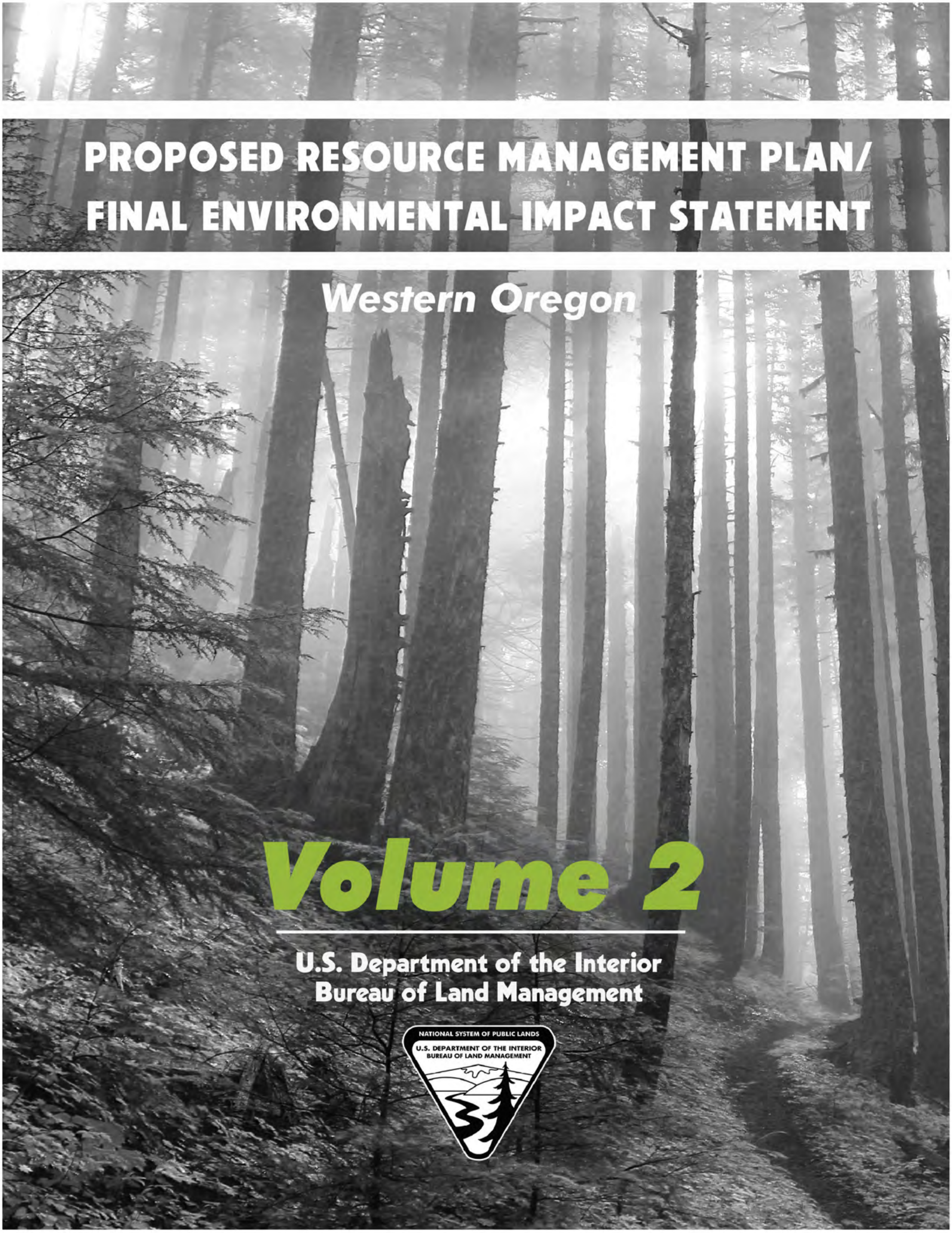

PROPOSED RESOURCE MANAGEMENT PLAN/ FINAL ENVIRONMENTAL IMPACT STATEMENT

Western Oregon

Volume 2

U.S. Department of the Interior
Bureau of Land Management

NATIONAL SYSTEM OF PUBLIC LANDS
U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

The BLM manages more than 245 million acres of public land, the most of any Federal agency. This land, known as the National System of Public Lands, is primarily located in 12 western states, including Alaska. The BLM also administers 700 million acres of sub-surface mineral estate throughout the nation.

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NATIONAL SYSTEM OF PUBLIC LANDS

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

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Recreation and Visitor Services

Key Points

- Alternative D would provide the largest number of acres allocated as Recreation Management Areas.
- Alternative D would also provide the largest number and acres of Recreation Management Areas in closest proximity to the 12 study communities in the planning area.
- Alternative A would reduce managed recreation opportunities as compared to the No Action alternative.
- The Proposed RMP would provide more acres allocated as Recreation Management Areas than Alternatives A, B and C, and less acres then Alternative D.

Issue 1

How would the alternatives affect the types and levels of BLM-provided recreation opportunities across western Oregon?

Summary of Analytical Methods

Management actions and allowable use decisions would affect recreation and visitor services. Direct effects on recreation are those that allow, restrict, or prohibit recreation opportunities, including both the opportunity for access (e.g., public closure) and opportunity to engage in specific activities (e.g., camping, recreational target shooting, and riding OHVs). Indirect effects are those that alter the physical, social, or operational components of recreation setting characteristics. Effects on settings can either be the achievement of a desired recreation setting characteristic or the unwanted shift in recreation setting characteristics.

The BLM does not specifically manage for recreation setting characteristics in areas where the BLM has not designated Recreation Management Areas (RMAs), although lands not designated as RMAs do still provide intrinsic recreational values and opportunities. The indicator typically used to describe the effect on lands not designated as RMAs, is the availability of opportunities as described by either acreage restrictions or limiting of recreation-specific activities.

For areas managed as Special Recreation Management Areas (SRMA), the BLM used both availability of recreation opportunities and changes to physical, social, and operational components of recreation setting characteristics as indicators of effects. For areas managed as Extensive Recreation Management Areas (ERMA), the BLM considered both availability of activity opportunities and changes to recreation setting characteristics.

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 2014b, pp. 109–114).

Recreation Management Areas

The BLM evaluated the effects of the alternatives and the Proposed RMP on recreation opportunities and outcomes by comparing how they would (1) designate RMAs by type; (2) potentially change recreation setting characteristics; (3) affect the availability of recreation opportunities and the extent to which they meet anticipated recreation demand in the planning area; and (4) restrict available recreation-specific activities. This analysis includes recreation management strategies and effects from management for other program areas on recreation resources under each of the alternatives and the Proposed RMP.

Recreation Opportunities and Restrictions

The BLM manages, allows, and restricts specific recreation activities within RMAs in order to create and sustain high-quality recreation opportunities, achieve desired recreation conditions including recreation setting characteristics, and protect public health and safety from potential conflicts between recreationists. The BLM considered the extent to which managed, allowable, and restricted recreation activities occur among the alternatives and the Proposed RMP.

Recreation Setting Characteristics

Visitors seek a diverse range of setting-dependent outdoor recreation opportunities. They choose different areas in which to recreate based upon the qualities and conditions of the area as well as a desired set of recreation experiences and benefits. The BLM identifies desired recreation setting characteristics for RMAs to complement the desired recreation opportunities and activities within those RMAs.

The BLM categorizes the type of recreation setting characteristic desired in a particular area through its Recreation Setting Classification System. The BLM bases the Recreation Setting Classification System on a combination of physical, social, and operational components. Physical components include characteristics of remoteness, naturalness, and visitor facilities. Social components include characteristics of contacts, group size, and evidence of use. Operational components include characteristics of access, visitor services, and management controls.

Remoteness and Naturalness Characteristics

With the exception of the characteristics of remoteness and naturalness, the BLM discusses effects on all the recreation setting characteristics through analysis of RMAs, recreation opportunities, and recreation demand. The BLM has focused the discussion of effects remoteness and naturalness on how the alternatives and the Proposed RMP would change the existing recreation opportunity spectrum for these characteristics.

The recreation opportunity spectrum framework describes the mix of possible outdoor recreation settings that produce recreation experiences. The recreation opportunity spectrum is divided into six classes ranging from primitive to urban **(Figure 3-120)**. The classes are named only to help describe a recreation setting spectrum for recreation management. For example, the 'primitive' class is not exclusive to Wilderness, Wilderness Study Areas, or lands with wilderness characteristics and may be used elsewhere.

Figure 3-120. Recreation opportunity spectrum classes

'Remoteness' is defined by an area's proximity to human modifications associated with roads or trails. The BLM identified the recreation opportunity spectrum class for remoteness by using its functional road classification system to assign road types by recreation opportunity spectrum class and identifying distance criteria. The distance criteria used account for the project area's topography, vegetation, and road type. Road types consist of arterial, collector, local, and resource roads (USDI BLM 1996b, updated 2002). **Table 3-121** shows the criteria for defining the recreation opportunity spectrum class for remoteness.

Table 3-121. Distance criteria for establishing recreation opportunity spectrum class by remoteness

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

* **Local roads.** Roads that normally serve smaller areas than collector roads, accommodate fewer uses, have lower traffic volumes, and connect with collector roads or State and County road systems.

† **Resource roads.** Roads that provide point access to public lands, typically exist for a single use, carry very low traffic volumes, and connect with local or collector roads.

‡ **Collector roads.** Roads that primarily provide access to large blocks of public land, accommodate multiple uses, have BLM's highest traffic volumes, and connect with State and County road systems.

The BLM used the total amount of roads—including new road construction projected to occur under the alternatives and the Proposed RMP over the next 10 years—to classify recreation opportunity spectrum classes for remoteness. This analysis does not consider the proximity of non-BLM roads located on adjacent lands, since they do not aid in the comparison of the alternatives and the Proposed RMP.

'Naturalness' is defined by the level of an area's influence by human modifications other than roads and trails. Human modifications can include areas of development, utilities, rights-of-way, livestock structures, fences, habitat treatments, or landscape alternations. Naturalness considers the presence of human modifications and how these modifications may, or may not, affect the visitor's experience. Management considerations in this planning process would predominately influence landscape alternations through forest and habitat management actions. As such, the BLM's analysis of naturalness uses forest structural stage classes as a proxy to measure changes in recreation opportunity spectrum classes for naturalness. **Figure 3-121** shows a visual representation of forest structural stage classifications for naturalness for the five recreation opportunity spectrum classes with forest stand proxies.

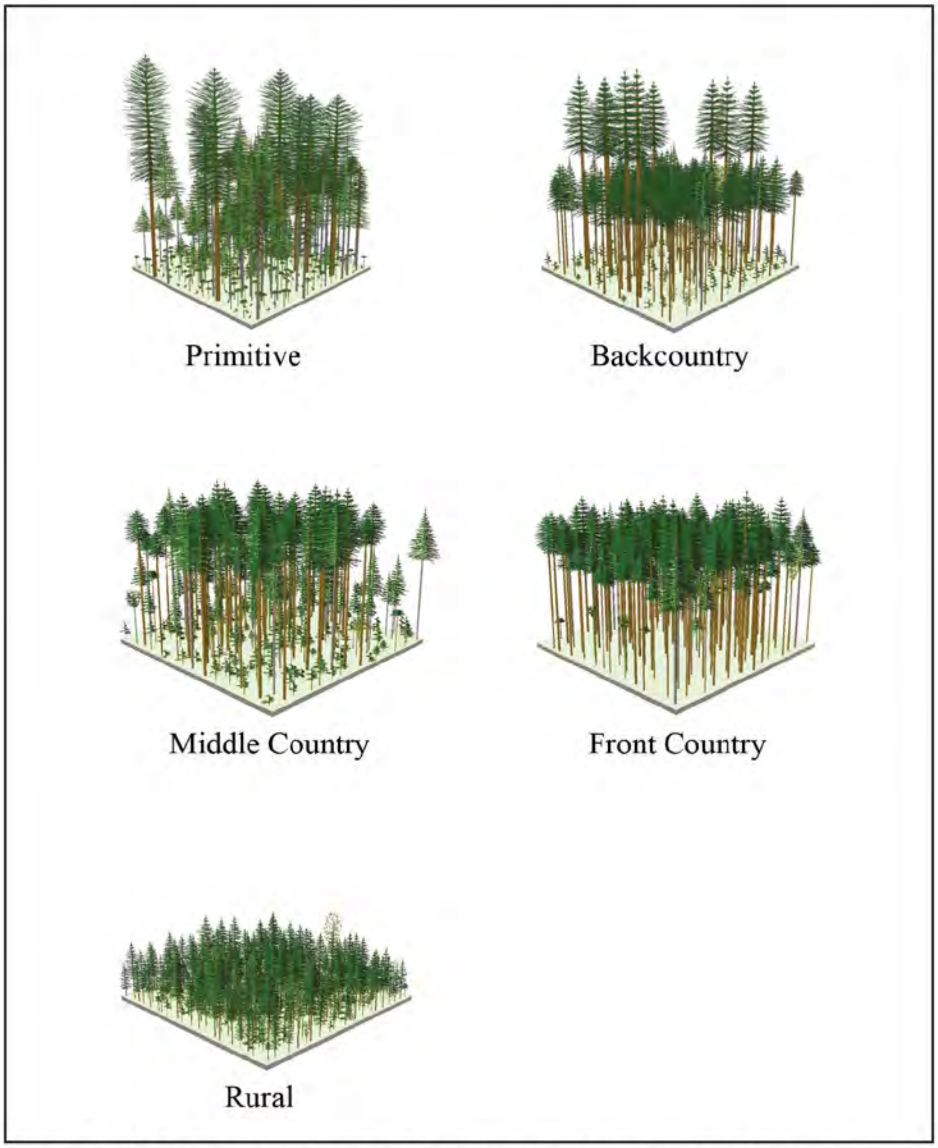

Figure 3-121. Stand visualizations for recreational setting classifications

Table 3-122 contains the levels of human modification and forest structural stage classes used as proxies by recreation opportunity spectrum class for naturalness.

Table 3-122. Level of human modification and forest structural stage class proxies by recreation opportunity spectrum class for naturalness

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

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

Background

The BLM's Recreation and Visitor Services Program manages recreation resources and visitor services to offer the largest benefits possible to individuals and communities and to enable communities to achieve their own desired social, economic, and environmental outcomes. The BLM manages recreation resources and visitor services primarily through designation of RMAs and their associated managed recreation activities, opportunities, and recreation setting characteristics. The BLM policy direction on designation of RMAs was revised in 2011 (USDI BLM 2011), and included changes to the designation process of RMAs. Current RMAs within the planning area were established under the previous policy direction (1981).

In previous planning efforts, SRMAs were established in accordance with the 1981 BLM policy on BLM-administered lands that were experiencing heavy recreation use or where the BLM planned on making large investments in staff, funding, facilities, or time. All remaining BLM-administered lands were designated as ERMAs, regardless of whether recreation occurred or was a management objective.

Under the new policy, the BLM only designates SRMAs where it recognizes recreation management as the predominant land use plan focus and where the BLM intends to manage and provide specific recreation opportunities and recreation setting characteristics on a long-term basis. In addition, ERMAs are administrative units that require specific management consideration in order to address recreation use or demand, but where recreation management is commensurate and considered in context with the management of other resources and resource uses. BLM-administered lands that do not meet these policy definitions are not identified for recreation or visitor services management.

A majority of the BLM-administered lands in western Oregon are intermingled with private lands. Legal public access is often not available where private lands surround BLM-administered lands. In such cases, reciprocal right-of-way agreements, easements, and unsecured access rights across adjacent private lands all have a determining effect on public access, which, in turn, influence visitor use. This lack of comprehensive legal public access constrains the BLM's ability to manage for recreational opportunities on a substantial portion of its lands in western Oregon. See the Trails and Travel Management section in this chapter for further discussion about public access within the planning area.

Affected Environment

BLM-administered lands in western Oregon offer diverse opportunities for a variety of outdoor recreation activities and related benefits. Typical recreation activities on BLM-administered lands include camping, hiking, horseback riding, mountain biking, public motorized vehicle use, and picnicking.

Recreation Management Areas

The BLM currently manages 29 SRMAs in western Oregon that total 201,258 acres, accounting for 8 percent of BLM-administered lands within the planning area. These 29 SRMAs include landscapes that generally encompass more lands than the BLM required for development of recreation sites and services, and, as such, it is extremely difficult to compare number and acres of currently designated SRMAs to actual acres of recreation sites, trails, or other recreation facilities. Under the 1995 RMPs, the BLM identified BLM-administered lands not delineated as a SRMA as ERMAs. In ERMAs, current management consists primarily of providing basic information and access. Dispersed recreation occurs in ERMAs, and visitors have the freedom of recreational choice with minimal regulatory constraints. Recreation issues or management concerns are apparent in ERMAs throughout the planning area where limited recreation management is present. These issues are most apparent in ERMAs within the rural-urban interface where increased recreation activities (including off-highway vehicle use and recreational target shooting) have led to social and natural resource impacts. The BLM currently manages 14 ERMAs in western Oregon totaling 2,277,604 acres, accounting for 92 percent of BLM-administered lands within the planning area.

Recreation Opportunities and Restrictions

Current SRMA and ERMA designations are consistent with 1981 BLM policy, which was the applicable policy at the time of the 1995 RMPs. Under this policy, the BLM identified SRMAs where BLM-administered lands were experiencing heavy recreation use or where the BLM planned to make large investments in staff, funding, facilities, or time. All remaining BLM-administered lands were designated as an ERMA, regardless of whether recreation occurred or was a management objective. Because of this difference, the 1995 RMPs did not designate recreational opportunities or restrictions to lands identified as ERMAs and, therefore, there are no recreational opportunities or restrictions identified for ERMAs. As such, current managed recreation opportunities and restrictions only apply to the acres designated as SRMAs within the planning area (**Table 3-123**). Because the currently designated 29 SRMAs generally encompass more lands than actual acres of recreation sites, trails, or other recreation facilities, the identification of total SRMA acres where recreation opportunities are managed and allowed or restricted is equally difficult to compare to current BLM recreation management within the planning area. For example, the BLM does not actively manage for overnight camping outside of the portion of a SRMA that contains the developed campground and associated recreation facilities. As such, the calculations of managed and allowed or restricted acres of recreation opportunities are likely overestimates of current management.

Table 3-123. Current SRMA acres of managed and allowed, and restricted recreation opportunities within the decision area

Recreation Opportunities	Managed and Allowed (Acres)	Restricted (Acres)
Horseback Riding	199,008	2,250
Hiking	201,258	-
Mountain Bicycling	188,169	13,089
Public Motorized Use	170,127	31,131
Overnight Camping	194,952	6,306
Recreational Target Shooting	172,819	28,439

Note: The BLM can manage, allow, and restrict more than one opportunity within the same RMA, so totals of opportunities exceed total acreage.

Recreation Setting Characteristics

BLM-administered lands within the planning area currently provide a mix of remoteness and naturalness recreation opportunity spectrum classes that provide a variety of recreational opportunities and experiences for visitors (**Table 3-124**). The BLM currently only manages remoteness and naturalness characteristics in SRMAs, and does so under management commensurate with other resource considerations.

Table 3-124. Current acres of BLM-managed lands by remoteness and naturalness recreation opportunity spectrum classes

Recreation Setting Characteristic	Recreation Opportunity Spectrum Class					
	Primitive (Acres)	Back Country (Acres)	Middle Country (Acres)	Front Country (Acres)	Rural (Acres)	Urban (Acres)
Remoteness	5,919	527,206	1,024,296	794,109	146,454	
Naturalness	588,776	516,118	178,922	443,170	435,232	-

Environmental Consequences

Defining adverse or beneficial effects is often subjective for the purposes of recreation and visitor services. A management action may be adverse to one individual or user group, while beneficial to another individual or user group. Therefore, the BLM does not use the terms adverse or beneficial in this analysis without defining the recreation-specific user group.

Recreation Management Areas

The BLM manages recreation resources and visitor services primarily through designation of RMAs and their associated managed recreation activities, opportunities, and recreation setting characteristics. The acreage and spatial distribution of RMA types varies under the No Action alternative, Alternatives A, B, C, and D, and the Proposed RMP; thus, varying the provision of BLM-managed recreation opportunities. During the development of the 1995 RMPs, the BLM identified the locations of the current SRMAs in accordance with the 1981 BLM policy on BLM-administered lands that were experiencing heavy recreation use or where the BLM planned to make large investments in staff, funding, facilities, or time. All remaining BLM-administered lands were designated as ERMAs, regardless of whether recreation occurred or was a management objective. The No Action alternative would manage SRMAs and ERMAs under the guidance of the 1995 RMPs as written, although this would be inconsistent with current BLM policy. The fundamental differences between previous and new BLM policy guidance for both identification of SRMAs and ERMAs and their management create a difficulty in being able to compare RMAs from the No Action alternative to the action alternatives and the Proposed RMP. For the purposes of providing a comparison of the action alternatives and the Proposed RMP, Alternative B represents an approximate continuation of the current recreation opportunities, but consistent with current definitions and policy for RMAs.

No Action Alternative

Under the No Action alternative, western Oregon BLM districts would continue to manage the 29 SRMAs totaling 201,258 acres and 14 ERMAs totaling 2,277,604 acres under the direction set forth in the 1995 RMPs and related amendments. While the No Action alternative maintains the designation of the largest acres of SRMAs and ERMAs of all the action alternatives and the Proposed RMP, their management would be greatly different and the representation of large acres does not correlate to a large acreage of protected recreation resources or provided recreation management.

Where current recreation management objectives and direction do not provide adequate management for emerging recreation trends and increased visitation, recreational users of all types would likely have substantial but localized negative recreation experiences. Recreation management on BLM-administered lands would continue under previous policy guidance to be commensurate with the management of other resources and resource uses in SRMAs, which could allow other land management actions to result in undesired changes to managed recreation sites and associated recreation setting characteristics, managed activities, and recreation opportunities. Over time, recreation opportunities would be lost where recreation conflicts with other resource uses including forest management, incompatible recreation activities, and lands and realty actions.

Alternative A

Under Alternative A, the BLM would designate 141 SRMAs totaling 20,065 acres **(Table 3-125)**. Alternative A would designate SRMAs where existing developed recreation sites or facilities currently exist within the planning area, and recreation would be recognized as the predominant land management focus within the SRMAs. The BLM would not designate ERMAs within the planning area **(Table 3-126)**. In effect, Alternative A places an emphasis on the management and protection of developed recreation facilities on BLM-administered lands, which would protect recreation opportunities on less than 1 percent of the planning area.

Table 3-125. Acres of designated Special Recreation Management Areas

District/ Field Office	Alt. A (Acres)	Alt. B (Acres)	Alt. C (Acres)	Alt. D (Acres)	PRMP (Acres)
Coos Bay	468	468	468	1,600	1,661
Eugene	104	95	241	8,645	240
Klamath Falls	612	2,691	7,451	23,873	3,306
Medford	17,199	19,782	46,155	48,235	51,164
Roseburg	167	165	2,413	2,413	2,412
Salem	1,515	1,771	2,318	1,927	11,947
Totals	**20,065**	**24,972**	**59,046**	**86,693**	**70,730**

Table 3-126. Acres of designated Extensive Recreation Management Areas

District/ Field Office	Alt. A (Acres)	Alt. B (Acres)	Alt. C (Acres)	Alt. D (Acres)	PRMP (Acres)
Coos Bay	-	6,146	14,790	19,758	21,881
Eugene	-	20,416	23,971	26,323	23,899
Klamath Falls	-	66,779	89,842	192,262	89,337
Medford	-	12,283	135,837	219,169	193,651
Roseburg	-	6,819	39,083	40,502	18,483
Salem	-	26,877	54,248	82,444	73,061
Totals	-	**139,320**	**357,771**	**580,458**	**420,311**

When compared to Alternatives B, C, and D, and the Proposed RMP, Alternative A would designate the fewest acres for recreation management and fewest acres of SRMAs. Alternative A would not provide for recreation management outside of established SRMAs. This would result in little to no management for recreation resources, opportunities, or recreation setting characteristics for intensively visited areas, such as motorized and non-motorized trails, that exist outside of these SRMAs. The BLM would reactively manage these areas where recreational use resulted in unwanted effects to other resources, and reactive management would be subject to the objectives of the landscape and could result in on-the-ground management not in favor of continued recreational use. Existing trails and other non-facility recreation features would deteriorate over time and could be removed from the landscape in favor of other resource uses.

The BLM's lack of proactive management of public visitation to high use areas outside of SRMAs in Alternative A would create management issues. These include continued private property trespass, public motorized vehicle incursion, and route proliferation. The BLM expects visitation within the decision area to increase, elevating these issues and leading to the continued decline in both recreation settings and environmental resources as the BLM could not provide or manage for additional recreation opportunities.

Under this alternative, the BLM would provide sufficient management direction to preserve the desired physical recreation setting characteristics within SRMAs. These restrictions would restrict or prohibit the type of development that would affect these settings and shift the setting characteristics to an undesirable setting. This alternative provides the fewest opportunities for managed recreation compared to Alternatives B, C, and D, or the Proposed RMP.

Alternative B

Alternative B would designate 134 SRMAs totaling 24,972 acres and 75 ERMAs totaling 139,320 acres. Alternative B would designate SRMAs at currently developed recreation facilities and on lands where there are both unique recreation opportunities and where SRMA designation would not conflict with sustained-yield timber harvest. This alternative would designate ERMAs where the BLM has developed and managed recreation areas, primarily where the BLM has authorized motorized and non-motorized trails, and where the BLM currently manages dispersed recreation activities. Alternative B would place an emphasis on the management and protection of recreation opportunities on approximately 6 percent of the decision area and would allocate less than 1 percent of the decision area as a SRMA to protect the management and protection of recreation opportunities as the primary land use focus.

Under this alternative, the BLM would provide sufficient management direction to preserve the desired physical recreation setting characteristics within both SRMAs and ERMAs. These restrictions would restrict or prohibit the type of development that would affect these settings and shift the setting characteristics to an undesirable setting.

When compared with Alternative A, Alternative B would provide for the protection of the majority of existing recreation opportunities, visitor activities, experiences, and outcomes that are currently available to visitors of BLM-administered lands within the planning area. Compared to the No Action alternative, Alternative B would continue to manage recreation opportunities consistent with current levels, but consistent with current definitions and policy for RMAs. Alternative B would also establish allowable use activities and restrictions within ERMAs. Limiting incompatible activities and adequately managing anticipated increases in visitor use (see Issue 2) would lead to the long-term protection of desired targeted recreation setting characteristics. Alternative B provides more managed recreational opportunities than Alternative A, but less than Alternatives C and D, and the Proposed RMP.

Alternative C

Alternative C would designate 139 SRMAs totaling 59,046 acres and 119 ERMAs totaling 357,771 acres. Alternative C would designate SRMAs at currently developed recreation facilities, and on lands where designation does not conflict with sustained-yield timber harvest. This alternative would designate ERMAs where the BLM has developed and currently manages recreation activities outside of developed facilities, primarily where the BLM has authorized motorized and non-motorized trails, and where the BLM currently manages dispersed recreation activities. Alternative C would also designate SRMAs and ERMAs where the BLM is seeking to address activity-specific recreation demand scarcity. Alternative C places an emphasis on the management and protection of recreation opportunities on approximately 16 percent of the decision area. Alternative C would allocate 2 percent of the decision area as an SRMA to provide the management and protection of recreation opportunities as the primary land use focus.

Compared to Alternatives A and B, Alternative C would allocate approximately three times as many acres as SRMAs. Alternative C would allocate more acres as ERMA when compared to Alternatives A and B, and less when compared with Alternative D. Under this alternative, the BLM would provide sufficient management direction to preserve the desired physical recreation setting characteristics within both SRMAs and ERMAs. These restrictions would restrict or prohibit the type of development that would affect these settings and shift the setting characteristics to an undesirable setting. The BLM assumed that increased visitor use (see Issue 2) would result from the increased protection of unique recreation settings and the establishment of recreation outcome objectives over RMA levels in Alternatives A and B, but this would be less than the protections in Alternative D and the Proposed RMP.

Alternative D

Alternative D would designate 141 SRMAs totaling 86,693 acres and 143 ERMAs totaling 580,458 acres. Alternative D builds off the RMA designations in Alternatives A, B, and C. Alternative D includes designation of SRMAs at currently developed recreation facilities, and on lands where designation does not conflict with sustained-yield timber harvest. Alternative D would include designation of ERMAs on all lands within the decision area where existing recreation use is occurring and the BLM has legal public access. In addition, the BLM would designate RMAs where known historic recreation use has occurred; and where the BLM seeks to address activity-specific demands. The BLM would designate these to the maximum extent possible without precluding sustained-yield timber harvest.

Alternative D would allocate the largest number of acres as RMAs as when compared to Alternatives A, B, and C. Alternative D places an emphasis on the management and protection of recreation opportunities on approximately 27 percent of the decision area. Alternative D allocates 3 percent of the decision area as a SRMA providing the management and protection of recreation opportunities as the primary land use focus. The BLM would provide sufficient management direction to preserve the desired physical recreation setting characteristics within both SRMAs and ERMAs. These restrictions would restrict or prohibit the type of development that would affect these settings and shift the setting characteristics to an undesirable setting. The BLM assumed that Alternative D would have the largest increase in visitor use (see Issue 2) from the increased protection of unique recreation settings and the establishment of recreation outcome objectives when compared to Alternatives A, B, and C, and the Proposed RMP.

Proposed RMP

The Proposed RMP would designate a total of 491,042 acres as Recreation Management Areas. This includes 116 SRMAs totaling 70,730 acres and 132 ERMAs totaling 420,312 acres. The Proposed RMP builds upon the RMA designations that were established across the range of the action alternatives. Specifically, the Proposed RMP uses SRMAs and ERMAs identified in Alternative C as a baseline, refining them to address resource consistency with the Proposed RMP land use allocations and resource management needs, and to incorporate unique opportunities for activity-specific demands within the planning area. A listing of SRMAs and ERMAs by district, RMA type, and associated acreage for the action alternatives and the Proposed RMP can be found in **Appendix O**.

When compared with Alternatives A, B, and C, the Proposed RMP would provide for the protection of the majority of existing recreation opportunities, visitor activities, experiences, and outcomes that are currently available to visitors of BLM-administered lands within the planning area. The Proposed RMP would also establish additional RMAs across the planning area to account for increased recreation use levels and the protection of unique settings and activity specific recreation opportunities. The total acres designated to recreation management under the Proposed RMP are higher when compared to Alternatives A, B, and C, but less than Alternative D.

The BLM assumed that increased visitor use (see Issue 2) would result from the protection of these unique recreation settings and the establishment of recreation outcome objectives on the 491,042 acres. Compared to Alternatives A, B, and C, the Proposed RMP would establish a greater amount of activity-specific recreation restrictions by establishing allowable use activities within both SRMAs and ERMAs. Limiting incompatible activities and adequately managing anticipated increases in visitor use would lead to the long-term protection of desired targeted recreation setting characteristics and recreation outcomes.

Recreation Opportunities and Restrictions

The BLM manages for or allows specific recreation activities within RMAs in order to create and sustain high-quality recreation opportunities, to achieve desired recreation conditions, or to protect recreation setting characteristics. Managing for, or allowing, specific recreation activities within SRMAs and ERMAs ensures that investments in recreation facilities are as efficient and effective as possible, and help to provide for public safety. Many SRMAs and ERMAs, are managed for specific recreational uses or opportunities, but allow other recreational uses that do not present conflicts for the primary recreational opportunities the BLM manages at the site.

Table 3-127 identifies the acres by alternative and the Proposed RMP within SRMAs and ERMAs where the BLM manages and allows each type of activity.

Table 3-127. RMA acres of managed and allowed recreation opportunities within the decision area

Recreation Opportunities	No Action (Acres)*	Alt. A (Acres)	Alt. B (Acres)	Alt. C (Acres)	Alt. D (Acres)	PRMP (Acres)
Horseback Riding	199,008	19,017	155,480	367,402	603,530	459,939
Hiking	201,258	20,065	162,796	381,671	625,203	489,884
Mountain Bicycling	188,169	18,817	150,494	359,326	591,748	406,134
Public Motorized Use	170,127	2,551	104,148	329,594	561,685	452,728
Overnight Camping	194,952	19,235	146,301	356,611	600,539	458,652
Recreational Target Shooting	172,819	1,829	122,627	350,409	531,687	326,289

Note: The BLM can manage for and allow more than one opportunity within the same RMA, so totals of managed and allowed opportunities exceed total acreage.

* Because the currently designated 29 SRMAs generally encompass more lands than actual acres of recreation sites, trails, or other recreation facilities, the identification of total SRMA acres where recreation opportunities are managed and allowed is equally difficult to compare to current BLM recreation management within the planning area or compare against the action alternatives and the Proposed RMP.

Under the action alternatives, the acres where the BLM would manage for specific recreation activities increase progressively from Alternatives A–D. The acres targeted for specific recreation activities under the No Action alternative are larger than Alternative A and less than those acres identified in Alternative B. The acres targeted for specific recreation activities under the Proposed RMP are larger than Alternative C and less than those acres identified in Alternative D.

For all areas, the BLM considered the potential for increases or decreases in conflict between recreationists from recreation management actions, opportunities, and restrictions. Recreational conflict occurs when incompatible activities take place in the same area, or when certain types of recreational use could result in unwanted impacts to other resources. Certain activities interfere with the experience expectations of other recreational users (Marcouiller *et al.* 2008). For example, a hiker with the expectation of a quiet experience that encounters an OHV on a trail might consider the encounter as a conflict. The presence of an OHV interferes with the expectation of a quiet outing. Conflict among recreational users is generally asymmetrical; that is, one user might perceive there is a conflict while another user might not perceive there is a conflict (Jackson and Wong 1982). The BLM manages these potential conflicts by applying restrictions on certain recreation activities. In some cases, this results in seasonal restrictions, but can also result in prohibition of the recreational activity within the SRMA or ERMA if necessary. Restrictions of certain activities would preclude the opportunities for these activities on BLM-administered lands. **Table 3-128** identifies the acres by alternative and the Proposed RMP within SRMAs and ERMAs where activity-specific recreation restrictions occur.

Table 3-128. RMA acres of restricted recreation opportunities within the decision area

Recreation Opportunities	No Action (Acres)*	Alt. A (Acres)	Alt. B (Acres)	Alt. C (Acres)	Alt. D (Acres)	PRMP (Acres)
Horseback Riding	2,250	1,048	8,828	49,414	63,620	31,102
Hiking	-	-	1,511†	35,144 (2,924†)	41,907 (2,924†)	1,157†
Mountain Bicycling	13,089	1,248	13,814	57,490	75,402	84,907
Public Motorized Use	31,131	17,514	60,144	87,223	105,466	38,313
Overnight Camping	6,306	829	18,006	60,205	66,611	32,389
Recreational Target Shooting	28,439	18,236	41,681	66,407	135,464	164,752

* Because the currently designated 29 SRMAs generally encompass more lands than actual acres of recreation sites, trails, or other recreation facilities, the identification of total SRMA acres where recreation opportunities are restricted is equally difficult to compare to current BLM recreation management within the planning area or compare against the action alternatives and the Proposed RMP.

† Acres of the total shown for restricted hiking acres would have seasonal restrictions applied to the trail systems. All other acre restrictions would prohibit or otherwise set conditions for year-round hiking.

Note: The BLM can restrict more than one opportunity within the same RMA, so totals of restricted opportunities exceed total acreage.

Under the No Action alternative, all action alternatives, and the Proposed RMP, the BLM would restrict recreation opportunities at levels shown in **Table 3-128** to protect resources, reduce recreation conflicts, and provide for public safety. Under the action alternatives, the acres where specific recreation activities the BLM would manage for or allow increase progressively in Alternatives A–D. The acres targeted for specific recreation activities under the No Action alternative are larger than Alternative A and less than those acres identified in Alternative B. The acres targeted for specific recreation activities under the Proposed RMP vary in their comparative levels to the action alternatives depending on the recreation opportunity.

Recreation Setting Characteristics

As explained in the Analytical Methods section, the BLM has focused the discussion of effects to recreation setting characteristics to the discussion of remoteness and naturalness and how the alternatives and the Proposed RMP would change the existing recreation opportunity spectrum for these recreation setting characteristics.

Timber management actions that require new road construction would affect the recreation opportunity spectrum class for the remoteness of an area. Increasing the amount or improving the type of access into an area can change distance zones, thus changing the recreation opportunity class, and lead to higher levels of certain types of use. New road construction for timber harvest under each alternative and the Proposed RMP would only require small increases in additional local and resource roads. The BLM anticipates changes to remoteness recreation opportunity spectrum classes from estimated road construction would be localized and minor when considered at the planning-area scale. However, these minor changes cannot be modeled or shown because new road construction is only projected numerically and not mapped spatially. So even though estimated miles of new road construction may be calculated, there is no way to determine where new construction would occur and if it would increase or decrease acres in a given recreation opportunity spectrum class for remoteness.

Under all alternatives and the Proposed RMP, there would be localized effects to the variety of recreational opportunities that exist on BLM-administered lands when considering recreation opportunity spectrum classes for remoteness. The BLM used forest structural stage classes as a proxy **(Table 3-122)** to measure changes in recreation opportunity spectrum classes for naturalness for all classes excepting urban, which would not contain forested components and would not change based upon BLM management.

Table 3-129 shows the acres of BLM-administered lands in each of the five classes of recreation opportunity spectrum for naturalness.

Table 3-129. Acres of BLM-administered lands by Recreation Opportunity Spectrum Classes for naturalness

Alternative/ Proposed RMP	Recreation Opportunity Spectrum Class				
	Primitive (Acres)	Back Country (Acres)	Middle Country (Acres)	Front Country (Acres)	Rural (Acres)
No Action	649,799	692,016	161,105	389,069	270,236
Alt. A	627,043	623,388	156,681	396,966	357,621
Alt. B	621,105	617,535	161,534	427,101	334,424
Alt. C	590,837	566,186	149,499	414,083	441,094
Alt. D	629,097	659,078	162,275	398,293	312,956
PRMP	616,678	612,852	164,791	425,527	341,851

Although some localized effects would occur within each of these five recreation opportunity spectrum classes, none of the changes would be measurable enough to influence visitor use patterns that are associated with any single recreation activity within the decision area. As a result, all alternatives and the Proposed RMP would continue to maintain a mix of naturalness recreation opportunity spectrum classes that provide a variety of recreational opportunities and experiences for visitors. These minor changes in naturalness recreation opportunity spectrum classes for each alternative and the Proposed RMP cannot be modeled or shown because timber harvest is only projected numerically and not mapped spatially. So even though estimated acres of timber harvest may be calculated, there is no way to determine where harvest would occur and if it would increase or decrease acres in a given recreation opportunity spectrum class for remoteness.

Effects from the Management of Other Resources

The management of other resources would affect recreation and visitor services. Forest management, lands and realty actions, special designations, and mineral resource development would have both short-term and long-term effects to localized recreation opportunities. Some land management actions, such as timber harvest and wildland fire and fuels management, would change landscapes, or result in temporary closures within and surrounding RMAs. Other land management actions, such as protections of ESA-listed species or sensitive resources, would not alter the landscapes, but could result in changes to access or even result in interpretive educational opportunities. Other actions, such as special area designations like Wild and Scenic rivers or National Trails, would usually identify those areas as valuable for a variety of recreation activities, and result in benefits to the focus recreation opportunities, which typically include low-impact opportunities such as wildlife viewing or hiking.

Land management decisions associated with the issuance of a right-of-way could result in permanent changes to recreation opportunities within the planning area. Construction of new roads or development on lands adjacent to BLM-administered lands can change the physical recreation setting characteristics of naturalness and remoteness, or effect developed recreation sites and trails, depending on the location of roads or development.

The BLM designates right-of-way avoidance or exclusion areas to protect resources from these types of unwanted actions. See the Lands and Realty section in this chapter for further explanation of rights-of-way, and avoidance and exclusion areas. All alternatives and the Proposed RMP result in some protections to RMAs from right-of-way exclusion or avoidance (**Table 3-130**). Alternatives C and D, and the Proposed RMP would have the most acres in both right-of-way avoidance areas and right-of-way exclusion areas.

Table 3-130. Right-of-way avoidance areas and right-of-way exclusion areas within RMAs

Alternative/ Proposed RMP	ROW Avoidance Area (Acres)	ROW Exclusion Area (Acres)
No Action	8,207	1,321
Alt. A	18,543	7,075
Alt. B	38,731	14,754
Alt. C	416,617	17,010
Alt. D	666,862	12,140
PRMP	390,080	100,892

Issue 2

How would the alternatives affect the types and levels of BLM-provided recreation supply and demand across western Oregon?

Summary of Analytical Methods

This analysis considered the effect of the alternatives and the Proposed RMP on recreation supply and demand specific to motorized and non-motorized trail use. See the Socioeconomics section of this chapter for discussions on the overall and more general recreation supply and demand within the planning area. The BLM estimated recreation demand by considering the estimated number of visitors projected to participate in a particular recreation opportunity over the next 10 years and beyond. The BLM measured recreation demand in two ways: (1) total number of visitors per year, and (2) total number of participants by 13 primary recreation activity categories. Because a single visitor usually participates in more than one activity, the number of participants is generally higher than the number of actual visitors. Since visitor use patterns are difficult to estimate and dependent on many factors beyond the scope of management (e.g., recreation trends and economy) only qualitative language is used to describe anticipated effects on visitation.

This recreation demand assessment considers the market area or 'visitation range' where the majority of the current or potential visitors are likely to reside. The BLM selected 12 population centers within the planning area to serve as study communities for this analysis. The BLM conducted a recreation demand analysis throughout the planning area in 2013–2014.[86] This analysis focused on proximity to user populations as well as both scarcity and demand for recreation opportunities. A number of factors influence the demand for outdoor recreation in western Oregon. This analysis examined recreation context, supply, and demand drivers, and is incorporated here by reference (ECONorthwest, April 2015).

[86] ECONorthwest, an economics, planning, and financial consulting firm, conducted the recreation demand analysis under contract from the BLM.

Since visitor use patterns are difficult to estimate and are dependent on many factors beyond the scope of management, such as recreational trends and the economy, the BLM only used qualitative language to describe anticipated effects on visitation.

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 2014b, pp. 109–114).

Background

BLM-administered lands are not the sole provider of recreational settings and opportunities in western Oregon, and many additional opportunities exist on other Federal, State, and County lands throughout the planning area. Other recreation-tourism markets also affect the amount of use on BLM-administered lands. An estimated 18 percent of all outdoor recreation participation in western Oregon occurs on BLM-administered lands (USDI BLM 2014a). For comparison purposes, BLM-administered lands account for 12 percent of all lands within the planning area. Recreation visitors to the planning area come from three primary sources: national and international locations, major metropolitan areas, and local communities.

As part of its 2010 revision of the Resources Planning Act Assessment, the U.S. Forest Service developed national projections of participation for 17 outdoor recreation activities through 2060 (Bowker *et al.* 2012). These projections take into account various scenarios of climate change based on the Intergovernmental Panel on Climate Change (IPCC) scenarios, population and income growth, and land use change. The BLM applied these projections to each of the 13 relevant BLM recreation categories, using the base scenario (A1B, corresponding to mid-range population growth and the highest average personal and household income level of the 3 IPCC scenarios). These participation trends are consistent with those observed over the last few decades in Oregon (Hall *et al.* 2009).

Table 3-131 and **Figure 3-122** provide the current level of participation for the 13 primary recreation activities on BLM-administered lands in western Oregon, the annual rate of change to participation for each activity (based on statewide trends), and their projected levels by the year 2060.

Table 3-131. Current and projected levels of participation by recreation activity within the planning area from 2012 to 2060

BLM Recreation Categories	Current Number of Participants (2012)	Projected Number of Participants (By End of Decade)				
		2020	2030	2040	2050	2060
Wildlife Viewing, Interpretation, and Nature Study	2,564,574	2,810,926	3,149,289	3,456,865	3,751,811	4,056,276
Driving for Pleasure (Along Designated BLM Roadways)	1,959,729	2,140,696	2,388,704	2,610,605	2,819,454	3,033,896
Camping and Picnicking	1,273,349	1,389,106	1,548,035	1,689,978	1,822,216	1,956,881
Non-motorized Travel (Hiking, Biking, and Horseback Riding)	1,211,201	1,334,041	1,499,867	1,666,874	1,841,117	2,031,541
Hunting (Big Game, Upland Game, and Migratory Game Birds)	1,063,709	1,111,142	1,159,767	1,197,012	1,232,188	1,270,468
Motorized Off-highway Vehicle Travel	826,256	887,031	955,996	1,035,266	1,128,804	1,238,989
Fishing	598,420	645,558	706,223	760,591	814,388	872,763
Specialized Non-motorized Activities and Events	458,870	501,333	559,264	612,440	663,431	716,455
Swimming and Other Water-based Activities	424,376	467,997	526,296	583,388	640,883	701,192
Non-motorized Boating	224,876	242,296	262,362	286,958	315,870	349,744
Motorized Boating	97,622	107,563	119,936	133,508	149,019	167,485
Non-motorized Winter Activities	50,444	56,687	64,711	73,679	84,205	97,138
Snowmobile and other Motorized Winter Activities	6,903	7,428	7,998	8,734	9,629	10,697
Total All Activities	**10,760,329**	**11,701,804**	**12,948,448**	**14,115,898**	**15,273,015**	**16,503,525**

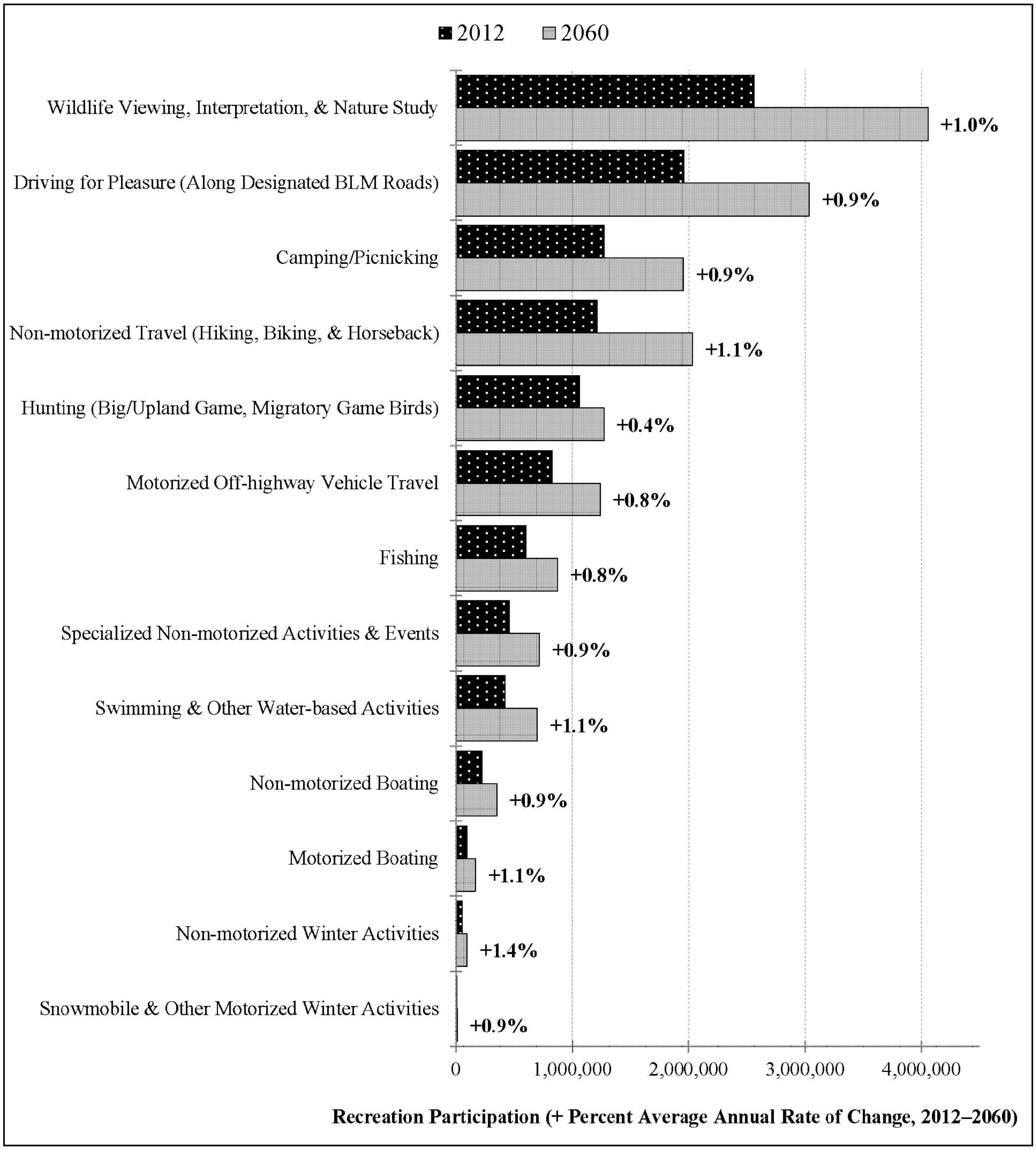

Figure 3-122. Projected levels of change by recreation activity within the planning area from 2012–2060

The BLM evaluated activity-specific recreation demand for 12 population centers within the planning area, achieving a wide spatial coverage and capturing a majority of the area's population **(Figure 3-123)**. **Table 3-132** provides a summary of 2,262 responses to the 2012–2013 interactive BLM website that solicited public input from the 12 selected study communities. Results show community level and activity specific recreation demand preferences for 16 distinct recreation activities across the 12 population centers in western Oregon.

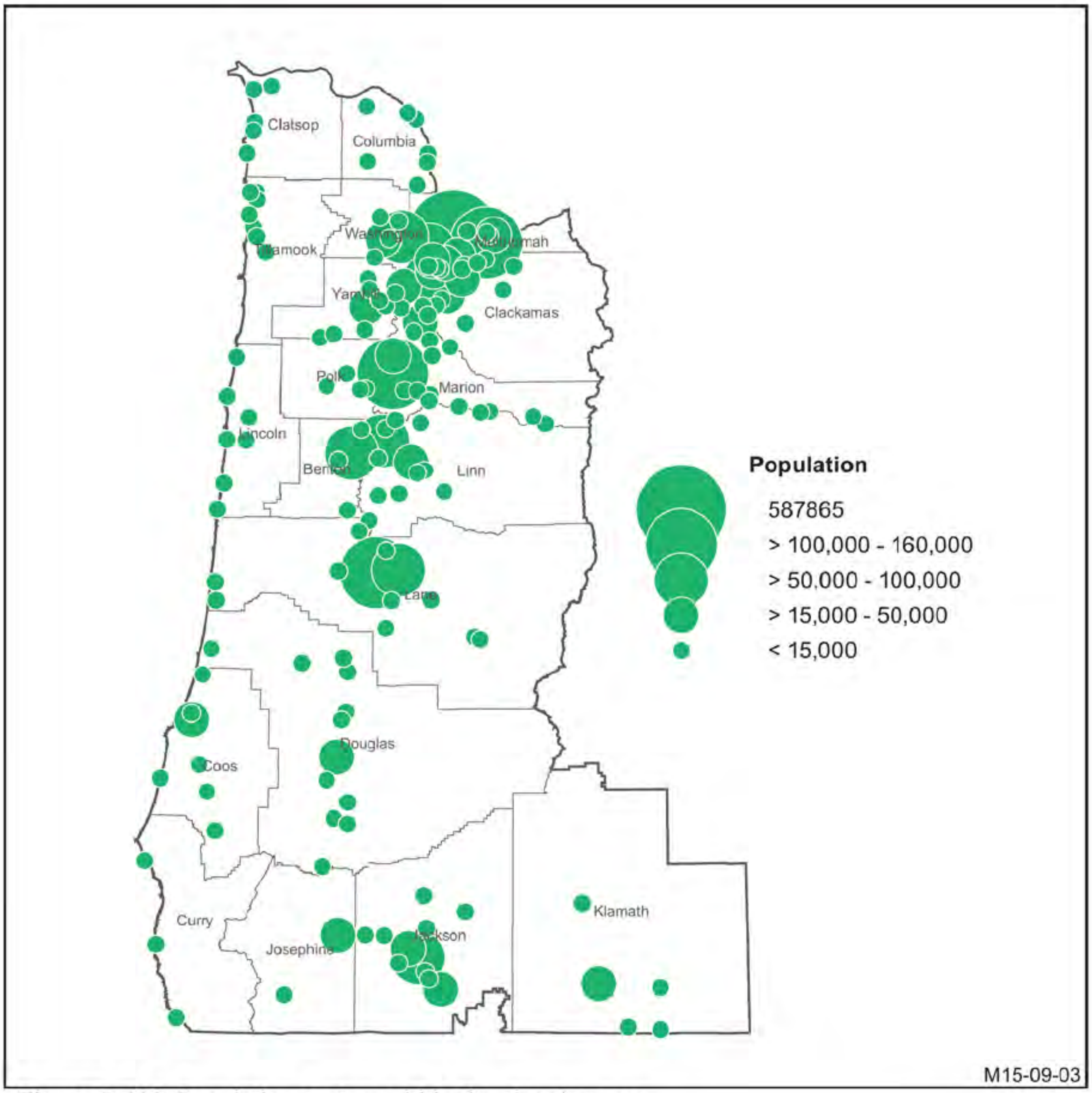

Figure 3-123. Population centers within the planning area

Table 3-132. Activity-specific recreation demand for western Oregon communities

Recreation Activity	Percentage of Activities in Each Community											
	Coos Bay	Corvallis	Eugene	Grants Pass	McMinnville	Medford	Newberg	Portland	Roseburg	Salem	Sandy	Tillamook
Nature Viewing	4%	3%	6%	2%	7%	3%	4%	2%	3%	3%	2%	3%
Non-motorized Trails	6%	5%	6%	11%	4%	12%	4%	5%	5%	8%	6%	5%
Water Trail	-	1%	-	-	-	-	-	1%	-	-	1%	1%
Hiking	2%	6%	6%	9%	7%	8%	2%	1%	6%	5%	6%	4%
Mountain Biking	17%	34%	29%	17%	18%	16%	21%	37%	14%	23%	27%	19%
Horseback Riding	1%	3%	5%	7%	4%	3%	4%	3%	4%	7%	5%	3%
Motorized OHV Travel	48%	19%	25%	29%	28%	31%	29%	21%	43%	26%	30%	25%
Hunting-Fishing	4%	6%	9%	3%	5%	2%	5%	4%	6%	7%	4%	7%
Camping-Picnicking	2%	2%	3%	3%	7%	2%	4%	2%	2%	5%	2%	2%
Hang Gliding-Paragliding	10%	8%	4%	10%	11%	11%	20%	13%	4%	4%	6%	22%
Recreational Target Shooting	2%	5%	2%	1%	2%	1%	4%	4%	1%	7%	4%	2%
Gold Panning-Dredging	2%	1%	1%	2%	1%	2%	1%	1%	2%	2%	1%	1%
River Recreation	1%	2%	1%	3%	4%	1%	2%	2%	2%	-	2%	2%
Rock Hounding	1%	4%	1%	1%	1%	1%	-	2%	1%	1%	1%	2%
Rock Climbing	-	1%	1%	1%	-	1%	-	1%	6%	-	2%	-
Winter Activities	-	-	1%	1%	1%	6%	-	1%	1%	2%	1%	2%

Affected Environment

Applying travel time distances from the 12 study communities in western Oregon (**Figure 3-124**) reveals the portions of BLM-administered lands that can be accessed relatively easily for recreational activities.

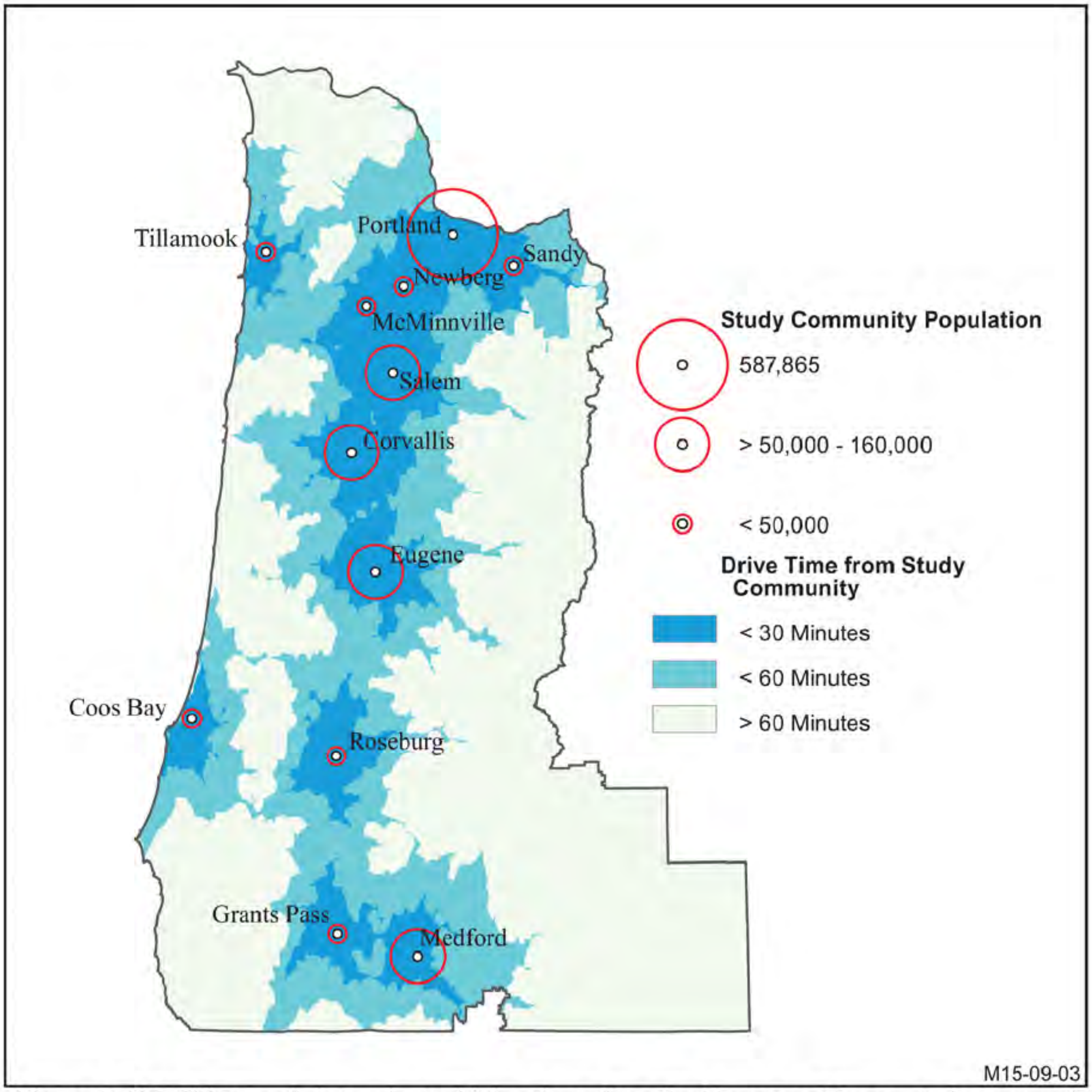

Figure 3-124. Thirty- and sixty-minute driving times from the 12 western Oregon study communities and population center size

Population centers and access tend to drive demand for outdoor recreation opportunities. The northern Willamette Valley is the most heavily populated portion of the region, dominated by the Portland Metro Area **(Figure 3-125)**. Recreation opportunities within proximity to these population centers experience the most demand, and consequently have the potential to provide the most value, when they provide the types of recreation of interest. While access is often quite difficult through rugged and mountainous areas, the majority of BLM-administered lands within the planning area are within 50 miles of one of the 12 population centers the BLM has used as a study community **(Figure 3-124)**.

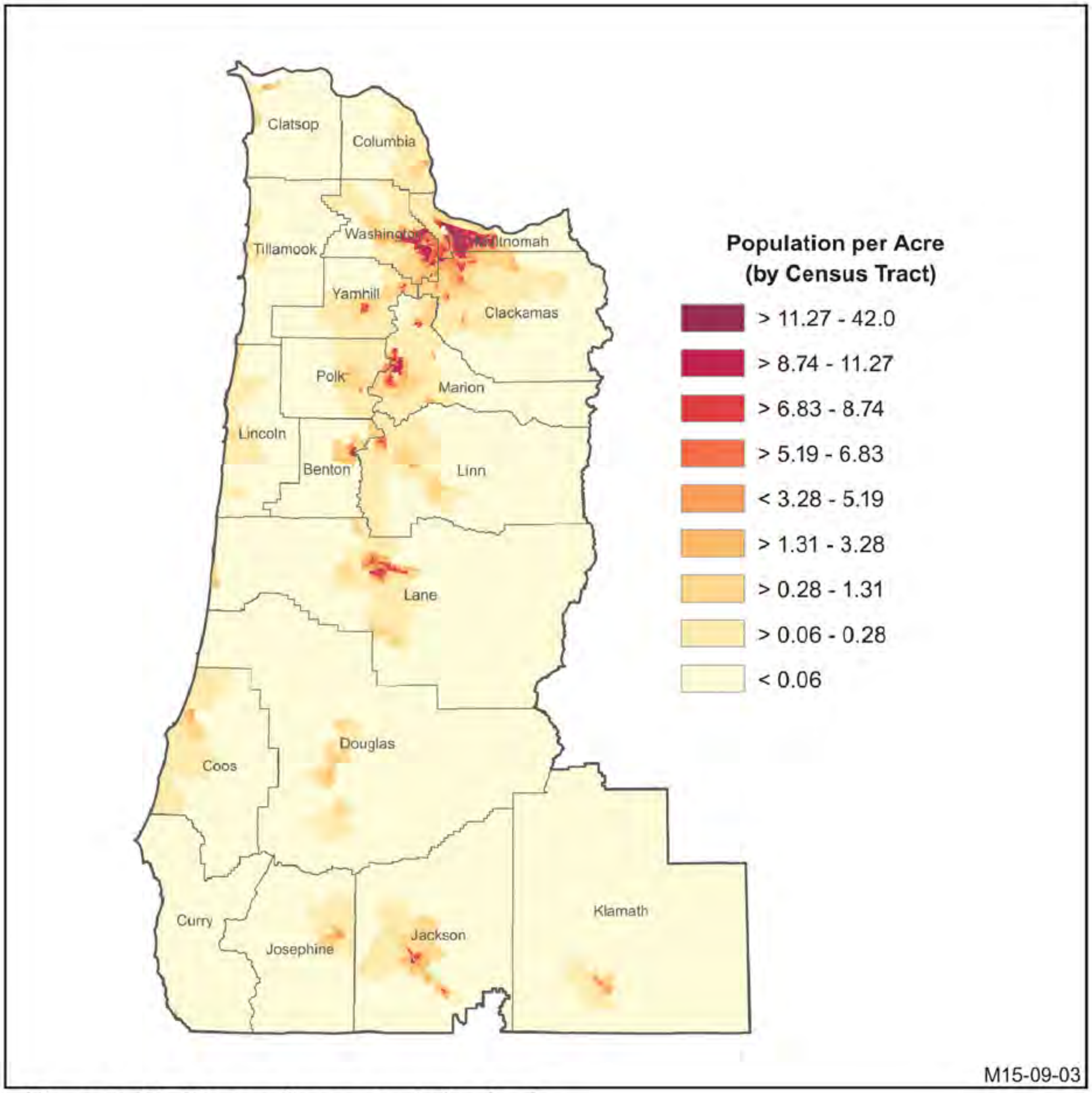

Figure 3-125. Western Oregon population density

Motorized and Non-Motorized Supply and Demand

Self-reported participation on the BLM's interactive mapping site revealed differences in outdoor recreation as a function of both supply opportunities and demand preferences. Currently, trail use accounts for 69 percent of the identified demand within the planning area (**Table 3-132**). Among respondents, motorized trail use is slightly greater than non-motorized trail use in the Coos Bay and Roseburg communities, while the opposite holds true for respondents in the rest of the study communities.

Hiking Trails

The availability of all identifiable non-motorized hiking trails (BLM and non-BLM) within a 30-minute and 60-minute drive of the study communities varies, with Sandy having the most trail miles available within both the 30-minute and 60-minute driving distances (**Table 3-133** and **Table 3-134**) Based on the available trail data, accessible hiking trails are generally scarcer for Coos Bay and Tillamook than the other communities are when looking at a 60-minute driving distance.

Table 3-133. Supply and demand for hiking trails within a 30-minute driving distance from study communities

Community	Community Participation Rate	Local User Population	Trail Miles	Trail Miles Per User
Coos Bay	40%	21,353	51	0.0024
Corvallis	54%	108,473	300	0.0028
Eugene	47%	160,078	73	0.0005
Grants Pass	46%	55,592	345	0.0062
McMinnville	46%	56,994	30	0.0005
Medford	47%	85,002	437	0.0051
Newberg	46%	236,095	187	0.0008
Portland	55%	773,649	298	0.0004
Roseburg	41%	39,120	66	0.0017
Salem	50%	213,239	326	0.0015
Sandy	45%	177,305	1,528	0.0086
Tillamook	34%	8,366	111	0.0133
1st Quartile	**44%**	**51,474**	**72**	**0.0007**
Median	**46%**	**96,737**	**242**	**0.0020**
2nd Quartile	**48%**	**186,289**	**330**	**0.0054**

Table 3-134. Supply and demand for hiking trails within a 60-minute driving distance from study communities

Community	Community Participation Rate	Local User Population	Trail Miles	Trail Miles Per User
Coos Bay	40%	32,674	157	0.0048
Corvallis	54%	498,958	443	0.0009
Eugene	47%	305,863	846	0.0028
Grants Pass	46%	150,993	1,162	0.0077
McMinnville	46%	760,939	641	0.0008
Medford	47%	137,371	512	0.0037
Newberg	46%	963,756	901	0.0009
Portland	55%	1,136,424	2,142	0.0019
Roseburg	41%	73,796	859	0.0116
Salem	50%	937,711	928	0.0010
Sandy	45%	704,886	2,800	0.0040
Tillamook	34%	26,923	269	0.0100
1st Quartile	**44%**	**121,477**	**495**	**0.0010**
Median	**46%**	**402,411**	**853**	**0.0032**
2nd Quartile	**48%**	**805,132**	**986**	**0.0055**

Hiking trail miles per capita with respect to the local residential population within 30 minutes is lowest for Portland, followed by Eugene and McMinnville. At the 60-minute radius, McMinnville, Newberg, Corvallis, and Salem have the fewest hiking trail miles with respect to population. When available trail miles per capita for these communities are low increased visitor interactions can be expected to degrade the user experience near in these areas.

Mountain Bike Trails

The availability of all identifiable mountain bike trails (BLM and non-BLM) within 30-minute and 60-minute driving distance of the study communities varies, with Corvallis having the most trail miles available within 30 minutes and Sandy having the most trail miles available within 60 minutes (**Table 3-135** and **Table 3-136**). Based on the available trail data, mountain bike trails are generally scarcer for Salem and Tillamook than other communities are when looking at a 30-minute drive.

Table 3-135. Supply and demand for mountain bike trails within a 30-minute driving distance from study communities

Community	Community Participation Rate	Local User Population	Trail Miles	Trail Miles Per User
Coos Bay	11%	5,716	30	0.0052
Corvallis	17%	34,276	183	0.0053
Eugene	11%	36,811	11	0.0003
Grants Pass	10%	11,990	56	0.0047
McMinnville	9%	11,698	27	0.0023
Medford	14%	25,988	16	0.0006
Newberg	9%	48,456	42	0.0009
Portland	11%	159,198	47	0.0003
Roseburg	9%	8,554	15	0.0018
Salem	12%	50,348	9	0.0002
Sandy	7%	26,005	79	0.0030
Tillamook	11%	2,651	8	0.0030
1st Quartile	**9%**	**10,912**	**14**	**0.0005**
Median	**11%**	**25,996**	**29**	**0.0020**
2nd Quartile	**12%**	**39,723**	**49**	**0.0035**

Table 3-136. Supply and demand for mountain bike trails within a 60-minute driving distance from study communities

Community	Community Participation Rate	Local User Population	Trail Miles	Trail Miles Per User
Coos Bay	11%	8,746	42	0.0048
Corvallis	17%	157,663	193	0.0012
Eugene	11%	70,336	284	0.0040
Grants Pass	10%	32,567	155	0.0048
McMinnville	9%	156,175	187	0.0012
Medford	14%	41,999	221	0.0053
Newberg	9%	197,801	202	0.0010
Portland	11%	233,849	225	0.0010
Roseburg	9%	16,137	147	0.0091
Salem	12%	221,404	170	0.0008
Sandy	7%	103,383	280	0.0027
Tillamook	11%	8,531	244	0.0286
1st Quartile	**9%**	**28,460**	**166**	**0.0012**
Median	**11%**	**86,859**	**197**	**0.0034**
2nd Quartile	**12%**	**167,698**	**230**	**0.0049**

Mountain bike trails per capita with respect to the local residential population within 30 minutes is lowest for Salem followed by Portland and Eugene. At the 60-minute radius, Salem, Newberg, and Portland have the fewest mountain bike trails with respect to population.

Off-highway Vehicle Trails

The availability of all identifiable OHV trails (BLM and non-BLM) within 30-minute and 60-minute driving time of the study communities varies, with Grants Pass having the most trail miles available within both a 30-minute and 60-minute drive (**Table 3-137** and **Table 3-138**). Based on the available trail data, OHV trails are negligible for Eugene and Portland when looking at 30-minute driving distances.

Table 3-137. Supply and demand for OHV trails within a 30-minute driving distance from study communities

Community	Community Participation Rate	Local User Population	Trail Miles	Trail Miles Per User
Coos Bay	29%	15,853	51*	0.0032
Corvallis	10%	19,356	21	0.0011
Eugene	6%	19,925	34	0.0017
Grants Pass	10%	12,354	177	0.0143
McMinnville	11%	13,440	58	0.0043
Medford	10%	18,589	89	0.0048
Newberg	11%	55,673	58	0.0010
Portland	2%	20,947	-	-
Roseburg	19%	18,551	53	0.0028
Salem	11%	44,848	2	0.0000
Sandy	9%	34,673	80	0.0023
Tillamook	16%	3,989	58	0.0146
1st Quartile	**9%**	**15,250**	**31**	**0.0020**
Median	**10%**	**18,972**	**55**	**0.0029**
2nd Quartile	**12%**	**24,379**	**64**	**0.0026**

* Trail miles shown for Coos Bay reflect designated and user-created trail miles found within the Oregon Dunes National Recreation Area. These trail miles under-represent the supply available for this geographic area, since there are more than 6,000 acres of open riding available within the Oregon Dunes National Recreation Area.

Table 3-138. Supply and demand for OHV trails within a 60-minute driving distances from study communities

Community	Community Participation Rate	Local User Population	Trail Miles	Trail Miles Per User
Coos Bay	29%	24,258	175*	0.0072
Corvallis	10%	89,033	22	0.0002
Eugene	6%	38,072	35	0.0009
Grants Pass	10%	33,554	653	0.0194
McMinnville	11%	179,435	124	0.0007
Medford	10%	30,041	278	0.0093
Newberg	11%	227,261	150	0.0007
Portland	2%	30,770	168	0.0054
Roseburg	19%	34,994	243	0.0069
Salem	11%	197,21	119	0.0006
Sandy	9%	137,844	162	0.0012
Tillamook	16%	12,835	78	0.0061
1st Quartile	**9%**	**30,587**	**109**	**0.0036**
Median	**10%**	**36,533**	**156**	**0.0043**
2nd Quartile	**12%**	**148,242**	**192**	**0.0013**

* Trail miles shown for Coos Bay include 51 designated and user-created trail miles found within the Oregon Dunes National Recreation Area. These trail miles under-represent the supply available for this geographic area, since there are more than 6,000 acres of open riding available within the Oregon Dunes National Recreation Area.

Off-highway vehicle trails per capita with respect to the local residential population within 30 minutes are lowest for Eugene and Portland. At the 60-minute radius, Eugene, Corvallis, and Salem have the fewest OHV trails with respect to population.

Environmental Consequences

The BLM focused on the 12 population centers within the planning area to serve as study communities when evaluating effects of the alternatives and the Proposed RMP to recreation supply and demand. The BLM focuses discussions here on recreation demand for trails, as this accounts for 69 percent of the identified demand within the planning area (**Table 3-132**). As such, this analysis focuses on trails in general[87] and RMAs that target popular trail based activities within the planning area, specifically hiking, mountain biking, and riding OHVs. See the Socioeconomics section of this chapter for further discussion of more general recreation demand within the planning area.

Individual RMAs do not identify total miles of trail per area, but extrapolating from available trail miles per acre under current conditions allows an approximation of the number of trail miles that would be available under each alternative and the Proposed RMP. Currently there are approximately 395 miles of trails on BLM-administered lands in western Oregon, which could increase to the highest levels at 1,734 miles under the Proposed RMP and to 2,037 miles under Alternative D (**Table 3-139**).

Table 3-139. Potential RMA trail miles

District/ Field Office	No Action (Miles)	Alt. A (Miles)	Alt. B (Miles)	Alt. C (Miles)	Alt. D (Miles)	PRMP (Miles)
Coos Bay	35	2	35	81	114	125
Eugene	46	-	46	54	78	54
Klamath Falls	29	-	29	42	92	40
Medford	146	79	146	831	1,221	1,103
Roseburg	39	1	39	230	238	116
Salem	100	5	100	197	294	296
Totals	**395**	**88**	**395**	**1,435**	**2,037**	**1,734**

No Action Alternative

Existing developed recreation sites would often meet the current level of recreation demand in the planning area. However, the anticipated increase in recreation could result in the demand for additional or expanded recreation sites and trail systems because of user conflicts and degraded recreation experiences. Existing motorized and non-motorized trails within the decision area would continue to attract users, but a need to manage trail systems commensurate with other resources and resource uses within the planning area would limit effective management and allow for increased conflict between recreation and competing uses along both motorized and non-motorized trails. Seasonal crowding at certain developed sites (e.g., Fishermen's Bend and Sandy Ridge Trail System) would affect user enjoyment of the area because use exceeds management capability. While expansion of existing sites or development of new

[87] Data sources for trail miles within 30- and 60-minute driving distances were sourced from – AllTrails (hiking and OHV), Singletracks and MTB Project (mountain biking), and RiderPlanet USA (OHV) (ECONorthwest 2015).

sites to address crowding would be considered, it would only occur where it would be commensurate with other resources and resource uses within the planning area.

Action Alternatives and the Proposed RMP

Overall, the alternatives and the Proposed RMP increase RMA acreage progressively from Alternative A through D with the Proposed RMP providing the second highest number of acres, although the changes in RMA acreage do not follow consistent patterns for all of the identified communities. Recreation opportunities that are close to population centers experience the most participants and visitor-days, and consequently result in the highest value for residents within the 12 study communities.

In terms of proximity to the 12 study communities, the overall acreage accessible within 30-minute and 60-minute driving distances under each alternative and the Proposed RMP track with their overall RMA acreage. The study communities with the least existing non-motorized and motorized trail miles within 30-minute proximities for the various recreation activities see some improvement under the Proposed RMP and Alternative D, while other study communities with little trail mileage within 30-minutes would see substantial increase in total RMA acreage (including non-trail) under the Proposed RMP and Alternative D (**Table 3-133**). Moving out from 30- to 60-minute driving distances increase the recreation area acreage by more than double, and increases to five- or six-fold under the Proposed RMP and Alternative D. While all communities would see increased total RMA acreage progressively in Alternatives A–D, the Grants Pass and Medford communities would experience the highest increase in RMA acreage under the Proposed RMP and Alternative D.

Recreation Participation Changes

This analysis includes estimates of changes in outdoor recreation participation based on different levels of outdoor recreation opportunities in the form of RMA total acreage by alternative and the Proposed RMP. The Proposed RMP/Final EIS includes estimates of participation based on elasticity of demand (i.e., demand responsiveness) estimates derived from data collected by the U.S. Census Bureau as part of the American Time Use Survey sponsored by the Bureau of Labor Statistics. That is, as the quantity of available RMA acreage increases, there is some proportionate increase in participation based on existing levels. The BLM applied outdoor recreation visitor day and visit forecasts to these estimated changes in participation that would occur under each alternative and the Proposed RMP. See **Appendix P** for more detail on the methods for estimating and applying demand elasticity.

The BLM applied changes in demand resulting from differing quantities of RMA acreage to provide a breakdown by district and local vs. non-local participation. The BLM does not directly measure local vs. non-local recreation participation. Local and non-local breakdowns for these analyses are based on proportions observed for the nearest U.S. Forest Service lands, which does measure the breakdown. The BLM applied the general forecasts for trends in future outdoor recreation participation to all alternatives and the Proposed RMP as a multiplier on the demand effects of increases in RMA acreage. These demand analyses do not include any consideration of changes in quality of RMAs. To this extent, any improvements in RMA quality that would occur and would be likely to increase participation are not included and corresponding participation estimates would likely be underestimates.

Table 3-140 displays the change in recreation visitation that would result from an increase in designated RMA acreage by alternative and the Proposed RMP with full implementation in 2062.

Table 3-140. Recreation visitation estimates with full implementation in 2062

District/ Field Office	No Action (Visits)	Alt. A (Visits)	Alt. B (Visits)	Alt. C (Visits)	Alt. D (Visits)	PRMP (Visits)
Coos Bay	909,878	760,199	909,878	1,119,515	1,267,736	1,320,747
Eugene	1,433,945	1,181,424	1,433,945	1,479,730	1,612,827	1,478,836
Klamath Falls	191,562	157,954	191,562	206,216	265,531	203,895
Medford	1,750,602	1,606,946	1,750,602	3,199,395	4,024,774	3,774,585
Roseburg	1,501,923	1,242,401	1,501,923	2,815,480	2,869,646	2,031,426
Salem	2,318,837	1,930,109	2,318,837	2,718,855	3,117,211	3,126,341
Totals	**8,106,746**	**6,879,033**	**8,106,746**	**11,539,191**	**13,157,726**	**11,935,831**

The changes in recreation visitation resulting from differing quantities of RMA acreage increases proportionately from Alternatives A to D. Recreation visitation for the Proposed RMP would be higher than Alternatives A, B, and C and less than Alternative D.

Issues Considered but not Analyzed in Detail

How would BLM management affect significant caves?

The Federal Caves Resources Protection Act (16 U.S.C. 4301) defines a cave as significant if it meets at least one of the following criteria: size, mineral formations, endemic or other unusual species or subspecies, seasonally important habitat for non-endemic species or subspecies, archaeological or paleontological site, historical or religious significance, hydrologic connectivity to other caves or springs, unusual geologic strata or processes, recreationally important, or pristine in that human contact has been minimal or nonexistent.

The BLM has designated five caves within the decision area as significant under this Act. All of these caves are in the Medford District: three in the Grants Pass Field Office and two in the Butte Falls Field Office. The size and extent of these caves are unknown.

Under all alternatives and the Proposed RMP, the BLM would continue to apply current management to protect the resources associated with these caves and protect visitor safety. All alternatives and the Proposed RMP would maintain conditions at significant caves, and there would be no meaningful difference among the alternatives and the Proposed RMP.

How would BLM management affect public health and safety at Formerly Used Defense Sites (FUDS)?

The decision area includes a portion of one Formerly Used Defense Site (FUDS): the Modoc Aerial Gunnery and Bombing Range (Modoc Range), which is located in Modoc County, California, and Klamath and Lake Counties, Oregon. The estimated acreage of the Modoc Range varies depending on the source of the information, but it covers between 623,328 and 2,872,000 acres in southern Oregon and northern California, most of which is outside of the planning area. The Modoc Range was constructed by the U.S. Navy in the 13th Naval District during World War II. Prior to the 13th Naval District operations at the site, the predominant land use was agricultural for forestry and livestock grazing. The Modoc Range was associated with the Naval Air Station, in Klamath Falls, and was used as a practice area for aerial gunnery, bombing, and strafing. Currently, the majority of the land comprising the Modoc Range is managed by the U.S. Forest Service, U.S. Fish and Wildlife Service, U.S. Bureau of Reclamation, and the BLM, and is mostly used for recreational purposes.

The Army Corps of Engineers Modoc Aerial Gunnery and Bombing Range Site Inspection Report (2009) indicates that the BLM has two Munitions Response Sites within the planning area, which are potentially affected with munitions and explosives of concern. These sites were Navy bomb target areas that may present an explosive risk. The affected BLM-administered lands are located at two recreation sites: Gerber Lake Reservoir (937 acres) and Willow Valley Lake (649 acres). These lakes were used as practice bombing targets for approximately 15 months in the 1940s, with targets set at the center of the lakes. Munitions debris (i.e., non-explosive remnants) from practice bombs have been found on the shores of the lakes and on an island in Gerber Lake. Although the munitions used in bombing were practice, these rounds originally had spotting charges and other energetic components that could potentially represent an explosive hazard if they did not function properly upon impact. Until Unexploded Ordinance-trained technicians inspect the munitions, certify them as safe, and remove them from the site, all munitions are presumed to be a hazard. The Army Corps of Engineers has scheduled additional investigations at these two locations in 2021 to assess hazardous materials, explosives, and explosive remnants. Based on current information, the two sites on BLM-administered lands in the decision area are considered low risk compared to others in the FUDS Inventory, with a score of 6 out of 9 (with 1 being the highest risk and 9 the lowest risk). However, the investigation and cleanup of the sites and the eventual remedy may affect recreational use over the long-term, depending on the risks identified. Discovery of munitions at any time may result in a change in the schedule to address these areas and an increase in the need for site access controls.

Under all alternatives and the Proposed RMP, the BLM would apply the same management to protect public health and safety in the portion of the Modoc Range within the decision area. All alternatives and the Proposed RMP would maintain conditions at the Modoc Range, and there would be no meaningful difference among the alternatives or the Proposed RMP that the BLM can discern at this scale of analysis with the information currently available to the BLM.

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Socioeconomics

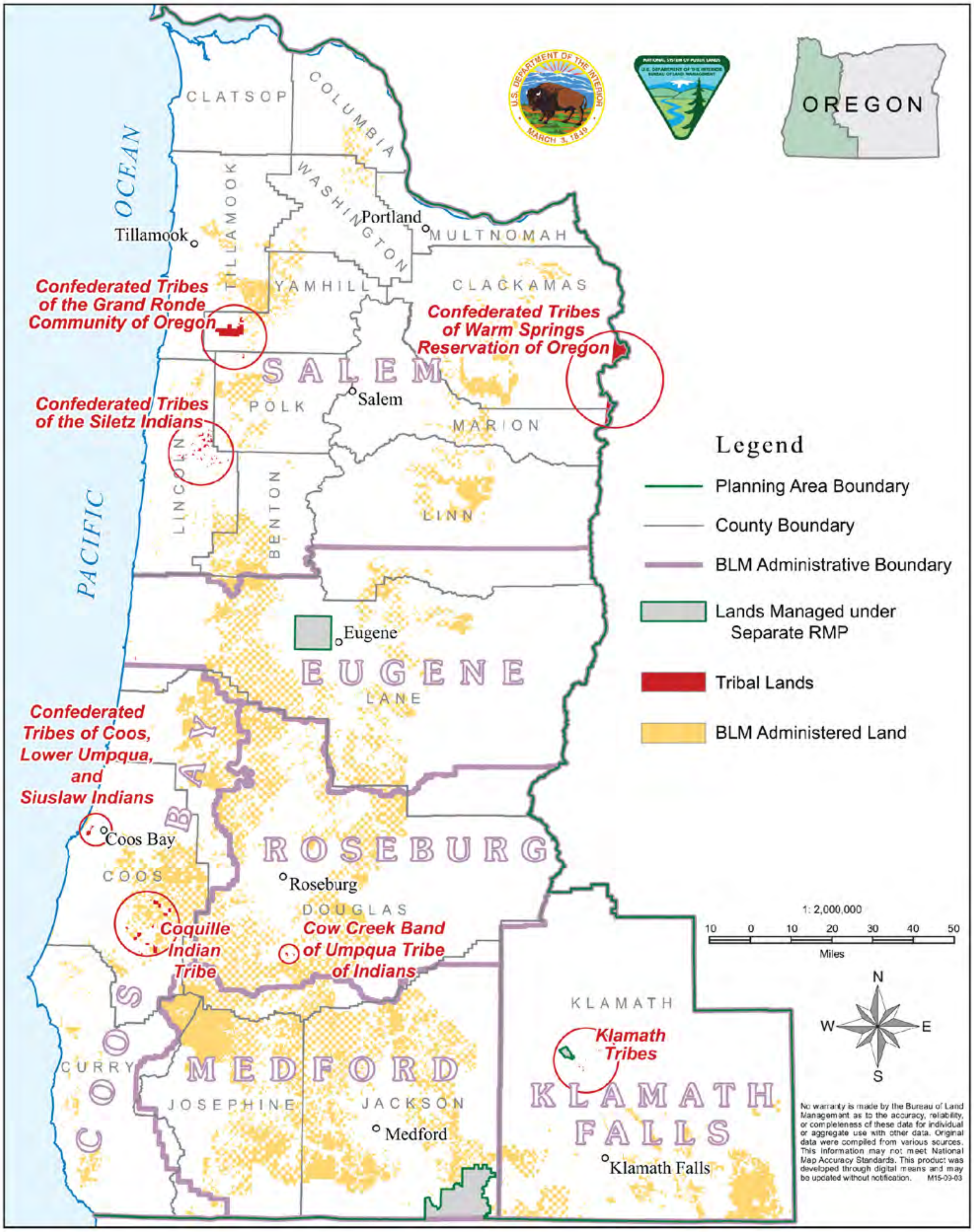
Background

The analysis of socioeconomic resources has two broad emphases: economic growth and stability; and social capacity and resiliency. To address these topics, the BLM assessed the value of goods and services derived from BLM-administered lands, economic activity in the planning area, county payments, economic stability, the capacity and resiliency of communities, and environmental justice. This section also describes the cost to the BLM to implement the alternatives and the Proposed RMP.

This section also presents an analysis of the cumulative effects on economic activity of past, present, and reasonably foreseeable future actions, including both land management on BLM-administered lands and non-BLM-administered lands, presenting the effects of alternatives and the Proposed RMP in relation to the broader economic context in western Oregon.

Geography and Population

The planning area contains 19 counties in western Oregon. For several BLM districts, the district boundaries are generally consistent with county boundaries, with most of the area of each county in one BLM district. The planning area also contains the lands of seven federally recognized Indian Tribes (**Map 3-5**).



Map 3-5: Counties, BLM Administrative Boundaries, and Tribal Lands within the Planning Area

As of 2012, the planning area's population was approximately 3.4 million or 88 percent of the State's total population (**Table 3-141**). The population of the 12 counties in the BLM's Salem District is almost 2.5 million, almost 75 percent of the planning area population. All of the counties in the planning area have experienced some level of population growth from 1990–2000 and from 2000–2012. However, only four counties' growth rates have been higher than the State of Oregon since 2000 (12 percent): Linn, Polk, Washington, and Yamhill. All of these are in the BLM's Salem District. Several counties have experienced very little recent growth (less than 2,600 people). These tend to be the more geographically isolated parts of the planning area: Clatsop, Tillamook, and Lincoln counties in the northwest; Curry and Coos counties in the southwest; and Klamath County in the southeast.

Table 3-141. Planning area population, 1990–2012

Geography	Population				Population Change, 1990–2012		Population Change, 2000–2012	
	1990	2000	2010	2012	Number	Percent	Number	Percent
Oregon	2,842,321	3,421,399	3,831,074	3,836,628	994,307	35%	415,229	12%
Planning Area	2,535,122	3,033,622	3,387,980	3,393,160	858,038	34%	359,538	12%
Benton County	70,811	78,153	85,579	85,501	14,690	21%	7,348	9%
Clackamas County	278,850	338,391	375,992	377,206	98,356	35%	38,815	11%
Clatsop County	33,301	35,630	37,039	37,068	3,767	11%	1,438	4%
Columbia County	37,557	43,560	49,351	49,317	11,760	31%	5,757	13%
Coos County	60,273	62,779	63,043	62,937	2,664	4%	158	0.3%
Curry County	19,327	21,137	22,364	22,344	3,017	16%	1,207	6%
Douglas County	94,649	100,399	107,667	107,391	12,742	13%	6,992	7%
Jackson County	146,389	181,269	203,206	203,613	57,224	39%	22,344	12%
Josephine County	62,649	75,726	82,713	82,636	19,987	32%	6,910	9%
Klamath County	57,702	63,775	66,380	66,350	8,648	15%	2,575	4%
Lane County	282,912	322,959	351,715	351,794	68,882	24%	28,835	9%
Lincoln County	38,889	44,479	46,034	45,992	7,103	18%	1,513	3%
Linn County	91,227	103,069	116,672	116,871	25,644	28%	13,802	13%
Marion County	228,483	284,834	315,335	315,391	86,908	38%	30,557	11%
Multnomah County	583,887	660,486	735,334	737,110	153,223	26%	76,624	12%
Polk County	49,541	62,380	75,403	75,448	25,907	52%	13,068	21%
Tillamook County	21,570	24,262	25,250	25,254	3,684	17%	992	4%
Washington County	311,554	445,342	529,710	531,818	220,264	71%	86,476	19%
Yamhill County	65,551	84,992	99,193	99,119	33,568	51%	14,127	17%
Lands of Federally Recognized Tribes Within the Planning Area								
Confederated Tribes of the Coos, Lower Umpqua, and Siuslaw Indians of Oregon (Coos County)	4	25	47	24	20	500%	-1	-4%
Confederated Tribes of Grand Ronde Community of Oregon (Yamhill County)	57	55	434	473	416	730%	418	760%
Confederated Tribes of Warm Springs Reservation of Oregon	3,076	3,314	4,012	3,960	884	29%	646	19%
Coquille Tribe of Oregon (Coos County)	See note	258	323	297	See note		39	15%
Confederated Tribes of the Siletz Reservation (Lincoln and Polk Counties)	5	308	506	476	471	9420%	168	55%
Cow Creek Band of Umpqua Indians of Oregon (Douglas County)	58	22	104	21	-37	-64%	-1	-5%
Klamath Tribes, Oregon (Klamath County)	See note	29	26	17	See note		-12	-41%

Notes:

In 1990, the Coquille Tribe and the Klamath Tribes did not have a legally established land base. The 1990 Census gives data for a Tribal Designated Statistical Area (TDSA) that is a much larger area than the 2012 Reservation and Off-Reservation Trust Lands with approximately 5,500 American Indian and Alaska Native persons in the Coquille TDSA and approximately 1,850 in the Klamath TDSA

The County totals include the populations of lands of federally recognized tribes, but the table shows them separately for clarification

Sources:

U.S. Census Bureau; 1990 Census of Population and Housing Public Law 94-171 Data Age by Race and Hispanic Origin, (Official), http://censtats.census.gov/cgi-bin/pl94/pl94data.pl (accessed September 17, 2014)

U.S. Census Bureau; 2000 Census of Population and Housing Summary File 1

U.S. Census Bureau; American Community Survey, 2010 Census Restricting Data, Table DP05; American FactFinder; http://factfinder2.census.gov; (July 2014)

U.S. Census Bureau; American Community Survey, 2012 American Community Survey 5-Year Estimates, Tables DP03, DP04, DP05, S1901 and S1701; American FactFinder; http://factfinder2.census.gov; (July 2014)

The lands of seven federally recognized Indian Tribes range in size from a few dozen acres (i.e., the reservation and off-reservation lands for the Coos/Lower Umpqua/Siuslaw Tribes) to more than 18,000 acres (the Warm Springs reservation is nearly 650,000 acres; of which approximately 18,000 acres are within the planning area).

Some of the Tribal lands had large population percentage increases between 1990 and 2012, but this is because the base population in 1990 was very low, or, in the cases of the Coquille Tribe and the Klamath Tribes, because the land base had not yet been established. **Table 3-141** includes only the population living on Tribal lands and not the entire Tribal membership population, which may be considerably larger.

Projected Growth

Since 1950, Oregon's population has increased at a faster pace than the U.S. population as a whole. Between 1950 and 2010 Oregon's population increased by 150 percent, whereas the United States' population increased by 104 percent. The 2007–2009 recession hit Oregon harder than many other states, reducing net migration and slowing Oregon's population growth. As of 2012, Oregon's growth rate was below the national growth rate. However, Oregon's growth rate is expected to rise higher than the U.S. growth rate (Vaidya 2012).

Between 2010 and 2030, the State's Office of Economic Analysis projects that the population of the planning area will be approximately 4.2 million, an increase of approximately 832,000. The State projects that approximately 80 percent of this increase will be in the twelve counties in the BLM's Salem District (State of Oregon 2012). The State does not currently prepare population projections for geographies below the county level, such as cities.

Distressed Areas

The State of Oregon Business Development Department conducts economic assessments to determine which counties, cities, communities, or other geographic areas qualify as 'distressed.'

Pursuant to Oregon Administrative Rules (OAR) 123-024-0031, the Department defines 'distressed' areas based on indicators that take into account unemployment rates, per capita personal income, change in average covered payroll per worker over 3 years and change in the county's weighted average employment change over 2 years. As of March 2014, the Department identifies as distressed 24 of Oregon's 36 counties (and all geographic areas within a designated county). Of the 19 planning area counties, the Department identifies 14 as distressed, and only Benton, Clackamas, Multnomah, Washington and Yamhill Counties are not identified as distressed (Business Oregon 2014, contains the listing and the methodology).

Within the non-distressed counties, the Department has identified the following cities and places as distressed:

Benton:	Albany, Alpine CDP,[88] Alsea CDP
Clackamas:	Barlow, Estacada, Johnson City, Molalla, Oregon City, Sandy
Multnomah:	Fairview, Gresham, Troutdale, Wood Village
Washington:	Cornelius, Forest Grove
Yamhill:	Amity, Carlton, Dayton, Lafayette, McMinnville, Sheridan, Willamina

[88] Census Designated Places (CDPs) are settled concentrations of population that identifiable by name but are not legally incorporated under the laws of the state in which they are located. State and local officials and the Census Bureau delineate CDPs cooperatively.

Of these 22 cities and places, all but six meet the minority or income criteria for environmental justice. Socioeconomic Issue 6 – Environmental Justice contains more information.

In 2012, the Oregon Secretary of State identified eight counties, all in the planning area, whose financial condition may indicate a higher risk of distress than other counties: Coos, Curry, Douglas, Jackson, Josephine, Klamath, Lane, and Polk (Oregon Secretary of State 2012). In 2014, the Secretary of State added Columbia and Linn counties to the list, and took Klamath County off (Oregon Secretary of State 2014).

Issue 1

How would the alternatives affect the supply, demand, and value of goods and services derived from BLM-administered lands?

Key Points

- BLM-administered lands provide a wide variety of market and non-market goods and services to the planning area such as timber, recreation, carbon storage, minerals, and source water protection.
- The annual harvest value of timber, compared to $23 million in 2012, would increase under all alternatives (first decadal average), from $37 million under Alternative D to $135 million under Alternative C. The Proposed RMP would increase harvest value to $51 million.
- The revenue BLM receives from other commodity uses of land, including permits for special forest products, livestock grazing, energy production, and mineral extraction would remain largely unchanged under the alternatives and the Proposed RMP, with one exception: under Alternative D, the BLM would cease to authorize any livestock grazing within the decision area, and the value would go to $0.
- Using non-market valuation techniques (social cost of carbon), the annual value of net carbon storage would increase under all alternatives from a current average of $85 million per year in 2012, except Alternative C. The smallest increase would occur in the No Action alternative ($118 million) and the largest increase would occur in Alternative D ($216 million). Under the Proposed RMP, the value of net carbon storage would increase to $159 million. Under Alternative C, the value of net carbon storage would decrease to $43 million.
- Other goods and services provided by the BLM-administered lands in the planning area currently provide economic value through increased property values associated with scenic views and through cultural and spiritual values. Data are currently unavailable to quantify the current value or expected change in value of these resources under the alternatives and the Proposed RMP.
- BLM-administered lands provide over $200 million in value to recreation participants annually, and this number will increase based on trends in preferences and demographics.
- Outdoor recreation visits would increase based on trends as well as response to increased quality and quantity of Recreation Management Areas under Alternatives C and D and the Proposed RMP.
- Compared to the alternatives, the Proposed RMP provides the largest increase in access to recreation opportunities, including developing sites close to where people live and providing recreation types that are particularly scarce for that region.
- Using non-market valuation techniques (net willingness to pay) the analysis estimates the 2012 value of recreation on BLM-administered lands at $223 million. Based on a phased recreation development timeline of 50 years, the value of recreation by the end of the first decade (2023) would range from $243 million under Alternative A to $278 million under Alternative D. Under

the Proposed RMP, the value of recreation in 2023 under a 50 year phased timeline would be $271 million in 2023. Assuming a 20-year phase-in period rather than a 50-year period, the value of recreation in 2023 would range from $230 to $331 million, with the Proposed RMP value at $311 million.

- Over a 50-year period, the total net present value of recreation would range from a low of $5.1–$5.4 billion for Alternative A (based on 20- and 50-year phased development timelines respectively) to a high of $8.1–$6.9 billion for Alternative D. The Proposed RMP would have a range of total net present value for recreation of $6.7 to $7.6 billion.

Summary of Notable Changes from the Draft RMP/EIS

The BLM has—

- Added analysis to estimate increasing participation in and associated value of recreation resulting from change in the supply of recreation opportunities on BLM-administered lands;
- Revised the net carbon storage analysis with updated values of the social cost of carbon based on new values released by the Interagency Working Group on the Social Cost of Carbon (IWG 2015), and included a more detailed discussion of uncertainty in these estimates;
- Revised the scenic amenities discussion to reflect a clearer definition of the Visual Resource Management methodology used to analyze the effects on visual resources; and
- Revised data to reflect revisions in underlying data on sustainable energy production, livestock grazing, minerals, and net carbon storage.

Summary of Analytical Methods

This analysis describes the socioeconomic contribution of the goods and services derived from BLM-administered lands in western Oregon under the alternatives and the Proposed RMP. **Table 3-142** shows the categories of goods and services included in this analysis. These goods and services fall into two categories: those that are sold or traded in markets, for which the BLM or others earn revenue from their use or extraction (market goods and services); and those that are consumed or otherwise enjoyed without direct payment, but for which value may materialize in indirect ways in the economy (non-market goods and services).

Table 3-142. Goods and services derived from BLM-administered lands in western Oregon

Goods and Services	Method of Valuation	
	Market	Non-Market
Timber	X	
Recreation and Visitation		X
Special Forest Products	X	X
Sustainable Energy Production	X	
Livestock Grazing	X	
Minerals	X	
Net Carbon Storage		X
Source Water Protection		X
Biodiversity and Sensitive Species		X
Scenic Amenities		X
Cultural Meaning		X

Source: USDI BLM 2014

The BLM's management activities affect the supply of the goods and services that BLM-administered lands provide, in terms of both quality and quantity. These changes in the supply interact with current and expected future demand for each good or service, leading to changes in economic value. The analysis expresses the value of each good or service in terms of market prices (e.g., stumpage prices) or in non-market values, as indicated in **Table 3-142.** The analysis assesses the value of goods and services not traded in markets using measures of willingness to pay, derived using scientifically validated and professionally accepted techniques outlined in official BLM guidance for estimating non-market values (USDI BLM 2013a). These non-market valuation techniques result in monetary estimates for non-market goods and services.

Non-market values may be compared to market-based values in some but not in all circumstances. Market and non-market values are comparable insofar as they both reflect changes in society's overall economic well-being. However, they are not comparable in how they contribute to the fiscal status of the economy. The analysis of these impacts, such as to jobs and earnings, is located in Issue 2. By definition, market values are associated with monetary transactions that have real financial impacts in communities. Non-market values reflect the importance people place on goods and services for which they do not have to pay real money. They also estimate likely payments if market conditions did exist, such as if the BLM charged people what they would be willing to pay to use outdoor recreation resources. People's interactions with these non-market goods and services (e.g., participating in a mountain biking trip) may produce financial impacts traceable in the economy (some of which are included in the analysis in Issue 2), but these impacts likely do not reflect the entire value associated with the good or service.

Several comments on the Draft RMP/EIS reflected the belief that non-market resources do contribute to economic well-being in planning area communities, by retaining residents, attracting new residents including retirees and entrepreneurs who bring human and financial capital, and through other mechanisms. These beliefs have been supported by research showing how scenic amenities, open space, healthy watersheds, public lands and protected areas, and other non-market resources contribute to local economic development (e.g., Rasker *et al*. 2013).

The BLM-administered lands in the planning area provide all of the goods and services listed in **Table 3-142** within the scope of current and proposed management activities. Market and non-market goods and services are not necessarily mutually exclusive and, in many cases, are complementary. That is, the lands can supply multiple goods and services at the same time. For example, recreational uses and timber harvest are not mutually exclusive; many types of recreation take place on lands managed also for timber harvest.

General Methodology for Estimating Supply, Demand, and Value

In this analysis, the BLM describes the past and current condition of each good and service, and incorporated the following information—

- Supply of the good or service, in terms of both quantity and quality
- Demand for the good or service
- Market price and value or non-market value of the good or service

In determining value, the BLM considered both use and non-use values of goods and services. Use values arise from the extraction or consumption of a resource and are typically (though not always) revealed through market transactions. Market activity does not typically reflect non-use values associated with BLM-administered lands, so market prices are not available to reveal their value. In these cases, the BLM relied on non-market techniques to estimate or describe economic value.

This methodology is consistent with Federal guidelines for conducting economic analyses (USDI BLM 2005, 2013a, 2013b, CEQ 2013, EPA 2010). 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. 130–134).

This analysis reports all values in 2012 dollars unless otherwise noted.

The supply description of each good or service relies on information from BLM resource programs; other sections in this chapter contain much of this information. To streamline the discussion, this section summarizes that information and refers to the appropriate section for more detail.

Other sources of supply for forest-based goods and services exist in Oregon besides those available from BLM-administered lands in the planning area. For example, the forestland on BLM-administered lands in the planning area (approximately 2.4 million acres) accounts for approximately 8 percent of total forestland in Oregon, or approximately 30.5 million acres (Oregon Department of Forestry, no date). The BLM-administered lands in the planning area includes approximately 13 percent of the total number of acres in western Oregon in designated Wild and Scenic River areas and approximately 4 percent of designated Wilderness (The Nature Conservancy and Wild Salmon Center 2012).

The demand assessment for each good or service relies on information from the BLM, the U.S. Forest Service, and economic and related literature, such as journal articles and professional reports. The types of information that describe demand vary by good or service, but generally includes user counts, permit counts, goods produced, patterns of use, and other evidence from people who directly or indirectly interact with the good or service.

Methodology for Estimating Market Values

The analysis reports both fair market values, as revealed by market prices, and BLM revenue, as data are available. The BLM collects revenue from the harvest or use of many of the goods and services in **Table 3-142**. Revenue is an indication of the value of the good or service, but may not capture the full market value of the good or service, for the following reasons:

- The BLM permit or sale price (and thus collected revenue) is set below market value.

- The BLM does not collect revenue for all goods or services harvested or used in a particular category, in some cases legitimately, and in other cases because illicit harvest occurs.

The value assessment of each good or service relied on information from the BLM regarding permit and market prices, and, where BLM data does not reflect market prices, the assessment relied on external information about commodity prices. The data sources and methods of valuation of each market-based good or service are described in more detail below.

Methodology for Estimating Non-market Values

The BLM assessed the economic importance of some goods and services using non-market values (see **Table 3-142**). As the name implies, non-market goods and services are not traded in markets. As a result, it is not possible to calculate how BLM actions could affect the values of these goods and services using market prices. Instead, when sufficient data are available, the analysis used non-market values to estimate their economic importance. If data were not available to estimate a dollar value, the analysis relied on other information to describe their economic importance, without monetary quantification. The BLM (USDI BLM 2013a) describes non-market values and methods of incorporating them in socioeconomic analyses for resource management plans.

Two broad categories of non-market values exist: use values and non-use or passive use values. People enjoy use values when they make use of the environment, such as through fishing, hunting, boating, or bird watching. Unlike other use values (e.g., from the production of commodities), these activities are usually not captured through market transactions. Non-use values reflect value derived in a manner other than directly interacting with natural resources. Existence value is a type of non-use value that describes the value that society places on the existence of a species, place, or habitat. For example, people may be willing to pay to protect an area with wilderness characteristics, even though they have no plans to visit the area (King and Mazzotta 2000).

In this analysis, the BLM did not attempt to estimate values for non-market goods and services on BLM-administered lands directly. Instead, the analysis relied on unit values from studies of similar goods and services, and applied the unit values as appropriate for goods and services on BLM-administered lands. This technique, known as benefit transfer, provides a method for valuing non-market goods and services when data or resources are limited (EPA 2010).

Where data describing the amount or unit value of goods and services were not available, the analysis used several types of information to indicate economic importance qualitatively:

- Values of similar goods and services studied elsewhere
- Surveys of people's preferences and actions
- Values of substitute goods and services
- Descriptive evidence of the importance of a good or service to society

Valuation Methodologies for Specific Goods and Services

Timber

Analysis of the economic value of timber harvested on BLM-administered lands involved the input of economic and forestry data and modeling. The BLM developed data sets describing the costs of the various logging techniques and other costs associated with timber sales based on current data. Stumpage prices provided the basis for the timber revenue estimates. These prices rely on the long-term trend for timber prices in western Oregon. **Appendix P** contains more detail regarding the price projection methodology. The BLM developed a timber harvest model within the Woodstock software platform to project harvest volumes by grade, species type, district, and other parameters for the alternatives and the Proposed RMP, including the No Action alternative. The model outputs, all in 2012 dollars, provide detail on the harvest volumes, costs, and revenues in 10-year blocks.

The BLM also developed a model to project the effects of changes in BLM harvests on private timber producers in the western Oregon timber market.

Recreation and Visitation

The assessment of the economic value of recreation on BLM-administered lands in the planning area required consideration of the BLM's recreation management under the alternatives and the Proposed RMP, the overall supply of recreation resources in the planning area, the user population and participation rates, and how changes in supply could address scarcities that would increase usage and benefit. The BLM's Recreation Management Information System (RMIS) provides estimates of visitor-days and numbers of participants by activity and district. These are combined with estimates of economic value associated with visitor-days in terms of consumer surplus (benefits net of costs to the participant) (Loomis 2005).

Increased recreation opportunities would not necessarily result in proportionate increases in participation and visitor-days. The BLM currently provides approximately one-third of all public land within an hour's driving distance of the major population centers. If the BLM-administered areas near such communities were improved to provide more and better recreation opportunities, the additional demand could be substantial. Because of population growth and increasing interest in outdoor recreation, participation numbers and visitation are both expected to increase over time (see the Recreation section of this chapter).

In order to estimate changes in the number of outdoor recreation visitor-days in the planning area as a result of changes in Recreation Management Area (RMA) acreage, the BLM developed a time use model based on Bureau of Labor Statistics and the U.S. Census Bureau's American Time Use Survey (U.S. Department of Labor, Bureau of Labor Statistics 2015). The model provides a measure of the elasticity, or responsiveness, of outdoor recreation demand to changes in the available and accessible supply of outdoor recreation acreage. The BLM developed estimates of how demand would change in terms of time spent participating in outdoor recreation with changes in RMA acreage. The model data suggest that a 100 percent increase in total RMA acreage would lead to a 17 percent increase in outdoor recreation activity. In economic terms, this reflects an inelastic, or relatively low, demand response with respect to RMA supply. Elasticity incorporates current supply and demand when estimating future demand response. The visitation change results were based upon applying the 17 percent elasticity estimate to each district or office outdoor recreation activity, baseline RMA acreage, and RMA acreage for the alternatives and the Proposed RMP. See **Appendix P** for more details on the data, model, and results.

For the purposes of this analysis, the BLM assumed that the full implementation of actual increases in recreation opportunities resulting from increases in RMA acreage would not occur immediately upon adoption of the RMPs, particularly where alternatives include the development of new RMAs, facilities, or uses. There is considerable uncertainty about the rate of increase in recreation opportunities that would result from increased RMA acreage. For example, where increased recreation opportunities would depend on development of new campgrounds, new trail systems, or other recreational facilities and developments, substantial increases in recreation opportunities would likely take decades. The BLM based this assumption on past BLM experience with planning, analyzing, and developing recreation facilities and developments.

For the purpose of this analysis, the BLM considered two scenarios: (1) increases in recreation opportunities associated with increased RMA acreage phased in over 20 years (complete at 20 years) and (2) increases in recreation opportunities associated with increased RMA acreage phased in over 50 years (complete at 50 years).[89] For these analyses, the BLM assumed a linear incremental increase from current levels to final alternative and Proposed RMP levels at 20- and 50-year periods. Conceptually, for the 50-year phasing, 1/50th of increase in recreation opportunities would be implemented in the first year, with full implementation in the 50th year. For Scenario 1, the median level of recreation opportunities would be implemented in the 10th or 11th year of the analysis period, while for Scenario 2, the median level of recreation opportunities would be implemented in the 20th or 21st year. This analysis generally compared the effects on the economic value of recreation that would occur in 2018 along the trajectories to full implementation in 20 years or 50 years (**Figure 3-136**). Consequently, for the purposes of modeling, the BLM assumed all districts would see equal timing of increases in recreation opportunities over each scenario timeframe. The BLM also assumed that visitation response and associated valuation estimates would be proportional and consistent over each phasing timeframe.

Actual implementation of increased recreation opportunities within RMAs would be at the discretion of BLM managers and would not be expected to occur at a constant rate over time or at similar rates across districts. The BLM has conducted this analysis under these dual-scenarios to present a range of plausible implementation rates for comparison. If the BLM were to fully implement the increases in recreation opportunities under Alternatives C or D, or the Proposed RMP in less than 20 years, the economic benefits associated with recreation management in 2018 would be greater than those described in this analysis.

The recreation opportunities associated with new RMAs provide the capacity for increased and improved outdoor recreation and consequent economic value. The specific types and quantities of improvements are not defined at this time. For this analysis, the BLM applied RMA acreage as a proxy for recreation opportunities, so that as RMA acreage increases, so do recreation opportunities in a proportionate manner. Scaling from current outdoor recreation visitation, this assumes similar types and proportions of opportunities to existing BLM-administered recreation opportunities. To the extent that new RMAs would provide higher quality opportunities, opportunities in greater demand, or more accessible opportunities, the resulting value would be greater.

In addition, the BLM analyzed spatial data on the BLM's own recreation areas, their attributes, and other public recreation opportunities, as well as census data on population and outdoor recreation participation rates. In this way, the BLM identified the nearby populations that use BLM recreation resources and how recreation opportunities on BLM-administered lands relate to other opportunities. Source information included estimates for total outdoor recreation activity in western Oregon using survey data from Oregon's Statewide Comprehensive Outdoor Recreation Plan. This analysis (ECONorthwest 2015) qualitatively informed this section of the Proposed RMP/Final EIS but did not directly factor into the quantitative estimates of use and economic value that would result under the alternatives and the Proposed RMP.

The BLM considered all these data and calculated consumer surplus values, which represent the net economic benefit to a participant in recreation activity after deducting market-based costs associated with the activity. Consumer surplus values are non-market values. They do not represent dollars exchanged, but, rather, the amount of net benefit beyond expenditures for the activity (e.g., fuel, equipment, meals, and lodging) that represent additional willingness to pay.

[89] The No Action alternative and Alternative B involve no change in RMA acreage, so do not involve phasing of an increase in recreation opportunities over time.

To compare the alternatives and Proposed RMP regarding accessibility and local recreation scarcities, the BLM used the acreage of RMAs designated under the alternatives and the Proposed RMP. The BLM compared the overall and district-level change in total RMA acreage. The BLM then identified the change in RMA acreage within 30-minute and 60-minute driving distances of 12 study communities[90] in western Oregon. Recognizing that quality, accessibility, and congestion all contribute to variation in demand for recreation opportunities and resulting value, the BLM compared the changes in accessible RMA acreage as a proportion of total current recreation-oriented acreage. The BLM also considered how these proportional changes in recreation acreage correspond to existing conditions and estimates of recreation value from BLM-administered lands.

The BLM applied projections for growth and composition of outdoor recreation participation over the next 50 years to outdoor recreation to incorporate long-term trends as well. As part of the 2010 revision of the Resources Planning Act Assessment, the U.S. Forest Service developed national projections of participation for 17 outdoor recreation activities through 2060 (Bowker *et al.* 2012). These projections take into account various scenarios of climate change (based on the Intergovernmental Panel on Climate Change (IPCC) scenarios), population and income growth, and land use change. The BLM applied these projections to each of the relevant BLM recreation categories, using the base scenario (A1B, corresponding to mid-range population growth and the highest average personal and household income level of the 3 IPCC scenarios). These participation trends are consistent with those observed over the last few decades in Oregon (e.g., Hall *et al.* 2009). This analysis assumed that the outdoor recreation participation trends through 2060 would extend through 2062.

Across the recreation analyses and presentation of results, the BLM uses three separate measures of outdoor recreation activity. 'Visits' are individual trips for an outdoor recreation activity, regardless of the length of time. 'Visitor-days' are summation of visits to 12-hour units. Consumer surplus estimates are based on these 12-hour visitor-day measures. 'Participants' are a count of the number of individuals who participate in outdoor recreation activity, and might involve several visits per year.

