Proposed RMP would provide the same proportion (38 percent) of core habitat, although the amount of acres of core habitat
would be considerably higher under the Proposed RMP. Alternative D would provide the most core habitat for the marbled murrelet (both in terms of gross acres and proportion of total nesting habitat), which is only slightly less than the No Timber Harvest reference analysis.

Alternatives D, B, A, and the Proposed RMP (in descending order) would provide nesting habitat in a configuration that would lead to reduced risk of nest predation (e.g., larger patch size and less edge habitat). In contrast, Alternative C would exacerbate nest predation by reducing patch size and providing the largest amount of habitat subject to edge effects.

The BLM-administered lands currently contribute 41 percent of the high-quality nesting habitat for the marbled murrelet in the planning area. There are currently 572,424 acres of high-quality nesting habitat for the marbled murrelet across all ownerships or 9 percent of the forestland capable of providing nesting habitat in the planning area (Table 3-259). Falxa and Raphael (2015, pp. 115–118) report that in 2012, approximately 12 percent of habitat-capable lands had higher-suitability nesting habitat within Zone 1 in Oregon. Thus, the 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).

Within the planning area, high-quality nesting habitat would increase from 9 percent to 12 percent of all habitat-capable land under all alternatives, the Proposed RMP, and the No Timber Harvest reference analysis in 50 years (Appendix S). At the planning area scale, there is only slight differentiation in amount of high-quality nesting habitat development among the alternatives and the Proposed RMP, and that amount is only slightly less than under the No Timber Harvest reference analysis (Figure 3-170).

![Figure 3-170. Marbled murrelet high-quality nesting habitat in the planning area](image)

There are 480,369 acres of designated marbled murrelet critical habitat in the decision area and 1,338,444 acres in the planning area. Currently, 59 percent (273,178 acres) of designated marbled murrelet critical habitat on BLM-administered lands is nesting habitat, and 34 percent (154,331 acres) is high-quality nesting habitat. Under the No Action Alternative and Alternative A, no designated marbled murrelet
critical habitat would be within the Harvest Land Base. Under Alternative B, 9 percent of marbled murrelet critical habitat would be within the Harvest Land Base. Alternatives C and D would allocate the largest amount of marbled murrelet critical habitat within the Harvest Land Base (22 and 20 percent, respectively). Under the Proposed RMP, 8 percent (39,718 acres) of marbled murrelet designated critical habitat on BLM-administered lands would be within the Harvest Land Base. Of the 39,718 acres of critical habitat within the Harvest Land Base under the Proposed RMP, 36 percent (14,496 acres) is currently marbled murrelet nesting habitat and 3 percent (1,220 acres) is high-quality nesting habitat. However, the amount of nesting habitat in critical habitat in the Harvest Land Base represents only 5 percent of the total nesting habitat within critical habitat on BLM-administered lands. Of the critical habitat within the reserve land use allocations under the Proposed RMP, 59 percent is currently marbled murrelet nesting habitat and 3 percent is high-quality nesting habitat (Appendix S).

Within designated critical habitat, the No Timber Harvest reference analysis would result in an increase in nesting habitat from 59 percent to 97 percent of all habitat-capable land in 50 years and an increase in the amount of high-quality nesting habitat from 34 percent to 43 percent of all habitat-capable land in 50 years (Appendix S). All alternatives and the Proposed RMP would develop more nesting habitat and high-quality nesting habitat within designated critical habitat for the marbled murrelet in 50 years. Alternatives A and D and the No Action alternative would result in increases in nesting habitat in designated critical habitat that are almost indistinguishable from the No Timber Harvest reference analysis. Alternative C would have the smallest increase in nesting habitat and high-quality nesting habitat (Figure 3-171).

![Figure 3-171. Marbled murrelet nesting habitat in critical habitat in the decision area](image)

Timber harvest under all alternatives and the Proposed RMP would not affect the functionality of marbled murrelet critical habitat above the stand-scale at any time during the next 50 years because of the limited extent of timber harvest and because most or all designated critical habitat would be within reserves. Under Alternatives B, C, and D, and the Proposed RMP, the BLM would treat between approximately 1-3 percent of marbled murrelet nesting habitat within critical habitat with timber harvest per decade during
the next 50 years. The harvest treatments would be distributed amongst the 480,369 acres of critical habitat in the decision area. Under the No Action alternative and Alternative A, timber harvest within critical habitat would be even less and would be limited to thinning treatments within reserve allocations.

On all land ownerships in the planning area, the No Timber Harvest reference analysis would result in an increase in high-quality nesting habitat within designated critical habitat from 24 percent to 37 percent of all habitat-capable land in 50 years (Appendix S). The development of high-quality nesting habitat for the marbled murrelet would be nearly indistinguishable among the No Action alternative, Alternatives A, B, D, and the Proposed RMP in the planning area. These alternatives and the Proposed RMP would be within 1 percent of the No Timber Harvest reference analysis results. Alternative C would develop the least high-quality nesting habitat within designated critical habitat, which would be 3 percent less than the No Timber Harvest reference analysis in the planning area (Figure 3-172).

![Figure 3-172](image)

**Figure 3-172.** High-quality marbled murrelet nesting habitat in designated critical habitat in the planning area

Opportunities for marbled murrelet nesting would increase under all alternatives and the Proposed RMP as the amount of nesting habitat and high-quality nesting habitat would increase. Increased nesting opportunities and nesting habitat would encourage population growth, thereby aiding species recovery. As noted above under Background, there is an association between total marbled murrelet abundance at-sea and total nesting habitat available inland (Falxa and Raphael 2015; Raphael *et al.* 2011). Alternative D would provide the largest increase in nesting opportunity, and therefore the largest contribution to species recovery, but Alternatives A and B, and the Proposed RMP would provide similar amounts of nesting habitat and opportunities. Alternative C and the No Action alternative would provide less of an increase in nesting opportunities, but would still contribute to increases in the marbled murrelet population. The No Action alternative, Alternatives A, B, and D, and the Proposed RMP would also provide nesting habitat in configurations (larger patches) that would reduce nest predation, which would further aid successful marbled murrelet reproduction and population growth. Nesting habitat configuration under Alternative C would exacerbate nest predation, limiting opportunities for population growth. Overall,
Alternative D would provide the most favorable habitat conditions for improving marbled murrelet nest success and potential population growth. The No Action alternative, Alternatives A and B, and the Proposed RMP would provide comparable, but slightly less favorable habitat conditions, compared to Alternative D. Alternative C would provide the least improvement to marbled murrelet nesting opportunities and would increase the risk the of nest predation.

**Issue 2**

*How would the alternatives affect known and future occupied marbled murrelet sites?*

**Summary of Analytical Methods**

The BLM used existing data as mapped within the BLM corporate murrelet database to identify currently known, occupied murrelet sites (GeoBOB 2015).

The BLM forecast the number of marbled murrelet 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 0–25 miles of the coast (251 of 458 survey polygons) and 10.2 percent of survey polygons within 25–50 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 25–50 miles from the Pacific Ocean (*Figure 3-173*). The survey polygons examined in this preliminary analysis represent 83,234 acres of survey effort.

![Figure 3-173. Marbled murrelet occupancy detection rates](image)

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 each alternative and the Proposed RMP (see Table 3-261 through Table 3-263). Table 3-261 displays the total acreage of marbled murrelet...
nesting habitat that would be considered for harvest by decade under each alternative and the Proposed RMP, prior to forecasting the results of survey and site management requirements under each alternative and the Proposed RMP.

**Table 3-261.** Decadal forecast for marbled murrelet nesting habitat considered for harvest over 50 years (2013–2063)

<table>
<thead>
<tr>
<th>Alternative/Proposed RMP</th>
<th>Marbled Murrelet Nesting Habitat Considered for Harvest by End of Decade (Acres)</th>
<th>Cumulative Nesting Habitat Considered for Harvest (Acres)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2023</td>
<td>2033</td>
</tr>
<tr>
<td>No Action</td>
<td>37,734</td>
<td>37,407</td>
</tr>
<tr>
<td>Alt. A</td>
<td>22,886</td>
<td>18,105</td>
</tr>
<tr>
<td>Alt. C</td>
<td>57,612</td>
<td>47,845</td>
</tr>
<tr>
<td>Alt. D</td>
<td>38,735</td>
<td>21,684</td>
</tr>
<tr>
<td>PRMP</td>
<td>28,493</td>
<td>21,166</td>
</tr>
</tbody>
</table>

**Table 3-262** displays the amount of marbled murrelet nesting habitat modeled for harvest under each alternative and the Proposed RMP, which would require surveys prior to harvest. If surveys on these acres were to detect marbled murrelet, 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, as described in Chapter 2.

**Table 3-262.** Marbled murrelet nesting habitat modeled for harvest that would be subject to surveys prior to harvest

<table>
<thead>
<tr>
<th>Alternative/Proposed RMP</th>
<th>Marbled Murrelet Nesting Habitat Considered for Harvest with Surveys by End of Decade (Acres)</th>
<th>Cumulative Nesting Habitat Considered for Harvest (Acres)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2023</td>
<td>2033</td>
</tr>
<tr>
<td>No Action</td>
<td>37,734</td>
<td>37,407</td>
</tr>
<tr>
<td>Alt. A</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Alt. B</td>
<td>24,073</td>
<td>23,948</td>
</tr>
<tr>
<td>Alt. C</td>
<td>10,028</td>
<td>11,057</td>
</tr>
<tr>
<td>Alt. D</td>
<td>38,735</td>
<td>21,684</td>
</tr>
<tr>
<td>PRMP</td>
<td>21,331</td>
<td>18,024</td>
</tr>
</tbody>
</table>

**Table 3-263** displays the amount of marbled murrelet nesting habitat modeled for harvest under each alternative and the Proposed RMP without being surveyed, and thus without determining whether nesting marbled murrelet are present. That is, these are acres to which the BLM applied the detection rates to forecast occupied sites that would be lost, as described in this analysis below.
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 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 decision area would help to provide context for the effects of the alternatives and 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 decision area could currently support 2,459 marbled murrelet sites. To evaluate the accuracy of this forecast, this analysis 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 murrelet on the Olympic Peninsula. Applying their estimate to the amount of nesting habitat currently available on BLM-administered lands (493,969 acres), the decision area could currently support 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 each alternative and the Proposed RMP, may overestimate the number of future marbled murrelet sites in the decision area.

The alternatives and the Proposed RMP present a range of pre-project survey requirements in the management direction (see Chapter 2 and Appendix B). The following is a brief summary of management direction for marbled murrelet surveys:

- No Action alternative—survey nesting habitat
- Alternative A—no surveys required
- Alternative B—survey nesting habitat in Zone 1 (0–35 miles from the coast), no surveys in Zone 2 (35–50 miles from the coast)
- Alternative C—survey nesting habitat for projects in stands 120 years old or older
- Alternative D—survey nesting habitat
- Proposed RMP—survey nesting habitat in all land use allocations in Zone 1 (0–35 miles from the coast) and in the reserves in Zone 2 (35–50 miles from the coast), no surveys in the Harvest Land Base in Zone 2.

Depending on the management direction and arrangement of nesting habitat, each alternative and the Proposed RMP would have different amounts of nesting habitat that would have surveys and nesting habitat that would not have surveys. For this analysis, the BLM assumed future marbled murrelet sites

<table>
<thead>
<tr>
<th>Alternative/Proposed RMP</th>
<th>Marbled Murrelet Nesting Habitat Harvested without Surveys by End of Decade (Acres)</th>
<th>Cumulative Nesting Habitat Harvested (Acres)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2023</td>
<td>2033</td>
</tr>
<tr>
<td>No Action</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Alt. A</td>
<td>22,886</td>
<td>18,105</td>
</tr>
<tr>
<td>Alt. B</td>
<td>12,370</td>
<td>5,469</td>
</tr>
<tr>
<td>Alt. C</td>
<td>47,584</td>
<td>36,788</td>
</tr>
<tr>
<td>Alt. D</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>PRMP</td>
<td>7,162</td>
<td>3,143</td>
</tr>
</tbody>
</table>

Table 3-263. Marbled murrelet nesting habitat modeled for harvest that would not be subject to surveys
would be discovered using the detection rates described above in nesting habitat with surveys. Conversely, the BLM assumed that nesting habitat without surveys would still contain marbled murrelet sites using the detection rates described above, but that these sites would remain undiscovered and that the habitat at these sites within the Harvest Land Base would be removed by timber harvest.

Under all alternatives and the Proposed RMP, the BLM would restrict activities that would disrupt nesting marbled murrelet during the nesting period. Therefore, the BLM assumed that there would not be any disruption effects to nesting marbled murrelet under any of the alternatives or the Proposed RMP.

The BLM did not quantitatively forecast population trends of the marbled murrelet because of the uncertainty surrounding recent population trends as reported in Falxa et al. (2014) and discussed above. In addition, there are numerous threats to the marbled murrelet in the marine environment from environmental sources (e.g., changes in prey abundance, distribution, and quality, or harmful algal blooms) or anthropogenic sources (e.g., derelict fishing gear and disturbance from vessel traffic) that are beyond the scope of land management decisions on BLM-administered lands. Instead, the BLM qualitatively evaluated the combined effects of habitat development and site management on marbled murrelet populations.

**Affected Environment and Environmental Consequences**

There are 351 known, occupied marbled murrelet sites on BLM-administered lands (GeoBOB 2015), encompassing 51,995 acres, as delineated by the BLM offices (Figure 3-174). Based on available information, there are also approximately 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 1,005 sites in the planning area (Table 3-264). Information regarding marbled murrelet occupancy for other landowners is not available. The BLM-administered lands support 35 percent of the known, occupied marbled murrelet sites in Oregon, whereas BLM-administered lands only comprise 13 percent of the habitat-capable acreage within range of the marbled murrelet. This may 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, the 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.
Figure 3-174. Known, occupied marbled murrelet sites in the decision area
### Table 3-264. Known marbled murrelet sites in the planning area

<table>
<thead>
<tr>
<th>Ownership</th>
<th>Known Occupied Marbled Murrelet Sites</th>
<th>Marbled Murrelet Survey Effort</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sites (Number)</td>
<td>Total Known Sites (Percent)</td>
</tr>
<tr>
<td>BLM</td>
<td>351</td>
<td>35%</td>
</tr>
<tr>
<td>U.S. Forest Service</td>
<td>417*</td>
<td>41%</td>
</tr>
<tr>
<td>Oregon Department of Forestry</td>
<td>237</td>
<td>24%</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td><strong>1,005</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

* 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.

† Only includes acreage from the Rogue-Siskiyou National Forest; acreage from the Siuslaw National Forest is not available

Approximately 88 percent of total occupied site acreage in the decision area is 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 No Action alternative, Alternatives A, B, and D, and the Proposed RMP. Therefore, all current nesting habitat within occupied sites would be retained, and eventually 97 percent of the acreage within occupied sites would develop into nesting habitat under these alternatives and the Proposed RMP.

The No Action alternative and Alternative D would not result in the loss of any occupied sites (*Table 3-265*). The No Action alternative and Alternative D would result in the discovery and protection of 144 and 141 sites discovered, respectively, in the first decade (*Table 3-266*). Alternative C would also result in the discovery and protection of sites (35), but more sites would be lost than would be discovered.

Alternative B would result in the loss of 23 sites, and the discovery and protection of 132 sites in the first decade (*Table 3-266* and *Table 3-265*). Alternative A would result in the loss of 106 sites in the first decade with no additional sites discovered (*Table 3-266* and *Table 3-265*). Alternative C would result in the largest number of occupied sites lost in the first decade (189 sites). Under the Proposed RMP, the BLM would discover and protect 377 occupied marbled murrelet sites during the first five decades where the BLM would conduct surveys (all land use allocations in Zone 1 and outside of the Harvest Land Base in Zone 2). In the Harvest Land Base in Zone 2 under the Proposed RMP, 39 occupied marbled murrelet sites would be lost during the first five decades, because the BLM would not conduct surveys prior to modification or removal of nesting habitat.
Table 3-265. Decadal forecast for marbled murrelet occupied sites lost over 50 years (2013–2063)

<table>
<thead>
<tr>
<th>Alternative/Proposed RMP</th>
<th>Occupied Sites Forecast to be Lost (Number by End of Decade)</th>
<th>Cumulative Occupied Sites Lost (Number)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2023</td>
<td>2033</td>
</tr>
<tr>
<td>No Action</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Alt. A</td>
<td>106</td>
<td>101</td>
</tr>
<tr>
<td>Alt. B</td>
<td>23</td>
<td>10</td>
</tr>
<tr>
<td>Alt. C</td>
<td>189</td>
<td>174</td>
</tr>
<tr>
<td>Alt. D</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>PRMP</td>
<td>13</td>
<td>6</td>
</tr>
</tbody>
</table>

Table 3-266. Decadal forecast for marbled murrelet occupied sites discovered over 50 years (2013–2063)

<table>
<thead>
<tr>
<th>Alternative/Proposed RMP</th>
<th>Occupied Sites Discovered and Protected (Number by End of Decade)</th>
<th>Cumulative Occupied Sites Discovered and Protected (Number)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2023</td>
<td>2033</td>
</tr>
<tr>
<td>No Action</td>
<td>144</td>
<td>165</td>
</tr>
<tr>
<td>Alt. A</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Alt. B</td>
<td>132</td>
<td>110</td>
</tr>
<tr>
<td>Alt. C</td>
<td>35</td>
<td>34</td>
</tr>
<tr>
<td>Alt. D</td>
<td>141</td>
<td>74</td>
</tr>
<tr>
<td>PRMP</td>
<td>97</td>
<td>76</td>
</tr>
</tbody>
</table>

These estimates for the Proposed RMP overstate the acreage of marbled murrelet nesting habitat that would be harvested and number of occupied sites that would be lost during each decade. During part of the first decade of RMP implementation, the Proposed RMP would avoid incidental take of northern spotted owls. High-quality marbled murrelet nesting habitat and northern spotted owl nesting-roosting habitat substantially overlap. Where the BLM would defer timber harvest to avoid incidental take of northern spotted owls, marbled murrelet nesting habitat would not be harvested and undetected occupied marbled murrelet sites coincident with occupied northern spotted owl sites would not be lost. It is not possible to quantify how much overlap would occur under the Proposed RMP, because the overlap would be dependent upon a spatially explicit forecasting of northern spotted owl occupancy combined with a spatially explicit forecasting of marbled murrelet occupancy. Nevertheless, this overlap is likely to be substantial, given the overlap in habitat requirements.