The BLM does not directly track residence location of outdoor recreation participants, but the U.S. Forest Service does. The BLM applied local, non-local, and non-primary breakdowns of participants from the nearest national forest. Locals refer to participants claiming to have traveled 50 miles or less from home to the U.S. Forest Service recreation interview location (White 2013, USDA FS 2013). Non-primary refers to visits that are secondary to other travel purposes. All outdoor recreation participation time is included in the benefit estimates in Issue 1, but recreation expenditures for visits that are secondary to other travel purposes are not included in market impacts under Issue 2 (White 2014, USDA FS 2014a).

Special Forest Products

This analysis focused on special forest products from forested areas. Non-forested areas may produce goods akin to these forest products that have value (e.g., sagebrush). However, the BLM assumed in this analysis that non-forested areas would remain non-forested under the alternatives and the Proposed RMP, so there would be no change in the supply or value of these goods.

The Forest Management section in this chapter describes the supply of special forest products in terms of acreage suitable for the production of Category I and Category II species.[91] Category I species thrive in

[90] The BLM selected 12 population centers within the planning area to serve as study communities, achieving a wide spatial coverage and capturing a majority of the area's population. These communities include Coos Bay, Corvallis, Eugene, Grants Pass, McMinnville, Medford, Newberg, Portland, Roseburg, Salem, Sandy, and Tillamook.

[91] These categories are not a formal designation but simply a way to characterize similar special forest products for ease of analysis.

disturbed forest conditions, and Category II species rely on undisturbed forest conditions. This section reports acreages for two areas: the coastal/north areas (Coos Bay, Eugene, and Salem Districts) and the interior/south areas (the Klamath Falls Field Office, and the Medford and Roseburg Districts).

The analysis describes the demand for special forest products using data derived from the BLM harvest database, reviews of the literature, and interviews with BLM district staff. The harvest database reports quantity of special forest products collected by species, number of permits issued, and revenue collected. The analysis relied on interviews with BLM district staff and other experts to understand the harvest database and better understand patterns of use and markets for special forest products.

The analysis reports both market prices and BLM revenue to describe value of special forest products. The harvest database reports BLM-collected revenue for special forest products. The analysis supplemented this information with information from the literature on market prices for special forest products. The literature indicates that BLM prices for special forest products are often below fair market value, so the analysis provides data for market values of special forest products when available.

Sustainable Energy Production

The BLM estimated the supply of sustainable energy resources within the decision area based on information provided in the Sustainable Energy section of this chapter. The analysis describes the demand for sustainable energy using information from government reports and professional literature, as well as information from the BLM database on special forest products. Two categories of special forest products reported in the database are relevant for sustainable energy production: biomass and fuelwood. Information on the value of biomass energy production came from revenue data collected by the BLM and from data from the U.S. Energy Information Administration.

Livestock Grazing

The BLM estimated the supply of livestock grazing within the decision area based on information provided in the Livestock Grazing section in this chapter. The analysis describes the demand for livestock grazing using information about the utilization of available livestock grazing allotments. Information on the value of livestock grazing came from Federal livestock grazing fees and from market prices for private and State livestock grazing fees and forage.

Minerals

The BLM estimated the supply of salable mineral material within the decision area for the affected environment and effects analyses based on information provided in the Minerals section in this chapter. The economic analysis described the current demand for salable mineral material disposal using information from a BLM database of mineral material sales. The analysis relied on data included in the database about the value of each sale. The BLM sells mineral materials at fair market value, so the analysis did not incorporate additional information about the market value of salable mineral materials. In this analysis, the BLM assumed that demand would not change from current conditions and that the BLM would continue to sell mineral materials at fair market value.

Carbon Storage

The BLM estimated carbon storage and emissions in the Climate Change section in this chapter. The carbon storage reported in that section is 'net carbon storage' representing carbon stored less carbon emitted through wildfire, prescribed burning, decomposition, and through the lifecycle of wood products.

Other sources of emissions (e.g., enteric fermentation) are minor and are discussed in Issue 2 of the Climate Change section.

In this economic analysis, the BLM calculated the annual amount and value of net carbon storage based on the information presented in the Climate Change section. To estimate value, the analysis used values developed by the U.S. Interagency Working Group (IWG) on Social Cost of Carbon (SCC). Estimating the SCC is complex, incorporating data from a variety of models and systems in climate science, ecology, and economics projected decades into the future. Each piece of data involves uncertainties, which the IWG discusses at length in Technical Support Documentation reports (IWG 2010, 2013, 2015). Examples of factors resulting in uncertainty in the IWG's SCC result include incomplete treatment of damages, and incomplete treatment of adaptation and technological change. The IWG discusses these uncertainties in detail in the first Technical Support Document (IWG 2010), which is incorporated here by reference.

The IWG provides several estimates of SCC that are dependent on three variables:

- The year emissions are expected to occur
- The discount rate (2.5 percent, 3 percent, and 5 percent)
- The estimated severity of future damages

The IWG estimates consider two scenarios of damage. The 'Average' case reflects the average costs across climate models and socioeconomic scenarios. The '95th percentile' case reflects higher than average damages that might occur, but that have a probability of future occurrence of 5 percent.

To estimate the value of the stored carbon on BLM-administered lands in 2012 for the affected environment, the analysis used the IWG estimates for emissions in year 2015, a 3 percent discount rate, and both the average and 95th percentile cases. According to the IWG, the estimated social cost per metric ton of carbon dioxide emitted in 2015 in 2007 dollars is \$36 (average) and \$105 (95th percentile case). These dollar values apply to carbon dioxide (CO_2), but net stored carbon is estimated in terms of tons of carbon (C). The BLM analysis converted dollars per metric ton of CO_2 to dollars per metric ton of C using a conversion factor of 3.67. The BLM converted dollar values to 2012 dollars using the Gross Domestic Product (GDP) deflator. The final per ton values multiplied by metric tons of net stored carbon are about \$143 (average) and \$417 (95th percentile case). The analysis presents both estimates to illustrate the uncertainty about the SCC due to uncertainty of the damage caused by carbon emissions. However, they do not represent the full range of possible SCC estimates that would be based on other discount rates or cost assumptions. Of the two estimates presented, the BLM considers the 'Average' scenario to be more likely.

To estimate the value of the effects of the alternatives and the Proposed RMP on net stored carbon, the analysis used a similar procedure. Using the results of the effects analysis presented in Issue 1 of the Climate Change section of this chapter, the economic analysis calculated the marginal change in stored carbon between 2013 and 2023 and between 2013 and 2063 by alternative and the Proposed RMP. The estimated social cost per metric ton of CO_2 for emissions in year 2017 (the midpoint of the first decade) is \$38 (average) and \$112 (95th percentile) in 2007 dollars. These values were converted to dollars per metric ton of C and to 2012 dollars as described above, and were applied to the marginal change in net stored carbon over the first decade. After conversions to dollars per metric ton of C and to 2012 dollars, the estimated social cost per metric ton of C in year 2017 is about \$152 (average) and \$445 (95th percentile). The estimated value of the marginal change over the 50-year period of analysis was calculated using the social cost per metric ton for emissions in year 2050 (the last year for which SCC is calculated by the IWG). Applying the 2050 SCC value to carbon storage in year 2063 approximates its value in that year, but may underestimate it somewhat. The estimated social cost per metric ton of CO_2 for emissions in year 2050 is \$69 (average) and \$212 (95th percentile case) in 2007 dollars. After conversions to dollars per metric ton of C and to 2012 dollars, the estimated social cost per metric ton of C in year 2050 is about $274 (average) and $841 ($95^{th}$ percentile case).

Source Water Protection

The BLM estimated the supply of land that produces water potentially used for drinking water in the Analysis of the Management Situation (USDI BLM 2013). The economic analysis describes the current demand for source water protection using information derived from agreements between the BLM and State and local governments, and spatial information developed by the Wild Salmon Center and the Nature Conservancy. Qualitative information on the value of source water came from the professional literature. In this economic analysis, the BLM assumed that the quantity and quality of the supply of water available for drinking would not change from current conditions and necessarily would meet all State and Federal drinking water standards. The Hydrology section in this chapter contains more information on effects on water quantity and quality.

Biodiversity and Sensitive Species

The BLM estimated the current conditions and effects on forest structure and threatened and endangered species in Forest Management, Fisheries, Wildlife, and Rare Plants and Fungi sections in this chapter. The economic analysis describes the demand and value for biodiversity and sensitive species using information derived from the professional literature, and laws and regulations governing environmental protection. Although the professional literature includes some quantitative estimates of willingness to pay for protection of species and their habitat, insufficient information is available at the scale of analysis to produce quantitative estimates of the specific economic value or changes in value that would result from the Proposed RMP or alternatives.

Scenic Amenities

The BLM estimated the supply of scenic amenities within the planning area based on information provided in the Visual Resource Management section in this chapter. The economic analysis derived changes in supply under each alternative and the Proposed RMP based on the number of acres where the Visual Resource Management (VRM) class designation would not be commensurate with the landscape's scenic value, as described within the Visual Resource Inventory (VRI) classification, thereby reducing the level of visual protection (VRM class) that is more customary of areas with higher scenic values (i.e., where management activities would allow changes to the landscape that are characteristic of more disturbance, lowering the quality rating and resulting in a downgraded VRI class assignment). The analysis describes the demand for scenic amenities and their value using information from professional, peer-reviewed literature. Although the professional literature includes quantitative information on the relationship between scenic amenities and property values, insufficient information is available at the scale of analysis to produce quantitative estimates of the specific economic value or changes in value that would result from the alternatives or the Proposed RMP.

Cultural Resources

The BLM estimated the supply of cultural resources within the decision area based on information provided in the Cultural Resources section in this chapter. The economic analysis describes demand for and value of cultural resources based on laws and regulations governing archaeological sites and cultural artifacts and descriptions of non-physical elements of cultural importance based on the framework for cultural meaning outlined in the United Nations' Millennium Ecosystem Assessment (Sarukhán and Whyte 2005). Insufficient information is available at the scale of analysis to produce quantitative estimates of the economic value or changes in value associated with changes in cultural resources by alternative and the Proposed RMP.

Affected Environment

Timber

Supply

Western Oregon continues to be a national leader in the production of timber and timber products. The Timber and Socioeconomic sections of the Analysis of the Management Situation (USDI BLM 2013c, pp. 2-98 – 2-99, 2-120 – 2-128), and the Forest Management section in this chapter provide information on the overall market supply and conditions. The past 50 years have seen dramatic changes in timber harvest for western Oregon, particularly from Federal lands including BLM-administered lands. **Figure 3-126** and **Figure 3-127** show the declines and fluctuations in both volume and prices over the past 50 years. These changes provide the context for assessing the economic consequences of possible changes in timber management on BLM-administered lands.

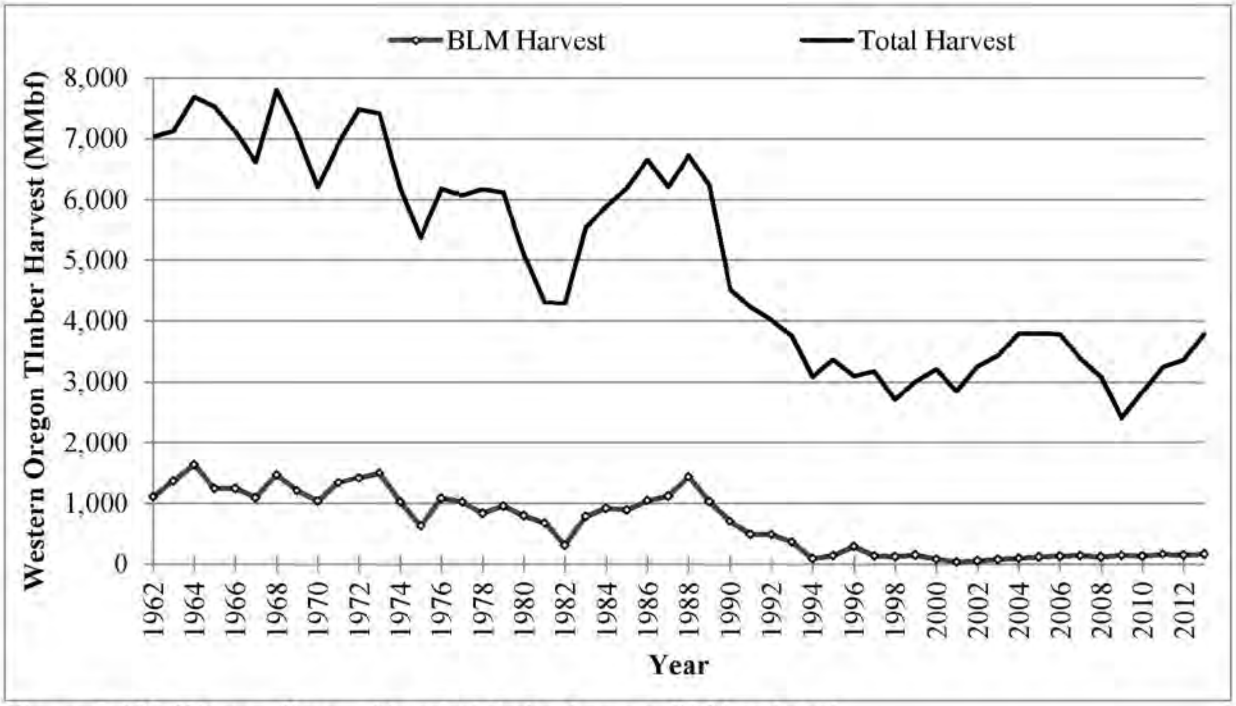


Figure 3-126. Western Oregon historical timber harvest, BLM and total
Source: Zhou and Warren 2012

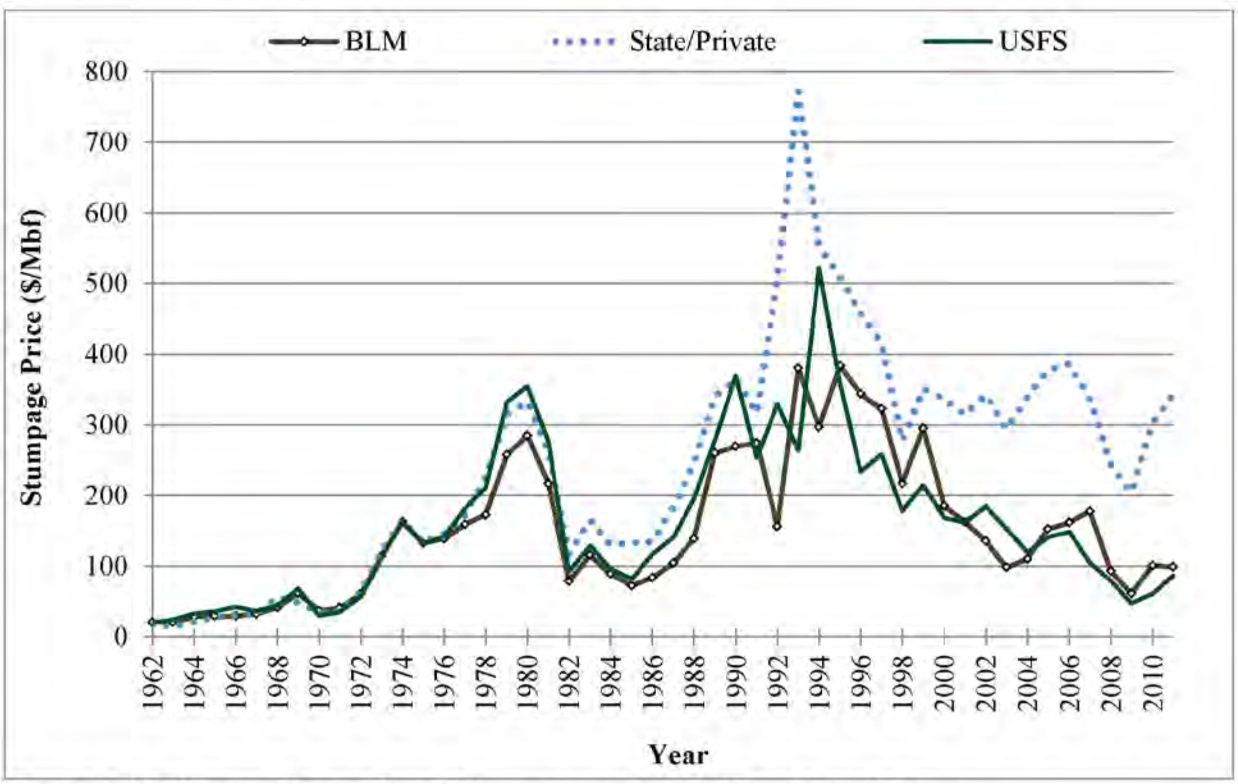


Figure 3-127. Western Oregon historical stumpage prices, BLM and State/private
Source: Zhou and Warren 2012

Figure 3-126 shows both the declines in total harvest in western Oregon, starting first on private timberlands in the early 1970s and BLM-administered lands in the early 1990s. In the early 1960s, about 20 percent of western Oregon's timber harvest occurred on BLM-administered lands; this had dropped to an average of 7 percent between 2008 and 2012. The nearly 85 percent drop in harvest on BLM-administered lands mirrors a similar drop on U.S. Forest Service lands following the implementation of the 1994 Northwest Forest Plan. **Figure 3-127** shows stumpage prices representing private stumpage markets.[92] The declines in stumpage prices of timber from BLM-administered lands reflect the higher logging costs and lower value log mixes associated with the predominance of thinning harvest, rather than regeneration harvest, under current implementation (see the Forest Management section in this chapter).

Federal lands (including BLM-administered lands and U.S. Forest Service lands) in western Oregon make up 61 percent of all timberland acreage, but have 73 percent of the growing stock in terms of volume (OFRI 2012). This suggests that, on average, Federal lands have more volume per acre than all timberlands in western Oregon. See the Forest Management section for detail on the BLM's forest inventory conditions.

Demand

Figure 3-126 and **Figure 3-127** show how historical timber production and regional price trends tend to fluctuate with overall economic conditions, as, for example, prices and harvest levels declined during the 2007–2009 recession, repeating patterns of past recessions.

Stumpage prices paid or bid for timber offered for harvest provide an indication of demand for BLM timber in western Oregon. **Figure 3-126**, in spite of the variability, shows an almost flat trend in real (inflation-adjusted) stumpage prices in western Oregon over the 50-year period of 1962–2011. The overall trend since 1962 is a 0.23 percent increase per year, which this analysis uses as the most appropriate representation of future prices (Haynes *et al.* 2007, Haynes 2008). The regional market includes other private and public timber producers, with private supply particularly dominating (77 percent for the past 5 years). Since the end of the 2007–2009 recession, State, Forest Service, BLM, and private harvests are increasing, as prices recover towards the long-term trend. Prices for public harvests have been rising (**Figure 3-127**).

Demand for BLM timber supply is a function of a variety of factors associated with both the final demand for timber products, as well as competition with other supply sources. Potential timber buyers compare the species composition, timber quality, accessibility, and other harvest cost differences when comparing Federal, State, local, and private timber sources. Federal timber sales have restrictions prohibiting foreign export, which potentially reduces demand, particularly when foreign markets such as Asia are strong.

A wide array of final market goods and services incorporate timber products; consequently, overall timber demand trends strongly with overall economic conditions. New housing starts are a particularly important component of this broad economic demand. In 2008, of the $6 billion in total wood product sales for the state of Oregon as a whole, $2.8 billion came from pulp and paper, $1.5 billion came from sawmills (lumber), followed by plywood, veneers, and other boards (OFRI 2012).

Value

At the BLM district level, harvests have increased in real value since 2012, although price per Mbf has generally declined since 2000 (**Figure 3-128** and **Figure 3-129** and **Table 3-143**). Year-to-year value at

[92] The stumpage price series shown is for western Oregon Department of Forestry sales and, like all Federal sales, is limited to domestic markets only.

the district level fluctuates as volume varies, within the overall context of generally increasing harvest volumes and total value for BLM-administered lands in western Oregon as a whole since 2001. For example, the Coos Bay District saw the largest overall timber harvest volume and value in 2007, while typically, it is in the bottom half of districts by these measures in other years since 2000. Between 2009 and 2014, the Salem District had the largest timber volume and value, both in total and per Mbf. The Klamath Falls Field Office consistently had the lowest timber harvest volume and value, except for 2007 when Medford was lower. The average value per Mbf for all western Oregon districts over the period 2000 to 2014 was $148. The overall western Oregon BLM harvest value over that period was $322 million.

A wide array of local and non-local supply and demand forces contribute to observed market prices for timber. While short-term conditions for supply in the U.S. and elsewhere, as well as final market demand for timber and timber products, can fluctuate somewhat widely, the long-term trends are relatively consistent. For the purposes of this long-term planning process, the BLM applied long-term price projections as detailed in **Appendix P**. The BLM did not include short-term analyses of potential market conditions based on current events or economic conditions in any price projections.

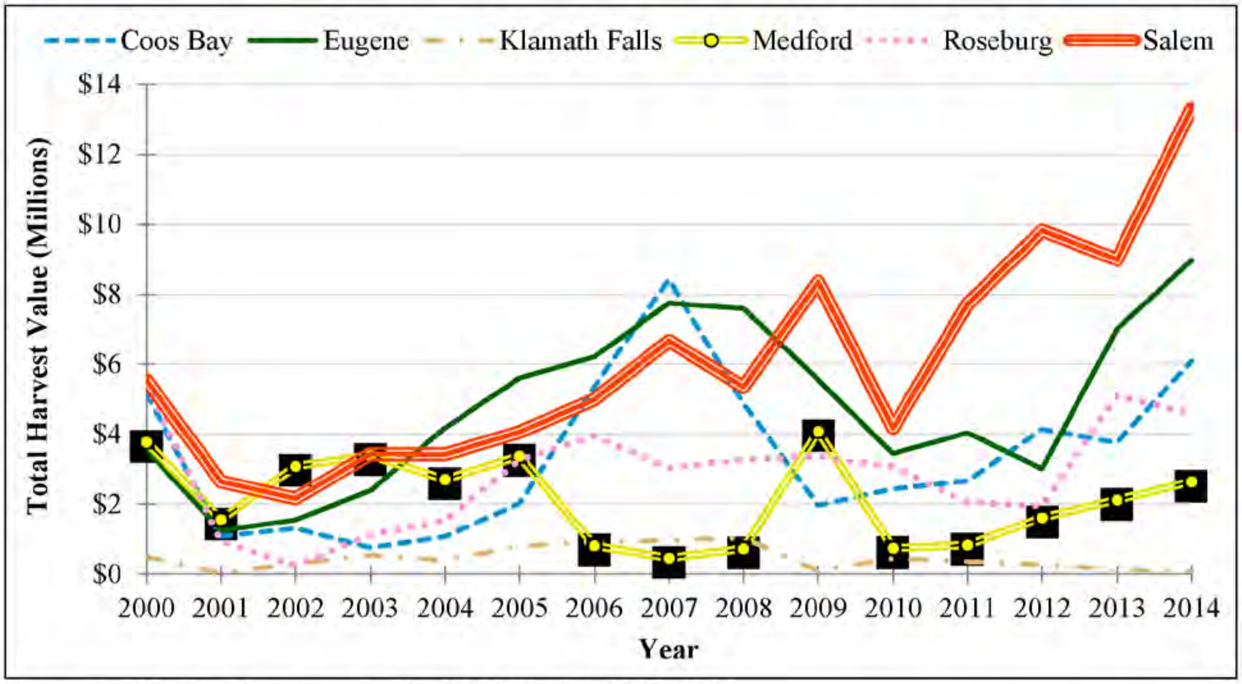


Figure 3-128. Total harvest value by BLM district, 2000–2014
Notes: All data are in 2012 dollars. Harvest data reflect the value and volume of wood removed from approved contracts during a calendar year, and correspond to sales that were offered and approved within the previous 1–36 months.
Source: USDI BLM 2014h

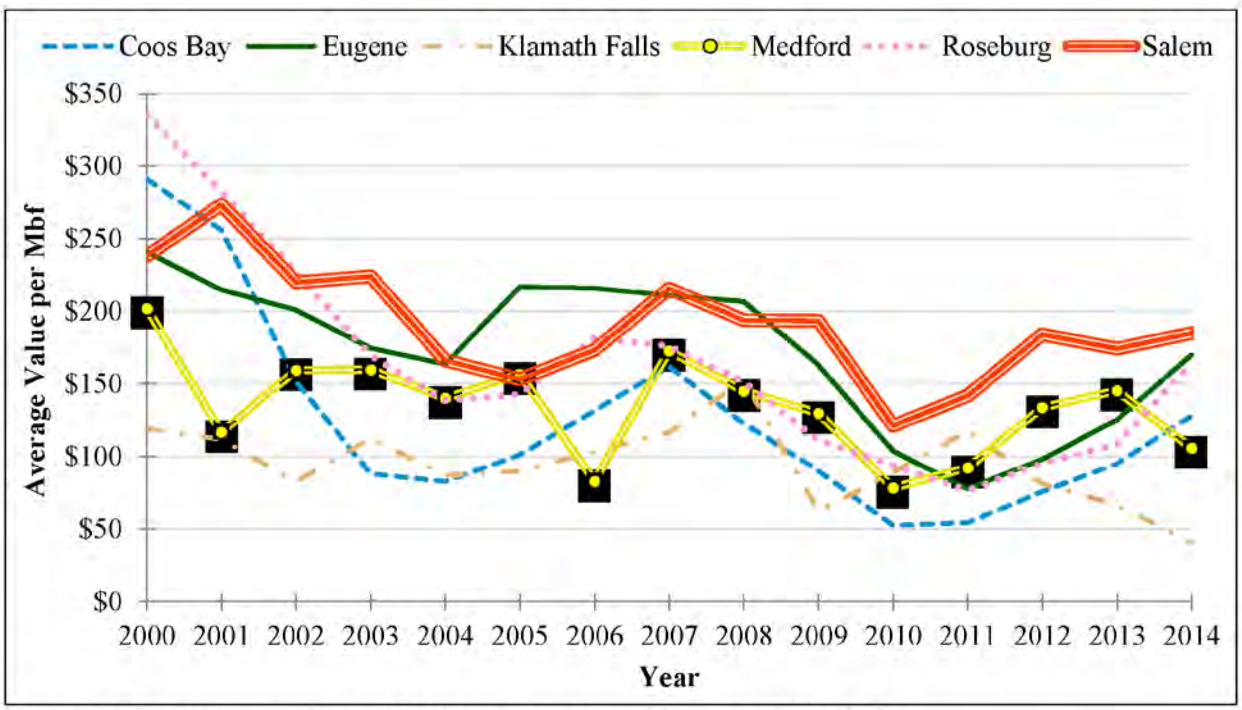


Figure 3-129. Average value per Mbf harvested by BLM district, 2000–2014
Notes: All figures are in 2012 dollars. Harvest data reflect the value and volume of wood removed from approved contracts during a calendar year, and correspond to sales that were offered and approved within the previous 1–36 months.
Source: USDI BLM 2014h

Table 3-143. Historical timber sale values and volumes, western Oregon BLM Districts, 2000–2014

District/ Field Office	Harvest Metric	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Totals
Coos Bay	Harvest Value (Millions)	$6.6	$1.4	$1.6	$0.9	$1.3	$2.3	$6.0	$9.2	$5.2	$2.1	$2.5	$2.7	$4.1	$3.7	$6.0	$55.6
	MMbf Harvested	22.7	5.3	10.6	10.4	15.3	22.9	45.5	56.8	42.1	23.0	48.4	50.0	54.5	39.1	46.7	493.3
	Value/Mbf (Dollars)	$291	$256	$152	$88	$83	$101	$132	$162	$123	$90	$52	$54	$76	$95	$128	$113
Eugene	Harvest Value (Millions)	$4.5	$1.6	$1.9	$2.9	$4.9	$6.4	$6.9	$8.5	$8.0	$5.9	$3.6	$4.1	$3.0	$6.9	$8.8	$78.0
	MMbf Harvested	18.9	7.2	9.5	16.6	30.1	29.7	32.2	40.1	38.9	36.1	34.6	52.9	30.6	55.2	51.7	484.3
	Value/Mbf (Dollars)	$241	$215	$201	$175	$164	$217	$216	$211	$207	$163	$104	$78	$98	$125	$170	$161
Klamath Falls	Harvest Value (Millions)	$0.6	$0.0	$0.4	$0.7	$0.5	$0.9	$1.0	$1.1	$1.1	$0.1	$0.5	$0.4	$0.3	$0.1	$0.1	$7.7
	MMbf Harvested	5.3	0.4	4.4	5.9	5.3	10.2	10.0	9.0	7.2	1.6	5.2	3.1	3.3	2.0	2.5	75.3
	Value/Mbf (Dollars)	$119	$112	$83	$112	$87	$90	$104	$117	$153	$62	$89	$117	$81	$67	$40	$102
Medford	Harvest Value (Millions)	$4.8	$2.0	$3.8	$4.1	$3.2	$3.9	$0.9	$0.5	$0.8	$4.3	$0.8	$0.9	$1.6	$2.1	$2.6	$36.2
	MMbf Harvested	23.9	16.7	23.9	25.7	22.8	24.8	11.0	2.9	5.3	33.3	9.9	9.2	12.1	14.5	24.6	260.5
	Value/Mbf (Dollars)	$202	$117	$160	$160	$140	$157	$83	$173	$145	$130	$78	$92	$134	$145	$106	$139
Roseburg	Harvest Value (Millions)	$6.9	$1.2	$0.3	$1.4	$1.8	$3.7	$4.4	$3.3	$3.5	$3.6	$3.2	$2.1	$1.9	$5.0	$4.5	$46.9
	MMbf Harvested	20.6	4.2	1.4	8.1	13.0	26.2	24.3	18.8	23.0	32.0	34.2	27.3	20.4	46.5	27.4	327.3
	Value/Mbf (Dollars)	$336	$282	$227	$170	$138	$143	$182	$176	$151	$111	$94	$77	$95	$109	$165	$143
Salem	Harvest Value (Millions)	$7.1	$3.3	$2.7	$4.2	$4.0	$4.7	$5.6	$7.3	$5.7	$8.9	$4.4	$7.9	$9.8	$8.9	$13.0	$97.3
	MMbf Harvested	29.7	12.1	12.1	18.5	24.3	30.5	32.2	33.7	29.2	45.8	35.9	55.4	53.3	51.0	70.6	534.5
	Value/Mbf (Dollars)	$238	$273	$220	$224	$166	$153	$173	$216	$194	$193	$121	$142	$184	$174	$185	$182
Totals	**Harvest Value (Millions)**	**$30.6**	**$9.4**	**$10.7**	**$14.1**	**$15.7**	**$22.0**	**$24.9**	**$29.8**	**$24.2**	**$24.8**	**$14.9**	**$18.0**	**$20.8**	**$26.8**	**$35.0**	**$321.7**
	MMbf Harvested	**121.0**	**45.9**	**61.8**	**85.1**	**110.8**	**144.3**	**155.2**	**161.3**	**145.7**	**171.9**	**168.3**	**197.9**	**174.3**	**208.2**	**223.4**	**2,175.1**
	Value/Mbf (Dollars)	**$253**	**$205**	**$172**	**$166**	**$142**	**$152**	**$160**	**$185**	**$166**	**$144**	**$89**	**$91**	**$119**	**$129**	**$157**	**$148**

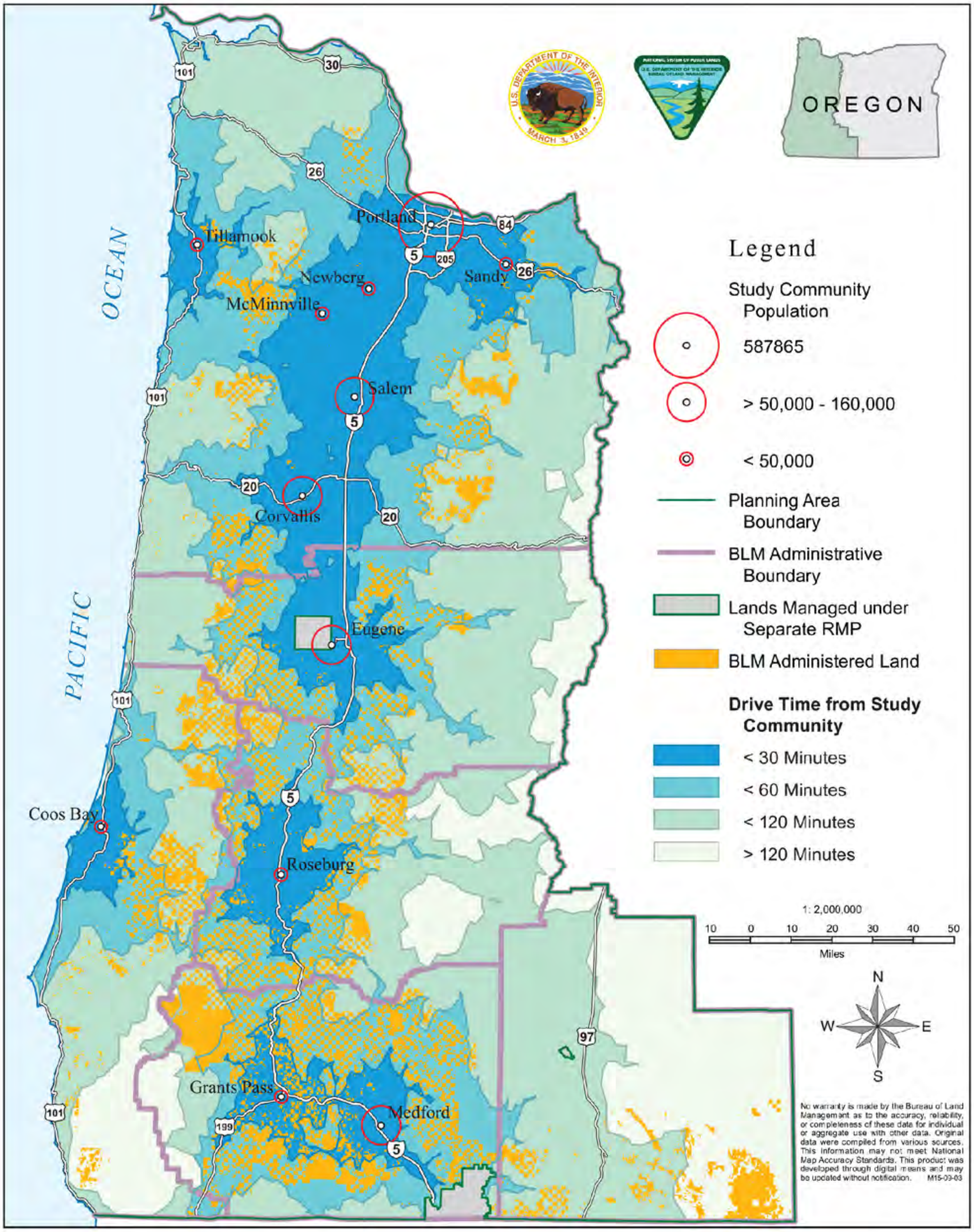
Note: All data are in 2012 dollars. Harvest data reflect the value and volume of wood removed from approved contracts during a calendar year, and correspond to sales that were offered and approved within the previous 1-36 months. 2014 data are preliminary and subject to change.
Source: USDI BLM 2014h

Recreation and Visitation

Supply

Sites managed for outdoor recreation are concentrated primarily on federally owned lands. These sites can be costly to establish and maintain, and include costs of forgoing other revenue generating uses. However, they can add substantial social value. Individuals who visit these sites directly benefit from access to recreation and nearby businesses are affected by increased expenditures due to visitation.

The BLM is a major provider of outdoor recreation opportunities throughout western Oregon. The BLM administers approximately 50 percent of all public land within 30-minute driving distance of the 12 largest communities in western Oregon, and 34 percent within 60-minute driving distance (**Map 3-6**). The U.S. Forest Service, National Park Service, Oregon Parks and Recreation Department, Oregon Department of Forestry, and a variety of local agencies and private entities provide a wide variety of outdoor recreation opportunities for residents and visitors. Participation on BLM-administered lands in western Oregon numbered approximately 10.8 million participants in 2013, with wildlife/nature viewing, scenic driving, camping and picnicking, non-motorized trail use, and hunting all experiencing over a million participants (see **Table 3-132** in Recreation). The recreation section of the Analysis of the Management Situation (USDI BLM 2013, pp. 2-72 – 2-82) describes the current conditions and trends for recreation facilities and user numbers in the planning area. **Table 3-144** provides an approximation of current acreage under recreation management, totaling approximately 164,000 acres.



Map 3-6: Travel Times from Major Communities in Relation to BLM-Administered Lands
Sources: Portland State University; U.S. Census 2014

Table 3-144. Current managed recreation acreage of BLM-administered lands

District/ Field Office	Current Managed Recreation (Acres)
Coos Bay	6,614
Eugene	20,511
Klamath Falls	69,470
Medford	32,065
Roseburg	6,984
Salem	28,648
Totals	**164,292**

Notes: Under the No Action alternative, all BLM-administered lands in the decision area are allocated to RMAs, and the management of RMAs described in the 1995 RMPs differs from current definitions and policy. Alternative B represents an approximate continuation of the current recreation management, but consistent with current definitions and policy for RMAs.
Source: BLM Recreation Management Area data, estimates prepared for Alternative B.

Demand

The BLM projects overall participation levels to increase; reaching 16.5 million participants annually by 2060 (see the Recreation section in this chapter).

Population centers and surrounding access tend to be the primary factors for demand for outdoor recreation opportunities. Researchers consider site attributes and travel costs, including time, to be the primary factors for variation in demand from one site to another, and for decisions between recreation and other forms of leisure (Loomis and Walsh 1997). Western Oregon is recognized nationally and globally for providing excellent outdoor recreation opportunities, with extensive forests, rivers, and mountains that include access, facilities, and trails throughout. The northern Willamette Valley is the most heavily populated portion of the region, dominated by the Portland metro area (see **Figure 3-140** in Recreation). Recreation opportunities within proximity to these population centers experience the most demand, and consequently have the potential to provide the most value, when they provide the types of outdoor recreation of interest. Some of the highest participation levels for trail use on BLM-administered lands are within these proximities.

Extending the analysis of travel distances and BLM-administered lands to the 12 study communities in western Oregon increases the coverage of BLM-administered lands within 60 minutes of travel. Proximities to study communities tend to correspond to BLM-administered lands with high recreation use (**Map 3-6**). While access is often quite difficult through rugged and mountainous areas, 45 percent of western Oregon is accessible within a 60-minute drive time from one of the 12 study communities, and 56 percent of the BLM-administered lands within this region fall within the 60-minute travel proximity. When considering the overall ownership shares of public lands within these travel proximities, the U.S. Forest Service is the largest landowner, at 48 percent, followed by the BLM at 34 percent (**Table 3-145**).

Table 3-145. Public land ownership shares in 60-minute driving distances from study communities

Community	Other Ownership (Percent)	Local Government (Percent)	State of Oregon (Percent)	BLM (Percent)	U.S. Fish and Wildlife Service (Percent)	Forest Service (Percent)
Coos Bay	3%	-	39%	46%	1%	12%
Corvallis	10%	4%	21%	49%	4%	12%
Eugene	2%	1%	4%	35%	1%	58%
Grants Pass	-	-	2%	80%	-	18%
McMinnville	5%	5%	38%	19%	3%	30%
Medford	-	-	1%	46%	-	53%
Newberg	1%	8%	58%	29%	4%	1%
Portland	-	3%	30%	5%	1%	61%
Roseburg	-	-	1%	47%	-	52%
Salem	1%	2%	7%	12%	2%	76%
Sandy	1%	3%	2%	6%	2%	85%
Tillamook	3%	4%	53%	12%	-	27%
Totals (Percent)	**1%**	**2%**	**14%**	**34%**	**1%**	**48%**
Totals (Acres)	**86,571**	**128,766**	**914,736**	**2,315,100**	**72,480**	**3,223,677**

Value

The most commonly used measure of value associated with outdoor recreation activity is consumer surplus,[93] which represents the net benefit to the participant after deducting market-based costs associated with the activity (e.g., equipment, transportation, and access fees). Consumer surplus is used to demonstrate the value, expressed in monetary terms, that participants experience but do not have to pay for. Consumer surplus values do not represent dollars exchanged, but, rather, the amount of net benefit beyond expenditures that represent additional willingness to pay. Expenditures on items such as equipment and transportation, while not directly representing value of the recreation site and activity itself, do reflect value to the recreation consumer. Issue 2 describes the effects of recreation expenditures on jobs and earnings.

The U.S. Forest Service (Loomis 2005) provides regional estimates by recreation type for the net value (consumer surplus; **Table 3-146**). These estimates derive from a meta-analysis of individual studies to estimate average recreation consumer surplus by recreation type and region. These data represent the average amount participants would pay beyond their total costs for the activity. Therefore, roughly half of participants would receive less consumer surplus, and half would receive more. The ranges for values reflect differing estimates from different contexts. The ranges also demonstrate that differing conditions for recreation opportunities can have very different values to users. Some of the factors that might contribute to variation in value for an activity is the site and facility quality, the attractiveness of the physical characteristics, and the accessibility (travel time). Several factors drive variation in net benefit between individuals, including people's differing preferences for amount and type of outdoor recreation

[93] Consumer surplus is the commonly used measure of value for recreation activity, because while equipment and travel expenses are determined in markets, recreation sites and access are not typically priced according to market forces.

activity. Participants can experience a range of values across participation visits themselves, with typically some level of diminishing returns with increased number of visits, up to the point where a participant decides not to make one more visit. Again, these data represent an average of all visit values.

Table 3-146. Net economic benefit (consumer surplus) by activity, per user day (2012 dollars)

Activity	Minimum Benefit (Dollars)	Mean Benefit (Dollars)	Maximum Benefit (Dollars)
Camping and Picnicking	$9-$18	$76-$123	$169-$265
Driving for Pleasure (Along Designated BLM Roadways)	$6	$24	$72
Fishing	$5	$52	$122
Hunting (Big Game, Upland Game, and Migratory Game Birds)	$7	$54	$132
Motorized Boating	$15	$32	$76
Motorized Off-highway Vehicle Travel	$48	$48	$48
Non-motorized Boating	$30	$33	$35
Non-motorized Travel (Hiking, Biking, and Horseback Riding)	$0-$37	$21-$62	$21-$153
Non-motorized Winter Activities	$57	$57	$57
Snowmobile and other Motorized Winter Activities	$13	$43	$147
Specialized Non-motorized Activities and Events	$2	$38	$148
Swimming and Other Water-based Activities	$7	$32	$70
Wildlife Viewing, Interpretation, and Nature Study	$8	$86	$411

Notes:
- All net economic benefit (consumer surplus) values reported in 2012 dollars. Consumer surplus value does not represent actual financial transaction, but rather value experienced by the participant.
- Activity categories from RMIS reports were aggregated to match the BLM reporting categories shown above. These underlying categories were cross-referenced with corresponding categories from Loomis (2005). Consumer surplus values associated with 'general recreation' were applied those activities without representative values.
'Camping and Picnicking' used values associated with 'Camping' and 'Picnicking'
'Driving for Pleasure (Along Designated BLM Roadways)' used values associated with 'Sightseeing'
'Fishing' used values associated with 'Fishing'
'Hunting (Big Game, Upland Game, and Migratory Game Birds)' used values associated with 'Hunting'
'Motorized Boating' used values associated with 'Motorboating'
'Motorized Off-highway Vehicle Travel' used values associated with 'Off-road vehicle driving'
'Non-motorized Boating' used values associated with 'Floatboating/rafting/canoeing'
'Non-motorized Travel (Hiking, Biking, and Horseback Riding)' used values associated with 'Backpacking', 'Hiking', 'Horseback Riding', and 'Mountain biking'
'Non-motorized Winter Activities' used values associated with 'Cross-country Skiing'
'Snowmobile and other Motorized Winter Activities' used values associated with 'Snowmobiling'. 'Specialized Non-motorized Activities and Events' used values associated with 'General Recreation'. These values therefore also represent a general recreation value that can be applied with specific type of activity is not identified.
'Swimming and Other Water-based Activities' used values associated with 'Swimming'
'Wildlife Viewing, Interpretation, and Nature Study' used values associated with 'Sightseeing' and 'Wildlife Viewing'
Source: Loomis 2005

The most common outdoor recreation activities, requiring the least equipment or specialized skill, have the largest participation numbers, and, based on the values in **Table 3-146**, provide the greatest total net benefit (e.g., Camping and Picnicking, and Wildlife Viewing, Interpretation, and Nature Study). Outdoor recreation participants in 2013 on BLM-administered lands numbered approximately 10.8 million participants. Note that visitor-days are fewer than the number of participants because visitor-days are summed across users to full 12 hours of recreation activity. Therefore, if an individual's recreation visit participation time is less than 12 hours, the data combine it with time from another participant. Based on the data in **Table 3-146** and **Table 3-147**, and using the average (mean) value, recreation activity contributed approximately $223 million in net economic benefit gains to residents of and visitors to western Oregon. **Table 3-147** shows 3.2 million visitor-days in 2013, which corresponds to 5.3 million total visits, demonstrating the general proportion of visits to visitor-days for outdoor recreation on BLM-administered lands.

Table 3-147. Total 2013 visitor-days, by activity, to all western Oregon BLM districts, and net benefit estimates (i.e., consumer surplus) (2012 dollars)

Activity	Visitor-days (Number)	Participants (Number)	Total Net Benefit (Consumer Surplus) (Thousands of 2012 dollars)
Camping and Picnicking	938,290	1,273,349	$111,728
Driving for Pleasure (Along Designated BLM Roadways)	376,562	1,959,729	$9,020
Fishing	181,746	598,420	$9,528
Hunting (Big Game, Upland Game, and Migratory Game Birds)	485,911	1,063,709	$26,122
Motorized Boating	41,843	97,622	$1,332
Motorized Off-highway Vehicle Travel	272,792	826,256	$13,014
Non-motorized Boating	74,580	224,876	$2,454
Non-motorized Travel (Hiking, Biking, and Horseback Riding)	243,325	1,211,201	$9,558
Non-motorized Winter Activities	14,723	50,444	$842
Snowmobile and other Motorized Winter Activities	1,896	6,903	$81
Specialized Non-motorized Activities and Events	111,012	458,870	$4,244
Swimming and Other Water-based Activities	106,537	424,376	$3,436
Wildlife Viewing, Interpretation, and Nature Study	385,596	2,564,574	$31,512
Totals	**3,234,813**	**10,760,329**	**$222,872**

Notes: Activity categories provided in the BLM RMIS reports were cross-referenced with corresponding categories from Loomis 2005. Consumer surplus values associated with 'general recreation' were applied those activities without representative values. A visitor-day represents 12 visitor hours at a site or area. So, for example, 12 one-hour visits equate to one visitor-day. As a result, there are more participants than visitor-days. Participants include both local and non-local people.
Sources: Loomis 2005 and 2013, and USDI BLM 2014f

Table 3-148 shows the breakdown by BLM district. The Salem and Eugene Districts have the highest visitor-day counts and, consequently, the highest recreation values.

Table 3-148. Total 2013 visitor-days, by BLM district, and annual net benefit estimates (i.e., consumer surplus) (2012 dollars)

District/ Field Office	Visitor-days (Number)	Total Net Benefit (Consumer Surplus) (Thousands of 2012 dollars) (Mean)
Coos Bay	272,757	$23,858
Eugene	914,175	$59,122
Klamath Falls	48,099	$3,243
Medford	462,463	$28,914
Roseburg	303,727	$20,681
Salem	1,233,592	$87,055
Totals	**3,234,813**	**$222,872**

Source: Loomis 2005 and 2013 and USDI BLM 2014f, applying activity-specific use of consumer surplus values

Special Forest Products

Supply

Special forest products include all non-timber products harvested or collected from BLM-administered lands in western Oregon. The BLM classifies these products into two broad categories. Category I products, such as Christmas trees, huckleberries, beargrass, pine cones, and some mushrooms (e.g., morels) grow in areas of disturbance. Timber harvesting, commercial thinning, and prescribed burning, create the types of disturbed conditions in which these products grow. Category II products, such as ferns, wild ginger, mosses, and some mushrooms (e.g., chanterelles), grow in undisturbed areas. **Table 3-149** identifies the special forest products found on BLM-administered lands for which the BLM issues permits, and the applicable category.

Table 3-149. Special Forest Products: permits, minimum prices, market values, and revenue to BLM (CY 2012 for all districts)

Special Forest Product	Category	Unit of Measure	Quantity Harvested	Permits (Number)	BLM Minimum Price per Unit	Market Price (Low)	Market Price (High)	BLM Revenue	Market Value (Low)	Market Value (High)
Boughs	2	Pounds	182,075	70	$0.03	$0.19	$0.71	$5,700	$34,600	$129,300
Burls & Misc.	2	Pounds	3,600	7	$0.05	$1.94	$2.91	$200	$7,000	$10,500
Christmas Trees	1	Count	581	818	$3.00	$16.94	$16.94	$4,500	$9,800	$9,800
Edibles & Medicinals	1, 2	Pounds	17,400	31	$0.05	$2.46	$3.24	$900	$42,800	$56,400
Floral & Greenery	1, 2	Pounds	1,192,125	1,467	$0.05	$2.52	$4.40	$82,200	$3,004,200	$5,245,400
Mosses	2	Pounds	1,000	1	$0.10	$2.51	$3.77	$100	$2,500	$3,800
Mushrooms	1 (Morels) 2 (Chanterelles)	Pounds	315,138	1,621	$0.10	$2.70	$125.40	$48,500	$850,900	$39,518,300
Seeds & Seed Cones	1 (Pine) 2 (Hemlock)	Bushels	1,000	3	$0.20-$0.25	$0.42	$3.05	$100	$400	$3,100
Transplants & Ornamentals	1, 2	Count	650	11	$1.00-$10.00	$0.02	$18.24	$400	< $100	$11,900
Totals		-	-	**4,029**	-	-	-	**$238,200**	**$3,952,200**	**$44,988,300**

Note: All revenue and market values rounded to the nearest hundred

Sources: Barnard 2014, Blatner and Alexander 1998, USDI BLM 2014, Draffan 2006, Muir *et al.* 2006, Pacific Northwest Christmas Tree Association 2014, USDI BLM Salem 2011, Schlosser and Blatner 1997, Schlosser and Blatner 1995, Thomas and Schumann 1993

Under current conditions, in the coastal/north region of the decision area, approximately 111,300 acres (11 percent) of stands on BLM-administered lands support Category I (disturbance-associated) products and 864,600 acres (89 percent) of stands on BLM-administered lands support Category II (disturbance-averse) products. In the interior/south region of the decision area, approximately 195,300 acres (16 percent) of forest on BLM-administered lands support Category 1 products and 992,000 acres (84 percent) of forest on BLM-administered lands support Category II products in the interior/south area. The Forest Management section in this chapter describes the distribution of Category I and Category II special forest products in more detail.

Demand

All the BLM districts in the planning area report harvests of non-timber forest products. The BLM manages the collection of these products via a permit system, issuing permits to both commercial collectors and for personal use. Districts report that people seeking permits to harvest are primarily local, and many are immigrants or non-English speakers. However, the BLM does not systematically collect information about the origin or other characteristics of people who receive permits.

Table 3-149 shows the quantity harvested of the special forest products for issued permits, for all products except biomass and wood products, which are addressed in other sections of Issue 1. The data reflect demand for these products, especially floral and greenery and mushrooms, but they likely underestimate the demand for several reasons:

- In some cases, there is a limit or cap on the number of permits issued or on the quantity of goods harvested. For such goods, demand would be greater than indicated by quantity harvested.
- Permittees may inaccurately report quantity harvested, resulting in these numbers under- or overestimating demand, though the tendency is likely toward underestimation.

Some harvest may take place without a permit (illegal trespass), so that demand is not captured in BLM data. BLM law enforcement reports that trespass does occur (Babcock 2014, personal communication). In 2012, the Roseburg District issued the most permits (1,440), followed by the Eugene (1,152), Coos Bay (980), Medford (241), and Salem (122) Districts, and the Klamath Field Office (94).

Value

Table 3-149 also shows the BLM's minimum price list for permitted special forest products, and a range of market values found in the literature (see table sources). Some districts price special forest products higher on a per-unit basis than the BLM's minimum price, though most districts reported using the minimum prices for most products.

Researchers with the U.S. Forest Service conducted the most thorough research on the market for special forest products in the Pacific Northwest in the 1980s and 1990s. These studies estimated that annual permitted harvest values across these markets totaled to $400 million for the Pacific Northwest annually (Schlosser *et al*. 1992). Later researchers noted, "There is very little information about year-to-year prices for products within the different industries [for various special forest products], so although large general trends can be discussed, specific prices and industry trends are not well understood" (Blatner and Alexander 1998). This research also suggests high levels of unpermitted use, and corresponding greater actual value harvested. Schlosser and Blatner (1997) estimated Christmas greens contributing approximately $128.5 million in product sales in the region in 1989, while edible mushrooms contributed $41.1 million in product sales.

Table 3-149 shows the revenue the BLM received from permit sales for the special forest products in 2012, and the value of each type of special forest product based on the range of market values. BLM revenue was highest in the Eugene district ($78,500), followed by the Roseburg ($60,300), Coos Bay

($44,300), Medford ($29,200), and Salem ($22,300) Districts, and the Klamath Falls Field Office ($3,500).

As **Table 3-149** shows, special forest products in each grouping may contain species that thrive in either Category I or Category II lands. For example, some mushrooms, such as morels, grow best in disturbed areas, while others, such as chanterelles, require undisturbed land to flourish. The BLM collects some data on the type of mushroom harvested, but for about 80 percent of the permit records related to mushrooms, the species is unspecified. This data insufficiency makes it difficult to determine the distribution of value between Category I and Category II lands for species that are in both categories.

Sustainable Energy Production

Supply

The potential sustainable sources of energy from BLM-administered lands in the planning area include biomass, geothermal, solar, and wind. The Sustainable Energy section of the Analysis of the Management Situation (USDI BLM 2013, pp. 2-117 – 2-120) discusses in more detail the background and potential for development of each on BLM-administered lands in western Oregon. As of 2014, there were no geothermal, solar, or wind developments on BLM-administered lands in the planning area, though, the U.S. Department of the Interior has identified one site with the potential for generating energy from geothermal resources.

BLM-administered lands in western Oregon generate several types of biomass, including slash, lumber and paper byproducts (e.g., pulp), firewood, and scrap and salvaged wood. The source of biomass the BLM is most likely to offer for energy production is slash from logging (see the Sustainable Energy section in this chapter). Thus, the quantity of biomass available for energy production each year is derived from the volume of timber harvests. According to the Sustainable Energy section, almost 153,000 bone dry tons of biomass from slash were available based on 2012 harvest levels. Supplies of other sources of biomass, such as firewood, are also available to produce additional energy.

Demand

Although BLM-administered lands in western Oregon provide some areas suitable for wind production, there is currently no demand for developing these areas, because their proximity to transmission capacity and centers of demand make development too costly under today's economic conditions (Peter Broussard, BLM, personal communication, 2013). Currently, demand for generating energy via geothermal resources is limited by technology and a lack of infrastructure to convey energy to population centers. There is no current demand for solar energy in the decision area based on current solar generation technology.

Markets for biomass fuel are close in proximity to the production areas, but other Federal, State, and private sources supply these markets. State and Federal mandates that require energy companies and communities to invest in renewable energy resources are driving investors to consider the energy resources available on BLM-administered lands, including those in western Oregon (USDI BLM 2014c). The BLM is actively working with communities and companies in western Oregon to develop information, infrastructure, and other resources to better-utilize biomass for renewable energy production (USDI BLM 2006 and 2010). Several co-generation facilities exist in western Oregon that utilize biomass to produce electricity, most commonly associated with existing sawmills. Industrial landowners and other partners are exploring opportunities for installing new generation capacity at existing sawmills, and building small-scale generation and heating projects for institutional facilities, such as schools (USDI BLM 2006).

Utilization of biomass (using sold amounts as a proxy for utilization, and utilization to represent demand) from BLM-administered lands in the planning area has varied over the last few years, ranging from almost 70,000 green tons in 2010 to less than 10,000 green tons since 2011. Incentives provided through the American Recovery and Reinvestment Act of 2009 likely contributed to the peak in 2010. In 2012, among the district/field offices in the planning area, only the Klamath Falls Field Office reported production of biomass materials totaling 3,000 bone dry tons. All six districts reported issuing permits for fuel wood, amounting to 5,578 green tons produced. Assuming 40 percent moisture content, this equals 3,347 bone dry tons. Thus, the total quantity of biomass utilized in 2012 was 6,347 bone dry tons.

Value

In 2012, the BLM received $1,500 in revenue from selling a permit for 3,000 bone dry tons of biomass. This equates to $0.50 per bone dry ton or about $0.03 per million BTUs. This transaction occurred in the jurisdiction of the Klamath Falls Field Office. The BLM also granted permits for the procurement of about 5,600 green tons of fuel wood across all six districts, and received in exchange about $30,700 in revenue. Assuming that the average moisture content of the biomass is 40 percent, this equates to about $9 per bone dry ton or about $0.5 to $0.6 per million BTUs. In total, BLM earned about $32,200 in revenue from all sources of biomass burned for energy in 2012. Data are unavailable to quantity the amount or value of biomass from BLM-administered lands that industrial landowners and paper mills utilized to produce energy.

Livestock Grazing

Supply

Only the Coos Bay District, Klamath Falls Field Office, and Medford District administer livestock grazing in the decision area. The Livestock Grazing section in this chapter provides detail on the current and historic supply of livestock grazing resources. In 2012, the decision area had approximately 23,000 active animal unit months (AUMs; **Table 3-150**).

Table 3-150. Livestock grazing, number of permittees, forage, market value, and BLM revenue, 2012

District/ Field Office	Supply	Indications of Demand		Indications of Value		
	Active Use (AUMs)*, †	Permittees (Number)	Billed AUMs*, ‡	Market Value Based on Private Forage Price ($16.80/AUM)	Market Value Based on State Forage Price ($8.48/AUM)	BLM Revenue Based on Federal Livestock Grazing Fee ($1.35/AUM)
Coos Bay	120	4	23	$386	$195	$31
Eugene	-	-	-	-	-	-
Klamath Falls	13,210	63	8,474	$142,363	$71,860	$11,440
Medford	10,255	43	6,878	$115,550	$58,325	$9,285
Roseburg	-	-	-	-	-	-
Salem	-	-	-	-	-	-
Totals§	**23,585**	**63**	**15,375**	**$258,300**	**$130,380**	**$20,756**

* An animal unit month (AUM) is the amount of forage required to sustain one cow and her calf, one horse, or five sheep or goats for a month on lands in western Oregon. Active Use is a measure of the amount of available forage designated for livestock grazing in a given year

† Active Use is used in this section to describe the supply of livestock grazing land provided by BLM-administered lands. Not all of this land is actually used for livestock grazing, even though livestock grazing is allowed by regulation

‡ A billed AUM is the amount of forage actually used for livestock grazing, and is the unit used to calculate revenue to the BLM.

§ Totals may not sum due to rounding

Sources: Livestock Grazing section of this chapter, USDI BLM Data: Allotments Use Summary for Billing Year 2012 by Districts, USDI BLM 2014b, USDI BLM 2014e

Demand

Demand for livestock grazing permits is from private landowners in the vicinity of and adjacent to BLM-administered rangelands, whose property the BLM has recognized as having preference for the use of public livestock grazing privileges. Public rangelands are made available for livestock grazing through a system of permits and leases tied to particular areas (allotments) and quantities of forage. In 2012, there were 110 permittees leasing or permitted to graze on BLM allotments in the management area (**Table 3-150**). These 110 permittees billed the BLM for the use of 16,333 AUMs of forage.

Value

The Federal government sets the Federal livestock grazing fee annually, which applies to BLM- and U.S. Forest Service-administered lands in the 16 western states. The fee is adjusted based on a formula set by Congress in the Public Rangelands Improvement Act of 1978 and modified by subsequent presidential Executive orders. While the fee takes into account market factors, such as production costs and beef prices, the price is not set in an open market, so may not reflect the actual value of the right to graze animals on BLM-administered lands.

The Federal livestock grazing fee in 2012 was $1.35 (USDI BLM 2013, USDI BLM 2014d). By law, the fee cannot fall below $1.35 per AUM, and cannot increase or decrease more than 25 percent year-over-year (Vincent 2012). Since 2004, the fee has ranged from $1.35 to $1.79. The BLM collected approximately $21,000 in revenue for the AUMs within the decision area in 2012 (**Table 3-150**).

Disputes persist about the extent to which Federal livestock grazing fees actually reflect 'fair market value' (USDI BLM 2013). The average price of private forage on land in the western United States in

2011 was $16.80 per AUM (USDI BLM 2013). The livestock grazing fee on State trust lands in Oregon in 2012 was $8.48 per AUM (Oregon Department of State Lands 2012). At these prices, the value of livestock grazing would have ranged from about $130,000 to $258,000. However, the value of an AUM on BLM-administered lands may not compare directly to livestock grazing fees for private land, because private livestock grazing fees may include other services that enhance its value, such as fencing and water infrastructure that BLM allotments do not provide. State livestock grazing fees may provide a better comparison, although differences in proximity, density of forage, and herd security between State trust and BLM-administered lands may still factor into a lower average value associated with using BLM-administered lands for livestock grazing.

Rangeland provides a broad range of goods and services. See the recreation and biodiversity subsections of this issue for discussion of the value of other goods and services associated with rangeland.

Minerals

Supply

BLM-administered lands include approximately 2.5 million acres that could provide mineral resources to the public. These lands include salable, locatable, and leasable mineral resources.

- **Salable Minerals**—The primary salable mineral resources associated with BLM-administered lands in western Oregon are sand, gravel, and crushed stone, referred to collectively as 'mineral material.'
- **Locatable Minerals**—Locatable minerals in western Oregon include precious metals (e.g., gold, silver, nickel, mercury, and uranium), nonmetallic minerals (e.g., fluorspar and gemstones), and uncommon variety minerals (e.g., certain limestone and silica).
- **Leasable Minerals**—Leasable minerals in western Oregon include oil, gas, coalbed natural gas, coal, and geothermal energy.

Those interested in mineral development have access to a large majority of BLM-administered lands in the planning area. Currently, approximately 13 percent, or 319,000 acres, of BLM-administered lands are closed to salable mineral material disposal, and approximately 4 percent, or 98,400 acres, are withdrawn from locatable mineral entry. The decision area would remain open to leasable mineral development under all alternatives and the proposed RMP except where legislation has already closed lands. The Minerals section of this chapter provides more detail on the supply of mineral resources.

Demand

Demand for minerals on BLM-administered lands comes from several sources: commercial (e.g., industrial landowners), governmental agencies utilizing materials for government projects with free use permits, and individuals looking for mineral resources (mostly locatable minerals) primarily for personal use or enjoyment. All these types of demand have the potential to generate economic benefits. This section focuses on demand from larger-scale mineral production. There are no current leases for oil, gas, or coal on BLM-administered lands in western Oregon, and limited activity related to locatable minerals. The BLM does not collect information about the quantity of locatable minerals removed from mining claims.

There are over 1,000 developed quarries for salable mineral materials on BLM-administered lands in western Oregon. In 2012, producers removed approximately 35,555 cubic yards of mineral material from these quarries, primarily crushed and specialty stone. Approximately 85 percent was from the Roseburg District (**Table 3-151**). Between 2005 and 2012, producers removed on average about 25,000 cubic yards in the Eugene, Medford, and Roseburg Districts. The most common uses for these minerals are road construction and resurfacing, and building other surfaces for use during logging operations. Recreation facilities (e.g., boat ramps) and conservation activities (e.g., stream improvements) use some material. The relatively close proximity of the source of salable mineral materials to roads, logging units, and recreation areas on BLM-administered lands helps reduce costs of associated activities.

Table 3-151. Salable mineral materials, market value, and revenue, 2012

District/ Field Office	Mineral Material Removed from BLM-administered Lands (Cubic Yards)	Market Value and Revenue to BLM (Dollars)
Coos Bay	-	-
Eugene	27	$188
Klamath Falls	-	-
Medford	5,285	$3,584
Roseburg	30,243	$15,141
Salem	-	-
Totals	**35,555**	**$15,328**

There were 1,045 active mining claims for locatable minerals on BLM-administered lands in western Oregon in 2013, an increase of 25 percent since 2005 (USDI BLM 2013). Most of the increase is in the Medford District, where claims increased by 200, or about 30 percent.

Value

Federal law authorizes the BLM to sell salable mineral materials at fair market value. Prices for mineral material are set by district rate sheets, or by appraisal for larger or specialized quantities. The price per cubic yard in 2012 ranged from $0.50 to $10.00 per cubic yard. The Eugene and Roseburg Districts charged $0.50 per cubic yard for most sales, while the Medford District charged $3.00 per cubic yard for most sales. The market value to the BLM in 2012 was approximately $15,300 (**Table 3-151**). The value of locatable minerals would also be based on their market value. However, the BLM does not collect information on production from these claims.

The value of recreational mining, where people participate for the experience as much or more than the prospect of earning income, is partially captured in the Recreation section of Issue 1. The BLM does not explicitly track user days for recreational mining, but some of these users are likely captured in the data for other recreational activities (e.g., hiking and public motorized travel activities).

Carbon Storage

Supply

The Climate Change section in this chapter describes the current conditions regarding climate change and carbon storage for the decision area. Forests in the decision area as a whole are a sink for carbon, fixing more carbon above- and below-ground than they emit. The BLM-administered lands in the planning area store an estimated 366 teragrams of Carbon (Tg C) (1 teragram is equivalent to 1 million metric tons. The carbon density (the amount of carbon per acre) varies by district with the Klamath Fall Field Office having the lowest density and the Eugene District the highest. Each year the net amount of carbon stored in forests changes, with some released through fire, decay, and other processes, and some fixed through growth. In 2012, the forests in the decision area fixed and stored a net total of about 769,000 metric tons of carbon.

Demand

Across the world, many individuals, businesses, and governments recognize a need to address climate change through greenhouse gas mitigation and adaptation, to avoid costs associated with climate change now and in the future. Some markets exist where greenhouse gas producers pay dollars for so-called 'carbon offsets' or 'carbon credits.' However, there is no active trading market in western Oregon, and the BLM does not participate in these markets. Among individuals and groups, demand exists to maintain existing carbon sinks and increase opportunities for carbon storage in western Oregon, but a funding mechanism to achieve this does not exist.

Value

Absent a market for carbon, this analysis addresses the value of carbon storage from a social perspective, where the value of carbon storage is derived from non-market valuation techniques such as avoided cost and avoided risk. The social cost of carbon (SCC) is an estimate of the anticipated future damages from greenhouse gas emissions. According to the Interagency Working Group convened by the Council of Economic Advisers and the Office of Management and Budget to analyze the social cost of carbon, SCC "is intended to include (but is not limited to) changes in net agricultural productivity, human health, property damages from increased flood risk, and the value of ecosystem services due to climate change" (Interagency Working Group on Social Cost of Carbon, United States Government 2013). The Interagency Working Group most recently revised the estimates of the SCC in 2015.

Combining the BLM estimates of the amount of carbon stored in forests in the decision area with the most recent average SCC estimates at the 3 percent discount rate, yields a value of carbon stored annually by forests in the decision area of approximately $85 million (**Table 3-152**). Using estimates that reflect higher risk of damage—the 95th percentile—yields a value of about $247 million.

Table 3-152. Quantity of total carbon stored on BLM-administered lands, estimated annual carbon stored, and estimated value (2012 dollars)

District/ Field Office	Stock of Stored Carbon (Million Metric Tons)	Estimated Annual Carbon Storage (Million Metric Tons)*	Value of Estimated Annual Stored Carbon (Millions)	
			Average†	95th Percentile†
Coos Bay	59.61	0.15	$21	$62
Eugene	59.65	0.15	$21	$62
Klamath Falls	8.71	0.01	$1	$3
Medford	93.94	0.02	$2	$6
Roseburg	63.63	0.06	$9	$25
Salem	75.71	0.21	$31	$89
Totals‡	**361.25**	**0.59**	**$85**	**$247**

* Estimated Annual Carbon Storage based on calculated per-year carbon storage for total carbon stored over the first decade of analysis (2013 to 2023).

† Values are based on 2015 SCC estimates converted from per metric ton of carbon dioxide (CO_2) to per metric ton of carbon (C) and converted to 2012 dollars, as described in the methodology at the beginning of this section. Both the average and 95th percentile scenarios reflect a 3 percent discount rate.

‡ Totals throughout this analysis do not include carbon stored in harvested wood products. These carbon amounts are reported in the Climate Change section.

Source: USDI BLM and Interagency Working Group on Social Cost of Carbon 2015

Source Water Protection

Supply

The BLM-administered lands in western Oregon capture, filter, and convey water that people in communities across western Oregon drink. There are approximately 20,400 miles of streams and rivers and 218,000 acres of lakes, ponds, and wetlands on BLM-administered lands (USDI BLM 2013). In 2011, the BLM and the Oregon Department of Environmental Quality (ODEQ) signed a memorandum of understanding that documents the efforts that both agencies will take for "managing and controlling point and nonpoint source water pollution from BLM-managed lands in the State of Oregon" (ODEQ and USDI BLM 2014, p. 1). Specific to the BLM's resource management plans, the memorandum of understanding states that RMPs will identify and include best management practices (BMPs) to control non-point sources of pollution, to the "maximum extent practicable" (ODEQ, no date, p. 1; ODEQ 2014). The Hydrology section in this chapter discusses the quantity and quality of water produced from the planning area.

Demand

Approximately 80 percent of Oregonians depend on drinking water from public water systems. These public water systems draw surface water and groundwater from areas designated to protect the quality of drinking water. There are approximately 80 source water watersheds in the planning area, with varying amounts of BLM-administered lands. According to the Atlas of Conservation Values, 73 percent of the BLM-administered lands in western Oregon are in areas the ODEQ identifies as drinking water protection areas (TNC and WSC 2012). The ODEQ and the Oregon Health Authority have identified the source water areas in the State and conducted inventories of sources of contamination (USDI BLM 2013, p. 2-44). Source water areas for many public water systems encompass lands with multiple ownerships and varying forest management policies where BLM-managed lands are often a minority portion of the total watershed. Many BLM-administered lands in these watersheds occupy headwaters locations miles upstream from surface water sources (D. Carpenter, personal communication, 2014).

Value

The economics literature on water-treatment costs includes a growing number of studies that find a relationship between the quality of forest cover in source-water areas, and treatment costs for utilities that source from these areas. These studies conclude that greater and higher quality forest cover helps reduce treatment costs (USDA FS 2000, Freeman *et al.* 2008, Earth Economics 2012, World Resources Institute no date). Utilities manage water systems to address sources of risk to drinking water supplies. To the extent that forest management practices influence the risk of threats to a watershed's integrity and its ability to provide clean drinking water, those changes would generate benefits or create costs for utilities (USDA FS 2000, Freeman *et al.* 2008, Earth Economics 2012, World Resources Institute no date).

Biodiversity and Sensitive Species

Supply

The BLM-administered lands in western Oregon include habitats and species of biodiversity importance. Important habitats include old-growth forests, wetland and riparian areas, and habitats contained in Areas of Critical Environmental Concern (ACECs). Important species include rare plants and fungi, various species of wildlife, fish, and insects (e.g., northern spotted owl, marbled murrelet, and coho salmon). Twelve ESA-listed plant species exist in the planning area. The BLM documented six of these species on BLM-administered lands in the decision area (USDI BLM 2013, p. 2-66). The Atlas of Conservation Values includes maps of species of concern and critical habitats for ESA-listed species on BLM-administered lands (The Nature Conservancy and Wild Salmon Center 2012). Wildlife, Rare Plants and Fungi, and Areas of Critical Environmental Concern contain information on the supply or prevalence of specific species. Many of these species are found in ACECs, including Research Natural Areas that contain areas for ecological and environmental studies and preserves of gene pools of typical and endangered plants and animals.

Demand

Markets do not exist for the biodiversity aspects of habitats and species. However, evidence of demand exists elsewhere. Biologically diverse habitats provide biophysical functions that people depend on for survival. Individuals and households express their demand for habitats and species through survey responses. Society as a whole expresses demand through laws protecting ESA-listed species and the habitats they depend on.

The Millennium Ecosystem Assessment describes the importance of biodiversity to the biophysical functions that people depend on:

> "Biodiversity—the diversity of genes, populations, species, communities, and ecosystems—underlies all ecosystem processes. Ecological processes interacting with the atmosphere, geosphere, and hydrosphere determine the environment on which organisms, including people, depend. Direct benefits such as food crops, clean water, clean air, and aesthetic pleasures all depend on biodiversity, as does the persistence, stability, and productivity of natural systems" (MEA 2005, p. 79).

The biodiversity within forest- and water-related ecosystems supports a range of fundamental ecosystem services (Pimentel *et al.* 1997, Krieger 2001) that people depend on including:

- Waste disposal
- Soil formation
- Nitrogen fixation
- Bioremediation of chemicals
- Crop and livestock breeding
- Biological control of pests
- Pollination

People and households express their demand for habitats and species through their response to survey questions. The economics literature contains numerous reports and articles in academic journals that describe studies of individual and household willingness to pay to protect habitats and species. Examples include Rubin *et al.* (1991), Hagen *et al.* (1992), Loomis and White (1996), Loomis and González-Cabán (1998), Moskowitz and Talberth (1998), Bulte and Van Kooten (1999), Spies and Duncan (2008), Pascual and Muradian (2010), and Loomis *et al.* (2014). The Value subsection below includes values from a number of these studies.

Society expresses demand for biodiversity and related habitats and species when voters or their elected representatives pass laws protecting threatened or endangered species and the habitats they depend one. For example, when the U.S. Congress passed the Endangered Species Act (ESA) in 1973, it recognized, "… that our rich natural heritage is of esthetic, ecological, educational, recreational, and scientific value to our Nation and its people" (USDI FWS 2013). According to the U.S. Fish and Wildlife Service, the purpose of the act is to, "protect and recover imperiled species and the ecosystems upon which they depend" (USDI FWS 2013). The State of Oregon has laws similar to the ESA and maintains its own list of threatened and endangered species separate from ESA-listed species (Oregon Department of Fish and Wildlife no date).

Value

The BLM identifies important values that areas provide including historic, cultural, or scenic, fish and wildlife resources, and natural processes or systems (USDI BLM 2013c, p. 2-14). Because people rely on these ecosystem services from forestlands, they also have economic value (Pimentel *et al.* 1997, Balmford *et al.* 2002, Farber *et al.* 2002, and, Pascual and Muradian 2010). The economic literature on this topic includes a number of studies that estimate the value of biodiversity and sensitive species in different contexts. Loomis *et al.* (2014) summarized the average values that sample households in the United States place on protecting ESA-listed species, by species group, see **Table 3-153**. In general, the average value takes into account the range of household values from zero to the highest values. Researchers typically apply the average value to all households in a study area.

Table 3-153. Willingness to pay (WTP) values per household, by species

Species Group	Average Annual Willingness To Pay (2012 dollars)*
Birds	$47
Fish	$117
Mammals	$19
Marine Mammals	$44

* Values updated from 2006 dollars using the GDP deflator
Source: Loomis *et al.* 2014

The literature also includes studies of sample households' average willingness to pay for some, but not all, of the threatened and endangered species present in the planning area (**Table 3-154**), and to protect old-growth habitat (**Table 3-155**).

Table 3-154. Annual willingness to pay (WTP) values per household, by species.

Species	Average Annual Willingness To Pay (2012 dollars #)
Bald eagle (*Haliaeetus leucocephalis*)	$131*
Fender's blue butterfly (*Icaricia icarioides fenderi*)	Unknown‖
Fisher (*Pekania pennanti*)	$19†
Golden eagle (*Aquila chrysaetos canadensis*)	$47†
Marbled murrelet (*Brachyramphus marmoratus*)	$47†
Northern spotted owl (*Strix occidentalis caurina*)	$68*
Oregon silverspot butterfly (*Speyeria zerene hippolyta*)	Unknown‖
Red tree vole (*Arborimus longicaudus*)	$18‡
Greater sage-grouse (*Centrocercus urophasianus*)	$47†
Steller's sea lion (*Eumetopics jubatus*)	$84*
Streaked horned lark (*Eremophila alpestris strigata*)	$47†
Taylor's checkerspot butterfly (*Euphydras editha taylori*)	Unknown‖
Gray wolf (*Canis lupus nubilus*)	$22*
Wolverine (*Gulo gulo*)	$201§

* See Martín-López *et al.* 2008, and references therein

† No species-specific studies exist; representative values from Loomis *et al.* 2014 used

‡ White *et al.* 1997; Note that the value reported above was not calculated for the red tree vole, specifically, but for a different vole species.

§ Ericsson *et al.* 2007

‖ No studies exist to estimate the WTP for invertebrate species, such as butterflies. However, Diffendorfer *et al.* (2013) calculated that U.S. households value monarch butterflies (*Danaus plexippus*) at approximately $4.78–$6.64 billion—a level similar to many endangered vertebrate species.

\# Values updated from 2006 dollars using the GDP deflator

Table 3-155. Annual willingness to pay (WTP) values per household to protect old-growth habitat.

Source	Average Annual Willingness To Pay (2012 dollars)
Rubin *et al.* (1991)	$65
Moskowitz and Talberth (1998)	$64 – $192
Loomis *et al.* (1994)	$128

The studies that produced the dollar amounts in **Table 3-154** and in **Table 3-155** differ in their location and year conducted, demographic characteristics of study populations, approach, methods, questions asked, and in some cases include values for multiple and overlapping goods or services. Extrapolating these results to an accurate total value for the planning area is not possible given these variables. Nevertheless, the findings confirm, that, on average, households in the United States value ESA-listed species. For illustrative purposes, the BLM estimated the value of bird species in the planning area using the latest estimates of willingness to pay from Loomis *et al.* (2014). A number of important bird species and their habitats exist in the planning area including eagles, the marbled murrelet, and northern spotted owl. Multiplying the average household willingness to pay estimate for bird species from Loomis *et al.* (2014), $47 (2012 dollars) by the number of households in the planning area, approximately 1.3 million

(U.S. Bureau of the Census 2014b), yields an estimated value of approximately $63 million (2012 dollars).

Scenic Amenities

Supply

The BLM categorizes the BLM-administered lands into one of four classes based on the relative value of visual resources. Visual Resource Inventory (VRI) Class I is assigned to those areas where a management decision has been made previously to maintain a natural landscape; these are located on congressionally designated lands, and BLM management actions must not adversely affect them. The other three VRI Classes are assigned based on a combination of scenic quality (i.e., visual appeal, as measured by a variety of factors), public sensitivity (i.e., degree of concern for the resource), and distance to publicly accessible travel routes and observation points. Over half of the BLM-administered lands in the decision area is VRI Class IV, which is the category of lowest visual resource value inventory class. About a quarter of the land (about 553,000 acres) is Class II and another quarter is Class III (about 578,000 acres). It is important to note that land with high scores for scenic quality may be distributed throughout these three classes, depending on the other attributes (sensitivity levels and distance zones) factored into the VRI rating. Approximately 1 percent of land in the decision area is Class I. The Visual Resource Management section of this chapter contains a detailed description of how land is categorized by VRI, and provides a more detailed breakdown of VRI classes throughout the management area.

Demand

People care about scenic amenities for a variety of reasons. Much of the demand for scenic amenities comes when people engage in recreation, on both public and private land. It is difficult to separate the demand for visual experience from the rest of the recreation experience, and the demand for recreation activities, such as motorized and non-motorized travel largely captures the demand for scenic amenities in the decision area. Scenic amenities are also important to people who live or work nearby BLM-administered lands and have views of public property.

Value

This section focuses on the value to private property owners with views of BLM-administered lands. Economic modeling demonstrates what common observation suggests: private property with a good view sells at a premium, compared to property without (Powe *et al.* 1997, Malpezzi 2002). The value of the premium is highly variable, and depends on the larger geographical and social context of the property. Studies have found premiums for views associated with residential properties ranging from statistically insignificant but positive to 1–89 percent of the price of a home (Behrer 2010). Most studies find the premium of a view is comparable to the premium added by a fireplace or a pool. The economic literature suggests that the price premium is more relevant for higher-valued residential properties and property with a primary purpose of recreation. The relationship between the VRI rating of a particular piece of BLM-administered lands and the value of nearby properties is complicated. VRI rating attempts to account for the proximity of private properties with views of BLM-administered lands under the VRI Sensitivity factor for "adjacent land uses." It is likely that the more distant these properties are away from the BLM, the less refined the data. However, data is not available that document how the scenic views of BLM-administered lands in directly contributes to the monetary value of private property. Moreover, a low VRI rating does not necessarily mean that the land is not likely contributing value to private property through views. For example, a private residence may have a highly desirable view that enhances its property value, and that view may be comprised in part of BLM-administered lands, but those lands could be categorized as VRI Class III or IV due to having combination of average or less scenic quality, moderate to low public sensitivity and its position within the distance zone.

Cultural Meaning

Supply

The BLM-administered lands in the planning area contain over 2,400 cultural resource sites, including sites that are pre-historic, historic, or multi-component (i.e., possessing both historic and pre-historic components). The Cultural Resources and Paleontological Resources section in this chapter provides additional detail on cultural and paleontological resources. The BLM-administered lands also provide intangible cultural services. The Millennium Ecosystem Assessment defines cultural services as including "nonmaterial benefits people obtain through spiritual enrichment, cognitive development, reflection, recreation, and aesthetic experiences" (Sarukhán and White 2005).

Demand

Visitation to specific sites, organized activities on and related to BLM-administered lands, and individual interaction with specific resources demonstrate demand for the cultural resources. Demand also exists among populations who may not visit BLM-administered lands or interact with resources directly, but hold their existence to be important, for example, to maintain their cultural identity.

BLM districts report document many examples of demand for cultural resources. Three of many examples are:

- The Coos Bay District promotes and facilitates access to the Cape Blanco Lighthouse, which is the oldest lighthouse in Oregon. In 2012, 20,000 visitors toured the lighthouse.
- The Roseburg District collaborated with the Umpqua National Forest to conduct a Passport in Time public archaeology project. Other examples of demand include school-age children attending the School Forestry Tour and Creek Week.
- The Salem District, between 1996 and 2012, conducted 392 public education and interpretative programs focusing on cultural resources, which involved 17,833 people.

Nine federally recognized Tribes have lands or interests within the planning area. Tribal members express their demand and value for cultural resources in the ways they use and protect resources that have cultural importance to them. In some cases, uses are consumptive, as when Tribal members collect and consume wild plants as food or medicine. In other cases, uses are non-consumptive, as when accessing a location for ceremonial or sacred purposes. Tribes are also engaged in active management and protection of resources on BLM-administered lands (USDI BLM 2013).

Society also expresses demand for the protection of prehistoric and historic sites and artifacts through the laws and regulations passed to protect them, including the National Historic Preservation Act (which also created a Historic Preservation Fund to survey, document, and protect cultural resources), the Archeological and Historic Preservation Act, the Archaeological Resources Protection Act of 1979, and others (USDI National Park Service 2014).

Value

The economics literature includes studies that describe the economic importance of cultural meaning or sense of place. Some studies estimate values based on spending by visitors to cultural sites, other studies estimate the value people place on protecting cultural sites or heritage, even if they never plan to visit these locations. These studies also describe a site's resources or attributes that contribute to cultural meaning, such as uniqueness, historical significance, or spiritual meaning (Snyder *et al.* 2003, de la Torre (ed.) 2002, and Dümcke and Gnedovsky 2013). Given the challenges of estimating the economic value of an intangible such as cultural heritage or sense of place, these studies provide insights into the importance people and societies place on these resources, rather than into a precise measure of economic value.

Cultural meaning contributes to the overall economic value of the goods and services from BLM-administered lands, though it is not possible to characterize all aspects of cultural meaning in the monetary language of economics.

The net economic benefit of recreation captures the value of some aspects of cultural meaning, as the cultural importance of an activity may be mixed with its recreational value. For example, family members may visit the Cape Blanco Lighthouse because it is the oldest lighthouse in Oregon, and hike or picnic while there. It is difficult to parse out the value they attribute to their day of recreation versus their interest in the lighthouse; there may be a premium they would place on their experience compared to another destination, but there is no applicable research to determine what this premium is.

Similarly, the value people place on the existence of sensitive species, such as salmon and the northern spotted owl, may be supported or enhanced by the cultural meaning people ascribe to these species. The economic studies underlying the values reported in **Table 3-154** do not parse the cultural aspects of value from other reasons why people ascribe value to the existence of these species.

The non-market values reported elsewhere in this section also do not capture the value of the cultural meaning indigenous people derive from the natural environment. Across the Pacific Northwest, for example, the tribal way of life is intertwined with the ecosystem that supports the many resources Tribes have used for thousands of years. In many cases, the rhythm of life and social organization revolves around the annual life cycle of plants, animals, and fish found on BLM-administered lands. These relationships are impossible—and inappropriate—to capture with a monetary measure, but they are important to these groups' economic well-being. Cultural meaning is perhaps more valuable from an economic perspective than other resources because the resources that have cultural importance are irreplaceable.

Summary

Table 3-156 summarizes the economic value of goods and services reported in the sections above. The first group of goods and services represent those that are valued using market prices, and from which BLM receives revenue. The amount of revenue received in 2012 is shown in the table, along with estimates of market value if BLM revenue is based on a price other than the market price. The second group of goods and services BLM does not earn revenue from directly. Two of these are quantified using non-market methods of valuation: willingness to pay for recreation and the social cost of carbon. The others are not monetized, but likely have economic value as described in the sections above. The quantified estimates in the table represent different metrics for estimating value, including market revenue, consumer surplus and willingness to pay, and avoided costs. The two groups are not strictly comparable and their sum should not be interpreted as a total value. The monetary estimates capture only a part of the total economic value of the goods and services provided by BLM-administered lands because they do not include the value of goods and services that cannot be monetized given available data, such as source water protection, biodiversity, scenic amenities, and cultural meaning.

Table 3-156. Summary of economic value of goods and services derived from BLM-administered lands in western Oregon, 2012

Good or Service	Type of Valuation	Economic Value in 2012
Market-based Goods and Services		
Timber	Market Price, Harvest Value	$20.8 million
Special Forest Products	BLM Permit Fees, Market Price	BLM Revenue: $0.24 million; Market Value (Low) $4 million, Market Value (High) $45 million
Energy Production	Market Price	$0.032 million
Livestock Grazing	Congressionally Set Price, Market Price	$0.022 million Market Value (State) $0.14 million Market Value (Private) $0.27 million
Minerals	Market Price	$0.015 million
Non-market-based Goods and Services		
Recreation	Consumer Surplus, Willingness to Pay	$223 million
Carbon Storage	Social Cost of Carbon	$85 million
Source Water Protection	Qualitative	Not Monetized
Biodiversity and Sensitive Species	Qualitative	Not Monetized
Scenic Amenities	Qualitative	Not Monetized
Cultural Meaning	Qualitative	Not Monetized

Environmental Consequences

Timber

Table 3-157 shows the total harvest volumes under the alternatives and the Proposed RMP. The volumes include both the Allowable Sale Quantity (ASQ) and non-ASQ harvest. The total harvest volumes change over time because of changes in the amount of non-ASQ harvest (see the Forest Management section in this chapter for explanation of non-ASQ volume).

Table 3-157. Annual total* BLM harvest volumes (short log scale) over time

Alternative/ Proposed RMP	2023 Harvest Volume (MMbf)	2033 Harvest Volume (MMbf)	2043 Harvest Volume (MMbf)	2053 Harvest Volume (MMbf)	2063 Harvest Volume (MMbf)	2113 Harvest Volume (MMbf)
No Action	399.6	391.6	380.2	364.5	341.2	286.9
Alt. A	248.6	243.7	245.2	244.3	252.2	294.9
Alt. B	331.7	322.9	315.5	302.7	300.9	288.6
Alt. C	555.0	548.7	541.1	532.7	524.4	588.0
Alt. D	180.0	179.8	179.4	178.9	184.5	244.4
PRMP	277.5	270.7	265.1	253.7	252.0	236.1

* Annual totals shown are calculated from decadal averages of modeled harvest volumes

The harvest volumes in **Table 3-157** are derived from the vegetation modeling (**Appendix C**) that also provides several other measures useful in describing value differences among the alternatives and the Proposed RMP and effects on BLM districts. These include gross revenues, costs, and net revenues. Based on these data, the BLM calculated the net worth of the alternatives and the Proposed RMP. As a caution, the gross revenue figures include logging costs and BLM adjustments to sale costs so that they are only a proxy for the actual revenues (harvest value) that the government would receive.

The ten-year average of timber gross revenues would be highest for all periods under Alternative C, and lowest for all time periods under Alternative D (**Figure 3-130** and **Figure 3-131**). Gross revenues would be generally stable across the 10-year periods, although Alternatives A, B, and D would fluctuate similarly while the Proposed RMP and Alternative C would differ rising in the third and fourth decade respectively. For the first decade (2014–2023), total revenues would range from a low of approximately $843 million under Alternative D to a high of $2.8 billion under Alternative C (**Table 3-158**). Total gross revenues for the Proposed RMP would be slightly higher than under Alternative A. These variations result from the timing of harvests of high value timber versus low value thinning harvests, and differences in the costs of harvest techniques.

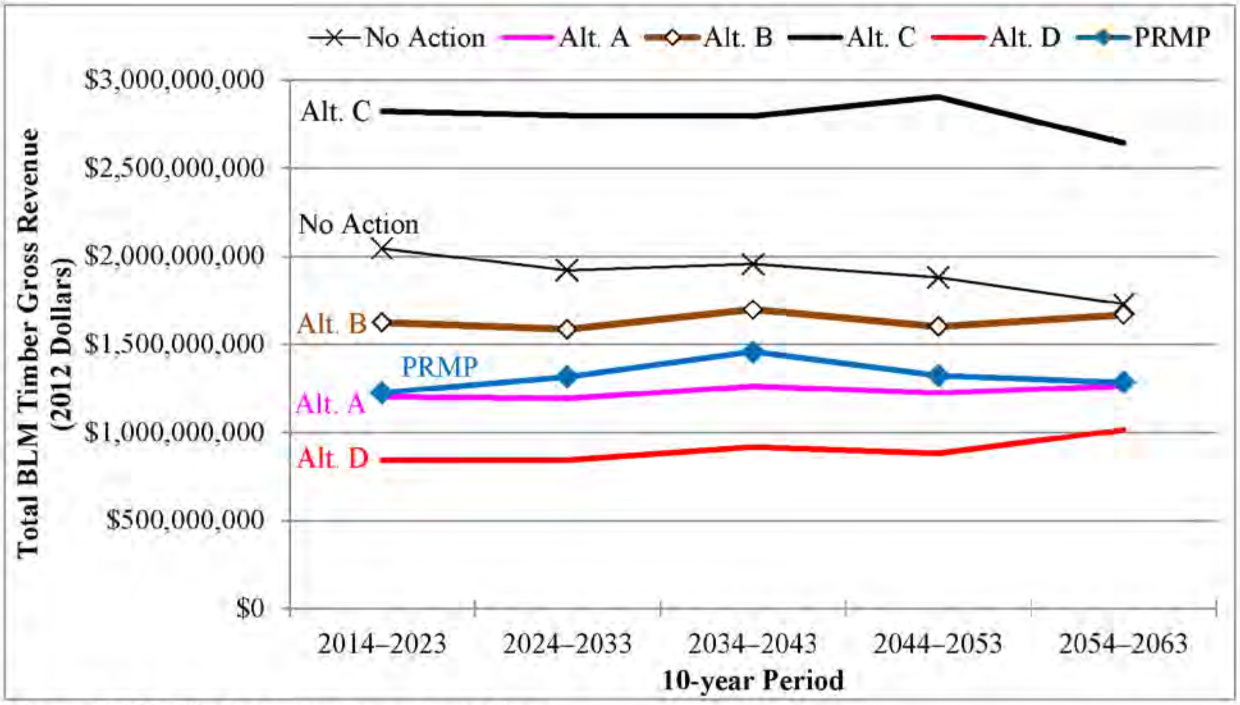


Figure 3-130. Timber gross revenue over time
Note: Year represents last year of 10-year period, and values are the 10-year sum
Source: Based on calculations using the Woodstock Model, 2012 dollars

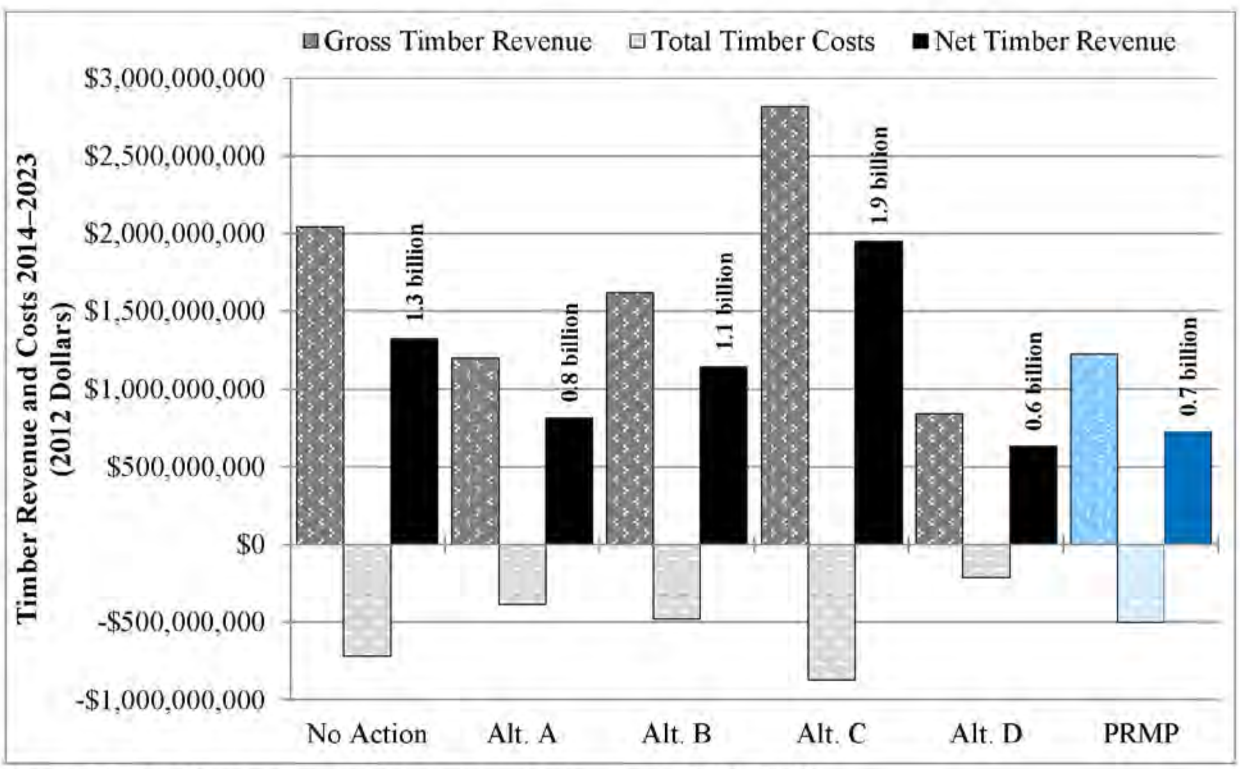


Figure 3-131. Gross revenue, total costs, and net revenue, 2014–2023
Source: Based on calculations using the Woodstock Model, 2012 dollars

Table 3-158. Gross revenue, total costs, and net revenue, 2014–2023 ($ Millions)

Alternative/ Proposed RMP	District/ Field Office	Gross Revenue Totals 2014–2023 (Millions)	Total Costs 2014–2023 (Millions)	Net Revenue Totals 2014–2023 (Millions)	Net Present Value Over 50 Years 2014–2063 (Millions)
No Action	Coos Bay	$370	$125	$245	$478
	Eugene	$426	$143	$283	$591
	Klamath Falls	$35	$18	$17	$41
	Medford	$470	$171	$299	$612
	Roseburg	$396	$142	$254	$522
	Salem	$345	$119	$226	$458
	Totals	**$2,042**	**$718**	**$1,324**	**$2,701**
Alt. A	Coos Bay	$226	$84	$143	$327
	Eugene	$285	$97	$188	$437
	Klamath Falls	$12	$1	$11	$24
	Medford	$203	$51	$152	$286
	Roseburg	$144	$51	$93	$182
	Salem	$330	$101	$229	$498
	Totals	**$1,200**	**$385**	**$815**	**$1,755**
Alt. B	Coos Bay	$236	$91	$145	$307
	Eugene	$381	$133	$248	$574
	Klamath Falls	$30	$4	$26	$54
	Medford	$322	$36	$286	$557
	Roseburg	$221	$78	$142	$300
	Salem	$432	$137	$295	$637
	Totals	**$1,622**	**$479**	**$1,142**	**$2,428**
Alt. C	Coos Bay	$533	$178	$355	$724
	Eugene	$742	$237	$505	$1,150
	Klamath Falls	$39	$14	$25	$55
	Medford	$364	$85	$279	$558
	Roseburg	$480	$155	$324	$647
	Salem	$662	$200	$462	$1,016
	Totals	**$2,821**	**$871**	**$1,950**	**$4,151**
Alt. D	Coos Bay	$103	$30	$73	$171
	Eugene	$210	$45	$164	$391
	Klamath Falls	$20	$7	$13	$29
	Medford	$155	$31	$124	$227
	Roseburg	$110	$31	$79	$166
	Salem	$244	$68	$177	$422
	Totals	**$843**	**$212**	**$630**	**$1,406**
PRMP	Coos Bay	$141	$57	$84	$182
	Eugene	$327	$121	$206	$505
	Klamath Falls	$24	$12	$12	$26
	Medford	$211	$107	$104	$228
	Roseburg	$179	$85	$95	$206
	Salem	$341	$118	$222	$539
	Totals	**$1,224**	**$501**	**$723**	**$1,686**

Costs and net revenue correspond proportionally to the alternatives and the Proposed RMP. For example, Alternative C would have the highest gross and net revenues, while Alternative D would have the least (**Figure 3-131**). Net revenues for the 2014 to 2023 period would be approximately $630 million under Alternative D, and approximately $2 billion under Alternative C. Gross revenue under the Proposed RMP would be approximately $1.2 billion (i.e., falling between Alternatives A and B).

The discounted net present value of the alternatives and the Proposed RMP for the 50-year period (2014 to 2063) (i.e., the value if all the revenue were realized in 2012) would range from approximately $1.4 billion under Alternative D to approximately $4.1 billion under Alternative C (**Table 3-158** and **Figure 3-132**). Under the Proposed RMP, the net present value would be approximately $1.7 billion. The net present value would be largest for the Salem District under Alternatives A, B, and D, and largest for the Eugene District under Alternative C. The net present value under the Proposed RMP would be largest for the Salem District, followed by the Eugene District.

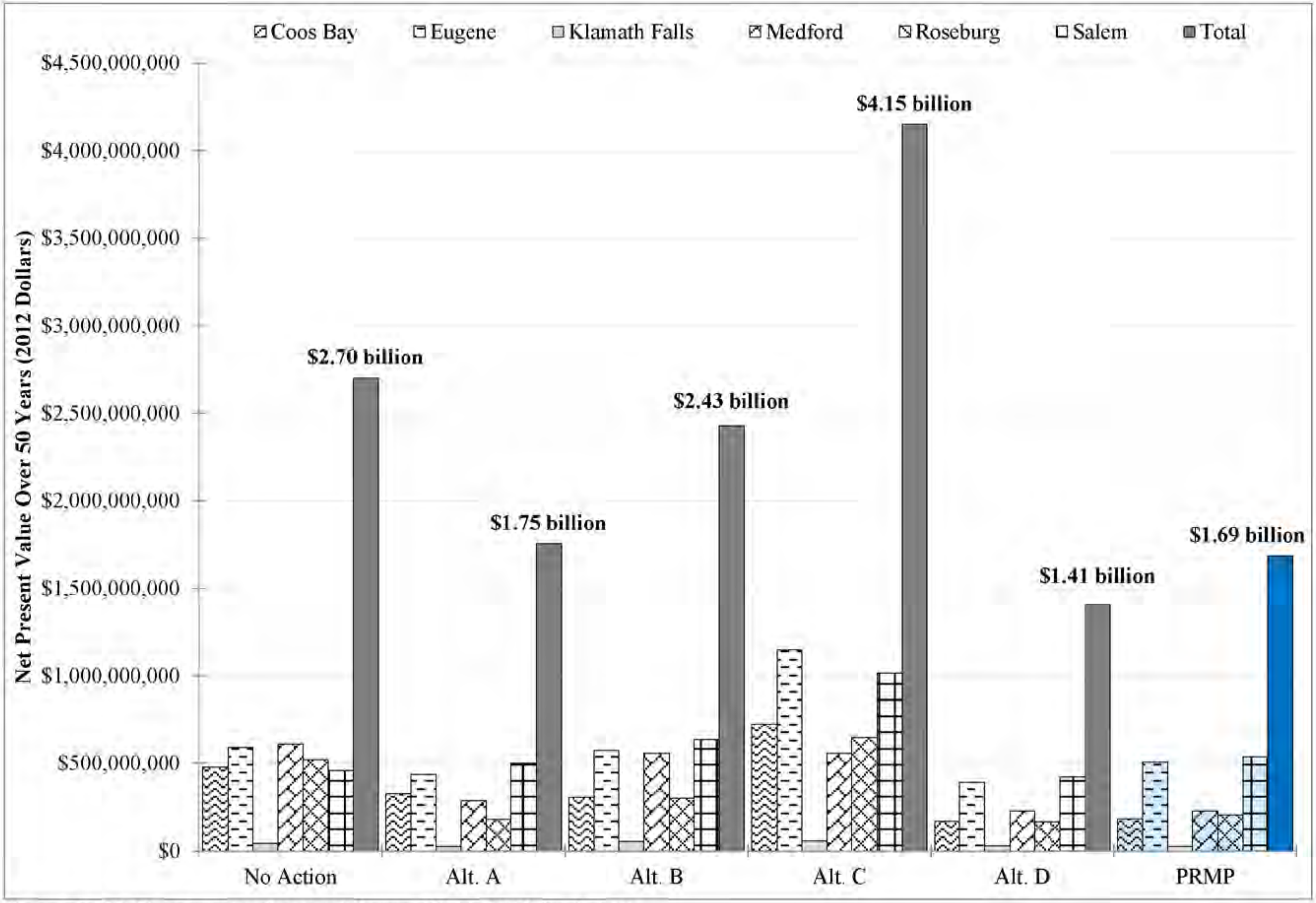


Figure 3-132. Net present value over 50 years (2014–2063) by district

Note: The values are in base 2012 dollars using a discount rate of 4 percent

The Forest Management section in this chapter details the differences in value of logs harvested in terms of grade over time, by alternative and the Proposed RMP. These differences help explain the differences in net present value among the alternatives and the Proposed RMP. Alternative C would have its highest value harvests early in the timeframe, while Alternative D would have its highest value harvests at the end of the timeframe. The Proposed RMP, like Alternatives B and D, would maintain a higher proportion of higher-grade harvest over time compared to Alternatives A and C. Discounting results in more heavily weighing benefits in the present than in the future.

Logging costs per thousand board feet (Mbf) would vary by district and by alternative and the Proposed RMP (**Figure 3-133**). These costs would change as harvest prescriptions differ and the biggest difference being the extent of thinning versus regeneration harvests. Costs in the Klamath Falls Field Office would be particularly low during the first time period relative to other districts under Alternatives A and B, and more in line with other districts under Alternatives C and D. In contrast, the Coos Bay District would have the highest costs per unit, but would be approximately $40 lower per Mbf under Alternative D. Across all districts, in the first five decades; Alternatives B and D would have the highest per unit costs; Alternative A would have the lowest. Among the alternatives and the Proposed RMP, Alternative D would have the lowest gross revenues, costs, and net revenues (**Figure 3-133**). Costs per unit would be greater under the Proposed RMP than under the alternatives during the first decade, particularly in the southern districts.

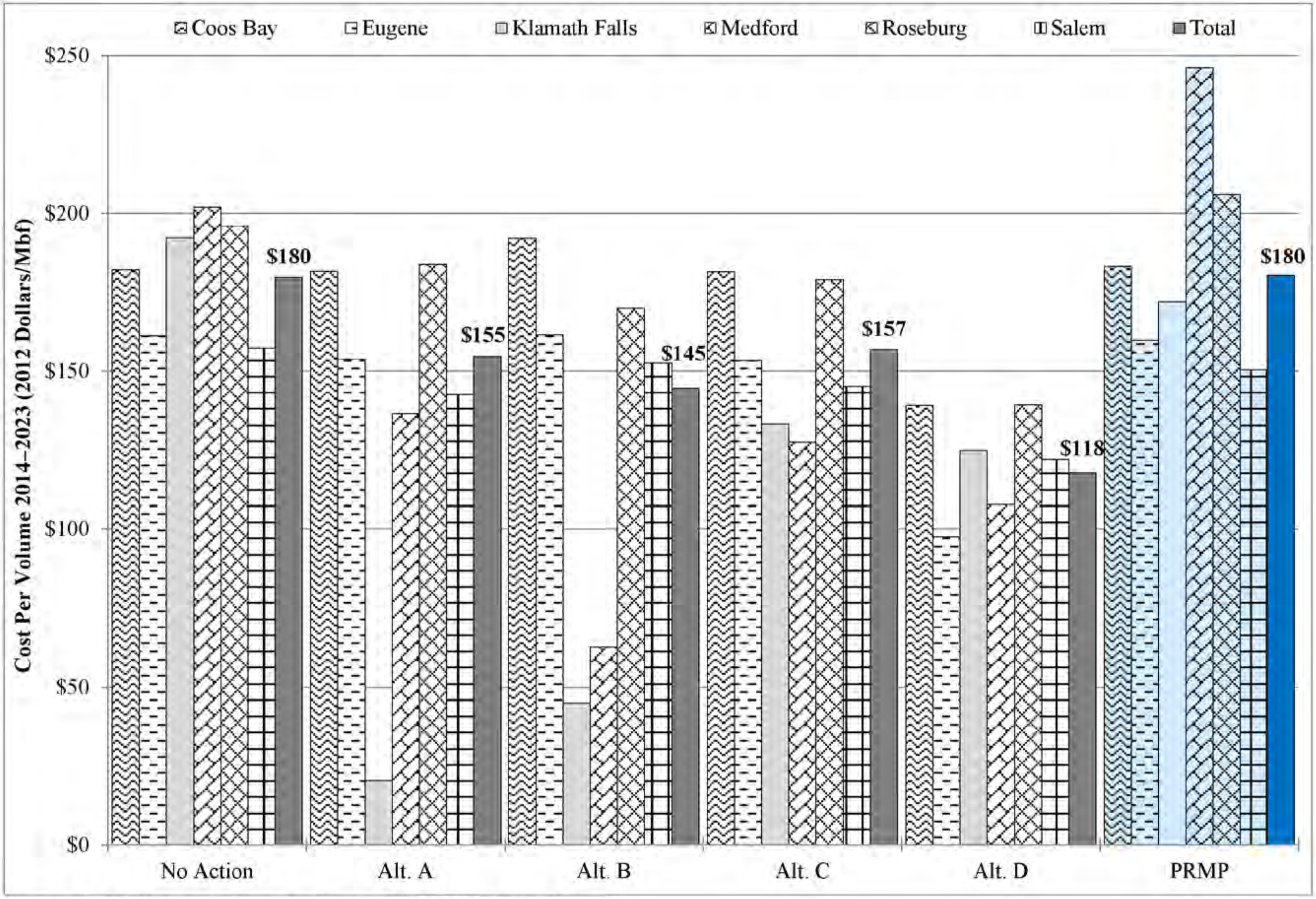


Figure 3-133. Cost per volume by district, 2014–2023 (2012 dollars)
Note: Costs are in short log units

Stumpage prices (the value of standing timber) for the first decade would be lowest for the Klamath Falls Field Office and highest on average for the Medford District (**Figure 3-134**). The Roseburg District would have the highest prices under Alternative C. Alternative C would have the highest overall stumpage prices ($324/Mbf) averaged across all districts, and the Proposed RMP would have the lowest ($246/Mbf). The BLM projects that stumpage prices would rise back to their long-term trend levels by 2018 and afterwards rise at their long-term real rate of increase of 0.23 percent (see Value discussion in Affected Environment). Stumpage prices would differ among alternatives and the Proposed RMP and across time as a function of changes in the mix of log grades and average logging costs. Log mixes change over time, both as a function of timber inventory changes and the differences in prescriptions for harvest, such as oldest first and extent of thinning.

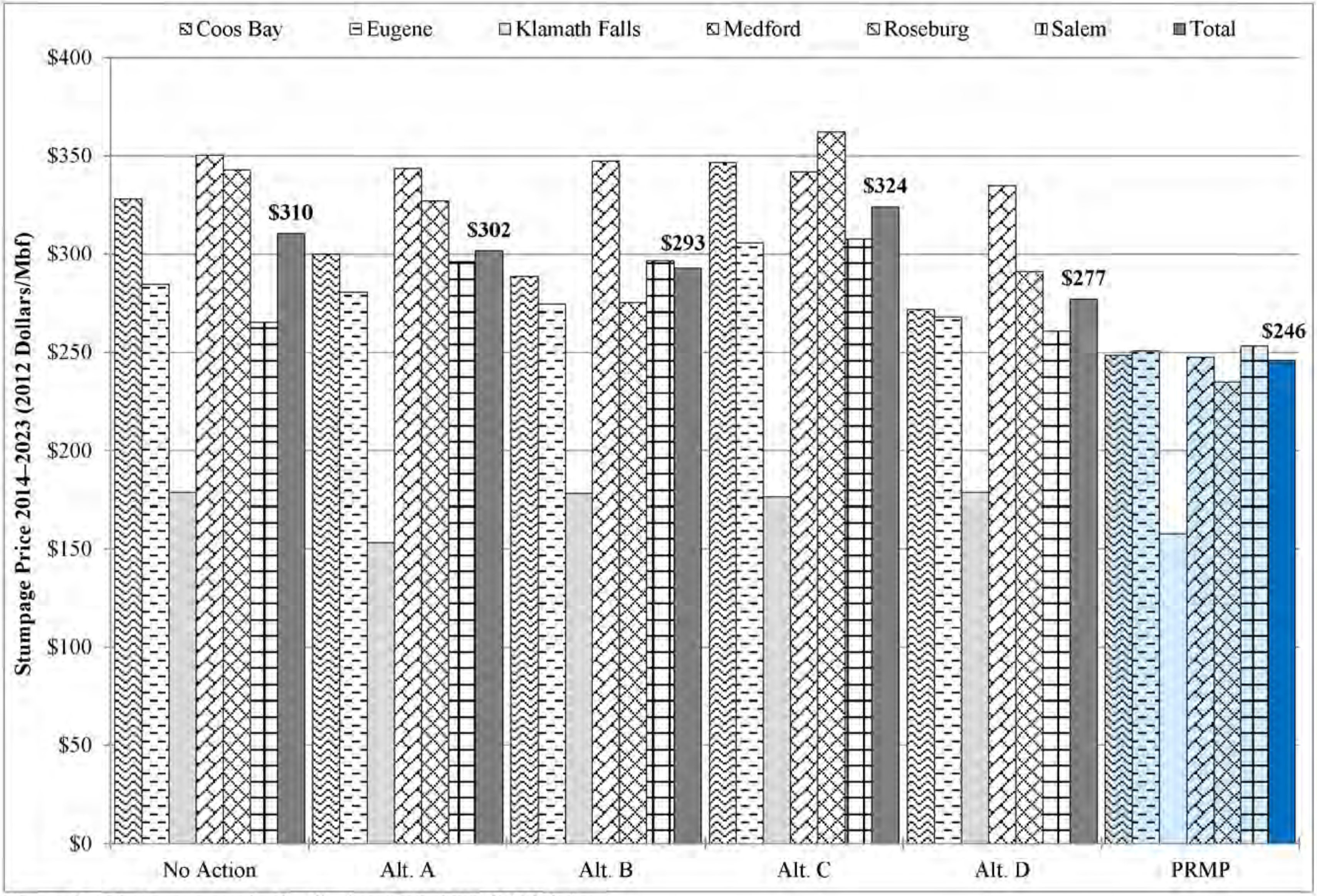


Figure 3-134. Stumpage price by district, 2014–2023 (2012 dollars)
Note: Prices are in short log units

The differences in log grade composition help explain the variation in market value of timber harvests by alternative and the Proposed RMP. Grade 1 contains logs that are generally saw logs or peelers. As such, they represent the highest value log mix and proportional changes in that mix are reflected in differences in stumpage prices both over time and among alternatives and the Proposed RMP (**Table 3-159**). **Table 3-160** shows the differences in proportion of Grade 1 logs by alternative over time. Among the alternatives and the Proposed RMP, Alternative C would have the largest share of Grade 1 logs early in the harvest timeframe, declining to nearly the lowest share by the end of the timeframe. This is reflected in the stumpage price for Alternative C, which would be the highest in the first decade across the alternatives and the Proposed RMP, and would decrease to one of the lowest in 2113. Conversely, Alternative D would have one of the lowest proportions of Grade 1 logs early in the timeframe, and some of the lowest average stumpage prices in the first few decades of the analysis, but would have the highest proportion of Grade 1 timber and stumpage prices at the end of the analysis period.

Table 3-159. Timber stumpage prices over time

Alternative/ Proposed RMP	2023 (Dollars)	2033 (Dollars)	2043 (Dollars)	2053 (Dollars)	2063 (Dollars)	2113 (Dollars)
No Action	$310.4	$287.8	$309.7	$311.8	$302.3	$317.4
Alt. A	$301.6	$300.6	$312.1	$300.2	$306.8	$264.8
Alt. B	$292.9	$283.6	$314.4	$308.1	$337.9	$350.2
Alt. C	$324.0	$323.4	$320.7	$339.8	$309.3	$264.8
Alt. D	$277.0	$271.7	$295.7	$284.8	$332.3	$351.1
PRMP	$245.9	$273.7	$320.4	$304.8	$297.2	$303.4

Table 3-160. Timber Grade 1 proportion over time

Alternative/ Proposed RMP	2023 (Percent)	2033 (Percent)	2043 (Percent)	2053 (Percent)	2063 (Percent)	2113 (Percent)
No Action	24%	16%	16%	12%	10%	14%
Alt. A	15%	14%	6%	8%	8%	1%
Alt. B	18%	10%	6%	6%	12%	18%
Alt. C	21%	19%	12%	9%	9%	2%
Alt. D	13%	12%	7%	8%	18%	21%
PRMP	13%	8%	6%	8%	9%	15%

Log grade explains some of the variation in market value over time and by alternative and the Proposed RMP, but it is not the whole story. Under the Proposed RMP, stumpage prices would be lower during the early decades and would rise relative to the alternatives through 2043. This reflects lower Grade 1 timber and higher logging costs initially, and an increasing value of timber harvests over time. Logging costs do not fluctuate with log grade as dramatically as stumpage prices, but, rather, primarily reflect the different harvest practices by alternative and the Proposed RMP, such as extent of thinning versus regeneration harvest for a site. These trends are important to recognize, but are not adequately captured in the first-decade (2014-2023) analysis reported in **Table 3-158**; this analysis is essentially a snapshot in time. Furthermore, although the net present values shown in the final column of **Table 3-158** reflect the entire period of analysis, they obscure these trends because they diminish the relative importance of later harvest values to earlier harvest values (because value generated in the final decades of analysis is more heavily discounted back to 2012 dollars, compared to value generated in the early decades of analysis).

Table 3-161 shows total harvest values computed as the product of the harvest quantities from **Table 3-157** and the stumpage prices from **Table 3-159**. These represent estimates of returns to the government derived from timber harvested from BLM-administered lands in western Oregon and may be compared to the harvest values in **Table 3-143** particularly the $20.8 million in 2012. The estimates for the alternatives and the Proposed RMP would be considerably higher than the value in 2012, because both timber harvest volumes and values would be higher under the alternatives and the Proposed RMP than occurred in 2012.

Table 3-161. Total annual average harvest values (millions) for selected decades by the alternatives and the Proposed RMP, 2023–2113 (2012 dollars)

Alternative/ Proposed RMP	2023 ($ Millions)	2033 ($ Millions)	2043 ($ Millions)	2053 ($ Millions)	2063 ($ Millions)	2113 ($ Millions)
No Action	93.0	84.5	88.3	85.2	77.4	68.3
Alt. A	56.2	54.9	57.4	55.0	58.0	58.6
Alt. B	72.9	68.7	74.4	69.9	76.3	75.8
Alt. C	134.9	133.1	130.1	135.8	121.7	116.8
Alt. D	37.4	36.6	39.8	38.2	46.0	64.3
PRMP	51.2	55.6	63.7	58.0	56.2	53.7

Market Impacts of Changes in BLM Harvests

The above discussion of the effects of changes in BLM harvests does not take into account the potential responses of other non-BLM timberland owners.[94] In the case of increases in BLM harvests, there would be reductions in private harvests as timberland owners adjust their harvest downwards as prices fall. Both of these results could reduce the potential job and revenue expectations from increases in the BLM harvest (as presented under Issue 2 Environmental Effects). For example, the BLM might expect the full employment effects associated with an increase in harvest, but the net change in employment would be reduced by reductions in private harvests. At the same time, expected revenues would be less than expected, as stumpage prices are reduced by the net increase in harvest volumes.

The BLM estimated the expected economic responses to increases in timber supply associated with increases in BLM timber harvests using a model of western Oregon timber markets (**Table 3-162**). Please note that this table is in long log scale, the common log scale in western Oregon. **Appendix P** includes a detailed description of the model. The calculations in the analysis assumed full implementation of timber harvests during the first decade of the alternatives and the Proposed RMP prior to the mid-point of that decade.

[94] There are four broad types of timberland ownerships: U.S. Forest Service; other public, which in western Oregon includes the BLM, the State of Oregon, and various counties; timber industry; and non-industrial private forests.

Table 3-162. Market effects on other timberland owners by BLM harvest in 2018 (2012 dollars), long log scale

Alternative/ Proposed RMP	BLM Harvest Volume (MMbf)	BLM Harvest Change Relative to 2012 (MMbf)	Stumpage Price (Per Mbf) (Resulting from Alternatives/ Proposed RMP)	Total Western Oregon Harvest (All Producers) (MMbf)	Stumpage Price Difference (Per Mbf), Alternatives/ Proposed RMP vs. 2012 Reference Data	Change in Total Western Oregon Harvest (MMbf) Alternatives/ Proposed RMP vs. 2012	Change in Stumpage Price, Alternatives/ Proposed RMP vs. 2012 (Percent)	Change in Harvest Volume, Total Western Oregon Harvest (Percent)	Estimated Change in Private Harvest (MMbf)*
Reference Data (2012)	144.3	-	$177.3	3,354.2	-	-	-	-	-
No Action	281.0	136.7	$168.2	3,453.0	$-9.1	98.8	-5%	3%	-37.9
Alt. A	172.4	28.1	$175.4	3,374.5	$-1.9	20.3	-1%	1%	-7.8
Alt. B	230.2	85.9	$171.6	3,416.2	$-5.7	62.1	-3%	2%	-23.8
Alt. C	390.9	246.7	$160.9	3,532.5	$-16.4	178.3	-9%	5%	-68.4
Alt. D	123.9	-20.4	$178.6	3,339.5	$1.4	-14.7	1%	<-1%	5.6
PRMP	184.6	40.3	$174.6	3,383.4	$-2.7	29.1	-2%	1%	-11.2

* BLM harvest change relative to 2012 minus change in total western Oregon harvest

Notes: The price per Mbf is based on actual market prices, see **Table 3-143**. These prices are lower than the stumpage values used in the vegetation modeling, see **Table 3-159** and discussion.

The model expresses volumes and prices in long log scale. In short log scale, the changes in BLM harvests and prices are as shown in **Table 3-163**.

Table 3-163. Harvests and prices in short log scale

Alternative/ Proposed RMP	Harvest (MMbf)	Price (Dollars Per Mbf)*
No Action	399.6	$118.3
Alt. A	248.6	$121.7
Alt. B	331.7	$119.1
Alt. C	555.0	$113.3
Alt. D	180.0	$123.0
PRMP	277.5	$114.8

* Prices are in 2012 dollars and converted from long to short log scale using a conversion factor of 1.435

Under the alternatives and the Proposed RMP (other than Alternative D), the BLM harvest would increase relative to 2012 levels, between 28 and 247 MMbf. This upward shift in the supply curve would lead to lower stumpage prices (between 1–9 percent) and reductions in private harvests (between approximately 8 and 68 MMbf), as timberland owners adjust their harvest downwards as prices fall. For example, under the Proposed RMP, stumpage prices would fall by $2.70 (2012 dollars) per thousand board feet (2 percent), while the total western Oregon harvest would expand by approximately 29 MMbf (1 percent), as private timberland owners would reduce their harvest by approximately 11.2 MMbf. Both of these effects would reduce the potential expectations for an increase in BLM harvest. The BLM considered this likely market reduction effect in the economic activity analysis (jobs and earnings) below in Issue 2.

These results illustrate the extent that private timberland owners respond to changes in stumpage prices associated with the increased changes in BLM harvest flows. The drop in stumpage prices may also lead to lower expectations about timber as a capital asset among private timberland owners and reduced market incentives for practices that contribute to sustained yield management.

Markets are constantly changing, and once a change is introduced in one region, timberland owners, producers, and consumers in other regions all react to those changes, reducing the impacts in the first region as production changes in other regions. Analysis of the time dimension of these market impacts suggest that they diminish over the following decade, so that market adjustments are only prevalent in the first two decades of any projections.[95]

Recreation and Visitation

The alternatives and the Proposed RMP define differences in areas designated and developed for recreation purposes, in some cases targeted at one or more specific activities such as mountain biking or OHV use. Variation in total acreage in Recreation Management Areas (RMAs) would be substantial, as Alternative A in total would have approximately 12 percent of the area under Alternative B[96] (**Table 3-164**). Alternative C would be approximately 2.5 times the area of Alternative B, and Alternative D would be 4 times Alternative B. The Proposed RMP RMA acreages would fall between Alternatives C and D and would be approximately 3 times the area of Alternative B. Acreages in the individual districts would follow these area-wide orderings by alternative and Proposed RMP, although, while the Klamath Falls Field Office would have the most acreage under Alternative B, Medford would have the most acreage among all other alternatives and the Proposed RMP. The Recreation and Visitor Services section contains more detail on the differences in the RMAs.

Table 3-164. BLM Recreation Management Area acres

District/ Field Office	No Action* (Acres)	Alt. A (Acres)	Alt. B (Acres)	Alt. C (Acres)	Alt. D (Acres)	PRMP (Acres)
Coos Bay	6,614	468	6,614	15,258	21,358	23,542
Eugene	20,511	104	20,511	24,212	34,968	24,139
Klamath Falls	69,470	612	69,470	97,293	216,135	92,643
Medford	32,065	17,199	32,065	181,992	267,404	244,815
Roseburg	6,984	167	6,984	41,496	42,915	20,895
Salem	28,648	1,515	28,648	56,566	84,371	85,008
Totals	**164,292**	**20,065**	**164,292**	**416,817**	**667,151**	**491,042**

* Under the No Action alternative, all BLM-administered lands in the decision area are allocated to RMAs, and the management of RMAs described in the 1995 RMPs differs from current definitions and policy. Alternative B represents an approximate continuation of the current recreation management, but consistent with current definitions and policy for RMAs.
Note: Acreages include all RMAs, both Special and Extensive.

[95] For examples of this diminishing price effect of changes in harvest, see Table 41 in Haynes *et al.* 2007. The USDA FS 2005 RPA timber assessment update. Gen. Tech. Rep. PNW-GTR-699. Portland. OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 212 p.

[96] Under the No Action alternative, all BLM-administered lands in the decision area are allocated to RMAs, and the management of RMAs described in the 1995 RMPs differs from current definitions and policy. Alternative B represents an approximate continuation of the current recreation management, but consistent with current definitions and policy for RMAs. Therefore, the economic benefits of RMA management under Alternative B best approximates the economic benefits under the No Action alternative.

An important differentiator among the alternatives and the Proposed RMP is designation of some RMAs for exclusion of particular recreation activities, for example, excluding activities such as public motorized vehicle use that might disrupt other activities such as hiking. Alternative A would result in the least acres and Alternative D would result in the most acres closed for various recreation activities (**Table 3-165**). The Proposed RMP would result in the second-most acres closed for various recreation activities. The closures identify areas that would be designated for more rustic and natural recreation opportunities. The primary activities targeted for closures would be recreational target shooting, followed by OHV use. Closure acreages generally correspond proportionally to RMA total acreages by alternative and the Proposed RMP. By increasing the quality of specific activities of high demand in specific areas, the BLM can create conditions that lead to increased quantity and quality and consequent value of outdoor recreation activity at specific RMAs. The response would be context specific, based on demand and substitute opportunities.

Table 3-165. Recreation opportunities, acres restricted (activity excluded) within the RMAs

Exclusion Type	No Action (Acres)	Alt. A (Acres)	Alt. B (Acres)	Alt. C (Acres)	Alt. D (Acres)	PRMP (Acres)
Total RMA acres	**164,292**	**20,065**	**164,292**	**416,817**	**667,151**	**491,042**
Equestrian Use	8,828	1,048	8,828	49,414	63,620	31,102
Hiking	1,511*	-	1,511*	25,144 (2,924*)	41,907 (2,924*)	1,157*
Mountain Bicycling	13,814	1,248	13,814	57,490	75,402	84,907
Off-Highway Vehicle Use	49,969	17,517	49,969	87,261	105,474	38,313
Overnight Camping	18,006	829	18,006	60,205	66,611	32,389
Recreational Target Shooting	41,681	18,236	41,681	66,407	135,464	164,752

* These acres of the total shown for restricted hiking acres would have seasonal restrictions applied to the trail systems. All other acre restrictions would prohibit or otherwise condition hiking year-round.
Note: This table uses the acres in Alternative B as the best approximation for the No Action alternative.

Both acreage and trail mileage are important characteristic for recreation areas. The RMAs do not specifically define trail miles, but extrapolating from available trail miles per acre of RMA under current conditions allows an approximation of the number of trail miles that would be available under the alternatives and the Proposed RMP. Currently, there are approximately 395 miles of identified trail miles on BLM-administered lands in western Oregon. This mileage could increase to approximately 1,400 miles under Alternative C, or to 2,000 miles under Alternative D. Under the Proposed RMP, there would be approximately 1,700 miles, which is more than 4 times the current trail mileage. (**Table 3-166**). Some RMAs would be more conducive to higher or lesser trail densities.

Table 3-166. Potential trail miles in RMAs

District/ Field Office	No Action (Miles)	Alt. A (Miles)	Alt. B (Miles)	Alt. C (Miles)	Alt. D (Miles)	PRMP (Miles)
Coos Bay	35	2	35	81	114	125
Eugene	46	-	46	54	78	54
Klamath Falls	29	-	29	42	92	40
Medford	146	79	146	831	1,221	1,103
Roseburg	39	1	39	230	238	116
Salem	100	5	100	197	294	296
Totals	**395**	**88**	**395**	**1,435**	**2,037**	**1,734**

Note: This table uses the acres in Alternative B as the best approximation for the No Action alternative.
Source: USDI BLM, estimated from trail densities by district.

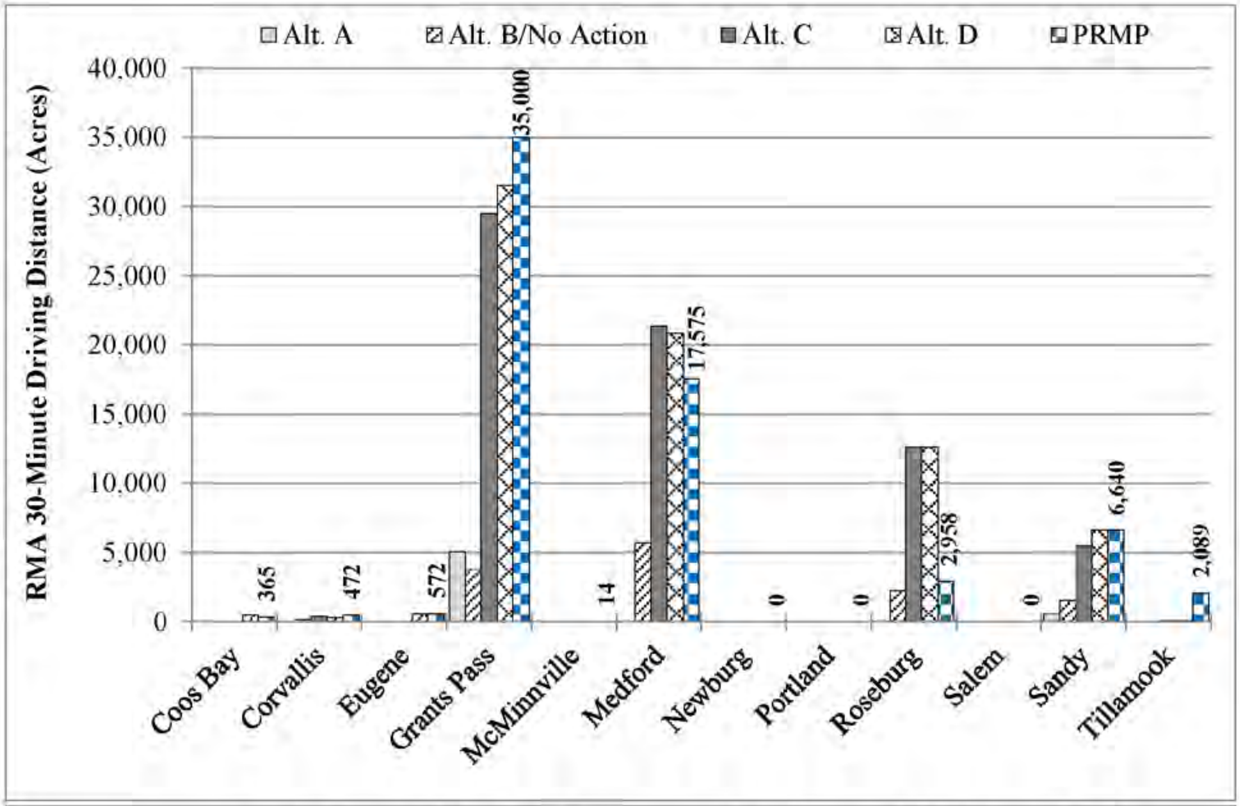
Demand for recreation determines the value for the recreation designations by alternative and the Proposed RMP. That is, if there is no demand, there is no participation and use, and therefore there is no recreation value. Demand for outdoor recreation, as discussed earlier, relates particularly to individual preferences, proximity, and accessibility. Recreation opportunities that are close to population centers experience the most participants and visitor-days, and consequently the most value, all else equal. While many factors can lead to variation in value of a visitor-day, the number of visitor-days is the primary factor the BLM utilizes to estimate the economic value of recreation areas. Accessibility and congestion are two fundamental factors that, when they improve, will improve the quality and therefore value of a visitor-day. Focusing on elements of RMA designation that are close to communities, thereby increasing the availability and accessibility of recreation opportunities while reducing congestion provides the most fundamental basis for estimating increases in value. The increase in value can manifest as both higher value for visits that would have occurred anyway, as well as increased visitor-days. Focusing on opportunities close to communities provides the strongest basis for estimating increases in value, and therefore, potentially, an underestimate by not including visitation outside of those community proximities.

When considering the RMA acreages under the alternatives and the Proposed RMP in terms of proximity to the 12 study communities in western Oregon, the overall acreage accessible within 30-minute and 60-minute driving distances under each alternative and the Proposed RMP track with their overall RMA acreage (**Table 3-167**). Moving out from 30-minute to 60-minute driving distances increases the accessible recreation area by more than double, and increases to 5- or 6-fold under Alternatives B, C, and D, and the Proposed RMP. The Proposed RMP would increase the RMA acreage within 30-minute driving distances more than any alternative, and would increase the RMA acreage within 60-minute driving distances more than any alternative except Alternative D. While all districts would see increased RMA acreage with increased total RMA acreage progressively from Alternative A through D, the communities of Grants Pass and Medford would experience the highest increase in accessible RMA acreage under Alternatives C and D and the Proposed RMP (**Figure 3-135**).

Table 3-167. RMA acreage by driving distance from population centers in western Oregon*

Drive-Time	No Action (Acres)	Alt. A (Acres)	Alt. B (Acres)	Alt. C (Acres)	Alt. D (Acres)	PRMP (Acres)
30-Minute	12,473	5,849	12,473	52,232	56,814	61,125
60-Minute	60,893	13,070	60,893	252,005	311,855	267,776

* Major population centers include Coos Bay, Corvallis, Eugene, Grants Pass, McMinnville, Medford, Newberg, Portland, Roseburg, Salem, Sandy, and Tillamook.
Note: The table uses Alternative B as the best approximation for the No Action alternative.



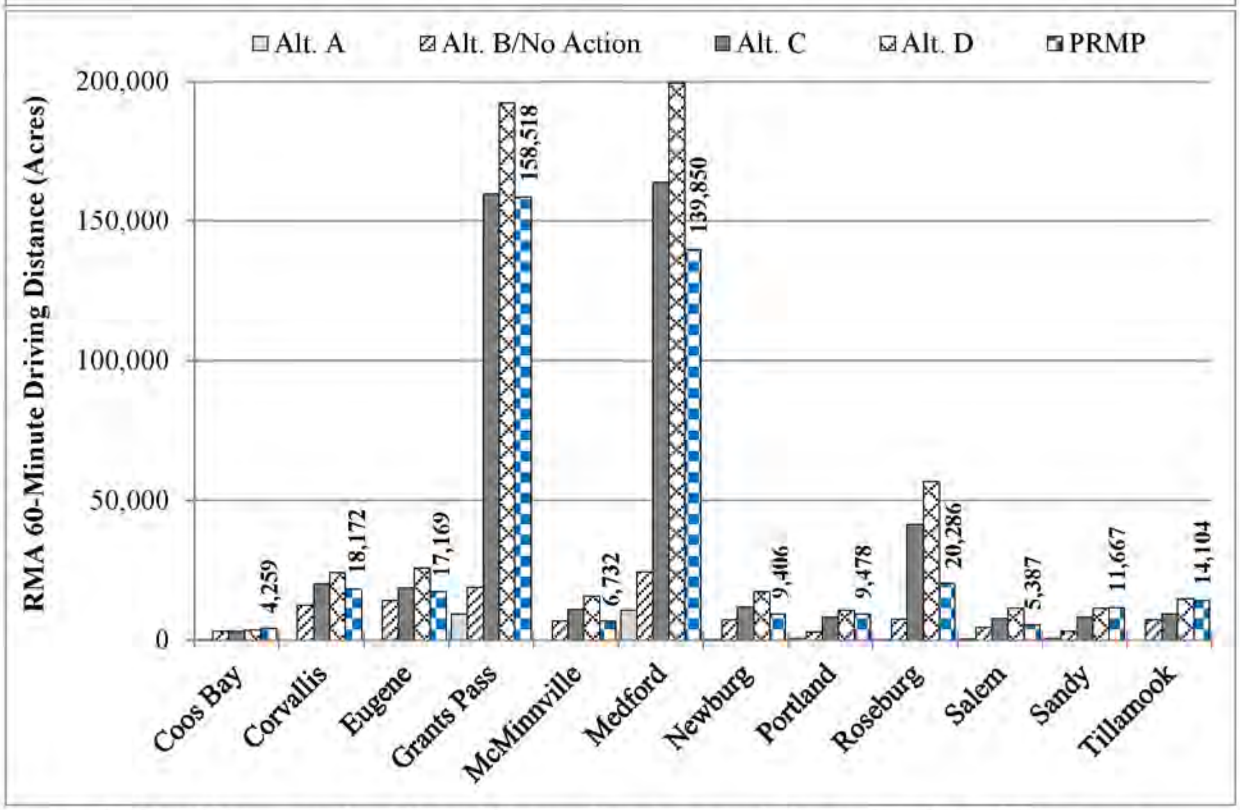


Figure 3-135. RMA acreage by driving distance of western population centers, 30 and 60 minutes

The increases in RMA acreage would elicit increased visitation according to the demand responsive measures applying the elasticity estimate described in Analytical Methods and in **Appendix P**. Furthermore, the increased visitation would be phased in for the alternatives and the Proposed RMP with substantial increases in RMA acreage with the phased-in increase in recreation opportunities described in Analytical Methods. This increase in demand over time would be in addition to increased demand based on forecast trends and population growth described under Affected Environment.

Table 3-140 in the Recreation and Visitor Services section in this chapter and **Table P-4** in **Appendix P** provide estimates for outdoor recreation visits under the alternatives and the Proposed RMP.

Applying the RMA acreage, historical visitation rates, the demand response model results, and the long-term trends in visitation, the BLM estimated alternative-specific and district-specific visitation for locals and non-locals under the alternatives and the Proposed RMP. **Figure 3-136** shows the estimated changes in visitation under the alternatives and the Proposed RMP over the 20-year and 50-year planning timeframes. Recreational use would increase most quickly under the 20-year implementation scenarios (dotted lines versus solid lines), and would be highest under Alternative D and lowest under Alternative A. **Figure 3-137** shows the final breakdown of visits in 2062 upon full implementation of increases in recreation opportunities associated with increased RMA acreage by district and separated between local and non-local participants, as well as non-primary visits. As noted under Analytical Methods, non-primary visits are visits associated with some other primary activity and consequently not included in market impact estimates under Issue 2. Under the Proposed RMP, the Medford District would experience the most visits, followed by the Salem District. Visits in the Medford District would be particularly dominated by local residents in comparison to other districts.

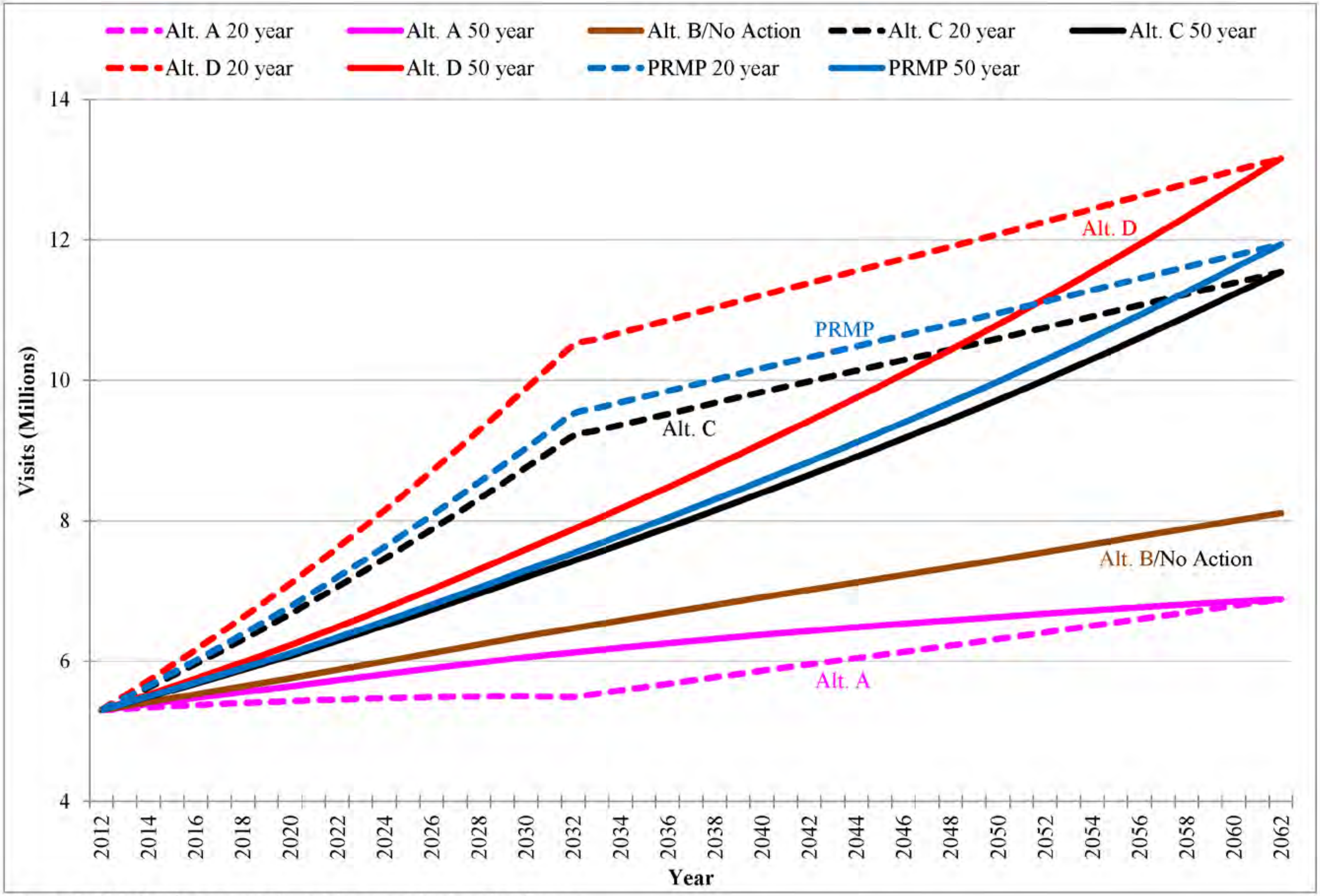


Figure 3-136. Outdoor recreation visits over phasing timeframes

Note: Figure assumes implementation of increased recreation opportunities and associated demand response over 20–50 year timeframes

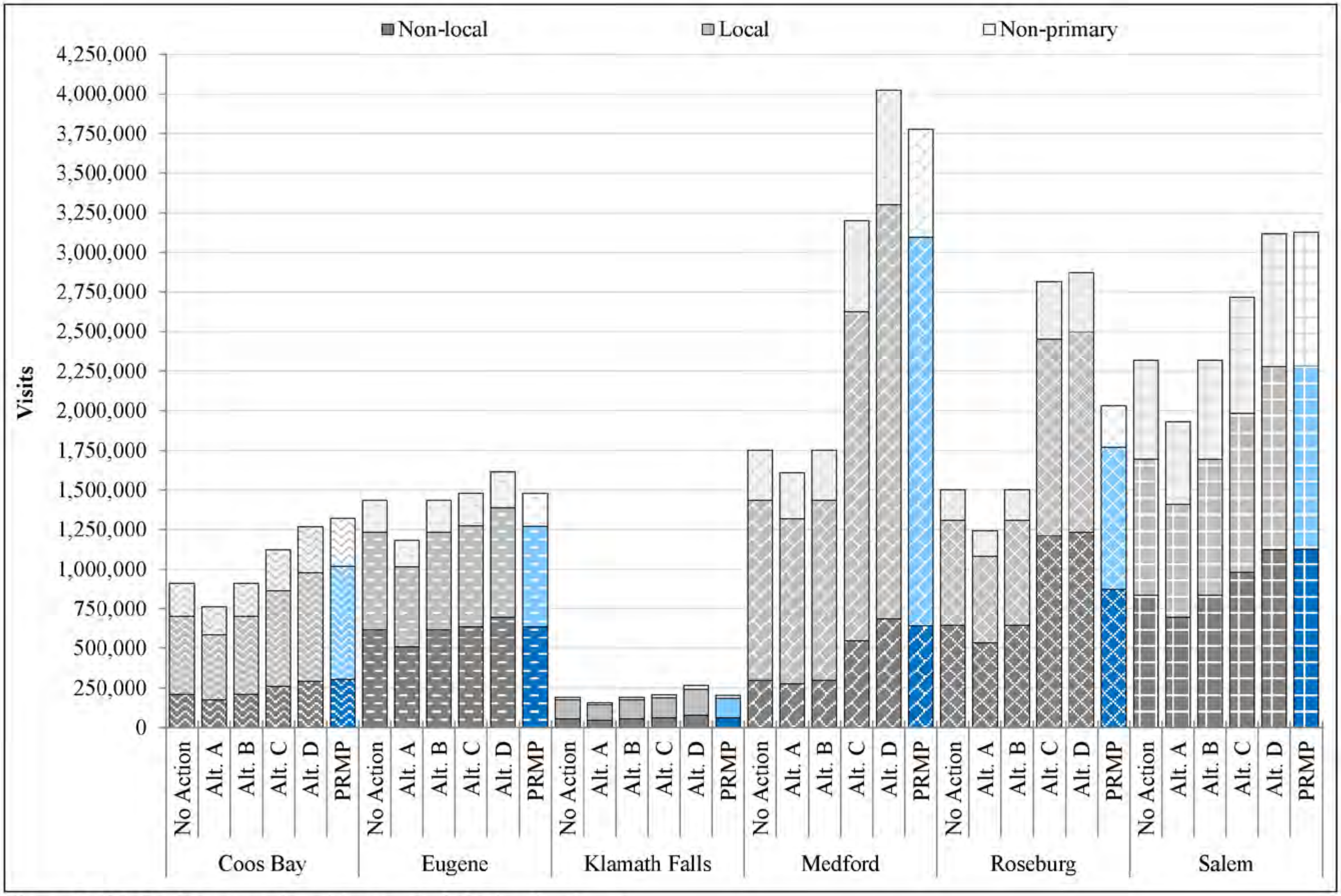


Figure 3-137. Outdoor recreation visits at end of phasing timeframes

Note: The figure assumes completed implementation of new RMA acreage and associated demand response over the 20- or 50-year timeframes.

The BLM applied the forecasted future increases in activity-specific participation based on trends and demand response to changes in RMA acreage through the year 2062. The increases in the number of visits would proportionally increase the total value of visits. Applying the mean activity-specific consumer surplus values from **Table 3-146**, the BLM estimated the value to recreation participants under the alternatives and the Proposed RMP in **Table 3-168**. Summing the annual values discounted at 4 percent starting in 2014 for 50 years results in over $5 billion in consumer surplus value under Alternative B, and up to over $8 billion under Alternative D **(Table 3-168)**. Under the Proposed RMP and the phasing assumptions, total consumer surplus in 2023 would range from $271 to $311 million. The faster the BLM would increase recreation opportunities associated with increased RMA acreage, the greater the would be the economic value provided by BLM-administered lands in terms of outdoor recreation in 2023 under Alternatives C and D and the Proposed RMP.

Table 3-168. Consumer surplus value projections, 2023 and net present value 2013–2062 (millions of 2012 dollars)

Activity	No Action	Alt. A		Alt. B	Alt. C		Alt. D		PRMP	
	Baseline (Millions)	20-year (Millions)	50-year (Millions)	Baseline (Millions)	20-year (Millions)	50-year (Millions)	20-year (Millions)	50-year (Millions)	20-year (Millions)	50-year (Millions)
Camping and Picnicking	$125.1	$115.1	$121.6	$125.1	$152.9	$134.8	$166.0	$139.4	$156.1	$135.9
Wildlife Viewing, Interpretation, and Nature Study	$35.3	$32.5	$34.3	$35.3	$43.1	$38.0	$46.8	$39.3	$44.0	$38.3
Hunting (Big Game, Upland Game, and Migratory Game Birds)	$29.2	$26.9	$28.4	$29.2	$35.7	$31.5	$38.8	$32.6	$36.5	$31.8
Motorized Off-Highway Vehicle Travel	$14.6	$13.4	$14.2	$14.6	$17.8	$15.7	$19.3	$16.2	$18.2	$15.8
Non-motorized Travel (Hiking, Biking, and Horseback Riding)	$10.7	$9.8	$10.4	$10.7	$13.1	$11.5	$14.2	$11.9	$13.4	$11.6
Fishing	$10.7	$9.8	$10.4	$10.7	$13.0	$11.5	$14.2	$11.9	$13.3	$11.6
Driving for Pleasure (Along Designated BLM Roadways)	$10.1	$9.3	$9.8	$10.1	$12.3	$10.9	$13.4	$11.3	$12.6	$11.0
Specialized Non-motorized Activities and Events	$4.8	$4.4	$4.6	$4.8	$5.8	$5.1	$6.3	$5.3	$5.9	$5.2
Swimming and Other Water-Based Activities	$3.8	$3.5	$3.7	$3.8	$4.7	$4.1	$5.1	$4.3	$4.8	$4.2
Non-motorized Boating	$2.7	$2.5	$2.7	$2.7	$3.4	$3.0	$3.6	$3.1	$3.4	$3.0
Motorized Boating	$1.5	$1.4	$1.4	$1.5	$1.8	$1.6	$2.0	$1.7	$1.9	$1.6
Non-motorized Winter Activities	$0.9	$0.9	$0.9	$0.9	$1.2	$1.0	$1.3	$1.1	$1.2	$1.0
Snowmobile and other Motorized Winter Activities	$0.1	$0.1	$0.1	$0.1	$0.1	$0.1	$0.1	$0.1	$0.1	$0.1
Total Value in 2023 (undiscounted)	**$249.5**	**$229.7**	**$242.6**	**$249.5**	**$305.0**	**$268.9**	**$331.2**	**$278.1**	**$311.4**	**$271.2**
2013–2062 (cumulative, 50-year net present value)*	**$5,707.0**	**$5,115.3**	**$5,401.7**	**$5,707.0**	**$7,361.4**	**$6,560.7**	**$8,141.5**	**$6,963.2**	**$7,552.6**	**$6,659.3**

* Four percent discount rate; the No Action alternative and Alternative B involve no change in RMA acreage, so do not involve phasing of RMA acreage over time

Sources: **Table 3-147**; **Table 3-126** in Recreation

Special Forest Products

Land area suitable for the production of Category I (disturbance-associated) and Category II (disturbance-averse) special forest products would vary by alternative and the Proposed RMP and over time. In both the coastal/north and interior/south regions, across the alternatives and the Proposed RMP, the acres suitable for the production of Category I goods would not exceed one-quarter of the total acreage in the decision area, whereas at least three-quarters of the acres in the decision area would support production of Category II goods. Over time and across the alternatives and the Proposed RMP, the acreage suitable for Category I products would peak from 2033 to 2053 and diminish after 2063. Alternative A would provide the fewest acres suitable for the production of Category I products and would have the least variation over time in both the coastal/north and the interior/south regions. In the coastal/north region, Alternative C would provide the most land suitable for Category I harvests. In the interior/south areas, Alternative B would provide the most harvestable land for Category I products. The Proposed RMP would provide between 12 percent (coastal/north) and 17 percent (interior/south) of acres available for Category I products in the first decade, peaking at between 14 percent (coastal/north) and 23 percent (interior/south) of acres in 2043, which would be more than Alternative A but less than Alternative D. See the Forest Management section in this chapter for a detailed presentation of the effects of the alternatives and the Proposed RMP on special forest products.

As the acres of land suitable for the production of Category I and Category II products shift by alternative and the Proposed RMP, the supply of each type of special forest product would change. Decreases in Category I acres would translate to increases in Category II acres, resulting in an increase in the supply of special forest products that thrive in undisturbed landscapes and a decrease in those that grow in disturbed landscapes. This has the potential to affect the marginal value of products in both categories, especially where there would be large changes in supply.

Both Category I and Category II lands include some higher value and some lower value products. Mushrooms, floral and greenery, and Christmas trees are the groupings of products that people harvest in the largest quantity and, thus, produce the most revenue for the BLM. Category I and Category II landscapes both supply floral, greenery, and mushrooms, whereas only Category I lands supply Christmas trees. Based on the BLM's available data, it is not possible to quantify how changes in the acres suitable for the production of Category I and Category 2 goods would affect the overall value of special forest products produced by BLM-administered lands in western Oregon. However, even Alternatives B and Sub-alternative C, which would have the highest conversion of land from disturbed to undisturbed characteristics, would result in relatively small changes and would likely have a small effect on the overall supply, and thus the value, of each category of special forest product in the decision area.

Sustainable Energy Production

Energy production from solar and geothermal resources would not vary across the alternatives and the Proposed RMP, for two reasons: (1) the alternatives and the Proposed RMP would only modestly impact the availability of any of these resources for development, and (2) the development of these resources is constrained not by supply but by lack of demand related to market conditions, and limited infrastructure and conveyance capacity to population centers. The Sustainable Energy section in this chapter discusses these limitations in more detail. The supply of BLM-administered lands available for granting a right-of-way for wind development and transmission corridors would decrease across the alternatives and the Proposed RMP (although alternatives and the Proposed RMP would decrease the acres excluded for development, they would increase the acres in avoidance areas). Alternative D would have the largest decrease and Alternative A the least. If demand for these resources aligns with the characteristics of the supply on BLM-administered lands in the future, these restrictions would limit the potential economic value of this resource.

The supply of biomass would vary across the alternatives and the Proposed RMP, so the potential for energy production from biomass would also vary. Biomass production is a direct function of timber harvest, so the alternatives with greater timber harvest would produce greater amounts of biomass. Alternative C would produce the most biomass. Alternative D would produce the least amount of biomass. The Proposed RMP would yield more biomass than Alternatives A and D, but less than the No Action alternative or Alternatives B and C.

The value of biomass depends on demand. Under today's market conditions, woody biomass is not cost competitive with fossil fuels (White 2010). This may change as technology evolves, fossil fuel prices increase, and infrastructure develops to utilize woody biomass close to where it is produced. If these developments occur, the value of woody biomass from BLM-administered lands would increase.

Livestock Grazing

The value of livestock grazing would not change under the alternatives or the Proposed RMP, except under Alternative D, which would eliminate livestock grazing. The No Action alternative, Alternatives A, B, and C, and the Proposed RMP would have no impacts on billed AUMs relative to current conditions, and would have no impact on BLM revenues from livestock grazing, so that the BLM would continue to receive about $22,000 per year from livestock grazing fees. Alternative D, which would have no livestock grazing, would reduce active and billed AUMs to zero, and, consequently, would reduce BLM revenues from livestock grazing to zero.

Minerals

As of 2012, mineral revenues to the BLM were minor (approximately $15,000) and would not change under the alternatives and the Proposed RMP. Under the alternatives and the Proposed RMP, the acres closed to salable mineral material disposal would decrease slightly relative to current conditions, leading to more land open to entry. Approximately 13 percent of BLM-administered lands are currently closed to salable mineral material disposal. The Proposed RMP would decrease closed land by about 12 percent, compared to 9–10 percent under the action alternatives. The acres that would be closed under the alternatives and the Proposed RMP would be small relative to the acres open to production, and the areas that would be closed are not suitable for quarry development. The closure of these areas under the alternatives and the Proposed RMP would not appreciably affect the quantity or value of salable mineral materials derived from BLM-administered lands.

All the alternatives and the Proposed RMP would recommend a decrease in the acreage open to locatable mineral entry.[97] Currently, 4 percent of BLM-administered lands in the planning area are withdrawn from this type of mineral exploration and development. The Proposed RMP and Alternative D would lead to the most land withdrawn from locatable mineral entry, at 12 percent of BLM-administered lands. The other action alternatives would result in approximately 10 percent of land withdrawn from locatable mineral entry. The withdrawal of these areas under the alternatives and the Proposed RMP would not appreciably affect the quantity or value of locatable minerals derived from BLM-administered lands.

[97] As explained in the Minerals section of this chapter, the BLM identified by alternative and the Proposed RMP the acres of land recommended for withdrawal from locatable mineral entry. The BLM assumed that areas recommended for withdrawal from locatable mineral entry under each alternative and the Proposed RMP to be withdrawn for the purposes of this analysis. The BLM would make recommendations for withdrawals, which vary by the action alternatives and the Proposed RMP, but adoption of the RMP would not actually withdraw lands from locatable mineral entry, because the BLM does not have the authority to withdraw lands from locatable mineral entry. Congress can designate withdrawals from locatable mineral entry, or the BLM can begin a withdrawal process for a decision signed by the Secretary of Interior.

None of the alternatives or the Proposed RMP would affect the acres of BLM-administered lands open to leasable mineral entry.

Carbon Storage

Table 3-169 shows the marginal change in net carbon storage and value for the alternatives and the Proposed RMP for the first decade of the analysis (2013–2022) and for the entire period of analysis (2013–2063). The amount of stored carbon, and value of stored carbon, would increase across the alternatives and the Proposed RMP in the first decade and over 50 years. Relative to the No Action alternative, Alternatives A, B, and D, and the Proposed RMP would all increase the amount of carbon stored in the first decade. Alternative C would store less carbon relative to the No Action Alternative. By 2063, the differences would become more pronounced, with most carbon stored and the highest value under Alternative D. Alternative C would store the least amount and have the lowest value. The Proposed RMP would store an amount higher than the No Action alternative, but less than Alternatives A and D.

Table 3-169. Value of carbon storage, 2012 dollars

Alternative/ Proposed RMP	Marginal Change in Stored Carbon 2013–2022 (MMT)*	Value of Stored Carbon 2013–2022		Marginal Change in Stored Carbon 2013-2063 (MMT)*	Value of Stored Carbon 2013–2063	
		SCC† Average 3% (Millions)	SCC† 95th Percentile 3% (Millions)		SCC† Average 3% (Millions)	SCC† 95th Percentile 3% (Millions)
No Action	7.69	$1,172	$3,423	99.81	$27,319	$83,942
Alt. A	10.91	$1,662	$4,856	117.10	$32,051	$98,483
Alt. B	9.98	$1,520	$4,442	111.13	$30,417	$93,462
Alt. C	2.84	$433	$1,264	73.58	$20,139	$61,882
Alt. D	14.2	$2,163	$6,320	134.11	$36,707	$112,789
PRMP	10.46	$1,593	$4,656	115.62	$31,646	$97,238

* MMT - Million metric tons

† SCC - Social cost of carbon

Sources: Carbon storage amounts come from the Climate Change section. Values are from Interagency Working Group on the Social Cost of Carbon (2015), using estimates from 2017 for the first period and 2050 for the 50-year period, a 3 percent discount rate, and adjusted to 2012 dollars. For more detail on these calculations, see the Methods section.

Emissions from activities included in the alternatives but not incorporated into the net carbon storage number (e.g., biomass combustion, mineral production, and livestock grazing) would further offset net carbon storage, though the amount of these emissions is small compared to the emissions that are already reflected in the net carbon storage values reported above. Emissions from all sources would be highest under Alternative C and lowest under Alternative D. Emissions under the Proposed RMP would be higher than Alternative D and lower than the No Action alternative and Alternatives B and C in all decades and lower than Alternative A in some decades (see the Climate Change section in this chapter).Therefore, the net carbon storage and associated value would be highest under Alternative D and lowest under Alternative C.

Source Water Protection

The BLM would continue protecting the value of source water in the planning area across all alternatives and the Proposed RMP. The alternatives and the Proposed RMP would maintain current water-quality conditions primarily by relying on the natural filtration and temperature-control services provided by the

Riparian Reserve that would surround streams and other water bodies, and by employing best management practices (BMPs,). The Riparian Reserve would shade streams, prevent temperature increases, and minimize or prevent sediment runoff from harvest activities. In addition, BLM would employ preventative BMPs along forest roads and in harvest areas. These preventative measures would minimize forest-management risks affecting drinking water and treatment costs, and would maintain ODEQ's water quality criteria and standards. In addition, the BLM would continue working with local watershed associations and community water supply agencies to minimize the potential impacts of activities on BLM-administered lands, such as timber sales, on water supplies.

Biodiversity and Sensitive Species

To the extent that an alternative or the Proposed RMP would degrade the quality of, or reduce the supply of, habitats or populations of sensitive species, it would negatively affect resources that households in the region and the United States value. Conversely, the alternatives or the Proposed RMP that would protect the quality of, or increase the supply of habitats or populations, would protect or positively affect resources that households' value.

Alternatives A and C would result in less increase in the acreage of structurally-complex forests than other forests, and thus would support less of an increase from current levels of biodiversity resources and values. Alternatives B and D would yield an increase in structurally-complex forests compared to Alternatives A and C. The Proposed RMP would yield a level similar to Alternative B. See the Forest Management section in this chapter for more information on these differences. Data are unavailable to estimate the magnitude of the change in economic value these changes in forest complexity would have.

- The action alternatives and the Proposed RMP would increase the potential for habitat loss for the Oregon silverspot butterfly, compared to the No Action alternative. The action alternatives and the Proposed RMP would degrade or negatively affect a resource that households' likely value given available research. However, effects to Oregon silverspot butterflies themselves would not be reasonably foreseeable, because this habitat is likely unoccupied. Furthermore, habitat for this species on BLM-administered lands constitutes less than 1 percent of the habitat in the planning area, limiting any potential economic effect.
- The alternatives and the Proposed RMP, including the No Action alternative, would sustain populations of bald and golden eagles and increase habitat in 50 years. This would protect the economic values associated with these populations.
- The No Action alternative would lead to the continued loss of habitat for the fisher, while the actions alternatives and the Proposed RMP would increase fisher habitat in 50 years. Thus, the No Action alternative would diminish the well-being of people who care about the fisher. Data are not available to quantify the extent to which households would be willing to pay to protect the fisher or its habitat. The action alternatives and the Proposed RMP would result in an increase in fisher habitat over time and their associated values.
- The No Action alternative and Alternative D would identify and protect all marbled murrelet sites. Alternatives A, B, and C, and the Proposed RMP would slightly reduce nesting habitat for the marbled murrelet (by less than 1–8 percent) in the first decade, but, by the second decade, the amount of high quality nesting habitat would surpass current amounts and would continue increasing in the later decades. Thus, the alternatives and the Proposed RMP would protect values associated with marbled murrelet over the long-term.
- Under the alternatives and the Proposed RMP, the BLM would increase the amount of northern spotted owl habitat over time. Such actions would help protect the values that households place on this resource.

Riparian Reserve that would surround streams and other water bodies, and by employing best management practices (BMPs, **Appendix J**). The Riparian Reserve would shade streams, prevent temperature increases, and minimize or prevent sediment runoff from harvest activities. In addition, BLM would employ preventative BMPs along forest roads and in harvest areas. These preventative measures would minimize forest-management risks affecting drinking water and treatment costs, and would maintain ODEQ's water quality criteria and standards. In addition, the BLM would continue working with local watershed associations and community water supply agencies to minimize the potential impacts of activities on BLM-administered lands, such as timber sales, on water supplies.

Biodiversity and Sensitive Species

To the extent that an alternative or the Proposed RMP would degrade the quality of, or reduce the supply of, habitats or populations of sensitive species, it would negatively affect resources that households in the region and the United States value. Conversely, the alternatives or the Proposed RMP that would protect the quality of, or increase the supply of habitats or populations, would protect or positively affect resources that households' value.

Alternatives A and C would result in less increase in the acreage of structurally-complex forests than other forests, and thus would support less of an increase from current levels of biodiversity resources and values. Alternatives B and D would yield an increase in structurally-complex forests compared to Alternatives A and C. The Proposed RMP would yield a level similar to Alternative B. See the Forest Management section in this chapter for more information on these differences. Data are unavailable to estimate the magnitude of the change in economic value these changes in forest complexity would have.

- The action alternatives and the Proposed RMP would increase the potential for habitat loss for the Oregon silverspot butterfly, compared to the No Action alternative. The action alternatives and the Proposed RMP would degrade or negatively affect a resource that households' likely value given available research. However, effects to Oregon silverspot butterflies themselves would not be reasonably foreseeable, because this habitat is likely unoccupied. Furthermore, habitat for this species on BLM-administered lands constitutes less than 1 percent of the habitat in the planning area, limiting any potential economic effect.
- The alternatives and the Proposed RMP, including the No Action alternative, would sustain populations of bald and golden eagles and increase habitat in 50 years. This would protect the economic values associated with these populations.
- The No Action alternative would lead to the continued loss of habitat for the fisher, while the actions alternatives and the Proposed RMP would increase fisher habitat in 50 years. Thus, the No Action alternative would diminish the well-being of people who care about the fisher. Data are not available to quantify the extent to which households would be willing to pay to protect the fisher or its habitat. The action alternatives and the Proposed RMP would result in an increase in fisher habitat over time and their associated values.
- The No Action alternative and Alternative D would identify and protect all marbled murrelet sites. Alternatives A, B, and C, and the Proposed RMP would slightly reduce nesting habitat for the marbled murrelet (by less than 1–8 percent) in the first decade, but, by the second decade, the amount of high quality nesting habitat would surpass current amounts and would continue increasing in the later decades. Thus, the alternatives and the Proposed RMP would protect values associated with marbled murrelet over the long-term.
- Under the alternatives and the Proposed RMP, the BLM would increase the amount of northern spotted owl habitat over time. Such actions would help protect the values that households place on this resource.

- Under all alternatives and the Proposed RMP, the BLM would increase habitat for red tree voles within the North Oregon Coast population. However, under Alternatives A and C, management actions could lead to loss of existing occupied habitat. It is unclear how this would affect population levels and potential for further listing under the ESA, and thus the values that households place on protecting the red tree vole. The No Action Alternative and Alternatives B and D, would protect existing occupied habitat and protect values associated with the red tree vole. The Proposed RMP would protect existing occupied habitat and protect values associated with the red tree vole north of Highway 20, but could lead to loss of existing occupied habitat south of Highway 20. As with Alternatives A and C, it is unclear how this loss under the Proposed RMP would affect population levels and potential for further listing under the ESA, and thus the values that households place on protecting the red tree vole.
- None of the alternatives or the Proposed RMP would have any measurable effects on populations or habitats of sage-grouse, gray wolf, streaked horned lark, wolverine, Taylor's checkerspot butterfly, Fender's blue butterfly, or Steller's sea lion or their value.

Scenic Amenities

The total acres in each Visual Resource Management class would vary across alternatives the Proposed RMP. As acres shift from lower Visual Resource Inventory (VRI) classes to higher Visual Resource Management (VRM) classes (i.e., become more disturbed), there would likely be a general decrease in visual value on those acres and the potential for reductions in the value associated with scenic amenities, such as decreases in property values, would increase. The potential change in economic value would be largest in areas adjacent or within view of residences, businesses, and communities where the visual quality would decrease from an undisturbed to a disturbed quality. Visual resource quality would likely decline over time under all alternatives and the Proposed RMP, as the BLM would manage a substantial acreage of BLM-administered lands at a higher VRM class than the VRI class at which the acreage was inventoried. Alternative D would manage the most acres (80 percent) under VRM classes with commensurate or lower levels of change permitted than their VRI classes, and would result in declines that would be substantially less than the other alternatives the Proposed RMP. The No Action alternative would manage the second-most acres (77 percent) and Alternatives B and C would manage the fewest acres (60 percent under each) consistent with their VRI classes, with Alternative A and the Proposed RMP managing only slightly fewer (61 percent). Changes in economic value of property would only occur where actual changes in the scenic quality of the landscape occur, and would be most pronounced immediately following the change. Reductions in value likely would diminish over time.

Cultural Meaning

Cultural and Paleontological Resources section analyzes the potential of each alternative the Proposed RMP to affect adversely cultural and paleontological resources. However, the great majority of potential adverse impacts would be prevented through pre-disturbance surveys. Alternatives A and D would have the lowest potential to result in potential adverse impacts to cultural and paleontological resources because they would allow the fewest acres of the type of ground-disturbing activity most likely to disturb cultural and paleontological resources. The Proposed RMP would have the next-lowest potential to result in adverse impacts. Alternatives B and C would have the greatest potential adverse impacts. Such impacts could potentially reduce the supply or quality of cultural resources, and possibly harm resources that people and societies hold important and would prefer to protect their continued existence. Pre-disturbance surveys and subsequent protection of sites would protect the economic values that people and societies place on these resources.

In addition to disturbing cultural resources, the alternatives the Proposed RMP would also affect levels of culturally important biological resources, as discussed above in Special Forest Products and Biodiversity and Sensitive Species. As the alternatives the Proposed RMP reduce the supply of these resources, the loss would affect the well-being of people who hold them important, whether or not they interact directly with them. As described above, the alternatives the Proposed RMP would affect each type of biological resource differently. A particular alternative or the Proposed RMP has the potential to reduce the supply of some cultural resources while at the same time increasing the supply of others. These effects would have varying impacts on individuals' experience of sense of place, spiritual enrichment, and cognitive development. At the broad landscape scale of this analysis, it is not possible to determine or estimate with meaningful accuracy the overall effects on the value of cultural meaning under the different alternatives and the Proposed RMP.

Summary

Table 3-170 summarizes the effects of the alternatives and the Proposed RMP on the value of goods and services that BLM-administered lands in western Oregon supply. The first group of goods and services represent those that are valued using market prices, and from which BLM receives revenue. The table includes changes in market value and BLM revenue (as available) for each alternative and the Proposed RMP. The goods and services in the second group do not provide direct revenue to the BLM. Of these, two are quantified using non-market methods of valuation; willingness to pay in the case of recreation and, for carbon, its social cost. The other goods and services are not monetized, but likely have economic value as described in the sections above. Changes in the non-market value are shown for each of the alternatives. For goods and services where data limited the analysis of the monetary value of the effect, the table shows the expected direction of change in value under each alternative and the Proposed RMP.

Table 3-170. Summary of effects on economic value of goods and services derived from BLM-administered lands in Western Oregon

Good/ Service	Type of Valuation	Economic Value in 2012 (Millions)	No Action	Alt. A	Alt. B	Alt. C	Alt. D	PRMP
Market-based Goods and Services								
Timber	Market Price, Harvest Value	$20.8	$93.0	$56.2	$72.9	$134.9	$37.4	$51.2
			Average per year 2013 – 2022 (Millions)					
Special Forest Products	BLM Permit Fees, Market Price	BLM Revenue: $0.24; Market Value Low $4, High $45	Changes in supply of lands suitable for the production of Category I and Category II species produce relatively small changes and would likely have a small effect on the overall supply, and thus the value, of each category of special forest products in the planning area.					
Energy Production	Market Price	$0.032	Value of energy production across all alternatives and the Proposed RMP limited by lack of demand; Supply of biomass would increase; Supply of land available for wind/ROW development would decrease					
Livestock Grazing	Congressionally Set Price, Market Price	BLM Revenue: $0.022; Market Value (State) $0.14, (Private) $0.27	No change in value of livestock grazing				No livestock grazing would reduce value to $0.	No change in value of livestock grazing
Minerals	Market Price	$0.015 million	Small change in acres available for quarry development would not likely be large enough to change quantity or value of minerals produced; No change in value of locatable or leasable minerals					
Non-market-based Goods and Services								
Recreation	Consumer Surplus, Willingness to Pay	$223	$249.5	$242.6	$249.5 (Baseline)	$268.9	$278.1	$271.2
			Annual value in 2023 Based on 50-year recreation implementation timeline					
Carbon Storage	Social Cost of Carbon	$85	$117.5	$166.2	$152.0	$43.27	$216.3	$159.35
			Average per year 2013–2022 (Millions)					
Source Water Protection	Qualitative	Not Monetized	No change under any alternative or the Proposed RMP					
Biodiversity and Sensitive Species	Qualitative	Not Monetized	-	Economic values associated with species generally protected or enhanced in the long run				
Cultural Meaning	Qualitative	Not Monetized	Value of cultural sites and artifacts protected across all alternatives and the Proposed RMP; overall effect on cultural meaning impossible to assess at the present scale of analysis					
Scenic Amenities	Qualitative	Not Monetized	513,215 (23%)	960,984 (39%)	986,431 (40%)	986,783 (40%)	493,825 (20%)	976,601 (39%)
			Number of acres potentially managed for lower visual quality than currently inventoried					

Issue 2

How would the alternatives affect economic activity in the planning area derived from BLM-administered lands?

Key Points

- The BLM contributes economically to all parts of the planning area, triggered by the production and use of commodities such as timber and other forest products, personal and commercial use of BLM-administered lands, expenditures for personnel, materials, and services, and Federal payments to State and local governments. These contributions trigger effects that find their way into virtually every industry of the local economy.
- In 2012, BLM management contributed 7,900 jobs and $355 million in earnings to the planning area, which is about 0.4 percent of the total jobs and earnings. Under the alternatives and the Proposed RMP, these contributions would range from a low of 7,100 jobs and $310 million in earnings (Alternative D) to a high of 12,200 jobs and $573 million in earnings (Alternative C). Under the Proposed RMP, contributions would be 8,500 jobs and $330 million in earnings.
- BLM management contributes the largest share of local area employment and earnings in the Roseburg and Coos Bay Districts (from 2.9 percent to 3.1 percent in 2012). Under Alternatives A, B, and D, and the Proposed RMP, these districts would experience losses in the BLM-based share of jobs by 2018.

Summary of Notable Changes from the Draft RMP/EIS

The BLM updated information on net changes to harvest on private timberlands as a market response to changes in BLM harvest. Generally, this update resulted in modest changes to the number of jobs and earnings attributable to the timber program. The BLM also revised the calculation of employment and earning effects of recreation management based on estimates of recreation visits by alternative and the Proposed RMP. The BLM added discussion of the uncertainty surrounding the implementation rate of BLM recreation management and its effect on employment and earnings.

Summary of Analytical Methods

The BLM developed two sets of economic models to portray economic conditions in the planning area and to estimate the contributions or effects of BLM management. The first set included seven multi-county models organized around BLM districts to estimate the effects of BLM resource programs and expenditures. The BLM delineated all district model areas, which often cover multiple counties, based on the economic connections to resource processing, visitor spending, and agency expenditures rather than on the acreage of BLM-administered lands. Except for the Salem District, a single model represents each district. The Salem District covers a very large and economically diverse portion of northwestern Oregon, and therefore required two distinct models to separate economic effects occurring in the urban Portland area from those occurring in more rural areas (i.e., the counties either inside or outside the Portland Metropolitan Statistical Area (MSA), OMB 2013). District model areas include the following counties:

- Coos Bay — Coos, Curry
- Eugene — Lane
- Klamath Falls — Klamath
- Medford — Jackson, Josephine
- Roseburg — Douglas
- Salem-Other — Benton, Clatsop, Lincoln, Linn, Marion, Polk, Tillamook
- Salem-Portland MSA — Clackamas, Columbia, Multnomah, Washington, Yamhill

The second set of model areas aligns with individual counties to capture best the local effects triggered by local government spending of Federal payments. Both sets of models covered the entire planning area. Planning area effects are the sum of BLM district models or individual county models that cover the same geographic area. All models built and run for the analysis utilized the IMPLAN® modeling system (MIG, Inc. 2013), which include proprietary data sets. Employment and earnings results from both sets of models includes the sum of all direct effects triggered by spending or production, plus supply chain (indirect) effects in supporting industries and other (induced) effects from industry employees spending payrolls.

Public and private data for 2012, the most recent year for which all economic data were available, provided the foundation for all economic models. In addition to proprietary IMPLAN® data sets, the district models use public and private forest and wood products industries data provided by the Oregon Forest Resources Institute (OFRI 2012). The BLM customized both the district and county models with State and local government employment data publically available from the Oregon Employment Department (OED 2014). All models included information on employment, earnings, production levels, organizational spending, and prices.

Following conventions established by the Bureau of Labor Statistics and Bureau of Economic Analysis, the BLM defined employment for purposes of this analysis as the average number of full-time and part-time jobs reported monthly over an entire year. Earnings includes total payroll cost of employees, including such payments as wages, salaries, bonuses, health insurance and other benefits, retirement contributions, and payroll taxes. Given lags in data availability, jobs and earnings in 2012 (expressed in 2012 dollars) represent current conditions in the planning area.

The BLM's management of public lands triggers economic effects in three ways: output production from resource management programs, agency expenditures, and Federal payments to local governments. Program outputs include timber harvest, special forest products, recreation (including wildlife- and fish-based), minerals, and livestock grazing. Program expenditures include all operational expenses (personnel, facilities, and overhead) plus resource-specific expenses to accomplish such activities as watershed restoration, fuels reduction, and transportation management. Federal payments include all funds received by counties, such as payments in lieu of taxes (PILT), mineral royalties, and O&C payments or their replacement (i.e., payments authorized by the Secure Rural Schools and Community Self-Determination Act, as amended).

The BLM estimated economic contributions from resource outputs based on the availability of both BLM records and either production or spending data. BLM records and research data abound for timber, forage, minerals, and recreation use of public lands. BLM data are insufficient at this time to make economic contribution estimates for most non-timber special forest products, but are available for timber special forest products. Although the BLM collects information on permits for non-timber special forest products, sufficient data on quantities and values are not available. Research and agency reporting continue to improve in efforts to close these data gaps. Records of BLM agency expenditures and of Federal payments to local governments provided a sound basis for estimating the local contributions triggered by Federal and local government spending.

The BLM provided resource program outputs and agency expenditures for the models. The Oregon Department of Forestry and the U.S. Forest Service (Gale *et al.* 2012, ODF 2014, Zhou 2013) provided geographic data on 2012 harvest and processing locations that yielded log flows for the analysis. The Department of the Interior (USDI 2014) and the Association of O&C Counties (AOCC 2014) provided data on Federal payments. Each O&C County, through the cooperation of the Association of O&C Counties (AOCC 2014), provided representative spending patterns of Federal payments. The U.S. Forest

Service (White 2014, USDA FS 2014a) provided spending patterns by recreationists on BLM-administered lands.

The economic effects described in this section reflect the effects of Federal payments to counties, as they would be under the formula established in the O&C Act. This is because of the uncertainty over the future of payments under the Secure Rural Schools (SRS) and Self-Determination Act (see the discussion in Issue 3, County Payments).

In addition to comparing the projected impacts of alternatives and the Proposed RMP in 2018, the effects tables also display current conditions as of 2012. To facilitate a comparison between current conditions and 2018 on an equal basis, for the effects analysis the BLM modified the effects of the actual payments to counties in 2012 (as shown in the Affected Environment section) to reflect the effects of the payments as they would have been under the O&C Act. The relevant columns in the environmental effects tables are labeled 'Current Modified.' For example, in 2012, the actual effect of all BLM-based Federal payments was 699 jobs (**Table 3-180**). The modified current effect would have been 198 jobs (**Table 3-181**).

The BLM assumed, for purposes of this part of the analysis, that the State forecasts of employment and population capture the effects of BLM management under the No Action alternative (i.e., the 1995 RMPs as written).

The timber program shows anticipated effects of BLM timber harvested and processed in western Oregon. The total effects of each alternative and the Proposed RMP include all direct employment and earnings in the forest products industry plus supply chain (indirect) effects in supporting industries and other (induced) effects from industry payrolls.

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. 135–137).

Affected Environment

Area Employment and Earnings

The Analysis of the Management Situation for the RMPs for Western Oregon summarizes historic and trend data for employment, unemployment, and earnings in the planning area, (USDI BLM 2013, pp. 104–108). When the BLM published the Analysis of the Management Situation, the most recent year available for these data was 2011. Data for 2012 are now available and used throughout this section to represent current conditions.

Table 3-171 shows current total employment and earnings for each of the model areas. **Appendix P** includes tables with employment and earnings by industry.

Table 3-171. Total employment and earnings by district model area, 2012 (jobs, millions of 2012 dollars)

Industry	District Model Area Name and Counties							Planning Area Totals	Oregon Totals
	Coos Bay	Eugene	Klamath Falls	Medford	Roseburg	Salem-Other	Salem-Portland MSA		
	Coos, Curry	Lane	Klamath	Jackson, Josephine	Douglas	Benton, Clatsop, Lincoln, Linn, Marion, Polk, Tillamook	Clackamas, Columbia, Multnomah, Washington, Yamhill		
Employment (Jobs)	40,276	186,049	31,881	145,525	46,527	359,408	1,147,490	1,957,157	2,221,563
Earnings (Millions of 2012 dollars)	$1,507.7	$7,733.7	$1,198.0	$5,604.1	$1,789.7	$15,111.7	$65,067.0	$98,012.0	$108,412.3

Sources: MIG, Inc. 2013; Oregon Forest Resources Institute 2012 (Forest Products industries within greater Agriculture and Manufacturing throughout planning area)

Since 2001, total employment in the planning area has grown by 7.2 percent. However, since 2007, which was the peak of economic activity before the 2007–2009 recession, employment is down by 3.3 percent. Generally, throughout the planning area, district model areas show positive employment growth since 2001, ranging from 2.7 percent in the Coos Bay area to 9.8 percent in the Salem-Portland MSA area. Klamath Falls (-2.7 percent) and Roseburg (-3.9 percent) are still down from their 2001 levels. All model areas are down from their peak in 2007, ranging from the deepest low in Roseburg (-10.7 percent) to a very modest low in Salem-Portland MSA (-0.1 percent).

The two Salem District model areas account for 1.5 million jobs, or two-thirds of all employment in the planning area. At 1.1 million jobs in the Salem-Portland MSA model area and 0.4 million in the Salem-Other (non-MSA counties) area, these two are the largest economies in the planning area. The largest 2 industries in the two Salem District model areas, Health and Social Services and Governments, supply 238,000 jobs, or 21 percent of total employment in the Salem-Portland MSA area, and 112,000 jobs, or 31 percent in non-MSA counties. The next largest industries, Retail Trade and Manufacturing, each provide over 100,000 jobs or 9 percent in the Salem-Portland MSA area. In non-MSA counties, these same two industries account for nearly 38,000 jobs (11 percent) and 26,000 jobs (7 percent), respectively. Manufacturing, Governments, Health and Social Services, and Professional Services account for 48 percent ($31 billion) of all earnings within the Portland-MSA. Among the non-MSA counties, Governments, Health and Social Services, Manufacturing, and Retail Trade tally over $8.5 billion, or 55 percent, of all earnings. Total payrolls in these two model areas provide over 80 percent of all earnings in the planning area.

The five BLM District model areas from Eugene south have a pattern that is similar to the non-MSA counties within the Salem District. The top four sectors for employment are Governments, Health & Social Services, and Retail Trade followed by Manufacturing. Only in the Klamath Falls model area does a different industry—Agriculture rather than Manufacturing—make it into the top four. Earnings follow the employment pattern in all five model areas. Earnings by public sector employees lead in all areas except Eugene, where Health and Social Services payrolls are the largest in the area and exceed government payrolls by 2 percent. Retail Trade exhibits the lowest earnings of the top four industries, except in the Medford area where Manufacturing trails Retail Trade.

The recreation industry is well represented throughout western Oregon. While recreation participants spend money in many retail and service sectors, the BLM uses only two sectors in this analysis as an indicator of the visitor services or recreation industry: Arts, Entertainment & Recreation Services, and Accommodation & Food Services. These two sectors are especially aligned with both visitors from out of the area (e.g., accommodations) as well as local residents who engage in recreation (e.g., recreation services, and food services). These two sectors account for over 187,000 jobs (10 percent) and $4.1 billion of earnings (4 percent) throughout the planning area. The two Salem District model areas supply three-quarters of all jobs and 80 percent of all payrolls in these sectors within the planning area. In the central and southern model areas, Medford and Eugene stand out with over 16,000 jobs each (9 percent and 11 percent, respectively) and from $300 to $342 million in payrolls (4 percent and 5 percent, respectively).

Since 2001, visitor service or recreation industry employment in the planning area has grown by 19.8 percent. Since 2007, planning area employment in this industry is up by 2.4 percent. Generally, throughout the planning area, district model areas show positive growth since 2001, ranging from 9.0 percent in the Coos Bay area to 26.5 percent in the Salem-Portland MSA area. Two areas are still down from their 2001 levels—Klamath Falls (-3.3 percent) and Roseburg (-2.8 percent). All model areas but one are down from their peak in 2007, ranging from the deepest low in Klamath Falls (-14.8 percent) to a very modest low in Eugene (-0.2 percent). The sole model area with growth in this industry is Salem-Portland MSA with 6.8 percent.

The forest products industry is important throughout the planning area and of particular interest for public land resource management in western Oregon. **Table 3-172** and **Table 3-173** provide employment and earnings information for detailed sectors within the broader forest products industry. In both of the Salem model areas, Support Activities for Agriculture and Forestry is the largest employer within the forest products industry. This detailed sector includes private firms that provide services such as estimating timber volume, fighting forest fires, controlling forest pests, and planting seedlings for reforestation. It also includes firms that support agricultural production through planting crops, cultivating services, and vineyard cultivation. Firms that provide only forestry support could not be statistically separated from those that provide agricultural support. As a whole, this sector provides nearly 11,000 jobs (0.7 percent) and $295 million in earnings (0.4 percent) across both model areas.

Table 3-172. Forest products industry employment by detailed sector by district model area, 2012 (jobs)

Detailed Sector North American Industry Classification System (NAICS)		District Model Area Name and Counties							Planning Area Totals
		Coos Bay	Eugene	Klamath Falls	Medford	Roseburg	Salem-Other	Salem-Portland MSA	
Description	**Code**	**Coos, Curry**	**Lane**	**Klamath**	**Jackson, Josephine**	**Douglas**	**Benton, Clatsop, Lincoln, Linn, Marion, Polk, Tillamook**	**Clackamas, Columbia, Multnomah, Washington, Yamhill**	
Forestry & Logging	113	965	1,000	361	632	1,021	2,283	1,917	8,292
Support Activities for Agriculture & Forestry	115	625	683	255	1,548	334	6,180	4,481	14,106
Wood Products Manufacturing	321	1,112	3,251	1,363	1,863	2,578	2,502	2,869	15,538
Sawmills & Wood Preservation	3211	432	1,120	D	100	863	1,105	1,007	D
Veneer, Plywood, Reconstituted & Engineered Wood Products	3212	583	1,510	D	903	1,127	290	54	D
Other Wood Products	3219	97	621	D	860	588	1,107	1,808	D
Paper Manufacturing	322	-	403	-	25	-	2,385	1,720	4,533
Pulp, Paper & Paperboard Mills	3221	-	383	-	-	-	1,843	845	3,071
Converted Paper Products Manufacturing	3222	-	20	-	25	-	542	875	1,462
	Totals	**2,702**	**5,337**	**1,979**	**4,068**	**3,933**	**13,350**	**10,987**	**42,469**

D = Disclosure restricted because of confidentiality
Note: Table does not include trucking of logs and lumber because it is (1) not identifiable by NAICS and (2) less than 14 percent of the entire trucking industry (OFRI 2012; MIG, Inc. 2013)
Sources: Oregon Forest Resources Institute 2012; MIG, Inc. 2013 (NAICS 115 only)

Table 3-173. Forest products industry earnings by detailed sector by district model area, 2012 (millions of 2012 dollars)

Detailed Sector North American Industry Classification System (NAICS)		District Model Area Name and Counties							
		Coos Bay	Eugene	Klamath Falls	Medford	Roseburg	Salem-Other	Salem-Portland MSA	Planning Area Totals
Description	**Code**	**Coos, Curry**	**Lane**	**Klamath**	**Jackson, Josephine**	**Douglas**	**Benton, Clatsop, Lincoln, Linn, Marion, Polk, Tillamook**	**Clackamas, Columbia, Multnomah, Washington, Yamhill**	
Forestry & Logging	113	$64.9	$79.8	$33.0	$52.5	$54.2	$212.4	$157.6	$654.4
Support Activities for Agriculture & Forestry	115	$11.0	$18.5	$9.7	$48.0	$10.1	$162.1	$132.6	$392.0
Wood Products Manufacturing	321	$76.1	$221.5	$108.2	$108.2	$169.9	$153.2	$154.1	$991.1
Sawmills & Wood Preservation	3211	$27.3	$82.4	D	$6.2	$61.9	$71.8	$52.9	D
Veneer, Plywood, Reconstituted & Engineered Wood Products	3212	$44.6	$118.4	D	$77.2	$97.1	$44.2	$18.7	D
Other Wood Products	3219	$4.2	$20.7	D	$24.8	$10.9	$37.3	$82.5	D
Paper Manufacturing	322	-	$48.5	-	$2.2	-	$239.4	$136.5	$426.7
Pulp, Paper & Paperboard Mills	3221	-	$47.4	-	-	-	$197.9	$74.3	$319.6
Converted Paper Products Manufacturing	3222	-	$1.2	-	$2.2	-	$41.5	$62.2	$107.1
	Totals	**$152**	**$368**	**$151**	**$211**	**$234**	**$767**	**$581**	**$2,464**

D = Disclosure restricted because of confidentiality

Note: Table does not include trucking of logs and lumber because it is (1) not identifiable by NAICS and (2) less than 14 percent of the entire trucking industry (OFRI 2012; MIG, Inc. 2013)

Sources: Oregon Forest Resources Institute 2012; MIG, Inc. 2013 (NAICS 115 only)

The entire forest products industry in the Salem District includes all types of wood fiber harvesting and processing. In terms of employment, the forest products industry supplies over 24,000 jobs, with payrolls exceeding $1.3 billion (about 2 percent of total jobs and earnings). In the areas south of the Salem District, Forestry & Logging, Sawmills & Wood Preservation, and Veneer, Plywood, Reconstituted & Engineered Wood Products are the three major elements of the forest products industry. In addition, the Eugene area has several firms that manufacture pulp and paper products. South of the Salem District, total forest products industry employment ranges from a low of about 2,000 in the Klamath Falls area (6 percent of area total) to a high of 5,300 in the Eugene area (3 percent of area total). Similarly, earnings range from $151 million in the Klamath Falls area (13 percent of area total) to a high of $368 million in the Eugene area (5 percent of area total).

Table 3-174, below, displays the share of employment and earnings by both timber-related and recreation-related industries to total employment and earnings in each BLM district model area. One or both of these industries are particularly important to four model areas: Roseburg, Coos Bay, Medford, and Klamath Falls. The recreation-related industry is strongest in Coos Bay and Medford, where employment sums to 11 percent of area jobs and payrolls sum to over 5 percent of area earnings. The timber-related industry is most robust in Roseburg, Coos Bay, and Klamath Falls, where employment ranges from 6.2 to 8.5 percent of all area jobs and payrolls range from 10.1 to 13.1 percent of all earnings.

Table 3-174. Employment and earnings in timber- and recreation-related industries as a share of total employment and earnings by district model area, 2012

Resource-Related Industry		District Model Area Name and Counties							Planning Area Totals
		Coos Bay	Eugene	Klamath Falls	Medford	Roseburg	Salem-Other	Salem-Portland MSA	
		Coos, Curry	Lane	Klamath	Jackson, Josephine	Douglas	Benton, Clatsop, Lincoln, Linn, Marion, Polk, Tillamook	Clackamas, Columbia, Multnomah, Washington, Yamhill	
Employment	Timber-Related* (Forest Products)	6.7%	2.9%	6.2%	2.8%	8.5%	3.7%	1.0%	2.2%
Employment	Recreation-Related‡ (Arts, Entertainment & Recreation; Accommodations & Food Services)	11.0%	9.4%	10.0%	11.1%	7.9%	9.9%	9.3%	9.6%
Earnings	Timber-Related† (Forest Products)	10.1%	4.8%	12.6%	3.8%	13.1%	5.1%	0.9%	2.5%
Earnings	Recreation-Related‡ (Arts, Entertainment & Recreation; Accommodations & Food Services)	5.5%	4.4%	4.5%	5.3%	4.0%	4.5%	4.0%	4.2%

* Percentages calculated by dividing total employment in **Table 3-172** for each geographic area by total employment in **Table 3-171** for the same geographic area.
† Percentages calculated by dividing total earnings in **Table 3-173** for each geographic area by total earnings in **Table 3-171** for the same geographic area.
‡ Percentages calculated by dividing recreation-related industry total for each geographic area (selected geographic areas in text, others in project record) by comparable total in (**Table 3-173**) for the same geographic area.

A shrinking of the wood products manufacturing industry has been evident in the planning area since 2001. The industry contracted by -39.3 percent between 2001 and 2012. Since 2007, when many Oregon industries were at peak employment, planning area employment in this industry is down by -31.8 percent. All district model areas show negative growth since 2001, ranging from -43.9 percent in the Salem-Other area to -16.5 percent in the Coos Bay area. All areas except Coos Bay show negative growth at greater than -30 percent. No model area experienced a peak of industry employment in 2007. Statewide, employment in this industry is down by -33.6 percent since 2007 and -40.8 percent since 2001.

There are large differences between compensation for timber-related jobs compared to recreation-related jobs in western Oregon. The average forest products industry jobholder earns approximately $58,000 while the average recreation-based employee earns approximately $22,000, roughly a third of timber-related industries (**Table 3-173** and tables in **Appendix P**). Note that recreation includes two industries: Arts, Entertainment & Recreation Services, and Accommodation & Food Services).

Contributions by BLM Management to Local Economies

Through its management of Oregon & California (O&C), Coos Bay Wagon Road (CBWR), and other public lands, the BLM contributes economically to all parts of the planning area, triggered by—

- The production and use of basic commodities, such as timber, forage, minerals, and other forest products derived from BLM-administered lands,
- Personal and commercial use of BLM-administered lands, such as for recreation, solitude, education, and reflection,
- Local agency expenditures for personnel, materials, and services, and
- Federal payments to state and local governments, such as payments made under the Secure Rural Schools and Community Self-Determination Act and Payments in Lieu of Taxes Act, that are also spent on personnel, materials, and services.

The presentation of BLM contributions differs from the preceding presentation of area industry totals in **Table 3-170** through **Table 3-174**. **Table 3-175** through **Table 3-180** illustrate the various dimensions of BLM contributions in 2012, including the sum of direct, indirect, and induced effects that BLM contributions trigger as they ripple throughout each model area. Direct effects are those in industries either processing BLM resource outputs (e.g., sawmills) or selling goods and services to public land users (e.g., outfitter and guide services) and to government agencies using Federal funds (e.g., office supplies). Indirect effects are those in local supply chains that support local firms producing direct goods and services. Finally, induced effects are those triggered by workers in either direct or indirect firms who spend a portion of their paycheck locally. Thus, the BLM contributions trigger effects that find their way into virtually every industry of the local economy.

Table 3-175. Total employment and earnings contribution of BLM programs to district model areas, 2012

Program		District Model Area Name and Counties							Planning Area Totals
		Coos Bay	Eugene	Klamath Falls	Medford	Roseburg	Salem-Other	Salem-Portland MSA	
		Coos, Curry	Lane	Klamath	Jackson, Josephine	Douglas	Benton, Clatsop, Lincoln, Linn, Marion, Polk, Tillamook	Clackamas, Columbia, Multnomah, Washington, Yamhill	
Employment (Jobs)	Recreation	276	527	60	425	507	133	854	2782
	Livestock Grazing	-	-	55	40	-	-	-	95
	Timber	710	480	40	340	488	432	407	2,897
	Minerals	-	3	-	1	2	-	-	6
	Agency Expenditures	192	259	71	454	176	271	-	1423
	Payments to States/Counties	70	93	19	236	189	55	36	699
	Totals	**1,249**	**1,363**	**245**	**1,496**	**1,362**	**891**	**1,297**	**7,904**
	Share of Total Employment in Area*	3.1%	0.7%	0.8%	1.0%	2.9%	0.2%	0.1%	0.4%
Earnings (Millions of 2012 Dollars)	Recreation	$7.0	$16.2	$1.6	$12.2	$13.6	$3.8	$32.8	$87.2
	Livestock Grazing	-	-	$0.8	$0.6	-	-	-	$1.4
	Timber	$33.3	$23.2	$1.9	$15.8	$23.5	$21.3	$22.8	$141.7
	Minerals	-	$0.2	-	< $0.1	$0.1	-	-	$0.3
	Agency Expenditures	$13.1	$15.2	$4.2	$27.2	$12.0	$17.4	-	$89.1
	Payments to States/Counties	$3.4	$5.9	$0.9	$10.2	$9.6	$3.3	$2.2	$35.5
	Totals	**$56.8**	**$60.7**	**$9.4**	**$66.0**	**$58.9**	**$45.9**	**$57.8**	**$355.3**
	Share of Total Earnings in Area†	3.8%	0.8%	0.8%	1.2%	3.3%	0.3%	0.1%	0.4%

* Percentages calculated by dividing total employment in this table for each geographic area by total employment in **Table 3-171** for the same geographic area.
† Percentages calculated by dividing total earnings in this table for each geographic area by total earnings in **Table 3-171** for the same geographic area.
Note: Totals may not add due to rounding

Table 3-176. Total employment contribution of BLM timber programs to forest products industry by district model area, 2012 (jobs)

Detailed Sector North American Industry Classification System (NAICS)		District Model Area Name and Counties							Planning Area Totals
		Coos Bay	Eugene	Klamath Falls	Medford	Roseburg	Salem-Other	Salem-Portland MSA	
Description	Code	Coos	Lane	Klamath	Jackson, Josephine	Douglas	Benton, Clatsop, Lincoln, Linn, Marion, Polk, Tillamook	Clackamas, Columbia, Multnomah, Washington, Yamhill	
Forestry & Logging	113	140	71	9	48	88	78	43	477
Support Activities for Agriculture & Forestry	115	93	47	6	32	59	47	34	317
Wood Products Manufacturing	321	131	81	6	59	133	56	51	518
Sawmills & Wood Preservation	3211	111	56	4	40	72	50	46	379
Veneer, Plywood, Reconstituted & Engineered Wood Products	3212	20	20	1	6	10	5	4	66
Other Wood Products	3219	< 1	5	1	13	51	1	2	73
Paper Manufacturing	322	< 1	13	< 1	< 1	< 1	15	13	41
Pulp, Paper & Paperboard Mills	3221	< 1	13	< 1	< 1	< 1	15	13	41
Converted Paper Products Manufacturing	3222	-	< 1	-	< 1	-	< 1	< 1	< 1
Totals		**363**	**212**	**21**	**139**	**280**	**196**	**142**	**1,354**
Share of Forest Products Industry in Area*		13.4%	4.0%	1.0%	3.4%	7.1%	1.5%	1.3%	3.2%
Share of Total Employment in Area†		0.9%	0.1%	0.1%	0.1%	0.6%	0.1%	< 0.1%	0.1%

* Percentages calculated by dividing total employment in this table for each geographic area by total employment in **Table 3-172** for the same geographic area.
† Percentages calculated by dividing total employment in this table for each geographic area by total employment in **Table 3-171** for the same geographic area.
Note: Totals may not add due to rounding

Table 3-177. Total earnings contribution of BLM timber programs to forest products industry by district model area, 2012 (millions of 2012 dollars)

Detailed Sector North American Industry Classification System (NAICS)		**District Model Area Name and Counties**							**Planning Area Totals**
		Coos Bay	**Eugene**	**Klamath Falls**	**Medford**	**Roseburg**	**Salem-Other**	**Salem-Portland MSA**	
Description	**Code**	**Coos, Curry**	**Lane**	**Klamath**	**Jackson, Josephine**	**Douglas**	**Benton, Clatsop, Lincoln, Linn, Marion, Polk, Tillamook**	**Clackamas, Columbia, Multnomah, Washington, Yamhill**	
Forestry & Logging	113	$9.8	$4.9	$0.6	$3.4	$6.2	$5.5	$3.1	$33.5
Support Activities for Agriculture & Forestry	115	$3.7	$1.9	$0.2	$1.3	$2.4	$1.9	$1.4	$12.7
Wood Products Manufacturing	321	$7.3	$4.5	$0.3	$3.3	$7.4	$3.1	$2.8	$28.7
Sawmills & Wood Preservation	3211	$6.1	$3.1	$0.2	$2.2	$4.0	$2.8	$2.5	$20.8
Veneer, Plywood, Reconstituted & Engineered Wood Products	3212	$1.1	$1.1	-	$0.4	$0.6	$0.3	$0.2	$3.8
Other Wood Products	3219	<$0.1	$0.3	$0.1	$0.7	$2.9	$0.1	$0.1	$4.1
Paper Manufacturing	322	<$0.1	$1.2	<$0.1	<$0.1	<$0.1	$1.3	$1.2	$3.8
Pulp, Paper & Paperboard Mills	3221	<$0.1	$1.2	<$0.1	<$0.1	<$0.1	$1.3	$1.2	$3.8
Converted Paper Products Manufacturing	3222	-	<$0.1	-	<$0.1	-	<$0.1	<$0.1	<$0.1
Totals		**$20.8**	**$12.5**	**$1.2**	**$7.9**	**$16.0**	**$11.8**	**$8.5**	**$78.7**
Share of Forest Products Industry in Area*		13.7%	3.4%	0.8%	3.8%	6.8%	1.5%	1.5%	3.2%
Share of Total Employment in Area†		1.4%	0.2%	0.1%	0.1%	0.9%	0.1%	<0.1%	0.1%

* Percentages calculated by dividing total earnings in this table for each geographic area by total earnings in **Table 3-173** for the same geographic area.
† Percentages calculated by dividing total earnings in this table for each geographic area by total earnings in **Table 3-171** for the same geographic area.
Note: Totals may not add due to rounding

Table 3-178. Total employment and earnings contribution of BLM recreation programs to recreation-related industries by district model area, 2012

Industry		Coos Bay	Eugene	Klamath Falls	Medford	Roseburg	Salem-Other	Salem-Portland MSA	Planning Area Totals
		Coos	Lane	Klamath	Jackson, Josephine	Douglas	Benton, Clatsop, Lincoln, Linn, Marion, Polk, Tillamook	Clackamas, Columbia, Multnomah, Washington, Yamhill	
Employment (Jobs, Percent)	Arts, Entertainment & Recreation Services	72	87	12	81	92	38	115	498
	Accommodation & Food Services	135	225	29	165	201	72	340	1,167
	Totals	**206**	**312**	**41**	**245**	**293**	**111**	**455**	**1,664**
	Share of Recreation-related Industry in Area*	4.6%	1.8%	1.3%	1.5%	8.0%	0.3%	0.4%	0.9%
	Share of Total Employment in Area†	0.5%	0.2%	0.1%	0.2%	0.6%	<0.1%	<0.1%	0.1%
Earnings (Millions of 2012 dollars, Percent)	Arts, Entertainment & Recreation Services	$1.6	$2.6	$0.3	$2.0	$2.5	$1.3	$3.6	$13.9
	Accommodation & Food Services	$2.8	$4.8	$0.6	$3.4	$4.1	$1.5	$9.1	$26.3
	Totals	**$4.4**	**$7.5**	**$0.8**	**$5.4**	**$6.6**	**$2.8**	**$12.7**	**$40.2**
	Share of Recreation-related Industry in Area*	5.3%	2.2%	1.6%	1.8%	9.3%	0.4%	0.5%	1.0%
	Share of Total Employment in Area†	0.3%	0.1%	0.1%	0.1%	0.4%	<0.1%	<0.1%	<0.1%

Column group heading: District Model Area Name and Counties (Coos Bay through Salem-Portland MSA).

* Percentages calculated by dividing table total for each geographic area by comparable total employment or total earnings in **Table 3-172** for the same geographic area.
Note: Totals may not add due to rounding.
† Percentages calculated by dividing table total for each geographic area by recreation-related industry total for the same geographic area (selected geographic areas in text, others in project record).

Table 3-179. Total employment and earnings in O&C counties generated by BLM-based Federal payments, 2012 (jobs, millions of 2012 dollars)

County	Secure Rural Schools Program*							
	Title I and III				Title II		Total	
	County Government		Private Sector		Private Sector		County-wide	
	Jobs	Earnings	Jobs	Earnings	Jobs	Earnings	Jobs	Earnings
Benton	6	$0.5	3	$0.1	1	$0.1	10	$0.6
Clackamas	8	$0.7	5	$0.2	3	$0.1	15	$0.9
Columbia	6	$0.5	2	$0.1	2	<$0.1	10	$0.6
Coos	31	$1.6	9	$0.3	4	$0.1	44	$2.1
Curry	15	$0.9	5	$0.1	3	$0.1	23	$1.1
Douglas	133	$7.4	41	$1.4	12	$0.7	185	$9.4
Jackson	86	$3.1	30	$1.1	26	$0.8	141	$4.9
Josephine	56	$4.0	24	$0.8	11	$0.4	91	$5.2
Klamath	11	$0.6	5	$0.2	2	$0.1	17	$0.8
Lane	50	$4.4	29	$1.0	14	$0.4	92	$5.8
Lincoln	1	$0.1	1	<$0.1	-	<$0.1	2	$0.1
Linn	11	$0.9	4	$0.1	2	$0.1	17	$1.1
Marion	4	$0.3	2	$0.1	1	<$0.1	8	$0.5
Multnomah	2	$0.1	1	$0.1	1	<$0.1	4	$0.2
Polk	7	$0.5	2	$0.1	2	$0.1	12	$0.7
Tillamook	2	$0.2	1	<$0.1	1	<$0.1	4	$0.2
Washington	1	$0.1	1	<$0.1	1	<$0.1	2	$0.1
Yamhill	3	$0.2	1	<$0.1	-	<$0.1	4	$0.2
Totals	**434**	**$26.1**	**163**	**$5.6**	**85**	**$3.0**	**682**	**$34.8**

* Based upon Secure Rural Schools program payments received and spent by local governments in calendar year 2012

Note: Clatsop County is not included on the table. Included within the larger economic analysis area, Clatsop County has a small amount of BLM-administered lands, but does not have O&C or CBWR lands. Consequently, BLM-based Federal payments to Clatsop County are very small and generate a positive, but very minor effect on the county economy.

Table 3-180. Total employment and earnings in O&C counties generated by BLM-based Federal payments, 2012 (jobs, millions of 2012 dollars)

County	PILT Program* (BLM Acreage Only)						All BLM-based Federal Payments			
	County Government		Private Sector		County-wide		County-wide Jobs		County-wide Earnings	
	Jobs	Earnings	Jobs	Earnings	Jobs	Earnings	Total	Share of County Total†	Total	Share of County Total†
Benton	-	-	-	-	-	-	10	<0.1%	$0.6	<0.1%
Clackamas	-	-	-	-	-	-	16	<0.1%	$0.9	<0.1%
Columbia	-	-	-	-	-	-	10	0.1%	$0.6	0.1%
Coos	2	$0.1	1	-	3	$0.1	47	0.2%	$2.2	0.2%
Curry	-	-	-	-	-	-	24	0.2%	$1.2	0.3%
Douglas	3	$0.2	1	-	4	$0.2	189	0.4%	$9.6	0.5%
Jackson	3	$0.1	1	-	4	$0.1	145	0.1%	$5.0	0.1%
Josephine	-	-	-	-	-	-	91	0.3%	$5.2	0.4%
Klamath	1	$0.1	-	-	2	$0.1	19	0.1%	$0.9	0.1%
Lane	1	$0.1	1	-	2	$0.1	93	0.1%	$5.9	0.1%
Lincoln	-	-	-	-	-	-	2	<0.1%	$0.1	<0.1%
Linn	-	-	-	-	-	-	18	<0.1%	$1.1	0.1%
Marion	-	-	-	-	-	-	8	<0.1%	$0.5	<0.1%
Multnomah	-	-	-	-	-	-	4	<0.1%	$0.2	<0.1%
Polk	1	$0.1	-	-	1	$0.1	13	0.1%	$0.7	0.1%
Tillamook	-	-	-	-	-	-	4	<0.1%	$0.2	0.1%
Washington	-	-	-	-	-	-	3	<0.1%	$0.2	<0.1%
Yamhill	-	-	-	-	-	-	4	<0.1%	$0.2	<0.1%
Totals	**13**	**$0.7**	**5**	**$0.2**	**17**	**$0.9**	**699**	**<0.1%**	**$35.7**	**<0.1%**

* Based upon payments in lieu of taxes (PILT) received and spent by local governments in calendar year 2012
† Percentages calculated by dividing table total for each county by comparable total employment or total earnings for the same county (provided in project record).
Notes: Clatsop County is not included on the table. Included within the larger economic analysis area, Clatsop County has a small amount of BLM-administered lands, but does not have O&C or CBWR lands. Consequently, BLM-based Federal payments to Clatsop County are very small and generate a positive, but very minor effect on the county economy.

Economic contributions of BLM programs and payments total 7,900 jobs and over $350 million of earnings across the entire planning area. Total employment contributions range from a low of 240 jobs and $9.4 million of earnings in the Klamath Falls area (0.8 percent of area totals for each) to a high of 1,500 jobs and over $66 million of earnings in the Medford area (1.0 percent and 1.2 percent of area totals, respectively). Employment contributions from the timber program exceed all other programs in the planning area as a whole and in two of the model areas, Salem-Other and Coos Bay. Like employment, earnings contributions from the timber program exceed all other programs in the planning area and in the same model areas noted above, but also in the Eugene and Roseburg areas.

Expenditures by recreation participants on BLM-administered lands provide the largest employment contributions in the Salem-Portland MSA, Eugene, and Roseburg areas. In the Salem-Portland MSA, recreation-based jobs are approximately double those triggered by timber harvest and processing. In the Eugene area, recreation-based jobs exceed timber-based jobs by about 10 percent. In the Roseburg area, these jobs exceed timber-based jobs by about 4 percent. Expenditures by the BLM provide the largest employment and earnings contributions in the Medford and Klamath Falls areas. Jobs triggered through spending by recreation participants exceed those triggered through either BLM or local government spending in all model areas, except Medford and Klamath Falls where they are slightly smaller than contributions triggered by agency spending.

As a share of total area employment and earnings, BLM contributions as a whole range from lows of less than 1 percent in the Salem, Eugene, and Klamath Falls areas to highs of about 3 percent in the Roseburg and Coos Bay areas. Contributions in the Medford area are about 1 percent. While all contributions to local economies are important, economists often consider those that approach 5 percent of the total economy—as is the case for Roseburg and Coos Bay—as central to the economic well-being of an area.

The use and management of BLM-administered lands trigger direct, indirect, and induced effects touching every industry as they work their way throughout the local economies. Across the entire planning area, BLM management of public lands mostly affects Agriculture, Governments, Accommodation & Food Services, and Manufacturing. BLM management affects Agriculture more than other industries because of logging and forestry support sectors, but also because personal spending by worker households, regardless of the industry they work in, affects the agriculture industry. BLM payrolls and local government payrolls funded by Federal payments primarily affect the Governments sector. Recreation spending and personal spending by workers and their households affect Accommodations & Food Services. Finally, the forest products industry has a primary effect on Manufacturing. The leading industries for earnings are consistent with those for employment, with one exception; low wages and salaries in Accommodations & Food Services make this industry generally rank last among the top four industries across the planning area and in each of the model areas, whereas it ranks third in the top four for jobs. **Appendix P** contains detailed tables showing employment and earnings across all industries.

Table 3-176 and **Table 3-177** provide a more detailed look at BLM contributions to the forest products industry. Because the BLM harvest in 2012 yielded neither very large nor very small logs, the sawmill and logging sectors see most of the direct contributions, rather than the Veneer & Plywood sectors. Sawmill & Logging account for 63 percent of all industry employment and 69 percent of all earnings. Other than Klamath Falls, every area shows total employment in these two sectors ranging from 85–250 jobs and $5.4–$16.0 million in payroll. The largest employment and earnings contributions for the forest products industry occur in the Coos Bay and Roseburg model areas. BLM harvest contributes 3.2 percent of employment and earnings to the entire industry across the planning area, but it is especially vital to Coos Bay and Roseburg. In Coos Bay, 13 percent of industry jobs and payrolls depend on BLM harvest and in the Roseburg area, the share is 7 percent. These large shares demonstrate the important role that BLM timber harvest plays in these two areas of southern Oregon.

Table 3-178 provides detail into BLM contributions to two recreation-related industries in western Oregon (Arts, Entertainment & Recreation Services, and Accommodation & Food Services). While the BLM-related contribution to these sectors is primarily affected by recreation participant spending, other BLM activities contribute as well. Across the planning area, spending by recreation visitors, as well as spending by local households receiving earnings from BLM-based economic activities, results in over 1,600 jobs and $40 million of earnings in these two recreation-related sectors. The Salem-Portland MSA area led all areas with over 450 jobs and $12.7 million in payrolls in these sectors, followed by the Eugene, Roseburg, Medford, Coos Bay, Salem-Other, and Klamath Falls areas. BLM-administered lands in the planning area account for about 1 percent of all jobs and earnings in these two recreation-related industries. The contribution is particularly important in the Roseburg area where BLM-administered lands contribute 8.0 percent of industry jobs and 9.3 percent of industry earnings. In Coos Bay, the contribution is 4.6 percent of industry jobs and 5.3 percent of industry earnings. Contributions to the Roseburg and

Coos Bay areas range from 0.3 to 0.6 percent. As a share of the total planning area, BLM-administered lands contribute about 0.1 percent of all jobs and less than 0.1 percent of all earnings.

Federal Payments

Federal payments are an important contributor to local governments, providing funds for a variety of public services. Local government spending of Federal payments to employ personnel and purchase materials and services generates jobs and income. Eighteen counties in Oregon contain either O&C or CBWR lands, and therefore receive Federal payments under the Secure Rural Schools and Self-Determination Act (as amended). Each of these counties also receives Federal payments under the Payment in Lieu of Taxes Act. Socioeconomics Issue 3 discusses Federal payments to local governments and their contribution to public services funding. **Table 3-179** and **Table 3-180** identify the contribution of Secure Rural Schools (SRS) and Payment in Lieu of Taxes (PILT) payments to each of the 18 counties' economies.

Table 3-179 and **Table 3-180** estimate the contribution of BLM-based payments spent in 2012 that support both public and private sector payrolls. County governments spend SRS Title I and III payments directly; they have full discretion in the use of these funds, often using them for public safety and related services. Title II payments are directed by local resource advisory committees for resource-improvement projects on public lands in the area. In 2012, SRS payments contributed over 680 jobs and nearly $35 million in earnings to local economies throughout the planning area. Douglas and Jackson Counties have the largest employment effect with well over 100 jobs, followed by Lane and Josephine with over 90 each. Because each local government sets its own employment compensation rates, county rankings by earnings differ somewhat from those by employment. In terms of total county government payroll, Douglas County leads all counties, followed by Lane, Josephine, and Jackson Counties. PILT payments are typically much smaller than SRS payments, and thus generate smaller contributions to local economies. Across all of western Oregon, PILT payments provide 17 jobs and $0.9 million of earnings. All BLM-based Federal payments combined contribute nearly 700 jobs and $35.7 in earnings across the entire planning area. As a share of total employment and earnings, these estimates accounted for under 0.1 percent for the entire planning area and for each district model area.

Environmental Consequences

This section describes the employment and earnings effects of the No Action alternative, action alternatives, and the Proposed RMP. Changes in timber harvest, recreation visits, and BLM expenditures are the primary influences on projected future BLM-based employment and earnings in local economies in the planning area. There would be modest to no changes in mineral revenues across alternatives and the Proposed RMP, and the contribution of the livestock grazing program to BLM-based employment and earnings is much smaller than other programs, as shown in **Table 3-175**. Data in the tables in this section show effects for the year 2018—the mid-point of the first decade in the Woodstock vegetation modeling (**Appendix C**)—as an appropriate point for comparison of economic effects among alternatives and the Proposed RMP.

Table 3-181 shows economic effects by alternative and the Proposed RMP for the entire planning area by BLM program, timber-related industry, and recreation-related industry. With respect to total effects (i.e., direct, indirect, and induced), the alternatives and the Proposed RMP, except for Alternative D would result in an increase in jobs and earnings compared to 2012 figures based on Current-Modified.[98] The difference across alternatives and the Proposed RMP is substantial, ranging from 7,100 jobs and $310 million in earnings under Alternative D up to 12,200 jobs and $573 million in earnings in Alternative C. The Proposed RMP would generate about 8,500 jobs and $330 million in earnings. The timber program

[98] Current-Modified, i.e., payments to counties as they would have been under the O&C Act; see explanation in Summary of Analytical Methods.

would account for the highest shares of jobs and earnings under the No Action alternative and Alternatives A, B, and C (from 30 to 50 percent). Recreation would account for the highest shares of jobs under Alternative D (44 percent), but a smaller share of earnings (31 percent) compared with the timber program. Under the Proposed RMP, timber would account for the highest share of jobs at 39 percent and the highest share of earnings at 50 percent.[99] Timber shares would be highest under Alternative C, with 50 percent of all jobs and 52 percent of earnings, a 110 percent increase over Current-Modified. Recreation shares would be the lowest under Alternative C, with 25 percent of jobs and 17 percent of earnings, and the highest under Alternative D with 44 percent of jobs and 31 percent of earnings.

[99] Percentages may be calculated from the tables. For example 3,111 divided by 7,083 = 44 percent; $97.0 divided by $309.5 million = 31 percent.

Table 3-181. Total employment and earnings in the planning area

Program/ Industry	Employment (Jobs)							Earnings (Millions of 2012 Constant* $)						
	2012	2018						2012	2018					
	Current-Modified	No Action	Alt. A	Alt. B	Alt. C	Alt. D	PRMP	Current-Modified	No Action	Alt. A	Alt. B	Alt. C	Alt. D	PRMP
BLM Program														
Recreation	2,782	2,962	2,915	2,962	3,062	3,111	3,071	$87.2	$92.8	$91.3	$92.8	$95.5	$97.0	$96.0
Livestock Grazing	95	95	95	95	95	-	95	$1.4	$1.4	$1.4	$1.4	$1.4	$0.0	$1.4
Timber	2,897	4,720	3,127	3,989	6,093	2,477	3,366	$141.8	$227.7	$153.2	$194.5	$296.4	$122.1	$165.1
Minerals	6	6	6	6	6	6	6	$0.3	$0.3	$0.3	$0.3	$0.3	$0.3	$0.2
Agency Expenditures	1,423	1,860	1,458	1,677	2,253	1,285	1,732	$89.1	$115.5	$90.5	$104.2	$140.8	$79.3	$52.9
Federal Payments to Counties†	198	508	307	398	736	204	279	$10.5	$26.9	$16.3	$21.1	$39.0	$10.8	$14.8
Totals	**7,403**	**10,152**	**7,909**	**9,127**	**12,245**	**7,083**	**8,549**	**$330.1**	**$464.5**	**$352.9**	**$414.1**	**$573.4**	**$309.5**	**$330.4**
Timber-related Industries														
Forestry, Logging, & Support Activities	795	1,130	775	972	1,496	615	851	$46.3	$65.8	$45.1	$56.5	$87.0	$35.8	$49.5
Wood Products Manufacturing	518	959	555	738	1,179	421	561	$28.7	$53.2	$30.7	$40.9	$65.3	$23.3	$31.1
Paper Manufacturing	41	66	65	75	113	57	79	$3.7	$6.1	$5.9	$6.9	$10.4	$5.2	$7.2
Totals	**1,354**	**2,155**	**1,395**	**1,784**	**2,788**	**1,093**	**1,491**	**$78.7**	**$125.0**	**$81.8**	**$104.2**	**$162.7**	**$64.3**	**$87.8**
Recreation-related Industries														
Arts, Entertainment & Recreation Services	495	604	529	574	679	527	559	$13.9	$18.6	$14.0	$17.3	$24.8	$18.8	$19.5
Accommodation & Food Services	1,150	1,260	1,207	1,244	1,328	1,260	1,262	$26.0	$28.3	$23.5	$28.0	$37.5	$40.4	$37.6
Totals	**1,645**	**1,864**	**1,736**	**1,818**	**2,006**	**1,788**	**1,821**	**$39.9**	**$46.8**	**$37.5**	**$45.2**	**$62.4**	**$59.2**	**$57.0**

* Earnings in 2018 are expressed in 2012 dollars with unchanging or constant purchasing power.
† Federal payments include only those that would be paid under the O&C formula. Current has been modified as if O&C payments had been made in lieu of SRS payments.
Note: Totals may not add due to rounding

Change in total timber volume (including both ASQ and non-ASQ volume) is the most influential factor affecting economic consequences of the timber program under the different alternatives and the Proposed RMP, but composition of log sizes is also important. Logs of 24" or more (peeler logs) generate about three times more direct employment than smaller sawlogs. Logs less than 8" (roundwood) generate the least direct employment. Across the decision area, harvests in 2012 (243 MMbf) were 96 percent sawlogs with only 3 percent peeler logs and 1 percent roundwood. Under the No Action alternative (400 MMbf) and Alternatives A (249 MMbf), B (332 MMbf), and C (555 MMbf), harvests would have more volume than current, but peeler logs would account for 15–24 percent of total harvest. Roundwood would be steady across these alternatives at 13–14 percent of total volume. Given harvest volumes that would be greater than current and a mix of log sizes that would generate more employment than current, these alternatives show greater positive job and income effects. Under Alternative D (180 MMbf) harvest volumes would be less than current, but they would include a mix similar to the other alternatives. Under the Proposed RMP (278 MMbf), harvest volumes would be greater than current, with peeler logs accounting for 13 percent of total harvest.

As the BLM timber harvest would change, market forces would prompt private timberland owners to adjust their harvest volumes. The BLM anticipates that in 2018, private timberland owners would either increase their harvests modestly (8.2 MMbf short log under Alternative D) or decrease their harvests in varying amounts (-54 MMbf short log under the No Action alternative, -11 MMbf short log under Alternative A, -34 MMbf short log under Alternative B, -97 MMbf short log under Alternative C, and -17 MMbf short log under the Proposed RMP). See the discussion of market consequences in Socioeconomics Issue 1. The employment and earnings effects shown in **Table 3-181** incorporate these market implications.

The BLM's projections of recreation visits in 2018 vary from 5.6 million visits under Alternative A to 6.0 million visits under Alternative D. Visitation under the Proposed RMP is anticipated to reach 5.9 million visits in 2018. Under the alternatives and the Proposed RMP, except Alternative D, the BLM recreation program would remain the second largest generator of jobs among all BLM-based effects. Under Alternative D, recreation would rank first among programs, with over 3,100 jobs.

Employment and earnings estimates for the recreation program shown in **Table 3-181** are based on a 50-year implementation period for carrying out changes in the recreation management described for the alternatives and the Proposed RMP. Unlike a changing timber program, for which the BLM has many years of experience of shifting implementation to match objectives or targets, the agency would not be able to implement quickly the management necessary to increase recreation opportunities, even assuming full funding and staffing. In addition, substantially increasing recreation opportunities would require the development of new recreation facilities and new infrastructure to support specific targeted activities. Based on empirical evidence of past BLM recreation management, it would take substantially more than a decade from adoption of a new RMP to increase the recreation opportunities to new levels considered in several of the alternatives and the Proposed RMP. Given the uncertainties around the potential rate of increase in recreation management, the BLM assumed a 50-year implementation period to estimate the values in **Table 3-181**. However, it may be possible to implement new recreation management direction in a shorter time period. If the implementation rate were 20 years, for example, recreation visitation would increase much more quickly (except under Alternative A).

Under a 20-year recreation management implementation scenario, employment in the planning area by 2018 generated by visitor spending would increase over those shown in **Table 3-181** by 200–250 jobs under Alternative C and under the Proposed RMP, and by over 300 jobs under Alternative D. The Medford District would capture a large share of the additional jobs under these alternatives, ranging from 60–100 workers. The Roseburg District would see an additional 80 jobs under Alternatives C and D compared with those shown in **Table 3-181**. Increases in other districts would be more modest. There would be no change to the estimates in **Table 3-181** under the No Action alternative or Alternative B, and an 80-job decrease for the entire planning area under Alternative A, because visitation would not grow as quickly.

Across all alternatives and the Proposed RMP, BLM expenditures would continue to be an important generator of jobs and income across the planning area (**Table 3-181**). Jobs resulting from this spending would range from about 1,300 under Alternative D to more than 2,200 under Alternative C. Employment effects under Alternative A would be similar to Current-Modified, while those under the No Action alternative, Alternative B, and the Proposed RMP would be 250–400 jobs greater than Current-Modified. The timber program would be the primary determinant of BLM budgets in this part of the analysis. The timber program budget would vary depending on the mix of timber activities by district. For the purpose of this analysis, the BLM assumed that non-timber portions of BLM district budgets would be unchanged from current across all alternatives and the Proposed RMP. See Socioeconomics Issue 7 for additional details.

Payments to counties under the formula in the O&C Act would generate about 200 jobs under Alternative D. Under Alternative C, payments would generate over 700 jobs, and, under the other alternatives or the Proposed RMP, from 300 to 500 jobs. Alternative D would result in very similar numbers of jobs as those generated under Current-Modified. Payment-based employment would be about 280 jobs under the Proposed RMP. Earnings would follow the pattern of jobs, ranging from about $11 million under Alternative D to $39 million under Alternative C. Under the Proposed RMP, earnings based on O&C payments would be about $15 million in 2018.

Employment in timber-related industries would range from about 1,100 jobs under Alternative D to 2,800 jobs under Alternative C. Job counts under the alternatives and the Proposed RMP, except Alternative D, would increase compared to Current-Modified. Timber-related jobs under the Proposed RMP would be about 140 more than Current-Modified. Forestry, Logging, & Support Activities would continue to see the largest number of workers among timber-related industries.

Recreation-related industries include Arts, Entertainment & Recreation Services as well as Accommodation & Food Services. Typically, while these industries are aligned with spending by recreation participants, all BLM programs, not just recreation, affect economic effects in these industries. For example, local ranchers who earn a living by running livestock on BLM-administered lands may spend a portion of their income in the food service industry. Nonetheless, these industries offer a good indicator of recreation-based effects. Because wages in these industries are typically low, total earnings triggered by BLM management range from a low of 38 percent of those triggered by timber harvest under Alternative C and the No Action alternative to a high of 92 percent under Alternative D. Earnings in recreation-related industries under the Proposed RMP would be about $57 million, or 65 percent of those triggered by timber harvest.

Table 3-182 shows total job and labor income effects by BLM district model area and by alternative and the Proposed RMP. Except for the Medford District, Alternative C would have the largest employment and earnings increases across all district model areas and for the planning area as a whole. In the Medford District, the No Action alternative would have the largest employment and earnings increases. For the entire planning area, Alternative C's employment and earnings effects would be 20 percent greater than the No Action alternative, the next largest. Alternative C would be 65 percent larger than Current-Modified (12,245 versus 7,403 jobs). Alternative D would trigger smaller effects, a reduction from Current-Modified by 4 percent. Under the Proposed RMP, employment would rank third or fourth among all alternatives for all district model areas except Coos Bay, where the Proposed RMP would rank fifth. Earnings under the Proposed RMP would rank fifth or sixth for all district model areas except Salem-Portland MSA and Salem-Other, where the Proposed RMP would rank third.