Management direction under the alternatives and the Proposed RMP would provide differing amounts of protection around future occupied marbled murrelet sites. Alternative D and the No Action alternative would provide the largest acreage of protection around an individual site; all contiguous habitat within 0.5 miles would be included in the occupied site delineation (approximately 503 acres based on a circular radius). Alternatives B and C and the Proposed RMP would protect lands within 300 feet (approximately 6.5 acres based on a circular radius) of forecasted, occupied site delineations, but only Mature or Structurally-complex stands would be included in the delineation under Alternative C. Alternative A would provide no protection to future sites—because the BLM would not survey—and thus would identify no future sites.

Under Alternative C, designation and protection of an occupied site would last for 10 years after its discovery. For known, occupied sites, protection would last for 10 years after the Record of Decision for the RMP is signed (until approximately 2026). Cessation of protection for occupied sites 10 years after
discovery or after the Record of Decision is signed, could lead to the loss of currently occupied marbled murrelet habitat. Under Alternative C, the BLM would resurvey nesting habitat before habitat modification, but the BLM could modify or remove the habitat if resurvey does not determine occupancy. For the first decade or two, the BLM assumes that most currently occupied marbled murrelet sites would continue to be occupied, since the marbled murrelet tend to have high nest-site fidelity and nest locations of multiple birds can be aggregated. Miller et al. (2012) report that marbled murrelet re-nest in the same forest stands and trees in successive years, which suggests they have high nest-site fidelity. Although the marbled murrelet are not colonial nesters, similar constraints apply, since there can be multiple, simultaneous detections of more than one bird at inland sites, and nesting locations are often aggregated (Raphael et al. 2015, pp. 17–18; 57 FR 45328). Mack et al. (2003) reported that, on average, 39 percent of occupied sites changed status over a two-year period, and site status was not independent between years. The causes of changing site status between years are unknown, but variation between years could be due to changes in ocean conditions and prey base (Mack et al. 2003, p. 13). Finally, many currently occupied marbled murrelet sites would remain within the Late-Successional Reserve or other reserve land use allocations under Alternative C, even after 10 years without evidence of occupancy, because of reasons unrelated to the marbled murrelet, such as location within Structurally-complex forest or large block forest reserves. Because of these uncertainties related to whether current and future marbled murrelet sites would continue to be protected for longer than 10 years, the BLM did not model the loss of protection around occupied marbled murrelet sites after 10 years under Alternative C. Cessation of protection for occupied marbled murrelet sites after 10 years presents an unquantified level of uncertainty related to marbled murrelet site protection under Alternative C.

Overall, the No Action alternative and Alternative D would result in the least effect to occupied sites, because 144 and 141 additional sites, respectively, would be discovered and protected and none would be lost. The Proposed RMP would result in the net increase of 84 known, occupied sites, although 13 would be lost in the first decade. Alternative B would result in the net increase of 109 known, occupied sites, although 23 would be lost in the first decade. Alternative A would result in the net loss of 106 occupied sites with no new sites discovered. Alternative C would result in the largest net loss of occupied sites (154 sites), despite the discovery of 35 new occupied sites. In addition, all alternatives and the Proposed RMP would provide some level of continued protection for the 351 existing, known occupied marbled murrelet sites, although long-term protection under Alternative C is less certain. Alternative C would have the largest negative effect on future occupied marbled murrelet sites, and the No Action alternative or Alternative D would have no negative effect on future occupied marbled murrelet sites.

Despite the occasional loss of undiscovered marbled murrelet sites under the Proposed RMP and Alternatives A, B, and C (as described above), 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 (Figure 3-175). The murrelet population on BLM-administered lands would increase incrementally decade-by-decade under the No Action alternative, Alternatives A, B, and D, and the Proposed RMP. Under Alternative C, the BLM forecasts a net decrease in the murrelet population on BLM-administered lands in the first decade that corresponds to the net loss of nesting habitat described above. Fewer sites for nesting marbled murrelet under Alternative C would lead to reduced nesting, reduced nest success, and ultimately to population instability or decline. Fewer occupied sites under Alternative C would make marbled murrelet nesting more susceptible to stochastic events in the terrestrial or marine environments. Given that 35 percent of currently known, occupied marbled murrelet sites occur on BLM-administered lands, the loss of BLM sites under Alternative C could contribute to an overall population decline in Conservation Zones 3 and 4. While such population effects under Alternative C are possible, they are uncertain; given that the observed population levels do not currently demonstrate any trend, and it is uncertain what effect a loss of murrelet population on BLM-administered lands under Alternative C would have on the overall population levels.
Figure 3-175. Forecast of the number of occupied marbled murrelet sites in the decision area.

Appendix S contains additional information and supporting data on the marbled murrelet.
References
 GeoBOB. 2015. BLM OR RWO GeoBOB Marbled Murrelet Data snapshot (RWOR127) – March 26, 2015. USDA BLM, Portland, OR.
North Oregon Coast Distinct Population Segment of the Red Tree Vole

Key Points

- All alternatives and the Proposed RMP would lead to an increase in habitat for red tree voles within the North Oregon Coast DPS in 50 years.
- The loss of occupied stands under Alternatives A and C, particularly north of Highway 20, would further reduce the distribution of red tree voles in the North Oregon Coast DPS.
- The lack of provisions for pre-disturbance surveys and known site protection under Alternatives A and C would negatively affect the species throughout the North Oregon Coast DPS.
- The No Action alternative and Alternatives B and D would protect red tree voles throughout the North Oregon Coast DPS because of direction to conduct pre-disturbance surveys and known site management.
- The Proposed RMP would protect red tree voles north of Highway 20 because of direction to conduct pre-disturbance surveys and known site management. The Proposed RMP would negatively affect the species south of Highway 20 within the Harvest Land Base, where pre-disturbance surveys would not be required.

Summary of Notable Changes from the Draft RMP/EIS

The Proposed RMP/Final EIS has deleted the erroneous statement from the Draft RMP/EIS, “Since every red tree vole site in the North Oregon Coast DPS is critical for persistence ….” That statement could not be supported given the uncertainties around population numbers, trend, and distribution of the North Oregon Coast DPS of the red tree vole.

Background

On October 13, 2011, the U.S. Fish and Wildlife Service determined that the North Oregon Coast Distinct Population Segment (DPS)\(^{135}\) of the red tree vole (*Arborimus longicaudus*) warranted protection under the Endangered Species Act, but listing the species is precluded by the need to address higher priority species (76 FR 63720). 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. 145–146).

Red tree voles are widely distributed throughout much of their range in Oregon, except in the northern Oregon Coast Range – particularly within the North Coast Distinct Population Segment area north of Highway 20. In the northern portion of the North Coast Distinct Population Segment area, red tree voles are uncommon and sparsely distributed as compared to the rest of their range. Due to ownership patterns, connectivity between blocks of Federal habitat is limited north of Highway 20 as well (76 FR 63740).

Based on radio telemetry, red tree voles use a mean home range area of 0.43 acres, and there is no statistical difference between the size of male and female red tree vole home ranges. The average distance between red tree vole nest trees is 148 feet and the furthest distance reported is 531 feet (Swingle and Forsman 2009).

\(^{135}\) A distinct population segment (DPS) is a discrete population of a species and the smallest portion of a vertebrate species’ range that can be protected under the Endangered Species Act.
**Issue 1**
*What levels of habitat for the North Oregon Coast DPS of the red tree vole would be available under each alternative?*

**Summary of Analytical Methods**
In this analysis, the BLM considered habitat for the North Oregon Coast DPS of the red tree vole to be Mature and Structurally-complex stands within the range of the DPS (Figure 3-176). The Planning Criteria provides more detailed information on analytical assumptions, methods and techniques, and geographic and temporal scales, which is incorporated here by reference (USDI BLM 2014).

![Figure 3-176. Range of the North Oregon Coast DPS of the red tree vole](image)

This issue presents both an analysis of the direct and indirect effects of alternative and Proposed RMP implementation on habitat for the North Oregon Coast DPS of the red tree vole in the decision area and an analysis of the cumulative effects on habitat for the North Oregon Coast DPS of the red tree vole 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 assessed habitat connectivity by calculating the average patch size for contiguous habitat. The BLM considers the quality of habitat to increase as patch size increases. The BLM modeled habitat on non-BLM-administered lands within the planning area using the 2012 GNN structural condition.

The BLM forecast the number of stands within the North Oregon Coast DPS occupied by red tree voles in the future by applying observed detection rates and mean size of occupied stands against the acreage of habitat in the Harvest Land Base. In this analysis, the BLM assumed that forecast future sites within the Harvest Land Base would be lost because of timber harvest in the alternatives or the Proposed RMP that did not require surveys prior to habitat modification and protection of sites. The BLM assumed that sites within reserve allocations would be protected under all alternatives and the Proposed RMP.

Through preliminary analysis, the BLM found that surveys had a 22.9 percent detection rate (39 of 120 survey polygons) within the range of the North Oregon Coast DPS (USDI BLM, unpublished data 2014). Within the North Oregon Coast DPS, red tree voles are more abundant south of Highway 20 (49.2 percent detection rate) than north of Highway 20 (8.3 percent detection rate). The survey polygons the BLM considered in this preliminary analysis represent 6,245 acres of survey effort. The BLM applied these detection rates to the amount of red tree vole habitat within the Harvest Land Base within the range of the North Oregon Coast DPS under each alternative and the Proposed RMP.

The average size of survey polygons within the North Oregon Coast DPS is 36.7 acres (GeoBOB 2013). The BLM divided the acreage of habitat in the Harvest Land Base by 36.7 acres to forecast the number of stands that the BLM predicts to be occupied by red tree voles in the Harvest Land Base within the North Oregon Coast DPS. While this forecast uses spatial data, the BLM did not forecast the specific location of future, occupied stands. Thus, BLM did not specifically and separately analyze habitat development in or near these forecast sites.

Unlike the analysis for marbled murrelet and fisher, BLM did not calculate core and edge habitat since the available scientific literature has not established an effective ‘edge’ distance for red tree voles.

In this analysis, the BLM did not evaluate changes in the population of red tree voles because of changes in habitat, because quantifiable relationships between habitat availability and numbers of individual red tree voles in populations are unavailable.

**Affected Environment and Environmental Consequences**

There are 329,236 acres of BLM-administered lands capable of providing habitat for the North Oregon Coast DPS of the red tree vole, of which 174,495 acres (53 percent) are currently providing habitat in the decision area (Figure 3-177).
There are 3,728,250 acres of forested land capable of providing habitat for the North Oregon Coast DPS of the red tree vole across all land ownerships in the planning area. Of the forested land capable of providing habitat, 20 percent (741,263 acres) is existing habitat within the planning area. BLM-administered lands provide 24 percent (174,495 acres) of the available habitat for the North Oregon Coast DPS of the red tree vole (Figure 3-178).
Under the No Timber Harvest reference analysis, there would be 313,820 acres of habitat in the decision area in 50 years (Figure 3-177). Under all alternatives and the Proposed RMP, habitat for red tree voles within the North Oregon Coast DPS would increase from current conditions in 50 years. The action alternatives and the Proposed RMP would develop 75–94 percent as much habitat as under the No Timber Harvest reference analysis. Alternative D would develop the largest amount of habitat among the action alternatives and the Proposed RMP. Alternative C would develop the least amount of habitat, substantially less than the other alternatives and the Proposed RMP.

Under the No Action alternative, Alternatives A, B, and D, and the Proposed RMP, the amount of red tree vole habitat within the North Oregon Coast DPS would continually increase. That is, there would be no net loss of habitat at any time period relative to current conditions. Under Alternative C, there would be a 4 percent loss (-7,339 acres) of habitat in the first decade. However, sufficient habitat would develop by the second decade under Alternative C to surpass current amounts (Appendix S).

In the planning area, red tree vole habitat within the North Oregon Coast DPS would increase by 25–33 percent under the alternatives and the Proposed RMP in 50 years (Figure 3-178). The No Action alternative, Alternatives A, B, and D, and the Proposed RMP would have the similar increases in habitat (32, 31, 31, 33, and 30 percent respectively), only slightly less than the No Timber Harvest reference analysis (35 percent). Alternative C would have the least increase in habitat development (25 percent).

Under the No Action alternative, Alternatives A, B, D, and the Proposed RMP, BLM-administered lands would contribute 29–30 percent of the habitat for red tree voles within the North Oregon Coast DPS in the planning area in 50 years. The BLM-administered lands would contribute 26 percent of the habitat under Alternative C (Figure 3-178). At the planning area scale, the No Action alternative, Alternatives A, B, and D, and the Proposed RMP would provide 92–98 percent of the habitat projected under the No Timber Harvest reference analysis, with Alternative C providing the least habitat development (92 percent).

Currently, the average patch size of red tree vole habitat in the North Oregon Coast DPS is 29.3 acres. In 50 years, the average patch size would decrease under Alternative C, but would increase under all the other alternatives and the Proposed RMP, and under the No Timber Harvest reference analysis. The average patch size would increase to 64.4 acres under the No Timber Harvest reference analysis in 50 years. Alternative C would reduce average patch size to 25.6 acres, the No Action alternative and Alternatives A, B, and D would increase patch size (42.0, 40.0, 39.2, and 47.2 acres, respectively). The Proposed RMP would also result in an increase in the average patch size (36.5 acres in 50 years). Alternative C would lead to additional fragmentation of red tree vole habitat, while the other alternatives and the Proposed RMP would increase connectivity and suitability of habitat, based on trends in patch size. Larger patches of habitat would encourage higher local populations and higher nest numbers at a site, since the home ranges (0.43 acres) of multiple individuals could be contained within a single patch. Larger sites containing multiple nests would better support red tree vole population persistence in localized areas (USDA FS and USDI BLM 2000, p. 5).

There are 395 observations of red tree voles in the North Oregon Coast DPS within the decision area (Table 3-267), and an additional 14 observations on non-BLM-administered lands in the planning area (GeoBOB 2013). These observations are typically active or inactive nest structures that were discovered during pre-disturbance surveys; occasionally red tree voles themselves were observed during surveys. The small number of observations on non-BLM-administered lands is not necessarily reflective of population numbers, given the general lack of surveys outside of Federal lands within the range of the North Oregon Coast DPS. On BLM-administered lands, the currently known observations of red tree voles are biased towards pre-disturbance surveys that the BLM conducted within timber sale project areas typically located within the Matrix land use allocation.
Table 3-267. Known observations (395) of red tree voles within the North Oregon Coast DPS

<table>
<thead>
<tr>
<th>Alternative/Proposed RMP</th>
<th>Observations in the HLB* (Number)</th>
<th>Observations in the HLB* (Percent)</th>
<th>Observations in the Reserves (Number)</th>
<th>Observations in the Reserves (Percent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Action</td>
<td>40</td>
<td>10%</td>
<td>355</td>
<td>90%</td>
</tr>
<tr>
<td>Alt. A</td>
<td>21</td>
<td>5%</td>
<td>374</td>
<td>95%</td>
</tr>
<tr>
<td>Alt. B</td>
<td>25</td>
<td>6%</td>
<td>370</td>
<td>94%</td>
</tr>
<tr>
<td>Alt. C</td>
<td>41</td>
<td>10%</td>
<td>354</td>
<td>90%</td>
</tr>
<tr>
<td>Alt. D</td>
<td>29</td>
<td>7%</td>
<td>366</td>
<td>93%</td>
</tr>
<tr>
<td>PRMP</td>
<td>39</td>
<td>10%</td>
<td>357</td>
<td>90%</td>
</tr>
</tbody>
</table>

*Harvest Land Base under the No Action alternative includes Adaptive Management Areas, Connectivity/Diversity Blocks, and the General Forest Management Area.