Table 3-182. BLM-based total employment and earnings by district model area

District Model Area	Employment (Jobs)							Earnings (Millions of 2012 Constant* $)						
	2012	2018						2012	2018					
	Current-Modified†	No Action	Alt. A	Alt. B	Alt. C	Alt. D	PRMP	Current-Modified†	No Action	Alt. A	Alt. B	Alt. C	Alt. D	PRMP
Coos Bay	1,198	1,196	883	933	1,564	641	726	$54.4	$53.6	$37.9	$40.8	$72.4	$25.6	$25.5
Eugene	1,297	2,226	1,764	2,115	3,160	1,524	1,963	$56.6	$103.8	$79.5	$97.0	$150.4	$67.6	$76.7
Klamath Falls	231	283	224	277	305	197	268	$8.7	$11.1	$8.3	$10.9	$12.5	$8.9	$7.5
Medford	1,326	2,688	1,753	2,199	2,473	1,586	2,081	$58.6	$124.0	$79.5	$101.3	$113.4	$71.0	$71.9
Roseburg	1,225	1,672	1,100	1,314	2,008	1,062	1,257	$51.8	$74.0	$45.2	$56.4	$91.1	$41.4	$43.3
Salem-Other	851	845	874	928	1,240	765	896	$43.5	$44.1	$44.5	$47.2	$65.4	$37.8	$45.4
Salem-Portland MSA	1,275	1,241	1,312	1,360	1,494	1,309	1,358	$56.5	$53.9	$58.0	$60.5	$68.3	$57.3	$60.0
Planning Area Totals	**7,403**	**10,152**	**7,909**	**9,127**	**12,245**	**7,083**	**8,549**	**$330.1**	**$464.5**	**$352.9**	**$414.1**	**$573.4**	**$309.5**	**$330.4**

* Earnings in 2018 are expressed in 2012 dollars with unchanging or constant purchasing power
† Current has been modified as if O&C payments had been made in lieu of SRS payments. PILT payments are excluded
Note: Totals may not add due to rounding

The Eugene and Medford Districts would experience the largest effects across all alternatives and the Proposed RMP. Distribution of timber harvest and recreation visits across the areas primarily accounts for these large effects.

Table 3-183 provides a more detailed view of selected timber- and recreation-related industries by district model area. Coos Bay ranked first for economic effects of processing BLM timber in timber-related industries in 2012 (363 jobs and $20.8 million in earnings), but would rank anywhere from third to sixth behind other model areas in 2018 under the alternatives and the Proposed RMP. The Medford area would lead all areas in 2018 under the No Action alternative, but the Eugene area would lead all areas in 2018 under the action alternatives and the Proposed RMP. In all cases, the Klamath Falls area would experience the smallest economic effects. The same relationship among areas holds for employment as well as earnings.

Table 3-183. BLM-based total employment and earnings in timber-related* industries and recreation-related† industries by district model area

Metric		Employment (Jobs)							Earnings (Millions of 2012 Constant‡ $)						
Year		2012	2018						2012	2018					
Alternative/ Proposed RMP		Current-Modified§	No Action	Alt. A	Alt. B	Alt. C	Alt. D	PRMP	Current-Modified§	No Action	Alt. A	Alt. B	Alt. C	Alt. D	PRMP
Timber-related* Industries	District Model Area														
	Coos Bay	363	351	228	231	489	118	143	$20.8	$20.1	$13.1	$13.2	$28.0	$6.8	$8.2
	Eugene	212	503	383	505	881	288	433	$12.5	$29.9	$22.8	$30.0	$52.3	$17.2	$25.9
	Klamath Falls	21	39	13	32	38	26	29	$1.2	$2.2	$0.7	$1.9	$2.2	$1.5	$1.7
	Medford	139	560	243	377	406	191	303	$7.9	$31.9	$13.8	$21.5	$23.1	$10.9	$17.3
	Roseburg	280	442	185	263	505	154	231	$16.0	$25.1	$10.5	$15.0	$28.7	$8.8	$13.1
	Salem-Other	196	156	204	225	280	187	211	$11.8	$9.6	$12.5	$13.8	$17.2	$11.5	$13.1
	Salem-Portland MSA	142	104	139	150	188	129	141	$8.5	$6.2	$8.3	$9.0	$11.3	$7.8	$8.5
	Planning Area Totals	**1,354**	**2,155**	**1,395**	**1,784**	**2,788**	**1,093**	**1,491**	**$78.7**	**$125.0**	**$81.8**	**$104.2**	**$162.7**	**$64.3**	**$87.8**
Recreation-related† Industries	District Model Area														
	Coos Bay	204	214	198	203	231	194	200	$4.4	$4.5	$3.6	$4.2	$5.8	$5.1	$5.4
	Eugene	309	373	344	367	415	331	347	$7.4	$9.7	$7.7	$9.6	$12.1	$9.0	$9.3
	Klamath Falls	40	45	41	45	45	43	42	$0.8	$0.9	$0.7	$0.9	$1.0	$1.1	$0.9
	Medford	239	320	272	295	328	297	311	$5.3	$8.2	$5.9	$7.1	$10.9	$11.3	$11.3
	Roseburg	289	321	294	307	364	325	309	$6.5	$7.5	$5.6	$6.9	$12.9	$11.7	$8.7
	Salem-Other	109	113	113	117	133	110	117	$2.8	$2.8	$2.7	$3.1	$3.8	$3.4	$3.6
	Salem-Portland MSA	454	478	474	484	490	488	494	$12.7	$13.2	$11.3	$13.5	$15.9	$17.7	$17.8
	Planning Area Totals	**1,645**	**1,864**	**1,736**	**1,818**	**2,006**	**1,788**	**1,821**	**$39.9**	**$46.8**	**$37.5**	**$45.2**	**$62.4**	**$59.2**	**$57.0**

* Timber-related industries include Forestry, Logging & Support Activities; Wood Products Manufacturing; and Paper Manufacturing.
† Recreation-related industries include Arts, Entertainment & Recreation Services and Accommodation & Food Services. Totals include local resident spending whose earnings may be associated with non-recreation BLM programs.
‡ Earnings in 2018 are expressed in 2012 dollars with unchanging or constant purchasing power.
§ Current has been modified as if O&C payments had been made in lieu of SRS payments. PILT payments are excluded.
Note: Totals may not add due to rounding

By virtue of large recreation participant numbers, the Salem-Portland MSA area would continue to have the largest economic effects of any of the model areas from recreation-related industries, regardless of the alternative and the Proposed RMP. The Klamath Falls area would continue to experience the smallest effect. As noted above, total earnings in recreation-related industries triggered by BLM management are substantially smaller than those triggered by the BLM's timber harvest. Only in the Salem-Portland MSA would recreation-related earnings exceed timber-related earnings. Under the Proposed RMP and a 50-year implementation rate for recreation, all district areas would see increases in recreation-related jobs and earnings compared with Current-Modified, but increases would be more substantial for Medford, Eugene, and the Salem-Portland MSA areas.

Appendix P includes tables showing detailed economic effects by district model area and by alternative and the Proposed RMP.

Effects of Alternatives in Relation to the Broader Economic Context in Western Oregon

In the future, social and economic change in the planning area will result from the combined actions of many individuals, businesses, governments, and other organizations. A vast number of decisions made by thousands of individuals, businesses, and governments over the next decade will affect growth and change in population and employment with consequences for housing and transportation. For economic effect purposes, it is impossible to account for and project the effect of all such decisions separately. However, standard projections of population and employment that carry forward the economic momentum observed in current conditions and trends are a measure of how the economy is likely to develop, given known or reasonably foreseeable development. This section of the effects analysis takes such an approach by using an interpolation of employment in 2018 based on county-level forecasts by the Oregon Employment Department (Krumenauer and Turner 2014). These projections account for reasonably foreseeable levels of economic growth and enable an analysis that considers the cumulative effects of the alternatives and the Proposed RMP in the context of the broader western Oregon economy.

The BLM assumed, for purposes of this part of the analysis, that the State forecasts capture the effects of BLM management under the No Action alternative (i.e., the 1995 RMPs as written)[100] but do not capture the effects of Alternatives A–D or the Proposed RMP.

According to the State's projections, the planning area as a whole will experience 8.5 percent growth in employment between 2012 and 2018 (**Table 3-184**). The State attributes this growth to continuing recovery from the 2007–2009 recession, particularly for the construction industry; a growing health care sector, due in part to an aging population; and the need for replacement workers due to baby boomer retirements. However, growth will vary substantially among the district areas. Jobs in the Portland-MSA and Eugene areas will increase by over 9 percent, Salem-Other, Roseburg, and Medford by about 8 percent, and Klamath Falls by 6.6 percent. Forecasts for the Coos Bay area indicate job losses of over 7,000 jobs, a decrease of 17.5 percent in the 6-year period.

[100] The administrative vehicles for offering timber have become more diverse in recent years. These vehicles, such as permits and stewardship sale contracts, are used to offer an increasing share of total timber volume.

Table 3-184. Current and projected total employment by district model area (average annual jobs, percent)

District Model Area	Area Total Employment (Average Annual Jobs)		BLM-based Total Employment (Average Annual Jobs)						BLM-based Share of Area Total Employment (Percent)					
	2012	2018	2018						2018					
	Current	Projected*	No Action	Alt. A	Alt. B	Alt. C	Alt. D	PRMP	No Action	Alt. A	Alt. B	Alt. C	Alt. D	PRMP
				Incremental Change from No Action										
Coos Bay	40,276	33,235	1,196	-314	-263	367	-556	-470	3.6%	2.7%	2.8%	4.7%	1.9%	2.2%
Eugene	186,049	203,072	2,226	-461	-110	934	-701	-263	1.1%	0.9%	1.0%	1.6%	0.8%	1.0%
Klamath Falls	31,881	33,997	283	-60	-6	22	-86	-15	0.8%	0.7%	0.8%	0.9%	0.6%	0.8%
Medford	145,525	156,964	2,688	-935	-489	-215	-1,102	-607	1.7%	1.1%	1.4%	1.6%	1.0%	1.3%
Roseburg	46,527	50,422	1,672	-572	-358	336	-610	-415	3.3%	2.2%	2.6%	4.0%	2.1%	2.5%
Salem-Other	359,408	388,098	845	29	83	395	-80	51	0.2%	0.2%	0.2%	0.3%	0.2%	0.2%
Salem-Portland MSA	1,147,490	1,258,230	1,241	70	119	253	68	117	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
Planning Area Totals	**1,957,157**	**2,124,018**	**10,152**	**-2,242**	**-1,025**	**2,093**	**-3,068**	**-1,602**	**0.5%**	**0.4%**	**0.4%**	**0.6%**	**0.3%**	**0.4%**

* BLM estimates based on total employment projections by Oregon Employment Department (Krumenauer and Turner 2014)
Note: Totals may not add due to rounding

Under the No Action alternative, BLM-based contributions to the planning area in 2018 would account for 0.5 percent of all employment (10,152 divided by 2,124,018). The share of employment by district area would range from 0.1 percent to 0.3 percent in the Salem district areas to over 4 percent in the Roseburg and Coos Bay areas.

Table 3-184 shows how the action alternatives and the Proposed RMP would affect total employment compared to the No Action alternative. Under Alternative A, BLM-based employment would drop by 2,200 jobs compared to the No Action alternative. Most of the reduction would occur in the Medford area, followed by drops in Roseburg, Eugene, and Coos Bay areas. In contrast, the two Salem areas combined would experience very modest increases in jobs (about 100). Under Alternative B, declines in BLM-based employment would still occur, but would be moderated somewhat compared with Alternative A (i.e., a loss of approximately 1,000 jobs). The Medford, Roseburg, and Coos Bay areas would see the largest reductions, while the two Salem district models would see greater increases compared with Alternative A. Under Alternative C, employment would increase compared to the No Action alternative in aggregate across the planning area and in each model area except Medford, which would see a loss of approximately 220 jobs. Compared with the No Action alternative, Alternative C would offer the only gains (or least reductions for Medford) of any of the action alternatives or the Proposed RMP. In contrast, Alternative D would prompt the most reductions of BLM-based jobs. Compared with the No Action alternative, Alternative D would reduce employment across the planning area by approximately 3,100 jobs, a third of which would occur in the Medford area. Roseburg, Eugene, and Coos Bay would all experience reductions of 550–700 jobs. Under the Proposed RMP, the net number of job losses would be 1,600 compared with the No Action alternative. The Medford, Roseburg, and Coos Bay areas would see the largest reductions, while the Salem District areas as a whole would experience an increase of approximately 170.

The number of jobs affected is an important consideration, but the share of BLM-based employment to total employment puts such changes in context. Under the alternatives and the Proposed RMP, the Salem and Klamath Falls areas retain a small share of total area BLM-based employment (less than 1 percent). In the Eugene and Medford areas, BLM-based employment would range from 0.8 percent to 1.7 percent of total area employment. Thus, while the Medford area is vulnerable to some of the largest changes in BLM-based jobs, the employment is not a large share of area employment.

BLM-based jobs changes would have the largest effects in the Coos Bay and Roseburg areas. Under Alternatives A, B, and D, the Coos Bay area would not only experience a relatively large job loss across the economy (7,000 jobs from 2012–2018, or 17 percent of 2012 employment), but BLM-based jobs could accentuate job losses by another 600 jobs. Under the Proposed RMP losses would be 500 jobs. Under the No Action alternative, BLM-based jobs in Coos Bay would account for 3.6 percent of all jobs, but that share would drop in half to 1.9 percent under Alternative D, and to 2.2 percent under the Proposed RMP. Alternative C would increase the share to 4.7 percent.

Effects in the Roseburg area would not be as severe as those in the Coos Bay area. Job reductions in the Roseburg area under Alternatives A, B, and D would reduce BLM-based shares from 3.3 percent under No Action to 2.2 percent, 2.6 percent, and 2.1 percent, respectively. Under the Proposed RMP, BLM-based shares would be about 2.5 percent. State projections show Roseburg area employment increasing by 4,000 jobs over the next 6 years, and thus any reductions in BLM-based employment would moderate projected increases. Under Alternative C, BLM-based employment in Roseburg would increase to 3.8 percent of total employment.

Issue 3

What would be the effect of alternatives on payments distributed to counties from activities on BLM-administered lands?

Key Points

- There is uncertainty regarding the source and amounts of future payments to counties from activities on BLM-administered lands. Congress has not authorized payments under the Secure Rural Schools and Community Self-Determination Act (SRS) beyond 2016.
- SRS payments to counties totaled $38 million in 2012. Had payments in 2012 been based on the O&C Act formula, they would have been $12 million. Under the alternatives and the Proposed RMP, assuming payments were based on the formula in the O&C Act, payments in 2018 would range from a low of $19 million under Alternative D, to a high of $67 million under Alternative C. The Proposed RMP would result in payments of $26 million.

Summary of Notable Changes from the Draft RMP/EIS

The BLM updated the information on Secure Rural Schools payments and added discussion of the payments to counties for services provided in response to activities on BLM-administered lands.

Background

To compensate counties for foregone property tax payments on the O&C lands owned by the Federal Government, Congress passed the Oregon and California Lands Act of 1937, which mandated that the counties receive a percentage of the receipts from the timber harvested and sold from the O&C acres. Congress amended the 1937 Act in 1956 and again in 1976. Currently, counties receive 50 percent of the stumpage value of commercial timber harvested and sold from the O&C acres. Of the remaining 50 percent, the Federal Government spends 25 percent in the counties to help maintain and develop the O&C acres, and the remaining 25 percent goes to the U.S. Treasury.

According to the O&C Act, counties can use their O&C payments at their discretion and do so by providing county services mandated by the State of Oregon (Johnson 2009; USDI BLM 2014b). These services include sheriff's patrols, regulating and financing county and local roads, solid waste disposal, education, circuit courts, a county assessor, and a district attorney (Johnson 2009, includes a complete list of mandated county services).

The O&C payment formula remained largely unchanged until the early 1990s. In response to declining timber harvests and payments to counties in the 1980s, Congressional budget appropriations for 1991, 1992, and 1993 included a 'floor' payment equivalent to the average of payments from 1986 through 1990 (USDI BLM 2014b). In the Omnibus Budget Reconciliation Act of 1993 (OBRA), Congress included a safety-net payment also based on the average of payments for 1986 through 1990. In 1994, counties received 85 percent of this amount. In 1995 through 1999, payments to counties declined by 3 percent each year. The OBRA effectively decoupled payments to counties from current timber harvests on BLM-administered lands. Congress repealed the OBRA and passed the SRS in 2000. Like the OBRA, the SRS based payments to counties on an average of harvests from previous years. The 2000 SRS used the three highest harvest years between 1986 and 1990. Initially set to expire in 2006, Congress continued reauthorizing the program on an annual basis (Adams and Gaid 2008). Congress passed a 1-year reauthorization of the SRS program on October 2, 2013, at 95 percent of the 2012 amount (USDA FS 2014). In April 2015, Congress reauthorized the SRS program for 2 years, with funding at 95 percent of funding for the previous year, as described above under Analytical Methods (USDA FS 2015). Counties use the SRS payments in the same way they used O&C payments—to pay for state mandated services including public safety, county roads, and education (Tuchmann and Davis 2013).

As described below under Affected Environment, payments to counties have declined substantially since 2003. Counties have dealt with these declines in different ways. Some tried funding vital services such as public safety by passing property tax levies. Others considered sales taxes or outsourcing services such as libraries and public health. Some have also reduced staff, or limited or ended services. A sampling of reports describing the financial hardships and challenges that some of the O&C counties currently face include: Mortenson 2012a, Mortenson 2012b, Zheng 2013a, Zheng 2013b, and Mapes 2014a. As noted above (Socioeconomics Background), in 2012, the Oregon Secretary of State identified a total of eight counties, all in the planning area, whose financial condition may indicate a higher risk of distress than other counties.

The Governor's Task Force on Federal Forest Payment and County Services (Governor's Task Force, 2009*)* noted the concerns for counties of ending of the SRS program:

> *"Many of these hard hit counties looked beyond deep reductions in services and the depletion of their reserves to the likelihood of an unprecedented and unmanageable fiscal crisis within two to four years after the cessation of Federal forest payments. Only a belated reauthorization of these payments by the Federal Government in October 2008 averted a crisis which, compounded by the effects of the current recession, could have forced the collapse of as many as nine 'crisis counties' over the next several years"* (Governor's Task Force 2009, p. 4).

The Task Force concluded that county governments and residents had limited ability to make up the lost Federal payments. For example, the Task Force estimated that increasing property taxes and adding taxes such as a lodging tax and real estate transfer tax—if enacted by voters—would only recover between 8 to 24 percent of lost Federal payments (Governor's Task Force 2009).

The inability of some O&C counties to provide public safety services in the face of declining Federal payments is a major concern for county and State officials. Josephine County released dozens of inmates in 2012 because of budget cuts. In early 2014, Polk County announced it would no longer provide 24-hour sheriff patrols because of budget reductions. Residents in these and other O&C counties rejected public-safety tax measures over the previous years (Templeton 2013, Mapes 2013b, Zheng 2013a). In response to these developments, the Oregon Legislature passed a bill that would allow the governor to impose certain taxes, but only with the approval of county officials. These taxes would fund public safety services. Under the bill, the State would match the taxes paid by county residents (Mapes 2013a, 2013b).

The BLM and the U.S. Forest Service provide additional background information on the history of payments to counties from activities on Federal lands (USDA FS 2015, USDI BLM 2015).

Summary of Analytical Methods

The Federal Government makes, or has made, five types of payments to counties based on BLM-administered lands in the planning area:

- Secure Rural Schools (SRS) payments
- O&C Act formula derived payments
- Payments in lieu of taxes (PILT)
- Coos Bay Wagon Road-based payments (these only occur in Coos and Douglas counties)
- Payments by districts to counties for services provided in response to activities on BLM-administered lands

Secure Rural Schools

The O&C counties face an uncertain future regarding payments through the Secure Rural Schools and Community Self-Determination Act (USDI BLM 2014b). On April 16, 2015, Congress reauthorized the Secure Rural Schools and Community Self-Determination Act as a part of the Medicare Access and CHIP Reauthorization Act of 2015, and extended SRS payments for two years (Pub. L. 114-10). Section 524 would retain the annual decrease in the full funding amount currently provided in Section 3(11)(C) of the SRS Act, which provides that for FY 2012 and each fiscal year thereafter, the full funding amount shall be 95 percent of the full funding amount for the preceding fiscal year. Accordingly, the full funding amount for FY 2014 (FY 2015 payment year) would be 95 percent of the amount for FY 2013, and the full funding amount for FY 2015 (FY 2016 payment year) would be 95 percent of the amount for FY 2014 (USDA FS 2015; USDI BLM 2015). Given the uncertainty of SRS payments beyond 2016, the BLM assumed, for the purpose of analyzing the potential effects of the alternatives and the Proposed RMP, that the distribution formula in the 1937 O&C Act, as amended, will determine future payments (USDI BLM 2015). The potential for county payments to change due to future legislation is unrelated to the BLM's alternatives and the Proposed RMP. Comparing alternatives and the Proposed RMP using payments derived under the formula in the O&C Act illustrates how the alternatives and the Proposed RMP could affect payments if they were based on harvest amounts.

O&C Act Formula Derived Payments

The distribution formula in the O&C Act contains three key components:

- Volume (in MMbf) of commercial timber harvested from O&C lands
- Stumpage price (per MMbf) of this harvest
- Each county's proportion of the total assessed value of all O&C lands as they were in 1915 (See **Table 3-187** for each county's proportion)

Under the O&C Act, counties share 50 percent of the commercial stumpage value (commercial harvest volume times stumpage price), and the other 50 percent goes to the Federal Government. The Federal Government spends one-half of the amount, or 25 percent of the total receipts, in the counties to help maintain and develop O&C lands (Babcock 2014, USDI BLM 2015).

The BLM based its analysis of the effects of alternatives and the Proposed RMP on payments to counties on the results of the vegetation model, which estimates the future volume and stumpage value of commercial timber harvests on BLM-administered lands. To estimate the effect of the alternatives and the Proposed RMP on payments to counties, the BLM distributed 50 percent of the estimated commercial stumpage value using each county's proportion of the total assessed value for all O&C lands.

Payments In Lieu Of Taxes

The Federal Government makes payments in lieu of taxes (PILT) to counties to help offset the lost tax revenue from Federal ownership of land within the counties (DOI 2014). PILT payments to O&C counties totaled approximately $3.8 million in 2012 and $5.1 million in 2013 (DOI 2014). These figures represent approximately 10 percent of SRS payments to O&C counties in 2012, and approximately 13 percent in 2013 (USDI BLM 2014c). PILT payments derive from a complex formula that makes projecting future payments challenging. A recent report by the Congressional Research Service describes this issue:

> *"The authorized level of PILT payments is calculated under a complex formula. No precise dollar figure can be given in advance for each year's PILT authorized level. Five factors affect the*

calculation of a payment to a given county: the number of acres eligible for PILT payments, the county's population, payments in prior years from other specified Federal land payment programs, state laws directing payments to a particular government purpose, and the Consumer Price Index as calculated by the Bureau of Labor Statistics" (Corn 2014, Summary).

As an example of the complexity, one of the provisions in the PILT formula is subtracting certain Federal payments made the prior year from the current year's PILT payment. This provision, however, does not currently apply to all Federal payments tied to O&C lands. For example, the PILT does not require offsetting prior years SRS payments when calculating PILT payments for lands administered by the BLM (Corn 2014). The percentage of total Federal acres eligible for PILT payments attributed to BLM-administered acres in the O&C counties varies from approximately 5 percent for Multnomah County, to approximately 97 percent for Polk County (USDI 2014). Even though SRS payments derived from BLM-administered O&C acres are exempt from PILT calculations, payments tied to other Federal acres in these counties are not.

Given the complexity of the PILT formula and the challenges of estimating future offsetting Federal payments, the BLM did not include PILT payments in its analysis of the effects of the alternatives and the Proposed RMP on payments to counties.

Coos Bay Wagon Road Lands

Similar to PILT, the complexity and uncertainty around Coos Bay Wagon Road (CBWR)-based payments make it impossible for the BLM to project credibly the specific payments from these lands over time at the scale of this western Oregon planning effort. Rather than direct payments of timber receipts according to the O&C Act formula, the 1939 Coos Bay Wagon Road Act created an in-lieu of tax payment program for the CBWR lands. The CBWR lands occur only in Coos and Douglas Counties. Under this payment program, the BLM collects receipts for timber sold from the Coos Bay Wagon Road lands and uses them to pay in-lieu of taxes an amount based on the established method of taxation used in the State of Oregon for other lands of similar character in the state. Currently, Oregon utilizes a Forest Land Class method for forestland taxation and assigns maximum assessment values based on state-established productivity classes. The Oregon Department of Revenue publishes the assessment values annually. The Coos and Douglas County tax assessors also establish tax rates on an annual basis. The tax rate established by the county assessors is the tax rate paid on the Oregon-established taxable value for the CBWR lands.

The CBWR-based payments depend not only on the receipts for timber sold from CBWR lands, but also on assessment values and tax rates which would change over time. In 2013, CBWR payments totaled approximately $337,635 (USDI BLM 2014g). It is likely that the relative amount of these CBWR-based payments will generally follow the revenues to the counties derived from the O&C lands.

District Payments to Counties by BLM Districts

Activities on BLM-administered lands can create demand for county services. The BLM districts contract with local jurisdictions (counties and cities) to provide services such as noxious weed control, refuse removal, road maintenance and decommissioning, campground maintenance, habitat restoration, trail maintenance, law enforcement patrol, and emergency services. Comprehensive data of the cost to county governments of providing services on BLM-administered lands is lacking, and, further, payments for such services by BLM district is highly variable from year to year, depending on funding or special project needs. For these reasons, estimating the effects of the alternatives and the Proposed RMP on these agreements and payments would be highly speculative. Therefore, this effects analysis does not include BLM contracting payments to local governments for specific services.

Effects Analysis

The BLM's analysis of the effects of alternatives and the Proposed RMP on payments to counties used the outputs from the vegetation model that describes how alternatives and the Proposed RMP would affect harvest volumes and stumpage prices. The vegetation model produces data on total harvest volume, but county payments use commercial sales volume, a subset of total harvest volume. The BLM estimated commercial sales volume at 75 percent of total harvest volume, based on data from the actual 2012 harvest.

Likewise, the vegetation model provides stumpage prices per thousand board feet measured in long logs, while payments to the U.S. Treasury and O&C counties use thousand board feet of short logs. The BLM converted those prices to short log basis and then subtracted costs per thousand board feet for road maintenance, slash management, and other actions that support timber harvests. The vegetation model produces all price outputs in 2012 dollars. This facilitates comparisons of prices and stumpage values across alternatives and the Proposed RMP, and time. For example, the model estimates stumpage prices in 2018 for the No Action alternative of $310.41 per thousand board feet. Even though the estimate represents a stumpage price in 2018, the dollar values are in 2012 dollars. That is, the price estimates do not include an inflation factor for estimates at different years in the future.

The BLM calculated stumpage values by multiplying harvest volumes by stumpage prices, and calculated payments to counties in 2018 and in 2028 (mid-points of the first two decades) using the O&C payment formula described above. The BLM assumed that the distribution formula among the counties would remain as it was in 2012.

The BLM selected these two periods because they provide estimated payments up to 14 years in the future that allow comparisons with what payments would have been in 2012. Estimating the amounts and sources of county payments beyond these years would be overly speculative.

Affected Environment

Table 3-185 shows the recent historical trend in SRS payments. From a high of approximately $117 million in FY 2007, payments declined to approximately $38 million in FY 2012, an approximately 68 percent decline.

Table 3-185. SRS payments to counties, 2003–2012

County	FY 2012 SRS Distributions (Dollars)	FY 2010 SRS Distributions (Dollars)	FY 2007 SRS Distributions (Dollars)	FY 2003 SRS Distributions (Dollars)
Benton	$771,004	$2,381,408	$3,255,508	$3,116,768
Clackamas	$1,057,665	$4,703,493	$6,429,918	$6,155,895
Columbia	$712,608	$1,745,801	$2.386,600	$2,284,891
Coos	$2,333,965	$5,626,088	$7,691,152	$7,363,379
Curry	$1,442,516	$3,093,288	$4,228,685	$4,048,471
Douglas	$10,719,614	$21,342,441	$29,176,221	$27,932,820
Jackson	$5,455,997	$13,279,952	$18,154,381	$17,380,697
Josephine	$5,512,586	$10,237,513	$13,995,209	$13,398,776
Klamath	$1,073,616	$1,983,094	$2,710,992	$2,595,458
Lane	$5,247,157	$12,940,962	$17,690,964	$16,937,029
Lincoln	$127,952	$305,091	$417,076	$399,301
Linn	$1,237,384	$2,237,337	$3,058,556	$2,928,209
Marion	$518,109	$1,237,315	$1,691,474	$1,619,389
Multnomah	$248,900	$923,749	$1,262,813	$1,208,996
Polk	$898,016	$1,830,549	$2,502,455	$2,395,808
Tillamook	$220,123	$474,587	$648,785	$621,135
Washington	$142,145	$533,910	$729,883	$698,777
Yamhill	$272,785	$610,183	$834,152	$798,603
Totals	**$37,992,142**	**$85,486,761**	**$116,864,821**	**$111,884,403**

Source: USDI BLM 2014g

Not all counties rely on SRS payments to the same extent. **Table 3-186** shows FY 2012 SRS payments and payments as a percentage of total county revenues and of each county's general or discretionary fund. Of the counties in the planning area, Coos, Curry, Douglas, and Josephine Counties rely most heavily on Federal payments as measured by percentage of their total county revenues. However, expressing payments as a percentage of *total* county revenue does not demonstrate the importance of Federal payments to some of the counties. This is because Federal payments are part of the counties' discretionary or general fund, which is a subset of total county funds. **Table 3-186** shows that for the four counties cited above, Federal payments account for between 25 and 82 percent of general fund revenues.

Table 3-186. SRS payments and county revenues

County	FY 2012 SRS Distribution (Dollars)	SRS Payment as a Percent of County Revenues	SRS Payment as a Percent of General Fund
Benton	$771,004	0.8%	3.4%
Clackamas	$1,057,665	0.3%	0.8%
Columbia	$712,608	1.4%	2.4%
Coos	$2,333,965	11.0%	82.3%
Curry	$1,442,516	8.9%	25.5%
Douglas	$10,719,614	11.4%	69.9%
Jackson	$5,455,997	1.7%	9.0%
Josephine	$5,512,586	8.1%	59.0%
Klamath	$1,073,616	1.8%	8.4%
Lane	$5,247,157	2.2%	6.8%
Lincoln	$127,952	0.1%	0.4%
Linn	$1,237,384	1.5%	4.9%
Marion	$518,109	0.2%	0.7%
Multnomah	$248,900	-	0.1%
Polk	$898,016	1.8%	5.4%
Tillamook	$220,123	0.6%	1.5%
Washington	$142,145	-	0.1%
Yamhill	$272,785	0.5%	1.0%
Totals	**$37,992,142**	-	-

Source: USDI BLM 2014g; County budget data available at each county's website

As described above under Analytical Methods, the BLM estimated the impacts of the alternatives and the Proposed RMP on county payments using the formula in the O&C Act, as amended. As the starting point for this analysis, the BLM calculated what the counties would have received in 2012 if payments had been based on the O&C Act. **Table 3-187** shows the 2012 SRS payments that counties received ($38.0 million) and the 2012 payments the counties would have received based on the O&C Act formula (approximately $11.7 million). The total 2012 O&C payment would have been approximately 31 percent of the SRS payment ($11.7 million divided by $38.0 million). Each county would have received an amount based on its percent of the total assessed value of all O&C lands, as shown in the table. For example, Benton County would have received $328,733 based on 2.81 percent of $11,698,670.

Table 3-187. County payments in 2012, actual payments, and payments based on O&C Act formula

County	2012 SRS Payment Actual (Dollars)	2012 Payment, Under O&C Act Formula (Dollars)	Total O&C Lands Payment (Percent)
Benton	$771,004	$328,733	2.81%
Clackamas	$1,057,665	$649,276	5.55%
Columbia	$712,608	$240,993	2.06%
Coos	$2,333,965	$690,222	5.90%
Curry	$1,442,516	$427,001	3.65%
Douglas	$10,719,614	$2,930,517	25.05%
Jackson	$5,455,997	$1,833,182	15.67%
Josephine	$5,512,586	$1,413,199	12.08%
Klamath	$1,073,616	$273,749	2.34%
Lane	$5,247,157	$1,786,387	15.27%
Lincoln	$127,952	$42,115	0.36%
Linn	$1,237,384	$308,845	2.64%
Marion	$518,109	$170,801	1.46%
Multnomah	$248,900	$127,516	1.09%
Polk	$898,016	$252,691	2.16%
Tillamook	$220,123	$65,513	0.56%
Washington	$142,145	$73,702	0.63%
Yamhill	$272,785	$84,230	0.72%
Totals	**$37,992,142**	**$11,698,670**	**100.00%**

Sources: USDI BLM 2014g; Babcock 2014; Output from vegetation model

Environmental Consequences

Table 3-188 shows commercial harvest volumes, stumpage price, stumpage value, and total payment to O&C counties based on 50 percent of stumpage value, by alternative and the Proposed RMP for 2018 and for 2028. **Table 3-189** shows the breakdown by county for each alternative and the Proposed RMP.

Table 3-188. Total payments to O&C counties in 2018 and 2028

Year	Commercial Harvest Volume (Thousand Board Feet, Short Log)*	Stumpage Price per Thousand Board Feet Short Log, (2012 Dollars)	Stumpage Value (Harvest Volume × Stumpage Price), (2012 Dollars)	Area-wide Payments to O&C Counties, (2012 Dollars)
No Action				
2018	299,667	$310.41	$93,018,783	$46,509,392
2028	293,698	$287.81	$84,529,383	$42,264,692
Alt. A				
2018	186,461	$301.59	$56,234,740	$28,117,370
2028	182,762	$300.64	$54,946,390	$27,473,195
Alt. B				
2018	248,744	$292.91	$72,859,670	$36,429,835
2028	242,196	$283.63	$68,694,703	$34,347,352
Alt. C				
2018	416,244	$324.04	$134,880,041	$67,440,021
2028	411,550	$323.42	$133,101,547	$66,550,773
Alt. D				
2018	135,034	$277.02	$37,407,288	$18,703,644
2028	134,881	$271.69	$36,646,367	$18,323,183
PRMP				
2018	208,136	$245.94	$51,187,903	$25,593,951
2028	202,995	$273.68	$55,556,162	$27,778,081

* The vegetation model produces data on total harvest volume, but county payments use commercial sales volume, a subset of total harvest volume. The BLM estimated commercial sales volume at 75 percent of total harvest volume, based on data from the actual 2012 harvest.

Source: USDI BLM, based on results of vegetation model and O&C payments formula

Table 3-189. Payments to O&C Counties by alternative and the Proposed RMP for 2018 and 2028 (2012 dollars)

County	2012 Payment, Under O&C Act Formula (Dollars)	Analysis Year	No Action (Dollars)	Alt. A (Dollars)	Alt. B (Dollars)	Alt. C (Dollars)	Alt. D (Dollars)	PRMP (Dollars)
Benton	$328,733	2018	$1,306,914	$790,098	$1,023,678	$1,895,065	$525,572	$719,190
		2028	$1,187,638	$771,997	$965,161	$1,870,077	$514,881	$780,564
Clackamas	$649,276	2018	$2,581,271	$1,560,514	$2,021,856	$3,742,921	$1,038,052	$1,420,464
		2028	$2,345,690	$1,524,762	$1,906,278	$3,693,568	$1,016,937	$1,541,684
Columbia	$240,993	2018	$958,093	$579,218	$750,455	$1,389,264	$385,295	$527,235
		2028	$870,653	$565,948	$707,555	$1,370,946	$377,458	$572,228
Coos	$690,222	2018	$2,744,054	$1,658,925	$2,149,360	$3,978,961	$1,103,515	$1,510,043
		2028	$2,493,617	$1,620,918	$2,026,494	$3,926,496	$1,081,068	$1,638,907
Curry	$427,001	2018	$1,697,593	$1,026,284	$1,329,689	$2,461,561	$682,683	$934,179
		2028	$1,542,661	$1,002,772	$1,253,678	$2,429,103	$668,796	$1,013,900
Douglas	$2,930,517	2018	$11,650,603	$7,043,401	$9,125,674	$16,893,725	$4,685,263	$6,411,285
		2028	$10,587,305	$6,882,035	$8,604,012	$16,670,969	$4,589,957	$6,958,409
Jackson	$1,833,182	2018	$7,288,022	$4,405,992	$5,708,555	$10,567,851	$2,930,861	$4,010,572
		2028	$6,622,877	$4,305,050	$5,382,230	$10,428,506	$2,871,243	$4,352,825
Josephine	$1,413,199	2018	$5,618,335	$3,396,578	$4,400,724	$8,146,754	$2,259,400	$3,091,749
		2028	$5,105,575	$3,318,762	$4,149,160	$8,039,333	$2,213,441	$3,355,592
Klamath	$273,749	2018	$1,088,320	$657,946	$852,458	$1,578,096	$437,665	$598,898
		2028	$988,994	$642,873	$803,728	$1,557,288	$428,762	$650,007
Lane	$1,786,387	2018	$7,101,984	$4,293,522	$5,562,836	$10,298,091	$2,856,046	$3,908,196
		2028	$6,453,818	$4,195,157	$5,244,841	$10,162,303	$2,797,950	$4,241,713
Lincoln	$42,115	2018	$167,434	$101,223	$131,147	$242,784	$67,333	$92,138
		2028	$152,153	$98,904	$123,650	$239,583	$65,963	$100,001
Linn	$308,845	2018	$1,227,848	$742,299	$961,748	$1,780,417	$493,776	$675,680
		2028	$1,115,788	$725,292	$906,770	$1,756,940	$483,732	$733,341
Marion	$170,801	2018	$679,037	$410,514	$531,876	$984,624	$273,073	$373,672
		2028	$617,064	$401,109	$501,471	$971,641	$267,518	$405,560
Multnomah	$127,516	2018	$506,952	$306,479	$397,085	$735,096	$203,870	$278,974
		2028	$460,685	$299,458	$374,386	$725,403	$199,723	$302,781
Polk	$252,691	2018	$1,004,603	$607,335	$786,884	$1,456,704	$403,999	$552,829
		2028	$912,917	$593,421	$741,903	$1,437,497	$395,781	$600,007
Tillamook	$65,513	2018	$260,453	$157,457	$204,007	$377,664	$104,740	$143,326
		2028	$236,682	$153,850	$192,345	$372,684	$102,610	$155,557
Washington	$73,702	2018	$293,009	$177,139	$229,508	$424,872	$117,833	$161,242
		2028	$266,268	$173,081	$216,388	$419,270	$115,436	$175,002
Yamhill	$84,230	2018	$334,868	$202,445	$262,295	$485,568	$134,666	$184,276
		2028	$304,306	$197,807	$247,301	$479,166	$131,927	$200,002
Totals	**$11,698,670**	**2018**	**$46,509,392**	**$28,117,370**	**$36,429,835**	**$67,440,021**	**$18,703,644**	**$25,593,951**
		2028	**$42,264,692**	**$27,473,195**	**$34,347,352**	**$66,550,773**	**$18,323,183**	**$27,778,081**

Source: USDI BLM, based on results of vegetation model and O&C payments formula

The total payment in 2012 under the O&C Act formula would have been approximately $11.7 million. Under all the alternatives and the Proposed RMP, payments to counties in 2018 and in 2028 would exceed this amount. Payments under Alternative C would be the highest, approximately $67 million in 2018. Payments under Alternative D would be the lowest among the alternatives, at approximately $18.7 million, but would still be 60 percent above what the 2012 payment would have been. Payments under the Proposed RMP would be approximately $25.6 million in 2018, or over twice what the payment in 2012 would have been if it were calculated using the formula in the O&C Act.

Unlike the Proposed RMP, payments under all alternatives would be slightly lower (from 2–9 percent) in 2028 compared to 2018, reflecting lower non-ASQ-based timber revenues in the second decade. Payments under the Proposed RMP would increase between these two decades in response to higher timber revenues driven by increasing harvests of larger diameter timber (see Issue 1 above). **Table 3-189** shows the distribution of total O&C payments to each county, by alternative and the Proposed RMP, for 2018 and 2028, along with estimated O&C payments in 2012, had county payments been based on the O&C formula that year.

Payments to individual counties under all alternatives and the Proposed RMP would exceed what the counties would have received in 2012; though the payments would be less than they received in some earlier years under the SRS payments (see **Table 3-185**). The difference in payments would be substantial for many counties. For example, Polk County would have received approximately $253,000 in 2012 under the O&C formula but would receive approximately $404,000 in 2018 under Alternative D and approximately $1.5 million under Alternative C (in 2012 dollars); these figures would be the high and low payments to Polk County that year. Polk County would receive approximately $553,000 in 2018 under the Proposed RMP (**Table 3-189**). See the discussion of the earnings and employment effects of these payments in Issue 2.

Issue 4

How would the alternatives contribute to economic stability in the planning area?

Key Points

- Over the long-term (1969–2007), timber-based industries nationally exhibited low or negative growth rates with high volatility compared with the United States economy as a whole, indicating that these industries tend to be inherently volatile.
- Increases in timber industry activity in the planning area would bring potential for additional exposure to greater economic instability. Recreation-related industries are relatively stable compared with timber-related industries.

Summary of Notable Changes from the Draft RMP/EIS

The BLM incorporated estimates of recreation visits by alternative and the Proposed RMP. Based on this updated information, the BLM updated the discussion of the long-term implications on stability of a changing BLM recreation program together with the timber program.

Summary of Analytical Methods

Growth and stability are classic goals of economic development. Historic growth rates of employment and earnings offer an indication of economic growth in the planning area, while the volatility of these rates offer insights into the economic stability of both communities (geographic areas) and industries (business groups). Long-term growth rates express fundamental economic shifts or trends for geographic areas and industries. Issue 2 discusses short-term trends that may not represent fundamental economic shifts. This analysis does not address seasonal volatility within each year, but only long-term volatility over many years.

This issue presents an analysis of the cumulative effects on economic stability of past, present, and reasonably foreseeable future actions expressed in domestic and international markets, including land management on both BLM-administered lands and non-BLM-administered lands.

For the purposes of this issue, geographic areas are the same BLM district model areas defined under Issue 2 for which historic economic data exist and which function as economic units. Industries are business groups defined by the Bureau of Economic Analysis for which the same historic economic data exist (BEA 2014).

Using historic data from the Bureau of Economic Analysis (BEA 2014), the BLM estimated the magnitude and volatility of growth rates for all employment and earnings—inclusive of all industries—in all seven economic model areas within the planning area. The BLM also estimated comparable rates for those industries that BLM management of timber and recreation most affects. Other resources the BLM manages have very small effects, as shown in the contribution analysis (See Issue 2). Employment comprises all wage and salary workers. Earnings include total payroll compensation for the same workers.

Growth rates are an average of year-over-year changes covering six national business cycles (1969 to 2007), the longest period for which complete data are available. The coefficient of variation of these annual growth rates indicates volatility; this is a generally accepted metric in the finance and economic disciplines. Stability is the inverse of volatility. Thus, highly volatile growth rates indicate long-term instability, while modest to low volatility growth rates indicate long-term stability.

The BLM computed growth rates for resource-related industries nationally rather than for the planning area alone in order to understand the inherent and historic volatility of resource-based industries, independent of public land management policies and budgets. Observing characteristics of these industries nationally minimizes the influence that past public land policies in western Oregon may have had on local resource industry behavior. While industries in western Oregon may differ from their national counterparts with regard to historic volatility, the BLM assumes that national industry characteristics provide a reasonable metric for assessing local industries when analyzing the effects of the alternatives and the Proposed RMP. Characterizing the effects of the alternatives and the Proposed RMP on long-term economic stability requires reasoned assumptions about both reasonably foreseeable resource outcomes and probable industry responses (see USDI BLM 2008, p. 59). To the extent that these analytical assumptions are weak or incorrect (e.g., if local industries differ from national counterparts; if future effects of these industries on volatility differ from historic volatility), the effects described in this analysis would differ.

To provide a common reference point, the BLM calculated growth rates and volatility for the United States economy as a whole over the same period. The BLM then indexed growth rates and volatility for both BLM district model areas and national industries to the United States economy. Thus, an index greater than 1.00 indicates higher growth rates or volatility compared with the United States economy, an index less than 1.00 indicates lower growth rates or volatility, and an index of 1.00 indicates a match with the United States economy.

Affected Environment

Table 3-190 presents long-term growth rates and their volatility for employment and earnings for the United States as a whole, for the seven model areas in western Oregon, and for selected resource-related industries nationally. Timber-related industries include Forest & Wood Products (logging and primary wood manufacturing) and Paper Manufacturing (pulp, paperboard, and related paper or container industries). Recreation-related industries include Arts, Entertainment & Recreation Services (excluding museums, zoos, historical sites, and nature parks); Accommodations; and Eating & Drinking Places.

Table 3-190. Growth and volatility of employment and earnings by geographic area and selected resource-related industries over six United States business cycles, 1969–2007

Geographic Area or Resource-related Industry	Employment (Jobs)			Earnings (2012 Dollars)		
	Growth Rate		Growth Volatility	Growth Rate		Growth Volatility
	Average Annual (Percent)	Indexed to U.S.	Indexed to U.S.	Average Annual (Percent)	Indexed to U.S.	Indexed to U.S.
Geographic Area						
United States	1.82%	1.00	1.00	2.97%	1.00	1.00
BLM District Model Area						
Coos Bay	1.33%	0.73	2.86	1.55%	0.52	3.72
Eugene	2.42%	1.33	1.61	3.01%	1.01	1.83
Klamath Falls	1.19%	0.66	2.80	1.82%	0.61	2.88
Medford	3.28%	1.80	1.07	3.95%	1.33	1.42
Roseburg	1.81%	1.00	2.16	2.16%	0.73	2.99
Salem-Other	2.43%	1.34	1.18	3.32%	1.12	1.37
Salem-Portland MSA	2.57%	1.41	1.15	3.71%	1.25	1.15
U.S. Industry						
Timber-related						
Forest & Wood Products Industries	0.42%	0.23	15.50	1.36%	0.46	6.15
Paper Manufacturing	-0.91%	-0.50	3.77	0.74%	0.25	5.14
Recreation-related						
Arts, Entertainment & Recreation Services	3.85%	2.12	0.85	5.41%	1.82	1.12
Accommodations	2.24%	1.23	1.59	3.50%	1.18	1.56
Eating & Drinking Places	3.64%	2.00	0.83	3.63%	1.22	0.96

Note: Employment includes all wage and salary workers. Earnings include total payroll compensation for the same workers. Data were available and adjusted for inflation over six U.S. business cycles spanning 38 years.
Source: Bureau of Economic Analysis (2014)

Table 3-190 shows that between 1969 and 2007 (six business cycles), United States employment grew at an average annual rate of 1.8 percent, while earnings grew at 2.97 percent (net of inflation). As a rule, earnings growth that exceeds employment growth suggests increases in employee productivity over the long term.

Among BLM district model areas, the Salem-Portland MSA, Salem-Other (non-MSA counties), and Eugene areas had similar growth rates for employment and earnings. All of these areas exceeded the national growth rate by up to 40 percent for employment and up to 25 percent for earnings. For example, the Salem-Portland area's average annual employment growth rate was 2.6 percent, 41 percent higher than the average annual rate for the United States of 1.8 percent. However, these areas also exceeded national volatility of employment and earnings growth by 15–80 percent, which indicates instability. Growth rates in the southern half of the planning area mostly lagged behind the United States. The Klamath Falls area had the lowest growth rates of any model area (1.2 percent). In addition, Klamath

Falls' volatility of employment (2.80 percent) and earnings growth (2.88 percent) greatly exceeded those of United States economy. The Coos Bay area's volatility was also very high.

High volatility, or instability, is typically characteristic of commodity-based economies (Carter *et al.* 2011). The Medford area is an exception to the general pattern for southwestern Oregon. This area experienced the highest employment and earnings growth rates in western Oregon accompanied by modest to high stability. Growth and stability in the Medford area may result from its position as a strong regional service center coupled with a well-balanced economy.

National industries related to timber and recreation demonstrate a wide range of growth and volatility characteristics. Over six United States business cycles, the Forest and Wood Products Industries have grown slowly, and have shown a very high level of volatility (or instability). These commodity-based industries are subject to the highs and lows of business cycles not only in the United States, but also internationally. Employment volatility has been 15 times higher and earnings volatility 6 times higher than the United States economy. Paper Manufacturing has shown a negative growth rate for employment coupled with a very modest positive rate for earnings. This disparity suggests strong improvements in productivity driven by technology advances. Volatility for both employment and earnings is high in Paper Manufacturing, but not as high as in the Forest and Wood Products Industries.

Recreation-related industries exhibit a mix of growth rates and volatility. The Arts, Entertainment & Recreation Services industry has shown strong employment and earnings growth rates coupled with stability over the six business cycles. The same pattern holds true for employment in the Eating & Drinking Places industry, but earnings lag behind. Employment and earnings in the Accommodations industry has grown somewhat faster than the United States, but with volatility that is roughly 50 percent higher than the United States economy.

Environmental Consequences

Under the alternatives and the Proposed RMP, some resource-related industries may increase in employment and earnings while others decrease. If industries increase that exhibit historic instability, they may inject greater economic instability into their host communities. Conversely, if industries increase that exhibit historic stability, their greater presence may add economic stability to host communities.

As discussed under Issue 2, both timber and recreation programs would vary by alternative and the Proposed RMP. Recreation visitation across the planning area could increase up to 25 percent (Alternative D) with a 20-year implementation rate or 13 percent (Alternative D) with a 50-year implementation rate by 2018. The slowest rate of increase would be about 2 percent under the No Action alternative with a 20-year implementation rate. Timber harvest could increase by 130 percent (Alternative C) or decrease by 25 percent (Alternative D) by 2018. Under the Proposed RMP, timber harvest would increase by 14 percent. Changes in either the timber program or recreation program could have stability effects in their host communities.

Because this issue considers a long-term perspective of economic stability, the BLM considers timber harvest levels over 50 years. However, as described in the Forest Management section of this chapter, total harvests under the alternatives and the Proposed RMP do not vary more than 15 percent in any year compared to average harvest levels in the first decade, and all change in harvest levels over time are driven by non-ASQ harvest, such as restoration thinning in the reserves. Furthermore, the alternatives and the Proposed RMP would maintain its relative rank among all other alternatives in terms of total timber harvest through 50-years. Said differently, Alternative C would have the largest harvest at every point in the planning period, followed by the No Action Alternative, Alternative B, the Proposed RMP, Alternative A, and Alternative D. The alternatives and the Proposed RMP, except Alternative D, would result in timber harvest volumes exceeding current (2012) levels.

The BLM projects that recreation visitation across the planning area would more than double under Alternatives C and D, and the Proposed RMP by 2063, the end of the 50-year planning period. Both BLM management and demographic characteristics combine to create a range of recreation increases, but, for a given implementation rate, Alternative D would always show the largest increases. Following Alternative D, the long-term ranking would be consistent, that is, the Proposed RMP would show the second largest increases, followed by Alternative C, Alternative B, the No Action alternative, and Alternative A. No alternative would show a decrease of recreation visits at any time during the analysis period.

Because the timber industry has a long, national history of high volatility, alternatives and the Proposed RMP with harvest volumes that exceed current levels are likely to introduce greater instability into local economies, based on past business cycles. The expansion of existing timber-based corporations or the addition of new ones would bring additional jobs and earnings to the planning area, but could make the whole planning area more vulnerable to large fluctuations inherent in domestic and international timber markets. Alternative C, with the largest harvest volumes, would have the greatest effect on jobs and earnings, but also the greatest potential for increased economic instability. The No Action alternative, Alternative B, Alternative A, and the Proposed RMP, based on their lower harvest volumes compared to Alternative C, would have comparatively lesser effects on jobs and earnings and lower potential for increased economic instability. With harvest volumes below current levels on BLM-administered lands, Alternative D would show job and earnings reductions, but may moderate existing economic instabilities across the planning area.

Because the historic volatility index of timber-related industries exceeds the index for every model area, each model area that would show increases in timber industry activity over current (**Table 3-183**) would bring additional exposure to greater economic instability. There would be greater potential for instability in the Eugene and Medford areas for the alternatives and the Proposed RMP, in both Salem areas under Alternatives B and C, in the Roseburg area under the No Action alternative and Alternative C, in the Klamath Falls area under the No Action alternative and Alternatives B and C, and in the Coos Bay area under Alternative C only. Under the Proposed RMP, exposure to greater economic instability would occur in the Medford and Eugene areas.

Recreation-related industries are relatively stable compared with timber-related industries. Growth in the three recreation sectors[101] would bring additional economic stability in the long run. Growth in visitation would result in expansion for all three industries across the planning area and in each model area. Growth would be projected for the planning area under the alternatives and the Proposed RMP. Arts, Entertainment & Recreation Services and Eating & Drinking Places both have volatility indexes that are smaller than any model area, and thus would bring increased stability under the alternatives and the Proposed RMP. Accommodations, with an industry index higher than the Medford and both Salem model areas, would bring a small amount of instability under the alternatives and the Proposed RMP.

Under some alternatives or the Proposed RMP, more volatile timber-based and less volatile recreation-based influences may offset to some degree. For example, Alternative C would have the highest harvests and high visitation compared with the No Action alternative, which could result in some stability offsets. Under the Proposed RMP, lower harvests and high visitation compared with No Action could result in increased stability overall. Under Alternative D, with the lowest harvests and highest visitation compared with the No Action alternative, stability is likely to be the greatest. Because recreation visitation increases would be modest under the No Action alternative and Alternative B, timber would be a stronger influence

[101] Arts, Entertainment & Recreation Services; Accommodations; and Eating & Drinking Places

on economic stability in the long run. Under Alternative A, neither timber nor recreation would greatly influence stability.

Greater economic stability alone, whether achieved through the moderation of historically volatile industries or an increase in historically stable industries, does not guarantee an increase in the economic well-being of an area. Industrial specialization can be beneficial to an area, though it may subject the area to greater volatility at the same time. Growth and stability are both important—though sometimes competing concepts—in a portfolio of economic growth and development considerations.

Issue 5

How would the alternatives affect the capacity and resiliency of different types of communities in the planning area?

Key Points

- Currently, cities in the northern part of the planning area generally have higher capacity and resiliency (ability to face changes and meet needs) compared to cities in the southern part of the planning area. Larger cities tend to have higher capacity and resiliency.
- Alternatives B and C would, overall, make the strongest contributions to community capacity and resiliency, with positive benefits to nearly all communities. Alternative D would have the smallest effect on community capacity and resiliency. The Proposed RMP would make strong contributions to community capacity and resiliency to communities in the Eugene and Medford areas. The Proposed RMP would negatively affect community capacity and resiliency in the Coos Bay area.

Summary of Analytical Methods

This analysis focuses on the potential effects of the alternatives and the Proposed RMP on selected communities of place in the planning area, specifically on small and mid-size cities and tribal communities. The BLM conducted many of the socioeconomic analyses in this section at an appropriate county or district level, but recognized that this scale can mask differences among smaller communities within these broad areas, or fail to show how county-level impacts can affect communities.

Communities in Land Use Planning

The BLM uses a variety of social science information in land use planning. The BLM Land Use Planning Handbook (USDI BLM 2005) states that social science information can include the economic, political, cultural, and social structure of communities, regions, and the Nation as a whole; social values, beliefs, and attitudes; how people interact with the landscape; and sense-of-place issues.

While the other socioeconomic analyses focus more on the economic effects, this analysis focuses on the social effects of the alternatives and the Proposed RMP on communities.

Communities exist at a variety of scales but are commonly one of two types: communities of interest, unified by a common interest, or communities of place, unified by a common geography. To analyze the effects of the alternatives and the Proposed RMP on communities in western Oregon, the BLM considered analyzing the effects on communities of interest. However, due the practical difficulties of comprehensively identifying such communities and analyzing how the alternatives and the Proposed RMP would affect them, the BLM decided instead to focus on communities of place. Further, because much of the socioeconomic analysis is at the county level, the BLM opted to gain a different perspective on the potential effects of the alternatives and the Proposed RMP by analyzing communities at the sub-county level.

A 'community of place' is a distinct geographic area within which residents or Tribal members would generally associate themselves with a single location. For purposes of this analysis, this location is an incorporated city or Tribal land.[102]

Incorporated cities comprise approximately 70 percent of the population of the planning area, justifying special consideration in the socioeconomic analysis. In addition, there are seven federally recognized Tribes with land in the planning area. This analysis includes them as separate communities of place, as the United States acknowledges them as sovereign nations with inherent powers of self-government.

A unique feature of the analytical approach to this issue was 1- to 2-hour telephone interviews with representatives of the governments of approximately 15 communities. This gave community representatives the opportunity to tell their stories and provided insights into the social values, beliefs, and attitudes of their communities, thereby supplementing the statistical data the BLM collected regarding capacity and resiliency.

Capacity and Resiliency

Social scientists commonly use the terms 'capacity' and 'resiliency' when researching and analyzing communities. Resiliency in particular is a term used increasingly frequently with respect to communities' responses to natural disasters such as hurricanes and to other changes such as climate or major economic change.

Many communities in western Oregon have experienced large socioeconomic changes, particularly since the listing of the northern spotted owl, the subsequent injunction barring timber harvest in northern spotted owl habitat, and the adoption of Northwest Forest Plan in 1994. As part of the Northwest Forest Plan monitoring program, the U.S. Forest Service has been leading socioeconomic monitoring to answer the question: What is the status and trend of socioeconomic well-being? (Grinspoon *et al.* in press) (**Appendix V**). In light of this ongoing monitoring and the potential effects of the updated RMPs for Western Oregon on communities, the BLM analyzed the potential socioeconomic effects of the alternatives and the Proposed RMP through the lenses of capacity and resiliency, which are measures of a community's ability to face change.

There are different definitions of capacity and resiliency though they tend to have common elements. This analysis uses the following definitions:

- Community Capacity: a community's ability to face changes; respond to external and internal stresses, create and take advantage of opportunities, and meet its needs
- Community Resiliency: a community's ability to adapt to change over time

There is some overlap between the two concepts and the presentation of results does not attempt to draw a fine line between them.

Community Selection

There are 161 cities (incorporated places) in the planning area. The BLM decided to exclude 27 very small cities (populations below 500) and very large cities (populations over 40,000) from the group for analysis, bringing the number to 134. The exclusions were for the following reasons:

[102] Many people live in unincorporated communities. The Bureau of the Census recognizes these areas as Census Designated Places (CDPs). However, while census data are available for CDPs, they do not have local elected or appointed officials who can speak for them, and this analysis does not include them.

- Very small cities represent a very small share of the planning area population (less than 1 percent), and information and interviews could be difficult to obtain.
- Large cities tend to mirror or contribute substantially to the socioeconomic characteristics of the counties in which they are located. Other analytical questions are focused on counties, so that including large cities would be duplicative and reduce the desired focus on communities below the county level.

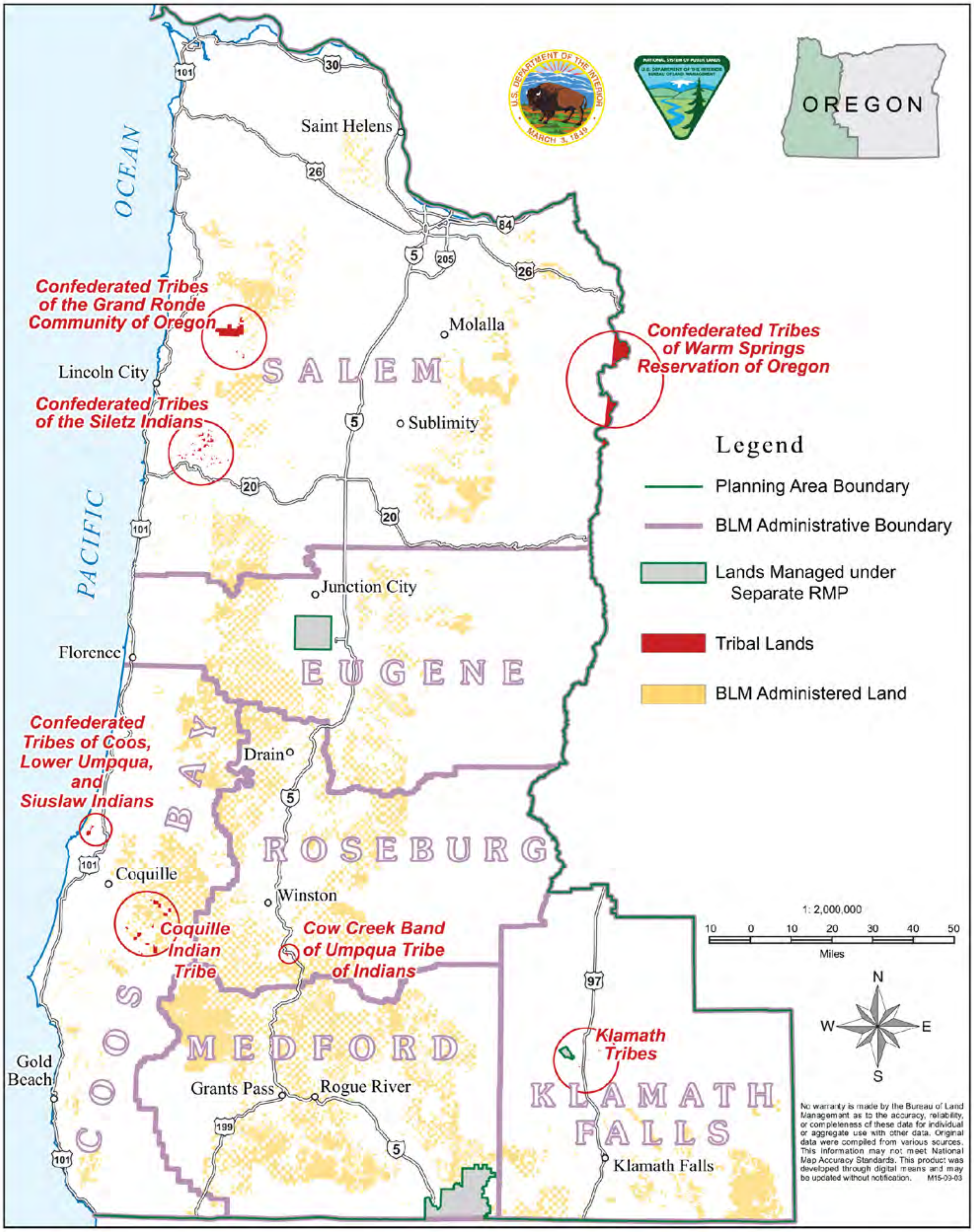
Analyzing all 134 cities, including personal interviews, would have been impractical. The BLM decided that a 10 percent sample of the 134 cities (i.e., approximately 13 cities) plus the Tribes would sufficiently represent the entire group, to enable an analysis sufficient to assess effects on community capacity and resiliency. The BLM stratified (weighted) the sample so that it would be representative of the diverse geography of the planning area.[103] The stratification was such that: (1) there were at least one or two cities from each BLM district; (2) there would be at least three rural cities from the Salem District;[104] and (3) Klamath Falls would be the representative city for the Klamath Falls Field Office.[105] Within these stratification rules, the BLM selected 13 cities at random from the group of 134 cities[106] (**Table 3-191** and **Map 3-7**). **Appendix P** shows all 134 cities in the sample group. The Planning Criteria document (USDI BLM 2014) contains a description of the selection methodology in detail, and is incorporated here by reference (USDI BLM 2014, pp. 140–148).

[103] Stratification was necessary because approximately 89 of the 134 cities (66 percent) are in the Salem District, and a random sample would likely have resulted in 8 or 9 of the 13 cities coming from the Salem District, which would not be representative of the diverse geography of the planning area.
[104] There are many urban cities in the Portland metropolitan area that, if sampled, would reveal little regarding the potential impacts of the alternatives and the Proposed RMP.
[105] The Klamath Falls Field Office has 4 cities, and 3 of them are small with populations under 850.
[106] To make the selections, the BLM used the random number function in Microsoft's Excel program.

Table 3-191. Selected communities (cities and Tribes) for analysis of capacity and resiliency

Selected Communities	County	District/Field Office
City		
Coquille	Coos	Coos Bay
Drain	Douglas	Roseburg
Gold Beach	Curry	Coos Bay
Florence	Lane	Eugene
Grants Pass	Josephine	Medford
Junction City	Lane	Eugene
Klamath Falls	Klamath	Klamath Falls
Lincoln City	Lincoln	Salem
Molalla	Clackamas	Salem
Rogue River	Jackson	Medford
St. Helens	Columbia	Salem
Sublimity	Marion	Salem
Winston	Douglas	Roseburg
Tribe		
Confederated Tribes of Coos, Lower Umpqua, and Siuslaw Indians	Coos	Coos Bay
Coquille Indian Tribe	Coos	Coos Bay
Cow Creek Band of Umpqua Tribe of Indians	Douglas	Roseburg
Confederated Tribes of the Grand Ronde Community of Oregon	Yamhill	Salem
Confederated Tribes of Warm Springs Reservation of Oregon	Clackamas and Marion	Salem
Klamath Tribes	Klamath	Klamath Falls
Confederated Tribes of the Siletz Indians	Lincoln and Polk	Salem

Note: While data for Tribes used census data for land owned by the Tribes, the analysis also considered Tribal members not living on Tribal-owned land



Map 3-7: Selected Communities (Cities and Tribes) used for the Analysis of Capacity and Resiliency

Data and Information about Communities

The BLM collected data and information about the selected communities from three sources: (1) publicly available data sources, primarily the U.S. Bureau of Census American Community Survey; (2) internet sites, primarily the official websites of the selected communities; and (3) interviews with community representatives.

Data Baseline

The publicly available data sources provided a data baseline for assessing potential impacts from the alternatives and the Proposed RMP. The BLM created the baseline from data on 13 metrics (measures) of capacity and resiliency including population, housing, jobs, unemployment, wages, income, health insurance, education, recreation, and assessable base. They are largely consistent with the metrics identified in **Table 37** of the Planning Criteria (**Appendix P**). The metrics chosen are among a large number of accepted potential metrics that exist (e.g., Jepson and Colburn 2013). The BLM selected the metrics in consultation with the Socioeconomic Working Group of the Cooperating Agency Advisory Group (see Chapter 4), based on their relevance to the capacity/resiliency question, availability of data across the communities, and analytic efficiency. The BLM summed each community's scores for all 13 metrics and expressed the totals as a percentage of the total theoretical maximum score; a higher percentage meant a higher level of capacity and resiliency.

The BLM recognized 4 capacity and resiliency categories based on the data score spread: high (over 65 percent), medium (60–64 percent), low (50–59 percent), and very low (less than 50 percent). The BLM assigned the communities to one of the categories based on its baseline score. Because of data limitations for the Tribes (see next section), the BLM did not assign the Tribes to a category.

Data Limitations

Most data have limitations, and the data in this analysis are no exception. First, most of the data for this analysis are from the American Community Survey, which the Bureau of Census derives from a sample of American households. They provide more detailed socioeconomic data than the decennial census, but the data have 'margins of error' (degrees of confidence, or reliability), and these tend to be greater for smaller communities because their sample sizes are smaller. Some communities commented on this during the interviews, and the BLM invited them to provide supplementary data.

The data are particularly unreliable for the Tribes, some of whom have very small populations living on tribal lands. The Tribes commented on this during the interviews, and they preferred to discuss the entire Tribal membership, not just the population living on Tribal lands.

Additionally, the way the metrics were selected and applied may incorrectly 'favor' one community over another, giving it a higher score. In other words, had the BLM selected different metrics, a different score might have been the result. Further, some metrics are arguably more important to capacity and resiliency than others are, whereas the calculations treat the metrics equally without weighting.

The BLM acknowledges these data limitations but believes that use of a relatively large number of metrics (i.e., 13 for the cities and 12 for the Tribes) mitigates the limitations and produces results that are useful and informative, especially when reviewed in conjunction with the interviews (see next section).

Interviews with City and Tribal Representatives

The BLM conducted interviews with city and tribal representatives in order to supplement the baseline data with representatives' personal experiences, perspectives, perceptions, and insights, and to help tell each community's 'story' in relation to the RMP revision. The BLM developed brief, introductory geographic and economic profiles of the selected communities to have some familiarity with the communities prior to the interviews. **Appendix P** contains these profiles.

The BLM contacted each of the selected communities' governments by phone and letter, inviting their participation. **Appendix P** contains copies of the letters. Of the 13 cities, 11 participated in an interview, 1 provided written responses to questions, and 1 declined to participate. Of the seven Tribes, two participated in an interview. The interviews typically lasted 60–90 minutes.

Each community government could decide who it wanted to participate. City representatives included city managers/administrators, mayors, county commissioners, and members of advisory boards. Tribal representatives included Tribal chairpersons, executive directors, and other staff. The interview conversations ranged widely but focused on the following questions:

- How do you view your community's 'capacity,' that is your community's ability to face changes, respond to external and internal stresses, create and take advantage of opportunities, and meet its needs?
- How do you view your community's 'resiliency,' that is your community's ability to adapt to change over time?
- How do the ways the BLM manages its resources affect your community (its capacity and resiliency)?
- Have changes in the BLM's resource management over time affected your community? In what ways?
- Are there changes in the ways that the BLM manages its resources that would increase your community's capacity and resiliency?

Note that the while many of the interviewees were community leaders, they spoke as individuals from the communities and not as official representatives of the communities. Thus, while the BLM takes their views as representative of the communities, it recognizes that the communities did not formally endorse the opinions expressed and that diversity of opinion in each community is likely.

Final Adjusted Capacity and Resiliency Categories

The interviews provided valuable insights into the communities. Following each interview, the BLM summarized the interview and sent it to the interview participants for comment. **Appendix P** contains all 14 interviews/written responses.

Based on what the interviews revealed about the communities and including insights that supplemented or put into perspective the baseline data, the BLM adjusted some of the communities' final assigned capacity and resiliency categories. This last step was qualitative and grounded in the interviews as documented.

Tribal Statement

The Tribes requested the following statement be included, given the data limitations described above, and the difficulty of using these data in an analysis of capacity and resiliency of the Tribes in the planning area. The Cooperating Agency Advisory Group's Tribal Working Group developed the following statement:

> *There are varying acreages of O& C lands located within the ancestral homelands of the seven western Oregon Tribes. Management of these lands has a direct impact on the cultural interests, traditional lifeways, and economic wellbeing of Tribal members.*
>
> *As defined above, capacity and resiliency from a social sciences perspective is a measure of a community's or group of people's ability to respond to certain events such as natural disasters, major economic change, external and internal stresses and to take advantage of opportunities to meet*

needs. However, it must be well communicated and understood that when applying a measure of capacity and resiliency to Tribes, that meaning may appropriately be interpreted differently.

Census data and the developed metrics used in this analysis become problematic when assessing Tribal capacity and resiliency. Oregon Tribes which had their federal status terminated in the 1950s and then were restored to federal recognition in the 1980s do not have a single reservation where all Tribal members live. The Congressional Acts restoring these Tribes established multiple county service areas where the Tribes have historical and cultural interests and where many Tribal members reside. These county service areas also have legal meaning for Tribal members to receive governmental services. The census data and metrics when applied to counties and cities focuses on a specific geographic location and the population living in this area. Using this same approach for the identified Tribal reservations is inaccurate because the focus for Tribes is a distinct group of people with special legal status living in multiple county locations. Applying the developed metrics to only Tribal members living on the specified reservation and in the respective county location gives conclusions which most likely are not reflective of the total Tribal population.

In respect to historic resiliency, Tribes have demonstrated perseverance and resiliency to the highest degree. Tribes have endured over two hundred years of devastation following the European occupation of native lands in North America. Tribes have also adapted to adverse actions, laws and policies of the United States government. Tribal people are still here, and in many cases, thriving – preserving culture, raising families, executing government functions, and significantly contributing to native and non-native people and their communities. Given that, it becomes clear that resiliency takes on a unique meaning when applied to Tribes.

For Tribes and their members there is also a culture dimension when determining capacity and resiliency. Those with strong ties to Tribal culture and active in traditional lifeways may have a very robust sense of capacity and resiliency which is not reflected by the non-Tribal analytical model used in this analysis.

Effects Analysis

The regional scale of the decision area and the geographical breadth of the potential effects are such that it is not possible to analyze with useful precision how the alternatives and the Proposed RMP would affect one specific local community versus another. Instead, the analysis assumed that effects to regions and counties would affect the local communities within those regions and counties, and either increase or decrease local community capacity depending on the different effects.

The capacity and resiliency effects analysis applied the environmental effects outputs from Issues 2 and 3 to the local communities as identified in the final adjusted capacity and resiliency categories. The key outputs from these issues were economic activity (jobs) and county payments. The analysis assumed that the communities in the categories were generally representative of the communities in the BLM district economic areas that the Issue 2 analysis modeled.

Affected Environment

Capacity and Resiliency Baseline

T**able 3-192** presents the baseline data. Column 2 of the table shows the comparison (reference) number used in applying the metric. For example, for the first metric, 'Population size compared to city average in sample', the comparison number is 7,264, which is the average population size of the 13 cities in the sample (or in the case of the Tribes, the 7 Tribes). Column 3 explains how the data should be interpreted, that is, what the purpose of the metric is, and what it expresses about capacity or resiliency. Column 4 explains how the scoring works. For example, in the case of the first metric, a city with a population 150 percent higher than 7,264 gets a score of 5 (e.g., St. Helens, which has a population of 12,807), whereas a city with a population between 125 percent and 75 percent of 7,264 has a score of 3 (e.g., Lincoln City, which has a population of 7,926). This differential reflects the fact that, other things being equal, places with greater population tend to have higher resilience (Harris *et al.* 2000).

Table 3-192. Capacity and resiliency metrics

1 Capacity/Resiliency Metric	2 Comparison (Reference) Number	3 Interpretation	4 Metric Application Method; City data compared to reference number. Scores range from 5 to 1. (5=higher capacity, 1=lower capacity)	Cities and Scores. Scores range from 5 to 1. (5=higher capacity, 1=lower capacity)												
				Coquille	Drain	Florence	Gold Beach	Grants Pass	Junction City	Klamath Falls	Lincoln City	Molalla	Rogue River	St. Helens City	Sublimity	Winston
Population size compared to city average in sample	7,264	Higher population ⇨ more capacity	150%=5, 150%-125%=4, 125%-75%=3, 75%-50%=2, 50%=1	2	1	3	1	5	2	5	3	3	1	5	1	3
Population change compared to State change rate (2000 to 2012)	12%	Greater increase in population ⇨ more resiliency	150%=5, 150%-125%=4, 125%-75%=3, 75%-50%=2, 50%=1	1	3	4	5	5	4	2	2	5	5	5	5	4
Population in 20-64 age cohort compared to State	61%	Greater population in this 'working' cohort ⇨ more capacity	150%=5, 150%-125%=4, 125%-100%=3, 100%-75%=2, 75%=1	3	2	2	3	2	3	4	3	3	2	4	2	3
Percent of housing that is owner occupied compared to State rate	63%	Higher share of owner occupied housing generally associated with resiliency	150%=5, 150%-115%=4, 115%-85%=3, 95%-75%=2, 75%=1	2	3	3	3	2	2	2	2	3	2	2	3	2
Unemployment rate compared to State	7%	A lower unemployment rate ⇨ more capacity	150%=1, 150%-115%=2, 115%-85%=3, 85%-55%=4, 55%=5	5	2	5	4	3	3	3	3	3	4	2	5	3
Jobs Sector Distribution Concentration Compared to the State (1)	0	A distribution closer to the State's ⇨ more resiliency	200%=1, 200%-175%=2, 175%-100%=3, 100%-0%=4, 0%=5	1	1	3	2	4	3	3	1	3	4	4	4	3
Percent of jobs paying over $3,333 per month compared to State	37%	A greater share of higher paying jobs ⇨ more capacity	125%=5, 125%-100%=4, 100%-75%=3, 75%-50%=2, 50%=1	3	2	2	2	2	3	2	1	2	2	2	2	4
Median household income compared to State	50,036	Higher household incomes ⇨ more capacity	150%=5, 150%-100%=4, 100%-75%=3, 75%-50%=2, 0%=1	3	2	2	4	5	2	2	2	5	2	4	5	2
Percent of population in poverty compared to State	15%	A smaller poverty population ⇨ more capacity	150%=1, 150%-135%=2, 135%-100%=3, 100%-50%=4, 50%=5	5	4	4	4	2	2	1	3	4	3	3	5	1
Percent of population with health insurance compared to State	84%	A higher share of the population with insurance ⇨ more capacity	125%=5, 125%-100%=4, 100%-75%=3, 75%-50%=2, 50%=1	3	3	3	3	4	3	3	3	3	3	3	4	4
Percent of population with a 4 year degree compared to State	20%	A higher share of the population with a degree ⇨ more capacity	>150%=5, 150%-125%=4, 125%-100%=3, <100%=1	1	1	1	1	1	1	1	1	1	1	1	5	1
Assessed Property Value Per Capita (dollars) compared to the city average in sample	75,099	Higher property value ⇨ higher tax base and more capacity	125%=5, 125%-100%=4, 100%-75%=3, 75%-50%=2, 50%=1	2	2	5	4	4	3	3	5	3	3	3	3	2
Acres of outdoor recreation land (per 1,000 population) compared to the State as a whole	8,605	More recreation land generally associated with more capacity	125%=5, 125%-100%=4, 100%-50%=3, 50%-25%=2, 50%=1	2	5	2	5	3	2	5	2	1	2	1	1	5
			Totals	**33**	**30**	**38**	**41**	**42**	**33**	**36**	**31**	**39**	**33**	**39**	**45**	**37**
			Comparison with Maximum Total of 65	**51%**	**46%**	**58%**	**63%**	**65%**	**51%**	**55%**	**48%**	**60%**	**51%**	**60%**	**69%**	**57%**

Notes and sources: See Tribes scores table

1 Capacity/ Resiliency Metric	2 Comparison Number	3 Interpretation	4 Metric Application Method Scores range from 5 to 1	Tribes and Scores						
				Confederated Tribes of Coos, Lower Umpqua, and Siuslaw Indians	Confederated Tribes of the Grand Ronde	Confederated Tribes of the Siletz Indians	Confederated Tribes of Warm Springs Reservation of Oregon	Coquille Indian Tribe	Cow Creek Band of Umpqua Tribe of Indians	Klamath Tribes
Population compared to tribal average in sample	753	Higher population = more capacity	150%=5, 150%-125%=4, 125%-75%=3, 75%-50%=2, 50%=1	1	2	2	5	1	1	1
Population change compared to State change rate (2000 to 2012)	12%	Greater increase in population = more resiliency	200%=5, 200%-150%=4, 150%-100%=3, 100%-50%=2, 50%=1	1	5	5	4	3	1	5
Population in 20-64 age cohort compared to State	61%	Greater population in this "working" cohort = more capacity	150%=5, 150%-125%=4, 125%-90%=3, 90%-70%=2, 70%=1	2	3	2	3	2	3	1
Percent of housing that is owner occupied compared to State rate	57%	Higher share of owner occupied housing generally associated with resiliency	125%=5, 125%-100%=4, 100%-75%=3, 75%-50%=2, 50%=1	1	1	3	4	1	5	2
Unemployment rate compared to State	7%	A lower unemployment rate = more capacity	198%=1, 198%-125%=2, 125%-75%=3, 75%-50%=4, 50%=5	1	1	2	1	3	5	3
Jobs Sector Distribution Concentration Compared to the State (1)	0	A distribution closer to the State's = more resiliency	200%=1, 200%-100%=2, 100%-75%=3, 75%-0%=4, 0%=5	4	1	3	1	4	4	2
Percent of jobs paying over $3,333 per month compared to State	37%	A greater share of higher paying jobs = more capacity	150%=5, 150%-125%=4, 125%-75%=3, 75%-50%=2, 50%=1	2	3	2	2	2	3	2
Median household income compared to State	50,036	Higher household incomes = more capacity	150%=5, 150%-125%=4, 125%-75%=3, 75%-50%=2, 50%=1	2	2	3	3	3	2	1
Percent of population in poverty compared to State	15%	A smaller poverty population = more capacity	200%=1, 200%-120%=2, 120%-75%=3, 75%-50%=4, 50%=5	2	2	1	2	2		4
Percent of population with health insurance compared to State	84%	A higher share of the population with insurance = more capacity	105%=5, 105%-85%=4, 85%-78%=3, 78%-20%=2, 20%=1	5	4	3	2	3	3	4
Percent of population with a 4 year degree compared to State	20%	A higher share of the population with a degree = more capacity	100%=5, 100%-50%=4, 50%-25%=3, 25%-15%=2, 15%=1	1	2	2	2	2	3	5
Acres of outdoor recreation land (per thousand population) compared to the State as a whole	8,605	More recreation land generally associated with more capacity	150%=5, 150%-125%=4, 125%-45%=3, 45%-15%=2, 15%=1	3	5	3	1	3	5	5
			Totals	**24**	**31**	**31**	**30**	**29**	**35**	**35**
			Comparison with Maximum Total of 60	**40%**	**52%**	**52%**	**50%**	**48%**	**58%**	**58%**

Notes: (1) A measure of difference in the distribution of jobs by sector in a 5-mile radius of the community compared to the distribution of jobs for the State. A lower number means a smaller difference in distribution and is generally healthier, (i.e., closer to the distribution for the State as a whole). Assessed Value Per Capita metric not applicable for Tribal lands; no property tax is levied.

Sources:

Environmental Resources Management (ERM) based on:

U.S. Census Bureau; American Community Survey, 2012 American Community Survey 5-Year Estimates, Tables DP03, DP04, DP05, S1901 and S1701; generated by Joan Huston; using American FactFinder, http://factfinder2.census.gov; (May 2014).

U.S. Census Bureau; American Community Survey, 2009 American Community Survey 5-Year Estimates, Tables DP03, DP04, DP05, S1901 and S1701; generated by Joan Huston; using American FactFinder, http://factfinder2.census.gov; (May 2014).

U.S. Census Bureau; Census 2000, Summary File 1, Table DP05; generated by Joan Huston; using American FactFinder; http://factfinder2.census.gov; (May 2014).

U.S. Census Bureau. 2013. OnTheMap Application. Longitudinal-Employer Household Dynamics Program. http://onthemap.ces.census.gov/, generated by Clive Graham July 3, 2014.

Assessed Property Value derived from individual County Assessors Offices Summary of Assessment and Tax Rolls

Oregon Parks and Recreation Department. 2011. Oregon Statewide Outdoor Recreation Resource/Facility Bulletin Final Report. A Component of the 2013–2017 Oregon-Statewide Comprehensive Outdoor Recreation Plan.

The scores for each metric range from 5 (higher capacity) to 1 (lower capacity). The theoretical maximum score for a city is 65 (13 metrics times 5). For the Tribes, the maximum is 60, because their dataset used only 12 metrics (the 'assessed value per capita' is not applicable to Tribal lands). **Appendix P** includes the raw data for the metrics.

At the bottom of **Table 3-192** are the combined total scores for all 13 metrics for each city and Tribe and a comparison of the total to the theoretical maximum score, expressed as a percentage. For example, Drain's total score from all 13 metrics is 30, which is 46 percent of 65.

Interview Summary and Conclusions

Capacity

The community representatives had different perceptions of their capacity, depending on their circumstances and situations. Many of the interviewees felt that their communities are very challenged by today's economic environment; they do not feel they have recovered from the 2007–2009 recession. Examples include Coquille, the Coquille Indian Tribe, Gold Beach, Klamath Falls, Rogue River, and Winston. These communities tended to fall into two groups: those whose representatives regard the community as timber-dependent and those whose representatives regard their economies as heavily reliant on the tourism sector, which tends to be seasonal and dependent on the broader economy.

Few, if any community representatives admitted to having an excess of capacity. Indeed, almost every community representative spoke of community financial stresses, especially in light of Oregon's citizen-driven tax cap initiatives that limit cities' ability to raise revenue. Many community representatives spoke of the impact of the reductions in timber payments to the counties, which have resulted in the counties reducing or cutting off funds to the cities.

On the other hand, several community representatives spoke of their strong human capacity, which is the willingness and eagerness of their residents to pitch in to benefit and support community life, especially in hard times. Examples include Coquille and Junction City. One counter case is St. Helens, whose representatives cited a loss of social cohesion, as they estimated 75 percent of the City's labor force now commutes to jobs in Portland and Hillsboro.

Resiliency

Community representatives had a range of perceptions regarding their resiliency. Some representatives felt their communities are at a 'tipping point' or crossroads with respect to their survival as communities with the capacity to meet their needs and obligations fully. The Grants Pass representatives used this actual 'tipping point' phrase, but others expressed similar feelings, including those from Coquille, the Coquille Indian Tribe, Drain, Gold Beach, Klamath Falls, Rogue River, and Winston.

These representatives feel their communities have low resiliency. To a varying extent, they see their communities as victims of a combined set of circumstances that has hit them hard:

- Decline of the timber industry and the resulting loss of 'family wage' jobs (the jobs that have replaced timber-related jobs pay less)
- Decline in payments to counties that have resulted in reductions in pass through funds to cities
- A broader economy that, for some, has not recovered from the 2007–2009 recession
- Lack of economic options. This varies by community but particularly affects geographically more isolated communities (Coquille Indian Tribe, Gold Beach, Klamath Falls) and smaller, timber-dependent communities, where the ebbs and flows in timber-related employment have major direct and ripple impacts on the community (Coquille, Drain, Rogue River, Winston). The

Coquille representative, for example, estimated that 30–50 percent of all jobs are at the City's one remaining mill.

- Broad political-economic shifts that favor Oregon's larger cities and metropolitan areas at the expense of western Oregon's rural areas. Smaller communities' representatives feel that they just cannot compete.
- Some community representatives feel that decision-making and related lawsuits, especially at the Federal level, are unbalanced; they overly favor environmental interests and considerations compared to local economic interests, (e.g., Drain, Klamath Falls, and Sublimity). Some representatives feel that what they perceive as overly protective environmental regulations deny them the tools to adapt economically.
- Demographic shifts, especially loss of school age children (Coquille, Drain, Rogue River, Winston), which is the result of the loss of jobs that support families, and, in some communities, an aging population.

Representatives of both coastal communities (e.g., Florence and Gold Beach) and some interior communities (e.g., Klamath Falls and Rogue River) described their communities as experiencing influxes of retirees.[107] Further, the general feeling among these representatives was that their retirees are not particularly beneficial fiscally or economically, unlike for communities that attract retirees that are more affluent.

Some community representatives (Coquille, Gold Beach, and Klamath Falls) described divisions among their residents in reaction to these circumstances. They described some groups as seeing the potential for a timber-based economy to come back, while others think that it is not coming back and that their communities need to adapt to the 'new normal.' The representatives pointed out that these divisions make it difficult to set future-oriented community policy.

Most of the community representatives described their efforts to adapt to their new situation, notwithstanding the challenges described above, as follows:

- Some communities have been able to 'move on' by diversifying their economies (e.g., Junction City and Sublimity).
- Others are trying to diversify their economies (e.g., Coquille Indian Tribe, Florence, Grand Ronde, Grants Pass, and Klamath Falls).
- Several smaller community representatives described how challenging it is for them to diversify (e.g., Coquille, Gold Beach, Klamath Falls, and Rogue River).
- Other community representatives said they were less tied to the natural-resource economy in the first place (e.g., Lincoln City).
- Two of the communities, St. Helens and Molalla, are near the Portland and Salem metropolitan areas, and their representatives pointed out that much of their labor forces now commute to these areas.

BLM Influences on Capacity and Resiliency

The interior communities in the southern part of the planning area (i.e., Coquille Indian Tribe, Drain, Grants Pass, Rogue River, and Winston) tended to perceive more direct effects from the BLM compared to the other communities. However, nearly all the communities feel that BLM affects them in two ways: BLM's management impacts on the broader economy, and its impacts on the counties, which they feel ripple through to the communities. The Grants Pass interviewees said that cities were "joined at the hip" with the counties. The Coquille Indian Tribe interviewees spoke of the BLM's impact on the Tribe in

[107] The BLM speculates that the lower cost of living in smaller communities may attract some retirees, though some communities also cited Oregon's high quality of life.

three ways: direct effects on the Coos County economy, indirect economic effects on the Tribal members who are spread across five counties, and direct effects on the Tribe due to its legal mandate to manage its forest consistent with BLM's management practices. The Tribe specifically wants to decouple management of the Coquille Forest from BLM management practices.

With respect to the BLM's impacts, the way the BLM manages timber is by far the number one issue of concern among the communities. The primary concern is economic. The community representatives share a common view that the BLM is party to a worldview that no longer allows for economic use of a (timber) resource that is abundant and renewable. In their view, the BLM is not managing the resource for the benefit of local communities, and, in consequence, they experience the effects of millions of dollars of potential income that are lost every year. A few of the communities (Drain, Sublimity) referred to the O&C Act of 1937 in making these points.

In this view, expressed most strongly by representatives of the more timber-dependent communities, the loss of income has hurt them economically and fiscally. The economic effects described by these representatives include the loss of family wage jobs, and the high poverty rates and demographic changes (fewer families with school age children, more elderly and retirees) that they see as resulting in communities failing to sustain local business and community activity. They also described reductions in services the counties provide (sheriff, courts, libraries, jail, health and social services, and juvenile services) and reductions in pass-through funds from the counties (for street repairs and upgrades). Several representatives (i.e., Coquille, Coquille Indian Tribe, Grand Ronde, and Winston) spoke of the negative impacts from cuts in funding for schools that affect their residents and Tribal members.

Fire is another major management issue for the communities, including the perceived lack of timber management that some interviewees believe has led to increases in fires. The Grants Pass representatives felt very strongly about this, citing large fires in 2013 (such as the 75,000-acre Big Windy Fire) that effectively shut down the city, causing economic losses, heat, human health effects, and negative reputational impacts. From the community representatives' perspectives, the cost of fighting forest fires is huge, affecting State budgets and subsequently affecting counties and cities as the State directs resources away from other priorities.

Several representatives (i.e., Coquille, Grants Pass, Klamath Falls, Rogue River, Sublimity, and Winston) felt that fewer managers and loggers in the forest and the steep decline in harvest since the 1990s have resulted in forests that are overgrown and more susceptible to damaging fires. They add that reduced or blocked access due to lack of management makes fighting the fires more difficult.

A few of the communities (i.e., Coquille, Florence, Gold Beach, Rogue River, and Winston) mentioned nearby BLM-managed recreation or had management concerns for specific sites. However, representatives of most communities did not describe BLM-provided recreation as a major factor affecting their community, and only a few places (e.g., Grants Pass) perceive it as important to local economies. A few communities cited lack of access and increasingly reduced access to the forest as reducing or limiting recreational activity, including hunting. The Grand Ronde representative specifically expressed disappointment over declining opportunities to hunt deer and elk, fewer openings and meadows due to lack of active management.

Some communities spoke of the BLM's role in supporting both local, resident-based recreation and the region's broader efforts to attract visitors (Gold Beach, Klamath Falls, and Lincoln City). However, some expressed the view that recreation/tourism were poor substitutes for local, resource-based jobs that provide family-wage salaries.

Representatives did not mention BLM management of other resources, such as livestock grazing, minerals, fisheries, or cultural resources as factors affecting communities, except in site-specific circumstances. The Tribes expressed a broader interest in these management practices, since their interests range over multiple counties.

Capacity and Resiliency Summary

The total scores from the capacity and resiliency data baseline are close, but there are differences. For example, the total percentage point spread was 23 points among the cities and 18 points among the Tribes **(Table 3-193)**. While strong data trends are a little difficult to discern, with the data from some metrics at variance with other data, it is possible to make the following overall observations:

- Cities in the northern part of the planning area generally have higher capacity and resiliency scores.
- Cities in the southern part of the planning area generally have lower capacity and resiliency scores.
- Grants Pass is a notable exception, its higher score driven by population, income, and employment metrics.
- Cities on the coast generally have lower capacity and resiliency scores. Gold Beach is a notable exception, its higher score driven by population, income, and recreation metrics.
- While there were few larger cities in the sample (only 3 of 13 are > 10,000 population), they tended to have higher scores, though Klamath Falls had a lower score.
- Data limitations and historical/cultural considerations make it difficult to assign capacity and resiliency scores to the Tribes.

Table 3-193. Capacity and resiliency data summary

1 Capacity and Resiliency Category	2 Percent of Maximum Data Score	3 Category Based on Data Score Alone
High	> 65%	Grants Pass Sublimity
Medium	60–64%	Gold Beach Molalla St. Helens
Low	50–59%	Coquille Florence Junction City Klamath Falls Rogue River Winston
Very Low	< 50%	Drain Lincoln City

Note: Due to data limitations the table does not include the scores of the tribes (see Analytical Methods).

There are no hard and fast rules to distinguish between different levels of capacity and resiliency, but distinguishing among communities is useful for assessing the impacts of the alternatives and the Proposed RMP. **Table 3-193** recognizes four capacity and resiliency categories based on the data score spread:

high, medium, low, and very low. See the categories and ranges in columns 1 and 2 and assignments in column 3.[108]

Figure 3-138 shows the final assignments including adjustments to the scores in **Table 3-193** based on the insights from the interviews. The figure includes overlapping categories recognizing that capacity and resiliency are concepts that encompass a wide range of contributory factors on which communities may be variously stronger or weaker.

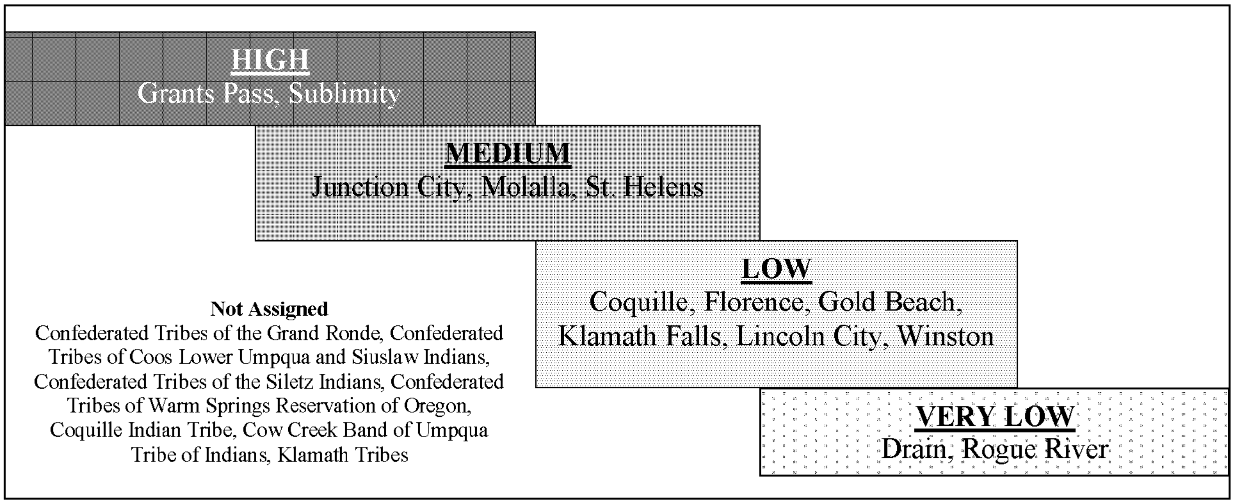


Figure 3-138. Capacity and resiliency affected environment summary

Environmental Consequences

To assess effects on community capacity and resiliency, the analysis focuses on: (1) effects on local economies, especially jobs and the associated earnings that result in spending in the communities; and (2) effects on county payments that affect the services the counties provide in communities, and in some cases, funds that counties pass through to communities.

Employment

Under the No Action alternative and under Alternative C, BLM-based employment (i.e., the number of jobs resulting from BLM activities and programs), would increase in every BLM district model area **(Table 3-193)**. This job growth would increase capacity and resiliency in local communities across the planning area. **Table 3-194** shows change in BLM-based employment by district model area. **Table 3-195** shows the effects of this change on the 13 selected cities.

[108] This grouping of communities based on resiliency scores is consistent with other analyses of the effects of public land management, for example: Harris *et al*. 2000, op. cit.

Table 3-194. Change in BLM-based employment for district model areas

District Model Area	Jobs in 2012* (Number)	No Action (Percent Change)	Alt. A (Percent Change)	Alt. B (Percent Change)	Alt. C (Percent Change)	Alt. D (Percent Change)	PRMP (Percent Change)	Number of Communities by Capacity-Resiliency Category†
Coos Bay	1,198	< -1%	**-26%**	**-22%**	31%	**-46%**	**-39%**	Low - 2
Eugene	1,297	72%	36%	63%	144%	18%	51%	Medium - 1, Low - 1
Klamath Falls	231	23%	**-3%**	20%	32%	**-15%**	16%	Low - 1
Medford	1,326	103%	32%	66%	87%	20%	57%	High -1, Very Low - 1
Roseburg	1,225	36%	**-10%**	7%	64%	**-13%**	3%	Low -1, Very Low -1
Salem-Other	851	**-1%**	3%	9%	46%	**-10%**	5%	Low - 1
Salem-Portland MSA	1,275	**-3%**	3%	7%	17%	3%	7%	High - 1, Medium - 2
Totals	7,403	37%	7%	23%	65%	-7%	15%	

* Jobs in 2012 are the 'Current-Modified' jobs from **Table 3-182**.
† Number of Communities by Capacity-Resiliency Category is from **Table 3-193**.
Notes: Cells with green shading mean an increase in the number of jobs compared to current. Light green (6% to 20% increase), medium green (21% to 50% increase), dark green (> 51% increase). Bold red numbers with pink shading mean a 20 percent or greater decrease in the number of jobs. Bold red numbers with no shading mean a decrease in the number of jobs of less than 20 percent.
Source: BLM, based on employment modeling in Issue 2

Table 3-195. Effects of change in BLM-based employment by community

Community	Capacity Resiliency Category	District/ Field Office	County	No Action (Effect)	Alt. A (Effect)	Alt. B (Effect)	Alt. C (Effect)	Alt. D (Effect)	PRMP (Effect)
Grants Pass	High	Medford	Josephine	+++	++	+++	+++	+	+++
Sublimity	High	Salem	Marion			+	++	-	
Junction City	Medium	Eugene	Lane	+++	++	+++	+++	+	+++
Molalla	Medium	Salem	Clackamas			+	+		+
St. Helens	Medium	Salem	Columbia			+	+		+
Coquille	Low	Coos Bay	Coos		--	--	++	--	--
Florence	Low	Eugene	Lane	+++	++	+++	+++	+	+++
Gold Beach	Low	Coos Bay	Curry		--	--	++	--	--
Klamath Falls	Low	Klamath Falls	Klamath	++		+	++	-	+
Lincoln City	Low	Salem	Lincoln			+	++	-	
Winston	Low	Roseburg	Douglas	++	-	+	+++	-	
Drain	Very Low	Roseburg	Douglas	++	-	+	+++	-	
Rogue River	Very Low	Medford	Jackson	+++	++	+++	+++	+	+++

Notes: All symbology refers to change in BLM-based employment in relation to 'Current-Modified' jobs from **Table 3-182**.
\+ = minor benefit (6% to 20% increase);
++ = moderate benefit (21% to 50% increase);
+++ = strong benefit (> 51% increase);
\- = minor negative impact (6% to 20% decrease);
-- = moderate negative impact (21% to 50% decrease);
--- = strong negative impact (> 51% decrease).
Blank cell indicates little or no effect (+5% to -5% change).

Under the No Action alternative, the highest percentage employment increases would be in the Medford, and Eugene model areas followed by the Roseburg area. This would benefit communities across all capacity and resiliency categories in these districts (such as Grants Pass, Florence, and Winston) but would have little or no effect on communities in other areas, including several communities with low capacity and resiliency such as Coquille and Gold Beach.

Under Alternative C, the highest percentage increases would be in the Medford, Eugene, Roseburg, and Salem-Other areas. These districts all have communities with medium, low, and very low capacity and resiliency. However, as shown in **Table 3-195**, all communities would see moderate or strong benefits under this alternative.

Alternatives A, B, and D would have mixed effects, increasing or decreasing community capacity and resiliency in different geographies **(Table 3-194)**. Under Alternative A, the Coos Bay, Roseburg, and the Klamath Falls model areas would see job losses. These districts contain communities with low or very low capacity and resiliency including Coquille, Gold Beach, Winston, and Drain. The Eugene and Medford areas would see the highest job increases under Alternative A, but these areas have more of a mix of higher and lower capacity/resiliency communities compared to the areas that would see job losses.

Under Alternative B, only the Coos Bay model area would lose jobs. This would have negative economic effects on the area's low capacity/resiliency communities, such as Gold Beach and Coquille. The other areas, especially Eugene and Medford, would see job increases and the communities within these areas, such as Grants Pass and Roque River, would see modest to strong benefits.

Under Alternative D, all model areas except Salem-Portland MSA, Eugene, and Medford would see job losses. The highest percentage losses would be in the Coos Bay area, with moderate to high losses in the Klamath Falls and Roseburg areas, which contain low and very low capacity/resiliency communities.

Under the Proposed RMP/Final EIS, the highest percentage increases would be in the Medford and Eugene model areas, though these increases would be lower than the increases under some of the other alternatives. The Klamath Falls area would see a modest increase (16 percent), though its 2012 jobs base is low (231 per **Table 3-195**). The Coos Bay area would see large job losses. As noted above, the Coos Bay area contains communities such as Coquille and Gold Beach with low capacity and resiliency.

County Payments

For purposes of the effects analysis, the BLM assumed that the Federal Government would make payments to counties using the formula in the O&C Act (see Socioeconomics Issue 3). Under the distribution formula, the counties in the Medford, Roseburg, and Salem Districts would receive 73 percent of the total payments **(Table 3-196)**.

Table 3-196. Shares of county payments by BLM district

District/ Field Office	Sum of County Payments (Percent)
Coos Bay	10%
Eugene	15%
Klamath Falls	2%
Medford	28%
Roseburg	25%
Salem	20%

Source: **Table 3-187**

Table 3-197 shows what the payments would be in 2018 by district using the payments to counties data and the distribution formula from **Table 3-187** and **Table 3-189**. **Table 3-198** shows the potential effects of these payments on the 13 selected cities.

Table 3-197. County payments in 2018 (2012 dollars)

District/ Field Office	2012 Payment Under O&C Act Formula* (Dollars)	No Action (Dollars)	Alt. A (Dollars)	Alt. B (Dollars)	Alt. C (Dollars)	Alt. D (Dollars)	PRMP (Dollars)
Coos Bay	$1,117,223	$4,441,647	$2,685,209	$3,479,049	$6,440,522	$1,786,198	$2,444,222
Eugene	$1,786,387	$7,101,984	$4,293,522	$5,562,836	$10,298,091	$2,856,046	$3,908,196
Klamath Falls	$273,749	$1,088,320	$657,946	$852,458	$1,578,096	$437,665	$598,898
Medford	$3,246,381	$12,906,356	$7,802,570	$10,109,279	$18,714,606	$5,190,261	$7,102,322
Roseburg	$2,930,517	$11,650,603	$7,043,401	$9,125,674	$16,893,725	$4,685,263	6,411,285
Salem	$2,344,415	$9,320,482	$5,634,721	$7,300,539	$13,514,980	$3,748,210	$5,129,028
Totals	**$11,698,672**	**$46,509,392**	**$28,117,370**	**$36,429,835**	**$67,440,021**	**$18,703,644**	**$25,593,951**

* Estimated O&C payments in 2012, had county payments been based on the O&C formula that year (see discussion in Issue 3)

Table 3-198. Potential effects of county payments by community

Community	Capacity Resiliency Category	County	Share of County Payments to Each County* (Percent)	No Action (Effect)	Alt. A (Effect)	Alt. B (Effect)	Alt. C (Effect)	Alt. D (Effect)	PRMP (Effect)
Grants Pass	High	Josephine	12.1%	+++	+	++	+++	+	+
Sublimity	High	Marion	1.5%	+			+		
Junction City	Medium	Lane	15.3%	+++	++	++	+++	+	++
Molalla	Medium	Clackamas	5.6%	+	+	+	++		+
St. Helens	Medium	Columbia	2.1%	+		+	+		
Coquille	Low	Coos	5.9%	++	+	+	++		+
Florence	Low	Lane	15.3%	+++	++	++	+++	+	++
Gold Beach	Low	Curry	3.7%	+	+	+	++		+
Klamath Falls	Low	Klamath	2.3%	+		+	++		
Lincoln City	Low	Lincoln	0.4%			+			
Winston	Low	Douglas	25.1%	+++	+++	+++	+++	+	++
Drain	Very Low	Douglas	25.1%	+++	+++	+++	+++	+	++
Rogue River	Very Low	Jackson	15.7%	+++	++	++	+++	+	++

* Under the O&C Act distribution formula; see **Table 3-187**
+ = small benefit ($0.5 million to $2.0 million);
++ = moderate benefit ($2.0 million to $4.0 million);
+++ = strong benefit (>$4.0 million).
Note: A blank cell indicates little or no effect (<$0.5 million).

Payments to counties would increase under the alternatives and the Proposed RMP, relative to what the payments would have been in 2012 under the O&C Act formula, though the payments to counties would be less than they received in some earlier years under the SRS payments. Driven by timber harvest volumes, payments would be highest under Alternative C, followed by the No Action alternative. Payments under the Proposed RMP would be approximately $25.6 million in 2018. See the discussion in Issue 3.

Relative to current population, the formula generally benefits the counties within districts with smaller populations. For example, counties in the Salem District, with approximately 74 percent of the planning area population, receive approximately 20 percent of the payments. This would limit beneficial effects to lower capacity resiliency communities in the Salem District such as Lincoln City. The counties in the Roseburg District (almost exclusively Douglas County), with approximately 3 percent of the planning area population, receives 25 percent. As noted under methods, the BLM assumed continuation of the current distribution formula.

The payments would benefit the counties in districts with low capacity/resiliency communities especially in the Coos Bay, Medford, Roseburg, and Eugene Districts. Examples would include Coquille, Drain, Florence, and Winston. The Klamath Falls Field Office would see some benefits, but since Klamath County receives only 2 percent of total receipts, the benefits would be small.

Under the alternatives and the Proposed RMP except Alternative C, BLM-based employment, and, as a consequence, earnings, would fall in some model areas (**Table 3-195**). In several cases, the loss of total

BLM-based earnings would be greater than the earnings from the county payments.[109] Payments to counties are a different kind of economic input and not directly comparable to worker earnings. However, the economic impact of earnings losses to communities with low capacity and resiliency would be substantial.

Earnings losses would exceed payments to counties under Alternatives B and D and the Proposed RMP. Under the No Action alternative and Alternative A, payments to counties would exceed earnings losses, except in the Coos Bay District under Alternative A.

Issue 6

Would the alternatives result in environmental justice impacts (disproportionally high and adverse effects on minority, low-income, or Tribal populations or communities)?

Key Points

- Employment effects to low-income populations in Coos and Curry Counties would be disproportionately negative under Alternatives A, B, and D, and the Proposed RMP. Under Alternative D, employment effects in Douglas and Klamath Counties would also be disproportionately negative. Low-income communities and Tribes in these counties would be vulnerable to these disproportionately negative effects.

Summary of Analytical Methods

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority and Low-Income Populations (1994) requires analyses of Federal actions to address human health and environmental conditions in minority and low-income communities, and to ensure that disproportionately high and adverse human health or environmental effects on these communities are identified and addressed.

Environmental justice refers to the "fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies" (EPA 2007). In the context of the RMPs for Western Oregon, a potential environmental justice population is one that could experience disproportionately high and adverse human health or environmental effects from the implementation of an RMP.

To identify potential environmental justice populations, the BLM collected the most recently available population and income data for populations in the following 284 geographies in the planning area:

- 19 counties
- 161 incorporated places (i.e., cities)[110]
- 97 census-designated places (CDPs)[111]
- 7 federally recognized Tribes with reservation and off-reservation trust land

[109] For example, under the Proposed RMP, the Coos Bay District would see a net loss in worker earnings of approximately $28.9 million ($54.4 million minus $25.5 million = $28.9 million - **Table 3-182**), but payments to Coos and Curry Counties would be $2.4 million (**Table 3-197**).

[110] Three of these 161 places, Bonanza, Butte Falls, and Waterloo are towns not cities, but for simplicity of presentation this analysis counts them as cities.

[111] Census Designated Places are settled concentrations of population that identifiable by name but are not legally incorporated under the laws of the state in which they are located. State and local officials and the Census Bureau delineate CDPs cooperatively.

The BLM also collected data for the State of Oregon. The State data serve as the reference for determining which local geographies contain potential environmental justice populations.

The BLM collected the population and income data from the American Community Survey. The American Community Survey is an ongoing survey by the U.S. Census Bureau that provides data every year, and provides more recent and more detailed data, compared to the decennial census. The American Community Survey gets data from a sample of the population. As a result, the data have statistical margins of error. The margins of error vary across the geography sampled with the data from smaller places generally having greater margins of error than larger places.[112] In addition, the American Community Survey compiles data from multiple years; the data in this analysis are from 2009–2012.

To identify potential environmental justice populations, the BLM used the following criteria, based on guidance from the Council on Environmental Quality for addressing environmental justice (CEQ 1997):

1. Geographies where the minority or Hispanic population exceeds 50 percent of the total population
2. Geographies where the minority or Hispanic population is "meaningfully greater" than the statewide minority or Hispanic population percentage. This analysis defines meaningfully greater as a minority or Hispanic population percentage that is 25 percent or higher than the statewide percentage.
3. Geographies where the percentage of the population in poverty is meaningfully greater than the statewide percentage. This analysis defines meaningfully greater as a poverty population percentage that is 25 percent or higher than the statewide percentage.
4. Geographies where the percentage of the population with low income is meaningfully greater than the statewide percentage

Minority populations include individuals that belong to one or more of the following races: African-American, American Indian, Alaska Native, Asian, Native Hawaiian, other Pacific Islander, Other race, or Multiple Races. For this analysis, the BLM summed the separate minority populations to calculate a total minority population for each geography. Minority individuals also include those identifying as Hispanic or Latino, regardless of race, and the BLM conducted a separate Hispanic or Latino population analysis.[113]

The population in poverty criterion uses data from the American Community Survey that identifies persons as below poverty level if that individual's income, or family's total income, is below a pre-defined threshold (U.S. Census Bureau 2014a).[114] This analysis defines low-income as the percentage of the households whose income is 50 percent or less than the state median household income. For criteria 2, 3, and 4 above, this analysis defines 'meaningfully greater' as a population percentage that is 25 percent, or more, higher than the statewide percentage.

The scale of the decision area and the geographical breadth of the potential impacts are such that it is not possible to analyze with useful precision how the alternatives or the Proposed RMP would affect one specific geography below the county level, such as a city or CDP versus another. Instead, the analysis assumed that positive or negative effects to regions and counties would have similar effects on the local geographies within those regions and counties.

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[112] See the U.S. Census Bureau website (http://www.census.gov) for more information about the American Community Survey, sampling, and margin of error.

[113] The U.S. Census Bureau defines race (e.g, African-American and Asian) separately from ethnicity (Hispanic or Non-Hispanic).

[114] Each person or family is assigned one out of 48 possible poverty thresholds that vary by size of the family and ages of the members. For example, the 2013 threshold for a family of 4 with 2 children under 18 was $23,624.

The first step in the effects analysis was to identify any negative effects that would result from implementation of the alternatives or the Proposed RMP, and then to assess whether they would fall disproportionately on minority or low-income populations. Views of what constitutes a negative or positive impact vary depending on different perspectives and values, but this analysis assumed that increases in BLM-based employment, and the increase in earnings that would result, would be positive impacts, and that decreases in employment would be negative. Similarly, this analysis assumed that increases in payments to counties would be a positive impact, and decreases in payments to counties would negative. The effects analysis section addresses these two types of effects on identified environmental justice populations.

The alternatives and the Proposed RMP could affect environmental justice populations in other ways. For example, dependence on a resource or use, such as access to recreation or to livestock grazing, that the Proposed RMP or alternatives would allocate or manage differently could lead to positive or negative impacts. However, such impacts would not likely result in disproportionally high and adverse effects, and the locally specific data necessary to assess such impacts at a landscape level are beyond the scope of this analysis.

The Planning Criteria provide additional detail regarding the Analytical Methods (USDI BLM 2014 pp. 149–151).

Background

Table 3-199 presents racial minority and Hispanic data for the counties in the planning area for 2000 and 2012. As of 2012, the minority population of the planning area as a whole was approximately 520,000 or 17 percent of the total population, slightly higher than the minority percentage for the State of Oregon (15 percent). Since 2000, when the planning area's minority population was 14 percent, the minority population has increased by 26 percent, though 4 counties, all in the Salem District, had minority growth rate increases above 40 percent (i.e., Linn, Polk, Washington, and Yamhill).