Under the alternatives and the Proposed RMP, 63–87 percent of BLM-administered lands within the North Oregon Coast DPS would be included in reserves and 13–37 percent of BLM-administered lands would be included in the Harvest Land Base (Table 3-268). Table 3-268 provides a simplified summary of land use allocations within the North Oregon Coast DPS under the alternatives and the Proposed RMP. Habitat and sites of red tree voles that fall within the reserves would generally be protected by the management direction of the reserve land use allocations, which would protect existing Mature and Structurally-complex forest habitat and foster the development of additional habitat. Under all action alternatives and the Proposed RMP, management direction in reserves would largely limit stand treatments to thinning to improve habitat conditions and would generally preclude stand treatments that would remove or degrade Mature and Structurally-complex habitat (Appendix B).

Table 3-268. Land use allocations within the North Oregon Coast DPS (348,186 acres of BLM-administered lands)

<table>
<thead>
<tr>
<th>Alternative/Proposed RMP</th>
<th>Harvest Land Base (Acres)</th>
<th>Harvest Land Base (Percent)</th>
<th>Reserves (Acres)</th>
<th>Reserves (Percent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Action</td>
<td>60,459</td>
<td>17%</td>
<td>287,727</td>
<td>83%</td>
</tr>
<tr>
<td>Alt. A</td>
<td>45,902</td>
<td>13%</td>
<td>302,284</td>
<td>87%</td>
</tr>
<tr>
<td>Alt. B</td>
<td>66,944</td>
<td>19%</td>
<td>281,242</td>
<td>81%</td>
</tr>
<tr>
<td>Alt. C</td>
<td>127,240</td>
<td>37%</td>
<td>220,766</td>
<td>63%</td>
</tr>
<tr>
<td>Alt. D</td>
<td>102,294</td>
<td>29%</td>
<td>245,892</td>
<td>71%</td>
</tr>
<tr>
<td>PRMP</td>
<td>61,949</td>
<td>18%</td>
<td>286,237</td>
<td>82%</td>
</tr>
</tbody>
</table>

Alternatives A and C would not require pre-disturbance surveys and protection of known sites. The Proposed RMP would require pre-disturbance surveys north of Highway 20. The Proposed RMP would not require pre-disturbance surveys south of Highway 20, but known sites in reserves south of Highway 20 would be protected. Of the 39 known sites of red tree voles in the North Oregon Coast DPS that are within the Harvest Land Base under the Proposed RMP, 36 are south of Highway 20 and 3 are north of Highway 20. Even in the absence of pre-disturbance surveys, red tree vole habitat and sites within the North Oregon Coast DPS that fall within the reserve system would receive protection through the overall reserve network (e.g., Late-Successional Reserve and Riparian Reserve). However, there are few federally administered lands in the North Oregon Coast DPS (22 percent of the North Oregon Coast DPS is federally administered, and 9 percent of the North Oregon Coast DPS is BLM-administered lands). Even though a high proportion of habitat would be protected within reserves, land management practices
on non-federal lands reduce the potential for connectivity between the blocks of federally managed habitat (USDA FS and USDI BLM 2004).

The alternatives have differing amounts of red tree vole habitat that would be allocated to the Harvest Land Base. Alternative A would have the least amount of current habitat in the Harvest Land Base (21,715 acres or 12 percent of all habitat) and Alternative C would have the largest amount of current habitat in the Harvest Land Base (61,284 acres or 35 percent of all habitat; Table 3-269). The Proposed RMP would have 28,529 acres (16 percent) of current red tree vole habitat in the Harvest Land Base (Table 3-269).

**Table 3-269.** Existing red tree vole habitat and forecast of occupied stands within the North Oregon Coast DPS within the Harvest Land Base

<table>
<thead>
<tr>
<th>Alternative/Proposed RMP</th>
<th>RTV Habitat in the Harvest Land Base (Acres)</th>
<th>Occupied RTV Stand Forecast</th>
<th>Discovered and Protected (Number)</th>
<th>Lost (Number)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Action</td>
<td>33,810</td>
<td>211</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Alt. A</td>
<td>21,715</td>
<td>-</td>
<td>136</td>
<td></td>
</tr>
<tr>
<td>Alt. B</td>
<td>37,846</td>
<td>237</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Alt. C</td>
<td>61,284</td>
<td>-</td>
<td>383</td>
<td></td>
</tr>
<tr>
<td>Alt. D</td>
<td>58,847</td>
<td>368</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>PRMP</td>
<td>28,529*</td>
<td>129</td>
<td>49</td>
<td></td>
</tr>
</tbody>
</table>

* 20,735 acres of habitat in the Harvest Land Base north of Highway 20 (with surveys) and 7,794 acres of habitat in the Harvest Land Base south of Highway 20 (without surveys)

Alternatives B and D would include direction to conduct pre-disturbance surveys and known site management, which would protect red tree voles throughout the North Oregon Coast DPS, and therefore no future sites would be lost. Similarly, the No Action alternative would also include direction to conduct pre-disturbance surveys and known site management, but it would differ in that projects within Matrix and AMA (or a combination of Matrix/AMA and Riparian Reserve) land allocations in select watersheds in the southern portion of the North Coast DPS would be exempt from pre-disturbance surveys and site management (Huff et al. 2012), which would result in some loss of sites. The BLM did not quantify the loss of sites under the No Action alternative from these exempted watersheds and the potential loss of sites is not reflected in Table 3-269. Under Alternatives A and C, the BLM would not require surveys prior to habitat modification throughout the North Coast DPS, and 136 and 383 stands, respectively, with forecast red tree vole occupancy would be lost over 50 years. (Table 3-269). The Proposed RMP would require surveys north of Highway 20 in stands ≥ 80 years old, and 49 stands with forecast red tree vole occupancy south of Highway 20 would be lost over 50 years.

The protection of stands occupied by red tree voles within the North Oregon Coast DPS under the No Action alternative and Alternatives B and D would contribute to reducing the likelihood or the need for further listing under the Endangered Species Act. It is uncertain whether the loss of stands occupied by red tree voles within the North Oregon Coast DPS under Alternatives A and C, and the Proposed RMP would increase the likelihood or need for further listing under the Endangered Species Act because of the uncertainties around population numbers, trend, and distribution. Alternative C would result in the loss of almost three times as many occupied stands as would be lost under Alternative A. The loss of forecast occupied stands under Alternative C would be almost as much as the number of current observations of red tree voles in the North Oregon Coast DPS. The loss of occupied stands under Alternatives A and C, particularly north of Highway 20, would further reduce the distribution of red tree voles in the North Oregon Coast DPS. Red tree voles already have a sporadic and sparse distribution north of Highway 20.
within the North Oregon Coast DPS (76 FR 63734) and the detection rate of voles in this portion of the North Oregon Coast DPS (8.3 percent) is lower than south of Highway 20 (49.2 percent). Loss of sites (or occupied stands) would further reduce population interaction and connectivity in the North Oregon Coast DPS, particularly north of Highway 20. Because more occupied stands would be lost under Alternative C than under Alternative A or the Proposed RMP (Table 3-269), Alternative C would have a greater negative effect on the distribution of the red tree voles in the North Oregon Coast DPS than Alternative A or the Proposed RMP. In contrast, red tree voles in the southern portion of the DPS (south of Highway 20) are relatively more abundant, so the loss of occupied stands would not reduce the distribution of the species within this portion of its range. The Proposed RMP would result in sites lost south of Highway 20 within the Harvest Land Base. Although it is possible that regeneration harvest in unsurveyed stands < 80 years old north of Highway 20 could result in loss of red tree vole sites under the Proposed RMP, such loss is not reasonably foreseeable, for the following reasons:

- a relatively small acreage of regeneration harvest would occur in stands < 80 years old (an average of approximately 440 acres per year) north of Highway 20
- the majority of stands < 80 years old north of Highway 20 (approximately two-thirds) are not red tree vole habitat
- the probability of such stands actually being occupied by red tree vole is low (8.3 percent detection rate north of Highway 20)

For these reasons, any loss of red tree vole sites north of Highway 20 is speculative, and it is more likely that any regeneration harvest in stands < 80 years old north of Highway 20 would occur in stands that are not occupied by red tree voles. Therefore, the relative effect of the Proposed RMP on red tree voles would be substantially less than Alternatives A or C because the number of lost sites would be much lower and because sites would only be lost in the portion of the range in which red tree voles are less vulnerable. Because the population status or population trend of red tree voles in the North Oregon Coast DPS is unknown, it is also unknown the extent to which loss of occupied stands would negatively affect the overall population of red tree voles in the North Oregon Coast DPS. Nevertheless, the loss of occupied stands south of Highway 20 under the Proposed RMP would not reduce the distribution of the species within this portion of its range, because red tree voles are more abundant south of Highway 20 and loss of some occupied stands would have relatively less effect on population interaction and connectivity than north of Highway 20, and because the vast majority of red tree vole habitat south of Highway 20 (approximately 92 percent) is allocated to reserve land use allocations under the Proposed RMP.

In summary, all alternatives and the Proposed RMP would lead to an increase in habitat for red tree voles within the North Oregon Coast DPS in 50 years, and the majority of that habitat would be protected within the reserves. In addition, at least 90 percent of red tree vole observations within the North Oregon Coast DPS would be protected in the reserves under all alternatives and the Proposed RMP. The lack of provisions for pre-disturbance surveys and known site protection under Alternatives A and C would negatively affect the species. Under the Proposed RMP, the lack of surveys south of Highway 20 would also negatively affect the species, although existing known sites in the reserves would be protected. The loss of occupied stands under Alternatives A and C, particularly north of Highway 20, would further reduce the distribution of red tree voles in the North Oregon Coast DPS. Alternative C would have greater negative effect to red tree vole distribution than Alternative A or the Proposed RMP, because a greater proportion of habitat would be in the Harvest Land Base from which more sites would be lost. The No Action alternative and Alternatives B and D would include direction to conduct pre-disturbance surveys and implement known site management, which would protect red tree voles in the North Oregon Coast DPS. The Proposed RMP would include direction to survey habitat ≥ 80 years old and protect red tree voles in that portion of the range where they are most vulnerable.

Appendix S contains additional information and supporting data on the North Oregon Coast DPS of the red tree vole.
References


GeoBOB. 2013b. BLM OR RWO GeoBOB Publication Surveys Version 1 Polygon. Data snapshot –March 6, 2013. USDI BLM, Portland, OR.


Northern Spotted Owl

Key Points

- The northern spotted owl population is under severe biological stress in much of western Oregon and has an even chance of being extirpated from the Coast Range within 20 years. This population risk is predominately due to competitive interactions between northern spotted owls and barred owls.
- In the Coast Range, the BLM has no opportunity, through habitat management alone, to reduce risks to the northern spotted owl during the next 50 years, and there are no substantive differences among the alternatives and the Proposed RMP in their potential effects on those risks.
- However, under all alternatives and the Proposed RMP, the BLM would contribute to self-sustaining northern spotted owl populations in the eastern and western Cascades, and the Klamath Basin, during the next 50 years.
- The Late-Successional Reserve designs of the alternatives and the Proposed RMP make similar contributions to the development and spacing of the large habitat blocks needed for northern spotted owl conservation. Once necessary lands are reserved, additional lands provide no appreciable benefit to the development or spacing of large habitat blocks.
- The alternatives and the Proposed RMP differ substantively in their contributions to east-west northern spotted owl movement between the Coast Range and western Cascades.
- BLM-administered lands are indispensable—
  - To northern spotted owl reproduction, movement and survival in the Coast Range, and in western and central portions of the Klamath Basin; and
  - In supporting north-south species movement through the Coast Range, and east-west species movement between the Coast Range and western Cascades.
- Implementation of a barred owl control program would appreciably improve the northern spotted owl population response under all alternatives and the Proposed RMP in all modeling regions. In the North Coast and Olympic and Oregon Coast modeling regions, a barred owl control program would appreciably delay the probability of de facto extirpation of northern spotted owl populations.

Summary of Notable Changes from the Draft RMP/EIS

- The BLM has conducted additional analysis only for Alternative C, the Proposed RMP, and the No Timber Harvest reference analysis. Based on the analytical results in the Draft RMP/EIS, the modeling results in the Proposed RMP/Final EIS for Alternative C and the No Timber Harvest reference analysis generally bracket the results for the other alternatives (i.e., the No Action alternative, Alternatives A, B, and D, and Sub-alternatives B and C). Where the analytical results for Alternative C and the No Timber Harvest reference analysis are essentially indistinguishable, the results for Alternative C and the No Timber Harvest reference analysis represent the effects of the other alternatives as well.
- The BLM dropped the analysis of northern spotted owl dispersal flux (Issue 2) and the northern spotted owl source analysis (Issue 4), because the results, over time, primarily were a function of competitive interactions between northern spotted owls and barred owls, as opposed to habitat changes resulting from the alternatives. Although both analyses helped the BLM refine the placement of land use allocations for the Proposed RMP, the BLM saw no analytical value in a second set of analyses.
- As described in Appendix T, Section D, the BLM refined its northern spotted owl relative habitat suitability surfaces to address recommendations by subject matter experts. The overall result of this refinement in the relative habitat suitability surface is that the baseline condition in the Proposed RMP/Final EIS describes less nesting-roosting habitat and more dispersal habitat than...
the baseline condition in the Draft RMP/EIS. Thus, some analytical results for Alternative C and the No Timber Harvest reference analysis in the Proposed RMP/Final EIS differ slightly in absolute values from those in the Draft RMP/Final EIS.

- As described under Issue 4 of this section and in Appendix T, Section E, the BLM—
  - Incorporated new northern spotted owl fecundity and survival, and barred owl encounter rate, data from the 2016 northern spotted owl meta-analysis (Dugger et al. 2016) into its northern spotted owl population simulations, and recalibrated its northern spotted owl HexSim model with those new values.
  - Refined the modeling of a barred owl control program according to recommendations from the U.S. Fish and Wildlife Service.

**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 alternatives and 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 U.S Fish and Wildlife Service to evaluate proposed actions in accordance with the Endangered Species Act of 1973, as amended. Specifically, the BLM designed its northern spotted owl analyses to determine if, under each alternative and the Proposed RMP, the BLM would—

- Contribute to a landscape in the planning area that meets the four ‘habitat-dependent’ conservation needs of the northern spotted owl;\(^{137}\) 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.

**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

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136 The estimated amount of dispersal habitat on BLM-administered lands in 2013 increased from 511,700 acres to 571,200 acres; the amount of nesting-roosting habitat decreased from 1,358,000 acres to 1,120,000 acres.

137 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 RMP decisions.
reeffirmed 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 U.S Fish and Wildlife 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 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, and Wiens et al. 2014).

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 ESA-listed species. Thus, the Revised Recovery Plan provides a useful framework for this analysis. Of the 33 recovery actions in the Revised Recovery Plan, only 4 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).
**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. 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 treatments including restoration (such as thinning consistent with Late-Successional Reserve or Riparian Reserve management direction) and timber harvest, and wildfire. The BLM describes the creation and validation of these surfaces in Appendix T, Sections A–C. As explained in more detail in the sections on vegetation modeling and climate change in this chapter, 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.

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 2008) 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, and 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/Final EIS 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, pp. Appendix C; USDI FWS 2012). These differences arise from differences in planning needs and regulatory requirements, as well as differences in data availability. The U.S Fish and Wildlife 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 U.S Fish and Wildlife Service and BLM also relied on different relative habitat suitability surfaces and different processes to evaluate the effects of habitat change. Prior to deciding on its analytical methods, the BLM reviewed with the U.S Fish and Wildlife Service and other subject matter experts the methods developed by the U.S Fish and Wildlife Service. The BLM then incorporated or augmented those datasets and methods that met its planning needs (Appendix T).

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138 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.

139 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.
**Issue 1**

In accordance with Conservation Need 1, would the alternatives 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?

**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 5 decades and, within 30–50 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 30–50 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 T.

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, G-3).

Thomas et al. (1990, p. 24) described a “large block” of nesting, roosting, and foraging habitat as being capable of supporting 15–20 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 20–25 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 15–20 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/Final EIS 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 1–24 northern spotted owl nesting pairs.

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140 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.
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 1994, 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, 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.

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. (2012, pp. 196–200), based on modeling, determined that habitat blocks with similar spacing 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 2008a[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 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 3-270 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.

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141 Only a portion of the Oregon Eastern Cascades Physiographic Province occurs in the planning area.
Table 3-270. Metrics to identify blocks of northern spotted owl nesting-roosting habitat

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

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 3-270 (and Table 3-271, 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.

Table 3-271. Metrics to identify and map large blocks of northern spotted owl nesting-roosting habitat

<table>
<thead>
<tr>
<th>Physiographic Province</th>
<th>Median Annual Home Range (Acres)</th>
<th>Minimum Area of a Large Habitat Block (Acres)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oregon Western Cascades</td>
<td>2,900</td>
<td>54,375</td>
</tr>
<tr>
<td>Oregon Coast Range</td>
<td>4,520</td>
<td>84,750</td>
</tr>
<tr>
<td>Oregon Klamath</td>
<td>3,400</td>
<td>63,750</td>
</tr>
</tbody>
</table>

The ‘calculated minimum quantity of nesting-roosting habitat within a median annual home range’ for each physiographic province, shown in Table 3-270, 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 and Eric Forsman, both with the Oregon Cooperative Wildlife Research Unit, Oregon State University, 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 60–70 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 2008a[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.

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 habitat within the associated provincial median annual home range circle. 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 3-270, 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

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142 As explained in Appendix T, 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-acre (200-ha) circle. Thus, the 500-acre core use area, as modeled by the BLM, does not have a hard boundary because relative habitat suitability values within the 500-acre circle are diminishingly influenced by variable values up to 2,600 feet 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 feet (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-acre circle scale, as influenced by variable values up to 2,600 feet away, to better simulate how northern spotted owls select and use site locations, the BLM used the same scale to evaluate habitat block development.

143 Table 3-270 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.
formula generated the minimum area of a large block of nesting-roosting habitat for each province, shown in Table 3-271.

If the area of a habitat block equaled or exceeded the ‘minimum area of a large habitat block’ shown in Table 3-271, 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 Alternative C, 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.

**Affected Environment and Environmental Consequences**

Figure 3-179 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 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 3-179.** The current (2013) positions of northern spotted owl habitat blocks in western Oregon

Notes: Dark green blocks are capable of supporting ≥ 25 pairs; dark orange blocks are capable of supporting 1–24 pairs. Light green denotes areas within 6 miles of dark green blocks; light orange denotes areas within 3.5 miles of dark orange blocks.

**Figure 3-180** 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 3-180. 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 3-181 shows the locations of northern spotted owl habitat blocks in 30 years (2043) and 50 years (2063) under Alternative C. Figure 3-182 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, under Alternative C and the Proposed RMP, 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 because of the limited extent of BLM-administered lands.
Figure 3-181. Northern spotted owl habitat block locations in 2043 and 2063 under Alternative C
Note: The circled area is discussed in the text.
Figure 3-182. Northern spotted owl habitat block locations in 2043 and 2063 under the Proposed RMP
Note: The circled area is discussed in the text.

The substantive difference between the No Timber Harvest reference analysis, on the one hand, and Alternative C and the Proposed RMP, on the other hand, is that by 2043 a portion of the large habitat block in the northern half of the Coast Range Province (circled areas in Figure 3-181 and Figure 3-182) would not develop as well under the alternatives and the Proposed RMP as it could according to the No Timber Harvest reference analysis (Figure 3-180). However, under both Alternative C and 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 Figure 3-180, Figure 3-181, and Figure 3-182).

The remaining differences among the alternatives and the Proposed RMP and the No Timber Harvest reference analysis are negligible in terms of their overall contributions to Conservation Need 1. In fact, the different Late-Successional Reserve designs would make surprisingly similar contributions to the development of large habitat blocks over time. The alternatives and the Proposed RMP 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.

**Issue 2**

*In accordance with Conservation Need 2, would the alternatives 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?*

**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.¹⁴ 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, 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” [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.* (2012, 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.”

¹⁴ 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/Final EIS.
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 T, 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).

**Affected Environment and Environmental Consequences**

Figure 3-183 shows those lands in the planning area that supported northern spotted owl dispersal in 2013. Figure 3-184 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 Figure 3-183 and Figure 3-184.
Figure 3-183. The northern spotted owl dispersal-capable landscape (stippled areas) in 2013, according to the No Timber Harvest reference analysis.
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 3-183). 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 3-184), 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 area west of Salem), and between the Oregon Coast Range and the Oregon Western Cascades provinces (the area south of Eugene), two areas where current habitat conditions appear to create barriers or strong filters to northern spotted owl movement and survival (USDI BLM 2015, pp. 767–768).
Figure 3-185 shows the northern spotted owl dispersal-capable landscape as it would develop in 30 years (2043) and 50 years (2063) under Alternative C; Figure 3-186 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 areas in each figure indicate the substantive differences between Alternative C and the Proposed RMP, and between the Alternative C and the Proposed RMP and the No Timber Harvest reference analysis.

Figure 3-185. Dispersal-capable lands (stippled areas), as they would exist in 2043 and 2063, under Alternative C
When compared to Alternative C (Figure 3-185), by 2063 the Proposed RMP (Figure 3-186) would better support north-south northern spotted owl movement through the Oregon Coast Physiographic Province (the area west of Salem) and northern spotted owl east-west movement between the Oregon Coast and Oregon Western Cascades provinces (the area south of Eugene). However, when compared to the No Timber Harvest reference analysis (Figure 3-184), by 2063 the Proposed RMP would appear to provide slightly less support to east-west northern spotted owl movement between the Oregon Coast and Oregon Western Cascades provinces (the area south of Eugene). This is despite the BLM constructing 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 described in the Draft RMP/EIS (USDI BLM 2015, p. 768), the BLM delineation 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). 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 (even though it did not include all BLM-administered lands within 15.5 miles of this area), the BLM concludes that the Proposed RMP would maximize its contribution to Conservation Need 2.

**Issue 3**

In accordance with Conservation Need 3, would the alternatives 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 T, 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. Thus, the evaluations of Conservation Needs 1, 2, and 4 also address Conservation Need 3. The BLM needed no additional analysis.

**Issue 4**

In accordance with Conservation Need 4, would the alternatives, 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?

**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 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.  

For the Draft RMP/EIS (USDI BLM 2015, pp. 782–783, 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/Final EIS.
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 2011b). 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 3.8 percent (Dugger et al. 2016, p. 70). 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, 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. Although computer modeling commonly involves an inherent tension between improved realism and errors

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146 Within the analysis of dispersal flux (USDI 2015, pp. 767–769), the BLM evaluated northern spotted owl movement and survival. For reasons explained at the beginning of the northern spotted owl section, the BLM limited the current analysis of Alternative C and the Proposed RMP to northern spotted owl movement.

147 Due to the number of biological and physical variables that affect northern spotted owl demography, some of which are not fully understood, 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 the alternatives and the Proposed RMP and, thus, help inform BLM decision-making (Appendix T). 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 the Proposed RMP; 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.\(^{148}\)

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, pp. Appendix C; USDI FWS 2012), 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 U.S. Fish and Wildlife Service’s HexSim model in Appendix T.

**Analytical Scales**

The BLM evaluated its contributions to Conservation Needs 1 and 2 using the physiographic provinces (USDA USFS and USDI BLM 1994, 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 U.S. Fish and Wildlife Service modeling regions (Figure 3-187) were similar to the physiographic provinces but four of the regions crossed state boundaries.

\(^{148}\) 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).
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 results mainly to compare alternatives and the Proposed RMP, the BLM felt that tabulating results by entire modeling regions more accurately would reflect northern spotted owl responses to the alternatives and the Proposed RMP 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—that, in the HexSim model, affects northern spotted owl survival.149

In the 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 2016 northern spotted meta-analysis (Dugger et al. 2016). 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 (Appendix T, Section E).

**Estimated Encounter Rates**
For the Draft RMP/EIS the BLM used estimated barred owl encounter rates (Table 3-272, 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 3-272, column 4) based on the results of the 2016 northern spotted owl meta-analysis (Dugger et al. 2016).

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149 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 2011:C-59, C-68 and C-69, and USFWS 2012, pp. 10, 13) and results from the 2016 northern spotted owl meta-analysis (Dugger et al. 2016) (Appendix T). 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 3-272.** Estimated (observed) and modified barred owl encounter rates

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

* 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

Note: The estimated encounter rates for the Draft RMP/EIS came from USDI FWS 2011a, p. C-66 and Table C-25; the estimated encounter rates for the Proposed RMP/Final EIS came from the results of the 2016 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, came from the U.S. Fish and Wildlife Service (Betsy Glenn, personal communication to Eric Greenquist, September 01, 2015).

**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 2012, pp. 26–27). If the U.S. Fish and Wildlife 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 2012, p. 26). These modified encounter rates are shown in Table 3-272, column 5.

During preparation of the Draft RMP/EIS, the BLM used the estimated barred owl encounter rates (Table 3-272, 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 U.S. Fish and Wildlife Service, the BLM also conducted a second simulation of Alternative C and the No Timber Harvest reference analysis using the U.S. Fish and Wildlife Service’s modified barred owl encounter rates (Table 3-272, column 5) to help parse out the differential effect of habitat changes over time from the effects of barred owls.\(^{150}\) The BLM recognized that the relatively high

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\(^{150}\) The requirements of regulations and BLM NEPA policy compel the BLM to use current estimated barred owl encounter rates in this NEPA analysis, but afford the BLM the discretion to include additional analysis using modified encounter rates.

The U.S. Fish and Wildlife Service is removing barred owls from four study areas in California, Oregon, and Washington to evaluate the feasibility, cost and effectiveness of barred owl removal (USDI FWS 2013). The U.S. Fish and Wildlife Service completed initial experimental removals in the California study area in 2014 but postponed experimental removals in the Oregon and Washington study areas because of funding limitations. The U.S. Fish and Wildlife Service’s action is relevant to this analysis because Council on Environmental Quality regulations for implementing NEPA direct that NEPA analyses address cumulative effects, which include the effects of “reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes..."
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 in the Draft RMP/EIS allowed the BLM to evaluate the influence of barred owls coupled with minimum (Alternative C) and maximum (No Timber Harvest reference analysis) habitat development on BLM-administered lands, effectively bracketing the possible influence of the alternatives on the northern spotted owl population in a scenario of barred owl control.

The Draft RMP/EIS presented modeling results for the No Timber Harvest reference analysis using both current barred owl encounter rates and modified barred owl encounter rates to demonstrate the potential role of barred owl control independent of habitat removal, which is incorporated here by reference (USDI BLM 2015, pp.783–804). The Proposed RMP/Final EIS does not include modeling of the No Timber Harvest reference scenario with the updated and refined modified barred owl encounter rates, because the analysis in the Draft RMP/EIS already demonstrated the potential role of barred owl control independent of habitat removal, which does not represent a reasonable alternative, but a scenario that has utility only to give context to the analysis of the alternatives. Further updated and refined modeling of the No Timber Harvest reference scenario would not improve that analysis.

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 under the alternatives. As shown in columns 3 and 4 of Table 3-272, in all cases the 2016 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 each alternative and 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 repeating simulation of northern spotted owl population responses in the absence of a barred owl control program with new encounter rates, because such an analysis would provide no additional information on the effects of the alternatives or the Proposed RMP beyond the analysis in the Draft RMP/EIS. The analysis of the alternatives in the absence of a barred owl control program in the Draft RMP/EIS provides a sufficient basis for reaching the analytical conclusions on the effects of the alternatives in the absence of a barred owl control program and that analysis is incorporated here by reference (USDI BLM 2015, pp. 778–804). Instead, the BLM simulated northern spotted owl responses to the Proposed RMP in two ways: (1) using the estimated encounter rates (Table 3-272, column 4) throughout each modeling region, and (2) using the modified encounter rate (Table 3-272, column 6) in barred owl control areas and the estimated encounter rates throughout the remainder of each modeling region.

such actions” (40 CFR 1508.7). The BLM NEPA Handbook explains that “[r]easonably foreseeable future actions are those for which there are existing decisions, funding, formal proposals, or which are highly probable based on known opportunities or trends” (USDI BLM 2008, p. 59). Since the U.S. Fish and Wildlife Service does not currently propose to conduct barred owl removal beyond its current study, future barred owl control by the U.S Fish and Wildlife Service is not reasonably foreseeable for the purpose of NEPA analysis. For this reason, the BLM must use current, estimated barred owl encounter rates in its analysis of the alternatives and the Proposed RMP. This is not to suggest that the U.S Fish and Wildlife Service will never take future action to control barred owls; the BLM simply acknowledges that the U.S Fish and Wildlife Service has not made a proposal or a decision on future barred owl control at this time.

That said, the BLM NEPA Handbook establishes that the BLM also has discretion regarding analysis of actions that are not reasonably foreseeable, stating that additional analysis of speculative future actions “is not required but may be useful in some circumstances” (USDI BLM 2008, p. 59). Given this flexibility, the BLM decided to run a second No Timber Harvest reference analysis, based on the modified barred owl encounter rates developed by the U.S Fish and Wildlife Service, to help bracket the potential effects of habitat development on BLM-administered lands on northern spotted owl population responses.
Therefore, for the Proposed RMP/Final EIS, the BLM worked with the U.S. Fish and Wildlife Service to model a realistic scenario of a future barred owl control program. The U.S Fish and Wildlife Service recommended that the BLM evaluate its alternatives by delineating hypothetical barred owl control areas, and using the 2016 estimated barred owl encounter rates (Table 3-272, column 4) outside control areas and a modified encounter rate of 0.150 (Table 3-272, column 6) within the control areas. The BLM describes its process in Appendix T, Section E. The BLM delineated control areas, and modified the barred owl encounter rate within those areas, to forecast the effects of a possible future barred owl control program by the U.S Fish and Wildlife Service. The U.S Fish and Wildlife 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 (Appendix T, 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 compare the alternatives and 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.

Based on the analytical results in the Draft RMP/EIS, the modeling results in the Proposed RMP/Final EIS for Alternative C and the No Timber Harvest reference analysis bracket the results for the other alternatives (i.e., the No Action alternative, Alternatives A, B, and D, and Sub-alternatives B and C). Where the analytical results for Alternative C and the No Timber Harvest reference analysis are essentially indistinguishable, the results for Alternative C and the No Timber Harvest reference analysis represent the effects of the other alternatives as well. Those specific and quantified analyses from the Draft RMP/EIS are incorporated here by reference (USDI BLM 2015, pp. 783–804).

### 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 U.S Fish and Wildlife 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

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151 For the Draft RMP/EIS, the BLM applied the modified encounter rates [Table 3-272, column 5] for each modeling region to the entire modeling region.
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 (for example, from inbreeding depression or reduced encounters between potential mates) that can occur at low population levels and cause sudden, local extirpation) (Akçakaya 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 effect to northern spotted owl survival might provide no option for long-term northern spotted owl persistence in some regions. That is, 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. It is not possible to model populations of species such as northern spotted owls at the scale of this analysis area and fully account for small population processes. Thus, the results of population modeling at very low population levels have inherently low accuracy. Instead, as detailed below, the BLM used quasi- or pseudo-extinction thresholds in the modeling to provide reliable comparisons of population outcomes under different alternatives.

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 2012, pp. 19–21, 30–32). The U.S Fish and Wildlife Service set these levels based on what constituted a ‘high risk of extinction’ (USDI FWS 2012, p. 20) at each scale. The U.S Fish and Wildlife Service based these thresholds on northern spotted owl biology and general principles of conservation biology (Betsy Glenn, personal communication to Eric Greenquist, October 15, 2014); the U.S Fish and Wildlife 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 email to Eric Greenquist, November 13, 2013). Singleton (2012, 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 2012, p. 146, and Peter Singleton, Pacific Northwest Research Station, U.S. Forest Service, personal communication via email to Eric Greenquist, November 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 20–25 breeding pairs that support each other demographically (i.e., their territories overlap such that their offspring would readily 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, August 24, 2014.)

Regarding how to portray extinction risk over time, Akçakaya (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” (Akçakaya 2000, p. 3, parentheses in original). Therefore, the BLM plotted a cumulative time to quasi-extinction curve, for each alternative and the Proposed RMP, using the modeling region-specific quasi-extinction thresholds developed by the U.S. Fish and Wildlife Service (USDI FWS 2012, pp. 19–21, 30–32). This allowed the BLM to compare its alternatives and 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 estimates of the relative contribution of each alternative and the Proposed RMP to northern spotted owl persistence.

**Population Source Analyses**

For the Draft RMP/EIS, the BLM evaluated northern spotted owl population sources (USDI BLM 2015, pp. 800–804) and that analysis is incorporated here by reference. The BLM did not evaluate population sources for the Proposed RMP/Final EIS 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.

**Affected Environment and Environmental Consequences**

**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 3-273). However, as shown in Table 3-274 and Table 3-275, this range-wide stabilization would result mostly from population increases in the California and eastern Cascades-portions of the range. In the western Cascades, Olympic Peninsula, Oregon Coast Range and Oregon Klamath-portions of the range, simulated populations decline throughout the next 50 years.