Table 3-199. Racial minority and Hispanic population change, 2000–2012

Geography	2012				2000				Change 2000 to 2012			
	All Minorities		Hispanic		All Minorities		Hispanic		All Minorities		Hispanic	
	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%
Oregon	563,921	15%	449,888	12%	459,776	13%	275,314	8%	104,145	23%	174,574	46%
Planning Area	519,755	17%	387,563	11%	411,827	14%	234,876	8%	107,928	26%	152,687	65%
Benton Co.	10,104	12%	5,486	6%	8,475	11%	3,645	5%	1,629	19%	1,841	38%
Clackamas Co.	38,017	10%	29,137	8%	29,539	9%	16,744	5%	8,478	29%	12,393	56%
Clatsop Co.	3,110	8%	2,820	8%	2,445	7%	1,597	4%	665	27%	1,223	70%
Columbia Co.	3,405	7%	2,035	4%	2,430	6%	1,093	3%	975	40%	942	64%
Coos Co.	5,937	9%	3,456	5%	5,039	8%	2,133	3%	898	18%	1,323	62%
Curry Co.	1,686	8%	1,258	6%	1,503	7%	761	4%	183	12%	497	56%
Douglas Co.	7,261	7%	5,042	5%	6,165	6%	3,283	3%	1,096	18%	1,759	44%
Jackson Co.	16,334	8%	21,894	11%	15,144	8%	12,126	7%	1,190	8%	9,768	61%
Josephine Co.	4,969	6%	5,274	6%	4,623	6%	3,229	4%	346	7%	2,045	50%
Klamath Co.	7,945	12%	6,990	11%	8,080	13%	4,961	8%	-135	-2%	2,029	35%
Lane Co.	37,680	11%	26,125	7%	30,231	9%	14,874	5%	7,449	25%	11,251	61%
Lincoln Co.	5,326	12%	3,662	8%	4,187	9%	2,119	5%	1,139	27%	1,543	67%
Linn Co.	9,901	8%	9,097	8%	7,010	7%	4,514	4%	2,891	41%	4,583	78%
Marion Co.	61,715	20%	76,429	24%	52,365	18%	48,714	17%	9,350	18%	27,715	42%
Multnomah Co.	158,601	22%	79,791	11%	137,661	21%	49,607	8%	20,940	15%	30,184	44%
Polk Co.	9,316	12%	9,122	12%	6,741	11%	5,480	9%	2,575	38%	3,642	38%
Tillamook Co.	1,838	7%	2,262	9%	1,490	6%	1,244	5%	348	23%	1,018	75%
Washington Co.	122,803	23%	83,085	16%	79,335	18%	49,735	11%	43,468	55%	33,350	40%
Yamhill Co.	13,807	14%	14,598	15%	9,364	11%	9,017	11%	4,443	47%	5,581	39%

Notes: Hispanic status is considered separately from racial identification.

Sources:

U.S. Census Bureau. 2014. American Community Survey, Profile of General Demographic Characteristics: 2000 Census 2000 Summary File 1 (SF 1), Table DP-1. American FactFinder, http://factfinder2.census.gov, (Sept 2014)

U.S. Census Bureau. 2014. American Community Survey, 2012 American Community Survey 5-Year Estimates, Tables DP03, DP04, DP05, S1901 and S1701. American FactFinder, http://factfinder2.census.gov, (July 2014)

The Hispanic population share of the planning area population was 11 percent in 2012, which was very close to the percentage for the State as a whole (12 percent). Since 2000, the planning area's Hispanic population increased by 65 percent. Nearly two-thirds of this increase was in three counties: Marion, Multnomah, and Washington.

The median household income in the planning area as whole in 2012 was $51,197, a little higher than the statewide median of $50,036 **(Table 3-200)**. Household income varies considerably across the planning area. The lowest median incomes (below $40,000) are in the southwest, in Coos, Curry, and Josephine Counties, and the highest (above $55,000) in the north, in Clackamas, Columbia, and Washington Counties. Between 2000 and 2012, the median household income increased in all counties in the planning area. For the planning area as whole, the increase of $8,955 was slightly lower than for the State of Oregon.

Table 3-200. Poverty population and median household income, 2000 and 2012

Geography	2000		2012		Change 2000 to 2012	
	Population in Poverty	Median Household Income	Population in Poverty	Median Household Income	Population in Poverty	Median Household Income
Oregon	388,740	$40,916	584,059	$50,036	195,319	$9,120
Planning Area	341,468	$42,242	515,861	$51,197	174,393	$8,955
Benton Co.	10,665	$41,897	17,418	$48,635	6,753	$6,738
Clackamas Co.	21,969	$52,080	36,265	$63,951	14,296	$11,871
Clatsop Co.	4,625	$36,301	5,725	$44,330	1,100	$8,029
Columbia Co.	3,910	$45,797	6,797	$55,358	2,887	$9,561
Coos Co.	9,257	$31,542	10,661	$37,853	1,404	$6,311
Curry Co.	2,554	$30,117	3,048	$38,401	494	$8,284
Douglas Co.	12,999	$33,223	18,777	$40,096	5,778	$6,873
Jackson Co.	22,269	$36,461	33,346	$43,664	11,077	$7,203
Josephine Co.	11,193	$31,229	16,301	$36,699	5,108	$5,470
Klamath Co.	10,515	$31,537	12,143	$41,066	1,628	$9,529
Lane Co.	45,423	$36,942	64,705	$42,628	19,282	$5,686
Lincoln Co.	6,084	$32,769	7,262	$41,996	1,178	$9,227
Linn Co.	11,618	$37,518	19,237	$47,129	7,619	$9,611
Marion Co.	37,104	$40,314	55,223	$46,654	18,119	$6,340
Multnomah Co.	81,711	$41,278	123,434	$51,582	41,723	$10,304
Polk Co.	6,943	$42,311	10,788	$52,365	3,845	$10,054
Tillamook Co.	2,718	$34,269	4,197	$41,869	1,479	$7,600
Washington Co.	32,575	$52,122	57,466	$64,375	24,891	$12,253
Yamhill Co.	7,336	$44,111	13,068	$53,950	5,732	$9,839

Sources:

U.S. Census Bureau. 2014. American Community Survey, Profile of Selected Economic Characteristics: 2000 Census 2000 Summary File 3 (SF 3), Table DP-3. American FactFinder, http://factfinder2.census.gov, (Sept 2014)

U.S. Census Bureau. 2014. American Community Survey, 2012 American Community Survey 5-Year Estimates, Tables DP03, DP04, DP05, S1901 and S1701. American FactFinder, http://factfinder2.census.gov, (July 2014)

Affected Environment

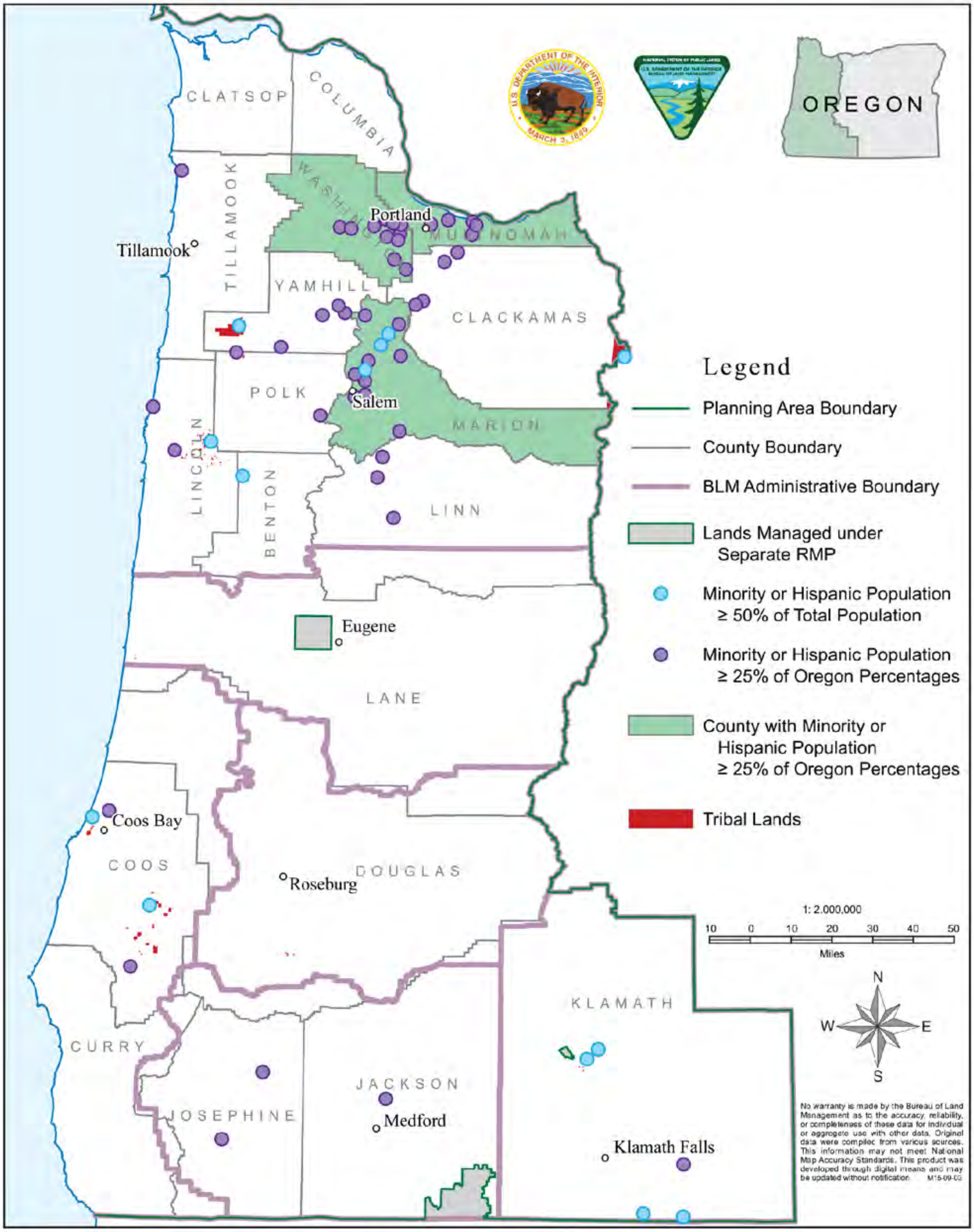
Minority Populations

Table 3-201 summarizes the data for minority populations in the planning area. **Map 3-8** shows their locations. **Appendix P** contains the data for all the minority population geographies in the planning area.

Table 3-201. Summary of minority populations meeting environmental justice criteria

Geography	Number of Geographies					
	50 Percent Criterion		Additional Meaningfully Greater Criterion		Total, Both Criteria	
Counties	-		3		3	
Cities	5		29		34	
CDPs	2		19		21	
Tribes	6		-		6	
Totals	**13**		**51**		**64**	
Population	**Population**					
	Total	**Minority**	**Total**	**Minority**	**Total**	**Minority**
Counties			1,584,319	343,119	1,584,319	343,119
Cities	28,637	16,718	86,766	21,028	115,403	37,746
CDPs	261	146	15,286	4,457	15,547	4,603
Tribes	5,247	4,647			5,247	4,647
Totals	**34,145**	**21,511**	**1,686,371**	**368,604**	**1,720,516**	**390,115**

Notes: Population numbers for cities and CDPs do not include those cities in Marion, Multnomah, and Washington Counties.
Sources: BLM staff compiled from: U.S. Census Bureau, American Community Survey, 2012, 2011, 2010, 2009. **Appendix P** contains more detailed source descriptions.



Map 3-8: Minority Populations and Counties within the Planning Area

Note: BLM administrative boundaries, counties, and Tribal lands are shown for reference.

50 Percent Criterion

Thirteen geographies meet the 50 percent criterion, (i.e., the racial minority or Hispanic population exceeds 50 percent of the total population). In total, these 13 geographies contain approximately 34,100 people, or approximately 1 percent of the total population of the planning area.

None of the 19 counties as a whole meets the 50 percent criterion.

Six of the seven Tribal land areas meet the criterion. The only Tribe not meeting the criterion is the Cow Creek Band of Umpqua Tribe of Indians. Note that the data for the Tribes have limitations. First, as noted in the Summary of Analytical Methods for Issue 5, the American Community Survey uses data derived from a sample of the population, and is not a 100 percent count. These data are subject to sampling error, and, in addition, some of the Tribes have very small populations (e.g., less than 30 persons) living on Tribal lands, thereby compounding the potential for error.

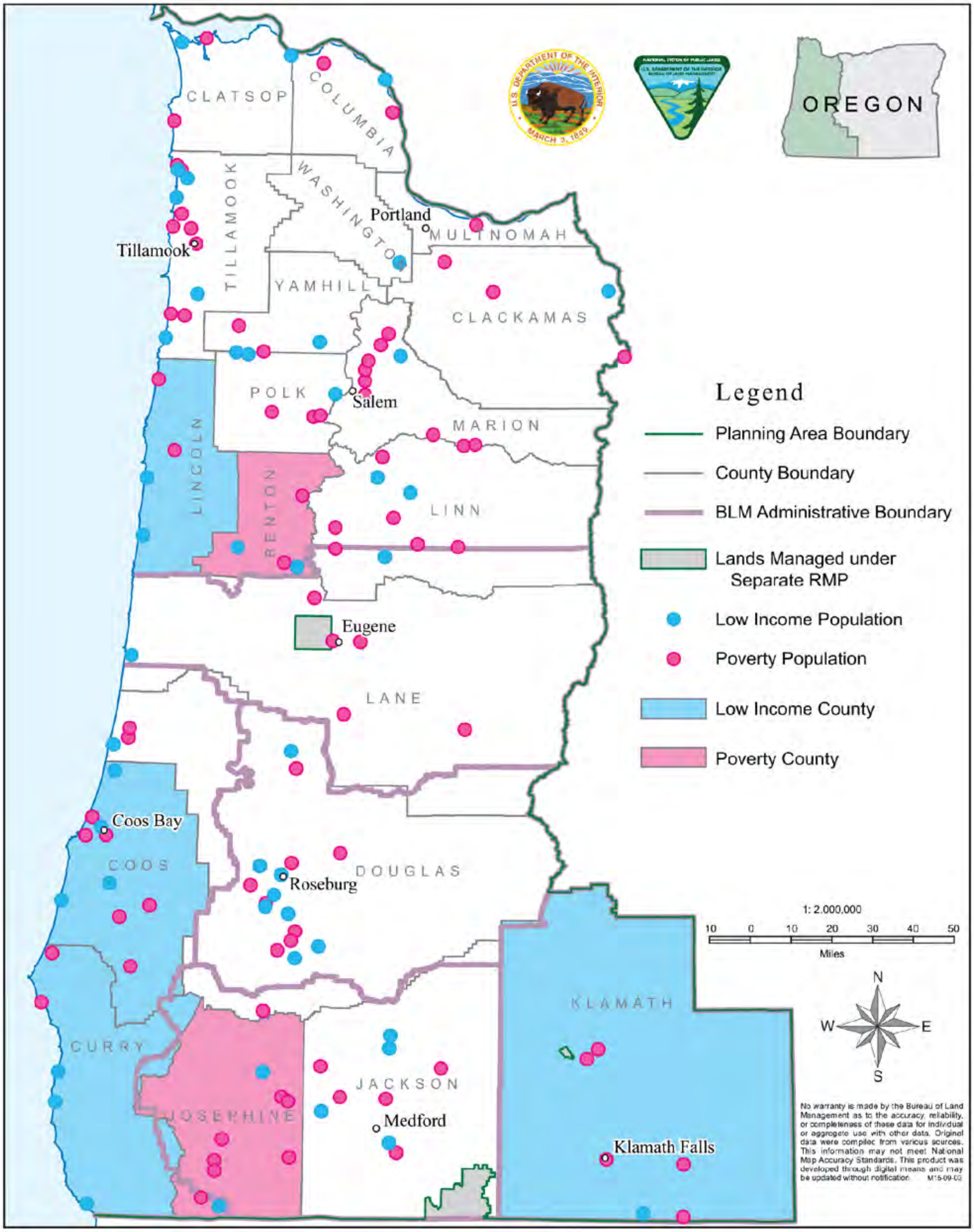
In particular, with respect to the Cow Creek Band of Umpqua Tribe of Indians, this potential for error is further compounded by the fact that the most recent available American Community Survey data was from 2009. In addition, the population on reservation and off-reservation trust land is not the entire Tribal membership. The U.S. Census Bureau does not collect data for the entirety of a Tribe's members. Some of the Tribes commented on this as part of the capacity/resiliency analysis, expressing concerns specifically with the lack of accuracy of the American Community Survey information as representative of their Tribal populations. Tribes were unable, however, to provide the BLM with population data that more accurately presented their members. As such, the BLM used this American Community Survey information, but acknowledges the uncertainties and inaccuracies in the analysis.

Seven other geographies meet the criterion: Summit CDP in Benton County; Chiloquin, Malin, and Merrill City in Klamath County; and Gervais, Woodburn, and Labish Village CDP in Marion County. Of these, five meet the criterion based on their Hispanic populations, and three meet the criterion based on their non-Hispanic minority populations.[115]

Meaningfully Greater Criterion

Fifty-one geographies, in addition to the 13 above, meet the meaningfully greater criterion, (i.e., the minority or Hispanic population is 25 percent or higher than the statewide percentages). The statewide percentages are 15 percent minority and 12 percent Hispanic. These geographies include 3 counties, 29 cities, and 19 CDPs. The three counties are Marion, Multnomah, and Washington (**Table 3-201** and **Map 3-9**).

[115] Labish Village in Marion County meets the criterion based on both its Hispanic and non-Hispanic minority populations.



Map 3-9: Low Income and Poverty Populations and Counties within the Planning Area

Note: BLM administrative boundaries, county boundaries, and Tribal lands are shown for reference.

Of the 48 cities and CDPs with meaningfully greater populations, 42 are in the Salem District, mostly along the I-5 corridor between Salem and Portland, and in the Portland metropolitan area itself.

Total, Both Criteria

In total, 64 geographies meet one or both of the criteria. These geographies contain approximately 1.72 million people, or approximately 50 percent of the total population of the planning area (approximately 3.4 million). Of the 1.72 million, approximately 390,000 are minority persons and approximately 199,000 are Hispanic (some of whom could also be non-Hispanic minority persons, such as Black Hispanics). The City of Portland, with a 22 percent minority population, accounts for approximately 586,000 of the 1.72 million, or 34 percent.

Low-income Populations

Table 3-202 presents data for low-income populations in the planning area as of 2012. **Map 3-9** shows their locations. **Appendix P** contains the data for all the low-income population geographies in the planning area.

Table 3-202. Summary of low-income populations meeting environmental justice criteria

Geography	Number of Geographies		
	Poverty	Additional Low-Income	Totals
Counties	2	4	6
Cities	45	18	63
CDPs	31	16	47
Tribes	5	1	6
Totals	**83**	**39**	**122**
		Population	
Counties	33,719	17,249	50,968
Cities	84,977	7,688	92,665
CDPS	15,903	630	16,533
Tribes	1,281	5	1,286
Totals	**135,880**	**25,571**	**161,451**

Note: To avoid double counting, the populations for additional low-income geographies exclude the populations counted as poverty.
Sources: BLM staff compiled from: U.S. Census Bureau, American Community Survey, 2012, 2011, 2010, 2009. **Appendix P** contains more detailed source descriptions.

Poverty Criterion

A total of 83 geographies meet the poverty criterion, (i.e., the percentage of residents in poverty is 25 percent or higher than the statewide percentage, which is 15 percent). These geographies comprise 2 counties (Benton and Josephine), 45 cities, 31 CDPs, and 5 of the Tribes. The total population of these 83 geographies is approximately 992,000 (29 percent of the planning area population). The number of people in poverty within the 83 geographies is approximately 136,000.

The poverty populations are scattered throughout the planning area and can be found in every county and BLM district (**Map 3-9**).

Low-income Criterion

Thirty-nine geographies meet the low-income criterion, i.e., the percentage of residents with income 50 percent or less than the state median household income is 25 percent or higher than the statewide percentage, which is 24 percent.

These geographies are all in addition to the 83 geographies meeting the poverty criterion, and include 4 counties, 18 cities, 16 CDPs, and 1 Tribe. The four counties are Coos, Curry, Klamath, and Lincoln. The number of additional people with low income within these 39 geographies is approximately 25,600.

Environmental Consequences

Minority Populations

The Affected Environment section identified three counties (Washington, Multnomah, and Marion) that meet the environmental justice criteria because of their minority populations; these 3 counties also contain 31 of the 55 minority cities and CDPs that meet environmental justice criteria. Altogether, the Salem District contained 43 of the 55 minority cities and CDPs plus 3 of the 7 Tribal land areas. The other 12 minority populations are scattered across the Klamath Falls Field Office, and the Coos Bay and Medford Districts.

To assess whether the alternatives or the Proposed RMP would disproportionately affect minority communities negatively, the BLM assessed whether any of the alternatives or the Proposed RMP would lead to disproportionately fewer BLM-based jobs in the Salem model area or lower payments to counties in the Salem District compared to the other districts.

The Salem model areas would gain in employment under Alternatives A, B, and C and under the Proposed RMP, so the impacts on employment would be beneficial (**Table 3-194**). Under the No Action Alternative, the Salem model areas would be the only area with job losses, though the losses would be modest (3 percent in the Portland MSA model area and 1 percent in the Salem-Other (more rural) model area. Under Alternative D, employment would increase in the Portland MSA area but decrease by three percent in the Salem-Other area (**Table 3-194**). However, the decrease in employment under Alternative D would be higher in the other three model areas that would experience decreases in BLM-related employment (-13 percent in the Roseburg area, -46 percent in the Coos Bay area, and -15 percent in the Klamath Falls area). Therefore, there would be no disproportionately negative effects on employment in minority counties. However, minority populations in the Coos Bay area could experience negative effects related to jobs under the Proposed RMP.

The BLM also assessed whether there would be any disproportionately negative effects on minority populations due to changes in payments to counties under the Proposed RMP or alternatives. Under the alternatives and the Proposed RMP, every county would receive higher payments under the O&C Act formula in both 2018 and 2028 than they would have received in 2012 under the O&C Act-based formula (**Table 3-189**). Therefore, there would be no disproportionately negative impacts because of changes in county payments.

Low-income Populations

The Affected Environment section identified 116 geographies that meet the low-income environmental justice criteria: 6 counties, 110 cities or CDPs, and 6 Tribes. Unlike the minority populations, which are concentrated in three counties, the low-income analysis showed that low-income populations are spread out more widely across the planning area, making the analysis of potential effects more complex (see **Map 3-8** and **Map 3-9**).

BLM-based total employment would increase in 2018 under the alternatives and the Proposed RMP compared to 2012. However, some of the alternatives and the Proposed RMP would result in reductions in BLM-based employment in some model areas (**Table 3-194**). Three areas would experience the largest decreases (13–46 percent): Coos Bay, the Klamath Falls, and Roseburg areas. Under Alternatives A and D, employment would decrease in all three areas. Under the No Action alternative and under Alternative B, employment would decrease in the Coos Bay area only. Under the Proposed RMP, the Coos Bay area would experience a large decrease employment (-39% or approximately 500 jobs), but employment effects would be positive in all other areas.

The counties within Coos Bay District, the Klamath Falls Field Office, and Roseburg District are Coos, Curry, Klamath, and Douglas Counties. Three of these counties meet the low-income environmental justice criteria, and the fourth (Douglas) is within 1 percent of the low-income threshold, and contains 14 cities or CDPs meeting the low-income environmental justice criteria.[116] In total, four of the six low-income counties in the planning area are in this southern part of the planning area.[117]

The BLM concludes that employment effects in Coos and Curry Counties would be disproportionately negative under Alternatives A, B and D, and the Proposed RMP, with greater negative effects under Alternative D and the Proposed RMP. Under Alternative D, employment effects in Douglas and Klamath Counties would also be disproportionately negative. Low-income cities, CDPs and Tribes in these counties would also be vulnerable to these disproportionately negative effects.

Under the alternatives and the Proposed RMP, every county would receive higher payments under the O&C Act formula in both 2018 and 2028 than they would have received in 2012 (**Table 3-189**). Therefore, there would be no disproportionately negative impacts because of changes in county payments. However, the BLM notes that under the alternatives and the Proposed RMP (except Alternative C), employment and earnings would fall in some model areas, and the loss of total BLM-based earnings would in many cases be greater than the earnings from the county payments (see the discussion of county payments in Issue 5).

A key issue for the counties is how any increased payments would compare to payments under Secure Rural Schools (SRS) funding (**Table 3-185**, **Table 3-186**, and **Table 3-187**). Coos, Curry, Douglas, and Josephine Counties are the counties most dependent on the SRS funding based on the high percentages of their general funds that the SRS payments represent (25 percent to 82 percent, **Table 3-186**). Three of these counties are low-income and Douglas County is within 1 percent of the low-income threshold. The State of Oregon Business Development Department considers all four counties as distressed (see the Background section).

The future of the SRS program and distributions to counties are outside the control of the BLM and cannot be assessed in the analysis of the alternatives and the Proposed RMP. Nevertheless, the BLM notes that decreases in SRS funding since 2003 have disproportionately negatively affected these four counties (**Table 3-185**), and three of these counties would experience employment losses under some of the alternatives which could exacerbate their distressed financial condition. Under the Proposed RMP, only Coos and Curry Counties would experience employment losses.

[116] Of the 14, 3 are in western Douglas County in the Coos Bay District.

[117] The fourth is Josephine County (adjacent to Curry and Douglas Counties), which meets the criteria for a poverty county.

Mitigation of Environmental Justice Impacts

The BLM Land Use Planning Handbook (USDI BLM 2005) specifies how to address disproportionately high and adverse environmental justice impacts associated with the proposed action—

> With the cooperation of the partners, affected minority populations, low-income communities, and Tribes, adopt and implement creative measures to eliminate, minimize, and/or correct identified Environmental Justice impacts (Appendix D, p. 12).

One option for addressing the impacts to Coos and Curry Counties is avoidance. The Draft RMP/EIS explored two alternatives (Alternative C and the No Action alternative) that would avoid the identified environmental justice impacts; however, these alternatives would not meet the purpose and need as well as the Proposed RMP. For example, the purpose of contributing to the conservation and recovery of the marbled murrelet restricts the BLM's ability to manage its land in ways that would generate more jobs in Coos and Curry Counties.

There is also scientific uncertainty associated with prediction of socioeconomic effects because social and economic systems are very dynamic rather than static. People and communities can respond to change in a number of ways. That is why the Draft RMP/EIS included an analysis of community resiliency; some communities and populations are better equipped to react to change or proactively create it. Yet even considering resiliency as a mediating variable, it is difficult to predict the effects of BLM plan implementation because many variables apart from BLM management have greater effects on employment and earnings and low-income populations in the affected counties. These variables include changes in national, state, regional, and local demographics, economies, and policies. See also the discussion of Economic Conditions in the Analysis of the Management Situation (USDI BLM 2013, pp. 2-100 – 2-110).

Public comments received on the Draft RMP/EIS also reflected a difference in beliefs regarding the nature and type of environmental justice impacts expected under the alternatives. Some commenters believed that alternatives having higher levels of timber harvest, despite having higher direct and indirect levels of employment and income, pose a cost in terms of lower property values, lower amenity values, and lower attractiveness to current and potential future residents.

Therefore, it is difficult to propose specific mitigation at this time. The BLM would monitor environmental justice effects as the RMP as implemented. The BLM will already be measuring the level and type of timber harvest, payments to counties, and changes in resource conditions. However, these measurements will not tell the BLM how low-income populations are being affected, so that a supplemental, targeted monitoring effort would be required. This monitoring, developed collaboratively with the cooperators and others, would identify and track appropriate indicators of social and economic conditions. The U.S. Forest Service's experience monitoring the socioeconomic effects of the NWFP suggest that it is difficult to link community effects to plan changes using only published information (Grinspoon and Phillips 2011; Grinspoon *et al.* in press). Therefore, the BLM would conduct primary research, such as focus groups or interviews with community residents, leaders, and others, to supplement and interpret the secondary data.

The results of the monitoring would allow the BLM and its partners to identify environmental justice impacts that have not been mitigated through the RMPs as implemented or by other means, pointing the way toward potential mitigation actions. The BLM would not allocate a specified amount of money toward mitigation of environmental justice impacts at this time, but would be committed to the monitoring effort, an open discussion of the results, and addressing environmental justice effects that can be attributed to actions taken under the Proposed RMP.

Issue 7

What would be the cost to the BLM to implement the alternatives?

Key Point

- The alternatives and the Proposed RMP (except for Alternative D) would result in an increase in the BLM's budget compared to the current budget. The Proposed RMP would result in a 6 percent increase in BLM's budget in the middle of the first decade compared to the current budget.

Summary of Notable Changes from the Draft RMP/EIS

The BLM refined the cost per Mbf of timber volume from the $200 per Mbf average in the Draft RMP/EIS to a cost per Mbf that is unique to each district and the timber management activities for future costs under each alternative and the Proposed RMP. The BLM recalculated the costs for the No Action alternative and the action alternatives based on these refined cost values. This recalculation altered the estimates of costs by district, but did not alter the total costs across the decision area by alternative.

Summary of Analytical Methods

The BLM compiled budget information for FY 2012 for each of the five BLM districts in the planning area and for the Klamath Falls Field Office. The budget data did not include the administrative cost of the BLM's Oregon State Office, because the State Office budget would not be affected by the RMPs. The budget data also did not include the fire program, because the fire budget can fluctuate widely from year to year, depending on the extent and scale of wildfires.

The BLM estimated the portions of the districts' budgets that are attributable to the timber program under current conditions, based on 2012 timber harvest volumes and an average timber volume cost of $200 per Mbf, a figure the State Office uses for budget estimates. This figure includes all of the work associated with preparing, offering, and administering timber sales. It includes work done by members of a timber sale interdisciplinary team, National Environmental Policy Act compliance work, overhead, etc.

To estimate the potential cost to the BLM to implement the alternatives and the Proposed RMP, the BLM applied a cost per Mbf that is unique to each district and the timber management activities under each alternative and the Proposed RMP. In order to account for the variation in harvest volume yield per acre and produce more accurate estimates of relative timber program costs by district, the BLM proportionally increased or decreased the estimated per Mbf costs by district relative to the weighted average Mbf per acre produced for each alternative and the Proposed RMP, while maintaining the overall average cost of $200 per Mbf. Cost per Mbf ranged from a low of $95 for the Salem District under Alternative D to a high of $362 for the Klamath Falls Field Office under Alternative A (**Table 3-203**).

Table 3-203. Estimated timber program costs per Mbf of timber volume

District/ Field Office	No Action (Dollars/ Mbf)	Alt. A (Dollars/ Mbf)	Alt. B (Dollars/ Mbf)	Alt. C (Dollars/ Mbf)	Alt. D (Dollars/ Mbf)	PRMP (Dollars/ Mbf)
Coos Bay	$172	$171	$219	$186	$233	$203
Eugene	$219	$142	$148	$148	$188	$136
Klamath Falls	$172	$362	$305	$310	$284	$315
Medford	$218	$333	$319	$331	$316	$318
Roseburg	$182	$291	$257	$241	$283	$265
Salem	$204	$155	$124	$170	$96	$138

The BLM estimated budgets based on projected harvests for the average of the first decade. The BLM added this figure to the non-timber portion of the budget, which the BLM assumed would remain unchanged between alternatives and the Proposed RMP, consistent with the analytical assumptions set forth in the Planning Criteria. The total of the timber and non-timber portion of the budget resulted in a total BLM budget by alternative and the Proposed RMP. The BLM expressed all dollar figures in constant 2012 dollars.

Note that as a landscape-level planning effort, none of the alternatives or the Proposed RMP prescribe project-level or site-specific activities on BLM-administered lands. Further, the BLM's selection of an alternative or the Proposed RMP does not authorize funding to any specific project or activity nor does it directly tie into the agency's budget as appropriated annually through the Federal budget process. Consequently, the effects analysis does not cover non-timber resources, even though these resources do have associated management costs.

Affected Environment

The BLM's budget for the 6 districts in the planning area totaled approximately $109.2 million in FY 2012, including labor and non-labor costs. The labor costs cover approximately 780 employees across all 6 districts (**Table 3-204**). The Medford office, which has the largest number of employees, accounts for approximately 30 percent of the total area-wide budget. Non-labor costs include items such as rent, transportation, and supplies, but the largest single component is contracts to non-BLM entities for a variety of services on BLM-administered lands.

Table 3-204. BLM budget by district, FY 2012

District/ Field Office	Employees (FTE)	Expenditures		Totals ($ Millions)	Programmatic Breakdown	
		Labor ($ Millions)	Non-Labor ($ Millions)		Timber ($ Millions)	Non-Timber ($ Millions)
Coos Bay	109	$9.1	$8.0	$17.1	$14.2	$2.9
Eugene	130	$10.4	$7.5	$18.0	$7.2	$10.8
Klamath Falls	41	$2.9	$3.0	$5.9	$0.9	$5.0
Medford	231	$17.7	$15.5	$33.2	$4.7	$28.5
Roseburg	117	$9.4	$4.1	$13.5	$9.0	$4.5
Salem	150	$12.3	$9.2	$21.6	$12.4	$9.1
Totals	778	**$61.9**	**$47.3**	**$109.2**	**$48.5**	**$60.7**
Totals (Percent)		**57%**	**43%**		**44%**	**56%**

Management of the BLM's timber program in FY 2012 accounted for an estimated $48.5 million, or 44 percent, of the total $109.2 million budget. The remaining 56 percent covered all other programs, such as recreation, mining, fisheries, and livestock grazing.

Environmental Consequences

Table 3-205 and **Table 3-206** show the estimated effects on the BLM's staff and budget under the alternatives and the Proposed RMP and the percent change compared to current conditions. The alternatives and the Proposed RMP (except for Alternative D) would result in an increase in the BLM's budget compared to the current budget (i.e., approximately $109.2 million). Alternative C, with its higher projected timber harvests compared to current, would require the highest budget, approximately $171.7 million, a 57 percent increase compared to the budget under current conditions (FY 2012). The No Action alternative would result in a 29 percent increase compared to current. Alternative D, with the lower projected timber harvests would require a lower budget, approximately 11 percent below current. The Proposed RMP would result in a budget that is about 6 percent higher than current.

Table 3-205. BLM employees by district; current condition and the average of the first decade

District/ Field Office	Current (FTE)	No Action (FTE)	Alt. A (FTE)	Alt. B (FTE)	Alt. C (FTE)	Alt. D (FTE)	PRMP (FTE)
Coos Bay	109	93	68	85	134	51	58
Eugene	130	218	142	166	243	140	150
Klamath Falls	41	45	43	50	56	45	48
Medford	231	326	285	326	349	261	310
Roseburg	117	152	110	142	221	94	132
Salem	150	174	141	141	230	101	137
Totals	**778**	**1,008**	**789**	**911**	**1,234**	**692**	**835**
Percent Change from Current		**30%**	**1%**	**17%**	**59%**	**-11%**	**7%**

Table 3-206. BLM budget by district; current condition and the average of the first decade

District/ Field Office	Current ($ Millions)	No Action ($ Millions)	Alt. A ($ Millions)	Alt. B ($ Millions)	Alt. C ($ Millions)	Alt. D ($ Millions)	PRMP ($ Millions)
Coos Bay	$17.1	$14.6	$10.7	$13.2	$20.9	$8.0	$9.0
Eugene	$18.0	$30.2	$19.7	$23.0	$33.7	$19.4	$20.7
Klamath Falls	$5.9	$6.4	$6.1	$7.1	$8.0	$6.4	$6.9
Medford	$33.2	$46.9	$41.0	$46.9	$50.2	$37.6	$44.6
Roseburg	$13.5	$17.7	$12.7	$16.5	$25.7	$10.9	$15.3
Salem	$21.6	$25.0	$20.2	$20.2	$33.0	$14.4	$19.7
Totals	**$109.2**	**$140.6**	**$110.4**	**$127.0**	**$171.4**	**$96.7**	**$116.2**
Percent Change from Current		**29%**	**1%**	**16%**	**57%**	**-11%**	**6%**

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Soil Resources

Key Points

- All alternatives and the Proposed RMP would increase the acreage of detrimental soil disturbance from timber harvest, road construction, and fuels treatments by 13–29 percent of current amounts during the first decade.
- The BLM would be able to reduce the acreage of detrimental soil disturbance from timber harvest, road construction, and fuels treatments through management practices that would limit initial compaction levels, remove existing or created compacted surfaces, and improve soil water and organic matter levels.
- Detrimental soil disturbance from public motorized travel activities would be highest under the No Action alternative because the action alternatives and the Proposed RMP would not designate any areas as *open* for public motorized access.

Summary of Notable Changes from the Draft RMP/EIS

- The analysis includes corrections to data for Alternative A under Issue 1. Additional acres of detrimental soil disturbance were not totaled correctly in the Draft RMP/EIS analysis.
- The analysis also includes updated data for Issue 2. The BLM revised road mileage calculations for all alternatives and the Proposed RMP based on reduced road miles when thinning forest stands.

Summary of Analytical Methods

Soil quality is the innate capacity of any soil to function within natural or managed ecosystem boundaries, to sustain plant and animal productivity, to maintain or enhance water and air quality, and to support ecosystem health. Land management practices most often reduce soil quality through declines in two ecosystem properties: site organic matter and soil porosity (Powers *et al.* 1990).

In this analysis, the BLM evaluated reductions in soil quality based on acres of detrimental soil disturbance. Detrimental soil disturbance is created when the innate soil properties change and the inherent capacity to sustain growth of vegetation is reduced (Powers *et al.* 1998). Detrimental soil disturbance generally represents unacceptable erosion levels, organic matter loss, soil compaction, soil displacement, severe heating to seeds or microbes, or a combination of these due to the implementation of management actions. The BLM evaluated the acres of detrimental soil disturbance created as a result of several sources of management-directed changes (e.g., ground-based and cable yarding, heating of soil during burning, and compaction during fuel reduction operations) and the cumulative total of all sources as a decrease in the innate ability of a soil to function and provide ecosystem services.

Evaluating soil quality is complicated by the diversity of soil properties that drive the functional processes, appraisal techniques, and soil uses (Page-Dumroese *et al.* 2000). This analysis evaluated a departure from soil quality using acres of detrimental soil disturbance rather than other measures such as changes to soil quality index or site index as discussed below.

Amacher *et al.* (2007) introduced the Forest Inventory and Analysis program that measured a number of chemical and physical properties of soils in order to address specific questions about forest soil quality or health. This soil quality index integrated 19 measured physical and chemical properties of forest soils into a single number that could serve as the soil's vital sign of overall soil quality. This effort monitors changes in forest soil properties with time, but this index requires specific data that is not available at this scale of analysis across the decision area.

Site index class characterizes soil productivity by tree height growth over a set time. Across the decision area, there is a distinct differentiation between the high productivity soils in the north (predominately Site Classes 2 and 3) and the lower productivity soils in the south (predominately Site Classes 4 and 5). However, this traditional measure of soil productivity does not encompass the full spectrum of the functions that define soil quality as the measurement requires a more holistic method that defines growth as it relates to functional processes in the soil.

For several aspects of this analysis, the BLM categorized the decision area into the coastal/north (the Salem, Coos Bay, and Eugene Districts, and the northern portion of the Roseburg District) and the interior/south (southern portion of the Roseburg District, the Medford District, and the Klamath Falls Field Office). This division represents a general divide in geology, soil conditions, and forest productivity within the planning area.

Issue 1

How would timber harvest under the alternatives affect soil quality?

Summary of Analytical Methods

Timber harvest causes detrimental soil disturbance most often from displacement of surface material and soil compaction during yarding activities. The extent of detrimental soil disturbance varies with the type of yarding method and the mitigation measures employed.

The intensity, location, and extent of compaction differ under a variety of yarding systems. In this analysis, the BLM assumed that determining the proper design measures to reduce or eliminate adverse effects could not be applied at this level of analysis but can be determined at the project scale as specific site conditions would be known. Therefore, the different yarding methods in this analysis assumed to create detrimental soil disturbance were applied under the alternatives and the Proposed RMP according to the following surface area percentage within each harvest unit:

- Ground-based – 35 percent
- Cable – 12 percent
- Aerial – 6 percent

  (Heilman *et al.* 1981, Fleming *et al.* 2006, Froehlich 1976, Han *et al.* 2009, Miller *et al.* 1989)

Ground-based cutting and yarding systems have the greatest detrimental effects to soil. Ground-based equipment includes previous models of rubber-tired skidders and tracked dozer equipment in addition to the current type of cut-to-length harvesters, feller bunchers, multi-wheeled forwarders, and excavators or de-limbers. When soil moisture contents result in maximum compaction effects, cut-to-length and whole-tree harvesting methods could cause a greater degree of soil compaction by needing an increased amount of designated skid trails across a harvest unit. Cut-to-length systems can cause less compaction in the center of the skid trail than whole tree harvesting especially when operators minimize compaction by placing heavy slash loads on skid trails before traversing a harvest unit. Whole-tree harvesting disturbs a larger area, sweeps slash from trails, and causes a high degree of compaction in the center of the track (Han *et al.* 2009). The extent of the equipment's coverage across a harvest unit can vary from several well-spaced designated skid trails to, coverage over a moderate amount of a harvest unit with unlimited skid trails. Typically, compaction on steeper slopes does not occur where slope conditions exceed ground-based machine capabilities because this equipment cannot operate on steeper slopes. In contrast, on accessible slopes, repetitive tracking across the same skid trail causes the extent of compaction to go deeper into the soil until equilibrium between site conditions and loads exists. More mechanized ground-based yarding equipment in use today is capable of traversing more of each harvest unit, both in area and on steeper slopes. These changes have resulted in equipment operating on terrain in new ways with heavy and large mechanical systems, and operating in harvest units where previous equipment had been unable to travel.

Cable yarding systems typically cause compaction at the landing area as well as within a harvest unit under cable corridors. Compacted areas stretch out like spokes from the landing or a road but are only as wide as the area of the sweeping tail end of a yarded log. Since there are many logs pulled to the landing along one yarding corridor, they create a compacted trail that ranges from 3 to 8 feet wide.

For aerial yarding, most compaction is within the work areas adjacent to a harvest unit. These areas generally undergo rehabilitation after harvest or are incorporated into the road system. Compaction from yarding activities inside such harvest units is typically negligible.

The BLM used available GIS data from the BLM Timber Sale Information System to determine the type of yarding system employed during timber harvest; this information provided an estimate of the levels of detrimental soil disturbance based on the assumed percentages listed above. The BLM used the final harvested acres from timber sale contracts from 1990 to 2012[118] to characterize current levels of detrimental soil disturbance. Using these 22 years of timber harvest data provides a partial indication of the current amount of detrimental soil disturbance. Past management of timber stands also have evidence of compacted trails within them. Depending on the soil type, root interactions, water and temperature conditions, and wildlife effects (e.g., burrowing and tunneling), the length of time soils remain compacted would be decades (Froehlich and McNabb 1984). However, the BLM does not have sufficient information to quantify detrimental soil disturbance from these older timber harvests at this scale of analysis. That level of detail should occur at the project level analysis.

The Woodstock model provided outputs on acres of each silvicultural system by alternative and the Proposed RMP for the first decade (see also **Appendix C** for more information). Districts provided estimates for projecting yarding methods based on past practices and projecting silvicultural systems under the alternatives and the Proposed RMP to estimate expected use of ground-based, cable, or aerial methods. The BLM only quantified the first decade of expected harvest for this analysis because yarding methods and equipment are subject to change and application of assumptions beyond the first decade would be speculative.

In this analysis, the BLM calculated the amount of detrimental soil disturbance generated from each timber harvest method by multiplying the areal extent (acres) of that yarding method by the percentages listed above.

Background

Soil compaction occurs when soil particles are pressed together reducing the pore space between them and increasing the weight of solids per unit volume of soil (bulk density). Soil compaction occurs in response to pressure from above (e.g., from animals or equipment). Heavy equipment operates directly on forest soils with a high potential to affect soil quality negatively, especially soil bulk density, which would affect plant and tree growth (Labelle and Jaeger 2011). Soil compaction during harvesting generally occurs in the first few passes of the equipment, but compaction reaches a maximum within the

[118] 2012 represents the most current year for which completed timber sale activity was available for analysis across the decision area.

first ten passes (Han *et al.* 2006). Bustos and Egan (2011) noted that compaction is a function of mass, number of passes, and total mass transported per pass. Using existing skid trails and having a designated skid trail system are effective methods for reducing impacts to soils with high initial bulk densities as this can result in less change to soil structure (i.e., compaction) than soils with a low initial bulk density (Han *et al.* 2009). The risk for compaction is greatest when soils are wet (USDA NRCS 1996). Compaction is usually described as an increase in bulk density and results in plants having to increase their root strength in order to penetrate the soil for growth.

Studies show that an increase of bulk density greater than 15 percent can have varied impacts to plant growth depending on soil texture, plant species, and competing vegetation (Tan *et al.* 2009). Powers *et al.* (2005) found that soil compaction effects depended upon initial bulk density and type; vegetation growth declined on compacted clay soils but increased on sands. Page-Dumroese *et al.* (2006) determined that overall, initial soil bulk density determined the degree of severe compaction. As initial bulk density increased, the level of change decreased. Fine-textured soils often had the lowest initial bulk density but the largest increase after treatment with a majority of compaction occurring after a single pass by the equipment. Long-term soil productivity studies in North America measured similar patterns of a larger percent increase in bulk density on fine-textured soils (Williamson and Neilsen 2000). Landsberg *et al.* (2003) measured resistance to penetration in 4 steep units with residual skid trails from salvage logging about 70 years earlier and the skid trails averaged more than elsewhere in the units. Page-Dumroese *et al.* (2006) noted some bulk density recovery after 5 years on coarse-textured soils in the surface soil (0–10 cm), but recovery was less in the subsoil (10–30 cm depth). Fine-textured soils such as silts and clays exhibited little recovery.

In general, soil compaction that reduces water infiltration rates and large pore space for gas and water movement constitutes detrimental soil disturbance and can last decades (Froehlich and McNabb 1984, Cafferata 1992, Page-Dumroese *et al.* 2007). Compaction restricts rooting depth, which reduces the uptake of water and nutrients by vegetation. Compaction decreases the soil pore size that can absorb water and decreases soil temperature. Soil organisms respond to compaction by decreasing their soil organic matter decomposition, which then decreases their release of nutrients back into the soil. Smaller pore spaces decrease the infiltration of both water and air into soil, which can lead to runoff with a corresponding increase of water erosion risk or hazard. The degree of soil compaction depends on the type of equipment used, number of equipment passes over the same location, and site conditions such as soil texture, water content, and temperature (Tan *et al.* 2009). Powers *et al.* (1990) hypothesized that the two most important site disturbances that reduce forest productivity are soil compaction and organic matter removal. Richardson and Wulfsohn (2004) found the most important characteristics related to the fertility of a site are the organic matter in the forest floor as well as the upper mineral layer and soil porous structure.

Soil compaction reduces tree growth, but the relationship between compaction and tree growth is complex and difficult to predict because it is dependent on many variables. For example, Miller *et al.* (1996) found a reduction in the early growth of seedlings planted on compacted skid trails compared to uncompacted locations; however, growth of most seedlings on compacted locations caught up to uncompacted locations after eight years. Tan *et al.* (2009) also found variable responses of three-year-old seedlings, depending on level of compaction, species, organic matter removal, and intensity of amelioration of compacted surfaces. Decreasing competition for site resources (e.g., water and nutrients) would offset severe compaction, and tree growth may not be affected (Sanchez *et al.* 2006).

As cited in Richardson and Wulfsohn (2004), organic matter serves an important role in site fertility. Organic matter includes needle cast and leaf litter, limbs and boles of trees, and underground roots. Soil fertility from organic materials is another element that contributes to overall soil productivity. Leaving the finer materials, such as the needles or twigs, has been determined to contribute to soil productivity when removing the bole portion for processing (Farve and Napper 2009). Whole tree removal has been demonstrated to have impacts to soil productivity where nutrients are limited. However, implementation of forest management actions, including timber removal, fuel reduction, and biomass removal, have been found to protect soil productivity through reserving residual amounts of fine and down woody material (Farve and Napper 2009). Leaving a residual amount of cut material or redistributing fine materials or limbs without burning allows the decomposition processes an opportunity to work on those materials and return nutrients to the soil. This action allows a variety of soil microbes to exist and process materials as well as to increase water retention and provide resilience to the ecological system.

A vast array of microbiotic organisms with potential to be affected by detrimental soil disturbance exists in the soil. Most of these organisms are the decomposers of organic matter, which return nutrients to the soil for use by plant roots or other organisms. However, little research exists on the effects of detrimental soil disturbance on microbiotic organisms other than the fungi and bacteria components. Most research on soil compaction in forests has focused on tree growth in skid trails or on tree growth response after amelioration treatment. Only recently did Shestak and Busse (2005) compare microbial composition, community size, activity, and diversity on compacted forest soils. They noted their results show tolerance or resilience by microbial communities. These authors suggest the reconfiguration of pores following compaction resulted in reduced total porosity and a near elimination of large pores, but an increase in habitable pore volume use by bacteria and fungi. Therefore, with the exception of poorly drained soils or for those regions receiving high annual precipitation where saturation is a concern, changes with compaction appear to be of little consequence to the microbial community. Previous studies have identified a variety of negative, neutral, and positive responses, yet there are few unifying concepts (Busse *et al.* 2006).

Affected Environment and Environmental Consequences

Current levels of detrimental soil disturbance from past timber harvests include 29,564 acres in the decision area: 12,688 acres are in the coastal/north and 16,876 acres are in the interior/south (**Figure 3-139**). The 29,564 acres of detrimental soil disturbance from past timber harvests constitute approximately 1 percent of the decision area.

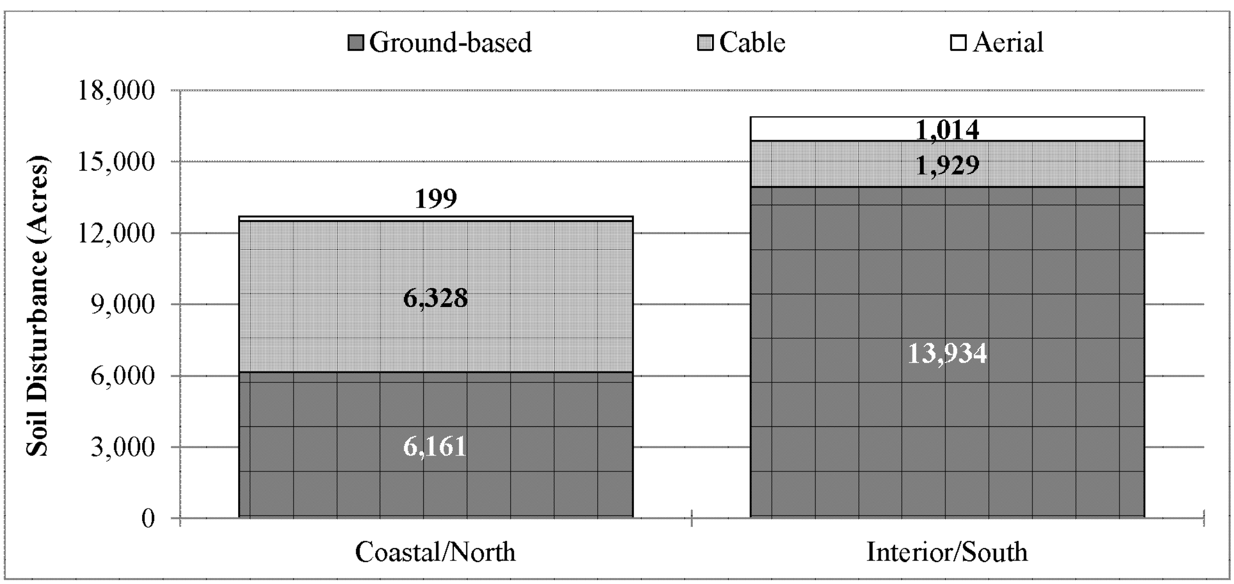

Figure 3-139. Detrimental soil disturbance from timber harvest by yarding system, 1990–2012

This acreage of detrimental soil disturbance constitutes 20 percent of the harvested acres in the decision area: 17 percent in the coastal/north and 23 percent in the interior/south. The interior/south has a higher percentage of detrimental soil disturbance on harvested acres because of the extensive use of ground-based yarding systems, which results in detrimental soil disturbance over a larger surface area within each harvest unit.

In the first ten years, the alternatives and the Proposed RMP would result in approximately 12,380–27,000 acres of detrimental soil disturbance from timber harvesting (**Figure 3-140** and **Table 3-207**). Alternative C would result in the most acreage of detrimental soil disturbance (27,000 acres) followed by Alternative B (25,217 acres), the No Action alternative (24,172 acres), the Proposed RMP (23,505 acres), and Alternative D (21,742 acres). In contrast, Alternative A would result in substantially smaller acreage of detrimental soil disturbance compared to the other alternatives and the Proposed RMP (12,380 acres) (**Table 3-207**). The amount of detrimental soil disturbance largely reflects the total acreage of timber harvested and the associated yarding system.

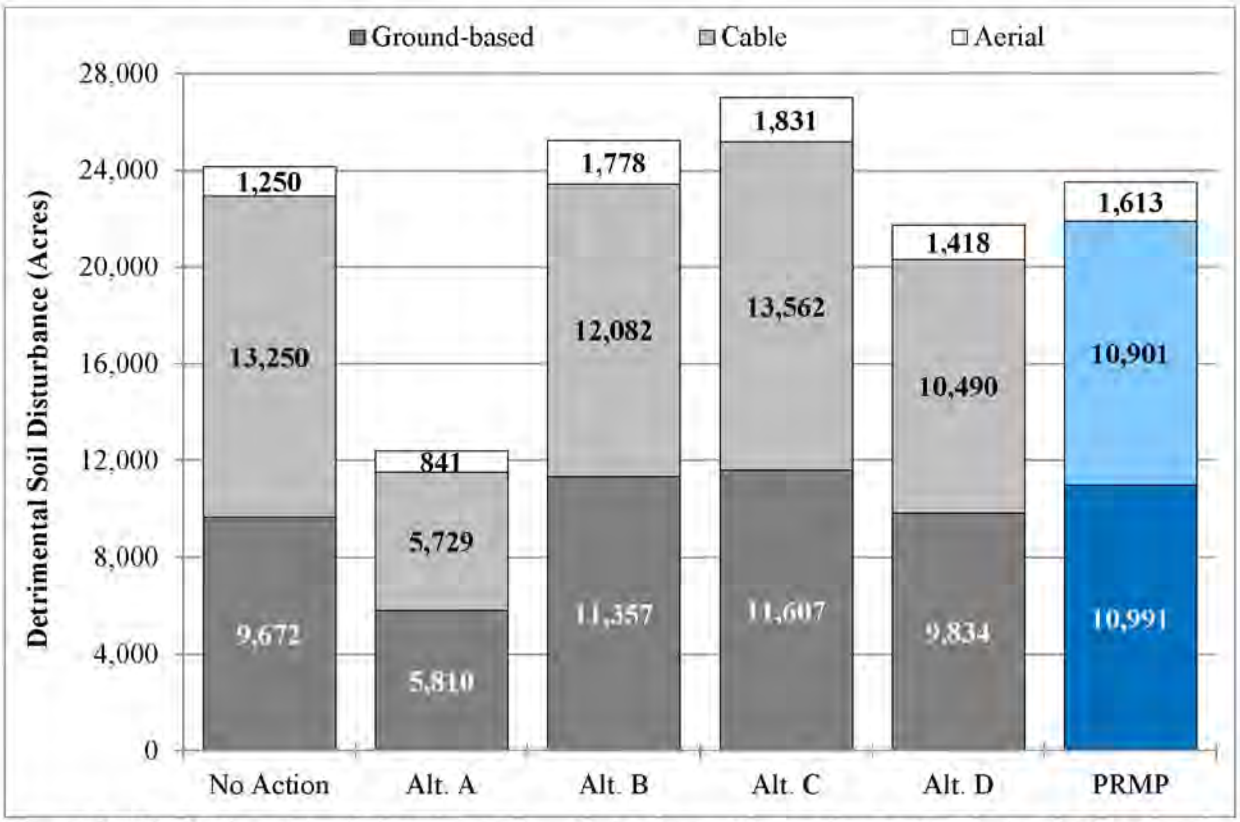

Figure 3-140. Detrimental soil disturbance from timber harvest by yarding system during the first decade

Table 3-207. Detrimental soil disturbance from timber harvest and by harvest method during the first decade for the coastal/north and interior/south

Detrimental Soil Disturbance	No Action		Alt. A		Alt. B		Alt. C		Alt. D		PRMP	
	Coastal/ North (Acres)	Interior/ South (Acres)	Coastal/ North (Acres)	Interior/ South (Acres)	Coastal/ North (Acres)	Interior/ South (Acres)	Coastal/ North (Acres)	Interior/ South (Acres)	Coastal/ North (Acres)	Interior/ South (Acres)	Coastal/ North (Acres)	Interior/ South (Acres)
Ground-based	5,496	4,176	2,364	3,446	4,847	6,510	5,633	5,975	4,411	5,423	4,560	6,431
Cable	9,320	3,930	3,421	2,308	7,368	4,715	8,812	4,750	6,760	3,730	6,360	4,541
Aerial	777	473	361	479	676	1,102	873	958	580	839	595	1,018
Sub Totals	15,594	8,578	6,147	6,233	12,890	12,327	15,318	11,682	11,750	9,992	11,515	11,990
Alternative/ Proposed RMP Totals	24,172		12,380		25,217		27,000		21,742		23,505	
Current Condition*	29,564		29,564		29,564		29,564		29,564		29,564	
Totals	**53,736**		**41,944**		**54,781**		**56,564**		**51,306**		**53,069**	
Percentage of Current Condition	80%		42%		85%		91%		74%		80%	

* This acreage is derived from **Figure 3-139** that only described detrimental soil disturbance from the years 1990–2012.

† This number does not account for detrimental soil disturbance that is ameliorated over time.

The detrimental soil disturbance from timber harvest modeled during the first decade under the alternatives and the Proposed RMP would result in new disturbance levels ranging from 42–91 percent of the current levels of detrimental soil disturbance from past timber harvests (**Table 3-207**). As a result, the alternatives and the Proposed RMP, together with past timber harvest, would result in a cumulative total of detrimental soil disturbance ranging from 41,944 acres to 56,564 acres, which would account for about 2 percent of the decision area. Each alternative and the Proposed RMP would result in detrimental soil disturbance averaging 15–16 percent of the total area as harvested by the three different systems in the first 10 years. These acres of detrimental soil disturbance do not account for disturbance that has been or would be ameliorated over time.

The BLM would be able to ameliorate detrimental soil disturbance by reducing soil compaction after harvest in ground-based units, and the landing areas for other systems. However, the extent and effectiveness of such amelioration depends heavily on site-specific and project-specific factors. For example, past implementation of sub-soiling and placement of woody debris and organic matter in conjunction with planting or seeding of native soil surfaces has produced ecosystems that resemble the unaltered soil conditions; simple closure to traffic of a rocked surface does not. Because of the variability driven by site-specific conditions and amelioration systems employed, the BLM cannot quantify those reductions in detrimental soil disturbance in this analysis.

Detrimental soil disturbance could result in some reduction of future tree growth. The BLM incorporated an assumption of 10 percent growth loss in the vegetation modeling of future stand growth over the length of the next rotation in stands with 20 percent detrimental soil disturbance levels. Management direction limits the increase of detrimental soil disturbance to 20 percent of any given treatment unit and includes all types of disturbances, including those resulting from treatments as well as new road and landing areas. All alternatives and the Proposed RMP, as analyzed, would increase the current level of detrimental soil disturbance by various percentages. Thus for some alternatives including the Proposed RMP, some mitigation of these impacts through the application of best management practices would be required. Currently, detrimental soil disturbance covers approximately six percent of the decision area. Raising that level by 20 percent would increase the detrimental soil disturbance to approximately seven percent of the decision area. Even then, there is only an expected reduction of growth from those areas in the future of 10 percent. Therefore, the sustainability of all lands under the decision area remains at approximately 99 percent of their current potential. However, at this scale of analysis and with the data available, it is not possible to quantify specifically the reduction in future tree growth from detrimental soil disturbance because the influence of site-specific and project-specific factors on the extent and intensity of detrimental soil disturbance is unknown.

Issue 2

How would road construction under the alternatives affect soil quality?

Summary of Analytical Methods

In this analysis, the BLM assumed that both permanent and temporary road construction would result in detrimental soil disturbance. It is not possible to forecast in this analysis if a given road segment would be decommissioned and mitigate detrimental soil disturbance, or how long after decommissioning detrimental soil disturbance would continue. Therefore, this analysis assumed that all new road construction would result in detrimental soil disturbance even though eventual decommissioning might mitigate these soil effects for some roads.

The BLM assumed that road construction would result on average in detrimental soil disturbance across a 45-foot width from upper cutbank to the lower toe of fill. However, the BLM is typically able to construct forest roads to narrower widths, and the 45-foot width average represents an overstatement of these narrower road footprints. Because of modeling parameters, road construction modeled in Woodstock applied the 45-foot width assumption for all roads (Brian Thauland and Carolina Hooper, BLM, personal communication, July 2013).

The BLM described the calculation of the mileage of road construction under each alternative and the Proposed RMP in the Trails and Travel Management section in this chapter.

The BLM calculated the acreage of detrimental soil disturbance from road construction by multiplying the length of roads in feet by the 45-foot road width and converting the net square feet into acres.

The Planning Criteria identified that this analysis would also address landings (USDI BLM 2014, p. 156). However, most of the landing area would be included in the road construction assumptions and is therefore not included here as a separate analysis.

Background

Road construction—by its very nature—removes the organic layer, cuts deep into the soil horizon, and produces a compacted surface. This results in detrimental soil disturbance, which decommissioning can potentially ameliorate. However, the effectiveness of decommissioning in reducing detrimental soil disturbance is not clear. Tan *et al.* (2009) note better growth on compacted sites with coarse sandy soils. Most of the decision area does not have coarse sandy soil types with the exception of some areas in the Medford District.

As noted by Powers *et al.* (1990), soil compaction and organic matter removal are the two most important site disturbances caused by forest management practices. These have the largest potential to reduce forest productivity. Replenishing the organic matter and reducing the amount of compaction both within the depth of a road surface and across the surface are key factors to providing quality soils for future tree growth. Lloyd *et al.* (2013) describes the effectiveness of different road decommissioning techniques for rehabilitation of ecological and hydrological systems in densely roaded forest ecosystems. Their overarching hypothesis is that restoration designs that fail to address explicitly both aboveground and belowground ecosystem structure and function would result in recovery to an alternative state that has diminished ecological and hydrological functions relative to a forest where a road was never built.

Affected Environment and Environmental Consequences

There are currently 14,416 miles of roads in the decision area. This constitutes a detrimental soil disturbance on 79,311 acres which is approximately 3 percent of the decision area.

Over the first decade, Alternative C would have the largest acreage of detrimental soil disturbance from road construction (3,822 acres) while Alternative D would have the least (1,319 acres; **Figure 3-141**).

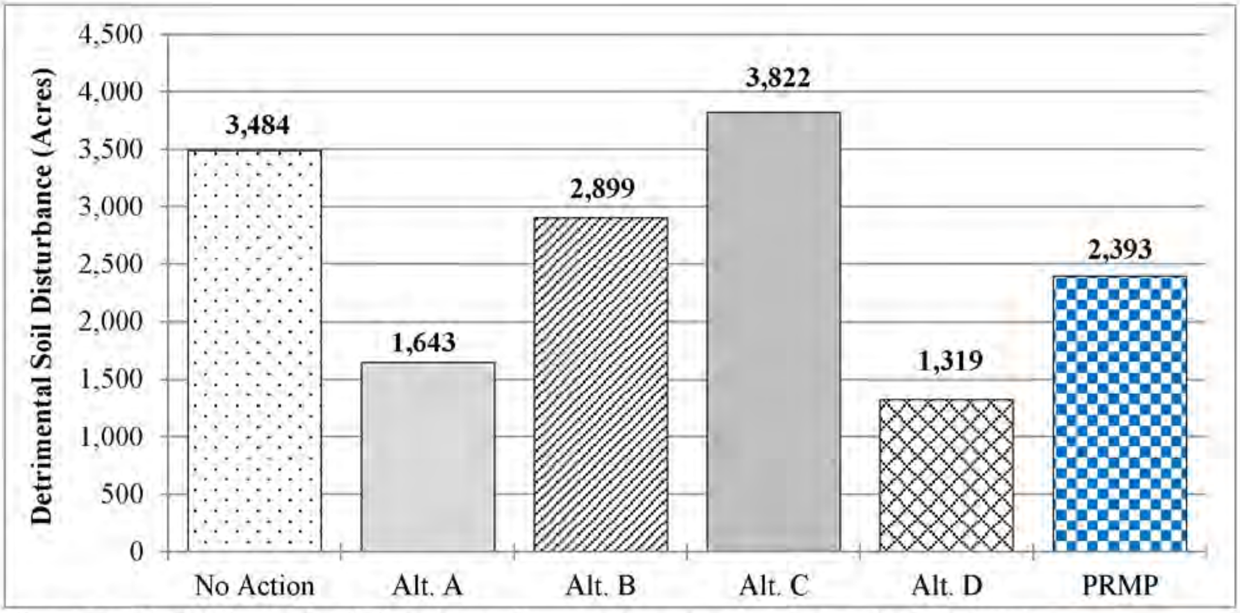

Figure 3-141. Detrimental soil disturbance from road construction during the first decade

The detrimental soil disturbance from road construction during the first decade under the alternatives and the Proposed RMP would constitute approximately 2–5 percent of the current detrimental soil disturbance from past road construction (**Table 3-208**). As a result, the alternatives and the Proposed RMP, together with past road construction, would result in a cumulative total of detrimental soil disturbance ranging from 80,630 to 83,133 acres.

Table 3-208. Acres of cumulative detrimental soil disturbance from road construction during the first decade

Detrimental Soil Disturbance From Road Construction	No Action (Acres)	Alt. A (Acres)	Alt. B (Acres)	Alt. C (Acres)	Alt. D (Acres)	PRMP (Acres)
Current Condition	79,311	79,311	79,311	79,311	79,311	79,311
First Decade Construction	3,484	1,643	2,899	3,822	1,319	2,393
Totals	**82,795**	**80,954**	**82,210**	**83,133**	**80,630**	**81,704**
Construction Percentage of Current Condition	4.4%	2.1%	3.7%	4.8%	1.7%	3.0%

Under all alternatives and the Proposed RMP, given the analytical assumptions, approximately 51–61 percent of the new road construction would be permanent roads and 39–49 percent would be temporary roads (**Table 3-209**). Temporary roads include both native-surfaced and rock-surfaced roads. The BLM could potentially decommission these temporary roads to ameliorate detrimental soil disturbance. Lloyd *et al.* (2013) describes the effectiveness of different road decommissioning techniques, include removing rock, loosening the compacted sub-grade, replenishing some of the organic matter, and implementing erosion-control measures. By following those techniques found to be most successful, the BLM could potentially decommission temporary roads to ameliorate detrimental soil disturbance. In past project implementation, removing rock, loosening the compacted sub-grade, replenishing some of the organic matter, and implementing erosion-control measures have successfully established trees and protected the soil environment. On permanent roads, where roads are established using a hardened surface of gravel or pavement, the potential for decommissioning is lower, as the cost of decommissioning can be equal to or greater than the cost of construction. Under BLM terminology, permanent roads can be considered decommissioned when supporting infrastructure (e.g., remove culverts or cross-drains) is removed to close these roads from continued use. However, this level of decommissioning would retain the hard surface and compacted subsoil. As such, this level of decommissioning is not included in this soils analysis, as the roads would not be fully decommissioned to restore the soil environment. For the purposes of soil analysis in all alternatives and the Proposed RMP, the BLM only considers decommissioning of temporary roads to result in amelioration of detrimental soil disturbance to levels that successfully establish trees and protected the soil environment.

Table 3-209. Acres of detrimental soil disturbance from road construction by road type during the first decade

Detrimental Soil Disturbance by Road Construction Type	No Action (Acres)	Alt. A (Acres)	Alt. B (Acres)	Alt. C (Acres)	Alt. D (Acres)	PRMP (Acres)
Permanent Roads	1,763	990	1,586	2,233	799	1,275
Temporary Roads	1,721	653	1,313	1,589	520	1,118
Totals	**3,484**	**1,643**	**2,899**	**3,822**	**1,319**	**2,393**
Percentage of Permanent Roads	51%	60%	55%	58%	61%	53%
Percentage of Temporary Roads	49%	40%	45%	42%	39%	47%

Given the vast size of the planning area and the complexity of road construction, not all temporary roads would undergo decommissioning adequate to ameliorate detrimental soil disturbance. However, temporary roads disturb less of the subsoil and have lower traffic volumes and so would be the most likely to be decommissioned. Under all alternatives and the Proposed RMP, decommissioning of temporary roads would provide some reduction in the acres of detrimental soil disturbance, but it is not possible at this scale of analysis with the data available to quantify this potential reduction in this analysis.

Even if all newly constructed roads were permanent, the increased acreage of detrimental soil disturbance from new road construction in the first decade would range from 1.7–4.8 percent of the current total (**Table 3-208**). This would be an increase from the current condition of 3.2 percent of the decision area with detrimental soil disturbance from road construction, to 3.25–3.35 percent of the decision area after 10 years depending on the alternative and the Proposed RMP. Detrimental soil disturbance could result in some reduction of future tree growth as described in Issue 1. The BLM incorporated an assumption of one percent growth loss in future stand growth for every two percent of detrimental soil disturbance created. The increase of detrimental soil disturbance due to roads is included in the 10 percent growth loss over the length of the next rotation, as it comprises part of the 20 percent detrimental soil disturbance levels. This represents a negligible increase in the acreage of detrimental soil disturbance from road construction. It also represents an overestimation as these numbers represent overstatements of road widths (45 feet) for many BLM roads. This analysis is also an overestimate because the BLM does not quantitatively account for potential reductions from road decommissioning.

Issue 3

How would fuel reduction treatments under the alternatives affect soil quality?

Summary of Analytical Methods

Fuel reduction treatments can result in detrimental soil disturbance through soil compaction, soil displacement, bare soil erosion, excessive soil heating, or the production of a thick mulch of chopped or chipped vegetation. The portion of treated areas experiencing detrimental soil disturbance varies by fuel reduction methods.

In this analysis, the BLM grouped together fuel reduction treatments for activity fuels such as the slash remaining after timber harvest and for hazardous risk fuels not associated with timber harvest. This is a change from the discussion in the Planning Criteria, which presented separate issues for the effects of treatment of activity fuels and hazardous risk fuels (USDI BLM 2014, pp. 166–171). At this scale of analysis with the data available, treatments for activity fuels or hazardous risk fuels do not have a discernible difference in creating detrimental soil disturbance.

This analysis evaluated fuel reduction treatments over a 22-year period. Fuel reduction by any method is temporary in nature as vegetation resprouts and needs retreatment in 5–15 years. In some instances, the type of fuel treatment changes from the removal of larger diameter trees to the reduction of understory shrubs or small diameter trees which increases the fuels component after overstory removals.

The BLM derived the acreage of past fuel reduction treatments for activity fuels by querying the Mechpoly and Burnpoly corporate BLM data.[119] The BLM used the Woodstock model outputs to obtain acreages for each alternative and the Proposed RMP for the six different silvicultural treatments of broadcast burns, hand piles, machine piles, landing piles, lop and scatter, and mastication during the first decade.

The BLM derived the acreage of fuel reduction treatments for hazardous risk fuels by querying the district fuel specialists for the level of treatment in the past two decades. Then the BLM projected a decadal level of treatment. The BLM assumed in this analysis that the amount of fuel reduction treatments for hazardous risk fuels would be the same among the alternatives and the Proposed RMP. Based on management objectives and direction in the alternatives and the Proposed RMP, the BLM concluded that there is no basis for predicting a change in treatment of hazardous risk fuels from current and recent practices regardless of how other land management decisions would change.

The BLM assumed the following detrimental soil disturbance would occur: 25 percent of areas treated with excavator machine piling, 35 percent of areas treated with heavy machinery mastication methods, and 5 percent of areas treated with broadcast burning. These estimations incorporate the number of times equipment travels across the units, the length of the boom on the equipment, the size of the piles, the material size to burn, and conclusions from previous publications and studies describing negative effects to the soil.

In this scale of analysis, the BLM assumed that hand pile burning, landing pile burning, and lop and scatter methods of fuel reduction treatment would not result in measurable detrimental soil disturbance. Hand-piling material that is smaller in diameter and in smaller piles typically does not generate lethal soil temperatures. Landing piles can be large enough to generate lethal temperatures, but the area already has detrimental soil disturbance from road construction. The BLM has used two methods of lop and scatter: (1) manual labor to cut and disperse excess vegetation in the treated area and (2) mechanical grinders to cut and disperse excess material (Busse *et al*. 2014). Grinding equipment remains on existing roads limiting the potential for detrimental soil disturbance. Neither method would result in detrimental soil disturbance that would be measureable at this scale of analysis.

In this analysis, the BLM assumed that machine pile burning and broadcast burning have the potential to cause some detrimental soil disturbance, especially where concentration of slash would cause deep heating of the soil or where large wood would be allowed to smolder for long periods of time. However,

[119] These are two layers in the BLM's corporate GIS database. As fuel reduction treatments are completed, specialists input the activity into these layers. However, these layers are not complete.

these circumstances would constitute only a small portion of the broadcast burn area, and quick mop-up after burning would limit the scope and extent of any detrimental soil disturbance. For machine piling, the scattered nature of constructing piles is reliant on the level of fuel loading. Less fuel equals larger distances between piles and potentially less compaction and lethal temperatures during ignition of the piles. The burning of machine piles causes detrimental soil disturbance from both the soil compaction around the pile from the equipment and the heating of the soil beneath the center of the pile.

Generally, mastication involves using mechanical equipment to grind cut vegetation and distributing treated material by spreading or blowing it out on the ground (Busse *et al.*, 2014). For mastication of fuels, the BLM assumed that most machines would be mobile across the treatment area. The impact to the soil resources would come from compaction, displacement, and some concentration of chipped material deeper than three inches. The BLM has employed boom excavators and horizontal bar type machines that need to traverse most of the unit for mastication. Grinding of heavy fuel loads has previously built up chipped material that impedes plant growth.

The Planning Criteria provides more discussion of the analytical methods for detrimental soil disturbance from prescribed burning and is incorporated here by reference (USDI BLM 2014, pp. 157–161).

Background

Prescribed fire can heat the soil to a lethal temperature that kills the microbes, which process organic matter in the soil to provide nutrients to growing vegetation. These same organisms connect roots and soil, which provide additional water and increase water uptake for plants. Inadequately populated soils that lack diverse bacterial and fungi communities demonstrate reduced growing capacity and function which would result in less vegetative growth.

The effects of prescribed burning on soil physical, chemical, and biological properties depend on specific properties or species. Threshold temperatures classed by Busse *et al.* (2014) for soil physical, chemical, and biological properties fall into low, moderate, or high classes. Mortality of bacteria or fungi components, as well as seeds and fine roots of plants within the soil, occurs in the low class between 100 °F and 300 °F. Most soil structure and organic matter changes occur in the moderate class, between 390 °F and 930 °F. The high class is where nutrient volatilization proceeds and occurs between 700 °F and 2,700 °F. The lethal threshold for roots is approximately 140 °F, while that of many soil organisms is between 122 °F and 392 °F.

Chemical and biological effects to soils from prescribed burning include oxidation of surface and soil organic material, changes in nutrient availability and pool size, changes in pH, and lethal heating to biota and fine roots. Soil properties most indicative of detrimental changes differ between fuel reduction practices, making comparisons among treatment types problematic.

Soil heating is a particular concern given anticipated changes to soil nutrient content and availability, microbial composition and function, soil carbon content, soil mineralogy, water repellency, and infiltration following severe burning (Neary *et al.* 2005). Busse *et al.* (2013) determined that, regardless of pile size or fuel composition, the soil heat pulse during burning was quenched rapidly with soil depth. The greatest soil heating occurred in the surface 4 inches, whereas benign temperatures registered at the 12-inch depth; mean maximum values were 104 °F for slash piles and 167 °F for woodpiles. Soil moisture plays a key role in heating dynamics, particularly when burning natural fuels or scattering slash. Heat penetration is substantially lower in moist soil than in dry soil due to the additional energy required to heat water (Busse *et al.* 2010).

Soils in the interior/south are generally lower in organic matter and nutrients and are more susceptible to degradation by prescribed burning than soils in the coastal/north. Detrimental soil disturbance from prescribed burning is particularly severe with machine piling because piled fuel concentrates heat in the center of the pile and equipment use compacts the soil around the pile. Smaller hand piles or the use of broadcast burning generally results in less detrimental soil disturbance than machine piling.

Mastication occurs with various types of equipment, including wheeled or tracked equipment, equipment with a rotary head attached to a boom, and equipment with the rotary mechanism attached directly to the front of the equipment. Boom-mounted masticators can reach areas such as deep ditches and steep embankments and can treat more area with less compaction than machines with the rotary mechanism on the front of the machine (Ryans and Cormier 1994). Tracked equipment can work on steeper slopes and softer soils than wheeled equipment. Mastication would cause some soil compaction and displacement depending on the type of equipment, soil conditions and type, operator experience, and stand conditions. Limiting masticators to designated skid trails or using low-ground-pressure equipment can reduce the extent and intensity of physical soil disturbance (Busse *et al.* 2014). Most mastication fuels treatments are fundamentally different from ground-based harvest yarding systems in which yarding concentrates traffic to skid trails that receive multiple passes. Most masticators track over broad areas to treat fuels, especially if using a horizontal fixed bar design. Boom-mounted masticators are more similar to ground-based yarding; for this type of mastication treatment, confining the equipment to skid trails, operating on a deep slash mat, and using low ground pressure equipment reduces or avoids detrimental soil disturbance.

Mastication produces a coating of cut vegetation debris across the forest floor. Because the resulting debris is unlike the natural forest floor in terms of particle size, composition, bulk density, and moisture regime, there are few direct comparisons to natural wildland systems or processes. Due to the limited number of studies of mastication impacts on soil resources within the planning area, it is difficult to interpret long-term ecological consequences. Short-term studies published in the last 5 years have found few detrimental effects, but the majority of these studies are conducted on sandy soils in California and juniper woodland vegetation types in Colorado. Those soils do not compact in the same manner as clay-textured soils in the planning area. Most short-term impacts center on compaction, mycorrhizal reductions, and nutrient loss or tie up, but long-term consequences or indirect effects from mastication remain largely unstudied (Busse *et al.* 2014). These same studies caution that results are very site-specific and taking the results to other treatment areas needs to be conducted with caution. More research is needed to understand the variability across landscapes. Thus, the BLM has cautiously assumed that mastication will affect soil resources in a manner similar to timber harvesting with mechanical type systems.

Mastication can substantially modify soil temperature and moisture regimes by creating mulch that insulates the soil and traps moisture at the soil surface. This mulch would keep soils cooler in the summer and warmer in the late fall and early winter. The extent that cut vegetation debris is incorporated into the soil during mastication determines the degree that soil temperature changes and water content increases. Masticated debris can act as a barrier against both water infiltration into the soil and evaporative losses from the soil.

Reducing fuels through mastication has limited short-term effects on soil microbial communities, largely because of the insulating and buffering effect of the cut vegetation debris. Mastication removes vegetation, which opens treated areas to the sun, but the resultant mulch reduces soil drying. Studies of mastication treatments in pinyon-juniper woodlands did not find differences in abundance, species richness, or community composition of arbuscular mycorrhizal fungi 2.5 years after treatment (Busse *et al.* 2014).

Mastication would reduce soil nitrogen availability. Mulch is generally low in nitrogen and high in carbon. After the addition of mulch to the soil, microbes will use inorganic nitrogen from the soil in order to decompose the added carbon-rich material. Under such circumstances, this nitrogen immobilization could temporarily reduce the amount of soil nitrogen available for plant growth. While such effects on soil nitrogen are possible, few studies have examined nitrogen transformations and dynamics following mastication. The depth of mulch influences the effect of these treatments on plant-available nitrogen. Ryan *et al.* (2011) found that patchy mulch 0.5–1.5" thick had no negative impact on soil nitrogen at the stand level, but uniform mulch 3–6" thick had substantial effects on soil nitrogen. While the depth of the mulch layer was not identified, in a comparison of fuel treatments in the Sierra Nevada Mountains, commercial thinning followed by mastication did not significantly alter available nitrogen or net nitrification rates 2 years after treatment as compared to untreated control stands (Moghaddas and Stephens 2007). The soil moisture content of the study area is drastically less than the coastal/north portion of the decision area, and the microbial processes would not come into equilibrium in the same manner of the studies.

A study conducted from 2003 to 2008 on the southeastern edge of the Klamath Mountains in northern California found that mastication and burning treatments did not significantly alter any overall community composition and species richness of mycorrhizal fungi (Southworth and Gibson 2010). In addition, mechanical mastication followed by burning did not significantly change soil nutrients at the depth of fine roots and mycorrhizal fungi, and soil nutrient composition did not vary among treatments. Reduction in the fruiting bodies of truffles did occur if the masticated fuels were burned. This study area comes closest to soil and weather conditions found in the interior/south portion of the decision area. Limited research in this area—particularly on clay-textured soils that are well-drained—makes it difficult to determine that similar results would occur in the decision area, particularly in the coastal/north area.

Fuel reduction through biomass removal can remove both carbon and nutrients. Long-term productivity can be reduced by removing these materials, particularly where soils are previously low in these nutrients (Poggiani *et al.* 1983, Swank and Reynolds 1986). The risk of reduction in soil quality due to nutrient loss is largest in the areas of lower productivity in the interior/south. Removal of material to meet hazard reduction goals may conflict with long-term site productivity.

Under the 1995 RMPs, the BLM placed greater emphasis on removing hazardous fuels in the interior/south than in the coastal/north (**Table 3-210**). Fuel reduction for hazard risk included removal of material along roadsides and pulling material into treated harvest units, which the BLM may not have recorded as fuel reduction treatments. Many areas recorded as burn treatments do not reflect in the totals as hazardous fuels reduced.

Table 3-210. Fuel treatments by method, 2003–2012

Fuels Treatment	Coastal/North			Interior/South			Totals (Acres)
	Activity Fuel (Acres)	Hazardous Risk Fuel (Acres)	Total Area Treated (Acres)	Activity Fuel (Acres)	Hazardous Risk Fuel (Acres)	Total Area Treated (Acres)	
Underburn/Broadcast Burn	81,142	2,725	83,867	57,095	33,053	90,148	**174,015**
Machine Pile and Burn	310	16,690	17,000	33,976	25,018	58,994	**75,994**
Mastication	-	2,773	2,773	-	5,359	5,359	**8,132**
Total Treatment Acres	**81,452**	**22,188**	**103,640**	**91,071**	**63,430**	**154,501**	**258,141**

Affected Environment and Environmental Consequences

Fuel treatments over the past 20 years have potentially resulted in detrimental soil disturbance on 30,424 acres in the decision area: 9,292 acres in the coastal/north, and 21,132 acres in the interior/south (**Table 3-211**).

Table 3-211. Detrimental soil disturbance from fuel treatments by method, 2003–2012

Fuels Treatment	Coastal/North (Acres)	Interior/South (Acres)	Totals (Acres)
Underburn/Broadcast Burn	4,071	4,507	**8,578**
Machine Pile and Burn	4,250	14,749	**18,999**
Mastication	971	1,876	**2,847**
Totals	**9,292**	**21,132**	**30,424**

For each alternative and the Proposed RMP, the total detrimental soil disturbance acres from treatment disturbance ranges from approximately 4,400–10,100 acres (**Figure 3-142**). This acreage ranges from 5 to 7 percent of the acres treated in each of the alternatives and the Proposed RMP. Alternative C would result in the largest amount of detrimental soil disturbance from fuel treatments (10,139 acres), and Alternative D would result in the least (4,346 acres). Alternative A (4,410 acres), the No Action alternative (5,330 acres), the Proposed RMP (5,665 acres), and Alternative B (6,055 acres) would result in only slightly more detrimental soil disturbance from fuel treatments than Alternative D and substantially less than Alternative C.

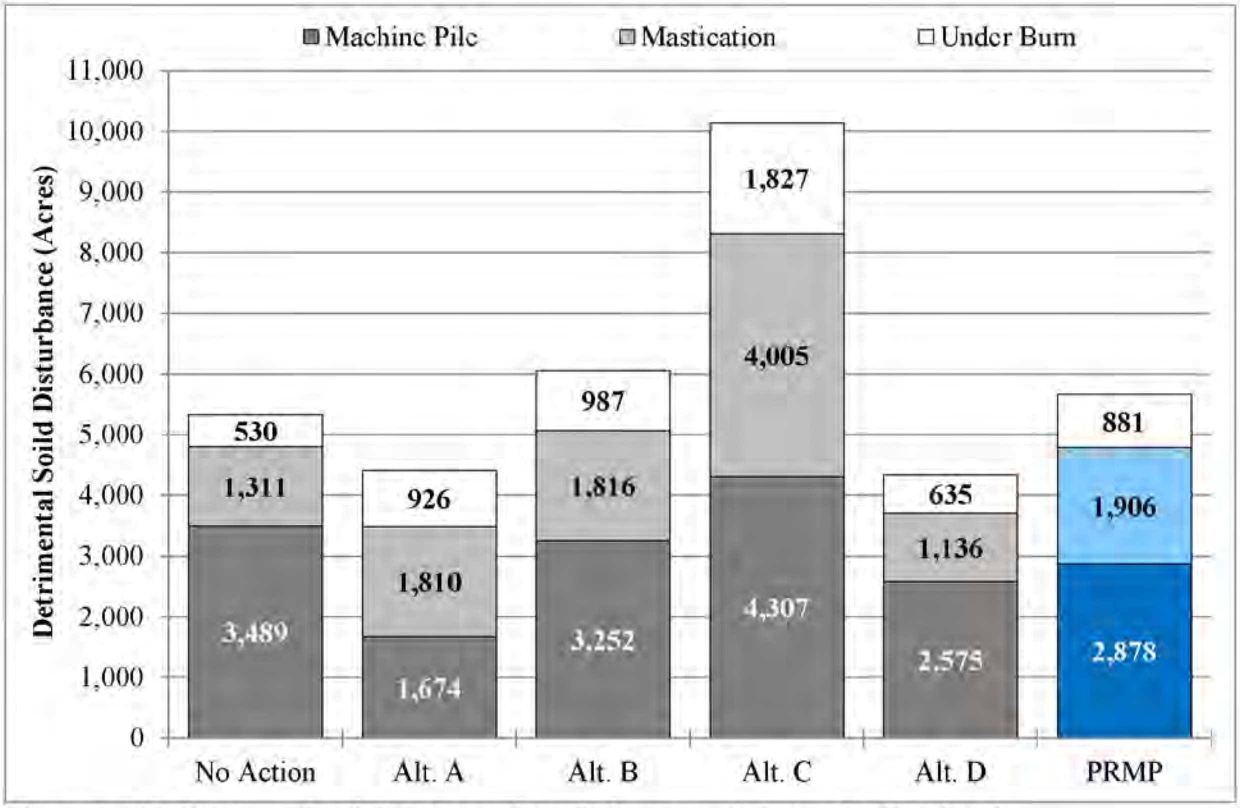

Figure 3-142. Detrimental soil disturbance from fuel treatments during the first decade

The detrimental soil disturbance from fuel treatments during the first decade under the alternatives and the Proposed RMP would be approximately 14–33 percent **(Table 3-212)** of the current detrimental soil disturbance from past fuel treatments. As a result, the alternatives and the Proposed RMP summed with past fuel treatments would result in a cumulative total of detrimental soil disturbance ranging from 34,770 acres to 40,563 acres.

Table 3-212. Detrimental soil disturbance from fuels treatments compared to the current condition

Detrimental Soil Disturbance From Fuel Reduction Treatments	No Action (Acres)	Alt. A (Acres)	Alt. B (Acres)	Alt. C (Acres)	Alt. D (Acres)	PRMP (Acres)
Current Condition	30,424	30,424	30,424	30,424	30,424	30,424
Fuels Reduction Treatments	5,330	4,410	6,055	10,139	4,346	5,665
Totals	**35,754**	**34,834**	**36,479**	**40,563**	**34,770**	**36,089**
Percentage of Current Condition	18%	14%	20%	33%	14%	19%

There are differences among the alternatives and the Proposed RMP based on the method of treatment that would produce different detrimental effects. Except Alternative A, machine piling would be the largest contributor to detrimental soil disturbance **(Figure 3-142)** in the alternatives and the Proposed RMP. Mastication is the largest contributor to detrimental soil disturbance in Alternative A. Where machine piling occurs, there would be compaction that would reduce seedling growth or impede vegetative cover of native plants. Where soil temperature is elevated above lethal temperatures, there would be loss of microbial activity and reduced soil attachment to roots that improve growth. If masticated materials accumulate in layers greater than 3 inches, the mulch layer would impede evaporation, water infiltration, and solar heating. The effect on seedling growth could be negative or positive depending on site and soil particulars. Across the 2.5 million acre decision area, the total number of treated acres would range from 5,330 to 10,139 acres. This increased level of detrimental soil disturbance would reflect a 10 percent reduction of growth on less than half of one percent of the decision area, which constitutes an insignificant loss under any alternative.

Issue 4

How would public motorized travel activity under the alternatives affect soil quality?

Summary of Analytical Methods

In this analysis, the BLM assumed that areas designated as *open* for public motorized access would experience detrimental soil disturbance. Areas designated as *closed* would not experience detrimental soil disturbance because the BLM would not permit public motorized travel activities. Areas designated as *limited* would not experience measurable additional detrimental soil disturbance because the BLM would limit public motorized travel activities to existing or designated roads and trails, which have already experienced detrimental soil disturbance through the construction of the roads or trails. Until the BLM completes route designations through implementation-level travel management planning (TMP), the BLM cannot identify which routes would be designated in any alternative and the Proposed RMP. Therefore, the BLM cannot quantify these more site-specific effects in this analysis, and the BLM would address these effects as part of the analysis supporting implementation-level TMP decisions.

Although the BLM has some site-specific and anecdotal information about illegal public motorized travel activities, the BLM does not have a basis for predicting the location or effects of any widespread or systematic illegal public motorized travel activities. In addition, much of the decision area has physical limitations to potential illegal public motorized travel activities, including dense vegetation, steep slopes, and locked gates. Terrain, vegetation, and a greater amount of open spaces in most of the interior/south can lead to degradation and erosion in a greater proportion than the coastal/north where vegetation is denser and terrain is steeper. However, the BLM lacks a basis for characterizing current illegal public motorized travel activities or forecasting potential illegal public motorized travel activities in the future under any of the alternatives and the Proposed RMP at this scale of analysis. In this analysis, the BLM assumed that members of the public participating in motorized travel recreation would operate vehicles consistent with BLM decisions about public motorized travel opportunities (see the Trails and Travel Management section of this chapter).

Background

Public motorized travel activities can cause detrimental soil disturbance as vehicle traffic compacts or displaces soil (Ouren *et al.* 2007). The effects can vary based on the type of vehicle. Vehicles include two-wheel and four-wheel all-terrain vehicles, large four-wheel-drive trucks, sport utility vehicles, and any other vehicle capable of off-road travel. Depending on the type of soil, there will be different effects. Relatively uniform sandy or clay soils are less vulnerable to compaction than loamy sands or coarse-textured, gravelly soils characterized by variability in particle size (Lovich and Bainbridge 1999). In addition, soils capable of holding greater water content are more susceptible to compaction than soils containing less moisture (Webb 1982). However, even soils in semi-arid and arid lands experience compaction because the texture of these soils is slow to recover through natural soil-loosening processes, including shrinking, swelling, drying, wetting, freezing, and thawing (Webb 1982).

Public motorized travel activities can cause soil erosion, which occurs when fine-grained particles blow off in the wind or wash off due to precipitation on an unprotected surface. The removal of the top layers of soil, particularly the organic matter, degrades the potential for soil function. The result can range from barren surfaces or very deep gullies depending on soil type, slope gradient, and amount of exposure to precipitation.

Affected Environment and Environmental Consequences

Under the No Action alternative, approximately 63,500 acres of the decision area would remain designated as *closed* for public motorized access, and approximately 319,600 acres would remain designated as *open* for public motorized access (see Trails and Travel Management **Table 3-218** in this chapter). The BLM would designate the remaining 84.4 percent as *limited* for public motorized access. Detrimental soil disturbance has occurred, and would continue to occur, on some portion of the 319,600 acres designated as *open* for public motorized access. It is not possible for the BLM to determine at this scale of analysis with current data the extent of the 319,600 acres of *open* for public motorized access that are actually experiencing detrimental soil disturbance or would experience detrimental soil disturbance in the future. However, within areas designated as *open* for public motorized access, such effects would occur throughout the *open* area without future analysis or decision-making by the BLM.

Under all action alternatives and the Proposed RMP, there would be no areas designated as *open* for public motorized access. Compared to the No Action alternative, this would curtail potential detrimental soil disturbance on over 319,400 acres or 13 percent of the decision area currently designated as *open*. The BLM would designate the entirety of the decision area as *closed* for public motorized access or *limited* for public motorized access. While public motorized vehicle use for recreational purposes is expected to increase as opportunities and demand increase (see Recreation and Visitor Services in this chapter), additional detrimental soil disturbance from public motorized travel on roads and trails would not be expected under the action alternatives or Proposed RMP from increased use. The BLM assumes that *limited* designations would confine continued public motorized travel activities to proposed, existing, or designated roads and trails, which would have already experienced detrimental soil disturbance through the construction of the roads or trails. As such, there would be no additional detrimental soil disturbance from public motorized travel activities measurable at this scale of analysis with the data available under any of the action alternatives or the Proposed RMP.

Until the BLM completes route designations through implementation-level TMPs, the BLM cannot identify specific routes designated in any alternative or the Proposed RMP. Therefore, the BLM cannot quantify these more site-specific effects in this analysis, and the BLM would address these effects as part of the analysis supporting implementation-level TMP decisions.

Issue 5

How would the combination of timber harvest, road construction, and fuel reduction treatments[120] *under the alternatives affect soil quality?*

Summary of Analytical Methods

In this analysis, the BLM combined the individual levels of detrimental soil disturbance from timber harvest, road construction, and fuel reduction treatments. For the purposes of this analysis, the BLM considered all acres of detrimental soil disturbance to be equal: acres of detrimental soil disturbance from timber harvest are equivalent to those from road construction or fuel reduction treatments. There are

[120] The BLM is unable to measure detrimental soil disturbance from public motorized travel activities with the data currently available at this scale of analysis (see Issue 4). Therefore, the BLM did not combine detrimental soil disturbance from public motorized travel activities with these other sources because no quantifiable metric is presently available.

differences in how detrimental soil disturbance from different management actions would affect soil quality. However, it is not possible to distinguish quantitatively these differences in detrimental soil disturbance at this scale of analysis with the data currently available. In addition, there would likely be some overlap in the acres of detrimental soil disturbance from these three sources (i.e., the same location within a harvest unit would experience detrimental soil disturbance from the ground-based yarding equipment during harvesting and from machine piling and burning during fuels treatment). However, it is not possible at this scale of analysis to separate the acres of detrimental soil disturbance from each source and identify overlapping acres. Therefore, these estimates overestimate the acres of detrimental soil disturbance in part because of the overlapping acres.

The BLM compared the combined amount of detrimental soil disturbance to a threshold of 20 percent of areas treated. The BLM derived this analytical threshold in part from a U.S. Forest Service Pacific Northwest Region standard in which overall soil quality is considered negatively impacted and amelioration must ensue when detrimental soil disturbance exceeds 15 percent of an area treated (USDA FS 2010). However, this 15 percent standard does not account for road construction. The BLM increased this analytical threshold from 15 percent to 20 percent to account for detrimental soil disturbance from road construction. This 20 percent threshold only provides an approximate analytical threshold at this scale of analysis. Comparing the amount of detrimental soil disturbance as a percentage of total area treated across the decision area over 10 years to this 20 percent analytical threshold provides only limited and approximate information. This estimated percentage does not reveal whether or not any particular site or treatment area would exceed this 20 percent threshold. The relevant scale for evaluating detrimental soil disturbance and determining the need for mitigation or amelioration is at the site scale such as an individual timber harvest unit or individual treatment area.

Affected Environment and Environmental Consequences

Currently, 139,299 acres in the decision area have experienced detrimental soil disturbance from past timber harvest, road construction, and fuel reduction treatments (**Table 3-213**).

Table 3-213. Detrimental soil disturbance from all sources, by the current condition and during the first decade

Management Action	Current Condition (Acres)	No Action (Acres)	Alt. A (Acres)	Alt. B (Acres)	Alt. C (Acres)	Alt. D (Acres)	PRMP (Acres)
Fuels Treatments	30,424	5,330	4,410	6,055	10,139	4,346	5,665
Road Construction	79,311	3,484	1,643	2,899	3,822	1,319	2,393
Timber Harvest	29,564	24,172	12,380	25,217	27,000	21,742	23,505
Totals	139,299	32,986	18,433	34,171	40,961	27,407	31,563
Total Combined with Current Condition	-	**172,285**	**157,732**	**173,470**	**180,260**	**166,706**	**170,862**
Percentage of Current Condition		24%	13%	25%	29%	20%	23%

Through the first decade, the alternatives and the Proposed RMP would increase detrimental soil disturbance amounts by 13–29 percent of current amounts. Alternative C would result in the largest combined increase in detrimental soil disturbance (40,961 acres), with decreasing acreages in Alternative B (34,171 acres), No Action (32,986 acres), the Proposed RMP (31,563 acres), and Alternative D (27,407 acres). Alternative A would result in the smallest combined increase in detrimental soil disturbance (18,433 acres).

Timber harvest activities are the largest source of detrimental soil disturbance under the alternatives and the Proposed RMP. New road construction based on silvicultural management would be low under all alternatives and the Proposed RMP as most of the required transportation system is currently in place. Fuels treatments for both the disposal of harvest waste and fire risk reduction activities under the alternatives and the Proposed RMP would use less of the treatment methods likely to result in detrimental soil disturbance than in the past. The expected treatments employ more hand piling or scattering, more landing burning, and less mastication or machine piling acres.

As noted in the issues above, the BLM would be able to reduce the acreage of detrimental soil disturbance from timber harvest, road construction, and fuel reduction treatments through management practices that would limit initial compaction levels, remove existing or created compacted surfaces, and improve soil water and organic matter levels. The BLM would apply the best management practices listed and described in **Appendix J** as necessary to limit the overall detrimental soil disturbance to 20 percent or less. However, because the extent and effectiveness of such mitigation or amelioration depends heavily on site-specific and project-specific factors, the BLM cannot quantify those reductions in detrimental soil disturbance in this analysis. Management direction limits the increase of detrimental soil disturbance to 20 percent of any given treatment unit and includes all types of disturbances, including those resulting from treatments as well as new road and landing areas. All alternatives and the Proposed RMP, as analyzed, would increase the current level of detrimental soil disturbance by various percentages. Thus for some alternatives including the Proposed RMP, some mitigation of these impacts through the application of best management practices would be required. Currently the detrimental soil disturbance covers approximately six percent of the decision area. Raising that level by 20 percent would increase the detrimental soil disturbance to approximately seven percent of the decision area. Even then, there is only an expected reduction of growth from those areas in the future of 10 percent. Therefore, the sustainability of all lands under the decision area remains at approximately 99 percent of their current potential.

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Sustainable Energy

Key Points

- Under all the alternatives and the Proposed RMP, the majority of the land in the decision area would be available for the potential development of sustainable energy resources.
- Alternative C would produce the largest amount of biomass.
- While Alternative A would have the largest acreage in exclusion areas, the BLM concluded that Alternative D would most likely constrain substantially wind energy and transmission line development by designating over a third of the decision area as avoidance areas.
- While there is currently no geothermal development and limited potential in the decision area, all action alternatives and the Proposed RMP would be less constraining to geothermal development than the No Action alternative, with Alternative A being the least constraining.

Summary of Notable Changes from the Draft RMP/EIS

The BLM corrected the quantities of slash available from timber harvest operations using a more direct conversion factor. In addition, the BLM recalculated the amount of available biomass, moving from green-ton metric to bone-dry-ton metric, which more consistently reflects energy available from biomass.

Background

For the purposes of this Proposed RMP/Final EIS, the BLM uses the term 'sustainable energy' in lieu of the term 'renewable energy', which the laws and policies that guide the management of the resources addressed in this section more commonly use. The term 'renewable' implies that an energy resource undergoes a cycle of availability (i.e., a cycle that alternates between energy depletion and energy replenishment). For this analysis, the BLM believes that it is more accurate to characterize these resources as sustainable.

Issue 1

How would management alternatives for forest treatments affect the availability of slash as a biomass energy source?

Summary of Analytical Methods

The BLM evaluated the alternatives and the Proposed RMP and quantified the projected volume of timber harvest in million board feet (MMbf). Using this harvest data, the BLM quantified the maximum quantities of slash that would be produced using the assumption that 750 bone dry tons of slash would be made available for every MMbf of harvest.

While other types of biomass exist, the BLM focused this analysis on slash (i.e., wood residue from timber harvest) since this is the specific type of biomass that provides the most practical opportunity for sustainable energy development in the planning area. Slash consists primarily of the branches and treetops of harvested merchantable timber. Slash excludes other biomass present in abundance but which is more difficult to transport such as snags, downed logs, and stumps (Cross *et al.* 2013, p. 1) or which might be left for other resource uses.

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. 164–165).

Background

While the availability of 750 tons of bone-dry slash per MMbf of timber is an acceptable assumption for the purposes of this analysis, the precise amount of biomass produced would vary based on several factors including the location and type of harvested stand. Other factors include the amount of non-merchantable hardwoods, the amount of sub-merchantable material designated for cutting and removal in fire-prone stands, and the level of defect within a given stand. Thinning would typically produce biomass that consists mainly of tops and sub-merchantable stems whereas regeneration harvest would produce more cull material and broken pieces.

Topography, vegetation, and yarding systems would affect the accessibility of biomass produced through timber harvest. Areas suitable for ground-based equipment would have a higher recovery level. Steep areas with dense brush would have a lower recovery level due to the difficulty of locating the material and bringing it to a landing using cable-yarding systems.

The sale of biomass also depends on market conditions. The amount sold is generally less than what is available because biomass typically lacks sufficient energy density for economical transport as a fuel for electrical power generation except where generating plants are close to harvest areas. A study sponsored by the U.S. Department of Energy (DOE) on the harvesting and transporting of biomass resulted in a negative energy balance (i.e., the expenditure of energy necessary to harvest was greater than was yielded by the product harvested; USDOE 1981, p. 5).

There are wood fiber biomass combustion boilers at 21 industrial or institutional sites in the planning area, supplying heat for industrial processes. At nine of these sites, steam-driven generators produce electric power. Private individuals and commercial companies also cut firewood on BLM-administered lands, which the BLM includes in the definition of biomass available on BLM-administered lands but does not come from slash.

Affected Environment

Biomass occurs in abundance throughout the planning area, but as described above, factors such as the distance from harvest areas to power generation sites influence its sales and use. Based on the harvest level in 2012, 152,782 bone-dry tons of biomass were available as slash from BLM-administered lands within the planning area. In addition to its use for energy generation, biomass currently harvested in the decision area is also sold for use in landscaping material, as raw manufacturing material for fiberboard, or for making charcoal briquettes.

Environmental Consequences

Table 3-214 shows the biomass available as slash from BLM-administered lands. As described above, a number of additional factors affect the biomass actually produced, as opposed to simply made available, from BLM-administered lands. These factors would likely lead to the production of less biomass than is described as available in **Table 3-214**. These factors would be consistent across alternatives and the Proposed RMP so the results in the table provide a reasonable basis for comparing the relative levels of biomass made available. Alternative C would make available the most biomass, followed by the No Action alternative, Alternative B, the Proposed RMP, Alternative A, and Alternative D.

Table 3-214. Biomass available from BLM-administered lands as timber harvest slash

Alternative/ Proposed RMP	Biomass Available (Bone Dry Tons)
No Action	300,000
Alt. A	187,500
Alt. B	248,250
Alt. C	416,250
Alt. D	135,000
PRMP	211,650

Issue 2

How would right-of-way avoidance and exclusion areas in the alternatives affect the potential siting of wind energy developments and sustainable energy corridor designations?

Summary of Analytical Methods

As presented in the Planning Criteria (USDI BLM 2014, pp. 164–165), the BLM intended to use the existing wind energy resource data compiled in the 2005 Final Programmatic Environmental Impact Statement on Wind Energy Development on BLM-Administered Land in the Western United States (USDI BLM 2005) to assess how the alternatives and the Proposed RMP affect the potential for wind energy development. However, the BLM found that the data in the 2005 Wind EIS is not detailed enough to reveal specific areas of high-energy potential within the planning area.

Instead, the BLM compared acres of right-of-way avoidance and exclusion areas to determine the extent to which each alternative and the Proposed RMP might constrain the development of wind energy and sustainable energy transmission. The BLM administers both wind energy and transmission lines through the granting of a right-of-way, so avoidance and exclusion areas would directly affect the potential for developing wind energy and transmission lines on BLM-administered lands. For the purposes of this analysis, the BLM assumed that right-of-way avoidance areas would preclude wind energy and transmission lines in most cases.

Background

According to the American Wind Energy Association, Oregon as a whole currently has approximately 435 megawatts of installed wind power generating capacity with another 140 megawatts proposed. The 2005 Wind EIS projected that by 2025, 196 megawatts of wind energy will originate from BLM-administered lands throughout Oregon (USDI BLM 2005, pp. 5–104).

The National Renewable Energy Laboratory (NREL) wind resource map for Oregon indicates that the state has wind resources consistent with community-scale production. The good-to-excellent resource areas for community-scale production are concentrated on ridge crests throughout Oregon. None of the good-to-excellent non-ridge crest areas with at least good wind resource potential are located in the decision area. There are a few sites with wind resources of this quality along the ridge peaks of the Cascade Range on the eastern border of the planning area and scattered along the Pacific coast. Current NREL mapping resolution does not reveal the presence of utility-scale wind resources in the decision area (USDOE 2014).

Wind energy development on BLM-administered lands is permitted through right-of-way authorizations in accordance with requirements of the FLPMA and the 2008 BLM Wind Energy Development Policy.

Affected Environment

Currently, there is no wind energy production or proposals for wind energy production on BLM-administered lands in western Oregon. As noted in the background section, there are no known sites with potential utility-scale wind development within the decision area of this RMP.

In addition to this limited potential, the lack of critical infrastructure necessary for development also limits the growth of sustainable energy resources (including wind) in western Oregon. There are currently no transmission lines that could easily transmit energy collected from wind energy in the planning area. There are no current plans to construct transmission lines that could fill this need. Any transmission line through BLM-administered lands would require a right-of-way.

Environmental Consequences

The alternatives and the Proposed RMP differ in the acreage of both exclusion areas and avoidance areas (**Table 3-82**). Since the BLM is unable to grant rights-of-way for energy transmission corridors in exclusion areas (unless legally mandated), Alternatives A, B, and C, and the Proposed RMP would decrease the percent of the decision area compared to the No Action alternative in which the BLM could grant a right-of-way for wind power. Alternative A would exclude wind energy and transmission line development from the largest percentage of the decision area, while Alternative D would slightly decrease the current acreage of exclusion areas.

Table 3-215. Right-of-way exclusion and avoidance areas

	No Action (Acres)	Alt. A (Acres)	Alt. B (Acres)	Alt. C (Acres)	Alt. D (Acres)	PRMP (Acres)
Exclusion Areas	43,590	130,597	93,274	93,274	42,568	107,790
Avoidance Acres*	243,928	179,436	326,510	575,444	871,713	456,801

* Right-of-way avoidance total acreage is not a direct sum of the individual criteria acres due to criteria that overlap geographically. Areas that overlap with right-of-way exclusion areas are subtracted from the sum of the total avoidance acres because right-of-way exclusion is more restrictive than right-of-way avoidance.

The BLM is able to grant a right-of-way in avoidance areas if a right-of-way is compatible with the protection of the values for which the BLM designated the avoidance area or if no other route is possible. However, it is unlikely that the development of wind power would be compatible with the values for which the BLM would designate the avoidance areas. The action alternatives and the Proposed RMP would designate ACECs, RMAs, Wilderness Study Areas, some WSRs, and VRM Class II areas as avoidance areas (see the Lands and Realty section of this chapter). Wind energy development would adversely affect the values associated with these designations, such as wildlife and vegetation, recreation, and visual quality; the 2005 Final Programmatic Environmental Impact Statement on Wind Energy Development on BLM-Administered Land in the Western United States analyzed the effects of wind energy development and that analysis is incorporated here by reference (USDI BLM 2005, Chapter 5, pp. 1–102). These avoidance areas would thus likely constrain the development of wind energy and sustainable energy transmission corridors on these BLM-administered lands. Alternative A would decrease the acres of avoidance areas compared to the No Action alternative while Alternatives B, C, and D, and the Proposed RMP would substantially increase this acreage (**Table 3-82**). Although Alternative A would have the largest acreage in exclusion areas, the BLM concludes that Alternative D would most likely constrain wind energy and transmission line development substantially by designating over a third of the decision area as avoidance areas. However, because of the absence of any current wind energy production, proposals for wind energy production, or known sites with potential utility-scale wind development in the decision area, and the lack of critical infrastructure necessary for wind energy development, the differences in acreage in the decision area available for wind energy development would have no meaningful effect on any reasonably foreseeable wind energy development in the decision area.

Issue 3

How would the alternatives affect the development of geothermal as a sustainable energy source?

Summary of Analytical Methods

To assess the effects of the development of geothermal energy resources in the planning area, the BLM compared the extent to which each alternative and the Proposed RMP would condition the development of fluid minerals; geothermal energy is managed as a fluid mineral. The BLM assumed that leasable stipulations with major constraints, such as no surface occupancy, would negatively affect, though not entirely preclude, the potential for geothermal development on BLM-administered lands.

Background

Although Oregon has yet to achieve commercial generation of electricity from geothermal energy, the potential exists. A U.S. Department of the Interior report identifies 7 sites within Oregon as having the highest geothermal potential out of 35 sites on public lands throughout the country (Kirby *et al.* 2003). Among these sites only the area within and in the immediate surroundings of Klamath Falls is within the planning area.

Affected Environment

There is no current geothermal development occurring on BLM-administered lands within the planning area. Geothermal potential exists in Oregon; however, it is primarily located in the eastern portion of the State. Some potential exists in the southern part of the State on the eastern border of the planning area of this RMP (USDI BLM and USDA FS 2008, p. I-9).

The BLM has applied no surface occupancy stipulations to 692,100 acres of BLM-administered lands.

Environmental Consequences

The alternatives and Proposed RMP would impose requirements for fluid mineral stipulations on differing acreages of BLM-administered lands within the planning area. The differing arrangement in each alternative and the Proposed RMP of ACECs, RMAs, Suitable Wild and Scenic Rivers, and Wilderness Areas drives these differences. **Table 3-216** compares acres for which the BLM would require stipulations across the alternatives and the Proposed RMP. It is important to note that while the No Action alternative acreage includes only acres to which the BLM has applied no surface occupancy stipulations, the action alternatives and the Proposed RMP acreages include all areas the BLM has identified as requiring stipulations. These stipulations include minor constraints, such as timing provisions, and major constraints, such as no surface occupancy.

Table 3-216. Acres that would have leasable stipulations

Criteria	No Action (Acres)	Alt. A (Acres)	Alt. B (Acres)	Alt. C (Acres)	Alt. D (Acres)	PRMP (Acres)
Leasable stipulations	692,100*	190,389	211,638	318,915	498,525	246,747

* This includes only no surface occupancy acres.

Under all action alternatives and the Proposed RMP, the BLM would substantially reduce the acreage requiring leasable mineral stipulations compared to the No Action alternative. Alternative A would have the least acreage requiring stipulations. Thus, all action alternatives and the Proposed RMP would be less constraining to geothermal development than the current condition.

Issue Considered but Not Analyzed In Detail

How would management alternatives affect the development of solar radiation as a sustainable energy source?

In the joint BLM-USDOE analysis, NREL could not demonstrate a potential for solar energy development to be a notable sustainable energy resource on BLM-administered lands in the planning area (USDI BLM and USDOE 2003, pp. 13–14, 19–20, A2–A3, E9). The BLM did not assess the effects on solar energy because of the lack of commercial prospects on the BLM-administered lands in the planning area.

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Trails and Travel Management

Key Points

- All action alternatives and the Proposed RMP would increase the acreage of areas *closed* to public motorized access compared to the No Action alternative.
- All action alternatives and the Proposed RMP would not designate any areas as *open* to public motorized access.
- Alternative D would provide the most trail-based opportunities for both motorized and non-motorized recreation activities.
- Easements and reciprocal right-of-way agreements secure access for BLM forest management activities. Reciprocal right-of-way agreements over O&C and Coos Bay Wagon Road lands do not grant rights for public access and recreational use. For this reason, a portion of BLM-managed roads and BLM-administered lands preclude legal public access.
- The overall replacement value of the BLM's transportation system exceeds $10 billion. Approximately 30 percent of road mileage is in fair or poor condition, primarily due to depleted surfacing aggregate and well-used minor culverts. Currently, the deferred maintenance backlog exceeds $300 million.

Summary of Notable Changes from the Draft RMP/EIS

The analysis of new road construction for commercial thinning in Issue 2 of this section uses new road construction ratios derived from six years (2007–2012) of harvest volume sold data and timber sale contract data rather than estimated new road construction ratios for commercial thinning from the 2008 FEIS. Ratios based on actual timber sale experience are intended to provide more accurate analytical basis than the estimates in the Draft RMP/EIS. These actual ratios are lower than the estimated 2008 FEIS ratios ranging from 33 percent lower in the Coos Bay District to 80 percent lower in the Medford District.

Background

BLM-managed Travel and Transportation System

The BLM manages a complex and well-utilized travel system within western Oregon. The BLM manages approximately 15,000 miles of roads and 395 miles of designated trails within the decision area. The primary purpose of the BLM transportation system is access for resource management, recreation use, and transportation of forest products. Due to the BLM's historic checkerboard land ownership pattern in Oregon, this road network has been developed in concert with neighboring private timberland owners, and thus has elements of a joint-use BLM/private road network. The BLM has designated a network of trails and travel management areas within the planning area to address particular concerns and prescribe specific management actions. Travel management areas frame transportation issues and help delineate and administer travel networks to support specific uses and resource requirements.

Long-term or perpetual reciprocal right-of-way agreements provide legal access to Federal and private timberlands for BLM administrative use and private timberland owners as authorized by the FLPMA, as well as other Federal laws and regulations. A reciprocal right-of-way agreement provides both the BLM and the private landowner with a non-exclusive right to use, construct, and maintain roads on each other's property for administrative purposes such as forest management. These types of agreements are in effect on nearly 75 percent of BLM-administered lands in the planning area. Approximately 85 percent of the 15,000-mile BLM-administered road system is on BLM-administered lands. Assuming the network is distributed uniformly among the 75 percent of BLM-administered lands managed under reciprocal right-of-way agreements, approximately 64 percent of BLM-managed roads on BLM-administered lands are covered by these agreements. Consistent with this assumption, the remaining 36 percent of BLM-managed roads on BLM-administered lands are not covered by reciprocal right-of-way agreements. Additionally, approximately 13 percent of the BLM-managed road system is on private land, with the majority of roads on lands managed by reciprocal right-of-way agreements. Thus, approximately 77 percent of BLM transportation system mileage is likely to be managed under a reciprocal right-of-way agreement.

Reciprocal right-of-way agreements over O&C and Coos Bay Wagon Road lands under 43 CFR 2812 do not grant rights for public access and recreational use. For this reason, a substantial portion of BLM-managed roads and BLM-administered lands do not include legal public access. BLM-managed roads can afford public access under certain circumstances, (e.g., when the BLM obtains non-2812 easements), or when contiguous road segments both originate and terminate upon BLM-administered lands. Current commercial use of the BLM's portion of the joint-use network consists predominantly of forest management activities.

The BLM manages public motorized access under three possible categories based on BLM land use planning decisions that take into account natural resource protection and public safety. The public motorized access categories applied to public motorized access designations are (1) *open*, which allows for unlimited travel, including cross-country, (2) *limited*, where motorized use is restricted to meet specific resource management objectives, and (3) *closed* to motorized use. These categories are described in more detail below under Issue 1. The BLM would apply designations of *open*, *limited*, and *closed* for public motorized access by alternative and the Proposed RMP to all acres in the decision area.

Implementation-level Travel Management Planning

Consistent with current BLM policy[121], the BLM is deferring implementation-level travel management planning during the current planning effort. Implementation-level travel management planning is the process of establishing a final travel and transportation network that includes route-specific designations within the broader land use planning level area designations. Land use planning-level designations are applied to all acres of BLM-administered lands within the planning area and designate areas as *open*, *limited*, or *closed* to public motorized access, as defined in the BLM Travel and Transportation Management manual (USDI BLM 2011). Through this planning effort, the BLM would designate all lands in the decision area as one of these three options and would identify areas in *limited* designations where implementation-travel management planning would occur under the action alternatives and the Proposed RMP. The BLM would complete route-specific designations within areas in *limited*

[121] The BLM Travel and Transportation Management Manual-1626 (USDI BLM 2011) outlines the BLM's policies for travel and transportation management planning in the land use planning process consistent with 43 CFR 8342. Included in this policy direction are reasons for deferring the development of an implementation-level travel management plan, which include: the size and complexity of the area, controversy, or incomplete data. The BLM has deferred implementation-level travel management planning for the planning area due to the size of the planning area and the complexities brought from the checkerboard landownership pattern and the number of reciprocal right-of-way agreements throughout. Additionally, the BLM is currently revising the 1626 Manual, and is updating it to reflect current practices in travel and transportation management planning, including establishing a more orderly and comprehensive process to address travel and transportation planning and management. As part of the revisions, the BLM is updating policy on the travel management planning process in land use planning in that "[c]ompleting only the required land use planning level decisions and considerations when developing an RMP, and deferring more detailed site-specific TTM planning to subsequent implementation level decisions will be the standard approach to addressing TTM in the planning process. This is due to the complex nature, potential for controversy, sizable datasets and often incomplete data available to complete a planning area-wide, site-specific TMP concurrently with a land use plan." (USDA BLM 2014, .06 (B) 6).

designations within 5 years after the completion of this plan revision (**Appendix X**). Although the land use planning-level designations of *open*, *limited*, or *closed* address only public motorized access, subsequent implementation-level travel management planning would address all modes of public travel, including non-motorized travel.

Implementation-level travel planning would follow a site-specific process for selecting a final public road and trail network. Selection of final public road and trail networks would consider types of use (e.g., motorized and non-motorized), class of user,[122] and seasons of use. The BLM would make final public route designations through implementation-level travel management planning[123] for the decision area in comprehensive, interdisciplinary travel and transportation management plans (TMPs) scheduled to be completed within 5 years after approval of the RMP revision. The BLM's GIS geodatabase would provide information for identifying public roads and trails for both motorized and non-motorized recreation activities. The BLM began on-the-ground route inventories across the decision area during the summer of 2014. Route inventories will continue throughout 2016. The BLM estimates that there are approximately 1,000 miles of non-designated user-created routes within the decision area. Where these routes are located within areas designated as *limited* for public motorized access, the BLM would develop proposed future public route designations or closures through public scoping and NEPA analysis utilizing draft route inventories to evaluate amendments to the existing travel network during an implementation-level travel management planning. **Appendix Q** includes interim public motorized access guidelines that the BLM would apply to *limited* to existing designations until subsequent travel management plans would be completed. **Appendix Q** also identifies areas where the BLM has completed implementation-level travel management plans prior to this RMP revision process.

Table 3-217 displays existing travel management area designations within the decision area under the 1995 RMPs.

Table 3-217. Existing 1995 RMP public motorized access designations within the decision area

District/ Field Office	Open (Acres)	Limited to Existing Roads and Trails (Acres)	Limited to Existing Roads and Designated Trails (Acres)	Limited to Designated Roads and Trails (Acres)	Limited to Designated Roads (Acres)	Closed (Acres)	Totals (Acres)
Coos Bay	-	-	-	318,676	-	3,489	322,165
Eugene	-	320,883	-	-	-	3,547	324,430
Klamath Falls	29,902	137,154	-	47,222	-	10,702	224,980
Medford	139,878	26,514	-	661,357	-	46,371	874,120
Roseburg	-	416,560	-	6,731	-	3,283	426,574
Salem	160,614	48,771	87,144	16,192	69,508	17,197	399,426
Totals	**330,394**	**949,882**	**87,144**	**1,050,178**	**69,508**	**84,589**	**2,571,695**

[122] Class of user identifies the type of activity allowed. For motorized roads and trails, classes may include designated routes for highway-legal vehicles, OHVs, or two-wheeled vehicles. For non-motorized routes, classes may include designated routes for mountain biking, hiking, or horseback riding.

[123] Implementation-level travel management planning decisions generally constitute the BLM's final approval allowing on-the-ground actions to proceed. These types of decisions require site-specific planning and environmental (e.g., NEPA) analysis. The implementation level travel management planning will be conducted using an interdisciplinary team approach to address all resource uses, including administrative, recreation, commercial and associated modes of travel (motorized, mechanized and non-motorized types).

R.S. 2477 Assertions

Section 8 of the Mining Act of 1866 provided that "be it further enacted, that the right-of-way for the construction of highways over public lands, not reserved for public uses, is hereby granted." The statute was self-enacting; rights were established by construction of a highway on unreserved public lands without acknowledgement or action by the Federal government. Congress later recodified this section of the statute as Revised Statute 2477 (R.S. 2477). The FLPMA repealed R.S. 2477 in 1976 with a savings provision for prior rights to be established.

There are a total of 53 documented R.S. 2477 assertions within the decision area: 2 in the Coos Bay District, 14 in the Eugene District, 1 in the Klamath Falls Field Office, 10 in the Medford District, 10 in the Roseburg District, and 16 in the Salem District.

A travel management plan is not intended to provide evidence bearing on—or address the validity of–R.S. 2477 assertions. R.S. 2477 rights are determined through a process independent of the BLM's planning process. Consequently, travel management planning does not take into consideration R.S. 2477 assertions or evidence. Travel management planning is based upon resource uses and associated access to public lands and waters. Should a decision be made on R.S. 2477 assertions, the BLM may adjust travel routes accordingly.

Issue 1

How would the alternatives affect the BLM's ability to provide trail and travel opportunities in western Oregon?

Summary of Analytical Methods

The BLM analyzed the effect of the alternatives and the Proposed RMP on trail and travel opportunities based on the acres designated as *open*, *limited*, or *closed* for public motorized access.

Although the BLM has some site-specific and anecdotal information about illegal public motorized travel activities, the BLM does not have a basis for predicting the location or effects of any widespread or systematic illegal public motorized travel activities. In addition, much of the decision area has physical limitations to potential illegal public motorized travel activities such as dense vegetation, steep slopes, and locked gates. Terrain, vegetation, and a greater amount of open spaces in most of the interior/south can lead to degradation and erosion in a greater proportion than most of the coastal/north where vegetation is denser and terrain is steeper. However, at this scale of analysis, the BLM does not have a basis for characterizing current illegal public motorized travel activities or forecasting potential illegal public motorized travel activities in the future under any of the alternatives and the Proposed RMP. The site-specific and anecdotal information that the BLM has about illegal public motorized travel activities is fragmentary and highly variable. Many areas that are experiencing illegal public motorized travel activities are apparently similar in characteristics such as public access, proximity to population centers, and terrain to many other areas that are not experiencing illegal public motorized travel activities. To use this site-specific and anecdotal information to project illegal public motorized travel activities in other areas within the decision area or to project future illegal public motorized travel activities would be unreliable and speculative. Therefore, in this analysis, the BLM assumed that members of the public participating in motorized travel recreation typically operate vehicles consistent with BLM decisions about public motorized travel opportunities.

The Planning Criteria provides additional information on analytical assumptions, methods and techniques, and geographic and temporal scales, which is incorporated here by reference (USDI BLM 2014, pp. 115–119).

Background

All alternatives and the Proposed RMP would designate all lands in the decision area as *open*, *limited*, or *closed* to public motorized access, which are defined as follows:

- ***Open***—Areas where the BLM does not limit public motorized travel activities since there are no issues regarding resources, visitor conflicts, or public safety to warrant limiting cross-country travel
- ***Limited***—Areas where the BLM has restricted public motorized travel activities in order to meet recreational and resource management objectives; restrictions may include the number or types of vehicles, the time or season of use, uses required to be permitted or licensed; and uses limited by existing or designated roads and trails
- ***Closed***—Areas that the BLM has closed to all public motorized travel activities to protect resources, ensure visitor safety, or reduce visitor conflicts

For areas designated as *limited*, the BLM would designate through subsequent, implementation-level travel management planning the types or modes of public travel, the limitations on time or season of use, the limitations to certain types of vehicles, the limitations on specific public routes, or limitations of other types.

The BLM based all designations on the protection of resources, the promotion of safety for all users, and the minimization of conflicts of users of BLM-administered lands. In developing the action alternatives and the Proposed RMP, the BLM applied the following designation criteria (43 CFR 8342.1) when designating lands as *open*, *limited*, or *closed* to public motorized access:

a) *Areas and trails shall be located to minimize damage to soil, watershed, vegetation, air, or other resources of the public lands, and to prevent impairment of wilderness suitability.*
b) *Areas and trails shall be located to minimize harassment of wildlife or significant disruption of wildlife habitats. Special attention will be given to protect endangered or threatened species and their habitats.*
c) *Areas and trails shall be located to minimize conflicts between off-road vehicle use and other existing or proposed recreational uses of the same or neighboring public lands, and to ensure the compatibility of such uses with existing conditions in populated areas, taking into account noise and other factors.*
d) *Areas and trails shall not be located in officially designated wilderness areas or primitive areas. Areas and trails shall be located in natural areas only if the authorized officer determines that off-road vehicle use in such locations will not adversely affect their natural, esthetic, scenic, or other values for which such areas are established.*

In applying the following designation criteria to the action alternatives and the Proposed RMP, the BLM designated lands with special management designations as follows:

- **Lands with wilderness values—**The BLM designated all Wilderness Areas and District-Designated Reserve – Lands Managed for their Wilderness Characteristics as *closed* under the action alternatives and the Proposed RMP to protect resources, ensure visitor safety, or reduce visitor conflicts and prevent impairment of wilderness suitability.
- **Recreation Management Areas and Areas of Critical Environmental Concern—**The BLM conducted site-specific reviews of the more than 450 Recreation Management Areas and Areas of Critical Environmental Concern to evaluate potential resource issues, visitor conflicts, or public safety concerns in determining the appropriate designation for each area. The public motorized access designation of each Recreation Management Area and Area of Critical Environmental Concern is provided in **Appendix O** and in **Appendix F (Table F-2)**, respectively. These designations include areas identified as *limited* and areas identified as *closed*. These site-specific evaluations considered desired recreation opportunities, recreational settings, relevant and important values, and special management needs to identify the appropriate public motorized

access designation. The BLM did not find any Recreation Management Areas or Areas of Critical Environmental Concern appropriate to designate as open.

The BLM designated all remaining BLM-administered lands as *limited* under the action alternatives and the Proposed RMP, even though not all remaining BLM-administered lands have legal public access due to the checkerboard nature of the planning area and right-of-way agreements across private lands that do not provide for public use. The BLM did not identify any acres under the action alternatives or the Proposed RMP where there would be no issues regarding resources, visitor conflicts, or public safety to warrant not limiting cross-country travel to designate as *open*.

The BLM would make refinements as needed to public travel routes within lands designated as *limited* through additional analysis and implementation-level travel management planning. The BLM would collaborate with affected and interested parties in evaluating the designated road and trail network for suitability for active route use and management, envisioning potential changes to the existing system or adding new trails that would help meet current and future demands within lands designated as *limited*. In conducting such evaluations, the BLM would apply designation criteria in 43 CFR 8342 and use prioritization guidance provided in **Appendix Q** for determining the order for completion of these evaluations.

Affected Environment and Environmental Consequences

The BLM currently manages 63 individual public trails and trail systems, with over 395 miles of trails in the decision area. Trail-based recreation opportunities within the decision area include supporting public trail systems for motorized and non-motorized users and providing a range of available activities across various recreation settings. Popular activities include hiking, mountain biking, horseback riding, and riding OHVs. **Appendix Q** contains an overview of the existing trail opportunities within the decision area.

The BLM would provide specific opportunities for both motorized and non-motorized trails in portions of the decision area designated for motorized use under RMA designations (see the Recreation section of this chapter). These designations would increase opportunities over the long-term by facilitating increased funding for motorized routes and trails and non-motorized trails.

Under the action alternatives and the Proposed RMP, the BLM would designate varying acreage of RMAs that would emphasize public motorized recreation activities (see the Recreation section of this chapter and **Appendix O**). Management of these RMAs would, over time, concentrate public motorized recreation activities within these RMAs and reduce dispersed motorized travel activities on other BLM-administered lands. Motorized users would be attracted to greater opportunities within these managed areas that provide targeted public motorized recreation opportunities.

For visitors engaging in non-motorized activities within RMAs specifically managed for motorized travel activities, the quality of their experiences would diminish to these extent that their activities would be incompatible with motorized travel activities. Over time, visitors seeking non-motorized forms of recreation would avoid RMAs specifically managed to accommodate motorized travel activities. In general, RMAs specifically managed for motorized travel activities would segregate user groups, eventually resulting in an overall improvement in the quality of experiences for all visitors.

If the BLM would not specifically manage some RMAs for motorized recreation opportunities, visitors seeking motorized forms of recreation would experience reduced opportunities over time. Therefore, conflicts between motorized and non-motorized visitors would increase in popular use areas, resulting in lower quality recreation experiences for both non-motorized and motorized visitors.

Public Motorized Access Designations

Table 3-218 summarizes public motorized access designations across the decision area by alternative and the Proposed RMP.

Table 3-218. Public motorized access designations

Trails and Travel Management Designations	No Action (Acres)	Alt. A (Acres)	Alt. B (Acres)	Alt. C (Acres)	Alt. D (Acres)	PRMP (Acres)
Open	319,661	-	-	-	-	-
Limited	2,088,946	2,345,575	2,325,663	2,296,313	2,320,987	2,322,820
Closed	63,539	128,757	148,551	178,001	153,305	156,036

None of the action alternatives or the Proposed RMP would designate any areas as *open* to public motorized access. The BLM would designate the 319,661 acres designated as *open* under the No Action alternative as *limited* or *closed* under all action alternatives and the Proposed RMP (**Table 3-218**). The reduction in acres *open* to public motorized travel activities would not directly equate to a concurrent decrease in public motorized travel opportunities across the decision area, because most of the areas that designated as *open* under the No Action alternative are located on steep, densely forested terrain, which is not conducive to cross-country motorized travel, regardless of designation. The BLM classifies only 7 percent of the area designated as *open* under the No Action alternative as non-forest habitat. The forested conditions on the remaining acreage generally confines public motorized travel activities to existing roads and trails, despite their current *open* designations. Nevertheless, eliminating the areas designated as *open* would result in some site-specific and localized loss of public motorized recreation opportunities, while improving non-motorized recreational experiences in these areas.

A *limited* designation would reduce cross-country public motorized travel activities in an area but would not eliminate it from existing or designated routes. Under all alternatives and the Proposed RMP, the BLM would designate the majority of the decision area as *limited* for public motorized access (**Table 3-218**). Alternative A would have the largest area designated as *limited*, followed by Alternative B, the Proposed RMP, Alternative D, and Alternative C. All action alternatives and the Proposed RMP would designate more acres as *limited* than the No Action alternative. In areas designated as *limited* to existing routes, the BLM would make changes in public travel opportunities (including non-motorized travel) consistent with 43 CFR 8342.1 – Designation Criteria, primarily through subsequent implementation-level travel management plans, which would designate specific roads and trails available for public travel and make specific restrictions. The BLM would improve or expand designated routes to enhance visitor experiences or to meet increasing demand subsequent to implementation-level travel management plans. In addition, through implementation-level travel management planning, the BLM would also prohibit or restrict public travel on routes that are not designed or suitable for travel activities or that are only compatible for certain types of travel in order to reduce visitor conflicts and improve public safety.

A *closed* designation would completely prohibit public motorized travel activities in the designated area. All action alternatives and the Proposed RMP would increase the acreage designated as *closed* to public motorized access compared to the No Action alternative (**Table 3-218**). The total acres *closed* to public motorized access would vary by action alternative and the Proposed RMP, largely due to variation in the acreage of RMAs, ACECs, and District-Designated Reserve – Lands Managed for their Wilderness Characteristics, from 128,757 acres under Alternative A to 178,001 acres under Alternative C (**Table 3-218** and **Table 3-3**). The BLM would designate some RMAs as *closed* to public motorized travel activities under the action alternatives and the Proposed RMP, to provide for Primitive recreation opportunities. The increase in *closed* acres would result in some site-specific and localized loss of public motorized recreation opportunities, while improving non-motorized recreational experiences in these areas.

Table 3-219 shows the acreage *closed* to public motorized access by land use allocation or designation by alternative and the Proposed RMP.

Table 3-219. Areas *closed* to public motorized access by land use allocation or designation

District/ Field Office (Area)	Land Use Allocation or Designation	Alt. A (Acres)	Alt. B (Acres)	Alt. C (Acres)	Alt. D (Acres)	PRMP (Acres)
Coos Bay	Recreation Management Areas	102	101	101	1,234	-
	Areas of Critical Environmental Concern	5,183	5,183	5,183	5,183	5,183
	District-Designated Reserve – Lands Managed for their Wilderness Characteristics	2,467	2,473	2,472	-	2,473
Eugene	Recreation Management Areas	52	294	2,893	3,955	2,598
	Areas of Critical Environmental Concern	6,899	6,899	6,548	6,975	6,975
Klamath Falls	Recreation Management Areas	9	7,061	16,167	13,884	13,416
	Areas of Critical Environmental Concern	-	-	-	-	-
Medford	Recreation Management Areas	17,096	30,045	26,320	35,754	12,816
	Areas of Critical Environmental Concern	11,302	11,302	11,302	11,302	11,302
	District-Designated Reserve – Lands Managed for their Wilderness Characteristics	68,645	73,994	62,904	-	74,119
	Wilderness	8,590	8,590	8,590	8,590	8,590
Roseburg	Recreation Management Areas	158	6,913	9,018	10,408	6,563
	Areas of Critical Environmental Concern	10,197	10,197	10,197	10,197	10,197
Salem	Recreation Management Areas	97	15,730	32,724	40,231	2,920
	Areas of Critical Environmental Concern	9,565	9,491	8,887	9,565	9,491
	District-Designated Reserve – Lands Managed for their Wilderness Characteristics	2,533	58	1,516	-	2,515
	Wilderness	5,703	5,703	5,703	5,703	5,703
Decision Area	Recreation Management Areas	17,514	60,144	87,223	105,466	38,313
	Areas of Critical Environmental Concern	34,650	34,515	33,893	34,905	43,148
	District-Designated Reserve – Lands Managed for their Wilderness Characteristics	79,709	76,525	66,190	-	79,107
	Wilderness	14,293	14,293	14,293	14,293	14,293
	Grand Totals*	**128,757**	**148,551**	**178,001**	**153,305**	**156,036**

* Grand totals do not total the sum of acres within the alternatives due to overlap within the alternatives and Proposed RMP of RMAs, ACECs, and District-Designated Reserve – Lands Managed for their Wilderness Characteristics. Additionally, some areas that are designated as *closed* are not within RMAs, ACECs, District-Designated Reserve – Lands Managed for their Wilderness Characteristics, or Wilderness. Grand totals reflect total acres designated as *closed* for each alternative or the Proposed RMP after removing the duplication of acres.

The No Action alternative would designate 13 percent of the decision area as *open* for public motorized access. Under the No Action alternative, most of the decision area (84 percent) would be designated as *limited* for public motorized access until the BLM would complete implementation-level travel management planning. This acreage designated as *limited* would be substantially lower than all action alternatives and the Proposed RMP. The No Action alternative would maintain the designation of 3 percent of the decision area as *closed* for public motorized access, substantially smaller than all action alternatives and the Proposed RMP. Although the No Action alternative is the only action alternative that would maintain any areas as open and would maintain the fewest acres as closed, the No Action alternative would result in the eventual decrease of motorized recreation opportunities because of limited management of RMAs for motorized recreation. Over time, the absence of RMAs specifically managed for motorized recreation opportunities under the No Action alternative would result in increasing conflicts between motorized and non-motorized visitors, resulting in lower quality recreation experiences for both non-motorized and motorized visitors.

Under Alternative A, most of the decision area (95 percent) would be designated as *limited* for public motorized access until the BLM would complete implementation-level travel management planning. Alternative A would designate a smaller acreage as *closed* for public motorized access than the other action alternatives and the Proposed RMP. However, under Alternative A, the BLM would not establish any RMAs that emphasize public motorized travel activities. Compared to the No Action alternative, Alternative A would designate more areas as *closed*, and would designate more RMAs for non-motorized trail use (**Appendix O**). Although Alternative A would designate fewer total acres within RMAs as *closed* to public motorized access, it would designate a higher proportion of RMAs as *closed* for public motorized access (87 percent). Overall, even though Alternative A would designate fewer total acres as *closed* than all other action alternatives or the Proposed RMP, Alternative A would result in the eventual decrease of motorized recreation opportunities due to the absence of RMAs for motorized recreation.

Under Alternative B, most of the decision area (94 percent) would be designated as *limited* for public motorized access until the BLM would complete implementation-level travel management planning. Alternative B would designate more acres as *closed* than the No Action alternative, Alternative A and the Proposed RMP, but fewer acres than Alternatives C and D. Alternative B would designate more RMAs for both motorized and non-motorized trail uses compared to Alternative A. Alternative B would restrict fewer acres within RMAs as *closed* to public motorized access than Alternatives C and D, but more acres than Alternative A and the Proposed RMP.

Under Alternative C, most of the decision area (93 percent) would be designated as *limited* for public motorized access until the BLM would complete implementation-level travel management planning. Alternative C would designate more total acres as *closed* than all other alternatives and the Proposed RMP. Alternative C would designate fewer RMA acres as *closed* than Alternative D, but more than Alternatives A and B and the Proposed RMP. Overall, even though Alternative C would designate more total acres as *closed* than any other alternative or the Proposed RMP, Alternative C would result in the eventual increase of motorized recreation opportunities due to the increase in acres designated as RMAs for motorized recreation.

Under Alternative D, most of the decision area (94 percent) would be designated as *limited* for public motorized access until the BLM would complete implementation-level travel management planning. Alternative D would designate more total acres as *closed* than the No Action alternative, Alternatives A and B, and fewer acres than Alternative C and the Proposed RMP. Although Alternative D would designate more RMA acres as *closed* than any other action alternative or the Proposed RMP, Alternative D would not allocate any District-Designated Reserve – Lands Managed for their Wilderness Characteristics, which would reduce the total acreage designated as *closed*.

Under the Proposed RMP, most of the decision area (94 percent) would be designated as *limited* for public motorized access until the BLM would complete implementation-level travel management planning. The Proposed RMP would designate more total acres as *closed* than the No Action alternative, Alternatives A, B, and D, but fewer acres than Alternative C. The Proposed RMP would designate fewer RMA acres as *closed* than Alternatives B, C, and D, but more than Alternative A. The Proposed RMP would designate fewer ACEC acres as *closed* than all action alternatives. Overall, even though the Proposed RMP would designate the second-most total acres as *closed*, the Proposed RMP would result in the eventual increase of motorized recreation opportunities due to the increase in acres designated as RMAs for motorized recreation.

Issue 2

How will the alternatives affect the use, maintenance, and condition of the BLM's transportation system?

Summary of Analytical Methods

The BLM used road ratios (feet/Mbf) from two sources to estimate miles of new road construction required for implementation of the No Action alternative and all the action alternatives and the Proposed RMP. These road ratios reflect different road requirements for different types of harvest. The BLM used ratios developed for the 2008 FEIS for the regeneration harvest and uneven-aged management harvest, and road ratios developed from 6 years (FY2007–FY2012) of harvest volume sold data and timber sale contract data for the commercial thinning harvest. The BLM is unable to use the harvest volume or timber sale contract data source for regeneration harvest or uneven-aged management harvest because the BLM has not implemented enough of these harvests in the recent past to provide new road construction data for either of these harvest types.

Uneven-aged management and commercial thinning harvest typically require more new road construction than regeneration harvest. The average road ratios (feet/Mbf) across the decision area for uneven-age management harvest are 20 percent higher than the road ratios for regeneration harvest, and the road ratios for commercial thinning harvest are 70 percent higher than for regeneration harvest. The Medford District is an exception to the rule for commercial thinning harvest, as these ratios are actually 30 percent lower than for regeneration harvest.

The BLM projected miles of road renovation and purchaser renovation value, miles of road improvement, and miles of road closure for each of the alternatives and the Proposed RMP using 6 years (FY2007–FY2012) of harvest volume sold data and timber sale contract data. The BLM projected total miles of the road network utilized for each alternative and the Proposed RMP using 8 years (CY2005–CY2012) of BLM timber sale contract haul data.

The BLM assumed that current trends in road closures would continue into the future, because road closure mileage is not be sensitive to harvest levels, given that most BLM-administered lands are encumbered by reciprocal right-of-way agreements. In other words, even if the harvest level would indicate an opportunity for road closure, the BLM would not be able to accomplish these closures in some locations due to the need to protect reciprocal right-of-way holders' rights to use BLM-owned roads.

In this analysis, the BLM evaluated the following:

- Miles of permanent and temporary new road construction
- Miles of permanent and long-term road closure
- Road network mileage changes
- Miles of road renovation and improvement
- Miles of the existing road network utilized

- Road maintenance fees collected as a percentage of annual maintenance need
- Value of purchaser renovation as a percentage of the BLM's deferred maintenance backlog

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. 127–130).

Affected Environment

Road Network Description

The following functional classifications describe the BLM's western Oregon transportation system:

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

These functional classifications indicate the character of service the roads provide and the appropriate road maintenance intensity levels from basic custodial care to annual scheduled and preventative maintenance programs.

Table 3-220 shows the distribution of the functional classifications within the BLM's western Oregon transportation system. Currently, slightly less than 5 percent of the transportation system falls into the collector classification, while about 21 percent of the system is local, and nearly 75 percent resource.

Table 3-220. Miles of BLM-managed roads within the decision area by functional classification

District/ Field Office	Collector Roads (Miles)	Local Roads (Miles)	Resource Roads (Miles)	Total Roads (Miles)
Coos Bay	186	408	1,302	1,896
Eugene	71	422	1,524	2,017
Klamath Falls	47	154	323	524
Medford	156	981	3,452	4,589
Roseburg	94	581	2,193	2,868
Salem	101	546	1,789	2,436
Totals	**655**	**3,092**	**10,583**	**14,330**

The total inventoried BLM transportation system mileage has remained relatively steady since 2007; there are currently 14,330 miles compared to 14,394 miles in 2007. Additionally, the BLM owns approximately 600 miles of non-inventoried roads—typically short (< 500 feet) logging spurs—within the boundaries of the decision area. Eighty-one percent of the BLM transportation system has some form of surfacing (aggregate or bituminous surface treatment), with 97 percent built to a single lane width.

Road Network Condition

Table 3-221, **Table 3-222**, and **Table 3-223** summarize western Oregon road, bridge, and major culvert condition data, respectively.

Table 3-221. Road condition, mileage, replacement value, and deferred maintenance backlog

District/ Field Office	Road Condition	Mileage	Replacement Value (Dollars)	Deferred Maintenance (Dollars)
Coos Bay	Fair/Poor	397	$314 million	$20 million
	Good	1,499	$1.216 billion	$1 million
	Totals	1,896	$1.530 billion	$21 million
Eugene	Fair/Poor	537	$361 million	$23 million
	Good	1,480	$1.267 billion	$2 million
	Totals	2,017	$1.628 billion	$25 million
Klamath Falls	Fair/Poor	66	$47 million	$6 million
	Good	458	$241 million	$1 million
	Totals	524	$288 million	$7 million
Medford	Fair/Poor	1,540	$1.061 billion	$123 million
	Good	3,049	$2.016 billion	$4 million
	Totals	4,589	$3.077 billion	$127 million
Roseburg	Fair/Poor	1,176	$730 million	$85 million
	Good	1,692	$934 million	$5 million
	Totals	2,868	$1.664 billion	$90 million
Salem	Fair/Poor	575	$408 million	$46 million
	Good	1,861	$1.347 billion	$1 million
	Totals	2,436	$1.755 billion	$47 million
Totals	Fair/Poor	4,291	$2.921 billion	$303 million
	Good	10,039	$7.021 billion	$14 million
	Grand Total	**14,330**	**$9.942 billion**	**$317 million**

Table 3-222. Bridge condition, replacement value, and deferred maintenance backlog

District/ Field Office	Bridge Condition	Count	Replacement Value (Dollars)	Deferred Maintenance (Dollars)
All Offices	Fair/Poor	53	$34.5 Million	$7.1 Million
	Good	306	$249.9 Million	$1.5 Million
	Grand Total	**359**	**$284.4 Million**	**$8.6 Million**

Table 3-223. Major culvert condition, replacement value, and deferred maintenance backlog

District/ Field Office	Major Culvert Condition	Count	Replacement Value (Dollars)	Deferred Maintenance (Dollars)
All Offices	Fair/Poor	18	$1.8 Million	$1.2 Million
	Good	526	$57.3 Million	-
	Grand Total	**544**	**$59.1 Million**	**$1.2 Million**

The overall replacement value (the current cost to rebuild the network from scratch) of the BLM transportation system is about $9.9 billion. Approximately 30 percent of the road mileage is in fair or poor condition, primarily due to depleted surfacing aggregate and worn-out minor culverts. Currently the deferred maintenance backlog is about $317 million. However, 85 percent of bridges and 97 percent of major culverts (> 7 foot diameter) are in good condition.

Road Maintenance

The BLM is responsible for maintaining roads under the BLM's ownership. Maintenance provides for resource protection, safe accommodation of users, and protection of the government's investment. Road maintenance on BLM roads is primarily for timber management and extraction, recreation, and fire management activities.

Each year, the districts identify and prioritize annual maintenance work. Currently the BLM maintains about 14 percent of the western Oregon transportation system each year. The miles of annual maintenance the BLM conducts has declined in recent years. From 2007 to 2013, the annual maintenance mileage declined about 47 percent, from 3,926 miles in 2007 to 2,064 miles in 2013. Annual maintenance work ranges from aggregate surface blading and roadside brush removal, to pothole repair and culvert replacement. The BLM funds annual maintenance of roads from a combination of appropriated funds and a collected account. Commercial timber haul, both BLM and private, generates funds paid into the collected account based on a maintenance fee for volume-hauled and mileage-used.

Although BLM appropriated funding has remained flat over the last two decades, the BLM's collected account has declined from $8 million to about $3 million annually over the past 25 years. This reduction is due entirely to BLM's declining timber sale offerings, since private use of the network has remained constant over the last two decades. This BLM funding shortfall creates a gap between annual maintenance need and actual annual maintenance expenditure, resulting in a large and growing deferred maintenance backlog, currently about $317 million.

Road Closure

There are times when the BLM determines that a road closure or travel restriction may be warranted. The objectives of road closure are typically for safety or resource protection, such as to reduce sedimentation, restore hydrological processes, reduce total road maintenance cost, and reduce impacts to fish or wildlife habitat, botanical resources, or special areas. The BLM districts coordinate in advance with potentially affected reciprocal right-of-way permittees on decisions to close roads for the purpose of protecting permittee rights to use BLM-owned roads. Should permittees not concur on BLM-proposed long-term or permanent closures, these proposals must be dropped, thus limiting the BLM's opportunities to reduce road densities.

The BLM currently has about 900 miles (6 percent) of the transportation system in a long-term decommissioned status. These are resource roads that have been closed to vehicles and left in an erosion-resistant condition; they may be re-opened in the future as needed. Slightly more than half of these miles have a natural surface type.

Environmental Consequences

New Road Construction

Timber harvest operations would require construction of additional resource roads under each of the alternatives and the Proposed RMP. No new collector or local roads would be needed as this portion of the transportation network was fully built out decades ago. T**able 3-224** summarizes the estimated new permanent and temporary road construction by surface type for the first decade.

Table 3-224. First decade new road construction by road surfacing and status

Alternative/ Proposed RMP	Temporary Rock (Miles)	Temporary Natural (Miles)	Permanent Rock (Miles)	Permanent Natural (Miles)	Total (Miles)
No Action	32	283	245	77	**637**
Alt. A	29	90	147	33	**299**
Alt. B	44	197	216	74	**531**
Alt. C	60	230	335	74	**699**
Alt. D	24	71	117	28	**240**
PRMP	35	170	173	59	**437**

In the first decade, total resource road new construction mileages would range from 240 miles for Alternative D to 699 miles for Alternative C, with the Proposed RMP requiring 437 miles.

In the first decade, new construction of permanent resource roads would range from 145 miles for Alternative D to 409 miles for Alternative C, with the PRMP producing 232 miles. The Proposed RMP permanent mileage would represent 1.5 percent of the existing western Oregon road network. Approximately 75 percent of these new Proposed RMP permanent road miles would be surfaced with aggregate. All new construction would be single lane width. **Table 3-225** contains a summary of the estimated new road construction by harvest type for the first decade.

Table 3-225. First decade new road construction associated with harvest methods

Alternative/ Proposed RMP	Regeneration Harvest (Miles)	Thinning Harvest (Miles)	Uneven-aged Harvest (Miles)	Totals (Miles)
No Action	309	328	-	**637**
Alt. A	232	10	57	**299**
Alt. B	149	195	187	**531**
Alt. C	467	112	120	**699**
Alt. D	94	15	131	**240**
PRMP	137	129	171	**437**

The amount of new construction attributable to each harvest type would vary greatly among the alternatives and the Proposed RMP; regeneration harvest would range from 28 percent (Alternative B) to 78 percent (Alternative A), thinning harvest would range from 3 percent (Alternative A) to 51 percent (No Action), and uneven-age management harvest would range from 17 percent (Alternative C) to 55 percent (Alternative D). New construction mileages under the Proposed RMP would be fairly evenly divided among the three harvest types. **Table 3-226** to **Table 3-231** contain a summary of the estimated new permanent and temporary road construction by office and surface type for the first decade.[124]

[124] These estimates represent analytical results based on the assumptions described in the Summary of Analytical Methods above. The BLM has made these assumptions and estimations solely for analytical purposes. These mileages of new permanent and temporary road construction by office and surface type for the first decade do not represent management direction or restrictions on future road construction under any of the alternatives and the Proposed RMP. Road construction under each alternative and the Proposed RMP would be implemented consistent with the management direction consistent with project-level analysis and decision-making.

Table 3-226. No Action first decade new road construction by road surfacing and status

District/ Field Office	Temporary Rock (Miles)	Temporary Natural (Miles)	Permanent Rock (Miles)	Permanent Natural (Miles)	Totals (Miles)
Coos Bay	8	36	37	25	106
Eugene	1	64	80	-	145
Klamath Falls	-	-	-	3	3
Medford	6	65	66	40	177
Roseburg	3	57	53	6	119
Salem	14	61	9	3	87
Totals	**32**	**283**	**245**	**77**	**637**

Table 3-227. Alternative A first decade new road construction by road surfacing and status

District/ Field Office	Temporary Rock (Miles)	Temporary Natural (Miles)	Permanent Rock (Miles)	Permanent Natural (Miles)	Totals (Miles)
Coos Bay	10	15	25	3	53
Eugene	4	4	40	1	49
Klamath Falls	-	-	-	1	1
Medford	9	26	42	23	100
Roseburg	1	16	25	-	42
Salem	5	29	15	5	54
Totals	**29**	**90**	**147**	**33**	**299**

Table 3-228. Alternative B first decade new road construction by road surfacing and status

District/ Field Office	Temporary Rock (Miles)	Temporary Natural (Miles)	Permanent Rock (Miles)	Permanent Natural (Miles)	Totals (Miles)
Coos Bay	5	26	25	20	76
Eugene	3	36	65	1	105
Klamath Falls	-	-	-	2	2
Medford	23	42	76	42	183
Roseburg	2	41	35	4	82
Salem	11	52	15	5	83
Totals	**44**	**197**	**216**	**74**	**531**

Table 3-229. Alternative C first decade new road construction by road surfacing and status

District/ Field Office	Temporary Rock (Miles)	Temporary Natural (Miles)	Permanent Rock (Miles)	Permanent Natural (Miles)	Totals (Miles)
Coos Bay	18	38	53	14	123
Eugene	9	22	105	2	138
Klamath Falls	-	-	-	3	3
Medford	17	49	76	43	185
Roseburg	3	55	73	3	134
Salem	13	66	28	9	116
Totals	**60**	**230**	**335**	**74**	**699**

Table 3-230. Alternative D first decade new road construction by road surfacing and status

District/ Field Office	Temporary Rock (Miles)	Temporary Natural (Miles)	Permanent Rock (Miles)	Permanent Natural (Miles)	Totals (Miles)
Coos Bay	6	8	12	3	29
Eugene	4	3	37	-	44
Klamath Falls	-	-	-	1	1
Medford	10	20	37	20	87
Roseburg	-	16	21	-	37
Salem	4	24	10	4	42
Totals	**24**	**71**	**117**	**28**	**240**

Table 3-231. Proposed RMP first decade new road construction by road surfacing and status

District/ Field Office	Temporary Rock (Miles)	Temporary Natural (Miles)	Permanent Rock (Miles)	Permanent Natural (Miles)	Totals (Miles)
Coos Bay	3	17	16	13	49
Eugene	3	28	56	1	88
Klamath Falls	-	1	-	1	2
Medford	17	37	62	35	151
Roseburg	2	40	27	5	74
Salem	10	47	12	4	73
Totals	**35**	**170**	**173**	**59**	**437**

The Medford District would require more new permanent road construction than the other western Oregon offices for each of the alternatives and the Proposed RMP. While the road ratios (feet/Mbf) for regeneration harvest and uneven-aged management harvest are about 2.5 times greater in the Medford District than the average of the other offices—due to the Medford District's lower per acre harvest volumes—the road ratios for commercial thinning harvest is roughly equal across all the offices. The Medford District accounts for 35 percent of the new road miles for the Proposed RMP while producing only 18 percent of the total harvest volume.

Road Closure

The BLM would accomplish both permanent and long-term road closures under each of the alternatives and the Proposed RMP. **Table 3-232** and **Table 3-233** summarize estimated permanent and long-term road closures by surface type for the first decade. The BLM has concluded that there is no reasonable basis to project a difference in road closure mileages among the alternatives and the Proposed RMP. Regardless of any changes in management of BLM-administered lands under the alternatives and the Proposed RMP, the opportunities for the BLM to close roads would continue to be heavily influenced by the need to protect reciprocal right-of-way holders' rights to use BLM-owned roads.

Table 3-232. First decade permanent road closure

District/ Field Office	Rock (Miles)	Natural (Miles)	Totals (Miles)
Coos Bay	2	29	31
Eugene	4	38	42
Klamath Falls	-	-	-
Medford	1	7	8
Roseburg	-	10	10
Salem	1	1	2
Totals	**8**	**85**	**93**

Table 3-233. First decade long-term road closure

District/ Field Office	Rock (Miles)	Natural (Miles)	Totals (Miles)
Coos Bay	35	96	131
Eugene	49	4	53
Klamath Falls	-	9	9
Medford	-	10	10
Roseburg	7	75	82
Salem	27	61	88
Totals	**118**	**255**	**373**

Permanent road closures, aimed primarily at natural surface roads, would affect substantially less than 1 percent of the western Oregon road network in the first decade.

Long-term road closures, implemented at a 2:1 ratio of natural surface type to rock surface type, would increase the percentage of the BLM road network in a long-term closure status from its current 6 percent to 8 percent by the end of the first decade.

In the first decade, net permanent road mileage changes would range from an increase of 52 miles for Alternative D to an increase of 316 miles for Alternative C. Net permanent road mileage would increase by 139 miles for the Proposed RMP, representing a 1 percent increase in the existing western Oregon road network.

Road Renovation and Road Improvement

The BLM will accomplish both renovation and improvement of existing roads needed for timber sale use under each of the alternatives and the Proposed RMP to support anticipated use, to provide for safety, and to protect adjacent lands and resources. Renovation consists of restoring a degraded road to its original design standard such as replacing worn out cross drain culverts and depleted rock surfacing. Improvement consists of upgrading the original design standard such as adding cross drain culverts and rock surfacing to an existing natural surface road. **Table 3-234** summarizes the estimated existing road renovation and improvement for the first decade.

Table 3-234. First decade existing road renovation and improvement

Alternative/ Proposed RMP	Renovation (Miles)	Improvement (Miles)
No Action	6,667	311
Alt. A	3,669	223
Alt. B	5,098	287
Alt. C	7,495	526
Alt. D	2,685	161
PRMP	4,295	246

In the first decade, road renovation mileages would range from 2,685 miles for Alternative D to 7,495 miles for Alternative C. The Proposed RMP would generate 4,295 miles of renovation, approximately 80 percent of which would occur on rock surface roads. Renovation of some roads would occur more than once in the first decade. Renovation tasks typically include roadside brushing, ditch line and culvert cleaning, culvert replacement, rock surface replacement, and pothole patching on paved roads.

In the first decade, road improvement mileages would range from 161 miles for Alternative D to 526 miles for Alternative C. The Proposed RMP would generate 246 miles of improvement, virtually all of which would consist of rocking natural surfaced roads, thus increasing the percentage of surfaced roads by 2 percent from the current 81 percent.

Road Utilization, Maintenance, and Condition

The BLM performed a reference analysis of "Manage most commercial lands for maximizing timber production" in the 2008 FEIS (USDI BLM 2008, pp. 573–574) and that analysis is incorporated here by reference. This reference analysis evaluated the outcomes if all BLM-administered lands in the planning area capable of producing a long-term flow of commercial timber volume would be managed under intensive forest management, without regard for the requirements of other laws or the purpose and need for action. The BLM presents this reference analysis in the context of road utilization, maintenance, and condition as a benchmark in the presentation of the analysis for the alternatives and the Proposed RMP. See the Forest Management section of this chapter for further description of harvest levels from this reference analysis.

Table 3-235 contains a summary of estimated road utilization by surface type for the first decade for each of the alternatives and the Proposed RMP and the 2008 reference analysis (BLM 2008, p. 484, **Table 3-60**).

Table 3-235. First decade existing road utilization by surface type

Alternative/ Proposed RMP	Paved (Miles)	Paved (Percent)	Rock (Miles)	Rock (Percent)
No Action	2,667	191%	4,115	40%
Alt. A	1,666	120%	2,561	25%
Alt. B	2,222	159%	3,416	33%
Alt. C	3,734	268%	5,741	56%
Alt. D	1,206	87%	1,854	18%
2008 FEIS Reference Analysis	8,047	577%	12,370	120%
PRMP	1,859	133%	2,858	28%

In the first decade, rocked road utilization percentages would range from 18 percent for Alternative D to 56 percent under Alternative C. Similarly, the first decade paved road utilization percentages would range from 87 percent for Alternative D to 268 percent under Alternative C. The Proposed RMP utilization percentage would be 28 percent for rocked roads and 133 percent for paved roads. In comparison, the 2008 "Manage most commercial lands for maximizing timber production" reference analysis rocked and paved utilization percentages would be120 percent and 577 percent (i.e., each paved road mile will be used 5.77 times) respectively.

Table 3-236 and **Table 3-237** summarize estimated road maintenance fee collections by surface type for the first decade for each of the alternatives and the Proposed RMP and the 2008 reference analysis. The BLM based these estimates on both road utilization ratios developed from 8 years (CY2005–FY2012) of BLM timber sale road use activity—at a western Oregon scale—and BLM's current road maintenance fee rate schedule. Additionally, the tables compare maintenance fee collections to the annual maintenance need for roads as reported in the Facility Asset Management System (the BLM's constructed asset inventory).

Table 3-236. First decade paved road maintenance fee collections compared to annual maintenance (AM) need

Alternative/ Proposed RMP	Road Use (Mbf-Miles)	Maintenance Fee/Mbf-Mile (Dollars)	Maintenance Fee Collected (Dollars)	AM Need (Dollars)	AM Need (Percent)
No Action	11.9 M	$0.71	$8.4 M	$80 M	10%
Alt. A	7.4 M	$0.71	$5.3 M	$80 M	6%
Alt. B	9.9 M	$0.71	$7.0 M	$80 M	9%
Alt. C	16.6 M	$0.71	$11.8 M	$80 M	15%
Alt. D	5.4 M	$0.71	$3.8 M	$80 M	5%
2008 FEIS Reference Analysis	35.8 M	$0.71	$25.4 M	$80 M	32%
PRMP	8.3 M	$0.71	$5.9 M	$80 M	7%

Table 3-237. First decade rocked road maintenance fee collections compared to annual maintenance (AM) need

Alternative/ Proposed RMP	Road Use (Mbf-Miles)	Maintenance Fee/Mbf-Mile (Dollars)	Maintenance Fee Collected (Dollars)	AM Need (Dollars)	AM Need (Percent)
No Action	5.4 M	$1.46	$7.9 M	$88 M	9%
Alt. A	3.4 M	$1.46	$4.9 M	$88 M	6%
Alt. B	4.5 M	$1.46	$6.6 M	$88 M	7%
Alt. C	7.5 M	$1.46	$11.0 M	$88 M	12%
Alt. D	2.4 M	$1.46	$3.6 M	$88 M	4%
2008 FEIS Reference Analysis	16.2 M	$1.46	$23.7 M	$88 M	27%
PRMP	3.8 M	$1.46	$5.5 M	$88 M	6%

In the first decade, rocked road maintenance fee collection would range from 4 percent of annual maintenance need for Alternative D to 12 percent for Alternative C. Similarly, the first decade paved road maintenance fee collections range from 5 percent of annual maintenance need for Alternative D to 15 percent for Alternative C. The Proposed RMP would generate maintenance fee collections of 6 percent of annual maintenance need for rocked roads and 7 percent of annual maintenance need for paved roads. In comparison, the 2008 "Manage most commercial lands for maximizing timber production" reference analysis rocked and paved road maintenance fee collection percentages would be27 percent and 32 percent respectively.

The BLM's other sources of annual maintenance funding during the first decade would not vary by alternative and the Proposed RMP: (1) assumed annual maintenance appropriation of $63 million, and (2) private commercial timber haul maintenance fee collections of $25 million. When sources of funding are combined, the total amount available for annual maintenance expenditures for both rocked and paved roads would range from $95 million for Alternative D (57 percent of annual maintenance need) to $111 million for Alternative C (66 percent of annual maintenance need). The Proposed RMP would generate total annual maintenance expenditures of $99 million (59 percent of the $168 million annual maintenance need). In comparison, the 2008 "Manage most commercial lands for maximizing timber production" reference analysis would generate total annual maintenance expenditures of $137 million (82 percent of annual maintenance need).

Under all alternatives and the Proposed RMP, the road utilization rates would be insufficient to close the gap between annual maintenance expenditure and annual maintenance need, with the shortfall largest for Alternative D and least for Alternative C. The road utilization rates for the 2008 "Manage most commercial lands for maximizing timber production" reference analysis would be insufficient to close the gap between annual maintenance expenditure and annual maintenance need. The BLM is likely to continue to accrue new deferred maintenance in the first decade under any of the alternatives and the Proposed RMP. Given the higher utilization rates for paved roads relative to rocked roads, new deferred maintenance would likely skew towards rocked roads.

Table 3-238 contains a summary of the estimated value of timber sale purchaser renovation for the first decade for each of the alternatives and the Proposed RMP and the 2008 reference analysis. Additionally, the table compares renovation expenditures to the deferred maintenance backlog for roads as reported in the Facility Asset Management System (the BLM's constructed asset inventory).

Table 3-238. First decade paved and rock-surfaced roads renovation expenditures compared to the deferred maintenance (DM) backlog

Alternative/ Proposed RMP	Total Harvest Volume (Mbf)	Renovation Expenditure/ Mbf (Dollars)	Renovation Expenditure (Dollars)	Current DM Backlog (Dollars)	DM Backlog (Percent)
No Action	3,995,556	$9.55	$38.2 M	$317 M	12%
Alt. A	2,486,143	$9.55	$23.7 M	$317 M	7%
Alt. B	3,316,594	$9.55	$31.7 M	$317 M	10%
Alt. C	5,573,610	$9.55	$53.2 M	$317 M	17%
Alt. D	1,800,457	$9.55	$17.2 M	$317 M	5%
2008 FEIS Reference Analysis	12,010,000	$9.55	$114.7 M	$317 M	36%
PRMP	2,775,140	$9.55	$26.5 M	$317 M	8%

Renovation expenditures would reduce the BLM's $317 million deferred maintenance backlog. In the first decade, renovation expenditures would range from 5 percent of the deferred maintenance backlog for Alternative D to 17 percent for Alternative C. The Proposed RMP would generate renovation expenditures of $26 million (8 percent of the deferred maintenance backlog). In comparison, the 2008 "Manage most commercial lands for maximizing timber production" reference analysis would generate renovation expenditures of 36 percent.

The only source of deferred maintenance funding other than timber sale purchaser renovations would be the BLM's deferred maintenance program, which has assumed appropriation of $20 million and would not vary by alternative and the Proposed RMP. When both sources are combined, the total amount available for deferred maintenance expenditures on surfaced roads during the first decades would range from $37 million for Alternative D (12 percent of the deferred maintenance backlog) to $73 million for Alternative C (23 percent of the deferred maintenance backlog). The Proposed RMP would generate total deferred maintenance expenditures of $46 million (15 percent of the deferred maintenance backlog). In comparison, the 2008 "Manage most commercial lands for maximizing timber production" reference analysis would generate total deferred maintenance expenditures of $135 million (42 percent of the deferred maintenance backlog).

Across all the alternatives and the Proposed RMP, the **net** deferred maintenance backlog would continue to grow, since reductions in the deferred maintenance backlog due to timber sale purchaser renovation expenditures and deferred maintenance program spending would be less than the new deferred maintenance generated by the gap between annual maintenance need and actual annual maintenance expenditure. The 2008 "Manage most commercial lands for maximizing timber production" reference analysis would result in a decline of the **net** deferred maintenance backlog substantially in the first decade.

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Tribal Interests

Key Points

- An active and ongoing dialogue between BLM representatives and designated Tribal representatives and their leadership contributed to develop analyses. A summary of Tribal listening sessions is included as **Appendix R** and expands upon the issues in this section.
- A large portion of the issues identified by the Tribes are covered under specific resource sections (e.g., Fisheries, Hydrology, Socioeconomics, Invasive Species, and Cultural Resources) though the effects specific to Tribal communities may differ due to the unique relationships that Tribes have with the landscape and its resources. The BLM summarizes these unique and often qualitative effects here whereas the specific resource sections contain the quantitative technical analyses.

Summary of Notable Changes from Draft RMP/EIS

This section includes updated information and expands discussions based upon requests received from Tribes during government-to-government consultation meetings held since the release of the Draft RMP/EIS. These updates reflect expansion and clarification of information and identification of special areas, resources, and issues the Tribes requested be addressed. **Appendix R** also contains elements of this nature.

Issue 1

How would land management actions affect sacred sites and places of traditional religious and cultural importance?

Summary of Analytical Methods

The BLM described in the Planning Criteria how continued management of sacred sites and places of traditional religious and cultural importance of which the BLM is aware would continue through tribal consultation and implementation of the National Historic Preservation Act (54 U.S.C. § 300101 *et seq.*) as well as Executive Order 13007 – Indian Sacred Sites (61 FR 26771, 1996) and the American Indian Religious Freedom Act (42 U.S.C. 1996 *et seq.*).

The Planning Criteria provides more detailed information on analytical assumptions, which is incorporated here by reference (USDI BLM 2014, p. 167).

Background

The National Historic Preservation Act and the 36 CFR 800 – Protection of Historic Properties regulations use the term "properties of traditional religious and cultural importance" to describe geographic places prominent in a particular group's cultural practices, beliefs, or values that: (1) are widely shared within the group, (2) have been passed down through generations, and (3) have served a recognized role in maintaining the group's cultural identity for at least 50 years. Through NEPA, the National Historic Preservation Act, and the 36 CFR 800 regulations, Federal agencies are required to consult with potentially affected Tribes in order to identify and evaluate such places that Federal actions may affect.

Executive Order 13007 defines sacred sites as "specific, discrete, narrowly delineated locations on Federal land that are identified by an Indian Tribe, or... authoritative representative of an Indian religion, as sacred by virtue of their established religious significance to, or ceremonial use by, an Indian religion." A Tribal understanding or definition of sacred sites or sacredness in general is in contrast to the Federal definition. Specifically, a narrowly delineated space does not capture the inherent sacredness of the natural phenomena surrounding it.

Based on Federal definitions, sacred sites are religious or spiritual places and are not limited by age. Places of traditional and cultural importance can be either secular or religious but are limited to being 50 years of age or older under this definition. Different regulations require the BLM to consider these two types of sites, but in both cases, the Federal government is not the entity that determines what sites are sacred or have traditional religious and cultural importance. Tribes (or individuals as described in Executive Order 13007) are the only entities able to identify what sites are important to them. Therefore, consultation with Tribes is necessary to identify and evaluate these sites as well as to help determine how actions may affect the sites and how to resolve adverse effects.

The National Historic Preservation Act and Executive Order 13007 address identification and protection of these types of places. The American Indian Religious Freedom Act works in tandem with these directives to ensure Tribes retain access and the ability to use these places for religious purposes including the practice of ceremonies. The American Indian Religious Freedom Act states that "it shall be the policy of the United States to protect and preserve for American Indians their inherent right of freedom to believe, express, and exercise the traditional religions of the American Indian..., including but not limited to access to sites, use and possession of sacred objects, and the freedom to worship through ceremonials and traditional rites."

Affected Environment

There are both sacred sites and places of traditional and cultural importance within and nearby the planning area. As described above, sacred sites and places of traditional and cultural importance are identified by Tribal entities and can be more broadly encompassing than narrowly delineated spaces on the ground. Sacred sites and places of traditional cultural importance not on BLM-administered lands within the planning area and on both BLM and non-BLM-administered lands within near distances of the planning area boundary have the potential to be possibly influenced by management on BLM-administered lands within the decision area. See also Issue 6 in this section for discussions on effects to tribally managed lands.

One example of such a place is Little Pilot Butte, which is located within the Cascade-Siskiyou National Monument.[125] The site has sacred and religious importance to the Klamath Tribes. It has ceremonial significance to the Tribe that predates the establishment of the monument and continues to be used today.

Tribes or individual Tribal members often keep the location of these sites private; therefore, the BLM does not have knowledge of all the sacred sites and places of traditional and cultural importance located within or in near-distances of the planning area. The BLM manages those sites of which the BLM is aware in consultation with Tribes.

[125] The Cascade-Siskiyou National Monument is located within the Medford District but is outside of the decision area. BLM-administered lands included within the Little Pilot Butte area are managed in conformance with the Cascade-Siskiyou National Monument's 2008 Record of Decision and Resource Management Plan (USDI 2008), which will not be affected by this RMP revision.

Environmental Consequences

The BLM would continue to avoid or mitigate effects to those sacred sites and places of traditional cultural importance of which the BLM has knowledge to the extent practicable, permitted by law, and not clearly inconsistent with essential agency functions by: (1) accommodating access and ceremonial use of Tribal sacred sites by Tribal religious practitioners; and (2) avoiding adversely affecting the physical integrity of such sacred sites. Any potential effects to these sites would warrant consultation and involvement from the Tribe on how to avoid or mitigate effects. Under all alternatives and the Proposed RMP, the BLM would consult with Tribes early in the project planning process in order to identify currently unknown sites or sensitive areas and thus subsequently mitigate effects as necessary.

Issue 2

How would land management actions affect tribal plant collection, management, and use?

Summary of Analytical Methods

In the absence of data on specific plants of cultural interest along with their locations on the landscape, a quantified analysis of the effects on plant collection, management, and use is not possible to be part of the RMP process. Further site-specific analysis would take place during implementation of the RMP as would early consultation with interested Tribes in the planning process. This is the best way to avoid or mitigate effects to tribal plant collection, management, and use.

Two specific plant habitats were mentioned during consultation with Tribes: (1) upland areas including seasonal wet meadows and scab rock flats that exist primarily in the interior/south of the planning area; and (2) riparian areas primarily within the coastal/north part of the planning area. Multiple Tribes expressed a specific concern regarding the ability to manage for culturally important plants within riparian habitat areas. The Planning Criteria included the broader topic of tribal plant collection and effects to culturally important plants within riparian habitat areas as separate issues (USDI BLM 2014, p. 169), but they are now combined here under the broader topic of tribal plant collection.

While this analysis focuses primarily on riparian habitat areas with some emphasis on the upland areas, it is important to state that tribal plant collection, management, and use is not limited to these areas. **Appendix R** includes two lists of common plants with cultural uses. These lists are not exhaustive but provide a large sample of culturally significant plants found in the planning area. Without identifying locations of specific plants and associated types of management required, the analyses can only speak generally to how variation in riparian management across alternatives and the Proposed RMP would affect culturally important plants that live in those habitats. Given that the objective of the Riparian Reserve is to contribute to the conservation and recovery of ESA-listed fish species and their habitats and provide for conservation of Bureau Special Status fish and other riparian-associated species, treatments within riparian areas are restricted.

For culturally important plants existing within the interior/south, the habitats, management, and threats to those plants may differ from those within riparian habitat areas of the coastal/north part of the planning area. A summary list of those plants identified as culturally important to the Klamath Tribes has been included at the end of **Appendix R**. Effects are determined through Tribal consultation on project activities.

The Planning Criteria provides more detailed information on analytical assumptions, methods and techniques, and geographic and temporal scales, which is hereby incorporated by reference (USDI BLM 2014, pp. 166, 169).

Affected Environment

BLM-administered lands in western Oregon provide an abundant variety of plants that Tribal members collect and sometimes manage for traditional uses. Tribal members collect plant materials to make baskets, hats, regalia, tools, and other objects of Tribal culture, as well as use for food and medicine. Valued plants require active management in order for them to produce the desired material product. Two common treatments used for management of culturally important plants are conducting prescribed fire and thinning denser forested areas to promote the growth of shrubs and a diversity of other species.

The Coos Bay District has agreements with the Coquille Indian Tribe and the Confederated Tribes of the Coos, Lower Umpqua, and Siuslaw Indians that allow collection of specific plants on designated BLM-administered lands. The BLM and other Tribes in western Oregon are currently working together to draft agreements for tribal plant collection.

Environmental Consequences

The primary impacts to culturally important plants found in the interior/south of the planning area are due to grazing, juniper cutting, piling and burning, invasive species, and herbicide use. Without more detailed information on specific locations of plants and planned actions, analysis is not feasible. **Appendix R** contains a plant list provided by the Klamath Tribes that includes culturally important plants. Consultation with Tribes prior to planning and implementing project activities is the most effective way to analyze and potentially mitigate effects to culturally important plants.

Under all alternatives and the Proposed RMP, the BLM would permit prescribed fire within the Eastside Management Area – Riparian Reserve for vegetation management to the extent that it conforms to the management objectives and direction for the Riparian Reserve. **Appendix B** contains specific details on management in the Riparian Reserve.

Eastside Management Area – Riparian Reserve

In all action alternatives and the Proposed RMP, the Riparian Reserve along perennial and fish-bearing streams would encompass 150 feet on each side of the stream channel in forested areas in the Klamath Falls Field Office east of Highway 97. Some specific management direction relative to management of culturally important plants includes—

- Thinning and other silvicultural treatments; and
- No mechanical treatments within 60 feet of the stream channel under Alternatives A, B, C, and D; no vegetation treatments using ground-based machinery within 75 feet of the stream channel under the Proposed RMP.

In all action alternatives and the Proposed RMP, the Eastside Management Area – Riparian Reserve along non-fish-bearing intermittent streams, all lakes, all natural ponds, and wetlands > 1 acre would be 100 feet each side of the water feature. The Proposed RMP additionally establishes a 100-foot Eastside Management Area – Riparian Reserve around constructed water impoundments > 1 acre and constructed ponds > 1 acre. Some specific management direction relative to culturally important plants includes—

- Thinning and other treatments to support large tree development;
- No mechanical treatments within 35 feet on either side of the water feature under Alternatives A, B, C, and D; and
- No vegetation treatments using ground-based machinery within 50 feet of lakes, natural ponds, or wetlands under the Proposed RMP.

In Alternatives A, B, C, and D, the Eastside Management Area – Riparian Reserve width along all constructed impoundments and ponds, and wetlands < 1 acre is the extent of riparian vegetation. Under the Proposed RMP, the Eastside Management Area – Riparian Reserve width is 25 feet on each side of the water feature around wetlands < 1 acre, constructed impoundments < 1 acre, and constructed ponds < 1 acre. Some specific management direction relative to management of culturally important plants includes—

- Thinning and other treatments to speed the development of potential natural vegetation communities;
- No mechanical treatments within 35 feet either side of the water feature under Alternatives A, B, C, and D; and
- No vegetation treatments using ground-based machinery within 50 feet of wetlands under the Proposed RMP.

Under all alternatives and the Proposed RMP for all water feature types, the following includes some specific management direction relative to management of culturally important plants:

- Managing livestock grazing to levels that allow for maintenance and development of riparian plant communities
- Removing conifers where they compete with the natural vegetation community

Riparian Reserve

In Alternative A, the Riparian Reserve along fish-bearing streams and perennial non-fish-bearing streams would have an inner zone of 0–120 feet; on non-fish-bearing intermittent streams, the inner zone is 0–50 feet. The BLM would not conduct thinning within these inner zones. The outer zones for all fish-bearing and perennial non-fish-bearing streams would be 120 feet to one site-potential tree height and 50 feet to one site-potential tree height on non-fish-bearing intermittent streams. The BLM would conduct thinning in the outer zone for the purposes of providing wood to streams. Tree felling is limited to safety and stream restoration activities. The BLM would not conduct thinning for timber volume.

In Alternative B, the Riparian Reserve along fish-bearing streams and perennial non-fish-bearing streams would have an inner zone of 0–60 feet; on non-fish-bearing intermittent streams the inner zone is 0–50 feet. The BLM would not conduct thinning within these inner zones with the exception of safety, treatment of disease, or dry forest resiliency. The outer zones for all fish-bearing and perennial non-fish-bearing streams would be 60 feet to one site-potential tree height and 50–100 feet on non-fish-bearing intermittent streams. The BLM would conduct thinning for development of understory plants; and to increase diversity of riparian species.

In Alternative C, the Riparian Reserve along fish-bearing streams and perennial non-fish-bearing streams would have an inner zone of 0–60 feet; on non-fish-bearing intermittent streams, the inner zone would be 0–50 feet. The BLM would not conduct thinning within these inner zones except for safety, treatment of disease, or dry forest resiliency. The outer zones for all fish-bearing and perennial non-fish-bearing streams would be 60–150 feet. The BLM would conduct thinning for development of understory plants; and to increase diversity of riparian species.

In Alternative D, the Riparian Reserve along all streams would have an inner zone of 0–120 feet. The BLM would not conduct thinning within this inner zone except for safety, instream restoration, treatment of disease, or dry forest resiliency. The outer zone for all streams is 120 feet to one site-potential tree height. The BLM would conduct thinning in the outer zone to provide wood to streams and to reduce fuel in drier forests.

The Proposed RMP manages the Riparian Reserve differently by watershed classes. In Class I subwatersheds, the Riparian Reserve along fish-bearing and perennial streams would have an inner zone of 0–120 feet; on non-fish-bearing intermittent streams, the inner zone would be 0–50 feet. The BLM would not conduct thinning within these inner zones except for sudden oak death treatments and individual tree cutting or tipping as described in the management direction. The middle zone for non-fish-bearing streams is 50–120 feet. The BLM would conduct thinning within this zone for the purposes of providing wood to streams. Removal of cut trees would only be allowed for safety or operational reasons. The outer zone for fish-bearing and perennial streams and non-fish-bearing intermittent streams is 120 feet to one site-potential tree height. The BLM would conduct thinning in the outer zone for the purpose of providing wood to streams.

In Class II subwatersheds, the Riparian Reserve along fish-bearing and perennial streams would have an inner zone of 0–120 feet; on non-fish-bearing intermittent streams, the inner zone would be 0–50 feet. The BLM would not conduct thinning within these inner zones except for sudden oak death treatments and individual tree cutting or tipping as described in the management direction. The outer zone for fish-bearing and perennial streams is 120 feet to one site-potential tree height; on non-fish-bearing intermittent streams, the outer zone would be 50 feet to one site-potential tree height. The BLM would conduct thinning in the outer zone for the development of understory plants; and to increase the diversity of riparian species.

In Class III subwatersheds, the Riparian Reserve along fish-bearing and perennial streams would have an inner zone of 0–120 feet; on non-fish-bearing intermittent streams, the full Riparian Reserve width would be 0–50 feet. The BLM would not conduct thinning within these zones except for sudden oak death treatments and individual tree cutting or tipping as described in the management direction. The outer zone for fish-bearing and perennial streams is 120 feet to one site-potential tree height. The BLM would conduct thinning in the outer zone for the development of understory plants; and to increase the diversity of riparian species.

In conclusion, Alternatives B and C, and the Proposed RMP would be most conducive to the type of management needed for culturally important plants in these areas because the management direction allows for the widest range of management practices.

Early consultation with Tribes prior to project implementation would identify those plants that are important for traditional uses, and the BLM could reduce or eliminate effects to these resources. Identifying plant-gathering locations can also reduce or eliminate effects by project design or mitigation.

Issue 3

How would land management actions affect the visibility of the historic Siletz reservation boundary?

Summary of Analytical Methods

For this analysis, the BLM compared the extent to which each alternative and the Proposed RMP would be able to maintain a visible boundary between the BLM-administered lands and the historic Siletz reservation boundary. To do this, the BLM calculated the total linear miles of BLM-administered lands touching the historic reservation boundary minus the total number of linear miles of those same BLM-administered lands that are in land use allocations with clear-cutting. This analysis is based on the assumption that tree retention would allow the BLM to maintain a visible boundary while harvest without tree retention would not.

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, p. 169).

Background

President Franklin Pierce signed an Executive Order on November 9, 1855 to create a permanent reservation for the Coast and Willamette Valley Tribes. The original Coast Reservation spanned from Cape Lookout in the north to the Siltcoos River in the south and the eastern edge of Range 9 West, covering 1.1 million acres. A series of Executive Orders and Congressional Acts in 1865, 1875, and 1894 reduced the Coast Reservation. The historic reservation boundary spans approximately 155 miles along its northern, western, and southern boundaries. About 31 of those miles overlap BLM-administered lands.

Affected Environment

There is interest from Siletz Tribal members to be able to go to areas on the landscape and physically see the historic reservation boundary where feasible. The BLM does not currently have practices in place to maintain visibility along the 31 miles of the historic boundary that runs between the BLM and the historic Coast Reservation. However, there are patches of visibility that currently exist along this historic boundary. These patches occur in some areas where forested BLM-administered lands are adjacent to private timberlands.

Environmental Consequences

For Alternatives A and C, only one land use allocation, the High Intensity Timber Area, proposes clear-cutting within the decision area. All other land use allocations have timber harvest methods that include the ability to retain 'leave trees' that could be used to mark a boundary. The High Intensity Timber Area land use allocation is not included within the No Action alternative, Alternatives B and D, or the Proposed RMP; therefore, all 31 miles of BLM-administered lands touching that boundary would have the ability to retain leave trees during harvest activities.

In Alternatives A and C, some lands with High Intensity Timber Area land use allocation touch the historic Coast Reservation boundary. In Alternative A, 1.24 miles of High Intensity Timber Area lands touch this boundary leaving over 29 miles available for leave tree retention. In Alternative C, 10.12 miles of High Intensity Timber Area lands touch the historic boundary leaving almost 20 of the 31 miles available for leave tree retention.

In conclusion, BLM-administered lands touch approximately 20 percent of the historic Coast Reservation boundary. The No Action alternative, Alternatives B and D, and the Proposed RMP would allow for leave tree retention on all of the boundary miles in order to have a visible boundary for the historic reservation. Alternative A would allow leave tree retention on 96 percent and Alternative C would allow leave tree retention on 67 percent of the boundary.

Issue 4

How would land management actions affect lamprey, fish, and fish passage?

Summary of Analytical Methods

Large wood, stream temperature, sediment, and water flow have the greatest influence on aquatic habitat to support fish populations. The BLM analysis of the effects to fish and their habitat are in the Fisheries section in this chapter. Additionally, BLM road construction may contribute sediment delivery to streams, and that analysis is covered in the Hydrology section of this chapter.

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. 49–55, 65–88, 166–167).

Affected Environment

Salmon, lampreys, and other fish are a traditional cultural food for Tribes with interests in the planning area, and their population decline is a concern for those Tribes. Data on lamprey within the planning area is largely unavailable, and while they are not an ESA-listed species, a number of professional fish biologists have noted a reduction in the population.

Environmental Consequences

The alternatives and the Proposed RMP have very similar potential effects to salmon and lamprey. The Fisheries and Hydrology sections of this chapter contain analyses of the alternatives and the Proposed RMP for effects to fish and water, respectively.

Implementation of any of the alternatives and the Proposed RMP would not affect fish passage within the decision area because 97 percent of the large, fish-passage culverts are in good condition. The majority of fish barriers within the planning area are on private lands.

Issue 5

How would land management actions affect migrating mule deer and resident deer and elk populations?

Summary of Analytical Methods

The BLM analyzed the effects to deer and elk based on the availability of high-quality forage habitat by alternative and the Proposed RMP. The Early Successional forest stage represents high-quality forage habitat for this analysis. Deer and elk populations rely on the shrubs and forbs available in this habitat type for survival and successful reproduction.

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. 167, 201, and 202).

Affected Environment

Multiple Tribes expressed interest and concern over declining populations of migrating mule deer as well as resident deer and elk populations. Deer and elk are important to Tribes as a traditional food source for the traditional cultural practice of hunting, and for their place in the larger eco-system. Declining timber harvests on Federal land in western Oregon have reduced the amount of early successional forests that the deer and elk rely upon for high-quality forage. The Wildlife section in this chapter specific to deer and elk provides a more detailed description of the current picture of deer and elk populations within the planning area.

Environmental Consequences

Under the No Action Alternative, Alternatives A, B, and C, and the Proposed RMP, higher-quality forage habitat would increase for deer and elk populations on BLM-administered lands in 50 years. This increase in habitat is correlated to the combination of size of the Harvest Land Base and the harvesting methods used in those alternatives and the Proposed RMP, thus creating more Early Successional habitat within the decision area. These four alternatives and the Proposed RMP would thus improve conditions for this tribally important resource. In Alternative D, the BLM contribution to higher-quality forage habitat would remain unchanged if not decrease slightly over time. The Wildlife section in this chapter contains analysis specific to deer and elk, which provides a more thorough description of effects.

Issue 6

How would land management actions affect historic trail routes?

Summary of Analytical Methods

The BLM considers historic trail routes as a type of cultural resource. The Cultural and Paleontological Resources section in this chapter provides a description of the analytical methodology used to analyze effects to cultural resources and the results of that analysis. Historic trail routes also include, but are not limited to, those designated by Congress as National Historic Trails. The National Trails System section in this chapter provides a more detailed analysis of the Oregon National Historic Trail and the California National Historic Trail-Applegate Trail Routes, the two national historic trail routes within the decision 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. 41–43 and 167–168).

Affected Environment

Federal agencies and others have identified, recorded, and evaluated a portion of the historic trail routes within the planning area. These sites are linear features on the landscape and exist in a variety of conditions. The General Land Office created some of the earliest documentation available for trails. Some Native American travel routes were later incorporated into European settler travel routes, trails, roads for the Forest Service and other Federal agencies, and railroad grades for hauling lumber, passengers, and freight. The National Register of Historic Places lists some prominent trails, such as the Oregon Trail. The Salem District has at least six recorded historic trail routes. In order to identify important historic trail routes, the BLM must consult with interested Tribes in addition to conducting research of historic records.

Environmental Consequences

Identification, recording, and evaluation of historic trail routes would help avoid or mitigate effects to historic trail routes. The BLM does not have all historic trail routes recorded and will need to consult with Tribes in order to identify trail routes important to them. The Cultural and Paleontological Resources section of this chapter provides a more detailed analysis of effects to cultural resources.

Issue 7

How would land management actions affect neighboring tribally managed lands?

Summary of Analytical Methods

This issue touches upon many other issues analyzed in this chapter. Numerous land management actions could potentially affect neighboring tribally managed lands.

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, p. 168).

Affected Environment

Tribally managed lands exist throughout the planning area. Multiple Tribes have lands adjacent to BLM-administered lands. Some management actions or inaction may result in effects to neighboring lands. Effects to neighboring lands can stem from—

- The spread of invasive species;
- The occurrence of wildfire; and
- Public access to tribally managed lands or places of importance to Tribes.

Additionally, the Coquille Forest managed by the Coquille Tribe is "subject to the standards and guidelines of Federal forest plans on adjacent or nearby Federal lands, now and in the future" per Title V of the Oregon Resource Conservation Act of 1996 (Public Law 104-208). This means that the adopted BLM RMP that applies to the Coos Bay District will also apply to the Coquille Forest in that it will establish the suite of possible management approaches available for the Coquille Forest. However, the BLM RMP will not determine which specific land use allocations apply to which specific portions of the Coquille Forest or the rate or extent of timber harvest on the Coquille Forest.

Environmental Consequences

To the extent Tribal lands border BLM-administered lands, the effects previously listed could occur and are explained further here. BLM management actions comprise only a portion of the potential affects to tribally managed lands. The effects to neighboring tribally managed lands also depend on the type of management taking place on those lands.

For invasive species, the BLM would continue to implement measures to prevent, detect, and control new invasive species infestations as well as use manual, mechanical, cultural, chemical, and biological treatments to manage invasive species infestations. The Invasive Species section of this chapter describes the analysis of BLM management considered for control and prevention of invasive plant species, invasive aquatic species, and sudden oak death. This analysis generally found Alternatives B and C to present the highest risk for spread of invasive plant species, invasive aquatic species, and sudden oak death.

Concerning wildfire, the BLM would manage for fire-resilient landscapes and would continue to suppress wildfire where it threatens health and human safety. There is no accurate way to predict the exact location and timing of wildfires. However, management within dry forests would include treatments that reduce flame lengths and decrease the probability of crown fire potential, which would provide for more effective and safer fire suppression opportunities. All alternatives and the Proposed RMP include fuels reduction strategies to varying degrees in dry forests.

In general, BLM land management actions would not affect access to tribally managed lands, although alternatives and the Proposed RMP with more roads may allow for more access opportunities, and those with fewer roads may limit access opportunities. The effects of the range of alternatives and the Proposed RMP on the BLM-managed transportation system are described in Issue 2 of the Trails and Travel Management section of this chapter, including analytical estimates of roadwork needs based upon management activities within the first decade (**Table 3-239**). The No Action alternative and Alternatives B and C would potentially provide the most opportunities for access whereas Alternatives A and D would provide the least opportunities for access. The Proposed RMP has the third lowest number of miles of new road construction. It would provide more access opportunities than Alternatives A and D but less than the No Action alternative and Alternatives C and D.

Table 3-239. Mileage of new road construction and road renovation or improvement

Alternative/ Proposed RMP	Total Estimated New Road Construction (Miles)	Total Estimated Road Renovation (Miles)	Total Estimated Road Improvement (Miles)
No Action	637	6,667	311
Alt. A	299	3,669	223
Alt. B	531	5,098	287
Alt. C	699	7,495	526
Alt. D	240	4,295	161
PRMP	437	4,295	246

It is important to note that Tribes have the ability to petition the Secretary of the Interior as authorized by Public Law 108-278 (also known as the Tribal Forest Protection Act of 2004) to conduct activities to achieve land management goals for Federal land. These activities must be on BLM-administered lands adjacent to Tribal forestland where BLM-administered lands pose the threat of fire or disease or is in need of restoration activities. Therefore, if BLM land management activities present a threat to neighboring tribally managed forestlands, the Tribes can request to take action to remedy the threat.

As noted, the Coquille Tribe manages the Coquille Forest "subject to the standards and guidelines of Federal forest plans on adjacent or nearby Federal lands, now and in the future" per Title V of the Oregon Resource Conservation Act of 1996 (Pub. L. 104-208). The analysis of effects to BLM-administered lands of the alternatives and the Proposed RMP generally reflects how these alternatives and the Proposed RMP would affect resources on the Coquille Forest. For example, if the Coquille Tribe elects to manage a portion of the Coquille Forest as Late-Successional Reserve, their Late-Successional Reserve management would have similar site-specific effects as Late-Successional Reserve management on BLM-administered lands because it would follow the same management direction. However, it is not possible for the BLM to identify specific effects of the BLM RMP on the Coquille Tribe stemming from the management of the Coquille Forest. As noted, the BLM RMP will not determine which specific land use allocations apply to which specific portions of the Coquille Forest or the rate or extent of timber harvest on the Coquille Forest. Absent such information, the BLM cannot ascribe any particular effect of the BLM RMP on the Coquille Tribe as a result of the BLM RMP establishing potential management approaches available for the Coquille Forest.

Issue 8

What are the social and economic effects of land management actions on Tribal communities?

Summary of Analytical Methods

The Socioeconomics section looks at the social and economic effects of the alternatives and the Proposed RMP on communities within the planning area. Since Tribes are distinct communities that have Tribal members who live within the planning area, they also would be subject to these effects. Issue 2 of the Socioeconomics section looks at how the alternatives the Proposed RMP affect economic activity derived from BLM-administered lands. In addition, as part of the development of the affected environment portion of Issue 5 of the Socioeconomics section, the BLM collected data and interviewed community representatives throughout the planning area. While only two of the seven Tribes participated in the interviews, the information was broadly useful.

The Planning Criteria provides detailed information on analytical assumptions, methods, and techniques, and the geographic and temporal scales for all five socioeconomic issues presented (USDI BLM 2014, pp. 130–148).

Affected Environment

Federally recognized Tribes within the planning area represent distinct communities, and are subject to the economic conditions of the planning area. Issue 2 in the Socioeconomics section provides a detailed description of the current condition of employment, unemployment, and earnings in the planning area. Using employment as an example, since 2001 total employment in the planning area has grown by 7.2 percent. However, since 2007, which was the peak of economic activity before the 2007–2009 recession, employment is down by 3.3 percent. Generally, throughout the planning area, district model areas show positive employment growth since 2001 ranging from 2.7 percent in the Coos Bay area to 9.8 percent in Salem-Portland. Klamath Falls (-2.7 percent) and Roseburg (-3.9 percent) are down from their 2001 levels. All model areas are down from their peak in 2007, ranging from Roseburg (-10.7 percent) to Salem-Portland (-0.1 percent).

Issue 5 of the Socioeconomics section also analyzes the effects of the alternatives the Proposed RMP on the capacity and resiliency of different types of communities in the planning area including Tribal communities. While this analysis included Tribal communities in the data used to evaluate effects, no community-specific conclusions were possible to be drawn at the scale of analysis conducted. As such, no specific conclusions to Tribal communities are made. Despite the lack of conclusions being made specific to Tribal communities' capacity or resiliency, Tribal representatives have specifically expressed concerns with the data used (Census data) reflecting Tribal communities' capacity and resiliency. The Socioeconomics section identifies that the data used is the best available but acknowledges and describes limitations to the data. The Cooperating Agency Advisory Group's Tribal Working Group further developed the following statement to specifically identify Tribal concerns and clarify any potential inaccuracies to Tribal communities reflected by data limitations:

There are varying acreages of O&C lands located within the ancestral homelands of the seven western Oregon Tribes. Management of these lands has a direct impact on the cultural interests, traditional lifeways, and economic wellbeing of Tribal members.

As defined in the Socioeconomics section (Issue 5), capacity and resiliency from a social sciences perspective is a measure of a community's or group of people's ability to respond to certain events such as natural disasters, major economic change, external and internal stresses and to take advantage of opportunities to meet needs. However, it must be well communicated and understood that when applying a measure of capacity and resiliency to Tribes, that meaning may appropriately be interpreted differently.

Census data and the developed metrics used in this analysis become problematic when assessing Tribal capacity and resiliency. Oregon Tribes which had their federal status terminated in the 1950s and then were restored to federal recognition in the 1980s do not have a single reservation where all Tribal members live. The Congressional Acts restoring these Tribes established multiple county service areas where the Tribes have historical and cultural interests and where many Tribal members reside. These county service areas also have legal meaning for Tribal members to receive governmental services. The census data and metrics when applied to counties and cities focuses on a specific geographic location and the population living in this area. Using this same approach for the identified Tribal reservations is *inaccurate because the focus for Tribes is a distinct group of people with special legal status living in multiple county locations. Applying the developed metrics to only Tribal members living on the specified reservation and in the respective county location gives conclusions which most likely are not reflective of the total Tribal population.*

In respect to historic resiliency, Tribes have demonstrated perseverance and resiliency to the highest degree. Tribes have endured over two hundred years of devastation following the European occupation of native lands in North America. Tribes have also adapted to adverse actions, laws, and policies of the United States government. Tribal people are still here, and in many cases, thriving – preserving culture, raising families, executing government functions, and significantly contributing to native and non-native people and their communities. Given that, it becomes clear that resiliency takes on a unique meaning when applied to Tribes.

For Tribes and their members there is also a culture dimension when determining capacity and resiliency. Those with strong ties to Tribal culture and active in traditional lifeways may have a very robust sense of capacity and resiliency, which is not reflected by the non-Tribal analytical model used in this analysis.

Environmental Consequences

The Socioeconomics section, particularly Issue 2, contains a full description of the socioeconomic effects of the alternatives the Proposed RMP. With respect to effects, all the alternatives and the Proposed RMP, except for Alternative D, would result in an increase in BLM-based jobs and earnings compared to what would have been generated in 2012 in the absence of Secure Rural Schools payments (i.e., if earnings and jobs were just based on jobs and earnings derived from the BLM’s actual management of the land in 2012).

Issue 9

How would land management actions affect water quality?

Summary of Analytical Methods

The analysis of water quality is in the Hydrology section of this chapter. This analysis focuses primarily on sediment delivery and stream temperature.

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. 65–89 and 168–169).

Affected Environment

Tribes have identified more than one issue surrounding water quality. Water quality is important as drinking water as well as for fish and other aquatic species and their habitats.

Environmental Consequences

The Hydrology analysis reveals that there is very little effect to water under the alternatives or the Proposed RMP and that there is a modest difference between potential changes in stream temperature between the alternatives the Proposed RMP. The Oregon Department of Environmental Quality (ODEQ) regulates effects to drinking water, and the BLM would remain compliant with those regulations. Under all alternatives the Proposed RMP, the BLM would—

- Maintain water quality and stream flows within the range of natural variability, protect aquatic biodiversity, and provide quality water for contact recreation and drinking water sources;
- Meet ODEQ water quality targets for 303(d) water bodies with approved Total Maximum Daily Loads;
- Maintain high-quality water and contribute to the restoration of degraded water quality downstream of BLM-administered lands; and
- Maintain high-quality waters within ODEQ designated source water protection watersheds.

Issues Considered but not Analyzed in Detail

How would land management actions affect tribal resource collection of obsidian, chert, and other rocks and minerals for noncommercial purposes?

The decision area does not contain any identified locations for obsidian collection; therefore, analysis of effects is not possible. Chert and other non-modified rocks and minerals to include obsidian can be collected anywhere within the decision area, except developed recreation areas or where it is otherwise prohibited and posted per 43 CFR 8365.1–5. In the absence of specific locations identified for collection, an analysis of effects is not possible.

References

USDI BLM. 2008. Cascade-Siskiyou National Monument Record of Decision and Resource Management Plan. Bureau of Land Management, Medford District Office, Medford, OR. http://www.blm.gov/or/districts/medford/plans/files/CSNM%20ROD%20and%20RMP_8-15-08.pdf.

---. 2014. Resource Management Plans for Western Oregon Planning Criteria. Bureau of Land Management, Oregon/Washington State Office, Portland, OR. http://www.blm.gov/or/plans/rmpswesternoregon/files/rmp-criteria.pdf.

Visual Resources Management

Key Points

- Alternative D would manage the largest number of acres under objectives that would maintain inventoried visual values within the decision area.
- Alternatives B and C would manage the least number of acres under objectives that would maintain inventoried visual values within the decision area.
- The Proposed RMP would manage a larger number of acres under objectives that would maintain inventoried visual values within the decision area when compared to Alternatives B and C, and less acres when compared with the No Action alternative and Alternatives A and D.

Summary of Notable Changes from Draft RMP/EIS

Refinements to the GIS data identified errors to acres of Wild and Scenic Rivers tentatively classified as Wild that had been incorrectly categorized as VRM Class II. Changes for the action alternatives and the Proposed RMP in VRM Classes I and II contained in **Table 3-242** reflect these acre corrections.

Issue 1

How would visual resource management and varying types and intensities of forestry management affect visual resource values on BLM-administered lands in western Oregon?

Background

Public lands have a variety of visual values. These different values warrant different levels of management. Because it is neither desirable nor practical to provide the same level of management for all visual resources, it is necessary to systematically identify and evaluate these values to determine the appropriate level of management.

The Visual Resource Management (VRM) System is the inventory and planning actions taken by the BLM to identify visual values and establish objectives for managing those values. The BLM's VRM System consists of two distinct components:

- Visual resource inventory (VRI) classes (VRI Class I through VRI Class IV): identify the visual values
- Visual resource management (VRM) classes (VRM Class I through VRM Class IV): establish the objectives for managing visual values

The inventory consists of a scenic quality evaluation, sensitivity level analysis, and a delineation of distance zones. Based on these three factors, the BLM places BLM-administered lands into one of four visual resource inventory classes. These inventory classes represent the relative value of the visual resources; Inventory Classes I and II being the most valued, Class III representing a moderate value, and Class IV being of least value.

Inventory classes are informational in nature and provide the basis for considering visual values in the RMP process. Visual resource inventory data for the planning area is stored and maintained at the Oregon State Office's Geospatial Information Systems department. Inventory classes do not establish management direction and the BLM does not use them as a basis for constraining or limiting surface-disturbing activities, except for VRI Class I:

- **VRI Class I**—The BLM assigns this class to areas where the management goal is to preserve a natural landscape. Unlike other VRI classes, VRI Class I is assigned based on a pre-existing preservation management objective rather than on the existing condition of the visual resources. This includes areas such as Wilderness Areas, Wilderness Study Areas, and other congressionally and administratively designated areas where preservation of the existing landscape is the objective of the designation.
- **VRI Class II, Class III, and Class IV**—The BLM assigns these classes based on an overlay of existing scenic qualities, sensitivity levels, and distance zones as documented through the inventory process. Areas inventoried at a Class II have higher existing visual resource value than do areas inventoried at VRI Classes III or IV. Areas inventoried at VRI Class IV have the lowest existing visual resource value.

The BLM designates VRM classes through a resource management plan. Unlike VRI classes, which, with the exception of VRI Class I, represent an area's existing visual value, VRM classes establish objectives, which prescribe the amount of change allowed through BLM management actions in the characteristic of the landscape. The allowance for noticeable change under VRM classes increases as the VRM class number increases:

- **VRM Class I**—The objective of this class is to preserve the existing character of the landscape. The level of change to the characteristic landscape would be very low and must not attract attention.
- **VRM Class II**—The objective of this class is to retain the existing character of the landscape. The level of change to the characteristic landscape would be low. Management activities may be seen, but would not attract the attention of the casual observer.
- **VRM Class III**—The objective of this class is to partially retain the existing character of the landscape. The level of change to the characteristic landscape would be moderate. Management activities may attract attention but would not dominate the view of the casual observer.
- **VRM Class IV**—The objective of this class is to provide for management activities, which require major modifications of the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of viewer attention.

Visual values identified through the visual resource inventory are considered with other resource values in the resource management planning process. The assignment of VRM classes can vary from the VRI class placement except for VRM Class I, which is automatically assigned to VRI Class I areas. For example, the BLM is not precluded from establishing a VRM class of IV on an area that inventoried as a VRI class of II or III. Outside of VRI Class I areas, the BLM is not required to generate land use allocations or other resource designations considered during planning based on the inventoried VRI class. For example, the BLM is not precluded from establishing the Harvest Land Base on an area that inventoried as a VRI class of II. The BLM establishes visual management objectives through the designation of VRM classes in conformance with the objectives of the designated land use allocations and other resource designations (e.g., Wild and Scenic Rivers, Special Recreation Management Areas, and Areas of Critical Environmental Concern) considered during planning. **Appendix B** contains details of the management objectives and the assignment of VRM classes.

Summary of Analytical Methods

As part of this plan revision process, the BLM performed an updated visual resource inventory within western Oregon and established updated VRI classes. The BLM evaluated the loss or protection of visual values (scenic quality, sensitivity levels, and distance zones) by each alternative and the Proposed RMP from those identified during VRI classifications.

The BLM evaluated, by each alternative and the Proposed RMP, acres proposed for management under each VRM class, and analyzed how this management would affect existing visual resource values. Specifically, the BLM evaluated the effects to visual resource values by considering how management under the VRM class would likely change the existing character of the landscapes in a manner that could change the current acres in each VRI class over time. The identification of VRI classes is a calculation resulting from the combined rankings attributed to scenic quality, sensitivity levels, and distance zones. Of these three visual quality elements, land use planning decisions under consideration for this RMP revision would bear little influence decreasing sensitivity levels or changing distance zones. As such, the BLM focused this analysis on actions that could influence the third of these visual quality factors, scenic quality. The BLM assumed visual values to be potentially negatively influenced on acres assigned to be managed under a less protective VRM class than the identified VRI class, since the less protective the VRM class, the higher the level of permissible visible change. For example, BLM-administered lands inventoried as VRI Class III are considered to have moderate visual values; management of these lands under VRM Class IV, which allows for high levels of visible change, could adversely influence the inventoried characteristics of the natural landscape. The BLM concluded that the alternative or the Proposed RMP with the least acres managed under a less protective VRM class than their assigned VRI class would have the least potential effect to the inventoried visual values, and the alternative or the Proposed RMP with the most acres managed under a less protective VRM class than their assigned VRI class would have the largest potential effect change to the inventoried visual values.

Analysis Assumptions

For the purposes of this analysis, the BLM used VRI classes as a proxy to evaluate potential effects of forest management activities on scenic quality values and overall inventory scores. The BLM assumed that the following forest management activities would not degrade the inventoried visual value or scenic quality scores to an extent that would change the inventoried class:

- **VRI Class II**—Thinning could take place within VRI Class II areas without degrading their visual resource values to an extent that would change their VRI class. Regeneration harvest could not take place in VRI Class II areas without degrading visual resource values to an extent that would change their VRI class.
- **VRI Class III**—Thinning and regeneration harvest with retention could take place within VRI Class III areas without degrading their visual resource values to an extent that would change their VRI class. Clearcut harvests could not take place in VRI Class III areas without degrading visual resource values to an extent that would change their VRI class.
- **VRI Class IV**—All harvest types could take place within VRI Class IV areas without degrading their visual resource values.

The BLM acknowledges that this assumption likely overestimates the potential acres on which BLM forest management activities could possibly affect VRI classes. Since VRI classes are a calculation of three visual values, BLM-administered lands within the planning area could be inventoried as VRI Class II or III where scenic qualities are rated as being of moderate or low but sensitivity levels and distance zones are rated high.

The BLM assumes that no management actions would degrade lands identified as VRI Class I, as all acres identified an VRI Class I would be assigned to VRM Class I, and thus managed for very low to no visual contrast.

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. 123–124).

All surface-disturbing activities, regardless of the alternative or management action, would be subject to the management objectives of the underlying land use allocation. The visual resource contrast rating system analyzes the potential site-specific impacts of surface-disturbance and the facility design and placement on an area's visual components. The BLM would design surface-disturbing activities and facilities to mitigate visual effects and conform to the area's assigned VRM class objective.

Degradation of scenic qualities would potentially occur from surface-disturbing activities, such as those associated with regeneration timber harvest occurring within the Harvest Land Base or with construction of roads. Effects on visual resource values would also result from some actions proposed to manage other resources and uses (e.g., reciprocal rights-of-way and utility corridors). The BLM deemed that programs not addressed in this section have no, or negligible, potential to impact visual resource values under any of the alternatives or the Proposed RMP.

Table 3-240 shows the VRI class acreage and **Figure 3-143** shows the VRI class distribution in the decision area.

Table 3-240. Visual Resource Inventory class distribution in the decision area†

District/ Field Office	VRI Class I (Acres)*	VRI Class II (Acres)	VRI Class III (Acres)	VRI Class IV (Acres)
Coos Bay	579	16,382	61,070	246,829
Eugene	0	60,556	123,517	126,977
Klamath Falls	337	6,584	14,992	192,496
Medford	20,078	293,850	210,068	301,954
Roseburg	0	71,759	102,000	249,805
Salem	7,239	103,920	66,769	227,666
Totals	**28,233**	**553,052**	**578,415**	**1,345,726**

* The BLM assigns this class to areas where the management goal is to preserve a natural landscape. Unlike other VRI classes, VRI Class I is assigned based on a pre-existing preservation management objective rather than on the existing condition of the visual resources.

† See footnotes in **Table 3-241**

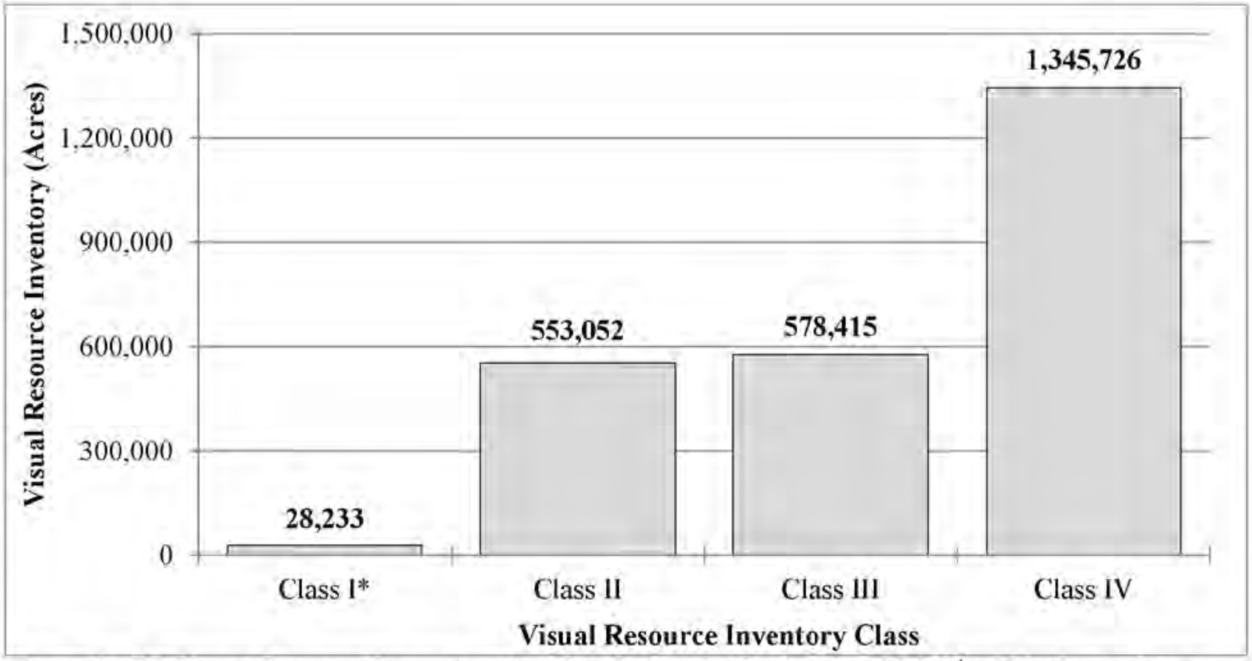

Figure 3-143. Visual Resource Inventory class distribution for the Proposed RMP† within the decision area

* The BLM assigns this class to areas where the management goal is to preserve a natural landscape. Unlike other VRI classes, VRI Class I is assigned based on a pre-existing preservation management objective rather than on the existing condition of the visual resources.

† See footnotes in **Table 3-241**

Effects from VRM Designation

Table 3-241 shows the acres assigned to each VRM class under each alternative and the Proposed RMP. Areas designated as VRM Class III or IV would allow more surface- and forest-disturbing effects and potentially have greater adverse effects on the visual resource's scenic quality than those areas designated as VRM Class I or II. The current visual values would potentially degrade to a moderate level if the BLM manages inventoried areas under a VRM Class III, and the visual values would be more severely reduced if managed under a VRM Class IV.

Table 3-241. Acres of Visual Resource Management classes in the decision area

VRM Class	No Action (Acres)	Alt. A (Acres)	Alt. B (Acres)	Alt. C (Acres)	Alt. D (Acres)	PRMP (Acres)
Class I	22,165*	27,628	27,628	27,628	27,628	28,233†
Class II	125,220	129,372	93,252	93,293	51,900	127,974
Class III	633,537	30,137	34,339	34,246	1,048,902	68,113
Class IV	1,691,128	2,283,679	2,315,571	2,315,623	1,342,361	2,254,535
Unknown‡	6,812	8,046	8,072	8,072	8,071	7
Totals	**2,478,862**	**2,478,862**	**2,478,862**	**2,478,862**	**2,478,862**	**2,478,862**

* Discrepancies exist in the current datasets for acres managed as VRM I within the Medford District under the 1995 RMPs.

† Calculations from GIS present the appearance of an additional 608 acres of VRM Class I under the Proposed RMP as compared to the action alternatives. However, there are no additional units proposed for management under VRM Class I under the Proposed RMP.

‡ Unknown acres result from GIS analysis resulting in small portions of slivering

Under all alternatives and the Proposed RMP, there would likely be a general decrease in visual values in the decision area over time, as the BLM would manage a substantial acreage of BLM-administered lands under a less protective VRM class than the assigned VRI class (**Table 3-241**). Compared to the other alternatives, Alternative D would likely have the least decrease in visual value, as it would have the fewest acres where the BLM would manage for a less protective VRM Class than the assigned VRI class. Alternative A and the Proposed RMP would have the largest acreages in the most protective management classes (VRM Class I and II), while Alternative B and C would have the largest acreages assigned to the least protective management class (VRM Class IV), which would allow for the most visual contrast and change to the visual landscape.

No Action Alternative

Under the No Action alternative, the VRM classes set under the 1995 RMPs would remain. Under this continued management, there would be virtually no change to the characteristics of the landscapes designated VRM I. There would be limited change to the visual values of the landscape in VRM Class II areas, which only allow for low levels of contrast from management actions. Ongoing resource use and development in areas managed as VRM Class III or IV would have the potential to degrade visual resources.

The No Action alternative would result in a general decrease in visual values in the decision area, as management allowing for moderate or high levels of change (VRM Classes III and IV) on inventoried lands of high and moderate values (VRI Classes II and III) would likely occur (**Table 3-242**). However, this decrease in visual values would be slightly less in the No Action alternative compared with Alternatives A, B, and C, and the Proposed RMP, all of which would manage more acres allowing for moderate or high levels of change than the No Action on lands with high and moderate inventoried values as compared to the No Action. This decrease would be slightly more than what would occur under Alternative D.

Table 3-242. Visual Resource Inventory class designations by Management class

Alternatives and the Proposed RMP VRM Management Class Designations		VRI Class I (Acres)		VRI Class II (Acres)		VRI Class III (Acres)		VRI Class IV (Acres)		VRI Unknown (Acres)	
No Action	**Acres**	Acres	%	Acres	%	Acres	%	Acres	%	Acres	%
VRM I	22,165	22,165	100%	-	-	-	-	-	-	-	-
VRM II	125,221	-	-	67,506	12%	17,872	7%	39,743	3%	100	7%
VRM III	683,537	-	-	186,340	34%	218,511	80%	277,592	20%	1,094	78%
VRM IV	1,391,127	-	-	285,702	52%	33,010	12%	1,072,258	76%	157	11%
Unknown	6,812	-	-	2,091	> 1%	1,296	> 1%	3,381	> 1%	44	3%
Totals	**2,228,862**	**22,165**	**100%**	**541,639**	**100%**	**270,689**	**100%**	**1,392,974**	**100%**	**1,395**	**100%**
		Total acres managed under a less protective VRM Class than assigned VRI Class								**513,215**	**23%**
Alt. A	**Acres**										
VRM I	27,628	27,628	100%	-	-	-	-	-	-	-	-
VRM II	129,372	-	-	92,457	17%	30,438	5%	6,462	> 1%	15	1%
VRM III	30,137	-	-	5,079	1%	25,038	4%	17	> 1%	3	> 1%
VRM IV	2,283,679	-	-	439,335	81%	508,426	89%	1,335,838	99%	80	5%
Unknown	8,046	-	-	1,864	> 1%	1,158	> 1%	3,385	> 1%	1,639	93%
Totals	**2,478,862**	**27,628**	**100%**	**538,735**	**100%**	**565,060**	**100%**	**1,345,702**	**100%**	**1,737**	**100%**
		Total acres managed under a less protective VRM Class than assigned VRI Class								**960,984**	**39%**
Alt. B	**Acres**										
VRM I	27,628	27,628	100%	-	-	-	-	-	-	-	-
VRM II	93,252	-	-	76,533	14%	16,713	3%	1	>1%	5	>1%
VRM III	34,339	-	-	5,079	1%	29,241	5%	17	>1%	2	>1%
VRM IV	2,315,571	-	-	455,244	84%	517,946	91%	1,342,298	99%	83	5%
Unknown	8,072	-	-	1,880	>1%	1,160	>1%	3,385	>1%	1,647	94%
Totals	**2,478,862**	**27,628**	**100%**	**538,736**	**100%**	**565,060**	**100%**	**1,345,701**	**100%**	**1,737**	**100%**
		Total acres managed under a less protective VRM Class than assigned VRI Class								**986,431**	**40%**
Alt. C	**Acres**										
VRM I	27,628	27,628	100%	-	-	-	-	-	-	-	-
VRM II	93,293	-	-	76,574	14%	16,714	3%	1	> 1%	4	> 1%
VRM III	34,246	-	-	5,079	1%	29,147	5%	16	> 1%	4	> 1%
VRM IV	2,315,623	-	-	455,203	83%	518,039	91%	1,342,299	99%	82	5%
Unknown	8,072	-	-	1,880	> 1%	1,160	> 1%	3,385	> 1%	1,647	94%
Totals	**2,478,862**	**27,628**	**100%**	**538,736**	**100%**	**565,060**	**100%**	**1,345,701**	**100%**	**1,737**	**100%**
		Total acres managed under a less protective VRM Class than assigned VRI Class								**986,483**	**40%**
Alt. D	**Acres**										
VRM I	27,628	27,628	100%	-	-	-	-	-	-	-	-
VRM II	51,900	-	-	51,816	10%	75	> 1%	3	> 1%	6	> 1%
VRM III	1,048,902	-	-	484,953	89%	563,201	99%	702	> 1%	46	3%
VRM IV	1,342,361	-	-	86	> 1%	624	> 1%	1,341,612	99%	39	2%
Unknown	8,071	-	-	1,880	> 1%	1,161	> 1%	3,385	> 1%	1,645	94%
Totals	**2,478,862**	**27,628**	**100%**	**538,735**	**100%**	**565,061**	**100%**	**1,345,702**	**100%**	**1,736**	**100%**
		Total acres managed under a less protective VRM Class than assigned VRI Class								**493,825**	**20%**
PRMP	**Acres**										
VRM I	28,233	28,233	100%	-	-	-	-	-	-	-	-
VRM II	127,974	-	-	81,585	15%	35,351	6%	10,690	1%	348	20%
VRM III	68,113	-	-	34,015	6%	12,114	2%	21,894	2%	90	5%
VRM IV	2,254,535	-	-	423,148	79%	517,700	92%	1,312,394	98%	1,293	74%
Unknown	7	-	-	0	0%	0	0%	0	0%	7	> 1%
Totals	**2,478,862**	**28,233**	**100%**	**538,748**	**100%**	**565,165**	**100%**	**1,344,978**	**100%**	**1,736**	**100%**
		Total acres managed under a less protective VRM Class than assigned VRI Class								**976,601**	**39%**

* Dark shaded boxes denote acres managed at equal or more protective VRM Class than the assigned VRI Class and would be managed with commensurate or lower levels of change permitted.

Alternatives A, B, and C

In Alternatives A, B, and C, the BLM would manage visual resources on congressionally reserved lands where decisions have been made to preserve a natural landscape (e.g., designated Wilderness Areas and Wild and Scenic Rivers) as VRM I, and designated Areas of Critical Environmental Concern according to their assigned inventory class. The BLM would manage the following as VRM II: designated and recommended Suitable Wild and Scenic Rivers classified as Scenic; National Trail management corridors; District-Designated Reserve – Lands Managed for their Wilderness Characteristics; and Special Recreation Management Areas that fall within the Primitive and Backcountry settings. The BLM would manage the following as VRM III: designated and recommended Suitable Wild and Scenic Rivers classified as Recreational; and Special and Extensive Recreation Management Areas that fall within the Middle Country setting. The BLM would manage all other lands as VRM Class IV, which would allow management activities that result in major modifications to the existing character of the landscape.

Alternatives A, B, and C would result in a general decrease in visual values in the planning area as the management allowing for moderate or high levels of change (VRM Classes III and IV) on inventoried lands of high and moderate values (VRI Classes II and III) would occur **(Table 3-242)**. Under Alternatives A, B, and C, the BLM would manage 960,984 acres (Alternative A), 986,431 acres (Alternative B), and 986,483 acres (Alternative C) allowing for moderate or high levels of change on lands with high and moderate inventoried values.

Alternative D

In Alternative D, the BLM would manage visual resources on congressionally reserved lands where decisions have been made to preserve a natural landscape (e.g., designated Wilderness Areas and Wild and Scenic Rivers) under VRM I, and designated Areas of Critical Environmental Concern according to their assigned inventory class. The BLM would manage the following as VRM Class II: designated and recommended Suitable Wild and Scenic Rivers classified as Scenic; National Trail management corridors; and Special Recreation Management Areas that fall within the primitive and backcountry setting. The BLM would manage the following as VRM Class III: designated and recommended Suitable Wild and Scenic Rivers classified as Recreational; and Special and Extensive Recreation Management Areas that fall within the middle country setting. The BLM would manage all other lands according to their VRI Class, except that in the Harvest Land Base, the BLM would manage lands inventoried as VRI Class II as VRM Class III.

While overall visual resource value is likely to decline over time under Alternative D, the decline would be less than under the other alternatives and the Proposed RMP. Under Alternative D only 493,825 acres would be managed allowing for moderate or high levels of change (VRM Class III or IV) on lands with high and moderate inventoried values (VRI Class II or III).

Proposed RMP

In the Proposed RMP, the BLM would manage visual resources on congressionally reserved lands where decisions have been made to preserve a natural landscape (e.g., designated Wilderness Areas and Wild and Scenic Rivers) under VRM I, and designated Areas of Critical Environmental Concern according to their assigned inventory class except that the BLM would manage designated Areas of Critical Environmental Concern within the harvest land base that are VRI Class II as VRM Class III. The BLM would manage the following as VRM Class II: designated and recommended Suitable Wild and Scenic Rivers classified as Scenic; National Trail management corridors; District-Designated Reserve – Lands Managed for their Wilderness Characteristics; and Special Recreation Management Areas that fall within the Primitive and Backcountry settings. The BLM would manage the following as VRM Class III:

designated and recommended suitable Wild and Scenic Rivers classified as Recreational[126]; and Special and Extensive Recreation Management Areas that fall within the Middle Country setting. The BLM would manage all other lands as VRM Class IV, which would allow management activities that result in major modifications to the existing character of the landscape.

The Proposed RMP would decrease the visual resource values within the decision area as management allowing moderate or high levels of change (VRM Classes III and IV) on inventoried lands of high and moderate values (VRI Classes II and III) would occur (**Table 3-242**). Under the Proposed RMP, the BLM would manage 976,601 acres allowing for moderate or high levels of change on lands with high and moderate inventoried values.

While visual resource value is likely to decline over time under the Proposed RMP, the decline would be less than under Alternatives B and C but greater than under Alternatives A and D and the No Action alternative.

Effects to Visual Resources from Forest Management

Certain sustained-yield timber management regimes are more or less compatible with the range of VRM class objectives. **Table 3-243** displays the level of compatibility for each VRM class compared to the management regimes for the High Intensity Timber Area (HITA), Moderate Intensity Timber Area (MITA), Low Intensity Timber Area (LITA), Uneven-aged Timber Area (UTA), Owl Habitat Timber Area (OHTA), and the No Action alternative.

Table 3-243. Compatibility of sustained yield management regimes with VRM classifications

Classification	HITA (Even-aged Management)	LITA/MITA/No Action (Two-aged Management)	OHTA/UTA (Uneven-aged Management)
VRM I			
VRM II			
VRM III			
VRM IV			

Notes:
Dark grey boxes indicate that the management regime would generally be incompatible.
Cross-hatched boxes indicate that the management regime may be compatible.
Light grey boxes indicate that the management regime would generally be compatible.

Areas inventoried as VRI Class II or III represent higher and moderate relative values of visual resources than the lowest represented by VRI Class IV. **Table 3-244** presents the acres of each VRI class that are in the Harvest Land Base under each alternative and the Proposed RMP. Regeneration timber harvest would not diminish the existing visual values of areas that are VRI Class IV. Management under the High Intensity Timber Area would diminish the visual resource values of VRI Class II and III areas, but

[126] All designated and recommended suitable Wild and Scenic Rivers would be allocated to the Congressionally Reserved Lands and the National Landscape Conservation System land use allocation, in which the BLM would manage for the protection of river segments' classifications, outstandingly remarkable values (ORVs), water quality, and free-flowing condition. Within designated and recommended suitable Recreational segments, a designation of VRM Class III would require that changes on the landscape be moderate and not dominate the view of the casual observer. The management direction for the Congressionally Reserved Lands and the National Landscape Conservation System would require the BLM to protect all identified ORVs, including scenery ORVs, regardless of VRM class designation, and the BLM would manage visual resources in designated and recommended suitable river segments with scenery ORVs consistent with both the land use allocation management direction and VRM class designation.

regeneration harvest with retention under the Low Intensity Timber Area, Moderate Intensity Timber Area, and No Action would only diminish the visual resource values of VRI Class II areas. It is worth noting that under all alternatives and the Proposed RMP, the largest designated VRI class of the Harvest Land Base would be VRI Class IV; timber harvest would not degrade the overall visual values of these areas. No acres of VRM Class I occur within the Harvest Land Base, and as such, discussions below exclude this VRM Class.