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152 However, as described in the next section, Population Risk, the forecast of population increase in the eastern Cascades of Oregon has inherently low accuracy.
Table 3-273. No Timber Harvest reference analysis: Northern spotted owl range-wide populations (mean of 500 replicate non-stochastic simulations) by year

<table>
<thead>
<tr>
<th>Populations</th>
<th>Simulation Year</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2013</td>
</tr>
<tr>
<td>Number of Territorial Females</td>
<td>3,696</td>
</tr>
<tr>
<td>Number of All Females</td>
<td>4,763</td>
</tr>
</tbody>
</table>

Table 3-274. No Timber Harvest reference analysis: Simulated northern spotted owl populations (mean of 500 replicate non-stochastic simulations), by modeling region and year

<table>
<thead>
<tr>
<th>Modeling Region</th>
<th>Simulation Year</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2013</td>
</tr>
<tr>
<td>West Cascades-North</td>
<td>24</td>
</tr>
<tr>
<td>East Cascades-North</td>
<td>308</td>
</tr>
<tr>
<td>North Coast and Olympic*</td>
<td>159</td>
</tr>
<tr>
<td>West Cascades-Central</td>
<td>154</td>
</tr>
<tr>
<td>West Cascades-South*</td>
<td>854</td>
</tr>
<tr>
<td>Oregon Coast*</td>
<td>153</td>
</tr>
<tr>
<td>East Cascades-South*</td>
<td>170</td>
</tr>
<tr>
<td>Klamath-Siskiyou-East*</td>
<td>539</td>
</tr>
<tr>
<td>Klamath-Siskiyou-West*</td>
<td>616</td>
</tr>
<tr>
<td>Redwood Coast</td>
<td>852</td>
</tr>
<tr>
<td>Inner California Coast</td>
<td>933</td>
</tr>
</tbody>
</table>

* Modeling regions entirely or partially in the planning area

Table 3-275. No Timber Harvest reference analysis: Simulated northern spotted owl populations (mean of 500 replicate non-stochastic simulations), by physiographic province and year

<table>
<thead>
<tr>
<th>Physiographic Province</th>
<th>Simulation Year</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2013</td>
</tr>
<tr>
<td>Washington Eastern Cascades</td>
<td>182</td>
</tr>
<tr>
<td>Washington Western Cascades</td>
<td>167</td>
</tr>
<tr>
<td>Washington Western Lowlands</td>
<td>2</td>
</tr>
<tr>
<td>Washington Olympic Peninsula</td>
<td>142</td>
</tr>
<tr>
<td>Oregon Coast Range*</td>
<td>161</td>
</tr>
<tr>
<td>Oregon Willamette Valley*</td>
<td>2</td>
</tr>
<tr>
<td>Oregon Eastern Cascades*</td>
<td>226</td>
</tr>
<tr>
<td>Oregon Western Cascades*</td>
<td>1,117</td>
</tr>
<tr>
<td>Oregon Klamath*</td>
<td>519</td>
</tr>
<tr>
<td>California Cascades</td>
<td>80</td>
</tr>
<tr>
<td>California Klamath</td>
<td>1,277</td>
</tr>
<tr>
<td>California Coast Range</td>
<td>887</td>
</tr>
</tbody>
</table>

* Physiographic provinces entirely or partially in the planning area

Figure 3-188 and Figure 3-189 show forecasts of how northern spotted owl populations would change under Alternative C and the Proposed RMP, and according to the No Timber Harvest reference analysis. The forecasts include implementation of the Proposed RMP with and without a barred owl control program. The graphs show, for each western Oregon modeling region (Figure 3-188) and each western Oregon physiographic province (Figure 3-189), 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.
Simulated northern spotted owl populations (mean numbers of females from 500 replicate non-stochastic simulations) for each western Oregon modeling region, by decade, under Alternative C and the Proposed RMP, and according to the No Timber Harvest reference analysis.

Note: The Proposed RMP with and without a barred owl control program are included for comparison.

Figure 3-188.
Figure 3-189. Simulated northern spotted owl populations (mean numbers of females from 500 replicate non-stochastic simulations) for each western Oregon physiographic province, by decade, under Alternative C and the Proposed RMP, and according to the No Timber Harvest reference analysis. Note: The Proposed RMP with and without a barred owl control program are included for comparison.
In general, there would be no discernable difference in the northern spotted owl population response under any of the alternatives or sub-alternatives, 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 alternative and the Proposed RMP (i.e., the habitat provided by each alternative and the Proposed RMP 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, within the scope of the alternatives and the Proposed RMP, the northern spotted owl population response 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 3-188), and the Oregon Coast Range Physiographic Province (Figure 3-189), show no discernable difference between all alternatives and the Proposed RMP, or between those alternatives and the No Timber Harvest reference analysis. In the North Coast and Olympic Modeling Region, which includes the Olympic Peninsula of Washington (Figure 3-187), 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 3-189), 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 all alternatives and the Proposed RMP would have negligible effects on the northern spotted owl population response compared to factors that do not differ among the alternatives and the Proposed RMP, 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. Figure 3-188 and Figure 3-189 include simulations according to the Proposed RMP with both estimated barred owl encounter rates and encounter rates modified to simulate a barred owl control program (Table 3-272). 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 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 3-188) and the Oregon Western Cascades Physiographic Province (Figure 3-189), the alternatives and 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 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 3-188) and the Oregon Eastern Cascades Physiographic Province (Figure 3-189) 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 3-189), 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 3-188), 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 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 3-188) and the Oregon Klamath Physiographic Province (Figure 3-189), show no discernable differences in northern spotted owl population responses among the alternatives and the Proposed RMP. 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 3-189), the number of simulated females would decrease 33 percent in 50 years.

However, simulations of the Proposed RMP with a 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 (Figure 3-188 and Figure 3-189).

**Population Risk**

As shown in Table 3-264, at no time during the simulation of the No Timber Harvest reference analysis did the range-wide number of territorial northern spotted owl females 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 3-190 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 10 years.
Figure 3-190. No Timber Harvest reference analysis: extinction risk as a function of time, using a quasi-extinction level of 250 females in each modeling region.

Note: 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 has inherently low accuracy. This population currently is at risk from small population processes and stochastic changes to the environment.

In the Klamath-Siskiyou-East Modeling Region, Figure 3-190 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 3-191 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 would reach a 50 percent probability of dropping below the 100-female threshold in 17 years, which would increase to a 98 percent probability in 50 years. The northern spotted owl population in the North Coast and Olympic modeling region would reach 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 would be 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 3-191. No Timber Harvest reference analysis: Extinction risk as a function of time, using a quasi-extinction level of 100 females in each modeling region.

Note: 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 would drop 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 would increase 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 Alternatives and the Proposed RMP

Alternative C
As shown in Figure 3-192 and Figure 3-193, northern spotted owl extinction risks under Alternative C 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 Alternative C would not appreciably affect northern spotted owl population responses. Based on the results in the above analysis, the effects of the Alternative C and the No Timber Harvest reference analysis without barred owl control are essentially indistinguishable. Given that the effects of Alternative C and the No Timber Harvest reference analysis bracket the results for the other alternatives, the effects here for Alternative C also represent the effects of the other alternatives (i.e., the No Action alternative, Alternatives A, B, and D, and Sub-alternatives B and C).
Figure 3-192. Alternative C: extinction risk as a function of time, using a quasi-extinction level of 250 females in each modeling region

Note: 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 3-193. Alternative C: Extinction risk as a function of time, using a quasi-extinction level of 100 females in each modeling region.

Note: 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.
**Proposed RMP**

As shown in Figure 3-194 and Figure 3-195, northern spotted owl extinction risks under the Proposed RMP would not differ substantively to those under the No Timber Harvest reference analysis or Alternative C 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.

![Graph showing quasi-extinction risk as a function of time, using a quasi-extinction level of 250 females in each modeling region.](image)

**Figure 3-194.** Proposed RMP: extinction risk as a function of time, using a quasi-extinction level of 250 females in each modeling region

Note: 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 3-195. Proposed RMP: Extinction risk as a function of time, using a quasi-extinction level of 100 females in each modeling region
Note: 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.
Proposed RMP with Barred Owl Control

Figure 3-196 and Figure 3-197 show extinction risks in each western Oregon modeling region under the Proposed RMP with the implementation of a barred owl control program.

Figure 3-196. 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
Note: 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 3-197. 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
Note: 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 Figure 3-194 and Figure 3-196 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, Klamath-Siskiyou-East, and Klamath-Siskiyou-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 Figure 3-195 and Figure 3-197 indicates that, during the next 50 years, a 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. This relatively modest decrease in the extinction risk in the Oregon Coast modeling region with barred owl control under any alternative, the Proposed RMP, or the No Timber Harvest reference scenario largely reflects the currently low northern spotted owl population and the limited potential for BLM-administered lands to contribute to a stable northern spotted owl in the Oregon Coast modeling region. Nevertheless, any decrease in extinction risk in the Oregon Coast modeling region would provide additional time for the U.S. Fish and Wildlife Service to develop and implement additional conservation measures, including additional barred owl management. In the other Oregon modeling regions, barred owl control would appreciably improve northern spotted owl population response, but would have only negligible effects on extinction risk.

In summary, the northern spotted owl population is under severe biological stress in much of western Oregon, and this population risk is predominately due to competitive interactions between northern spotted owls and barred owls. Habitat management by the BLM alone will not be sufficient to produce stable populations of northern spotted owls in some (though not all) of the provinces within the planning area. However, habitat on BLM-administered lands plays an indispensable role in northern spotted owl conservation in several provinces. Habitat management by the BLM combined with the mitigation measure related to barred owl management would result in substantially improved outcomes for the northern spotted owl populations. Thus, the greatest contribution to conservation and recovery of the northern spotted owl by the BLM would come from a combination of habitat management and participation in barred owl management.

**Issue 5**

*In accordance with Recovery Action 6, would the alternatives 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?*

**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 T, 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 overlaps the Harvest Land September 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 alternatives and 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 alternatives and the Proposed RMP include 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 alternatives and 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 silvicultural 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 alternatives and the Proposed RMP, the BLM needs no additional analysis to determine that the alternatives and the Proposed RMP are 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.

As described in Appendix T, Section D, the BLM refined its northern spotted owl relative habitat suitability surfaces in the Proposed RMP/Final EIS. The overall result of this refinement in the relative habitat suitability surface is that the baseline condition in the Proposed RMP/Final EIS describes less nesting-roosting habitat and more dispersal habitat than the baseline condition in the Draft RMP/EIS.

Because there are no recommended thresholds related to Recovery Action 6, the interpretation of the analytical results is limited to evaluating the relative outcomes under the alternatives and the Proposed RMP and the trajectory of habitat over time. Although the use of the refined relative habitat suitability surface in the Proposed RMP/Final EIS has changed the absolute values for ‘strongly avoided’ habitat, the relative outcomes for the alternatives and trajectory of the amount of ‘strongly avoided’ habitat from the Draft RMP/EIS are still valid.

For this issue, the Proposed RMP/Final EIS has reanalyzed the No Timber Harvest reference analysis and Alternative C and has analyzed the Proposed RMP with the refined relative habitat suitability surfaces.
The other alternatives (the No Action alternative, Alternatives A, B, and D, and Sub-alternatives B and C) would have the same outcomes relative to Alternative C and the No Timber reference analysis as described in the Draft RMP/EIS.

**Affected Environment and Environmental Consequences**

Table 3-276 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; and (2) northern spotted owl critical habitat.

Table 3-276. 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

<table>
<thead>
<tr>
<th>Moist Forest BLM-administered Habitat Strongly Avoided</th>
<th>2013 (Acres)</th>
<th>2023 (Acres)</th>
<th>2033 (Acres)</th>
<th>2043 (Acres)</th>
<th>2053 (Acres)</th>
<th>2063 (Acre)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reserved Lands</td>
<td>37,808</td>
<td>35,987</td>
<td>30,908</td>
<td>25,866</td>
<td>24,696</td>
<td>24,021</td>
</tr>
<tr>
<td>Critical Habitat Units</td>
<td>69,042</td>
<td>62,050</td>
<td>47,489</td>
<td>39,272</td>
<td>35,962</td>
<td>33,828</td>
</tr>
</tbody>
</table>

According to the No Timber Harvest reference analysis, forest growth combined with the effects of wildfire would result in a net decrease in 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 in the decision area in each decade through 2063.

**Figure 3-198** 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 Alternative C and the Proposed RMP. Because the alternatives and the Proposed RMP reserve different lands, the acres of non-habitat are not directly comparable. Under Alternative C, the net acres of moist forest non-habitat in reserve land use allocations would decrease by 35 percent during 50 years, resulting in a net increase of 26,700 acres of northern spotted owl habitat in reserves. 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. The other alternatives (the No Action alternative, Alternatives A, B, and D, and Sub-alternatives B and C) would have the same relative outcomes on acres of non-habitat in moist forest reserve land use allocations in comparison to Alternative C and the No Timber reference analysis as described in the Draft RMP/EIS, and that analysis is incorporated here by reference (BLM 2015, pp. 804–808).

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153 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 3-198. 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
Note: The No Timber Harvest reference analysis is included for comparison.

Figure 3-199 shows how the acres of the moist forest non-habitat in critical habitat units on BLM-administered lands would change over time under Alternative C and the Proposed RMP. Because the critical habitat units are identical under Alternative C and the Proposed RMP, changes in the acres of non-habitat are directly comparable between the alternatives and the Proposed RMP. Under Alternative C, the net acres of moist forest non-habitat in critical habitat would increase by 44 percent during the next 50 years, which corresponds to a net decrease of 30,800 acres of northern spotted owl habitat. 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. The other alternatives (the No Action alternative, Alternatives A, B, and D, and Sub-alternatives B and C) would have the same relative outcomes on acres of moist forest non-habitat in critical habitat units in comparison to Alternative C and the No Timber reference analysis as described in the Draft RMP/EIS, and that analysis is incorporated here by reference (USDI BLM 2015, pp. 804–808).
Therefore, under all alternatives and the 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, all alternatives and 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. However, in designated critical habitat in the moist forest, Alternative C and Sub-alternative C would result in an increase in the acres of non-habitat over time from current amounts, whereas the Proposed RMP would result in a decrease in the acres of non-habitat.

**Issue 6**

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

**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 U.S Fish and Wildlife 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 U.S Fish and Wildlife 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 U.S Fish and Wildlife 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 U.S Fish and Wildlife 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 each alternative and 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. Thus, Swindle et al. indicates that protection of forest habitat within 660 feet of sites would help maintain extant northern spotted owl sites, even though Recovery Action 10 does not specifically recommend such protection. Therefore, for alternatives or the Proposed RMP that include protection of all known and historical northern spotted owl sites, the BLM included management direction to maintain all forest habitat within 660 feet of those sites.

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.

**Affected Environment and Environmental Consequences**

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, as explained at the beginning of Chapter 3, the BLM updated the baseline data for the Proposed RMP/Final EIS 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 3-200 shows the number of northern spotted owl known sites that would be at or above Recovery Action 10 habitat thresholds, during each decade, under Alternative C and the Proposed RMP. In 50 years, Alternative C would support 1,703 northern spotted owl known sites at or above Recovery Action 10 thresholds, a 22 percent increase from the current 1,395 sites. In 50 years, the Proposed RMP would support 1,874 northern spotted owl known sites at or above Recovery Action 10 thresholds, a 36 percent increase from the current 1,380 sites. Under Alternative C, in 50 years BLM-administered lands would support 69 percent of the 2,465 northern spotted owl known sites associated with those lands at or above Recovery Action thresholds whereas the Proposed RMP would support 76 percent of those sites at or above those thresholds. The other alternatives (the No Action alternative, Alternatives A, B, and D, and Sub-alternatives B and C) would have the same relative outcomes on the number of northern spotted owl known sites that would be at or above Recovery Action 10 habitat thresholds in comparison to Alternative C and the No Timber reference analysis as described in the Draft RMP/EIS, and that analysis is incorporated here by reference (USDI BLM 2015, pp. 808–811).

Figure 3-200. Number of northern spotted owl sites that would be at or above Recovery Action 10 habitat thresholds during each decade
Note: The No Timber Harvest reference analysis is included for comparison.

**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?
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 and Appendix T, Section A, 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 alternatives and the Proposed RMP vary in the management direction for post-fire silvicultural activities in reserve land use allocations and critical habitat. 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 each alternative and the Proposed RMP.

Affected Environment and Environmental Consequences

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 3-277 shows the acres of reserve land use allocations (Late-Successional Reserve and Riparian Reserve that is interspersed within Late-Successional Reserve) that would be affected by high- and moderate-intensity wildfire during each decade. Because simulated wildfires are identical under all alternatives and the Proposed RMP, the acres of affected critical habitat are identical under all alternatives and the Proposed RMP.