Thinning under the Owl Habitat Timber Area and Uneven-aged Timber Area would not diminish the visual resource quality of VRM Classes II, III, or IV. The acres reflected below include all lands within the harvest Land Base and do not separate the acres associated with these compatible sub-allocations from the total sum. As such, the below acres are an overestimation of the possible acres on which incompatible timber harvest management would be possible to occur.

Table 3-244. The Harvest Land Base within each Visual Resource Inventory class

Visual Resource Inventory Class	No Action (Acres)	Alt. A (Acres)	Alt. B (Acres)	Alt. C (Acres)	Alt. D (Acres)	PRMP (Acres)
Class II	174,030	69,785	116,425	141,535	133,680	100,410
Class III	209,996	82,103	117,755	154,676	168,159	102,647
Class IV	381,717	191,595	321,557	444,543	348,026	290,808
Unknown VRI	208	418	599	580	518	525
Totals	**765,951**	**343,901**	**556,336**	**741,334**	**650,383**	**493,865**

Alternatives A and C include High Intensity Timber Area and Uneven-aged Timber Area forest management within the Harvest Land Base. Forest management within the High Intensity Timber Area would include clear-cutting which would be potentially incompatible with the largest number of VRM Classes as it is incompatible with all but VRM Class IV. Uneven-aged Timber Area forest management would be compatible with all VRM Classes. Management under Alternatives C and A would result in the highest number of acres (Alternative C, 296,211 acres) and the fourth-highest number of acres (Alternative A, 151,888 acres) of all alternatives and the Proposed RMP where adverse effects from forest management practices could potentially occur. The large difference in sizes of the Harvest Land Base accounts for the differences in acres.

Alternative B and the Proposed RMP include Moderate Intensity Timber Area, Low Intensity Timber Area, and Uneven-aged Timber Area forest management within the Harvest Land Base. Forest management within the Moderate Intensity Timber Area and Low Intensity Timber Area would include regeneration harvest with some level of retention, which would be potentially incompatible with only VRM Class II lands. Uneven-aged Timber Area forest management would be compatible with all VRM Classes. Management under this alternative and the Proposed RMP would result in the second-highest number of acres (Proposed RMP, 203,057 acres) and the lowest number of acres (Alternative B, 116,425 acres) of all alternatives and the Proposed RMP where adverse effects from forest management practices could potentially occur.

In the No Action alternative, effects to visual resources from sustained-yield timber management—all of which would include some level of retention—would occur on 174,030 acres. This would potentially degrade the visual resource quality of 174,030 acres of VRI Class II lands. Timber harvest activities under the No Action alternative would potentially affect visual resource quality on the third-most acreage compared to other alternatives and the Proposed RMP.

Alternative D includes Moderate Intensity Timber Area, Owl Habitat Timber Area, and Uneven-aged Timber Area forest management within the Harvest Land Base. Forest management within the Moderate Intensity Timber Area would include regeneration harvest with some level of retention, which would be potentially incompatible with only VRM Class II lands. Owl Habitat Timber Area and Uneven-aged Timber Area forest management would be compatible with all VRM Classes. Management under Alternative D would result in the second-lowest number of acres (133,680 acres) of all alternatives and the Proposed RMP where adverse effects from forest management practices could potentially occur.

References

USDI BLM. 2014. Resource Management Plans for Western Oregon Planning Criteria. Bureau of Land Management, Oregon/Washington State Office, Portland, OR. http://www.blm.gov/or/plans/rmpswesternoregon/files/rmp-criteria.pdf.

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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 (T**able 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

District/ Field Office	Bald Eagle Management Areas (Number)	Bald Eagle Management Areas (Acres)
Coos Bay	26	765
Eugene	73	8,254
Klamath Falls	21	1,921
Medford	20	1,057
Roseburg	25	3,731
Salem	11	2,217
Totals	**176**	**17,945**

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 7^{th} 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.

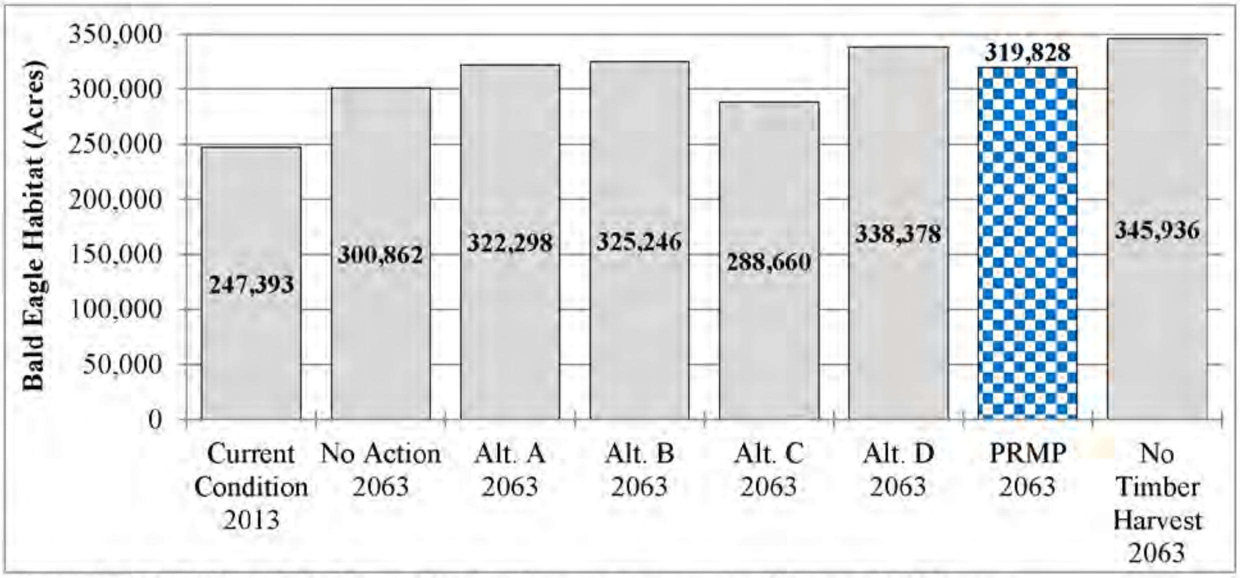

Figure 3-144. Bald eagle habitat in the decision area–current condition and in 50 years

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.

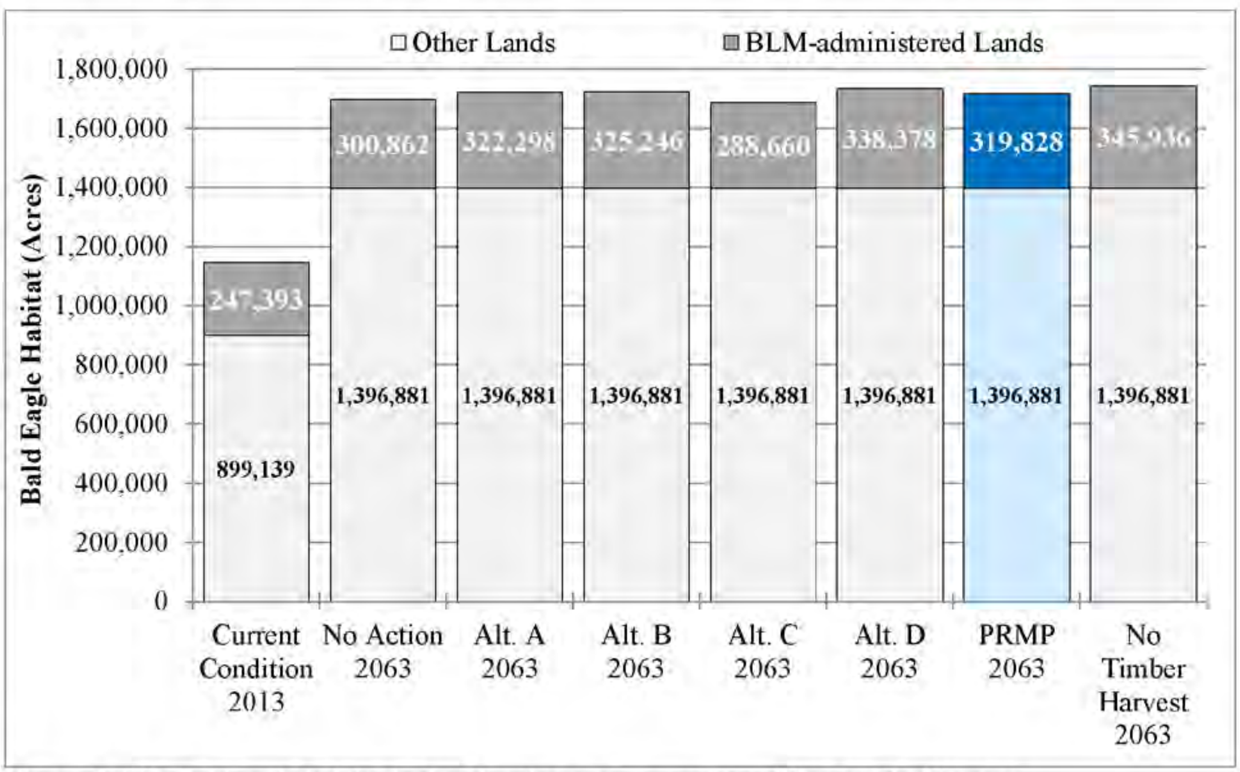

Figure 3-145. Bald eagle habitat in the planning area–current condition and in 50 years

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

Isaacs, F. B. 2011. Summary of reports on bald eagles (*Haliaeetus leucocephalus*) nesting in Oregon and along the lower Columbia River, 2008–2010. Oregon Eagle Foundation, Inc., Klamath Falls, OR. http://www.fs.fed.us/r6/sfpnw/issssp/documents/inventories/inv-rpt-bi-hale-oregon-2008-2010-2011-07.pdf.

Isaacs, F. B., and R. G. Anthony. 2011. Bald eagles (*Haliaeetus leucocephalus*) nesting in Oregon and along the lower Columbia River, 1978–2007. Final Report, March 18, 2011. Oregon Cooperative Fish and Wildlife Research Unit, Department of Fisheries and Wildlife, Oregon State University, Corvallis, OR. http://www.fs.fed.us/r6/sfpnw/issssp/documents/inventories/inv-rpt-bi-hale-oregon-1978-2007-2011-03.pdf.

Oregon Department of Fish and Wildlife (ODFW). 2006. Oregon Conservation Strategy. Oregon Department of Fish and Wildlife, Salem, OR. http://www.dfw.state.or.us/conservationstrategy/read_the_strategy.asp.

USDI BLM. 2008. Final Environmental Impact Statement for the Revision of the Resource Management Plans of the Western Oregon Bureau of Land Management Districts. BLM, Oregon State Office, Portland, OR. http://www.blm.gov/or/plans/wopr/final_eis/index.php.

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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 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 (LEMMA 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

Structural Stage	BLM-administered Lands		All Ownerships	
	(Acres)	(Percentage)	(Acres)	(Percentage)
Non-forested lands	91,752	4%	4,342,361	20%
Early Successional	53,459	2%	1,119,904	5%
Stand Establishment	387,247	17%	2,471,784	11%
Young	619,631	27%	9,803,753	45%
Mature	517,893	23%	2,434,278	11%
Structurally-complex	583,459	26%	1,573,394	7%
Totals	**2,253,442**	**100%**	**21,745,475**	**100%**

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 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).

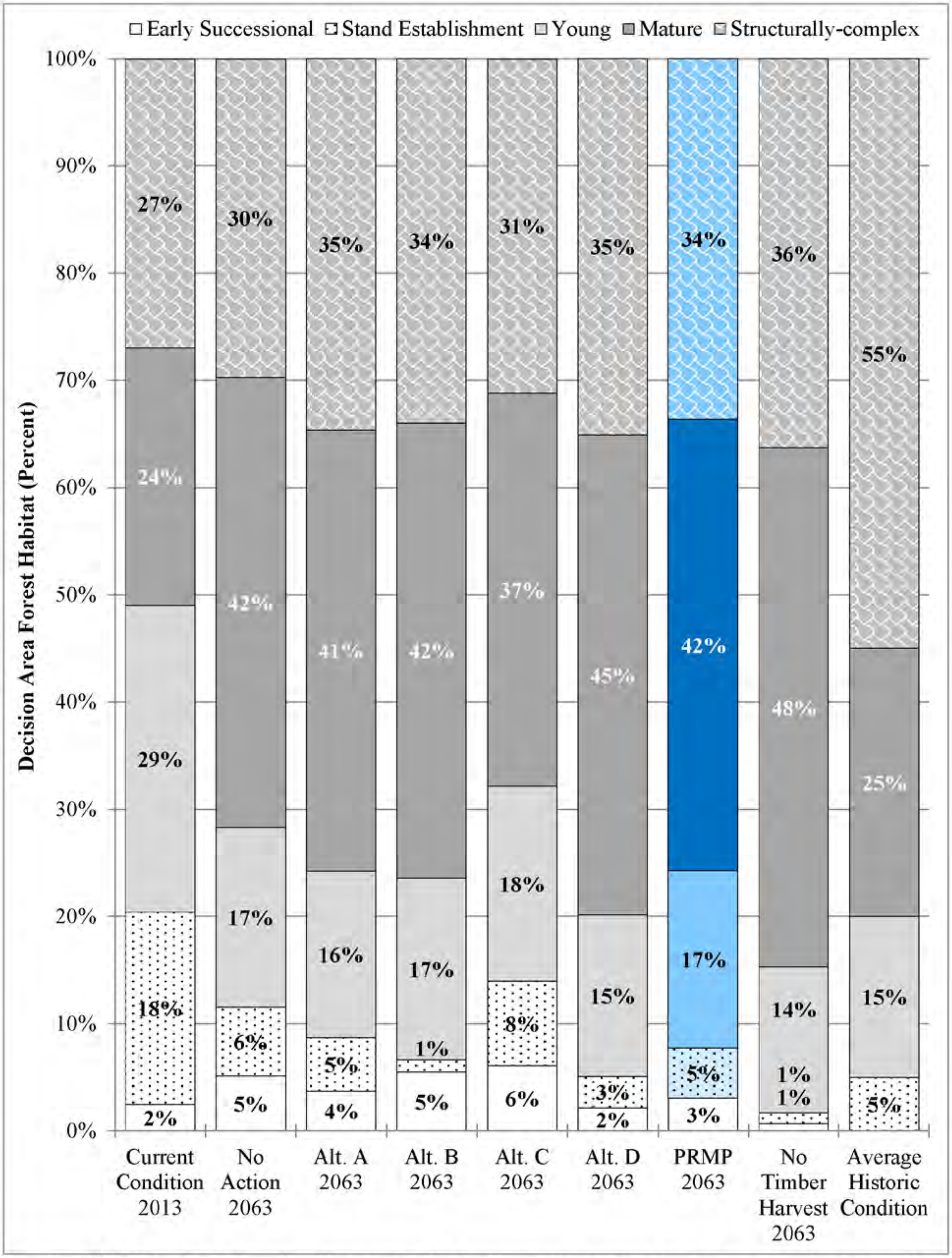

Figure 3-146. Structural stage development in the decision area compared with average historic condition

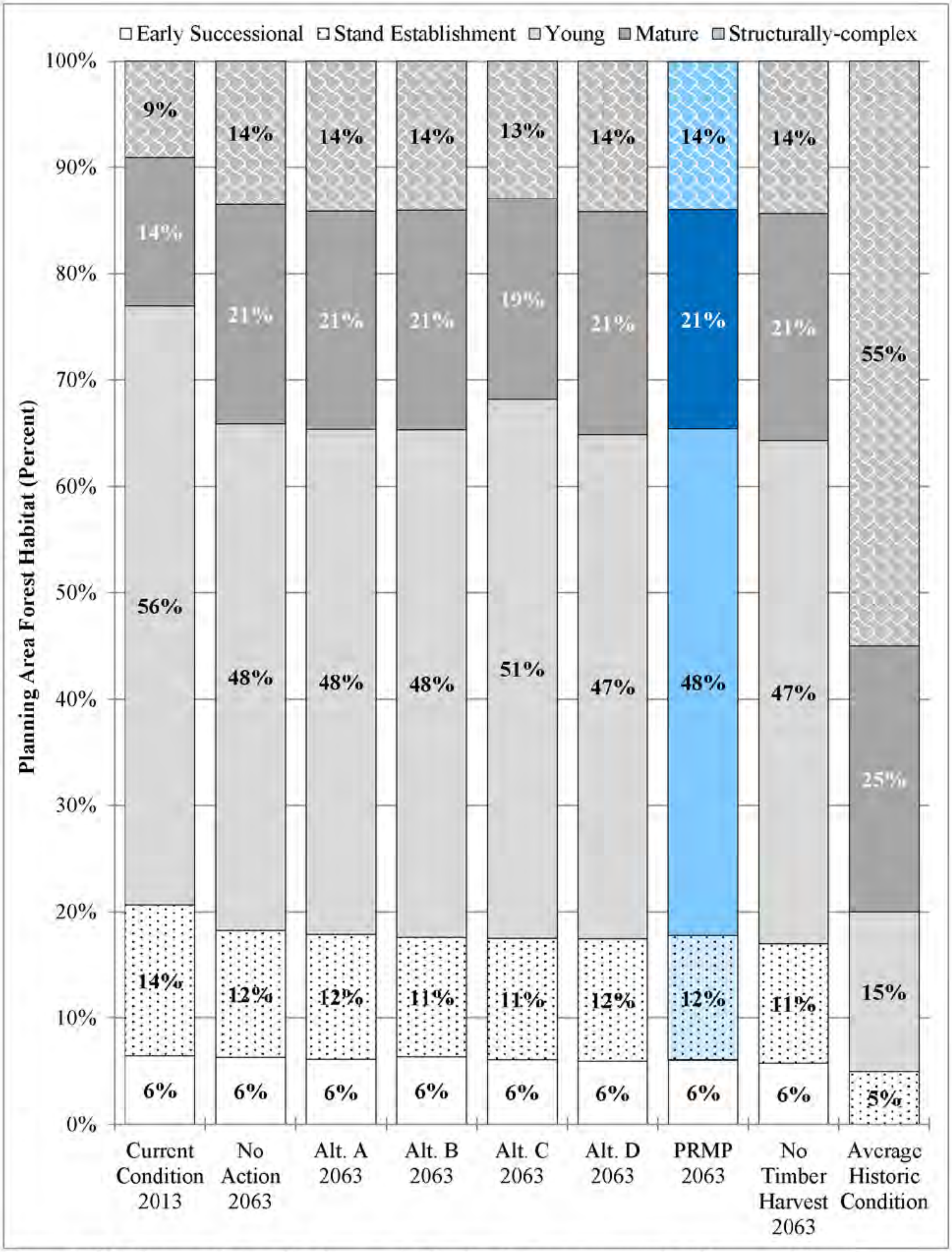

Figure 3-147. Structural stage development in the planning area compared with average historic condition

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) (**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) (**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 (**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 (**Figure 3-146** and **Figure 3-147**). **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 (**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 (**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

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

* 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)

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

* **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.

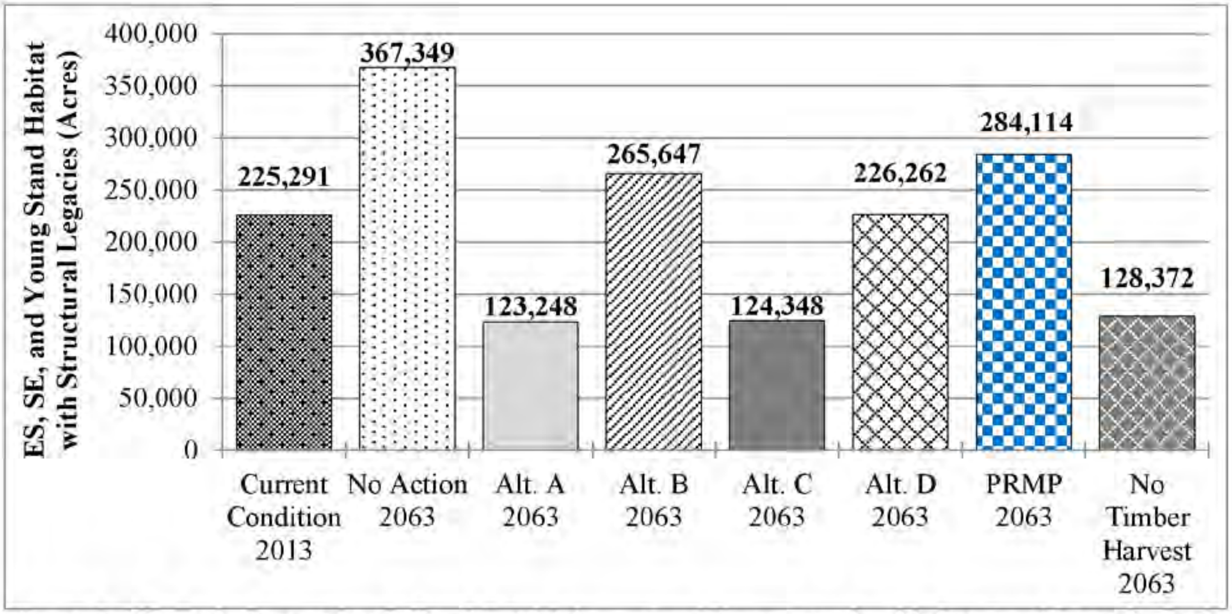

Figure 3-148. Early Successional, Stand Establishment, and Young stands with Structural Legacies in the decision area

Habitat for species associated with legacy structures in older stands[128] 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.

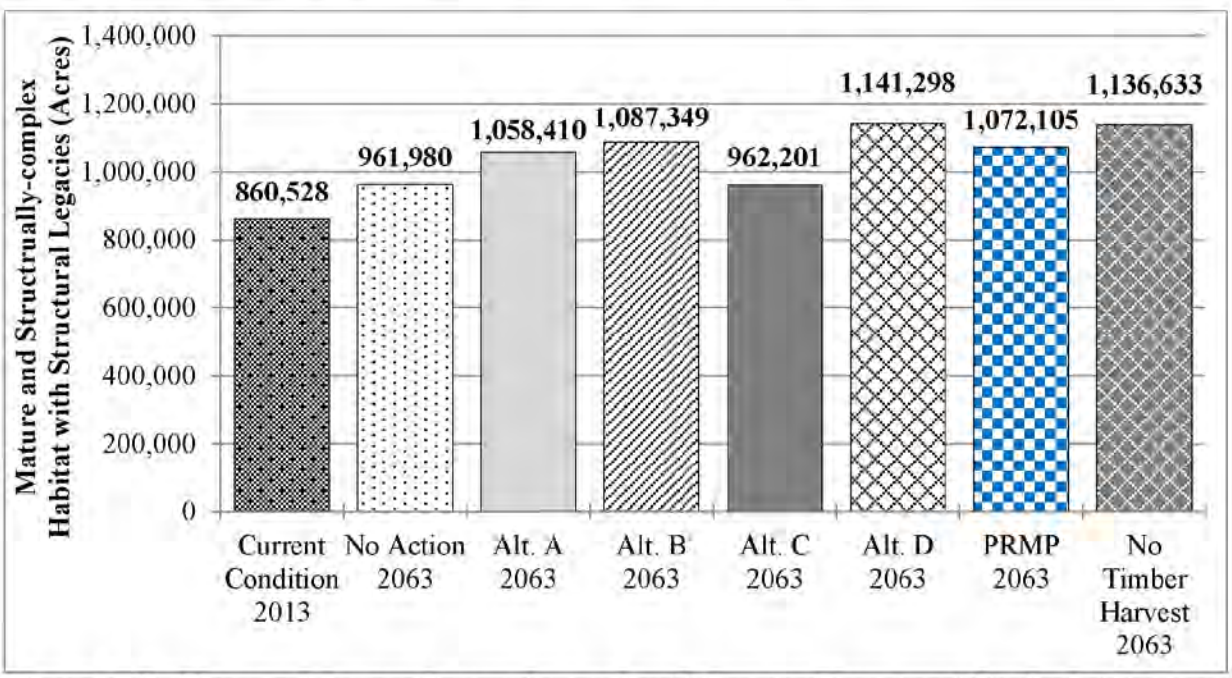

Figure 3-149. Mature and Structurally-complex stands with Structural Legacies within the decision area

[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)

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

* **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[129] 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).

[129] 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**)

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**).[130] 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**).

[130] 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.

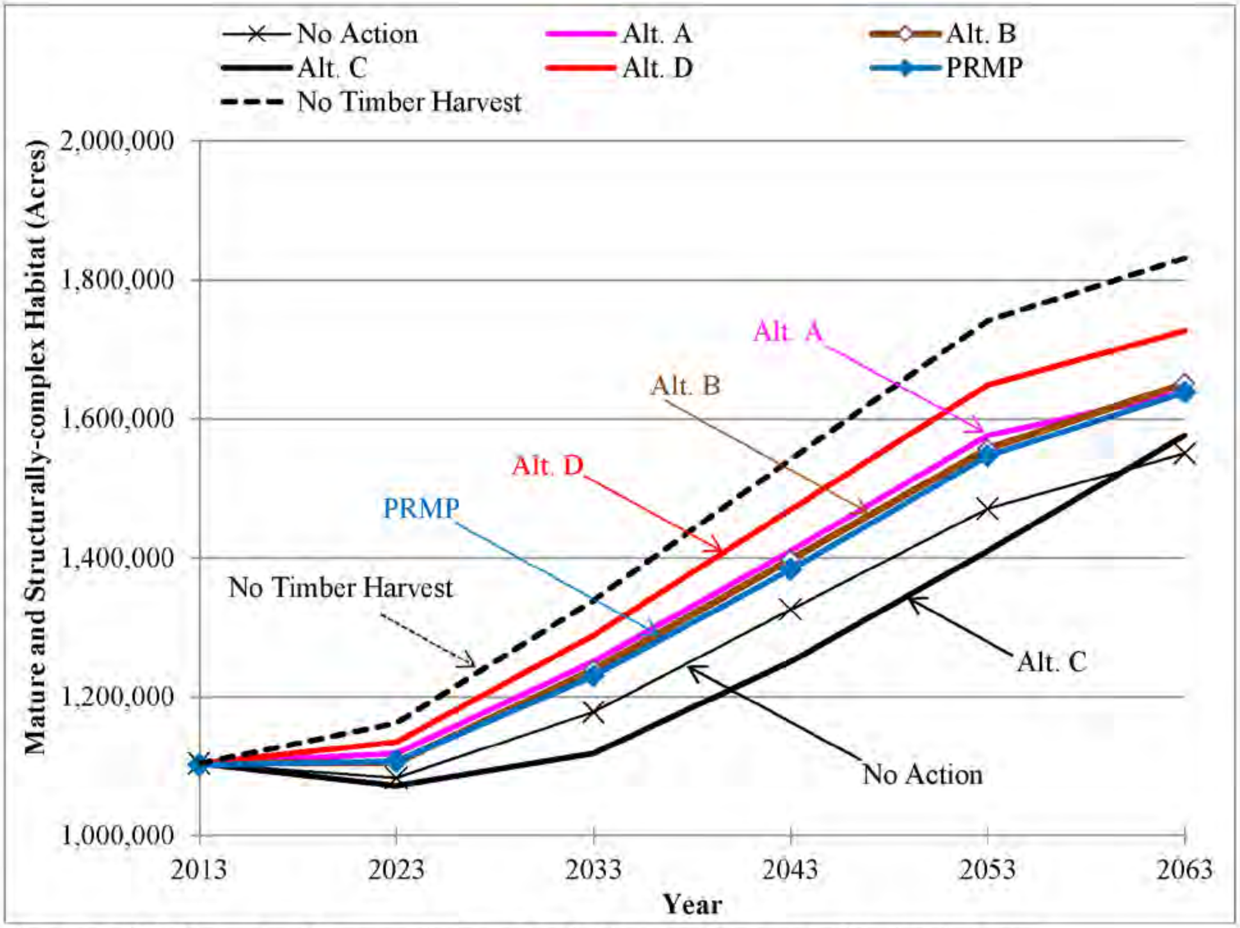

Figure 3-150. Mature and Structurally-complex habitat development in the decision area

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

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

* 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 the 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.

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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[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

[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**).

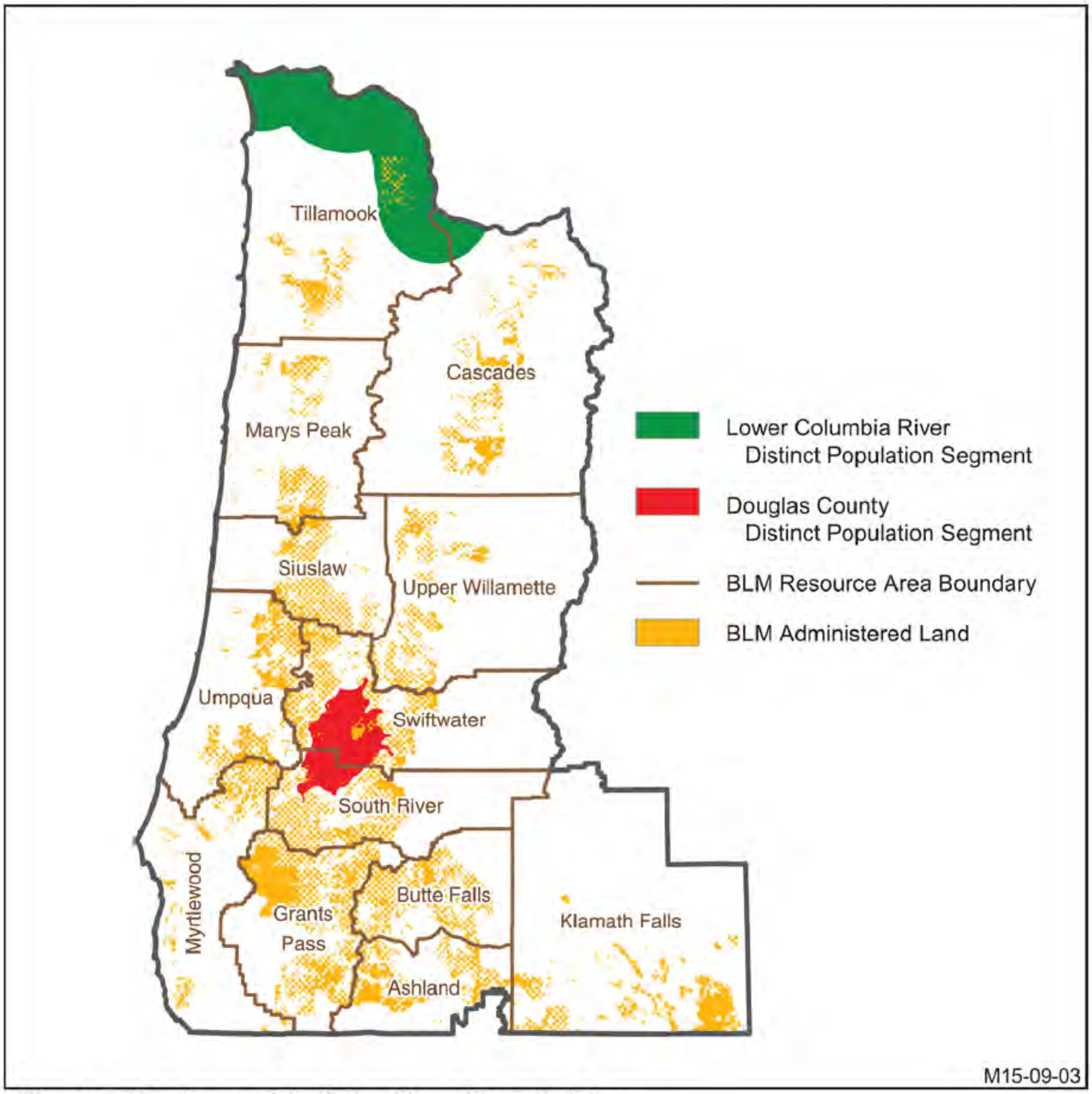

Figure 3-151. Range of the Columbian white-tailed deer

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.

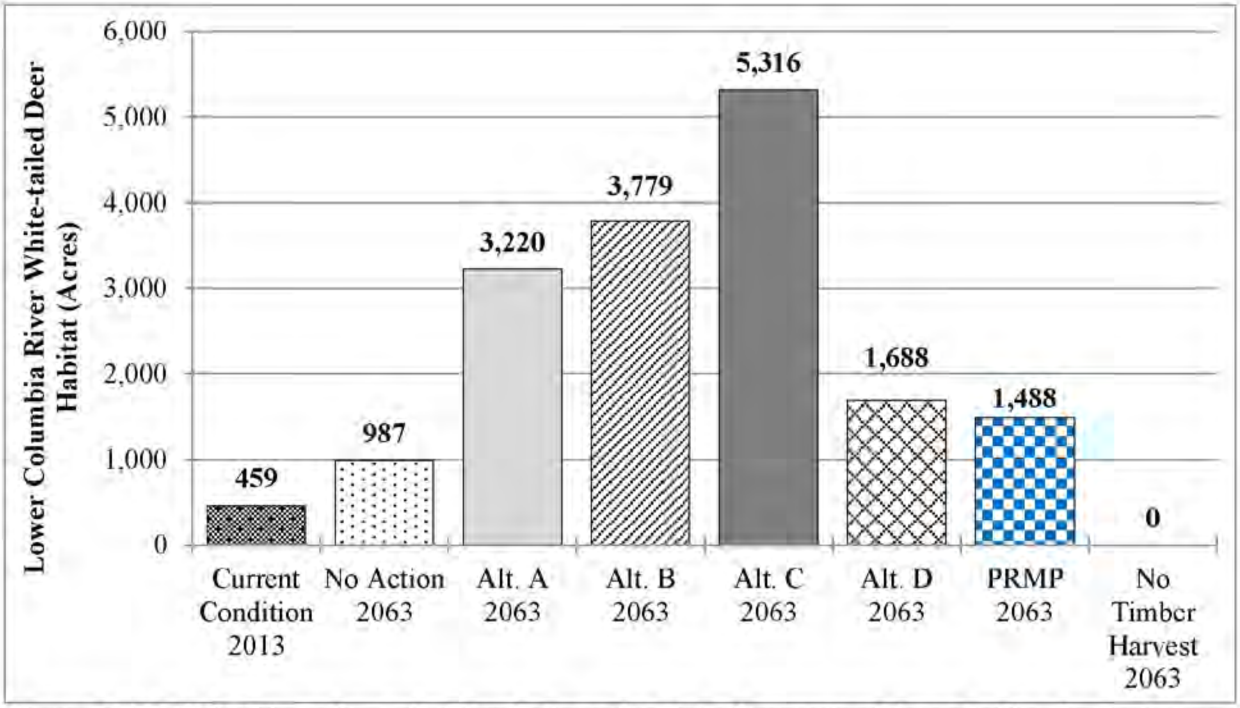

Figure 3-152. Columbian white-tailed deer high-quality Early Successional forage habitat for the Lower Columbia River population on BLM-administered lands

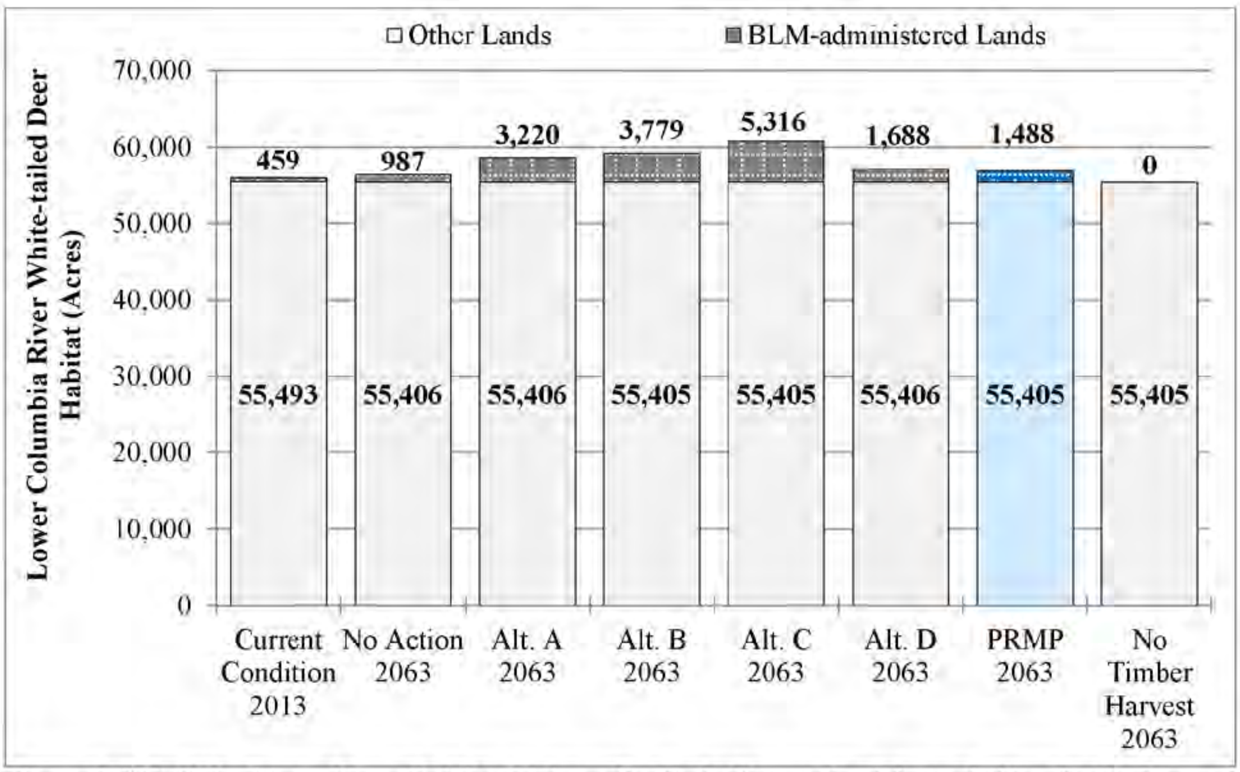

Figure 3-153. Columbian white-tailed deer high-quality Early Successional forage habitat for the Lower Columbia River population across all land ownerships

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.

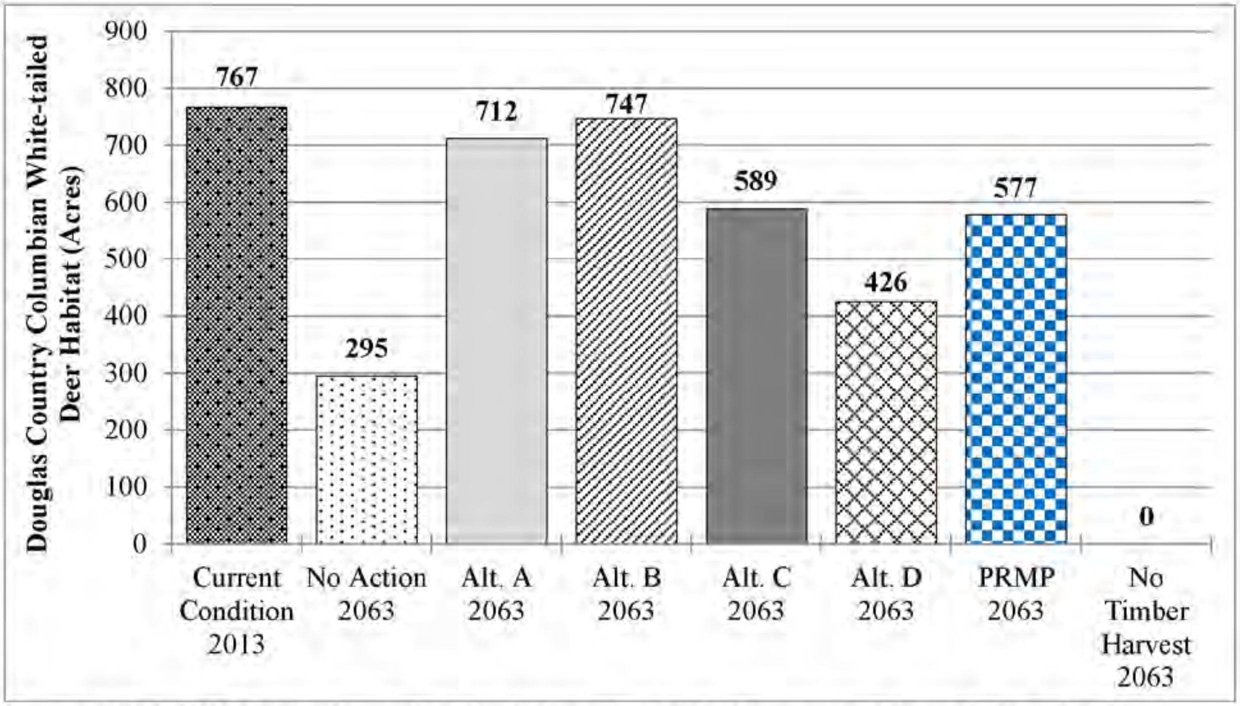

Figure 3-154. Columbian white-tailed deer high-quality Early Successional forage habitat for the Douglas County population on BLM-administered lands

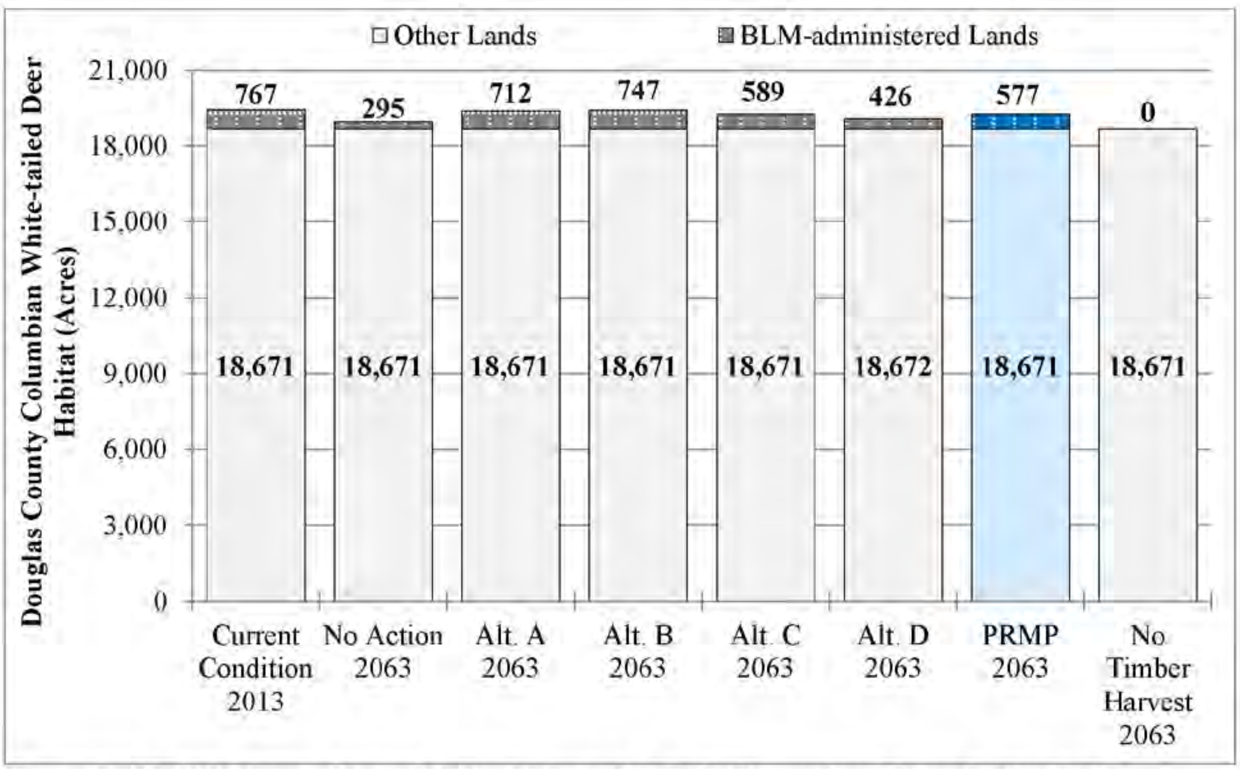

Figure 3-155. Columbian white-tailed deer high-quality Early Successional forage habitat for the Douglas County population across all ownerships

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.

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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 assumed 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.

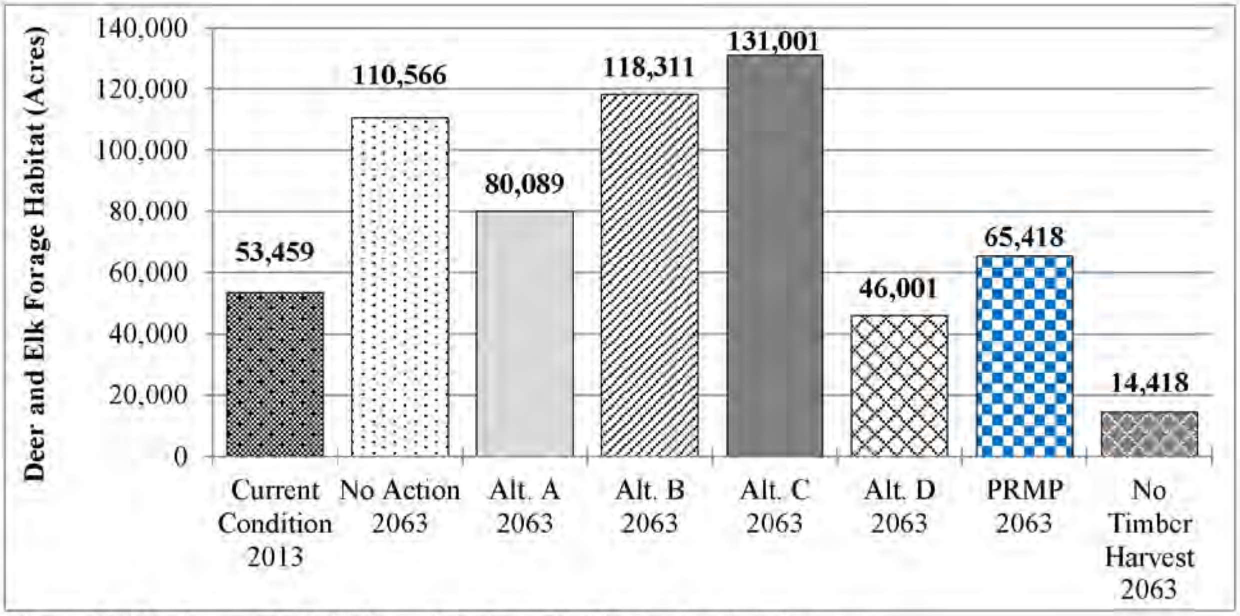

Figure 3-156. Deer and elk high-quality forage habitat in the decision area

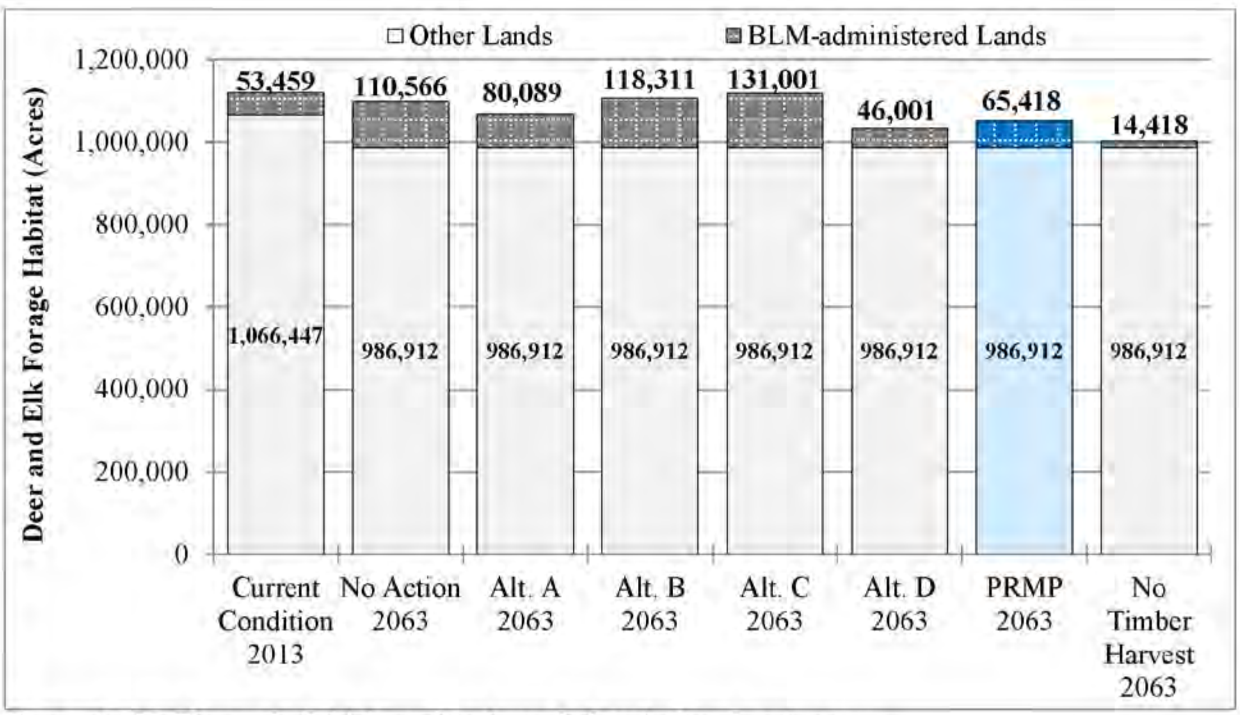

Figure 3-157. Deer and elk high-quality forage habitat in the planning area

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

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

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

District	Elk Management Areas (Name)	BLM-administered Lands (Acres)
Medford	Burnt Peak	1,773
	Camel Hump	8,876
	Elk Creek	18,814
	Salt Creek	17,479
	Shady Cove West	7,670
	Glendale Mule Creek	19,404
	Far-Out	8,868
	Peavine	26,315
	Elk Valley	14,239
	Medford Subtotal	**123,437**
Salem	Bummer Ridge	3,638
	Luckiamute	1,975
	Salem Subtotal	**5,614**
	Totals	**129,051**

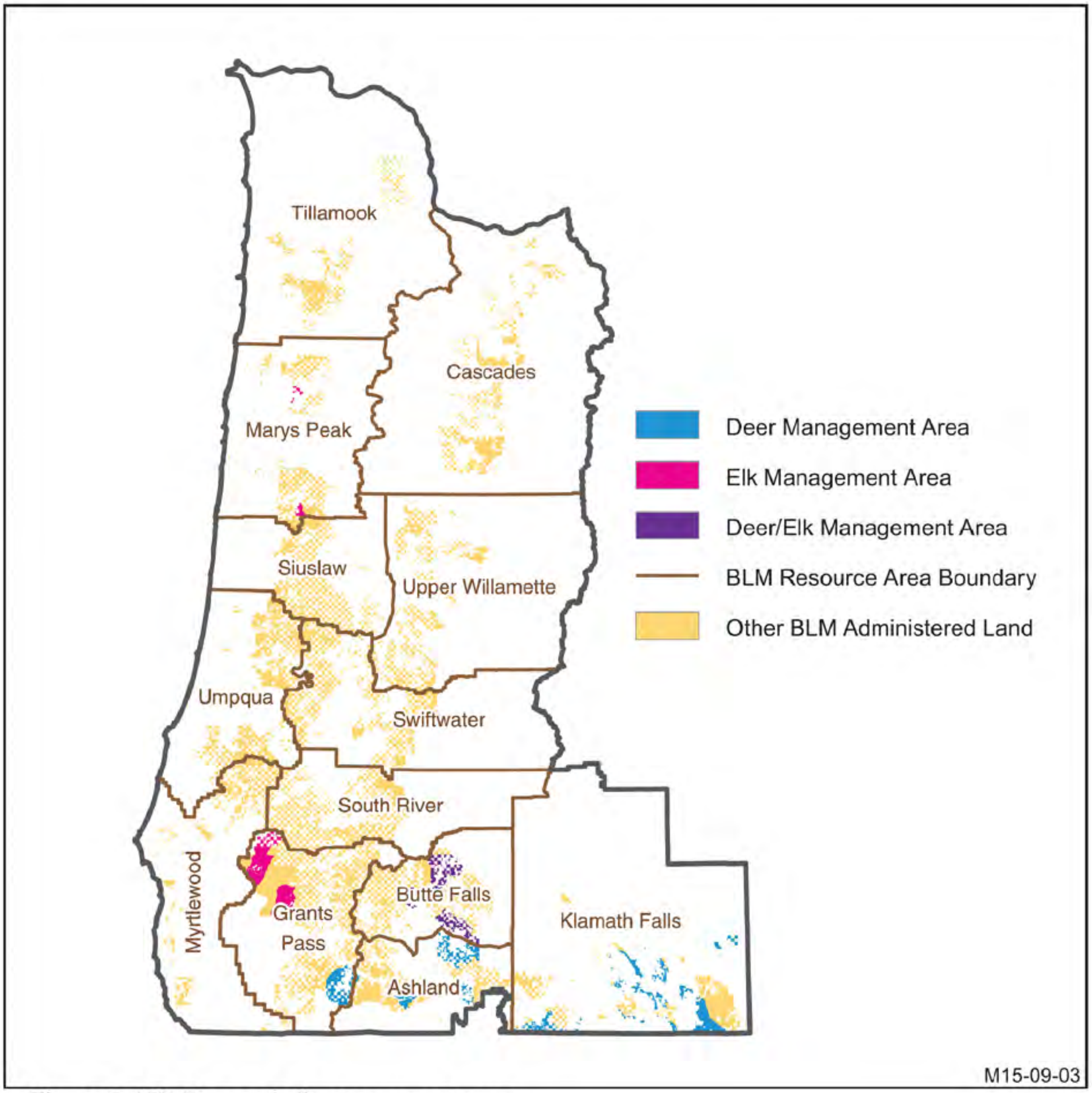

Figure 3-158. Deer and elk management areas

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

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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)**.

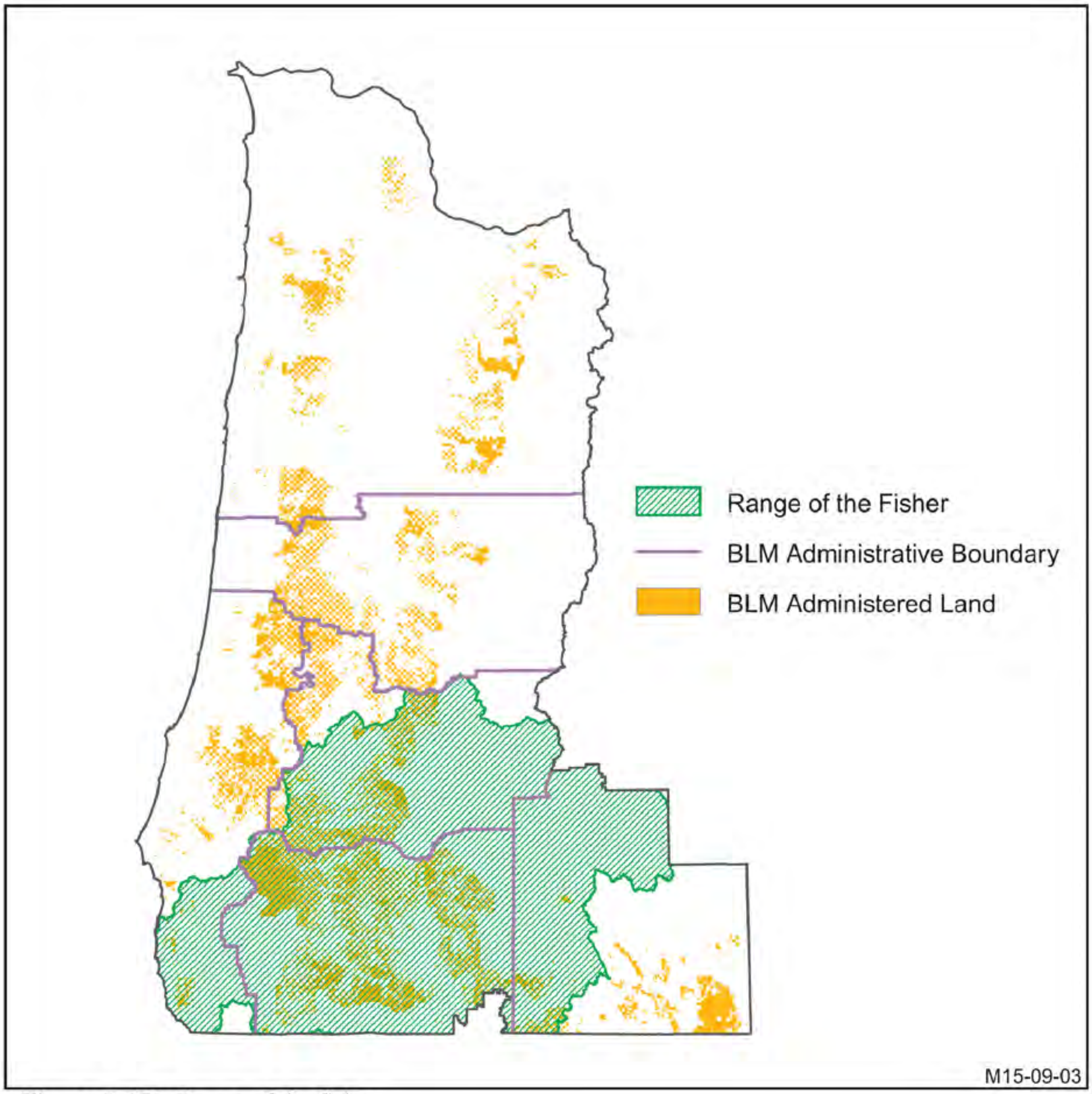
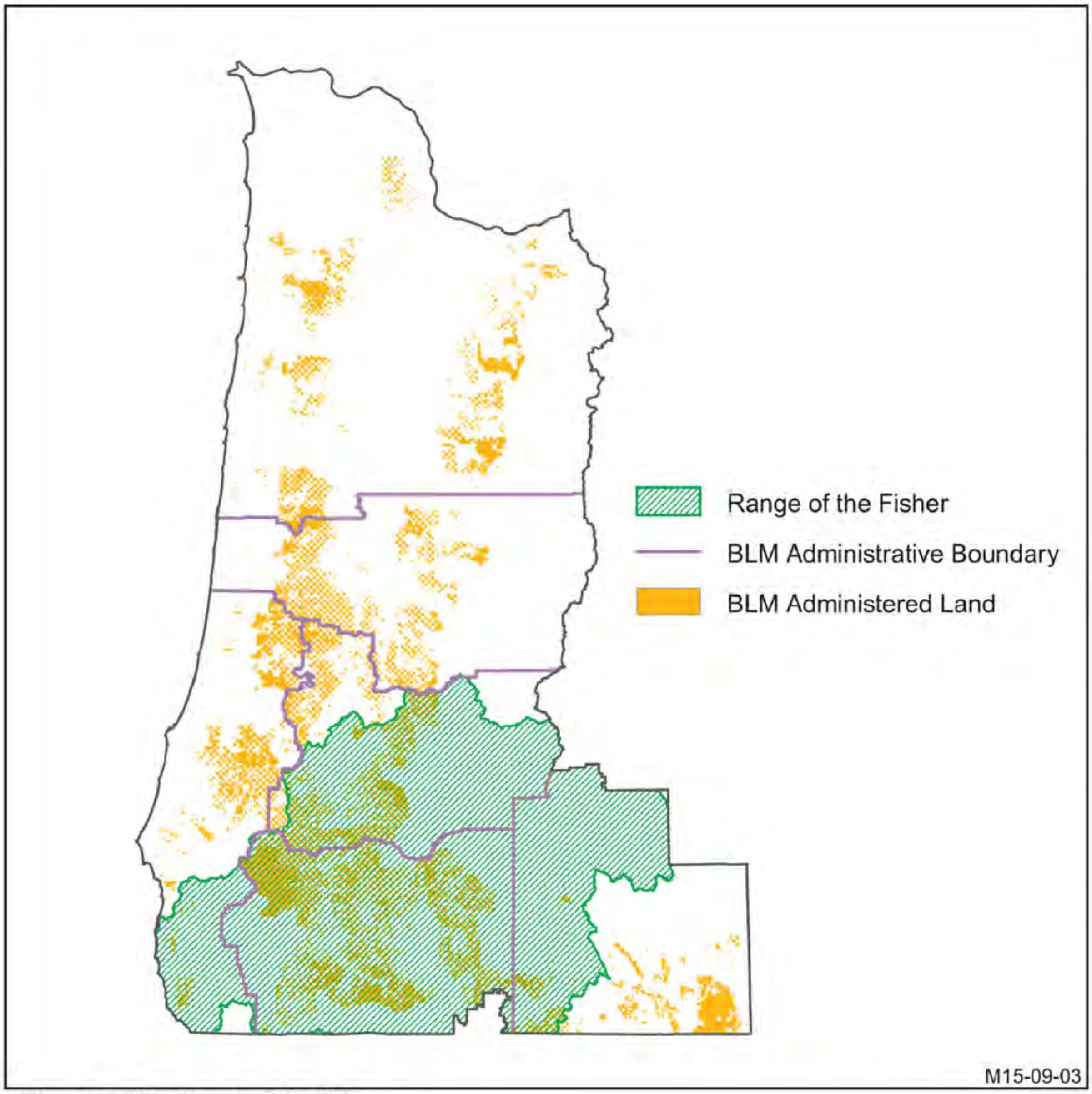


Figure 3-159. Range of the fisher

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.



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[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

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

In the planning area, there 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**).[133] 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.

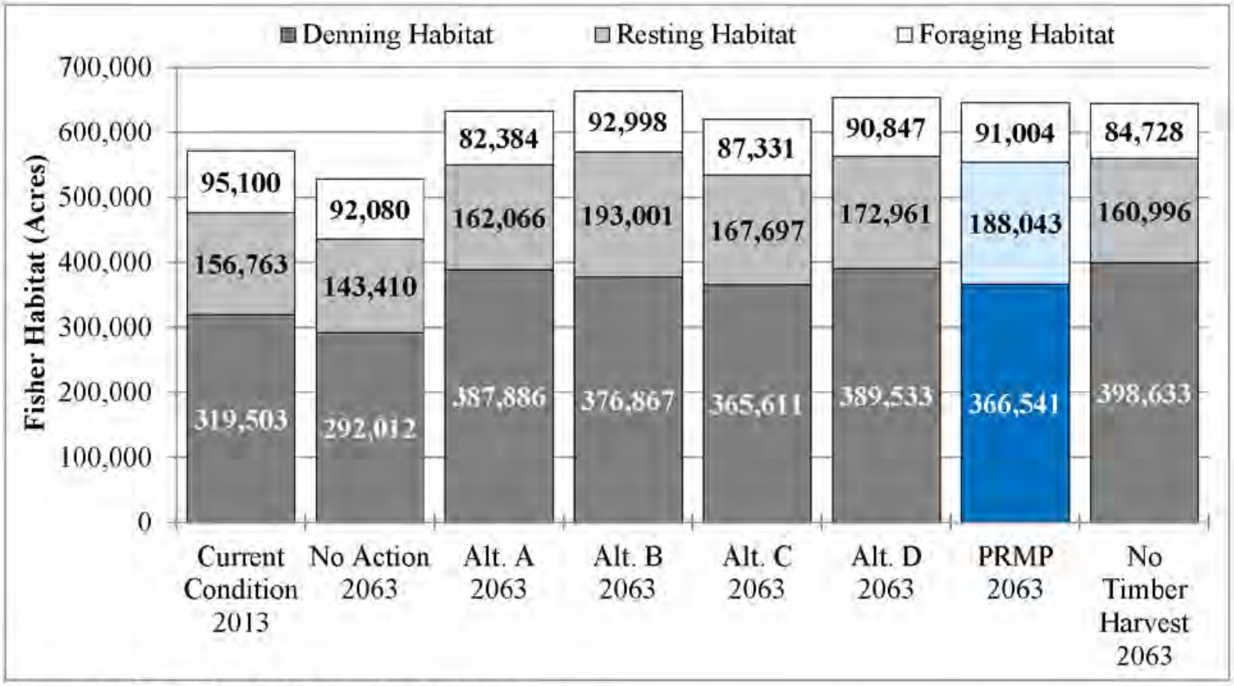

Figure 3-160. Fisher habitat in the decision area

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

Alternative/ Proposed RMP	Mean Patch Size (Acres)	Edge vs. Core Habitat		
		Edge Habitat (Acres)	Core Habitat (Acres)	Core (Percent)
Current Condition (2013)	31.0	403,186	168,168	29%
No Action (2063)	20.4	381,360	146,143	28%
Alt. A (2063)	31.4	428,759	203,578	32%
Alt. B (2063)	32.3	450,183	212,684	32%
Alt. C (2063)	30.1	420,919	199,721	32%
Alt. D (2063)	32.6	441,553	211,790	32%
PRMP (2063)	27.3	450,508	195,078	30%
No Timber Harvest (2063)	35.9	433,931	210,428	33%

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 of 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.

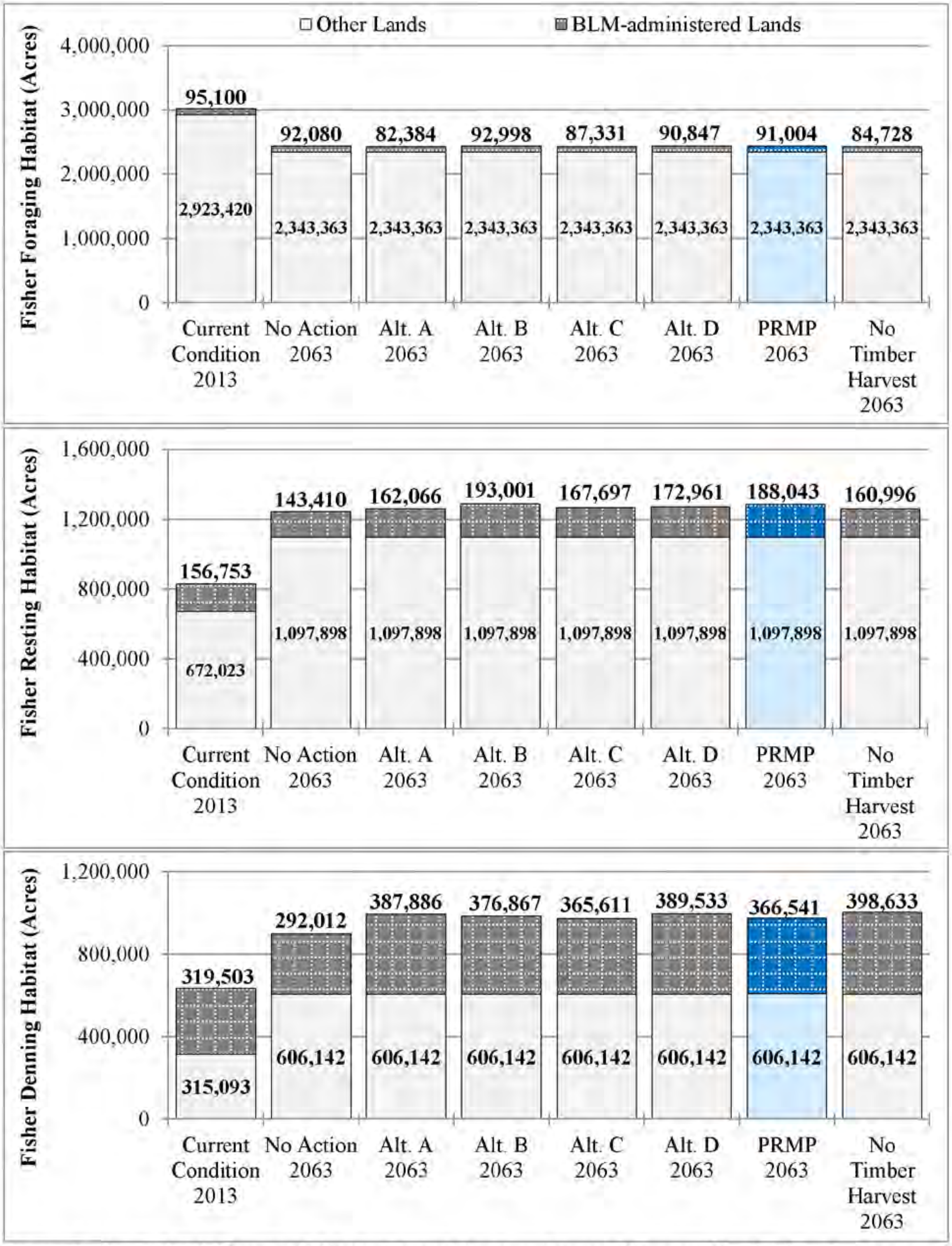

Figure 3-161. Fisher habitat on BLM-administered lands and across all ownerships for foraging, resting, and denning

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 3-2557**). 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

Alternative/ Proposed RMP	Total Fisher Habitat (Acres)	Female Fisher (Population)	Male Fisher (Population)	Total Fisher (Population)	Fisher Population Increase (Number)
Current Condition (2013)	4,484,755	956	336	1,292	-
No Action (2063)	4,574,905	975	343	1,318	26
Alt. A (2063)	4,679,739	997	351	1,348	56
Alt. B (2063)	4,710,269	1,004	353	1,357	65
Alt. C (2063)	4,668,042	995	350	1,345	53
Alt. D. (2063)	4,700,745	1,002	353	1,355	63
PRMP (2063)	4,692,992	1,000	352	1,352	60
No Timber Harvest (2063)	4,691,760	1,000	352	1,352	60

Figure 3-162 shows the amount of each type of fisher habitat within the planning area in 50 years.

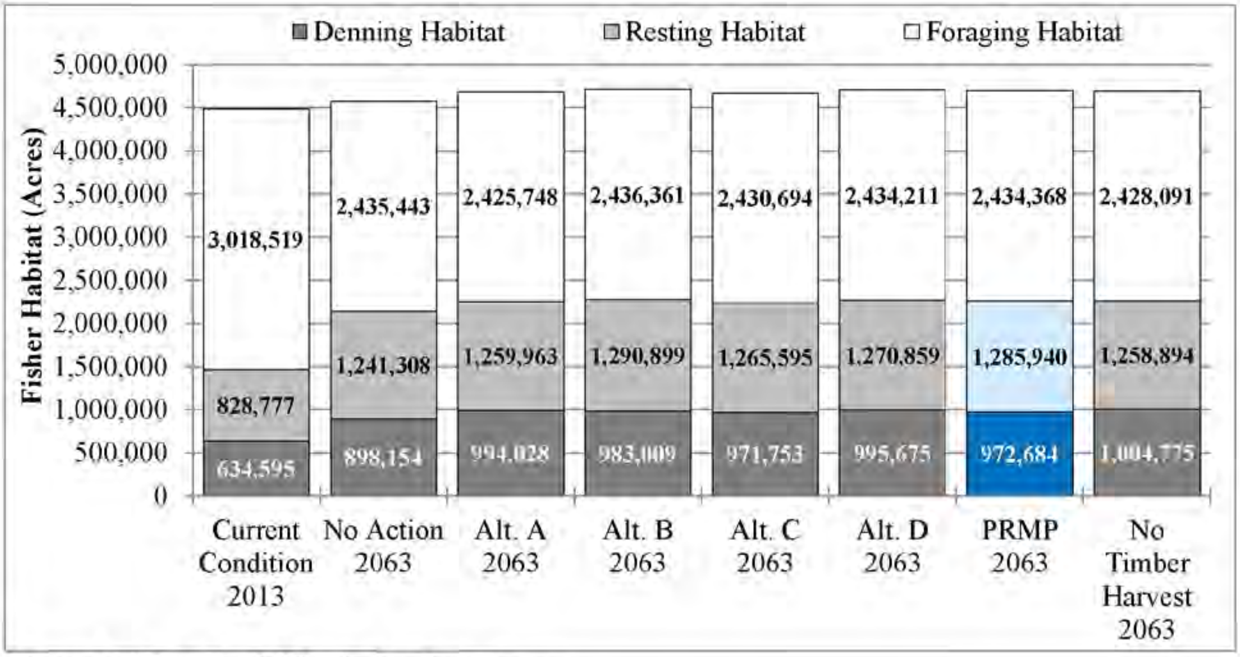

Figure 3-162. Fisher habitat in the planning area

Appendix S contains additional information and supporting data on fisher.

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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

County*	Historical Breeding Areas (Pre-2011) (Number)	Breeding Areas Surveyed in 2011 (Number)	Breeding Areas Occupied in 2011 (Number)
Clackamas	2	-	-
Coos	2	1	-
Curry	5	-	-
Douglas	19	4	3
Jackson	17	10	4
Josephine	2	-	-
Klamath	44	22	9
Lane	2	-	-
Linn	2	1	1
Totals	**95**	**38**	**17**

* 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.

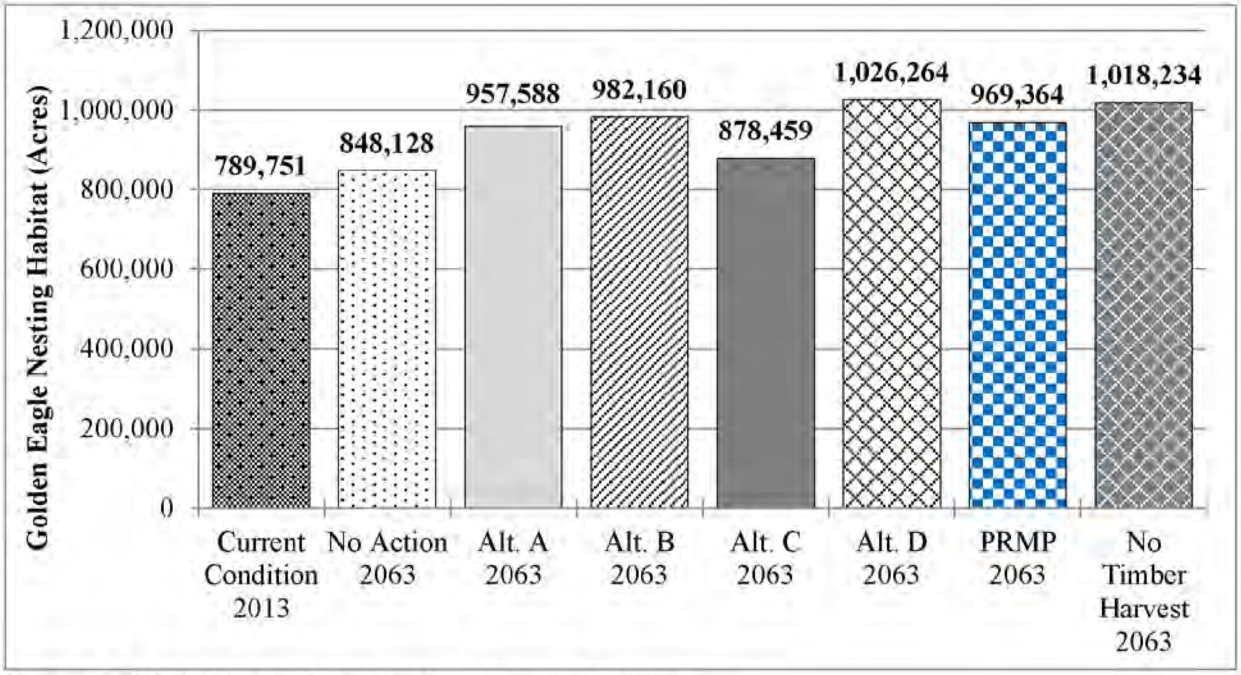

Figure 3-163. Golden eagle nesting habitat in the decision area

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.

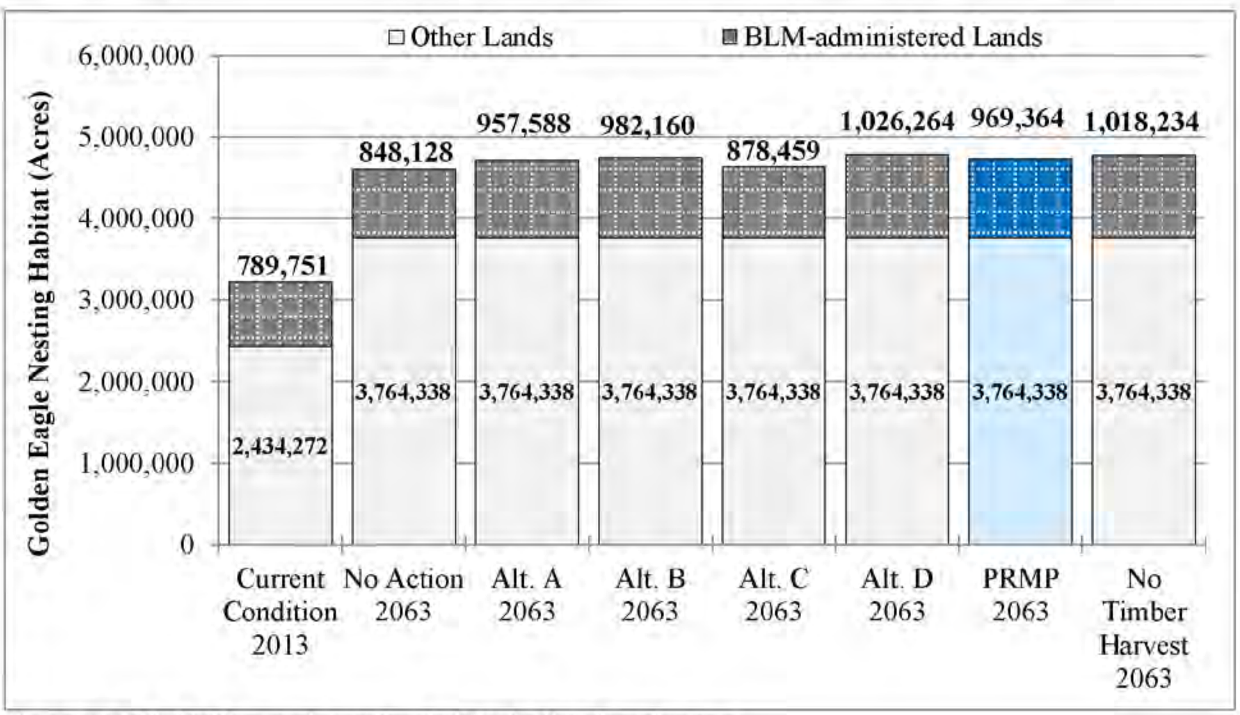

Figure 3-164. Golden eagle nesting habitat in the planning area

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.

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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.

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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**).

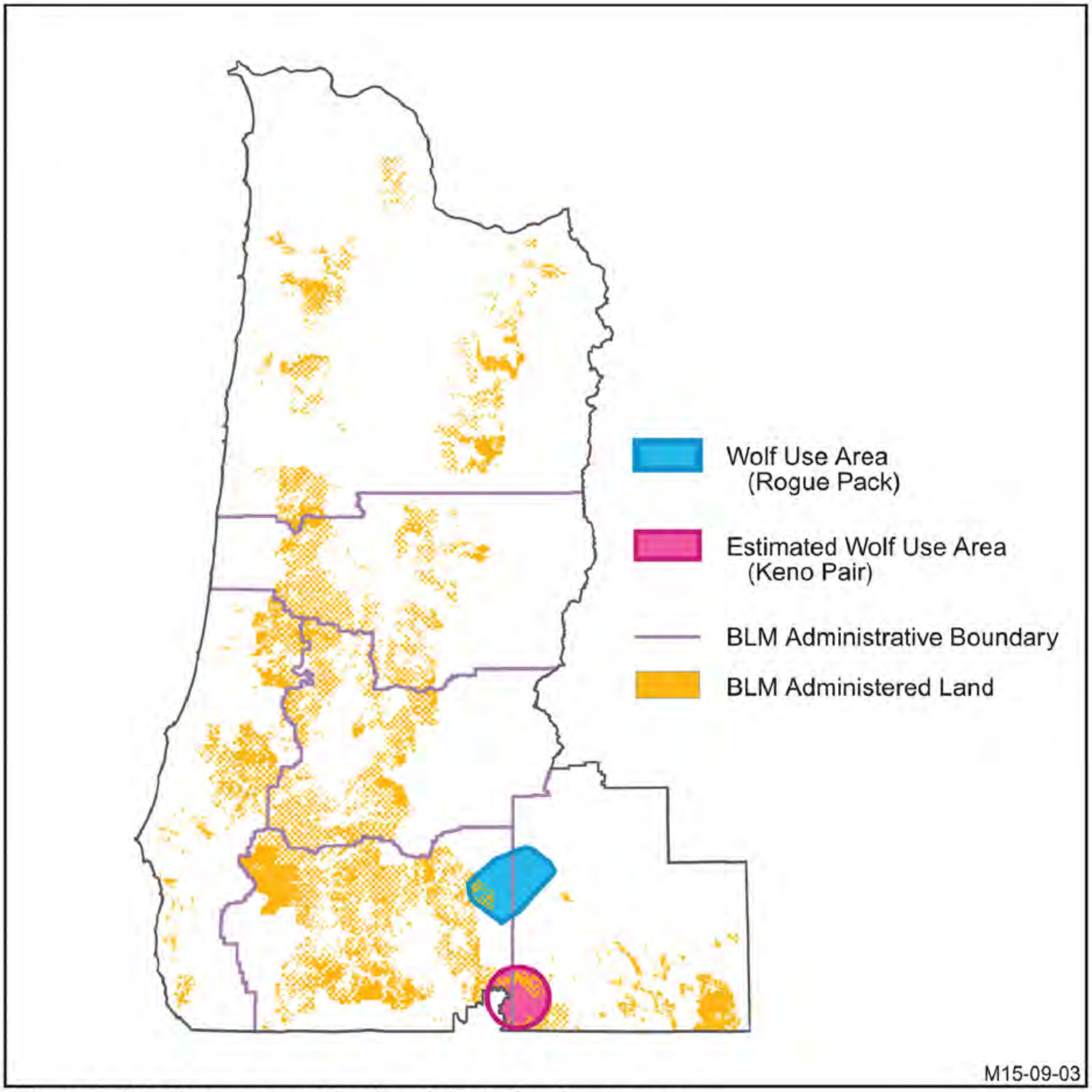

Figure 3-165. Known areas of wolf activity in the planning area

OR7 is a radio-collared male gray wolf whose movements are tracked by Oregon Department of Fish and Wildlife. OR7 dispersed from the Imnaha Pack located in northeastern Oregon in September 2011. In March 2013, OR7 moved into Klamath County, Oregon, and found a mate in May 2014. Oregon Department of Fish and Wildlife biologists confirmed that OR7 and his mate had produced pups, and thus became a 'pack' on June 4, 2014 (ODFW 2014a). 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.

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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.

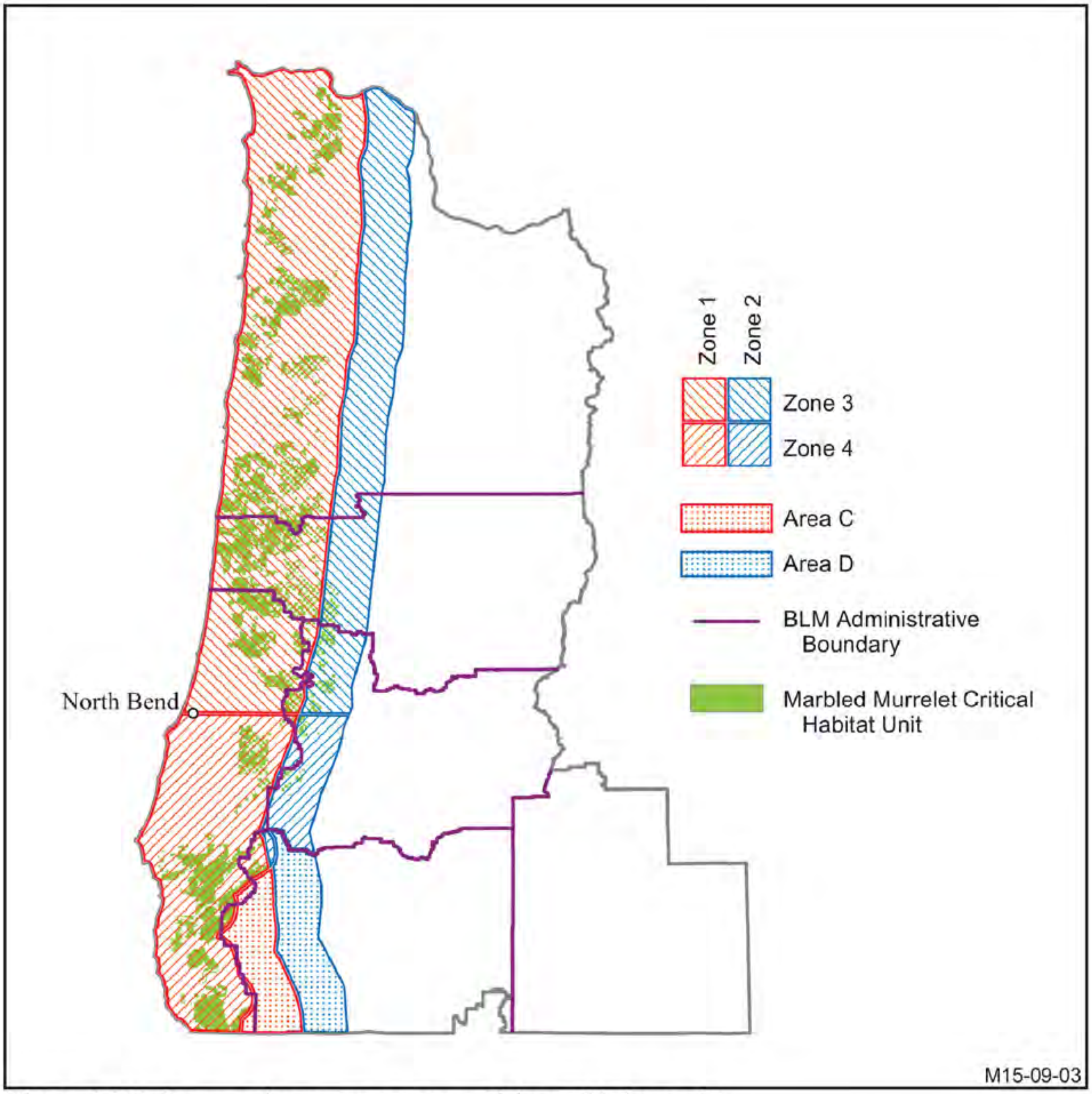

Figure 3-166. Range and management zones of the marbled murrelet

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**).[134] 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 3-257. Current marbled murrelet nesting habitat

Marbled Murrelet Habitat	Decision Area		Planning Area	
	(Acres)	Habitat Capable (Percent)	(Acres)	Habitat Capable (Percent)
High-quality Nesting Habitat	232,493	26%	572,424	9%
Low-quality Nesting Habitat	260,942	29%	-	-
Total Nesting Habitat	**493,434**	**56%**	-	-
Total Habitat-capable Acres	**885,590**	**100%**	**6,638,960**	**100%**

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**).

[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.

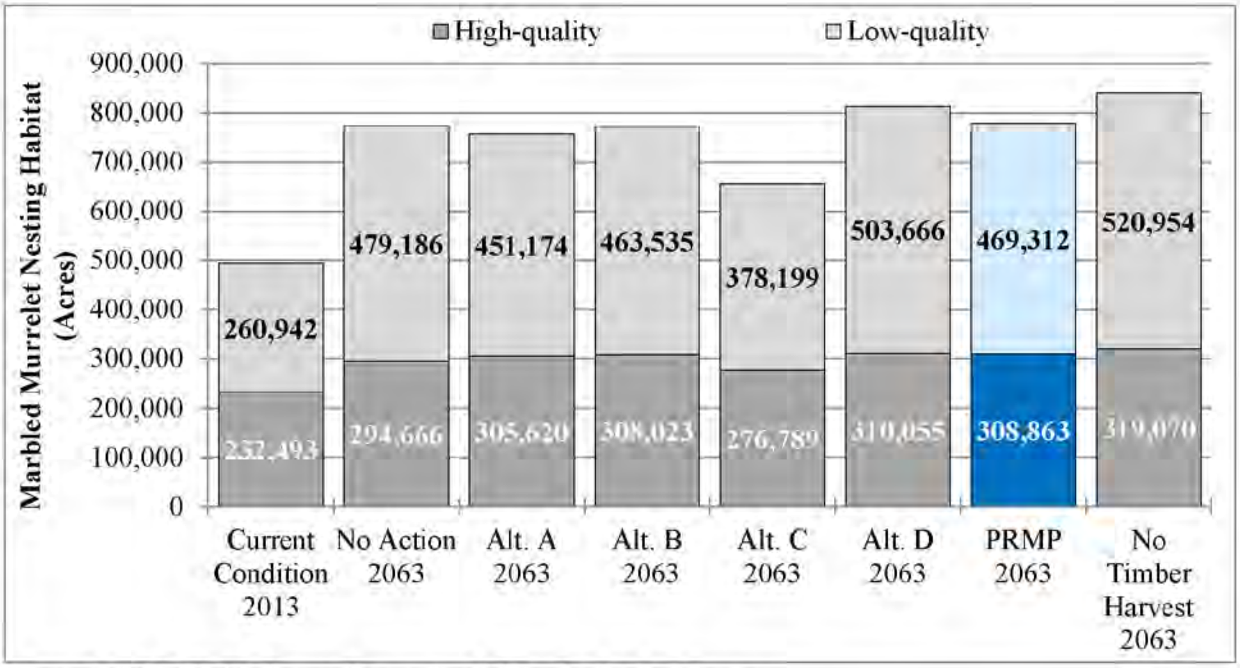

Figure 3-167. Marbled murrelet nesting habitat in the decision area

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.

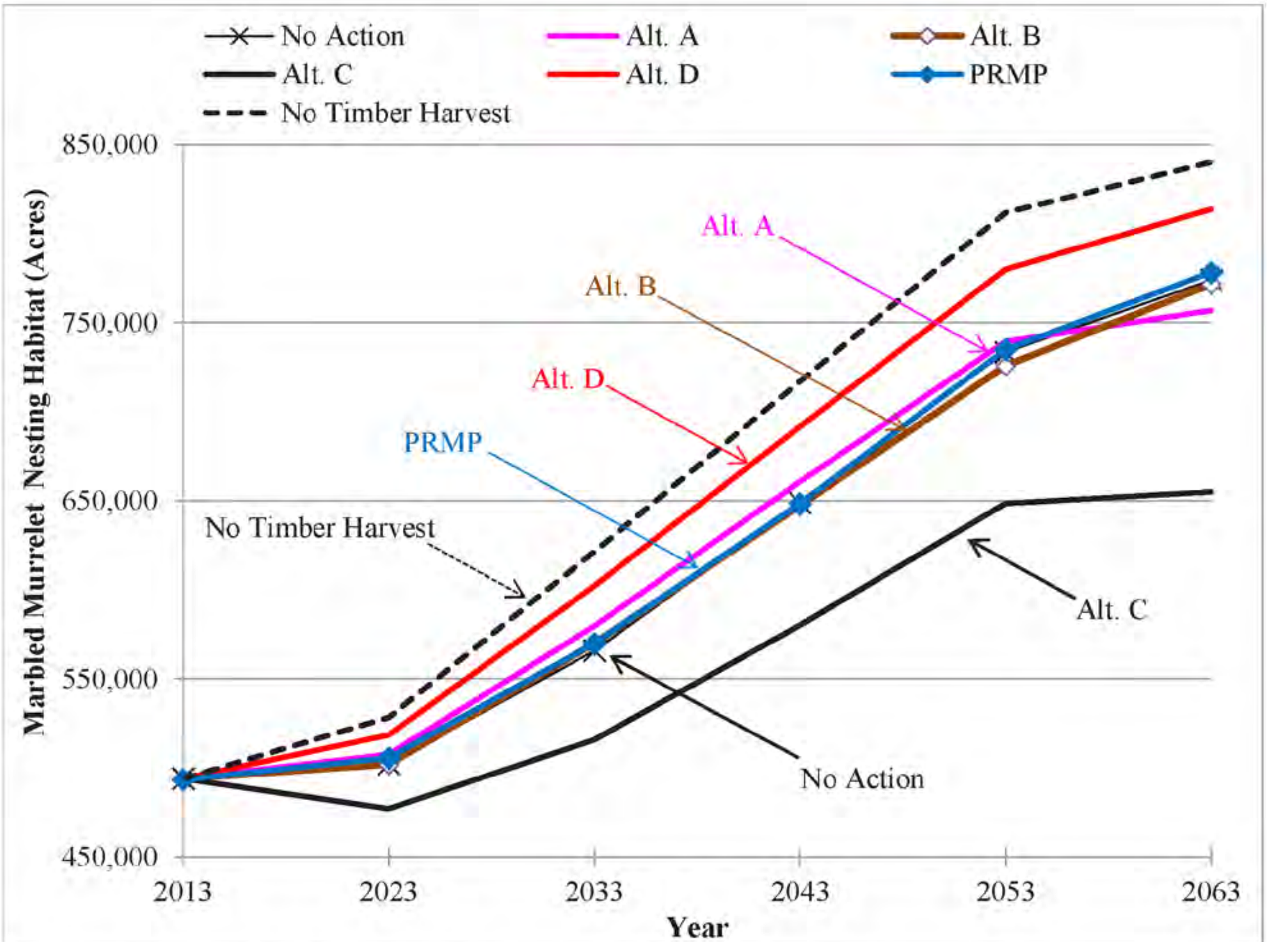

Figure 3-168. Marbled murrelet nesting habitat trends in the decision area

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**).

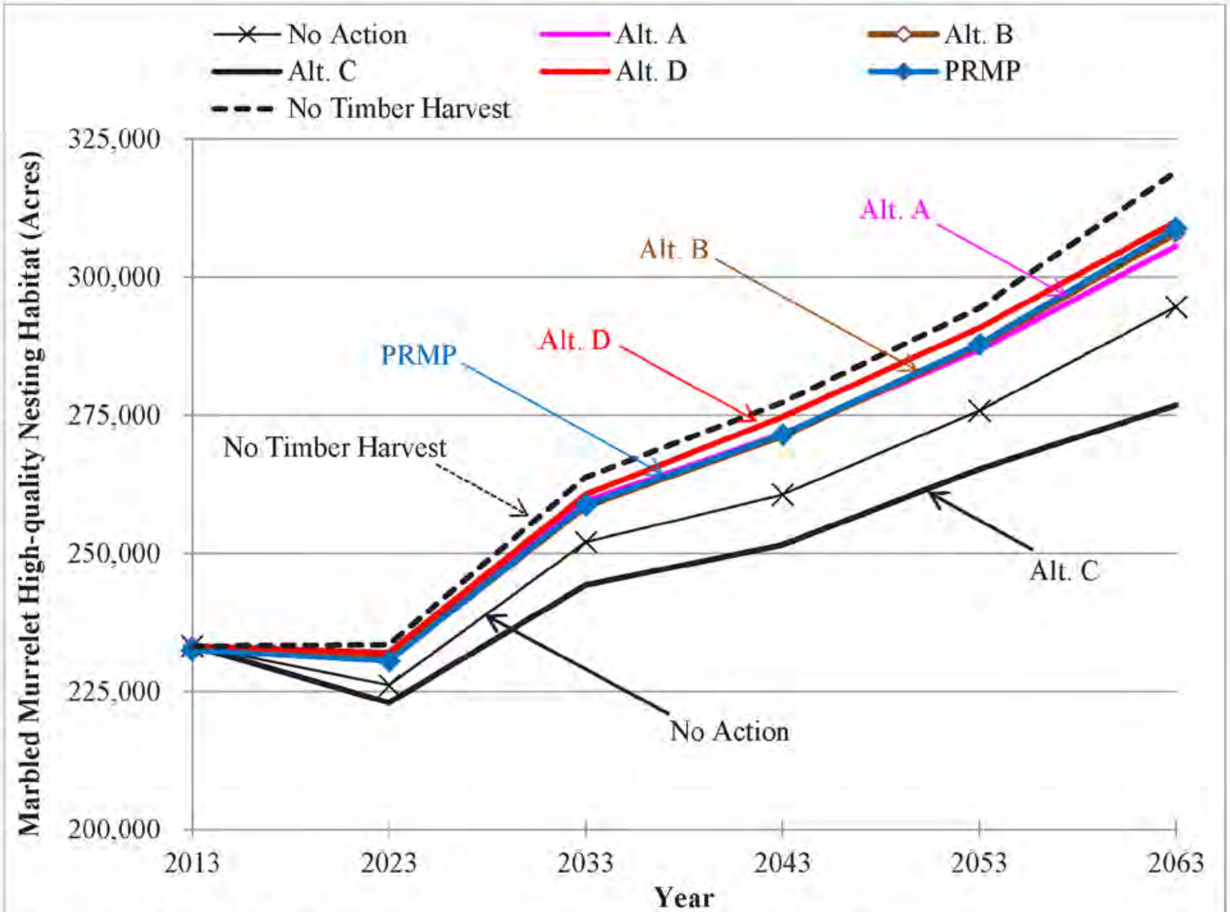

Figure 3-169. Marbled murrelet high-quality nesting habitat trends in the decision area

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.

Table 3-258. Land use allocations of marbled murrelet total nesting habitat in 2013

Alternative/ Proposed RMP	Within the Harvest Land Base		Within Reserves		Total Nesting Habitat (Acres)
	(Acres)	(Percent)	(Acres)	(Percent)	
No Action	82,869	17%	411,099	83%	493,968
Alt. A	42,139	9%	451,829	91%	493,968
Alt. B	46,899	9%	447,069	91%	493,968
Alt. C	115,544	23%	378,424	77%	493,968
Alt. D	72,062	15%	421,906	85%	493,968
PRMP	34,362	7%	459,072	93%	493,434

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

Alternative/ Proposed RMP	Within the Harvest Land Base		Within Reserves		Total Nesting Habitat (Acres)
	(Acres)	(Percent)	(Acres)	(Percent)	
No Action	20,902	9%	212,317	91%	233,219
Alt. A	2,839	1%	230,380	99%	233,219
Alt. B	4,070	2%	229,149	98%	233,219
Alt. C	18,479	8%	214,740	92%	233,219
Alt. D	6,887	3%	226,332	97%	233,219
PRMP	3,425	1%	229,067	99%	232,493

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

Alternative/ Proposed RMP	Mean Patch Size (Acres)	Edge vs. Core Habitat		
		Edge Habitat (Acres)	Core Habitat (Acres)	Core (Percent)
Current Condition (2013)	33.2	320,463	172,969	35%
No Action (2063)	44.3	467,594	306,258	40%
Alt. A (2063)	43.2	451,883	304,911	40%
Alt. B (2063)	45.1	460,710	310,848	40%
Alt. C (2063)	29.6	405,013	249,975	38%
Alt. D (2063)	56.5	468,768	344,953	42%
PRMP (2063)	42.3	481,482	296,690	38%
No Timber Harvest (2063)	69.7	472,978	367,046	44%

Currently, 35 percent of nesting habitat is core habitat, 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**).

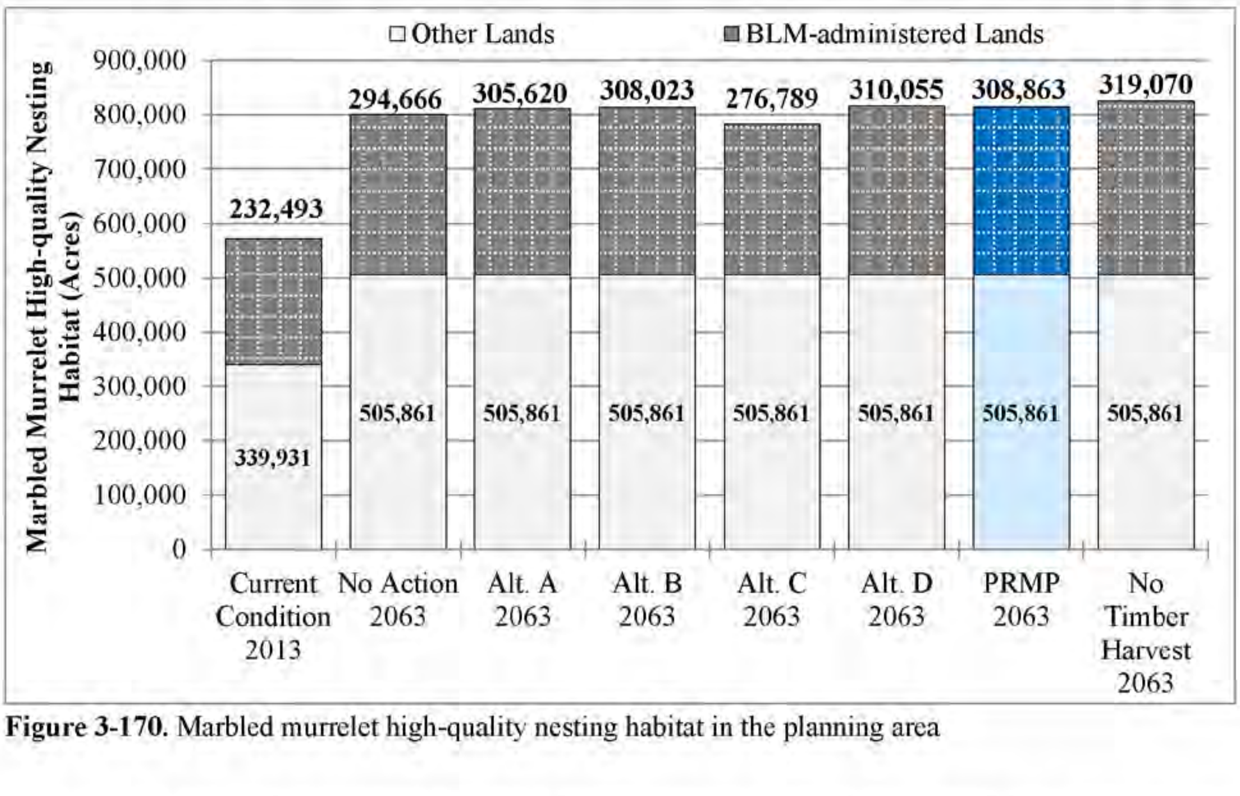

Figure 3-170. Marbled murrelet high-quality nesting habitat in the planning area

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**).

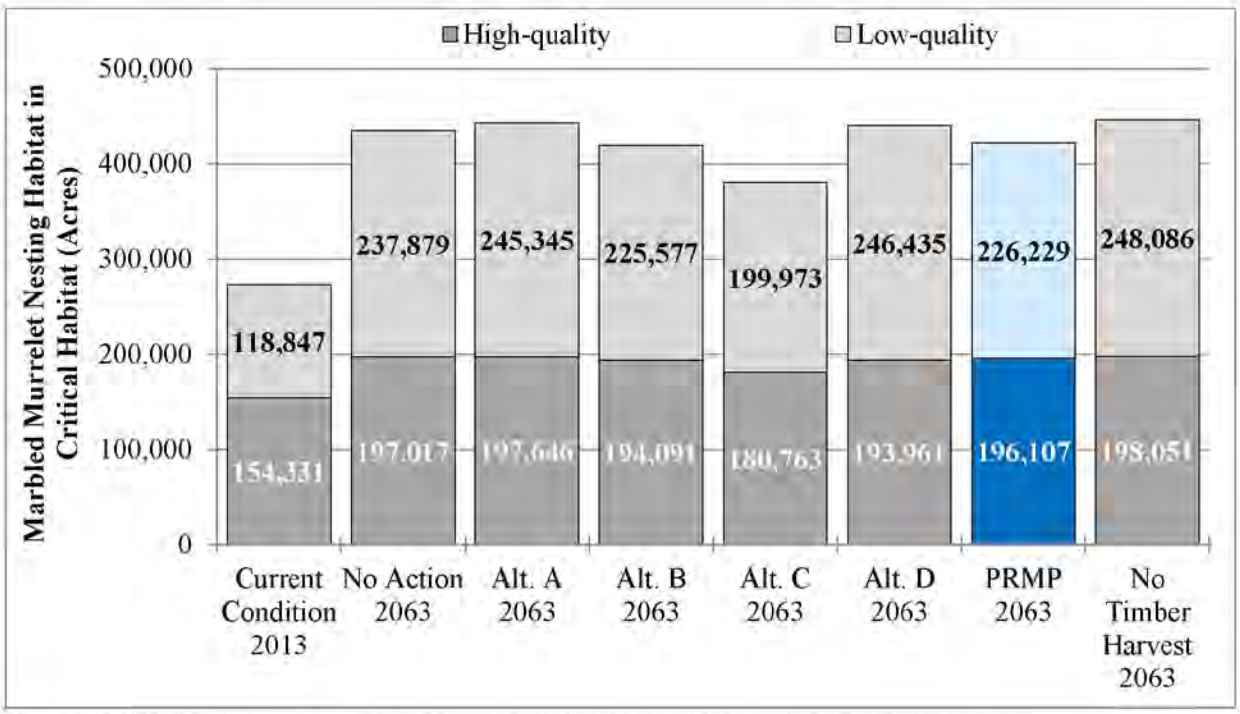

Figure 3-171. Marbled murrelet nesting habitat in critical habitat in the decision area

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)**.

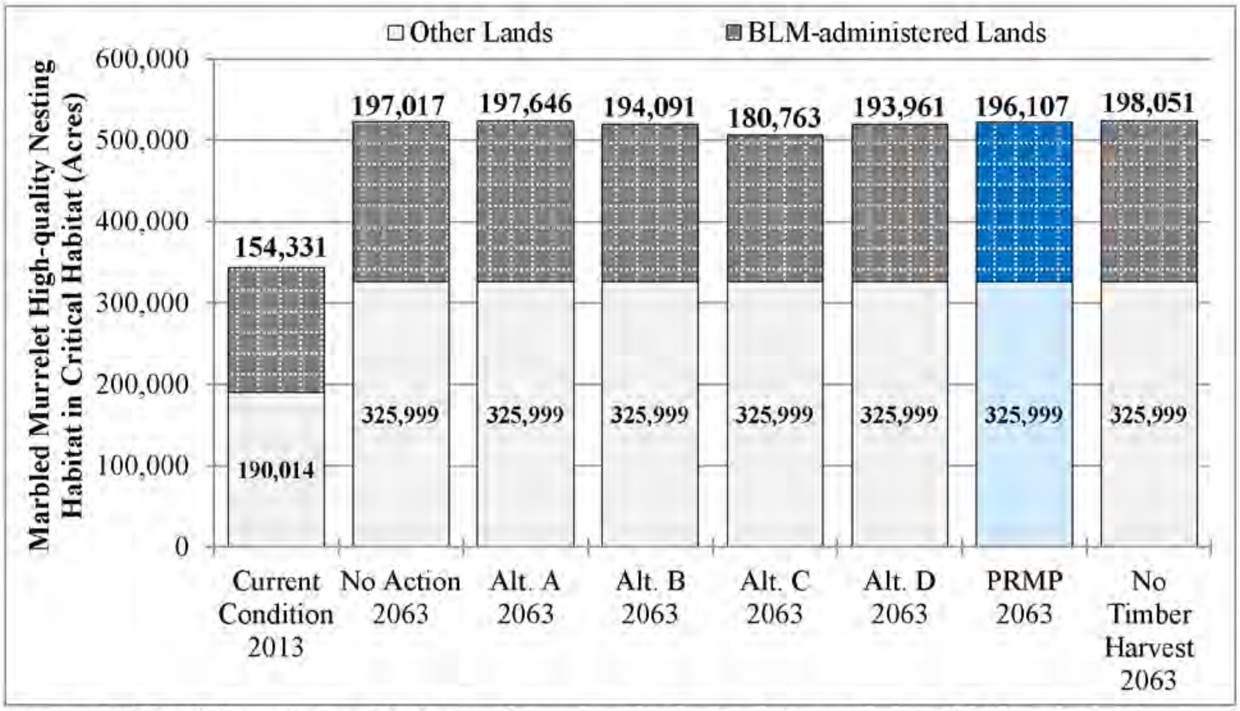

Figure 3-172. High-quality marbled murrelet nesting habitat in designated critical habitat in the planning area

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.

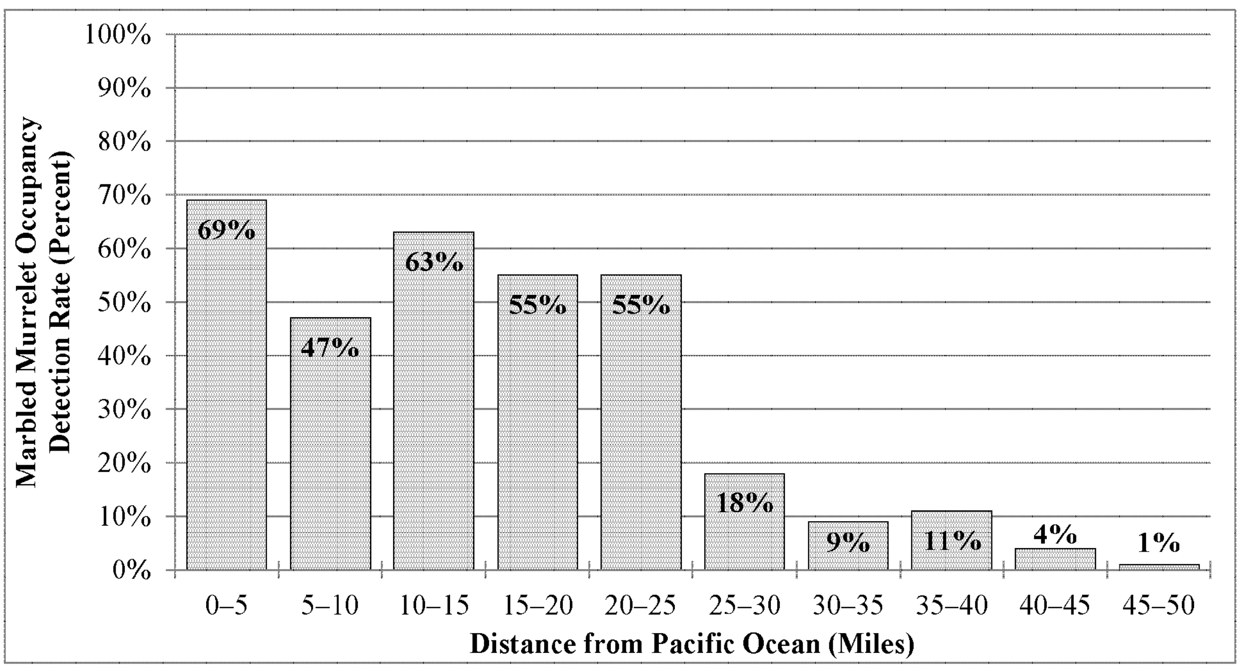

Figure 3-173. Marbled murrelet occupancy detection rates

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)

Alternative/ Proposed RMP	Marbled Murrelet Nesting Habitat Considered for Harvest by End of Decade (Acres)					Cumulative Nesting Habitat Considered for Harvest (Acres)
	2023	2033	2043	2053	2063	
No Action	37,734	37,407	30,237	35,391	37,721	178,491
Alt. A	22,886	18,105	20,351	20,857	19,327	101,526
Alt. B	36,442	29,417	28,258	25,138	31,471	150,726
Alt. C	57,612	47,845	44,280	48,413	52,740	250,889
Alt. D	38,735	21,684	23,508	20,850	45,150	149,928
PRMP	28,493	21,166	15,329	16,287	23,056	104,332

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

Alternative/ Proposed RMP	Marbled Murrelet Nesting Habitat Considered for Harvest *with* Surveys by End of Decade (Acres)					Cumulative Nesting Habitat Considered for Harvest (Acres)
	2023	2033	2043	2053	2063	
No Action	37,734	37,407	30,237	35,391	37,721	178,491
Alt. A	-	-	-	-	-	-
Alt. B	24,073	23,948	21,738	20,382	23,834	113,975
Alt. C	10,028	11,057	3,089	606	1,615	26,395
Alt. D	38,735	21,684	23,508	20,850	45,150	149,928
PRMP	21,331	18,024	11,571	13,702	18,333	82,960

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.

Table 3-263. Marbled murrelet nesting habitat modeled for harvest that would not be subject to surveys

Alternative/ Proposed RMP	Marbled Murrelet Nesting Habitat Harvested *without* Surveys by End of Decade (Acres)					Cumulative Nesting Habitat Harvested (Acres)
	2023	2033	2043	2053	2063	
No Action	-	-	-	-	-	-
Alt. A	22,886	18,105	20,351	20,857	19,327	101,526
Alt. B	12,370	5,469	6,520	4,755	7,636	36,751
Alt. C	47,584	36,788	41,190	47,807	51,125	224,494
Alt. D	-	-	-	-	-	-
PRMP	7,162	3,143	3,758	2,586	4,723	21,371

The average size of survey polygons is 55.6 acres (USDI BLM, unpublished data 2015), and the BLM assumed that survey polygons are the best available dataset depicting marbled murrelet occupancy at the stand level. The BLM divided the acreage of available nesting habitat at the end of each decade (2023, 2033, 2043, 2053, and 2063) by the average size of survey polygons to forecast the number of 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 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.