Table 3-277. Acres of reserve land use allocations that would be affected by high- and moderate-intensity wildfire during each decade

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>No Action</td>
<td>3,500</td>
<td>3,700</td>
<td>3,900</td>
<td>600</td>
<td>2,300</td>
</tr>
<tr>
<td>Alt. A</td>
<td>10,000</td>
<td>7,000</td>
<td>12,800</td>
<td>5,900</td>
<td>12,200</td>
</tr>
<tr>
<td>Alt. B</td>
<td>7,200</td>
<td>4,900</td>
<td>9,000</td>
<td>1,800</td>
<td>6,700</td>
</tr>
<tr>
<td>Sub. B</td>
<td>8,600</td>
<td>6,600</td>
<td>11,600</td>
<td>3,500</td>
<td>10,900</td>
</tr>
<tr>
<td>Alt. C</td>
<td>7,300</td>
<td>4,700</td>
<td>9,900</td>
<td>1,500</td>
<td>6,900</td>
</tr>
<tr>
<td>Sub. C</td>
<td>9,000</td>
<td>6,000</td>
<td>13,600</td>
<td>6,600</td>
<td>9,400</td>
</tr>
<tr>
<td>Alt. D</td>
<td>4,000</td>
<td>2,900</td>
<td>7,400</td>
<td>1,400</td>
<td>5,700</td>
</tr>
<tr>
<td>PRMP</td>
<td>7,300</td>
<td>4,700</td>
<td>8,800</td>
<td>1,900</td>
<td>6,400</td>
</tr>
</tbody>
</table>

Table 3-278 shows the acres of northern spotted owl critical habitat that would be affected by high- and moderate-intensity wildfire during each decade. Because the simulated fires are identical under all alternatives and the Proposed RMP, the acres of affected critical habitat are identical under all alternatives and the Proposed RMP.
Table 3-278. Acres of northern spotted owl critical habitat that would be affected by high- and moderate-intensity wildfire during each decade

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Critical Habitat</td>
<td>9,000</td>
<td>6,500</td>
<td>8,900</td>
<td>3,700</td>
<td>10,200</td>
</tr>
</tbody>
</table>

With respect to the treatment of areas affected by wildfire:

Under the No Action alternative:
- Salvage operations in the Late-Successional Reserve and northern spotted owl Reserved Pair Areas are allowed only if they would not diminish habitat suitability now or in the future (USDA FS and USDI BLM 1994, pp. C-13, D-16, D-17).
- Within Managed Late-Successional Areas, salvage “always should be guided by the objective of maintaining adequate amounts of suitable habitat” (USDA FS and USDI BLM 1994, p. C-26).
- Salvage following catastrophic events is permitted in the Riparian Reserve “if required to attain Aquatic Conservation Strategy objectives” (USDA FS and USDI BLM 1994, p. C-32).
- Salvage is permitted in other land use allocations to the extent it complies with snag and down woody debris requirements.

Under all action alternatives:
- Implement 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.
- Regenerate large-scale disturbances within the dry forest Late-Successional Reserve within 5 years using a mixture of plant species appropriate to the site. The BLM would leave at least 10 percent of the disturbance area unstocked with trees, in gaps at least one-quarter-acre in size for at least 2 decades, to accelerate the development of heterogeneous fuel conditions.
- Implement timber salvage operations in the Harvest Land Base (including in northern spotted owl critical habitat in the Harvest Land Base) to recover economic value and minimize commercial loss or the deterioration of damaged trees. Salvage operations would comply with alternative-specific stand-level snag and down woody debris retention standards.
- Prohibit timber salvage in the Riparian Reserve.

In the Late-Successional Reserve and critical habitat within the Late-Successional Reserve:
- Under Alternative A, Alternative B, Alternative D, and Sub-alternative B, the BLM would prohibit timber salvage in the Late-Successional Reserve except when necessary to protect public health and safety, or to keep roads and other infrastructure clear of debris. Under Alternative A, the Late-Successional Reserve would completely encompass northern spotted owl critical habitat and, thus, would prohibit timber salvage in all critical habitat.
- Under Alternative C and Sub-alternative C, the BLM would implement timber salvage operations in the Late-Successional Reserve to recover economic value and minimize commercial loss or the deterioration of damaged trees. For disturbances that kill at least 60 percent of overstory trees on contiguous areas of at least 10 acres, timber salvage would remove all dead wood volume in excess of down wood and snag requirements. For other disturbances, timber salvage would occur only as needed to reduce hazards to public health and safety.

In critical habitat within the Harvest Land Base:
- Under Alternative A, no critical habitat occurs in the Harvest Land Base.
• Under Alternative B and Sub-alternative B, for disturbances in Low Intensity Timber Areas (moist forest) that kill at least 60 percent of overstory trees on contiguous areas of at least 10 acres, timber salvage would follow the management direction for regeneration harvest. For all other disturbances (in the moist and dry forest), timber salvage would remove all dead wood volume in excess of down wood and snag requirements.

• Under Alternative C and Sub-alternative C, the BLM would implement timber salvage operations in the Late-Successional Reserve to recover economic value and minimize commercial loss or the deterioration of damaged trees. In High Intensity Timber Areas, timber salvage would remove all merchantable dead and down timber from disturbed areas (although areas probably would be clearcut to also remove live trees). In other portions of the Harvest Land Base, timber salvage would remove all merchantable dead wood volume in excess of down wood and snag requirements.

• Under Alternative D, for disturbances that kill at least 60 percent of overstory trees on contiguous areas of at least 10 acres, timber salvage would remove all dead wood volume in excess of down wood and snag requirements. For other disturbances, timber salvage would occur only as needed to reduce hazards to public health and safety.

Under the Proposed RMP:

• 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 where the BLM determines that removal is economically viable.
  • In salvage harvest units following disturbance events, the BLM would retain at least 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.
  • 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 (including surviving trees) within 5 years of harvest.

• For areas without timber salvage harvest after disturbance events, 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 (including surviving trees) 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 where the BLM determines that removal is economically viable.
  • In salvage harvest units following disturbance events, the BLM would retain at least 5 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.
  • 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 (including surviving trees) within 5 years of harvest.
For areas without timber salvage harvest after disturbance events, 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 (including surviving trees) 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 where the BLM determines that removal is economically viable.
  - In salvage harvest units following disturbance events, the BLM would retain at least 5 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.
  - 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 (including surviving trees) within 5 years of harvest.
- For areas without timber salvage harvest after disturbance events, the BLM would 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 trees) within 10 years of the disturbance event, to the extent possible given safety and operational constraints.

Therefore, in the Late-Successional Reserve and Riparian Reserve, the No Action alternative, each of the action alternatives, and the Proposed RMP would manage areas modified by wildfire to “conserve and restore habitat elements that take a long time to develop, such as large trees, medium and large snags, and downed wood.” However, when wildfire kills at least 60 percent of overstory trees on contiguous areas of at least 10 acres in the Late-Successional Reserve, Alternative C and Sub-alternative C would allow the removal of all dead wood volume in excess of down wood and snag retention standards, which would be the minimum level needed “to conserve and restore habitat elements.”

In northern spotted owl critical habitat in the Harvest Land Base, the No Action alternative and Alternative B, Alternative D, Sub-alternative B, and the Proposed RMP would allow salvage operations that meet down wood and snag retention standards, sufficient “to conserve and restore habitat elements.” Under the No Action alternative and Alternative B, Alternative D, Sub-alternative B, and the Proposed RMP, timber salvage would not cause the loss of dispersal or nesting-roosting habitat and would retain sufficient down wood or snags in treatment areas to conserve and restore habitat elements. Alternative A has no critical habitat in the Harvest Land Base. Alternative C and Sub-alternative C would allow the removal of all dead wood from burned areas in High Intensity Timber Areas, which would be inconsistent with the standard “to conserve and restore habitat elements.” Because of this difference in management direction, the alternatives and Proposed RMP would differ in stand-level effects of timber salvage, in that the No Action alternative and Alternative B, Alternative D, Sub-alternative B, and the Proposed RMP would conserve and restore habitat elements after disturbance, and Alternative C and Sub-alternative C would not conserve and restore habitat elements after disturbance. However, timber salvage would occur on such a small acreage over the next 50 years (see the Forest Management section of this chapter) that it would not have any landscape-scale effects or alter landscape patterns of habitat under any alternative or the Proposed RMP.

**Issue 8**

*In accordance with Recovery Action 32, would the alternatives 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?*
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 T, 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 T, 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.

Affected Environment and Environmental Consequences

BLM-administered lands in the planning area currently support 426,100 acres of strongly-selected-for habitat and 860,200 acres of Mature Multi-layered 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 Multi-layered 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, such as thinning consistent with Late-Successional Reserve or Riparian Reserve management direction.

Figure 3-201 shows the acres of strongly-selected-for habitat that would occur on BLM-administered lands during the next 50 years under Alternative C and the Proposed RMP.\textsuperscript{154} Both Alternative C and the

\textsuperscript{154} As explained at the beginning of Chapter 3, 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 Alternative C and the No Timber Harvest reference analysis. Thus, the results for Alternative C and 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
Proposed RMP include management actions for forest restoration, such as thinning consistent with Late-Successional Reserve or Riparian Reserve management direction. Under Alternative C, BLM-administered lands would support 407,800 acres of strongly-selected-for habitat in ten years, a 4 percent decrease from the current level, and then would support increasing acres of strongly-selected-for habitat each subsequent decade, reaching 550,200 acres in 50 years, a 29 percent increase from the current level. Under the Proposed RMP, BLM-administered lands would support 430,700 acres of strongly-selected-for habitat in 10 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. The other alternatives (the No Action alternative, Alternatives A, B, and D, and Sub-alternatives B and C) would have the same relative outcomes on the acres of strongly-selected-for habitat in comparison to Alternative C and the No Timber reference analysis as described in the Draft RMP/EIS, and that analysis is incorporated here by reference (BLM 2015, pp. 814–815).

Figure 3-201. Change in the acres of ‘strongly-selected-for’ habitat on BLM-administered lands in western Oregon
Note: The No Timber Harvest reference analysis is included for comparison.

Figure 3-202 shows the acres of Mature Multi-layered Canopy and Structurally-complex forest that would occur on BLM-administered lands during the next 50 years under each alternative. Alternative D would result in a 32 percent increase in Structurally-complex forest, exceeding that of the No Timber Harvest reference analysis. Sub-alternative B would result in a 29 percent increase, followed by Alternative B (26 percent), the Proposed RMP (24 percent), and Alternative A and Sub-alternative C (23 percent each), Alternative C (12 percent) and the No Action alternative (11 percent).

Multi-layered Canopy and Structurally-complex forest in 2013, than were included in the baseline data for the Proposed RMP.
Thus, under all alternatives and the Proposed RMP, the BLM would implement management actions for forest restoration, such as thinning consistent with Late-Successional Reserve or Riparian Reserve management direction, and would maintain well-distributed, older and more structurally-complex multilayered conifer forests, even though the alternatives and the Proposed RMP would differ substantively in the amounts.
References


Wagner, F. F., and R. G. Anthony. 1999. Reanalysis of northern spotted owl habitat use on the Miller Mountain Study Area; Final Report for Step 1: Identification and evaluation of northern spotted owl habitat in managed forests. Oregon Cooperative Fish and Wildlife Research Unit, Oregon State University, Corvallis, OR.


Northern Spotted Owl Critical Habitat

Key Points
- Under all alternatives and the Proposed RMP, the BLM would manage northern spotted owl critical habitat in accordance with the “special management considerations or protections” mandated by the final rule on critical habitat.
- BLM-administered lands in western Oregon currently support 1,554 known (including historic) northern spotted owl sites in critical habitat units, of which 74 percent meet Recovery Action 10 habitat thresholds. In 50 years, the number of northern spotted owl sites in critical habitat meeting Recovery Action 10 thresholds would increase to 81 percent under Alternative C and 89 percent under the Proposed RMP.
- BLM-administered lands in western Oregon currently support 346,200 acres of structurally-complex forest in critical habitat units. In 50 years, the acres of structurally-complex forest in critical habitat units would increase by 25 percent under Alternative C and 44 percent under the Proposed RMP.

Summary of Notable Changes from the Draft RMP/EIS
- The Proposed RMP/Final EIS has conducted additional analysis only for the Proposed RMP, Alternative C, and the No Timber Harvest reference analysis. Based on the analytical results in the Draft RMP/EIS, the modeling results in the Proposed RMP/Final EIS for Alternative C and the No Timber Harvest reference analysis generally bracket the results for the other alternatives (i.e., the No Action alternative, Alternatives A, B, and D, and Sub-alternatives B and C). Where the analytical results for Alternative C and the No Timber Harvest reference analysis are essentially indistinguishable, the results for Alternative C and the No Timber Harvest reference analysis represent the effects of the other alternatives as well.
- As described in Appendix T, Section D, the BLM refined its northern spotted owl relative habitat suitability surfaces to address recommendations by subject matter experts. The overall result of this refinement in the relative habitat suitability surface is that the baseline condition in the Proposed RMP/Final EIS describes less nesting-roosting habitat and more dispersal habitat than the baseline condition in the Draft RMP/EIS. Thus, some analytical results for Alternative C and the No Timber Harvest reference analysis in the Proposed RMP/Final EIS differ slightly in absolute values from those in the Draft RMP/EIS.

Background
Table 3-279 shows the amounts of northern spotted owl critical habitat on BLM-administered lands in the planning area that would be in the Harvest Land Base under each alternative. In Alternative A, small acreages of critical habitat would be in the Harvest Land Base, and in Alternative B, Sub-alternative B, and the Proposed RMP, small acreages of critical habitat would be in the Moderate Intensity Timber Area because of the accumulated area of very small differences between the critical habitat and BLM-administered lands spatial data.
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<td>General Forest Management Area</td>
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<td>71,387</td>
<td>30,306</td>
<td>-</td>
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<td>-</td>
<td>-</td>
<td>63,657</td>
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<tr>
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<td>878</td>
<td>339</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>909</td>
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<td>-</td>
<td>200,930</td>
<td>135,995</td>
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<td>744</td>
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<td>132,572</td>
<td>49,365</td>
<td>89,571</td>
<td>45,089</td>
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<tr>
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<td>-</td>
<td>-</td>
<td>1,571</td>
<td>-</td>
<td>306</td>
<td>-</td>
<td>-</td>
<td>-</td>
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<tr>
<td>Owl Habitat Timber Area</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>140,492</td>
<td>-</td>
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<tr>
<td>Harvest deferral‡</td>
<td>-</td>
<td>-</td>
<td>-</td>
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<td>-</td>
<td>165,547</td>
<td>-</td>
</tr>
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| Totals                                                  | 354,524           | 1,980          | 204,837        | 80,010         | 292,072        | 181,391        | 307,542        | 172,629      |
| Percent of Total Critical Habitat*                       | 29.2%             | 0.2%           | 16.9%          | 6.6%           | 24.1%          | 14.9%          | 25.3%          | 14.2%        |

* There are 1,213,975 acres of northern spotted owl critical habitat on BLM-administered lands in the planning area.
† Estimated acres that would be removed from the Harvest Land Base due to predicted marbled murrelet occupancy
‡ Estimated acres where harvest would be delayed until Recovery Action 10 thresholds are met

Sec. 3(5)(A)(i) of the Endangered Species Act 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

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 61 critical habitat subunits within 11 critical habitat units (77 FR 71918). Of these, 31 critical habitat subunits—within all or parts of 7 critical habitat units—occur in the planning area. To evaluate the potential effects of a proposed project on northern spotted owl critical habitat, the U.S Fish and Wildlife 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 each alternative and 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 under each alternative and the Proposed RMP. In addition, as described below, the BLM evaluated the consistency of the alternatives and the Proposed RMP with each of the considerations to the extent it could develop relevant data.

**Issue 1**

*In accordance with Consideration (1) for the Oregon Western Cascades and Coast Range, and Oregon Eastern Cascades, would the alternatives 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?*

**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 1–4, 6, and 8. Although the evaluations of Northern Spotted Owl Issues 1–4 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 1–4, 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.
Affected Environment and Environmental Consequences

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, as explained at the beginning of Chapter 3, the BLM updated the baseline data for the Proposed RMP/Final EIS 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 3-203 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 Alternative C and the Proposed RMP. In 50 years, Alternative C would support 1,259 northern spotted owl known sites at or above Recovery Action 10 thresholds, a 10 percent increase from the current 1,144 sites. 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. Under Alternative C, in 50 years BLM-administered lands would support 81 percent of the 1,554 northern spotted owl known sites associated with critical habitat on those lands at or above Recovery Action thresholds whereas the Proposed RMP would support 89 percent of those sites at or above those thresholds. The other alternatives (the No Action alternative, Alternatives A, B, and D, and Subalternatives B and C) would have the same relative outcomes on 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 in comparison to Alternative C and the No Timber reference analysis as described in the Draft RMP/EIS, and that analysis is incorporated here by reference (BLM 2015, pp. 820–822).
Figure 3-203. 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 during each decade. Note: 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 3-204 shows changes in the acres of strongly-selected-for habitat, in critical habitat, on BLM-administered lands in western Oregon under Alternative C and the Proposed RMP. The results are similar to those for all BLM-administered lands, as discussed under Northern Spotted Owl Issue 8 (Figure 3-201). Under Alternative C, BLM-administered lands would support 335,200 acres of strongly-selected-for habitat in 10 years, a 3 percent decrease from the current level, and then would support increasing acres of strongly-selected-for habitat each subsequent decade, reaching 434,900 acres in 50 years, a 26 percent increase from the current level. Under the Proposed RMP, BLM-administered lands would support 352,100 acres of strongly-selected-for habitat in 10 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. The other alternatives (the No Action alternative, Alternatives A, B, and D, and Sub-alternatives B and C) would have the same relative outcomes on the acres of strongly-selected-for habitat in critical habitat in comparison to Alternative C and the No Timber reference analysis as described in the Draft RMP/EIS, and that analysis is incorporated here by reference (BLM 2015, pp. 822–823).

As explained at the beginning of Chapter 3, 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 Alternative C and the No Timber Harvest reference analysis. Thus, the results for Alternative C and 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.
Figure 3-204. Change in the acres of ‘strongly-selected-for’ habitat in critical habitat on BLM-administered lands in western Oregon
Note: The No Timber Harvest reference analysis is shown for comparison.

As verified by these analyses and those that address Northern Spotted Owl Issues 1–4, under all alternatives and 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. However, the level of conservation would vary substantially by alternative and the Proposed RMP.

**Issue 2**

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

**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 1–4. 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.

**Affected Environment and Environmental Consequences**

As evidenced by the evaluations of Northern Spotted Owl Issues 1, 2, and 4, under all alternatives and the 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 lands 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.

**Issue 3**

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

**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.

**Affected Environment and Environmental Consequences**

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 all alternatives and 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 lands 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.

**Issues 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 alternatives 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/EIS). 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 alternatives or 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 an alternative due to an ESA Sec. 9 prohibition.

The BLM determined that its evaluations of Northern Spotted Owl Issues 1–4 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 its planning alternatives. 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 alternatives 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 2011). 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 alternatives and the Proposed RMP either do not address these considerations or address 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 1–4, 6, and 8, are directly pertinent to demonstrating, and sufficient to demonstrate, the emphasis of each alternative on conserving and recovering the northern spotted owl. Therefore, the BLM determined that this issue requires no additional analysis.
References
Oregon Silverspot Butterfly

Key Points
- There are no observations of this species on BLM-administered lands, and potential habitat is likely unoccupied.

Summary of Notable Changes from the Draft RMP/EIS
The BLM added evaluation of the location of potential habitat on BLM-administered lands relative to dispersal capabilities of Oregon silverspot butterflies.

Background
The U.S. Fish and Wildlife Service listed the Oregon silverspot butterfly (*Speyeria zerene hippolyta*) as a threatened species under the Endangered Species Act and designated critical habitat on July 2, 1980 (45 FR 44935). Habitat for the Oregon silverspot butterfly includes three types of grasslands: salt-spray meadows on coastal headlands, stabilized dunes, and coastal mountain meadows. Early blue violets (*Viola adunca*) or other species of *Viola* are an obligate food source. Violet abundance sufficient to support populations of Oregon silverspot butterfly occurs only in open grassland conditions; groups of violets in small forest clearings are inadequate to support the butterflies (USDI FWS 2001 and USDI FWS 2013). The Oregon silverspot butterfly is known or suspected to occur in five counties in Oregon, including Clatsop, Lane, Lincoln, Tillamook, and Yamhill (USDI FWS 2013). Although there are no observations of this species on BLM-administered lands (GeoBOB FaunaObs, March 6, 2013), Oregon silverspot butterflies are capable of dispersing five miles in the direction of prevailing winds (USDI FWS 2001, p. 10).

Threats to the Oregon silverspot butterfly include habitat loss due to commercial or residential development, public motorized vehicle use, excessive livestock grazing, fire suppression, ecological succession (USDI FWS 2001, p. 18 and USDI FWS 2013), small population size, and climate change (USDI FWS 2011, p. 9). In the absence of disturbance, open coastal grasslands favorable for abundant violets will develop into shrub land or forestlands through ecological succession and become unsuitable for Oregon silverspot butterflies. Historically, wind erosion, wildfires, fires set by Native Americans, and grazing by wildlife maintained habitat for the silverspot butterflies (USDI FWS 2001, pp. 15–16 and USDI FWS 2013). In addition, competition with invasive plants can reduce violet abundance and nectar sources, thereby reducing habitat quality for the Oregon silverspot butterfly (USDI FWS 2011, pp. 18–19).

The Revised Recovery Plan for the Oregon Silverspot Butterfly recommends four recovery actions:
- Protect and enhance existing habitat in each of six habitat conservation areas (Long Beach Peninsula, Clatsop Plains, Coastal Mountains, Cascade Head, Central Coast, and Del Norte)
- Determine ecological requirements, population constraints, and management needs of the Oregon silverspot butterfly
- Monitor the butterfly’s status and its habitat
- Reduce take (USDI FWS 2001, pp. 42–68)

Critical habitat for the Oregon silverspot butterfly is located on 438 acres administered by the Siuslaw National Forest (USDI FWS 2001). There is no designated critical habitat for this species on BLM-administered lands. Therefore, the BLM will not analyze effects to critical habitat for this species further.
**Issue 1**
*What levels of habitat for the Oregon silverspot butterfly would be available under each alternative?*

**Summary of Analytical Methods**
In this analysis, the BLM considered habitat for the Oregon silverspot butterfly to be coastal grasslands/dunes identified in the 2012 GNN as either California northern coastal grassland, Mediterranean California northern coastal dune, or north Pacific maritime coastal sand dune and strand ecological systems within Clatsop, Lane, Lincoln, Tillamook, and Yamhill counties.

**Affected Environment and Environmental Consequences**
There are 19,302 acres of potential coastal grassland/dunes habitat for the Oregon silverspot butterfly in the planning area, of which, 167 acres occur on BLM-administered lands. The BLM does not have site-specific data on habitat conditions of those 167 acres or information on their occupancy by the Oregon silverspot butterfly. There are 6,775 acres of coastal grassland/dunes habitat within five miles of known observations (based on ORBIC 2015) of the Oregon silverspot butterfly, but none of these acres are on BLM-administered lands. The 167 acres of habitat on BLM-administered lands is unlikely to be occupied by Oregon silverspot butterflies, because those habitat patches are beyond the reported dispersal capabilities of the species.

Under the No Action alternative, all 167 acres of potential habitat would be within areas designated as closed for public motorized access. Under the action alternatives and the Proposed RMP, 55 percent of potential Oregon silverspot butterfly habitat would be within areas designated as closed for public motorized access, and 45 percent would be within areas designated as limited to designated roads and trails with possible timing or vehicle restrictions. The action alternatives and the Proposed RMP would designate 75–77 acres as limited for public motorized access. There are inaccuracies in this data associated with intersecting modeled habitat for the Oregon silverspot butterfly and public motorized access designations. These inaccuracies are likely similar in magnitude to the slight differences among the action alternatives and the Proposed RMP. Therefore, the action alternatives and the Proposed RMP would increase the potential for habitat loss due to public motorized vehicle activities, since the designation on approximately 55 percent of habitat would change from closed to limited, but given the limitations of the data, there is not a meaningful difference in effects among the action alternatives and the Proposed RMP. In addition, effects to Oregon silverspot butterflies themselves would not be reasonably foreseeable, because this habitat is likely unoccupied.

Under all action alternatives and the Proposed RMP, the BLM would manage naturally occurring special habitats, such as natural meadows, to maintain their ecological function (Appendix B). In addition, all alternatives and the Proposed RMP include management direction to implement measures to prevent, detect, and rapidly control new invasive species infestations and to use manual, mechanical, cultural, chemical, and biological treatments to manage invasive species infestations (Appendix B).
References
Oregon Spotted Frog

Key Points

- Under all alternatives and the Proposed RMP, implementation of management direction and associated rangeland health standards would prevent negative effects to Oregon spotted frog eggs, tadpoles, or adults at occupied sites.
- All alternatives and the Proposed RMP would control invasive species infestations (e.g., reed canary grass) and avoid development in wetlands that would lead to Oregon spotted frog habitat loss.

Summary of Notable Changes from the Draft RMP/EIS

The BLM updated the analytical assumptions for Oregon spotted frog habitat based on information from the U.S. Fish and Wildlife Service.

Background

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 76–90 percent of its historical range (78 FR 53588). Historically, the spotted frog occurred from British Columbia, Canada, to northeastern California. It is currently found in five subbasins within the planning area: McKenzie River, Middle Fork Willamette, Upper Klamath, Upper Klamath Lake, and Williamson River. The U.S. Fish and Wildlife Service listed the Oregon spotted frog as a threatened species under the Endangered Species Act 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 in size, although sites greater than 9 acres in size may be necessary to support stable, local populations. Spotted frogs lay their eggs in wetland areas with low amounts of herbaceous cover, but rarely at bare or rocky sites (USDI FWS 2011). 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.

Threats to Oregon spotted frogs include loss of wetland habitat due to human development, agriculture conversion, livestock grazing, and introduction of nonnative plant and animal species (78 FR 53593). Livestock can consume and trample riparian vegetation, compact soil in riparian and upland areas, and defecate in water sources. The resulting increases in temperature, sediment production, and changes in water quality can negatively affect Oregon spotted frog habitat (USDI FWS 2011). 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 of their habitat. Removal or reduction of reed canary grass can improve the quality of the breeding habitat for spotted frogs.

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, 8 acres of which occurs on BLM-administered lands in the Klamath Falls Field Office (78 FR 53538). A final rule is expected in 2016.
**Issue 1**

*What levels of habitat for the Oregon spotted frog would be available under each alternative?*

**Summary of Analytical Methods**

Occupied and formerly occupied habitats are represented by the extent of proposed critical habitat for the spotted frog (B. White, U.S. Fish and Wildlife Service, Oregon State Office, Consultation Branch Manager, personal communication, Sept. 4, 2015). In cooperation 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. This assumption results in more habitat modeled as spotted frog habitat than is encompassed by proposed critical habitat. 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.

Because the U.S. Fish and Wildlife Service identified livestock grazing as a threat, the BLM tabulated how much spotted frog habitat in the decision area was coincident with BLM-administered livestock grazing allotments. The BLM consulted the riparian portions of the rangeland health assessments (see the Livestock Grazing section of this chapter) to determine if livestock grazing management in those particular allotments would be contributing adverse effects to spotted frog habitat.

**Affected Environment and Environmental Consequences**

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 3-280*). 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), U.S. 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 2011).

**Table 3-280.** Oregon spotted frog habitat in the decision and planning areas

<table>
<thead>
<tr>
<th>Oregon Spotted Frog Habitat</th>
<th>Decision Area (Acres)</th>
<th>Planning Area (Acres)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small Habitat Patches</td>
<td>94</td>
<td>1,315</td>
</tr>
<tr>
<td>Large Habitat Patches</td>
<td>191</td>
<td>98,428</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td><strong>286</strong></td>
<td><strong>99,743</strong></td>
</tr>
</tbody>
</table>

The BLM would not alter wetland habitat for the Oregon spotted frog through development or agriculture conversion under any alternative or the Proposed RMP. Similarly, under all alternatives and the Proposed RMP, the BLM would control invasive species infestations, which would benefit spotted frogs and their habitat through the removal of reed canary grass. Control of invasive species to benefit Oregon spotted frogs is consistent with conservation actions recommended by the Oregon Department of Fish and Wildlife in the Oregon Conservation Strategy (ODFW 2006, p. 338).

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

Under the No Action alternative, Alternative A, B, and C, and the Proposed RMP, the BLM would 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 L. Standard #5 of the rangeland health standards (Native, T&E, and Locally Important Species; 1.j.) includes guidance 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 allow the BLM to restrict the timing of livestock grazing to avoid effects to Oregon spotted frogs at occupied sites. In addition, the Proposed RMP specifically directs the BLM to manage livestock grazing at sites occupied by Oregon spotted frogs to prevent direct effects to eggs, tadpoles, or adults (Appendix B). Management of livestock grazing at sites occupied by spotted frogs is consistent with conservation actions recommended by the Oregon Department of Fish and Wildlife in the Oregon Conservation Strategy (ODFW 2006, p. 338).

Under Alternatives A, B, and C, and the Proposed RMP, the BLM would reduce the acreage available for livestock grazing by 27 percent (from 495,190 acres to 359,049 acres), but the acreage in allotments that is actively grazed would not change substantially. In 2013, there were 354,633 acres of allotments actively grazed, and the BLM assumes this approximate level of livestock grazing would continue under Alternatives A, B, and C and the Proposed RMP, and is roughly the same level of active livestock grazing currently under the No Action alternative (see the Livestock Grazing section of this chapter). Under Alternative D, the BLM would eliminate livestock grazing.

Under all alternatives and the Proposed RMP, the BLM would manage naturally occurring special habitats, such as wetlands and natural ponds, to maintain their ecological function (Appendix B). In addition, all alternatives and the Proposed RMP include management direction to implement measures to prevent, detect, and rapidly control new invasive species infestations and to use manual, mechanical, cultural, chemical, and biological treatments to manage invasive species infestations (Appendix B).

Overall, under the No Action alternative, Alternatives A, B, and C, and the Proposed RMP, there would be no reasonably foreseeable effect of livestock grazing on Oregon spotted frogs or their critical habitat, because management direction, coupled with implementation of rangeland health standards, would—

- Provide for spotted frog eggs, tadpoles, and adults;
- Maintain or restore habitat elements;
- Avoid development of wetland habitat; and
- Control invasive weeds that degrade habitat quality.

In addition to guidance in the rangeland health standards, the Proposed RMP would expressly direct management for spotted frogs to prevent effects. Because there would be no discernable effect of livestock grazing on Oregon spotted frogs or their critical habitat under the No Action alternative, Alternatives A, B, C, or the Proposed RMP, the elimination of livestock grazing under Alternative D would have no meaningful difference in effects on Oregon spotted frogs or their critical habitat.
References
Pacific Coast Distinct Population Segment of the Western Snowy Plover

Key Points
- Under all alternatives and the Proposed RMP, there would be no negative effects to designated critical habitat or to western snowy plover habitat due to protections provided by the New River ACEC and North Spit ACEC.

Summary of Notable Changes from the Draft RMP/EIS
The BLM added discussion of the effect of ACEC designation on Western snowy plover habitat and designated critical habitat.

Background
Historically, western snowy plovers (*Charadrius nivosus nivosus*) nested in at least 29 locations on the Oregon coast (USFWS 2013). 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 (DPS) 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 DPS 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 hikers with 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, especially corvids (Lauten *et al.* 2013, p. 9). Re-sprouting 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 DPS 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; this provides relatively undisturbed areas for individual and population growth and for normal behavior.
In the Recovery Plan for the Pacific Coast DPS 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 2007).

Overall, the population of snowy plovers has been increasing since their time of listing in 1993 (Table 3-281). Following the 2013 nesting season, the 10-year average for the number of breeding adults is 211–216 adults. The number of breeding adults along the Oregon coast has increased between 1993 (55–61 adults) and 2013 (190–191 adults) (Lauten et al. 2013) but is currently 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 (Lauten et al. 2013). The 5-year average for the number of fledglings per male is 1.153 through the 2013 nesting season, which meets the recovery goal of 1.0 fledglings per male (USDI FWS 2007, p. 147).

Table 3-281. Designated critical habitat for the Pacific Coast DPS of the western snowy plover.

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

Currently, the 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 2012 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.
Issue 1
What levels of habitat for the Pacific Coast Distinct Population Segment of the western snowy plover would be available under each alternative?

Summary of Analytical Methods
In this 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 the BLM’s control influence the population, such as predation by avian predators.

Affected Environment and Environmental Consequences
There are currently 334 acres of snowy plover habitat in the planning area, of which, 230 acres are in the decision area on the Coos Bay District and the remaining 104 acres are located on lands managed by the Army Corps of Engineers on the Coos Bay North Spit adjacent to BLM-administered habitat (Table 3-281). 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 3-281). There are 383 acres of critical habitat in the decision area, all in the Coos Bay District. Under the alternatives and the Proposed RMP, all snowy plover habitat and designated critical habitat would be within either the New River ACEC or the North Spit ACEC.

Under the alternatives and the Proposed RMP, a portion of the New River ACEC would be designated as a closed for public motorized access and a portion would be designated as limited (Appendix F). 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 (Appendix F). The Proposed RMP also specifically directs BLM to not authorize or construct additional roads or trails within snowy plover habitat or designated critical habitat (Appendix B).

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 restricting the timing and location of beach access or activities (Appendix B). 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 (Appendix B).

Overall, there would be no negative effects from recreational activities or public motorized vehicle use in snowy plover habitat or designated critical habitat due to the protections provided by the New River and North Spit ACECs. Effects from 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 additional trails or roads in snowy plover habitat under the alternatives or the Proposed RMP. The Proposed RMP would also avoid disruption of snowy plover nesting and would direct the restoration and maintenance of nesting habitat. ACEC management direction limiting public motorized vehicle activities and avoiding disruption...
to snowy plover nesting is consistent with actions recommended by the Oregon Department of Fish and Wildlife in the Oregon Conservation Strategy (ODFW 2006, p. 12).

References
Issues Considered but not Analyzed in Detail

Summary of Notable Changes from the Draft RMP/EIS
The BLM updated information regarding localities and effects to habitat for Fender’s blue butterfly and Taylor’s checkerspot butterfly. The BLM updated analysis of the effect of ACEC designation on vernal pool fairy shrimp habitat and designated critical habitat. Based on the updated analysis of effects to vernal pool fairy shrimp, the BLM moved the discussion to issues considered but not in analyzed in detail.

What levels of habitat for Fender’s blue butterfly would be available under each alternative?

The U.S. Fish and Wildlife Service listed Fender’s blue butterfly \textit{(Icaricia icarioides fenderi)} as an endangered species under the Endangered Species Act on January 25, 2000 (65 FR 3875). The West Eugene population, which is not within the decision area, includes almost all of the current BLM-administered Fender’s blue butterfly sites and critical habitat (USDI BLM 2012). 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:
- 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 (USDI FWS 2010, p. vi).

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 2010, USDI BLM 2012). 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, USDI BLM 2012, 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 decision area. However, there is no designated critical habitat for Fender’s blue butterfly within the decision area. Therefore, the BLM will not analyze effects to critical habitat for this species.

In this analysis, the BLM considered habitat for Fender’s blue butterfly to be native grassland and prairie vegetation within Benton, Lane, Polk, or Yamhill Counties. The BLM tabulated the amount of grassland and prairie habitat acres using the 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 in the Eugene and Salem Districts. There are three localities on BLM-administered lands in the decision area where Fender’s blue butterflies have been documented within the Eugene District, including the Oak Basin Prairie ACEC (USDI BLM 2011:2, pp. 17–18), Kelly Creek
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 23–83 individuals between 2006 and 2010 (USDI BLM 2011, pp. 17–18).

The BLM did not analyze this issue in detail, because the alternatives and the Proposed RMP would not differ in their effect on Fender’s blue butterfly. The BLM would designate the Oak Basin Prairie ACEC under the alternatives and the Proposed RMP. The BLM identified Fender’s blue butterflies as a relevant and important value of the Oak Basin Prairie ACEC and the BLM would manage the ACEC to maintain or restore relevant and important values. Management direction specific to the Oak Basin Prairie ACEC would direct forest management for maintenance and restoration of relevant and important values (Appendix F). This management direction would protect existing habitat for Fender’s blue butterflies within the Oak Basin Prairie ACEC. In addition, under the alternatives and the Proposed RMP, the BLM would manage existing populations and establish new populations of Kincaid’s lupine (see the Rare Plants and Fungi section of this chapter). This management would maintain and increase the potential supply of the primary larval food source and host for Fender’s blue butterfly, depending on the proximity of Kincaid’s lupine populations to existing Fender’s blue butterfly populations. Maintaining and restoring prairie habitat and Kincaid’s lupine is consistent with conservation actions for Fender’s blue butterfly recommended by the Oregon Department of Fish and Wildlife in the Oregon Conservation Strategy (ODFW 2006, p. 350).

What levels of habitat for the Siskiyou Mountains salamander would be available under each alternative?

The Siskiyou Mountains salamander (*Plethodon stormi*) is a Bureau Sensitive species and a Survey and Manage species under the current Survey and Manage measures. The U.S. Fish and Wildlife Service received a petition to list the Siskiyou Mountains salamander as a threatened or endangered species on June 16, 2004. On January 24, 2008, the U.S. Fish and Wildlife Service found that the listing of the Siskiyou Mountains salamander was not warranted (73 FR 4380).

Habitat for the Siskiyou Mountains salamander includes talus (loose surface rock), rock slopes, or rock outcrops. This species of salamander may also occasionally use down woody debris for cover but only when moisture levels are high and it is in close proximity to other rocky substrates. Threats to the Siskiyou Mountains salamander include activities that disturb surface habitat components or the microclimate conditions of the habitat (e.g., timber harvest, road construction, rock pit mining, development of large recreation sites, and wildland fire) (USDA FS et al. 2007). The current, known range of the Siskiyou Mountains salamander includes Jackson and Josephine Counties in Oregon, and Siskiyou County in California. Within Oregon, Siskiyou Mountains salamander occurs within the Applegate Valley watershed.

On August 16, 2007, the BLM committed to implement a conservation strategy for the Siskiyou Mountains salamander jointly with the U.S. Forest Service and the U.S. Fish and Wildlife Service as described in 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 (73 FR 4390; USFS et al. 2007). Objectives of this conservation agreement include: (1) establish the extent of known sites; (2) select high-priority known sites for salamander management; and (3) manage the selected high-priority sites in a manner that will provide viable, well-distributed populations. There are 380 sites known for the species, and 201 of those sites occur on BLM-administered lands. Through development of the conservation agreement, a panel of scientists and resource managers selected 110 high-priority sites (4,774 acres) for the Siskiyou Mountains salamander, of which 44 (1,950 acres) are on BLM-administered lands.
The BLM did not analyze this issue in detail, because the alternatives and the Proposed RMP would not differ in their effect on the Siskiyou Mountains salamander. Consistent with the conservation agreement, all alternatives and the Proposed RMP would manage high-priority sites to maintain a subpopulation of Siskiyou Mountains salamanders over the long-term (i.e., 100 years) (73 FR 4390, USDA FS et al. 2007). The conservation agreement established two strategies to provide for Siskiyou Mountains salamanders, which the BLM included in all alternatives and the Proposed RMP. The first strategy would maintain habitat conditions for the Siskiyou Mountains salamander at sites without risk of high-intensity fire by restricting activities that would have adverse effects on substrate, ground cover, forest condition (e.g., canopy cover), or microclimate. Maintenance of substrate and microclimate for Siskiyou Mountains salamanders is consistent with conservation actions recommended by the Oregon Department of Fish and Wildlife in the Oregon Conservation Strategy (ODFW 2006, p. 340). The second strategy would manage sites identified in the conservation agreement with a risk of high-intensity fire to reduce fuel loadings within desired conditions to improve Siskiyou Mountains salamander habitat.

In addition, under the action alternatives and the Proposed RMP, there would be more BLM-administered lands, and therefore more Siskiyou Mountains salamander sites, protected within reserves. Out of 213 Siskiyou Mountains salamander sites in the decision area, 46 sites would lie within reserves under the No Action alternative, 100–204 sites would lie within reserves under the action alternatives, and 184 sites would lie within reserves under the Proposed RMP (Appendix S). All alternatives and the Proposed RMP would result in an increase in habitat for the Siskiyou Mountains salamander over current conditions in 50 years.

Because the BLM would manage high-priority sites for the benefit of the salamanders and their habitat, and there would be an increase in habitat for the Siskiyou Mountains salamander over time, the BLM concludes that there is no discernable difference in effects on the Siskiyou Mountains salamander among the alternatives and the Proposed RMP.

What levels of habitat for Steller’s sea lion would be available under each alternative?

The National Marine Fisheries Service listed the Steller’s sea lion (Eumetopics jubatus) as a threatened species under the Endangered Species Act on November 26, 1990 (55 FR 49204). The National Marine Fisheries Service designated critical habitat in August 27, 1993. The western Distinct Population Segment of Steller’s sea lion was listed as endangered on May 5, 1997 (62 FR 24345) but this Distinct Population Segment is located west of 144 °W longitude, which is approximately 1,000 miles offshore from the planning area. The planning area is within the range of the eastern Distinct Population Segment (east of 144 °W longitude), and the eastern Distinct Population Segment of Steller’s sea lion was delisted on November 4, 2013 (78 FR 66140).

The eastern Distinct Population Segment of Steller’s sea lion is not in danger of extinction or likely to become so within the foreseeable future. The eastern population increased from 18,313 animals in 1979 to 70,140 animals in 2010, an annual population growth of 4.18 percent. The National Marine Fisheries Service concluded that human disturbance of Steller’s sea lions on or near coastal habitats is not likely to cause the eastern distinct population segment of Steller’s sea lion to become in danger of extinction throughout all or a portion of its range within the foreseeable future. Coastal development, recreation, and human population growth may lead to more disturbances of Steller’s sea lions on terrestrial sites or in the water. However, protections against such disturbance exist, and will likely remain in place, under a variety of State and Federal statutes such as the Marine Mammal Protection Act.
Although rookeries and haul-out sites for Steller’s sea lion could occur on BLM-administered lands adjacent to the Pacific Ocean, there is no basis to conclude that any BLM management under any of the alternatives or the Proposed RMP would affect Steller’s sea lions or their habitat.

**What levels of habitat for the streaked horned lark would be available under each alternative?**

The U.S. Fish and Wildlife Service listed the streaked horned lark (*Eremophila alpestris strigata*) as a threatened species under the Endangered Species Act on October 3, 2013 (78 FR 61452). The Analysis of the Management Situation for the RMPs for Western Oregon provides more information on the historic range and known populations, which is incorporated here by reference (USDI BLM 2013). The U.S. Fish and Wildlife Service designated critical habitat for the streaked horned lark on October 3, 2013 (78 FR 61506). All designated critical habitat in the planning area is on the Willamette Valley National Wildlife Refuge Complex administered by the U.S. Fish and Wildlife Service. Therefore, no BLM actions would have an effect on critical habitat for this species.

In this analysis, the BLM considered habitat for the streaked horned lark to be open areas of non-forest at least 300 acres in size, within grassland and prairie vegetation, within Benton, Clackamas, Clatsop, Columbia, Lane, Linn, Marion, Multnomah, Polk, Washington, or Yamhill Counties (78 FR 61459). The BLM tabulated the amount of open 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 1,400,297 acres of streaked horned lark habitat within the planning area, but none occurs in the decision area. There are no observations of this species on BLM-administered lands (GeoBOB FaunaObs, March 6, 2013).

None of the alternatives or the Proposed RMP would create streaked horned lark habitat within the decision area. There is no management direction under any alternative or the Proposed RMP that would degrade streaked horned lark habitat outside of the decision area. Therefore, none of the alternatives or the Proposed RMP would affect streaked horned lark habitat quantity or quality.

**Appendix S** contains additional information and supporting data on the streaked horned lark.

**What levels of habitat for Taylor’s checkerspot butterfly would be available under each alternative?**

The U.S. Fish and Wildlife Service listed Taylor’s checkerspot butterfly (*Euphydras editha taylori*) as an endangered species under the Endangered Species Act on October 3, 2013 (78 FR 61452). Within the planning area, the species was historically found throughout grasslands in the Willamette Valley but the current range in the planning area is reduced to Benton County (78 FR 61452, 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 miles) between habitat patches (Benton County 2010, citing USDI FWS 2008b). There are 4 historic sites from the 1940s, approximately 1,800 feet from BLM-administered lands, but subsequent surveys have not 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), including 20 acres in Oregon, but all are on privately owned lands. Therefore, the BLM will not analyze effects on critical habitat.

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 2010, 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). In this analysis, the BLM considered habitat for Taylor’s checkerspot butterfly to be grassland and prairie vegetation and oak woodlands 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 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 occurs on BLM-administered lands in the Salem District. The 4.4 acres is distributed amongst 16 patches with a maximum patch size of 2.0 acres. There are no observations of this species on BLM-administered lands (GeoBOB FaunaObs, March 6, 2013).

The BLM identified the Oak Basin Prairie ACEC as containing habitat for the Taylor’s checkerspot, and it theoretically could be present (USDI BLM 2011, p. 19). However, no surveys for this species have been conducted. Given the occurrence of only 2 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 likelihood of Taylor’s checkerspot butterfly occurring in Oak Basin Prairie is very low (USDI BLM 2011, p. 19).

The BLM did not analyze this issue in detail, because the alternatives and the Proposed RMP would not differ in their effect on Taylor’s checkerspot butterfly. It is very unlikely that the species occurs on BLM-administered lands, and the alternatives and the Proposed RMP would not differ in their effect on the very small acreage of potential habitat on BLM-administered lands. There is no management direction under any alternative or the Proposed RMP, in which the BLM would degrade grassland habitat for Taylor’s checkerspot butterfly. Given the narrow range of habitat for Taylor’s checkerspot butterfly and its limited spatial extent on BLM-administered lands, habitat availability for Taylor’s checkerspot butterfly would not vary among the alternatives or the Proposed RMP.

Under the alternatives and the Proposed RMP, the BLM would manage naturally occurring special habitats, such as oak savannah/woodlands, to maintain their ecological function (Appendix B). Maintenance of oak savannah and prairie habitat is consistent with conservation actions for Taylor’s checkerspot butterfly recommended by the Oregon Department of Fish and Wildlife in the Oregon Conservation Strategy (ODFW 2006, p. 352).
What levels of habitat for the vernal pool fairy shrimp would be available under each alternative?

The U.S. Fish and Wildlife Service listed the vernal pool fairy shrimp (*Branchinecta lynchi*) as a threatened species under the Endangered Species Act on September 19, 1994 (59 FR 48136). At the time of its listing, the species was known to occur only in California (USDI FWS 2014). 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 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 rangewide 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, pp. IV-1 – IV-72).

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

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 alternatives and the Proposed RMP, all of the designated vernal pool fairy shrimp critical habitat on BLM-administered lands would be within the Table Rocks ACEC. Approximately 96 percent of vernal pool fairy shrimp habitat (293 of 307 acres) would be within the Table Rocks ACEC; the 14 acres of habitat that would not be included in the Table Rocks ACEC would be allocated to the Riparian Reserve under all alternatives and the Proposed RMP.

A portion of the Table Rocks ACEC would be designated as a closed for public motorized access and a portion would be limited under the alternatives and the Proposed RMP. The portion that would be limited is an existing administrative road providing access to adjacent lands (Appendix F). ACEC management direction would preclude effects from recreation and public motorized vehicle use on vernal pool fairy shrimp habitat. In addition, the Table Rocks ACEC would be closed to livestock grazing under the alternatives and the Proposed RMP. The Proposed RMP also specifically directs the BLM to not authorize or construct additional roads or trails within vernal pool fairy habitat or designated critical habitat (Appendix B).

Under the alternatives and the Proposed RMP, the BLM would manage naturally occurring special habitats, such vernal pools/ponds, to maintain their ecological function. Maintaining the ecological
function and quality of vernal pools/ponds is consistent with conservation actions for the vernal pool fairy shrimp recommended by the Oregon Department of Fish and Wildlife in the Oregon Conservation Strategy (ODFW 2006, p. 352).

Overall, there would be no effects to any designated critical habitat or to 96 percent (293 acres) of vernal pool fairy shrimp habitat due to the protections provided by the Table Rocks ACEC under the alternatives and the Proposed RMP. There would be no effects to the remaining 4 percent (14 acres) of fairy shrimp habitat due to the protections provided by the Riparian Reserve management direction (Appendix B). There would not be any negative effect to designated critical habitat or to vernal pool fairy shrimp habitat due to protections provided by the Table Rocks ACEC, and effects would not vary among the alternatives or the Proposed RMP.

What levels of habitat for the wolverine would be available under each alternative?

The U.S. Fish and Wildlife Service proposed the wolverine (*Gulo gulo*) as a threatened species under the Endangered Species Act on February 1, 2013 (78 FR 7864). Wolverine habitat is dependent on high-elevation areas that are cold and receive enough winter precipitation to maintain snow late into the spring; wolverines are dependent on spring snow cover for successful reproduction. Wolverine habitat does not appear to be restricted to specific vegetation or other structural characteristics.

Human use and disturbance may have an effect on wolverine behavior. However, little is known about the behavioral responses of individual wolverines to human presence, or about the species’ ability to tolerate and adapt to repeated human disturbance. The U.S. Fish and Wildlife Service does not consider stressors such as recreation, infrastructure development, or transportation corridors to pose a threat to wolverines. There is no evidence to suggest that land management activities are a threat to the conservation of the wolverine.

Future climate change, with reduced snowpack, earlier spring thaw, and warmer summer temperatures, is the only projected threat to wolverine habitat. These changing conditions will reduce wolverine habitat and increase fragmentation of remaining habitat.

The BLM considered habitat for the wolverine to be all lands at least 4,592 feet in elevation within the Cascades Province. There are 1,570,784 acres of wolverine habitat within the planning area, of which 59,311 acres is in the decision area. There are no observations of this species on BLM-administered lands (GeoBOB FaunaObs, March 6, 2013).

The BLM did not analyze this issue in detail, because the alternatives and the Proposed RMP would not differ in their effect on the wolverine or wolverine habitat.
References


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