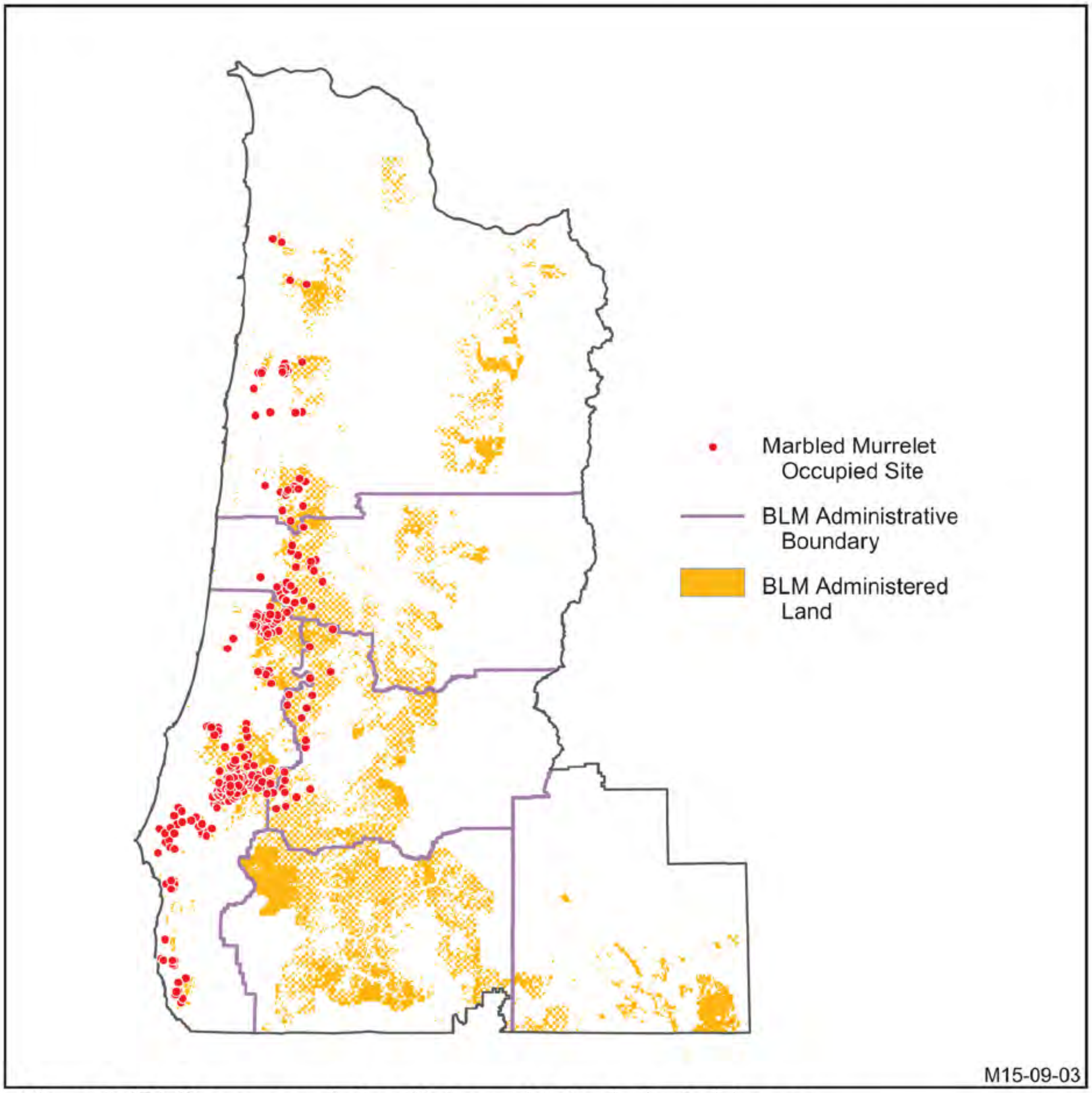

Figure 3-174. Known, occupied marbled murrelet sites in the decision area

Table 3-264. Known marbled murrelet sites in the planning area

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

* 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)

Alternative/ Proposed RMP	Occupied Sites Forecast to be Lost (Number by End of Decade)					Cumulative Occupied Sites Lost (Number)
	2023	2033	2043	2053	2063	
No Action	-	-	-	-	-	-
Alt. A	106	101	96	89	89	481
Alt. B	23	10	12	9	14	68
Alt. C	189	174	178	212	238	991
Alt. D	-	-	-	-	-	-
PRMP	13	6	7	5	9	39

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

Alternative/ Proposed RMP	Occupied Sites Discovered and Protected (Number by End of Decade)					Cumulative Occupied Sites Discovered and Protected (Number)
	2023	2033	2043	2053	2063	
No Action	144	165	129	165	191	794
Alt. A	-	-	-	-	-	-
Alt. B	132	110	101	95	122	560
Alt. C	35	34	11	4	5	89
Alt. D	141	74	89	92	166	562
PRMP	97	76	42	69	91	377

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 alterative 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.

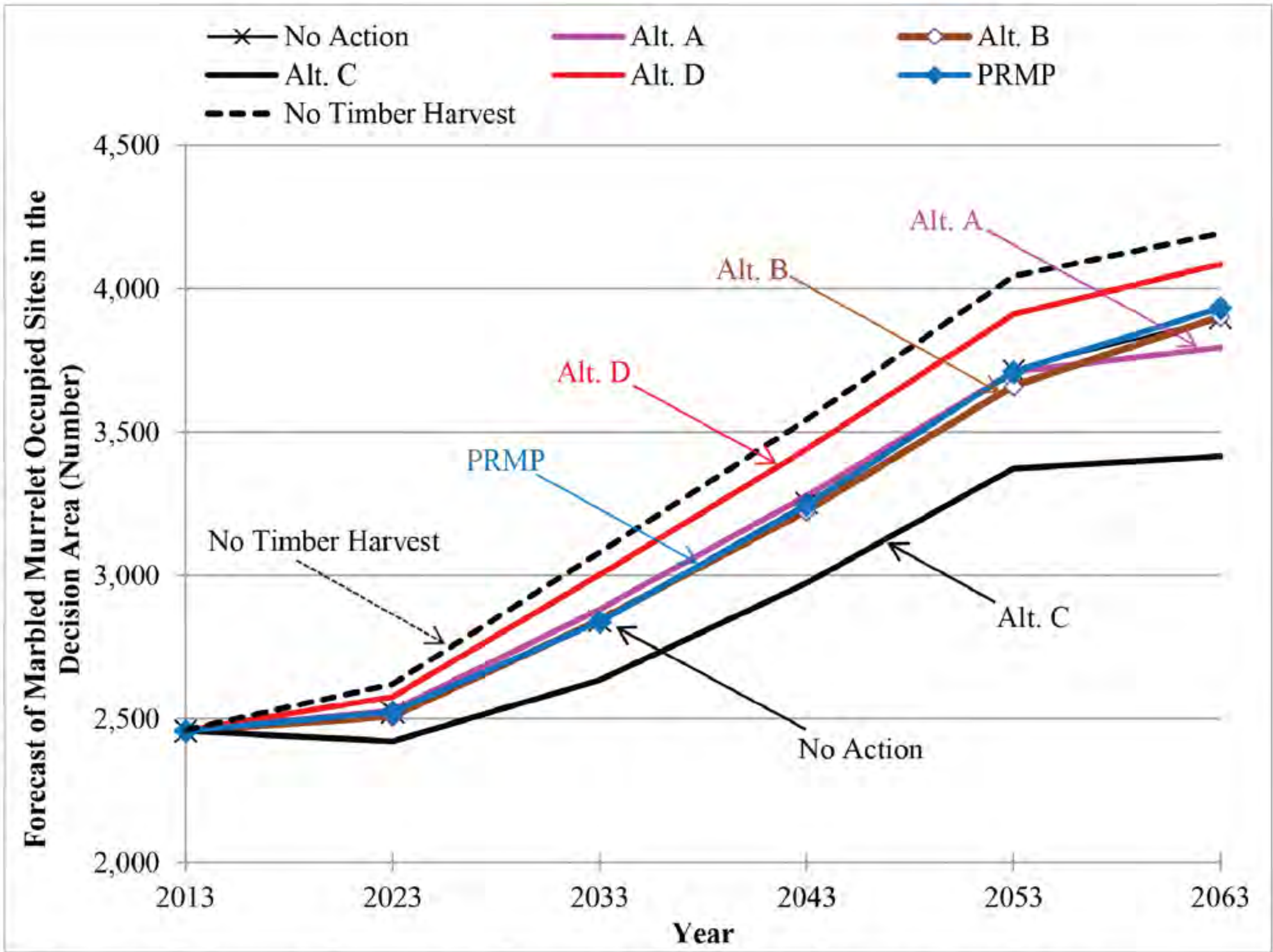

Figure 3-175. Forecast of the number of occupied marbled murrelet sites in the decision area

Appendix S contains additional information and supporting data on the marbled murrelet.

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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).

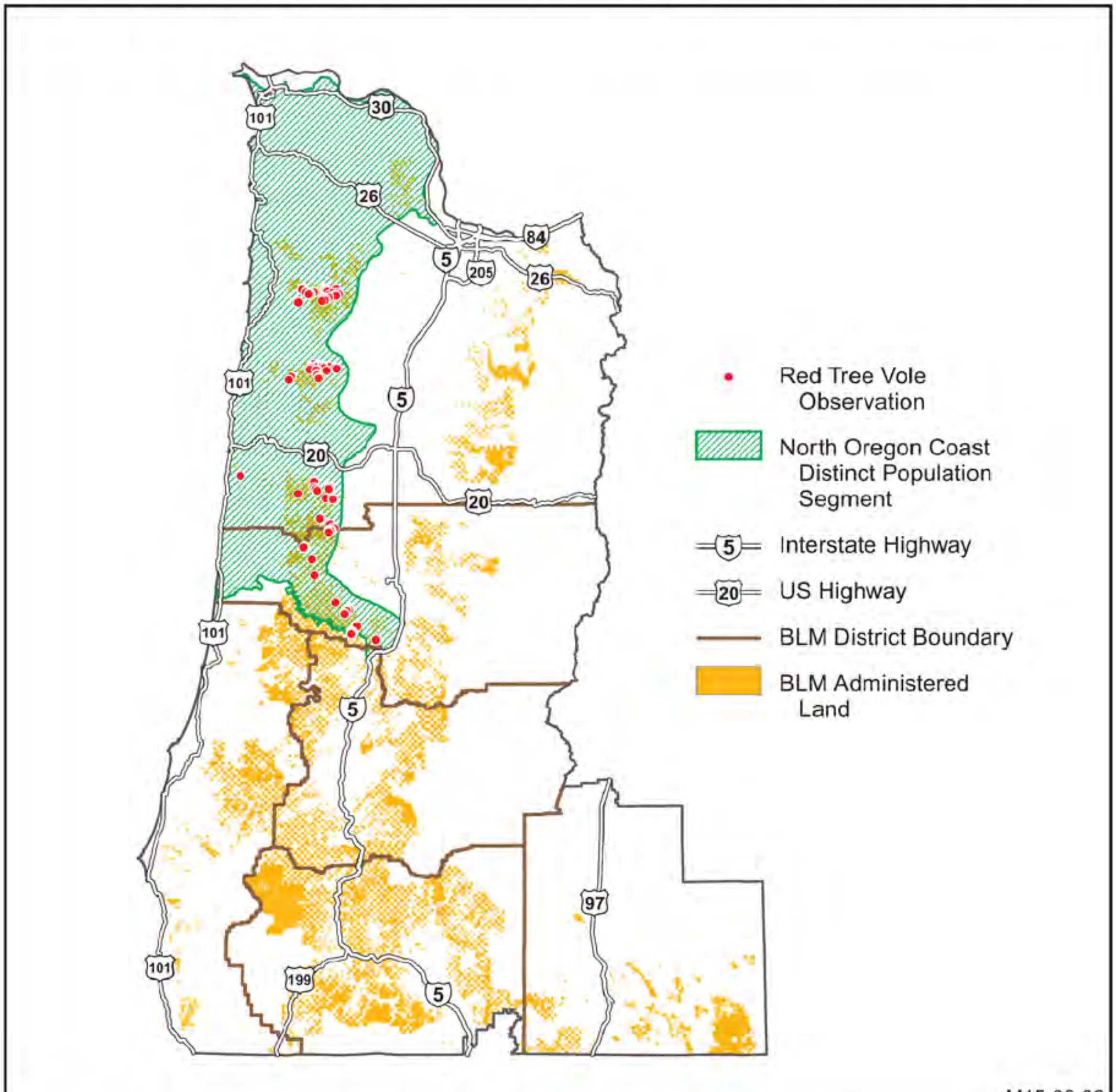

Figure 3-176. Range of the North Oregon Coast DPS of the red tree vole

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**).

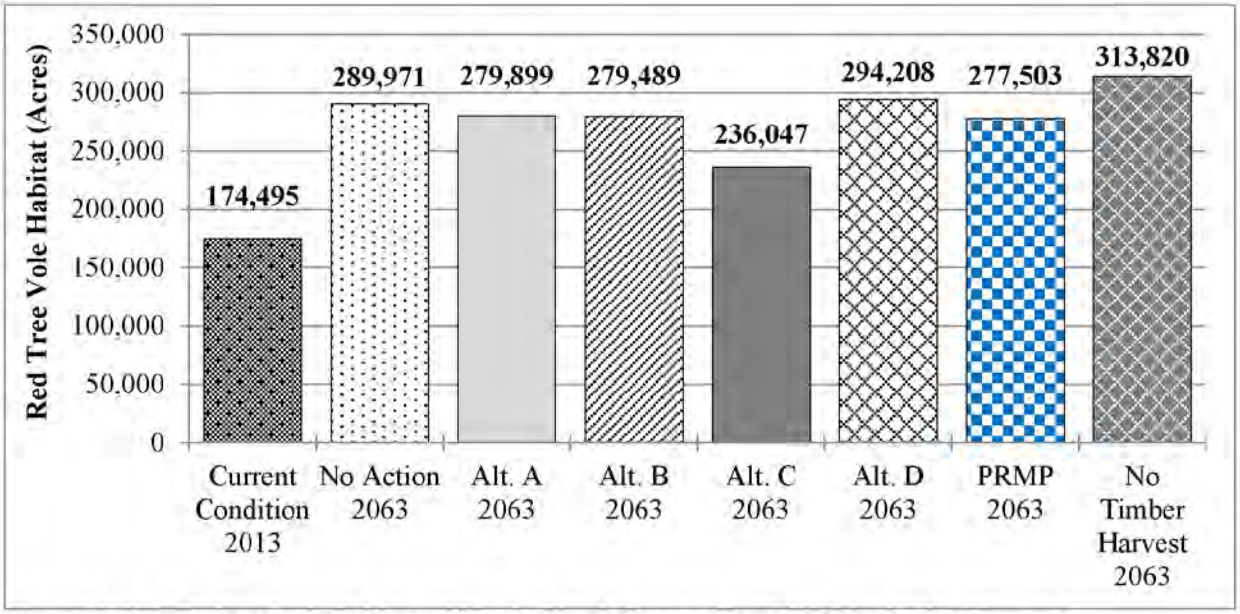

Figure 3-177. Red tree vole habitat within the North Oregon Coast DPS in the decision area

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**).

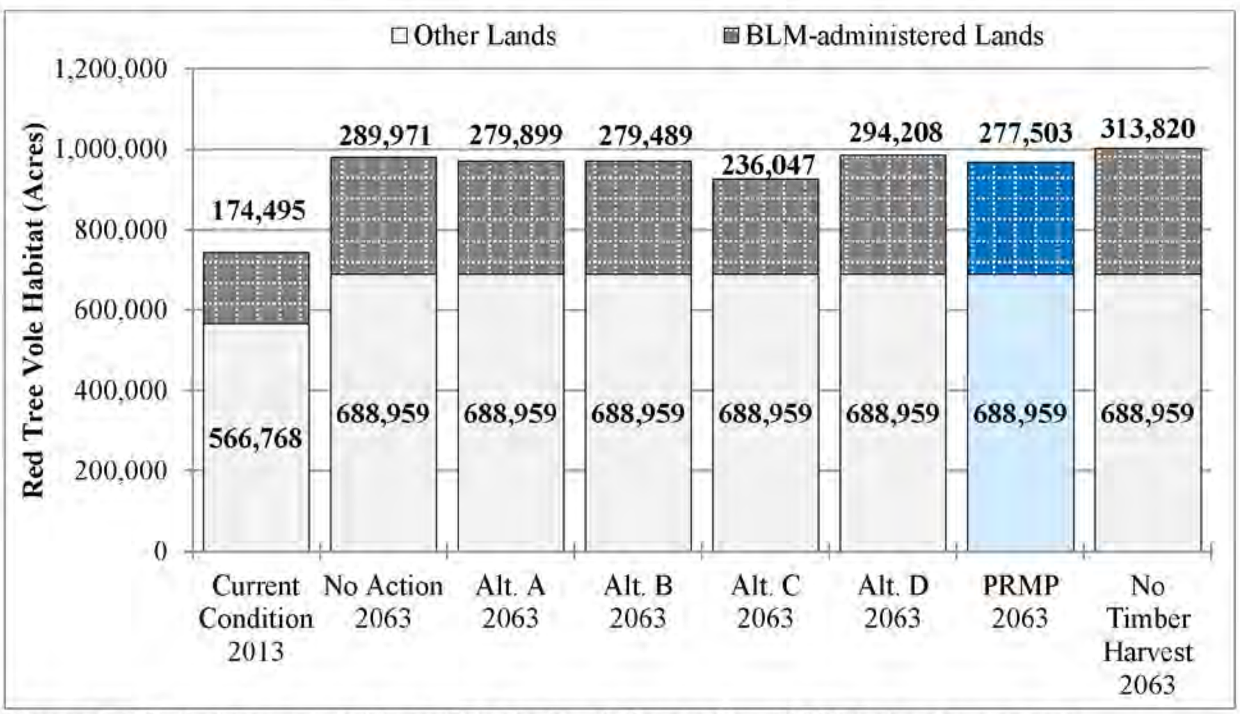

Figure 3-178. Red tree vole habitat within the North Oregon Coast DPS in the planning area

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

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

* 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)

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

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

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

* 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.

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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.[136] 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

[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.

reaffirmed these conservation needs in its final rule on northern spotted owl critical habitat (77 FR 71908).

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

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

The U.S. Fish and Wildlife Service considers all four habitat-dependent conservation needs when it evaluates proposed actions. The 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.[138] 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.[139] 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 <u>*Conservation Need 1*</u>*, 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).[140]

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,[141] 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.

[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

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

Thomas *et al.* (1990, p. 194) first tabulated median annual home ranges of northern spotted owl pairs in different study areas and physiographic provinces. According to Courtney *et al.* (2004, p. 5-5), although the sizes of northern spotted owl home ranges differ by physiographic province and forest type, and among individual owl pairs within a study area, research since 1990 has shown that provincial variations are similar to those tabulated by Thomas *et al.* (1990, p. 194). However, neither Thomas *et al.* (1990) nor Courtney *et al.* (2004, pp. 5–24) estimated the median annual home range size in the Oregon Eastern Cascades Physiographic Province. Therefore, the BLM applied the Oregon Western Cascades metrics in **Table 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

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

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[142].

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.[143] 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.

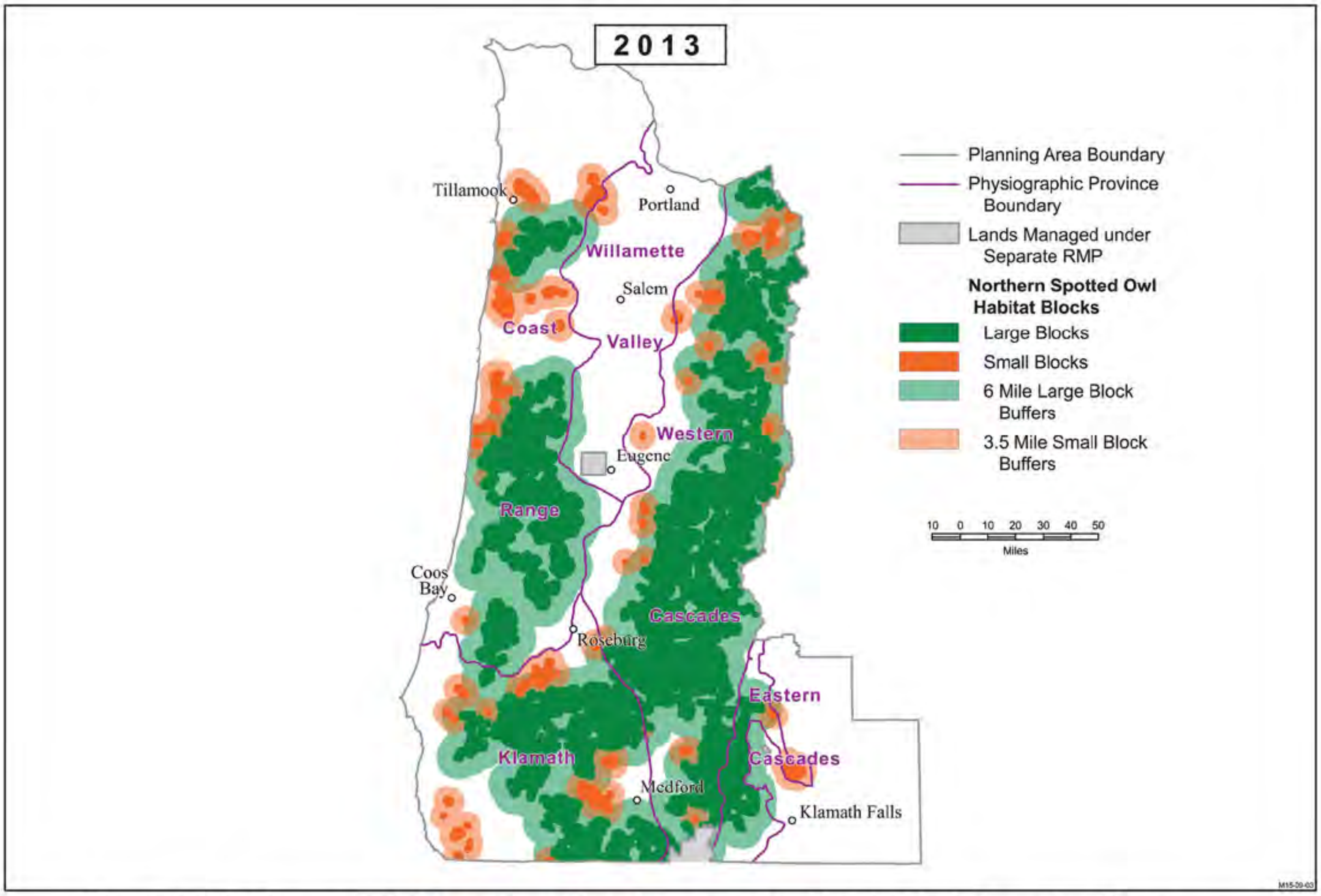

Figure 3-179. The current (2013) positions of northern spotted owl habitat blocks in western Oregon

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.

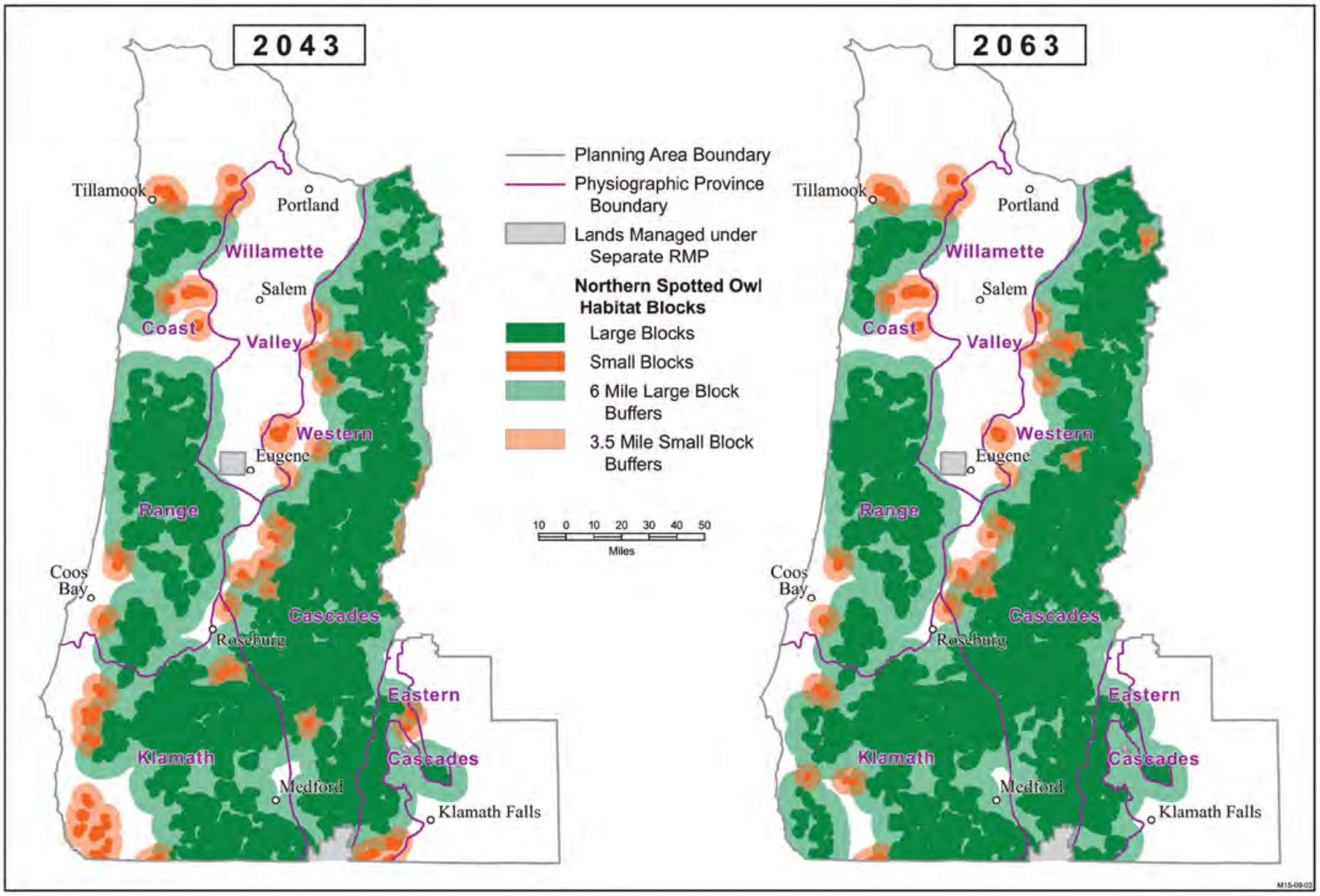

Figure 3-180. The potential contributions of BLM-administered lands in western Oregon to habitat blocks in 2043 and 2063 according to the No Timber Harvest reference analysis

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.

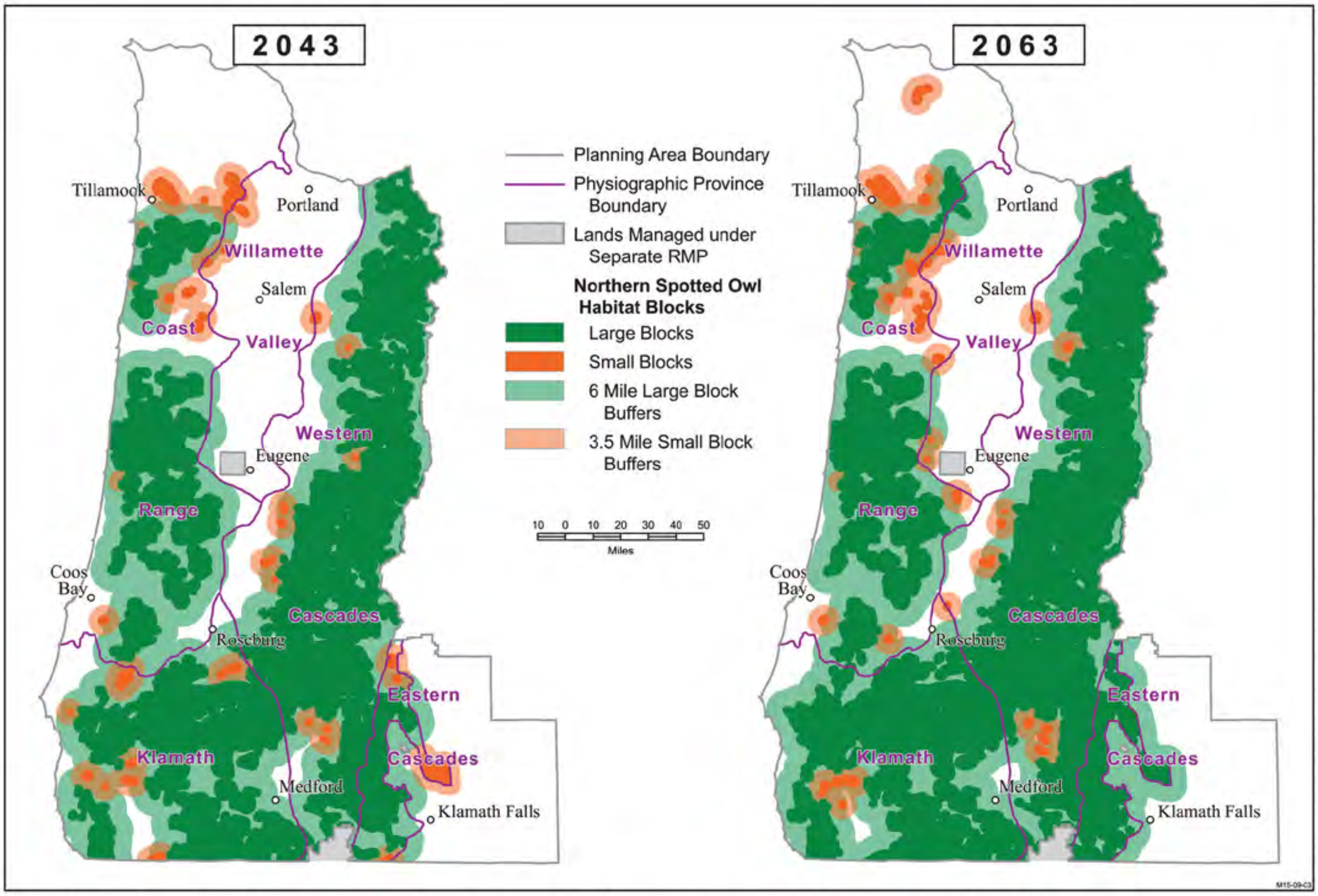

Figure 3-181. Northern spotted owl habitat block locations in 2043 and 2063 under Alternative C
Note: The circled area is discussed in the text.

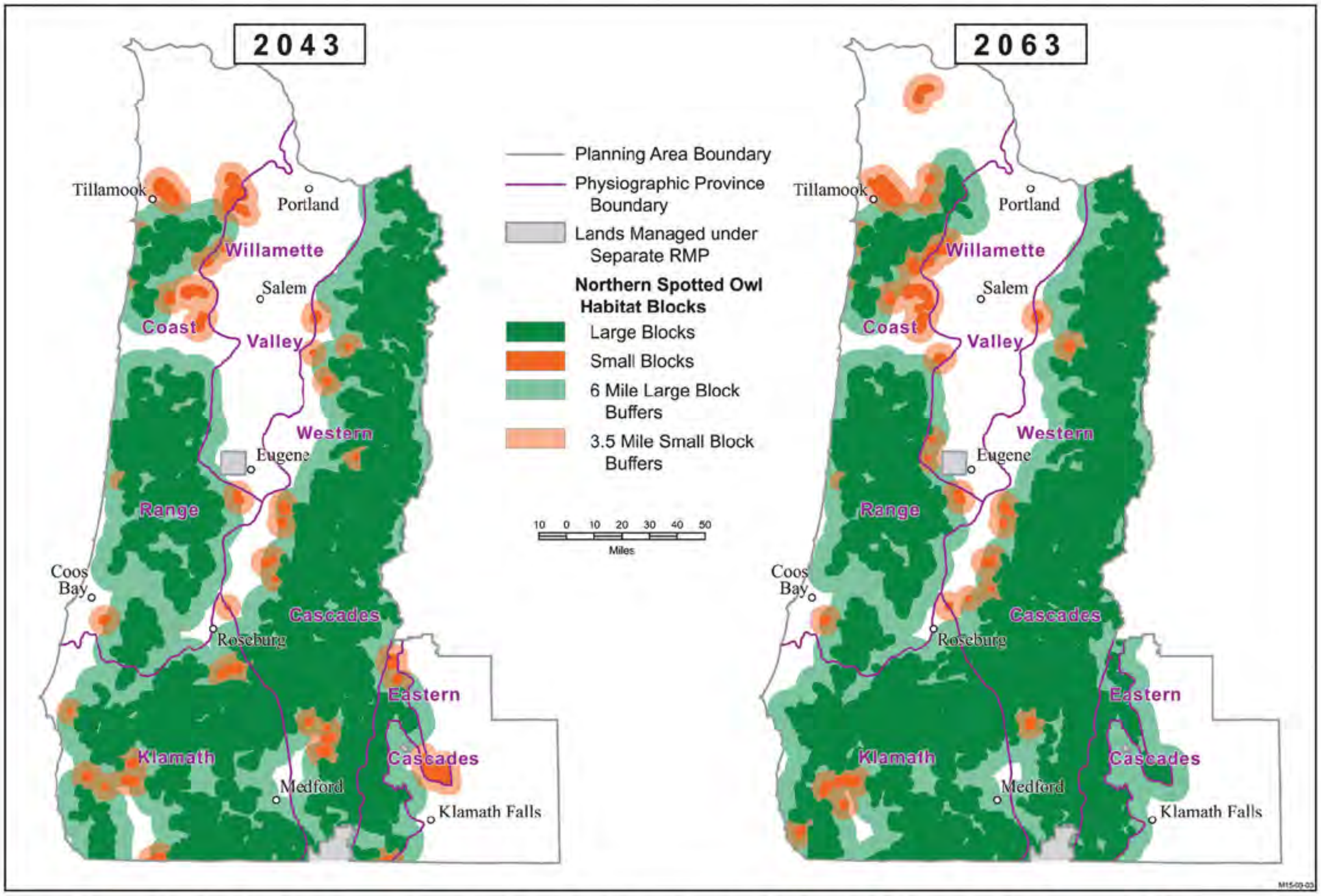

Figure 3-182. Northern spotted owl habitat block locations in 2043 and 2063 under the Proposed RMP
Note: The circled area is discussed in the text.

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.[144] 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."

[144] 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**.

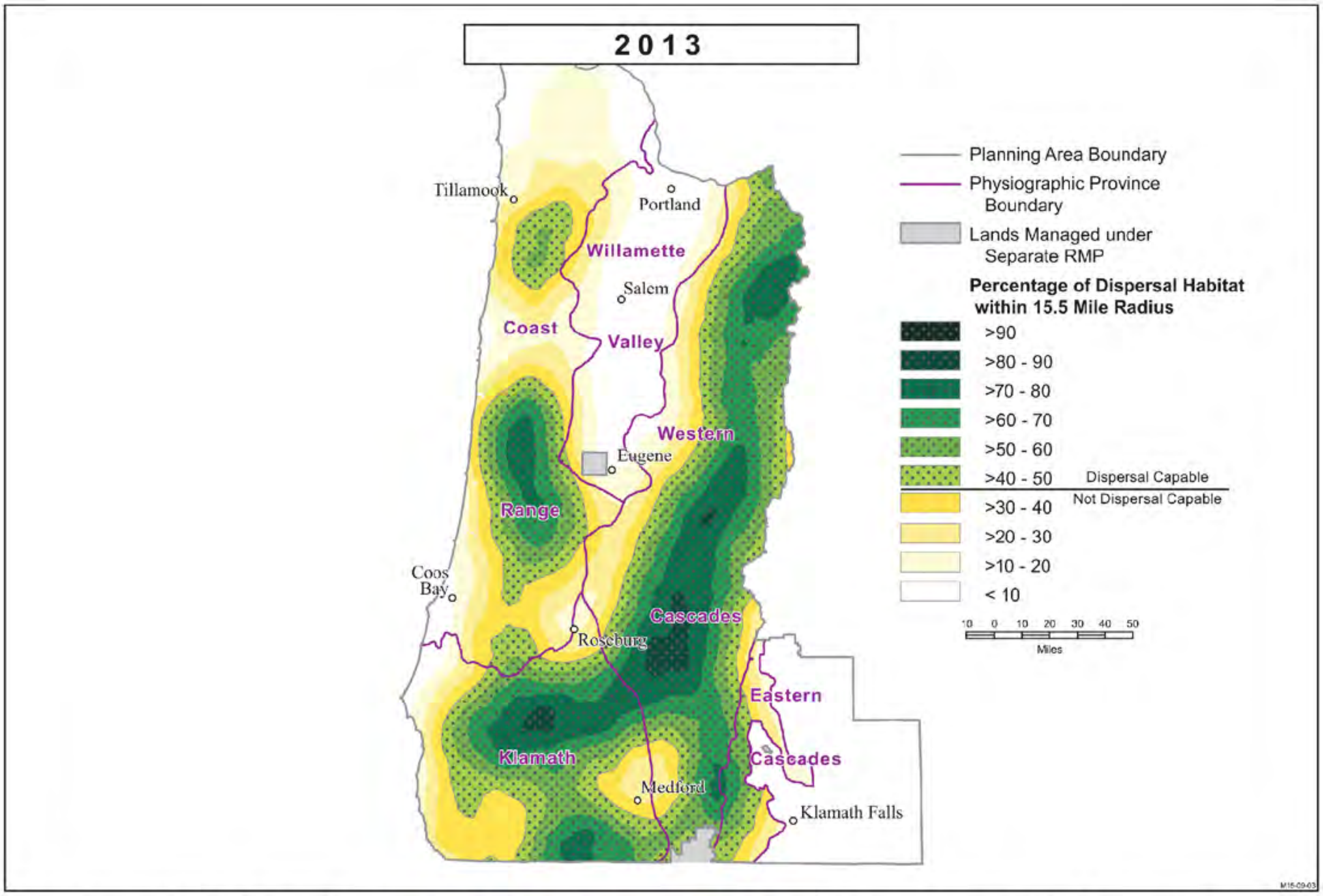

Figure 3-183. The northern spotted owl dispersal-capable landscape (stippled areas) in 2013, according to the No Timber Harvest reference analysis

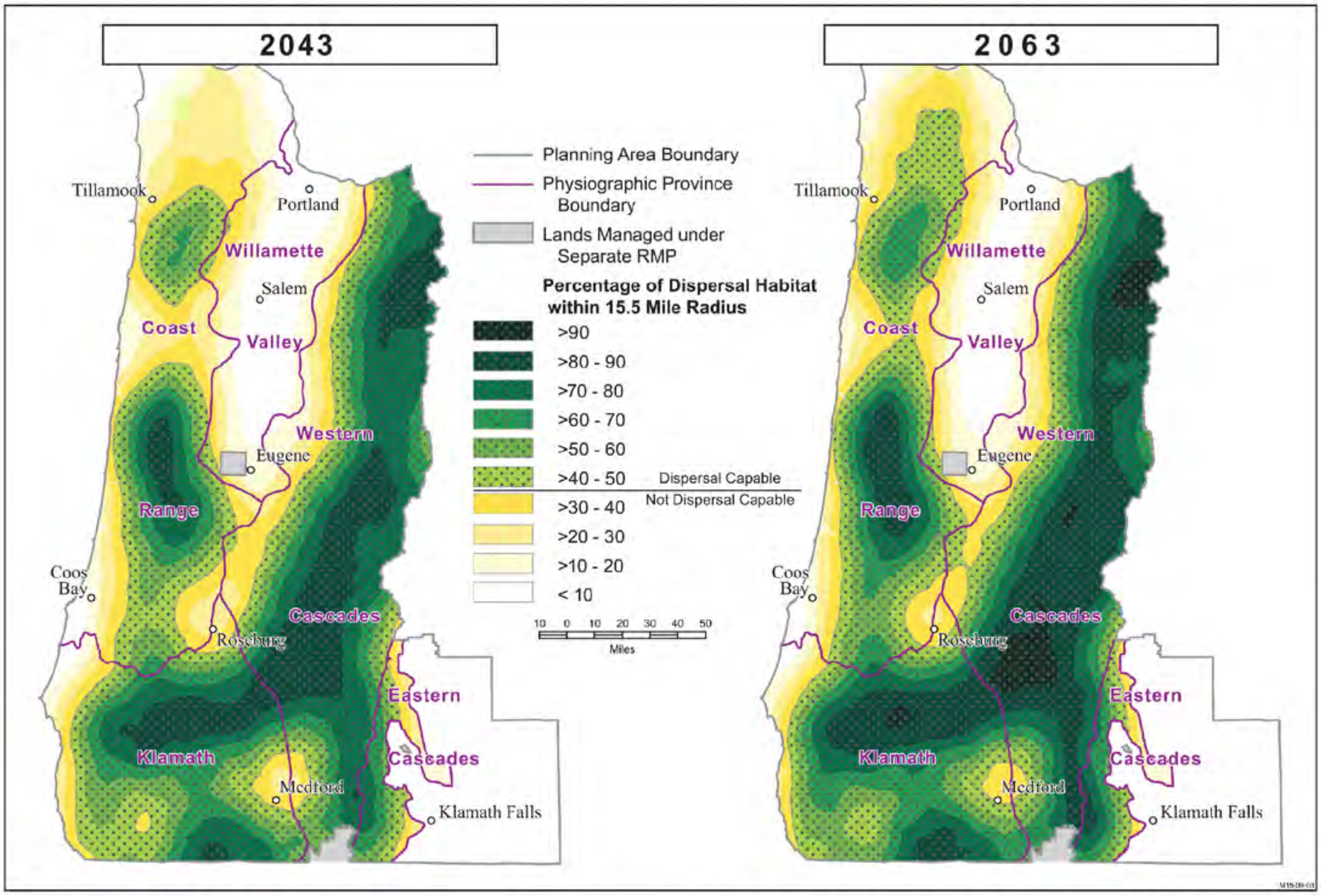

Figure 3-184. The northern spotted owl dispersal-capable landscape (stippled areas) in 2043 and 2063, according to the No Timber Harvest reference analysis

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.

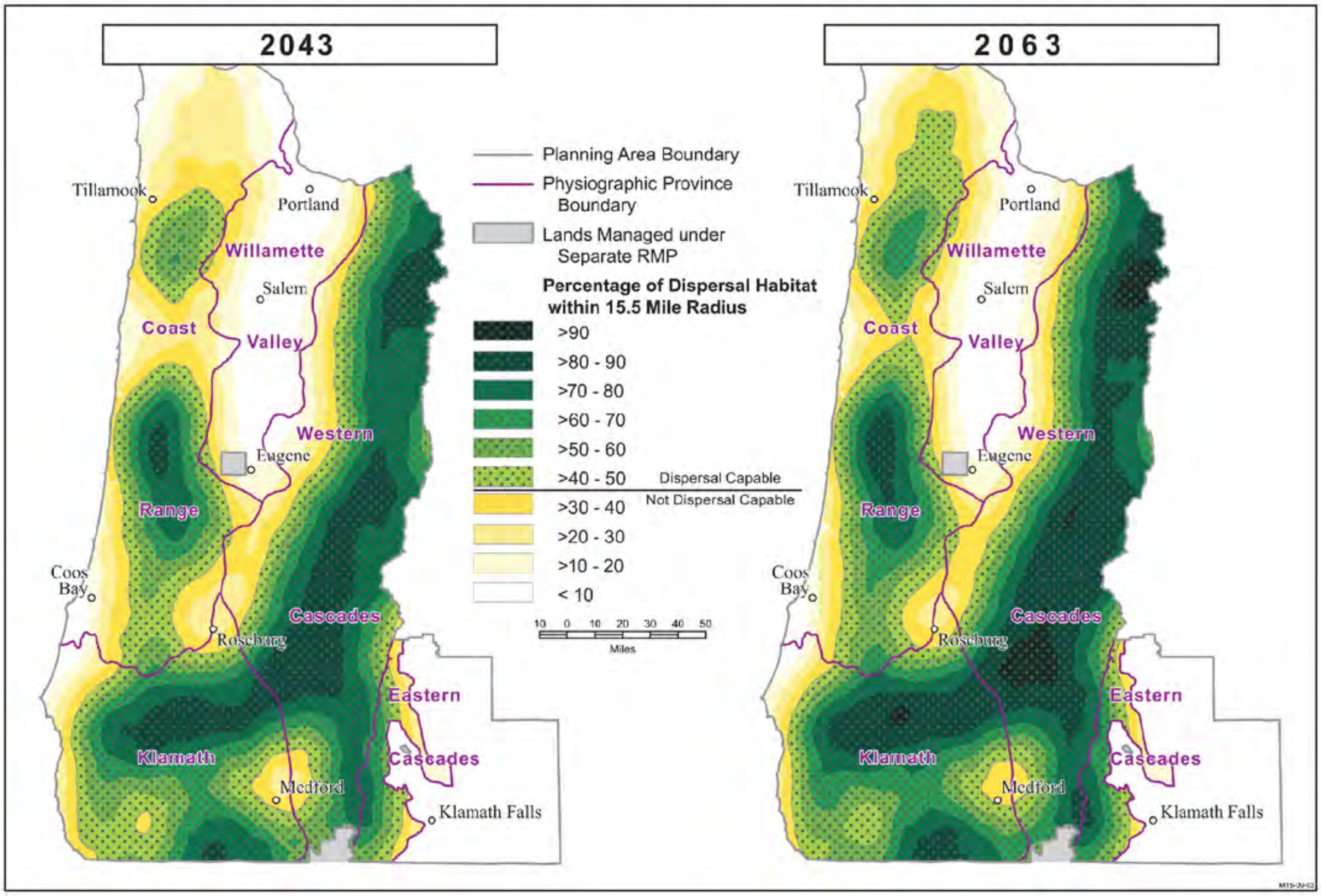

Figure 3-185. Dispersal-capable lands (stippled areas), as they would exist in 2043 and 2063, under Alternative C

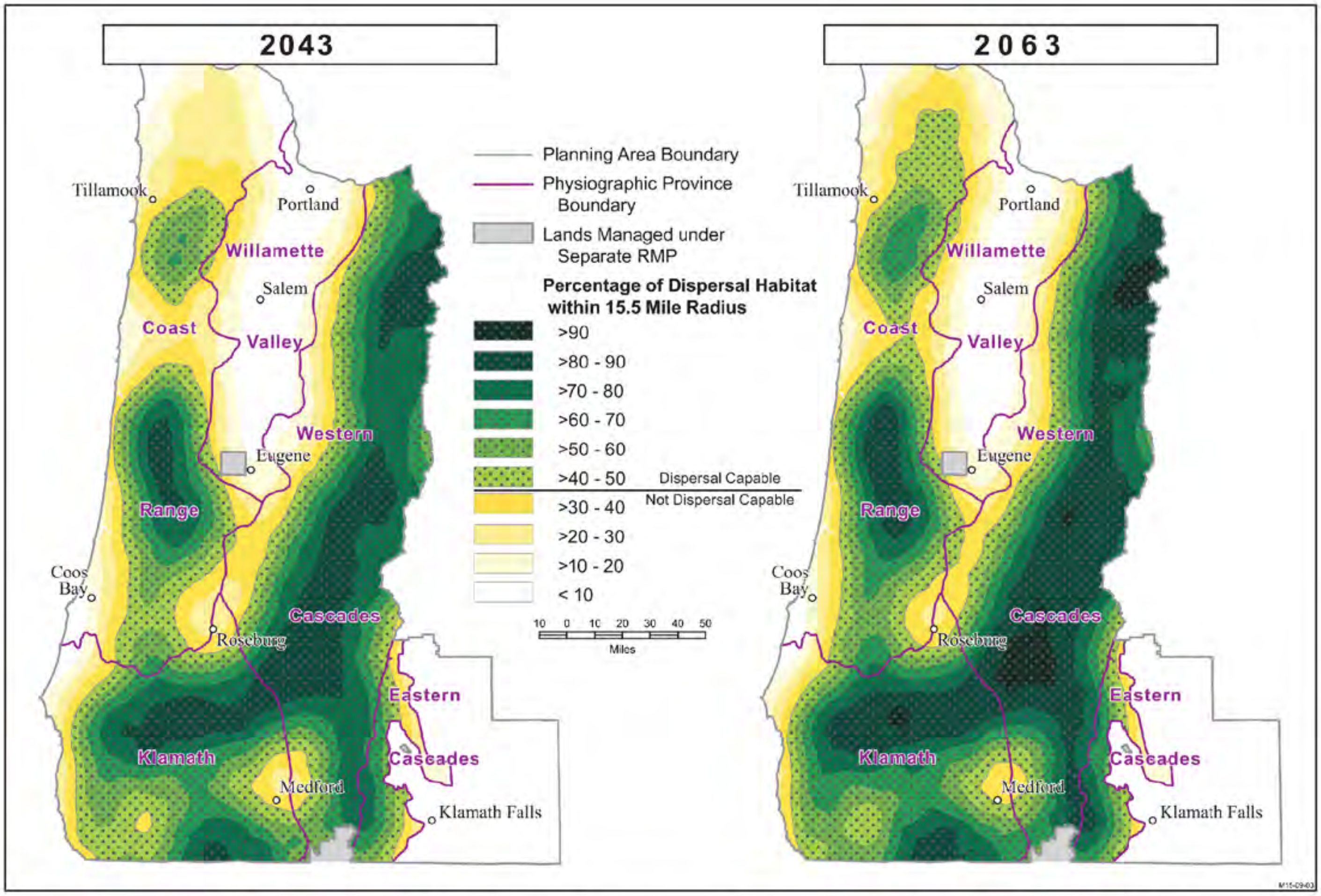

Figure 3-186. Dispersal-capable lands (stippled areas), as they would exist in 2043 and 2063, under the Proposed RMP

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.[145]

[145] 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[146] 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.[147] Although computer modeling commonly involves an inherent tension between improved realism and errors

[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).

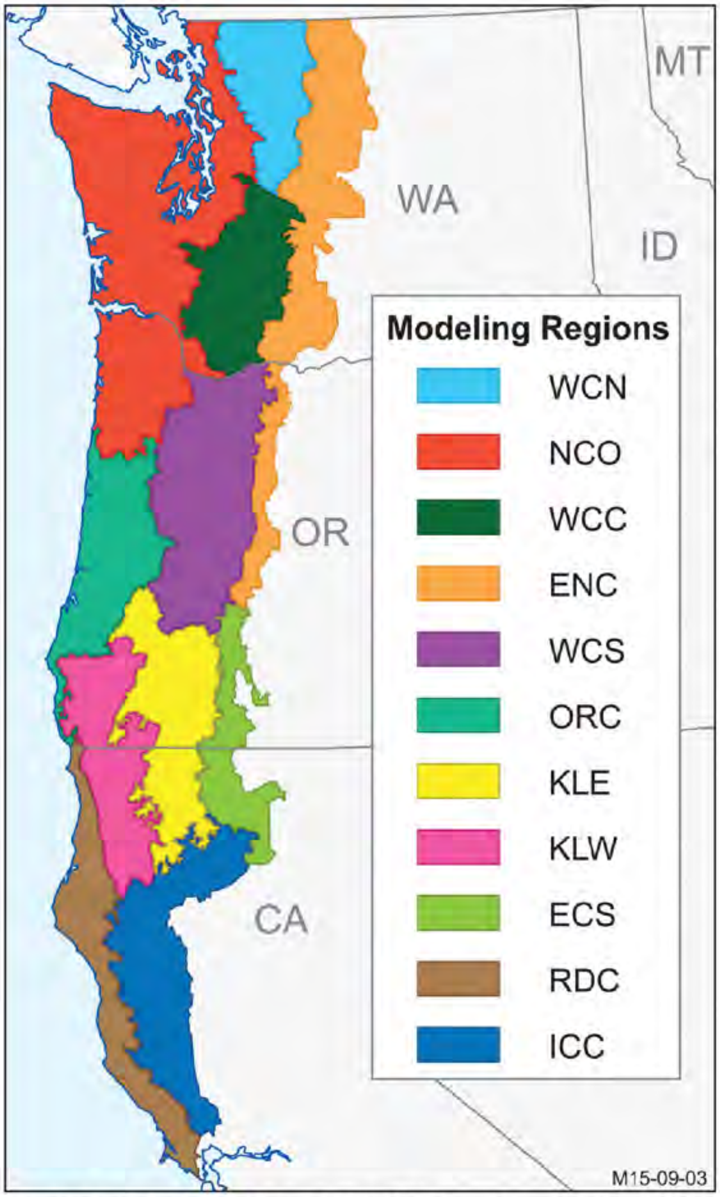

Figure 3-187. U.S. Fish and Wildlife Service modeling regions
Note: Acronyms are defined in **Table 3-272** below (2011a, pp. C-7 – C-13).

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).

[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

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

* The names of some modeling regions differ from those shown elsewhere in USDI FWS 2011a: C-9–C-13.

† Modeling regions entirely or partially in the planning area

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

[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.

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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 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.[151] 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

[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 to 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.[152] In the western Cascades, Olympic Peninsula, Oregon Coast Range and Oregon Klamath-portions of the range, simulated populations decline throughout the next 50 years.

[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

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

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

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

* Modeling regions entirely or partially in the planning area

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

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

* Physiographic provinces entirely or partially in the planning area

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.

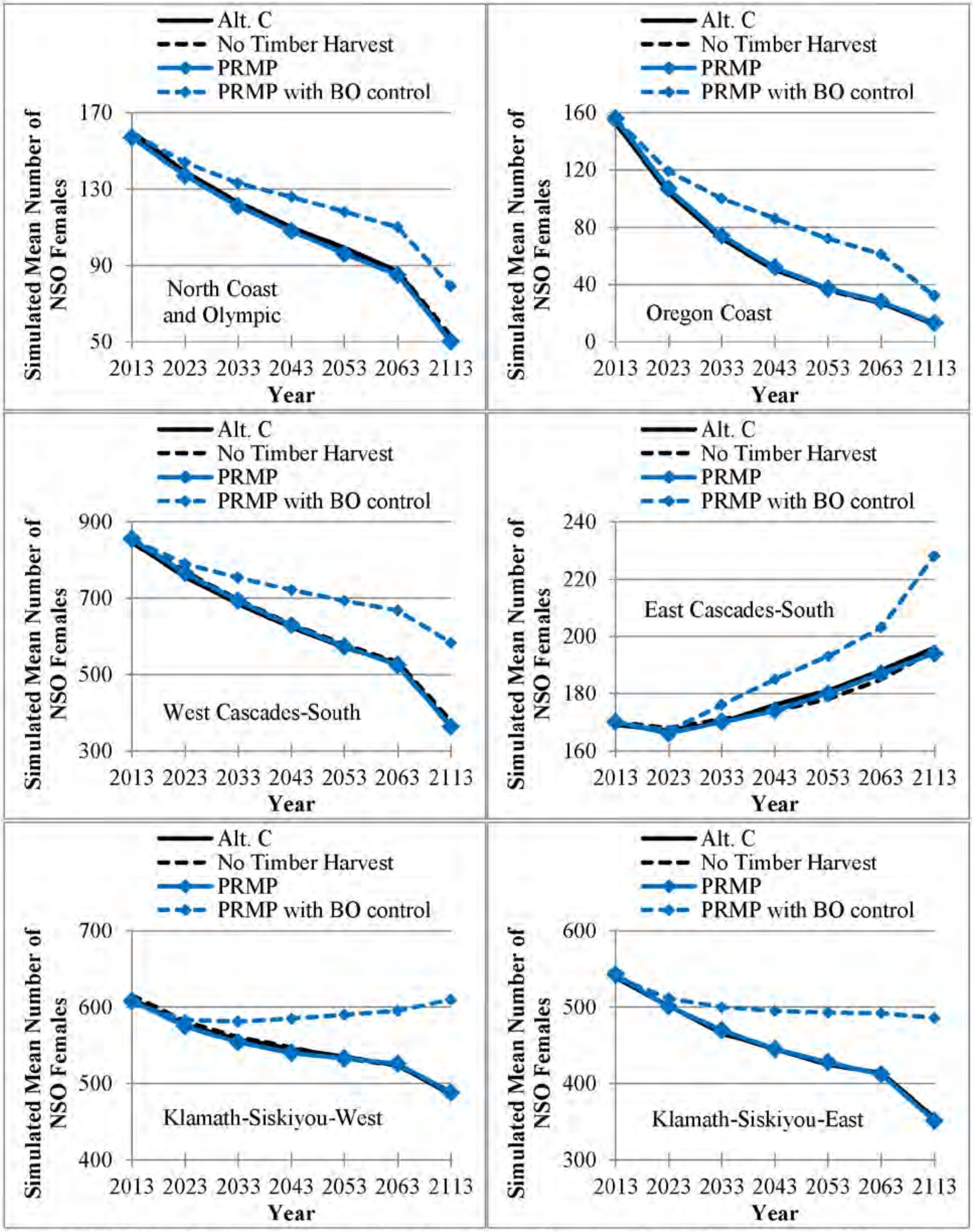

Figure 3-188. Simulated northern spotted owl populations (mean numbers of females from 500 replicate non-stochastic simulations) for each western Oregon modeling region, by decade, under Alternative C and the Proposed RMP, and according to the No Timber Harvest reference analysis

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

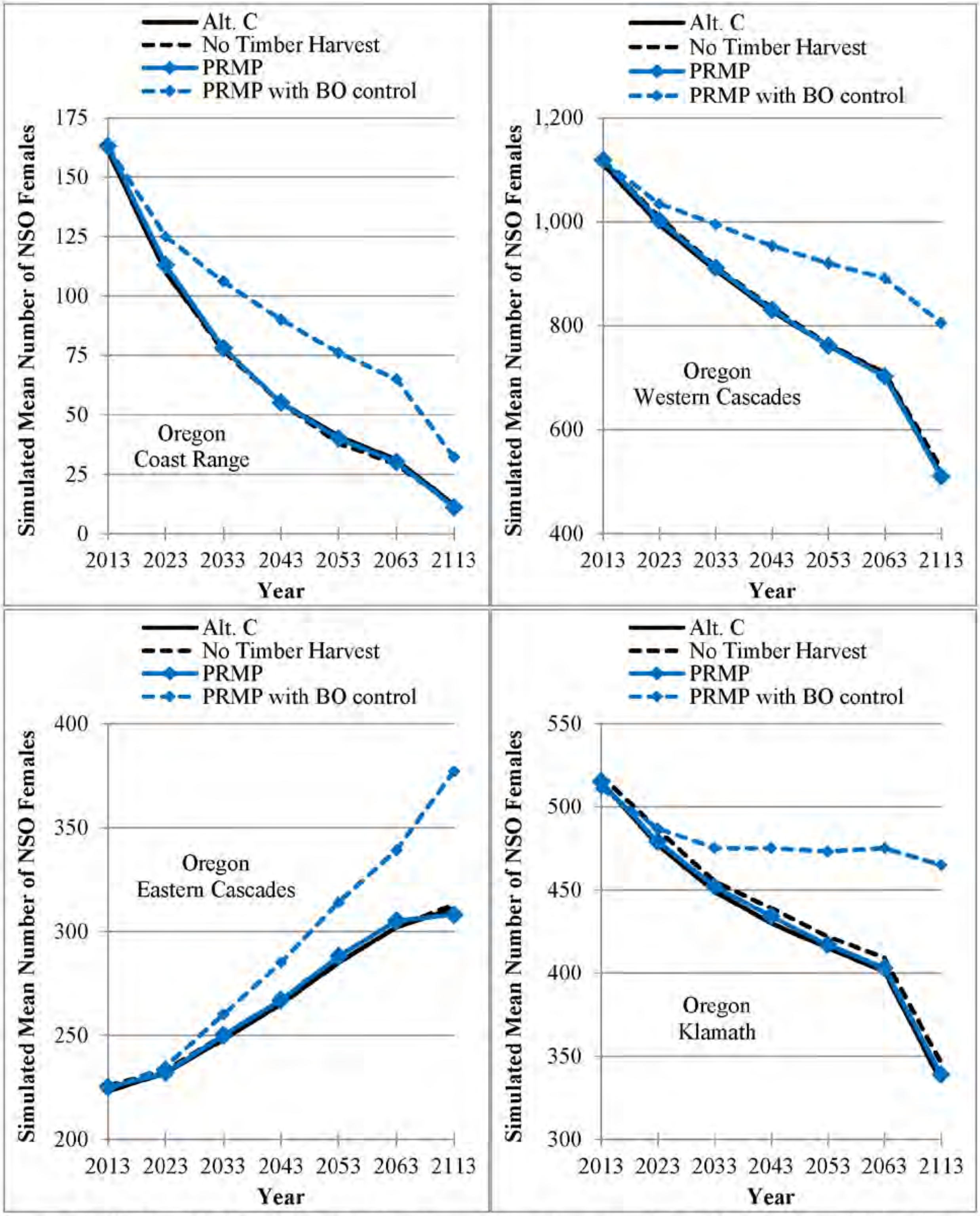

Figure 3-189. Simulated northern spotted owl populations (mean numbers of females from 500 replicate non-stochastic simulations) for each western Oregon physiographic province, by decade, under Alternative C and the Proposed RMP, and according to the No Timber Harvest reference analysis

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.

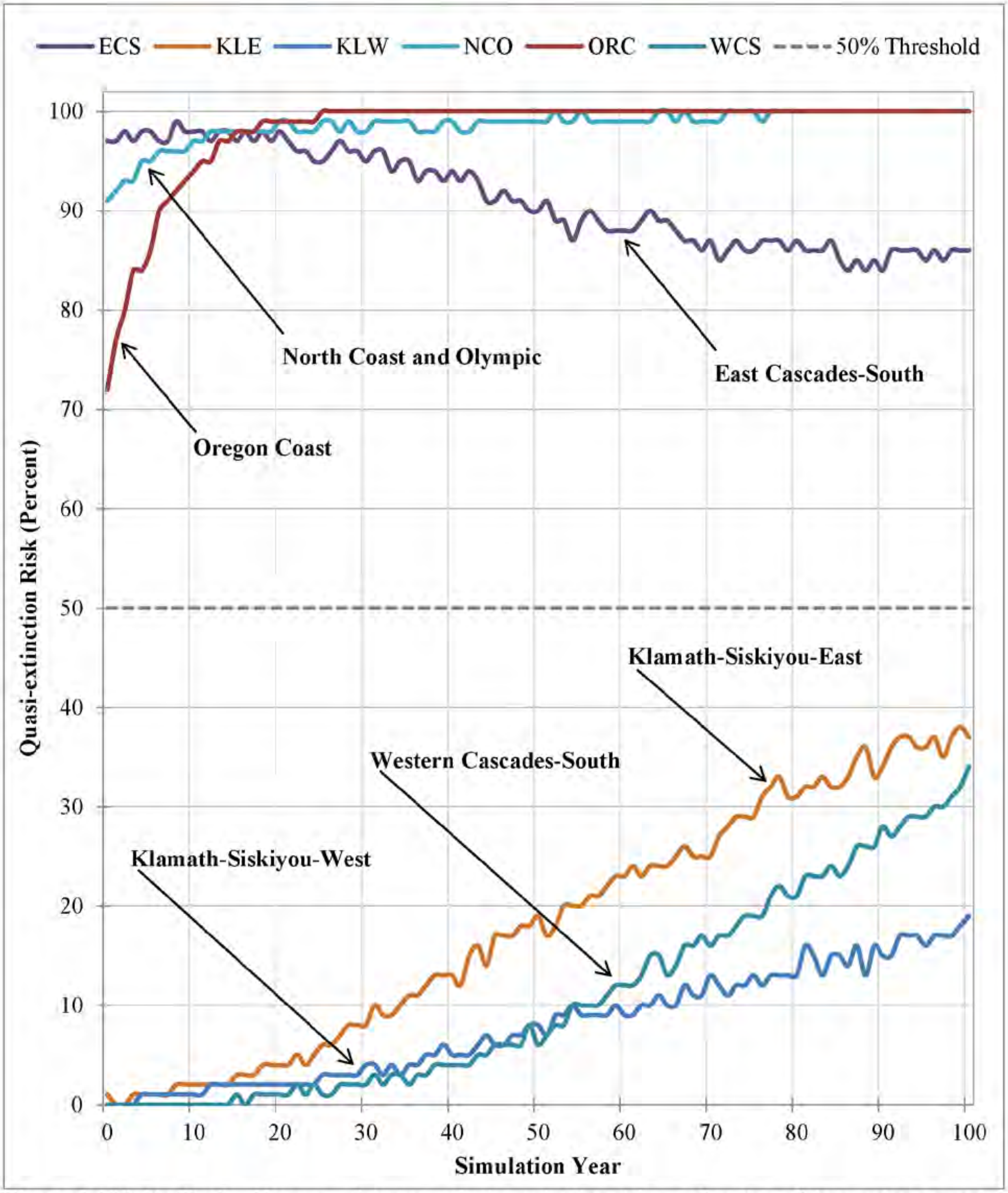

Figure 3-190. No Timber Harvest reference analysis: extinction risk as a function of time, using a quasi-extinction level of 250 females in each modeling region

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.

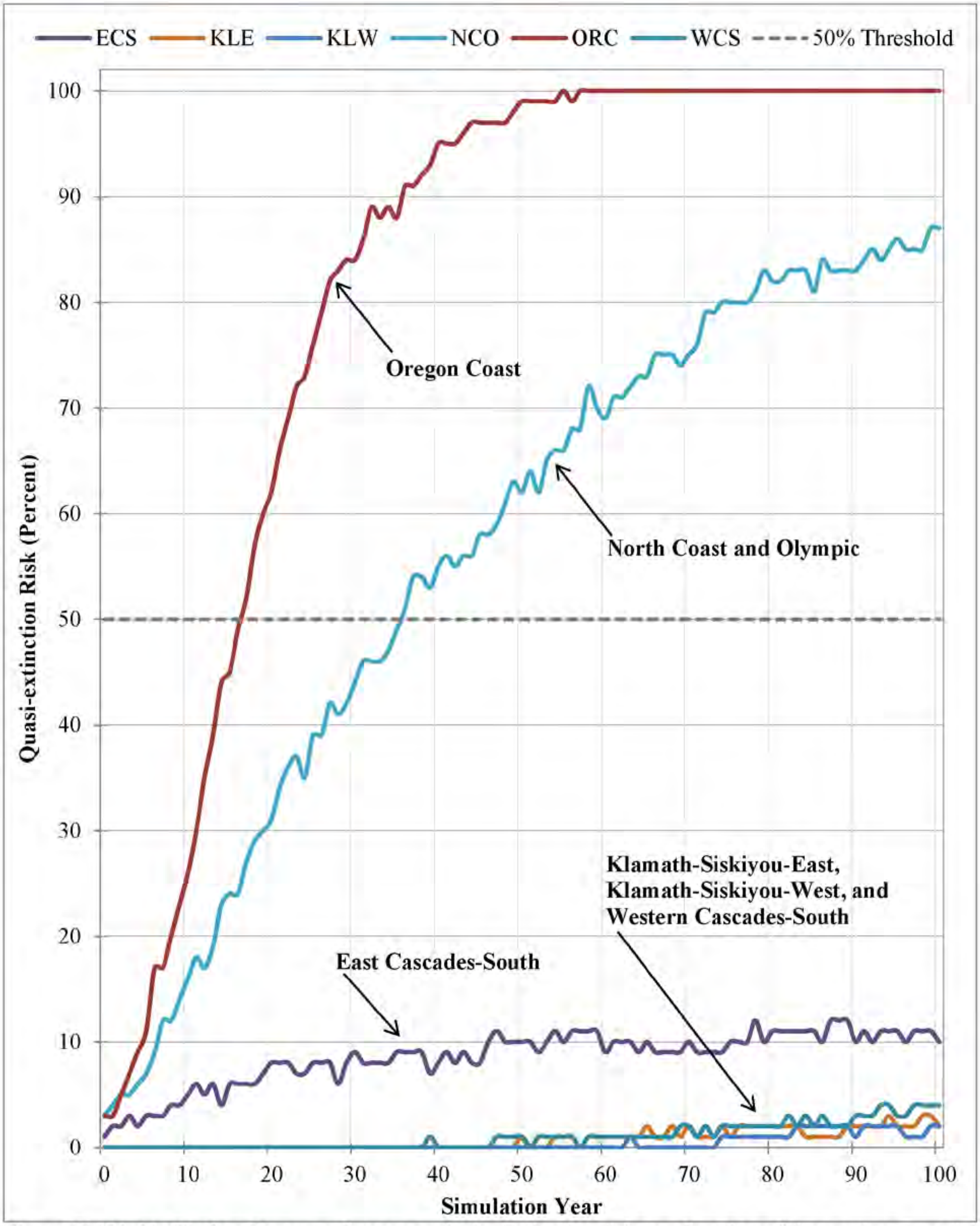

Figure 3-191. No Timber Harvest reference analysis: Extinction risk as a function of time, using a quasi-extinction level of 100 females in each modeling region

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).

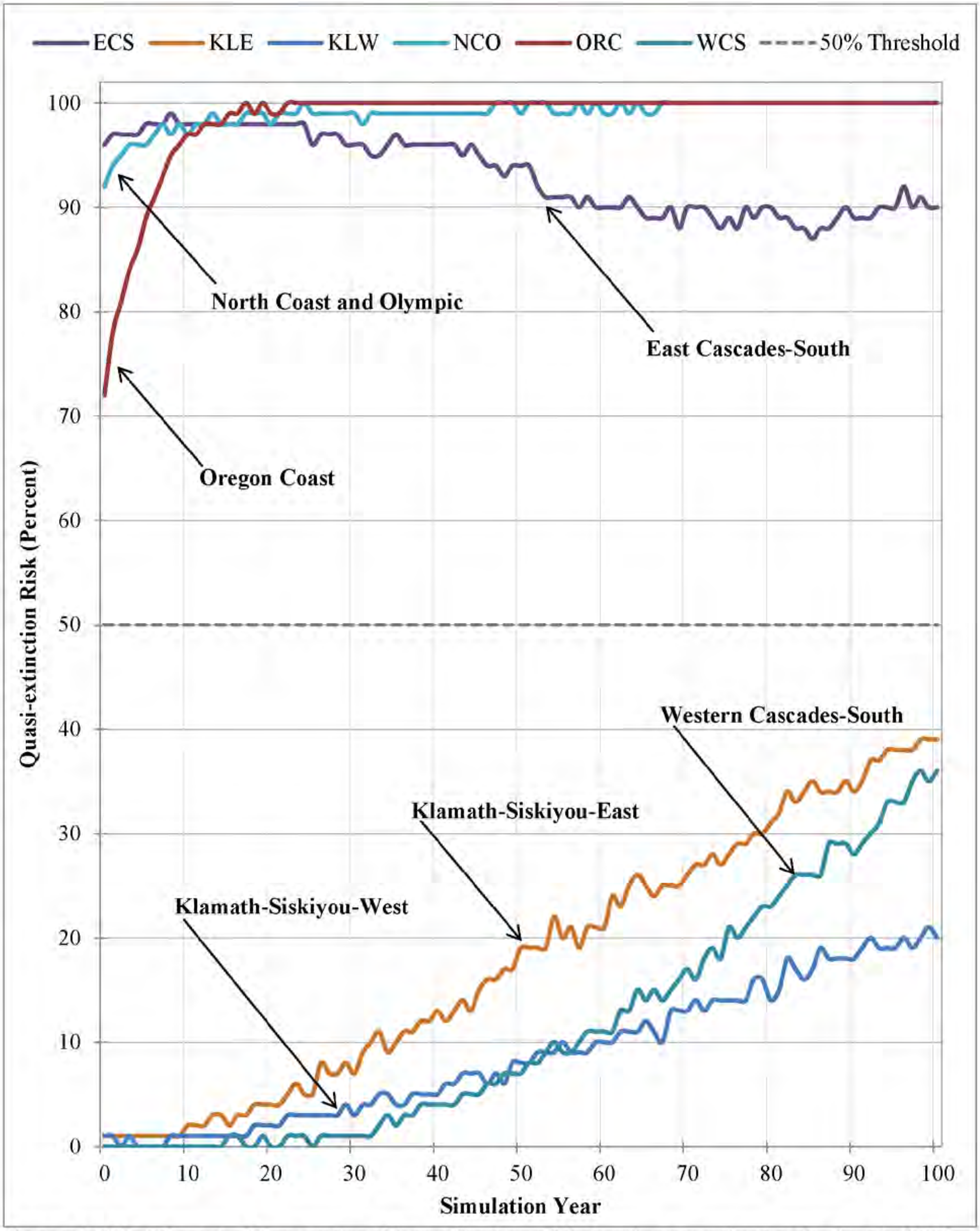

Figure 3-192. Alternative C: extinction risk as a function of time, using a quasi-extinction level of 250 females in each modeling region

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.

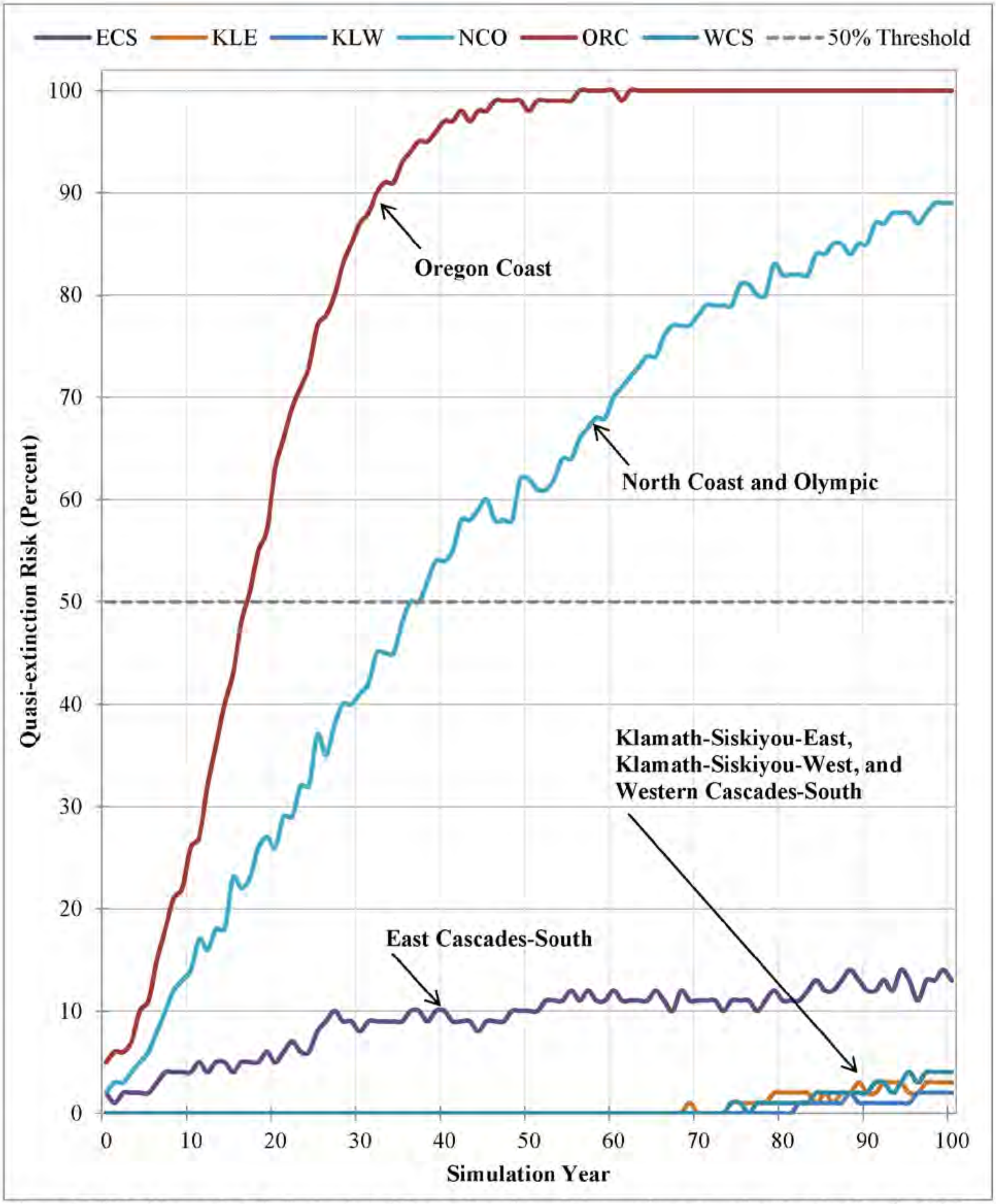

Figure 3-193. Alternative C: Extinction risk as a function of time, using a quasi-extinction level of 100 females in each modeling region

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.

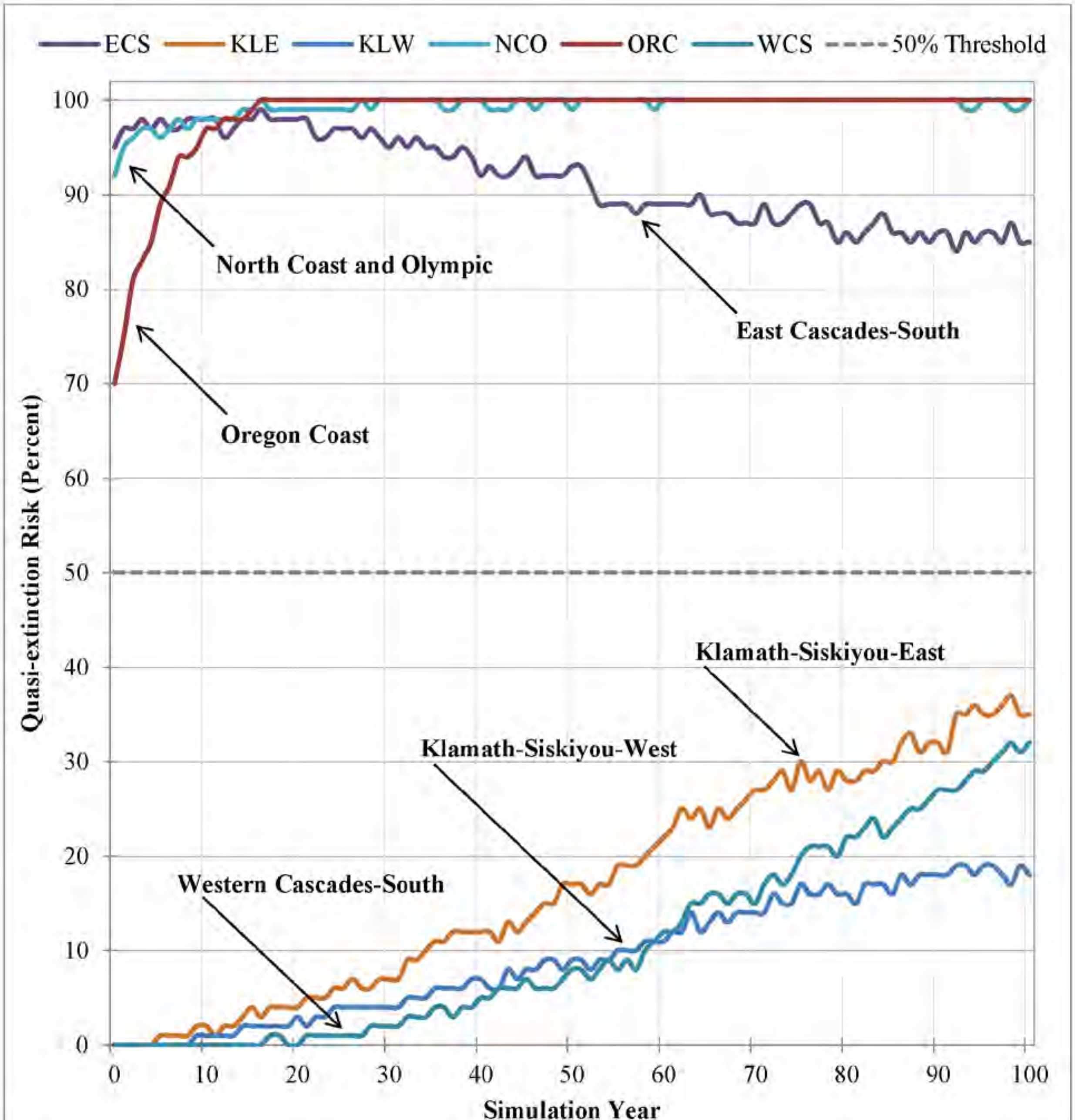

Figure 3-194. Proposed RMP: extinction risk as a function of time, using a quasi-extinction level of 250 females in each modeling region

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.

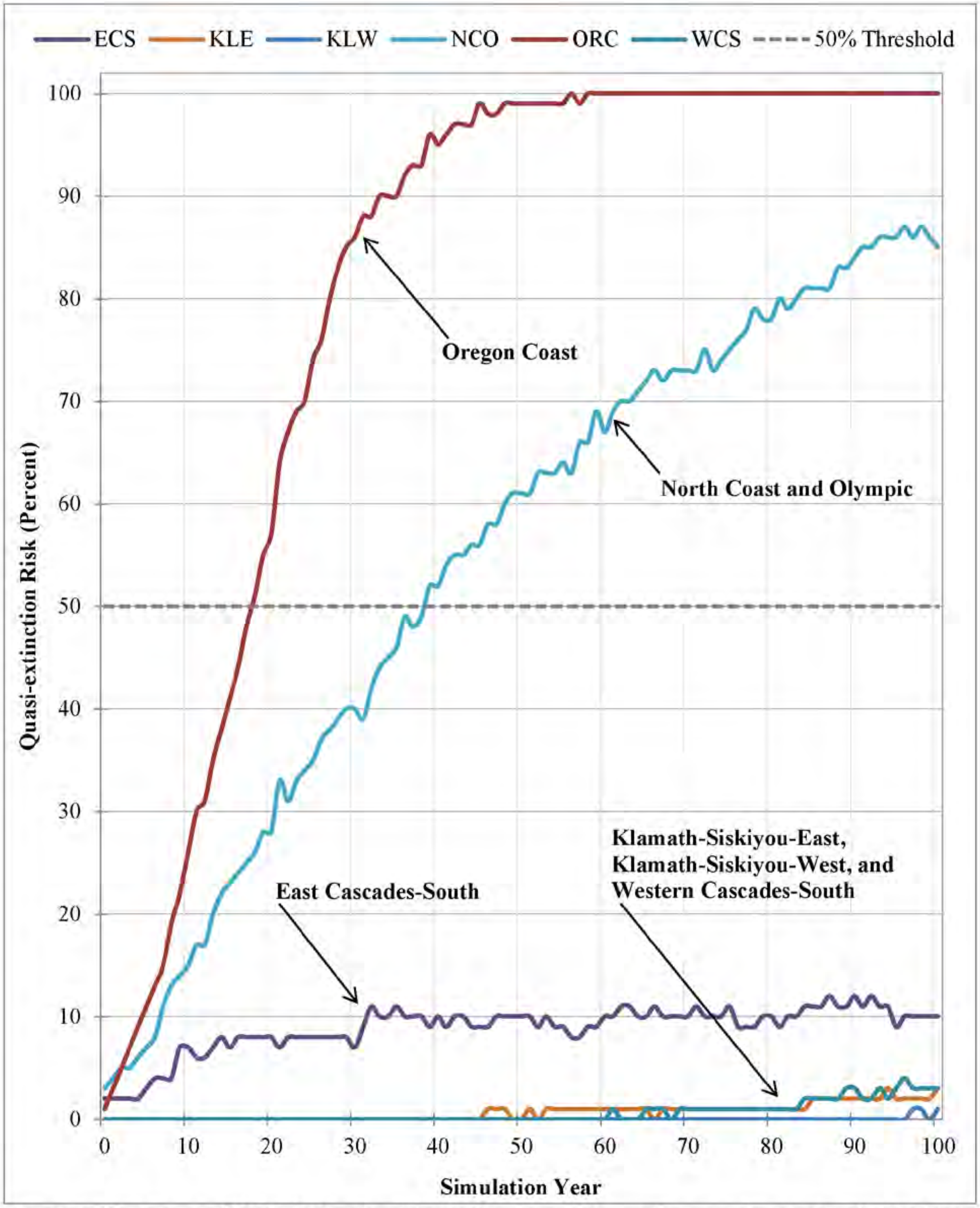

Figure 3-195. Proposed RMP: Extinction risk as a function of time, using a quasi-extinction level of 100 females in each modeling region

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.

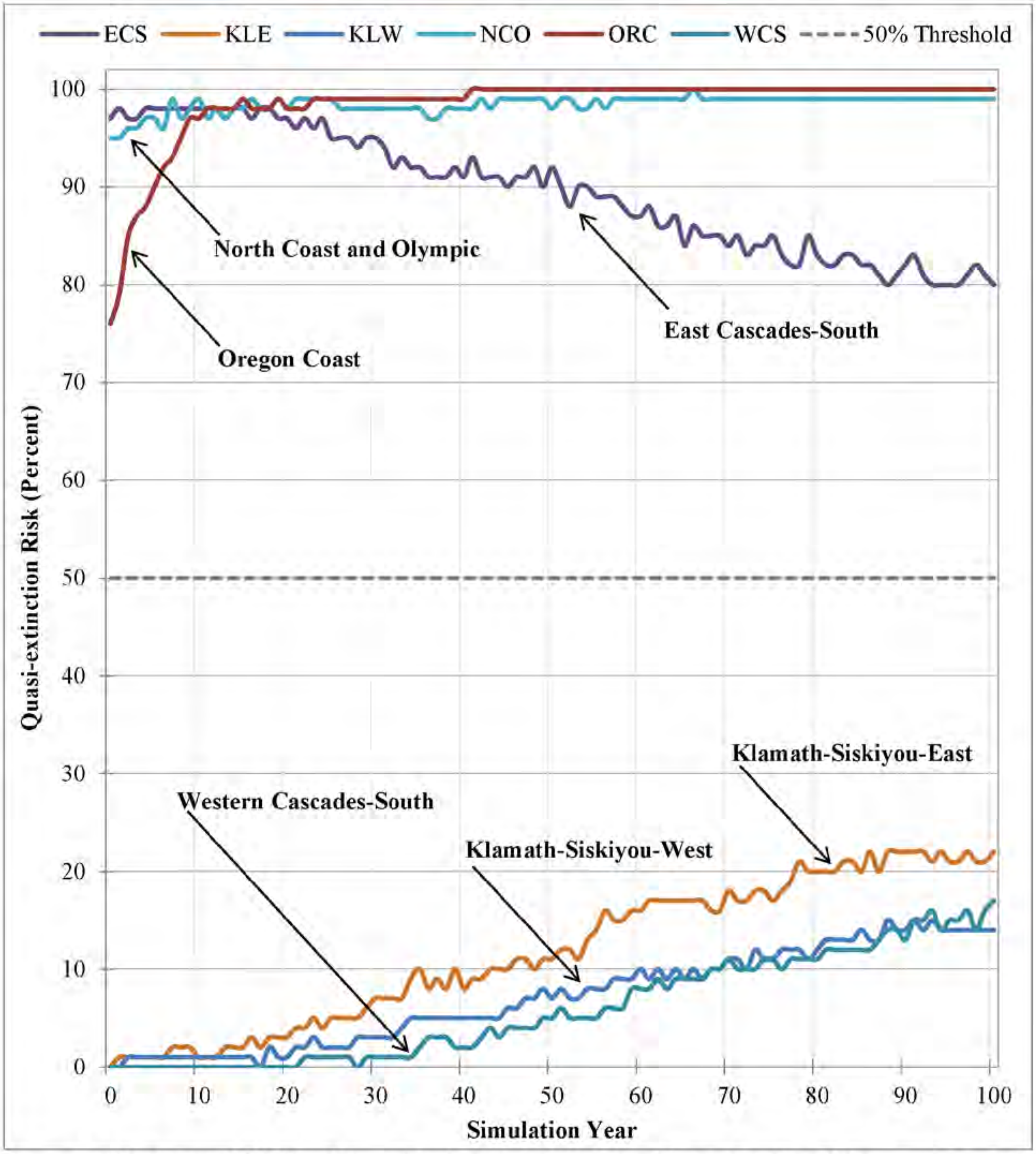

Figure 3-196. Proposed RMP with barred owl control: extinction risk as a function of time, using a quasi-extinction level of 250 females in each modeling region

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.

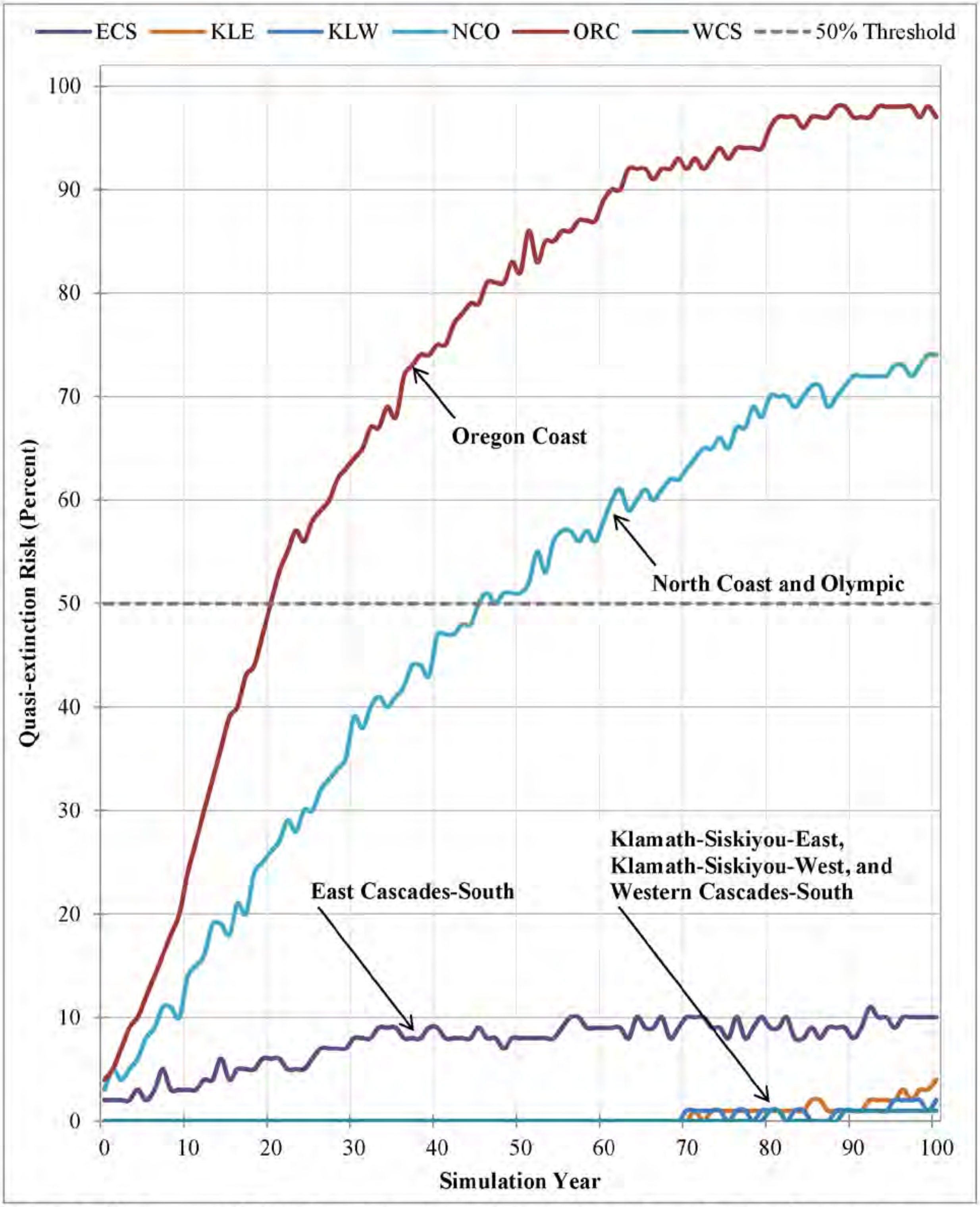

Figure 3-197. Proposed RMP with barred owl control: Extinction risk as a function of time, using a quasi-extinction level of 100 females in each modeling region

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 overlays 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;[153] 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

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

According to the No Timber Harvest reference analysis, 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).

[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.

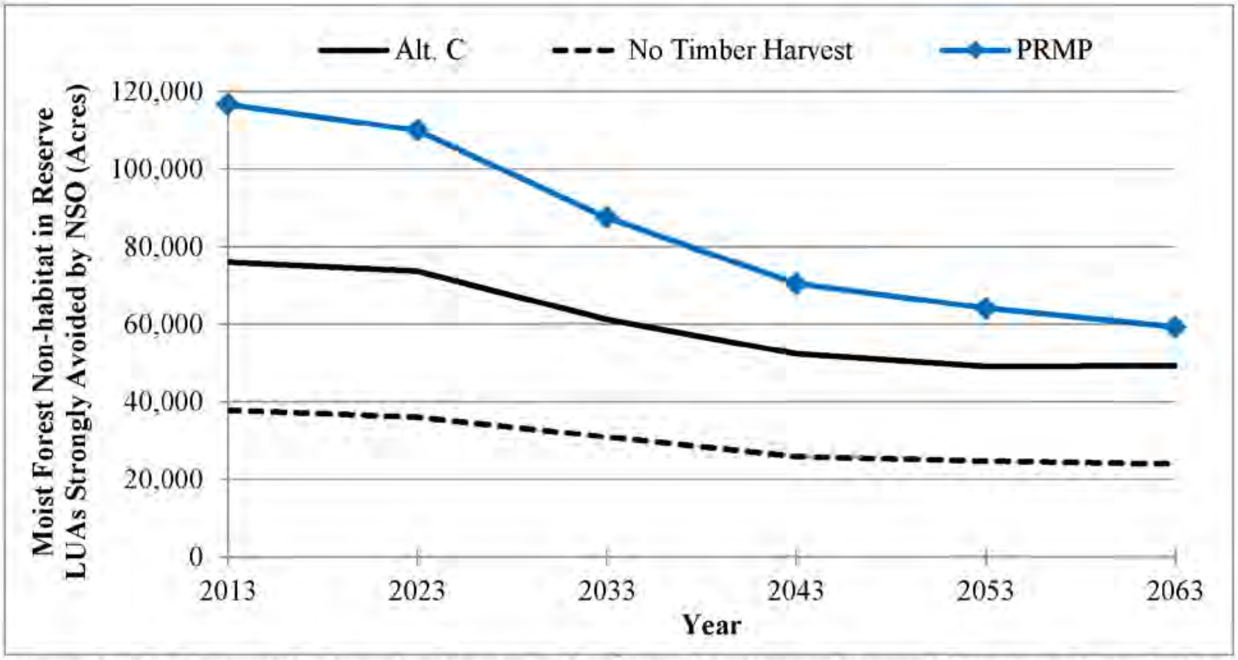

Figure 3-198. Forecasted change in the acres of the forested landscape that would be strongly avoided by northern spotted owls (i.e., non-habitat) of reserve land use allocations

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).

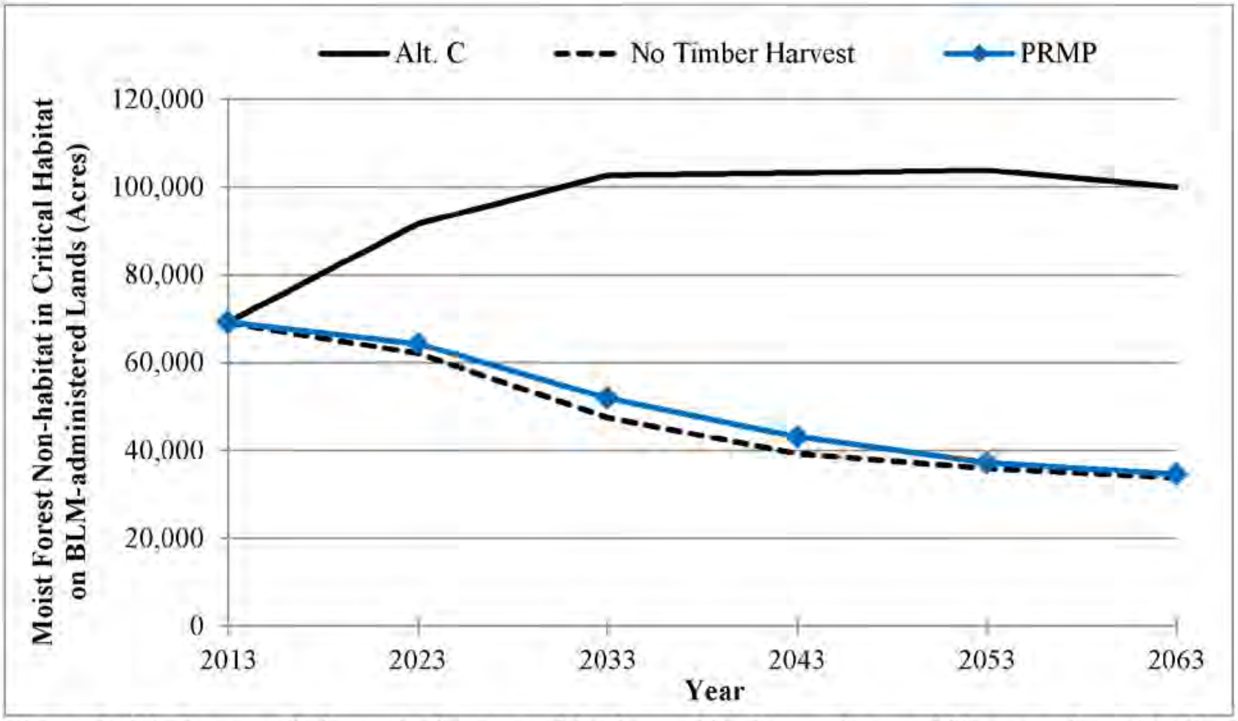

Figure 3-199. Forecasted change in the acres of the forested landscape that would be strongly avoided by northern spotted owls (i.e., non-habitat) in critical habitat units on BLM-administered lands
Note: The No Timber Harvest reference analysis is included for comparison.

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).

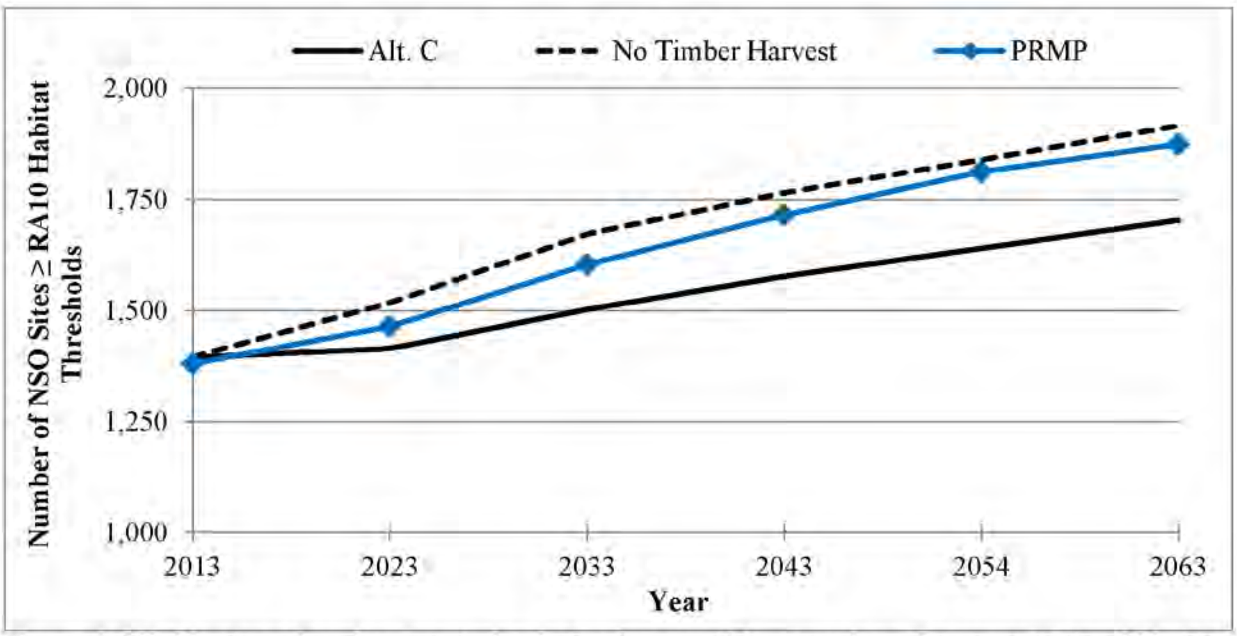

Figure 3-200. Number of northern spotted owl sites that would be at or above Recovery Action 10 habitat thresholds during each decade

Note: The No Timber Harvest reference analysis is included for comparison.

Issue 7

In accordance with <u>Recovery Action 12</u>, 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 each alternative, acre differences are a function of the size and location of the reserve land use allocations of each alternative.

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

Alternative/ Proposed RMP	2013–2023 (Acres)	2023–2033 (Acres)	2033–2043 (Acres)	2043–2053 (Acres)	2053–2063 (Acres)
No Action	3,500	3,700	3,900	600	2,300
Alt. A	10,000	7,000	12,800	5,900	12,200
Alt. B	7,200	4,900	9,000	1,800	6,700
Sub. B	8,600	6,600	11,600	3,500	10,900
Alt. C	7,300	4,700	9,900	1,500	6,900
Sub. C	9,000	6,000	13,600	6,600	9,400
Alt. D	4,000	2,900	7,400	1,400	5,700
PRMP	7,300	4,700	8,800	1,900	6,400

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

Habitat	2013–2023 (Acres)	2023–2033 (Acres)	2033–2043 (Acres)	2043–2053 (Acres)	2053–2063 (Acres)
Critical Habitat	9,000	6,500	8,900	3,700	10,200

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.[154] Both Alternative C and the

[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).

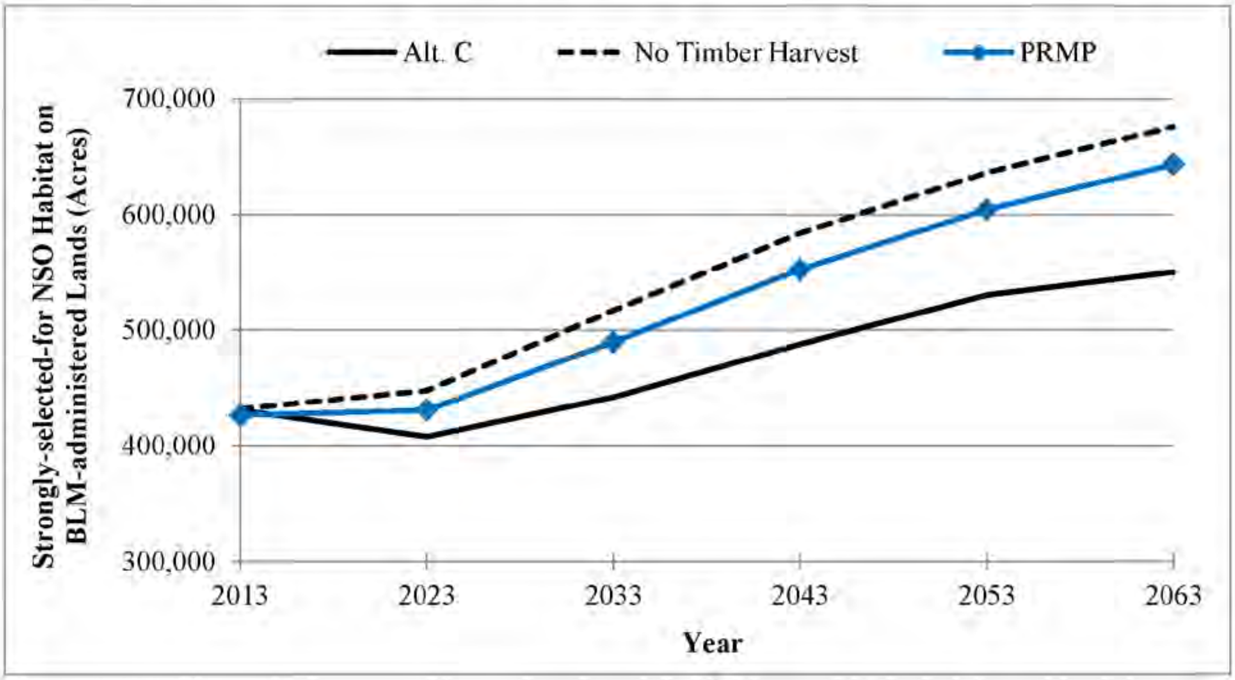

Figure 3-201. Change in the acres of 'strongly-selected-for' habitat on BLM-administered lands in western Oregon

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.

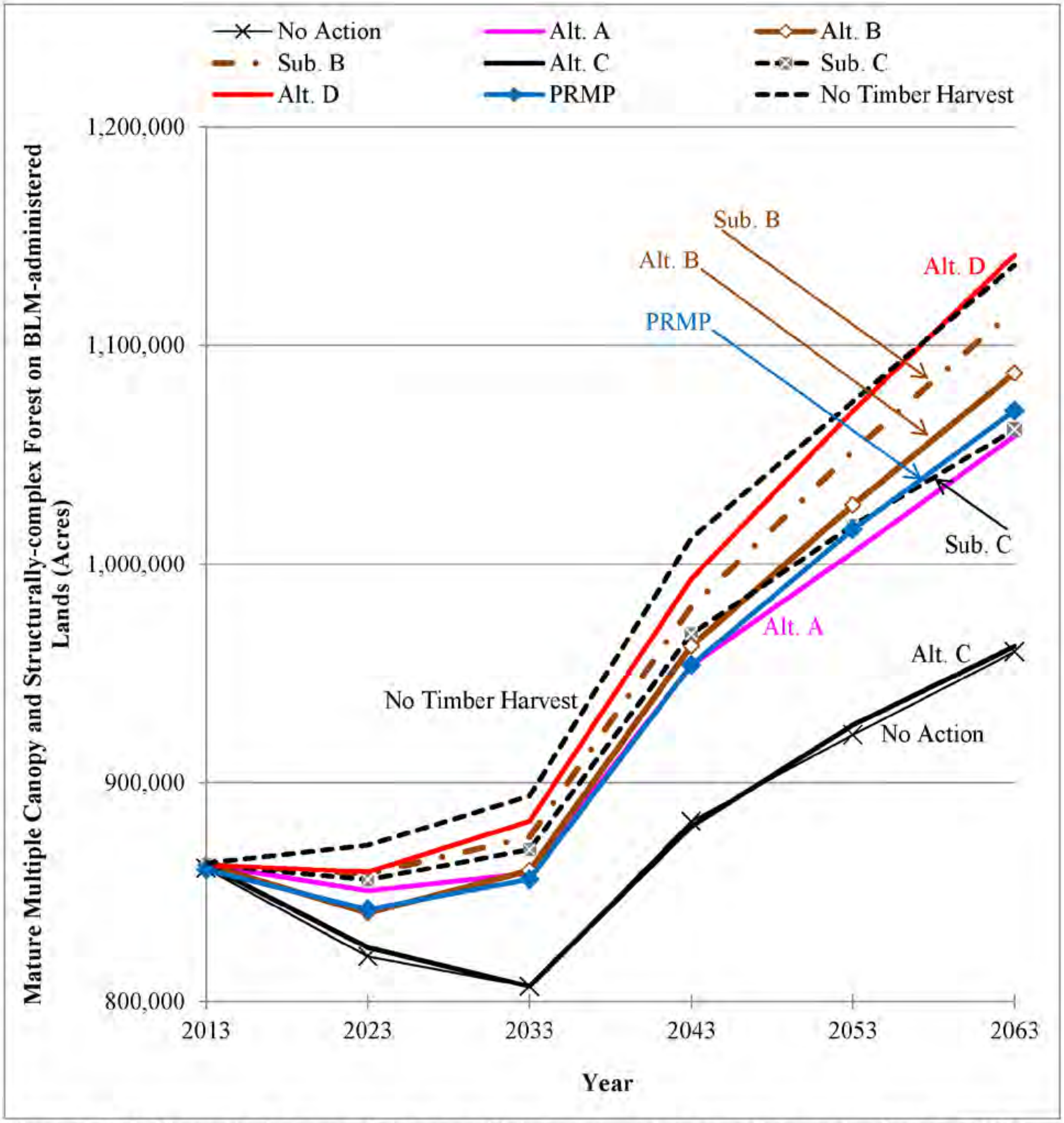

Figure 3-202. Change in the acres of mature multiple-canopy and structurally-complex forest on BLM-administered lands in western Oregon

Note: The No Timber Harvest reference analysis is included for comparison.

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 multi-layered conifer forests, even though the alternatives and the Proposed RMP would differ substantively in the amounts.

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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.

Table 3-279. Acres and percentages of northern spotted owl critical habitat on BLM-administered lands in the Harvest Land Base

Land Use Allocation	No Action (Acres)	Alt. A (Acres)	Alt. B (Acres)	Sub. B (Acres)	Alt. C (Acres)	Sub. C (Acres)	Alt. D (Acres)	PRMP (Acres)
Adaptive Management Area	50,304	-	-	-	-	-	-	-
Connectivity/Diversity Blocks	61,130	-	-	-	-	-	-	-
General Forest Management Area	243,090	-	-	-	-	-	-	-
Low Intensity Timber Area	-	-	71,387	30,306	-	-	-	63,657
Moderate Intensity Timber Area	-	-	878	339	-	-	909	744
High Intensity Timber Area	-	1,418	-	-	200,930	135,995	-	-
Uneven-aged Timber Area	-	562	132,572	49,365	89,571	45,089	594	108,228
Predicted Marbled Murrelet†	-	-	-	-	1,571	306	-	-
Owl Habitat Timber Area	-	-	-	-	-	-	140,492	-
Harvest deferral‡	-	-	-	-	-	-	165,547	-
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

forestry prescriptions. Some examples that could be utilized include Franklin *et al.* (2002, pp. 417–421; 2007, entire), Kerr (2012), Drever *et al.* (2006, entire), Johnson and Franklin (2009, pp. 39–41), Swanson *et al.* (2010, entire), and others cited in the Revised Recovery Plan for the Northern Spotted Owl (USDI FWS 2011, pp. III-14, III-17 – III-19)."

Oregon Eastern Cascades:

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

The U.S. Fish and Wildlife Service delineated the northern spotted owl range into 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 <u>Consideration (1) for the Oregon Western Cascades and Coast Range, and Oregon Eastern Cascades</u>, 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 Sub-alternatives 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).

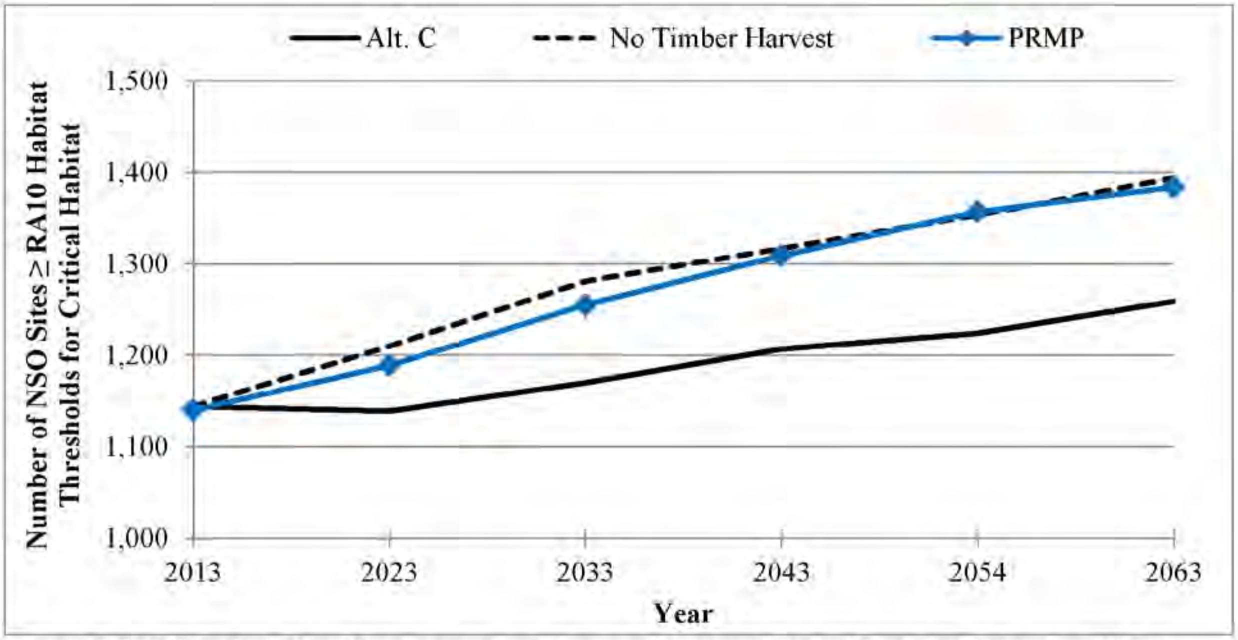

Figure 3-203. Number of northern spotted owl known sites associated with critical habitat on BLM-administered lands that would be at or above Recovery Action 10 habitat thresholds during each decade
Note: Potential change according to the No Timber Harvest reference analysis is included for comparison.

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.[155] 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).

[155] 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.

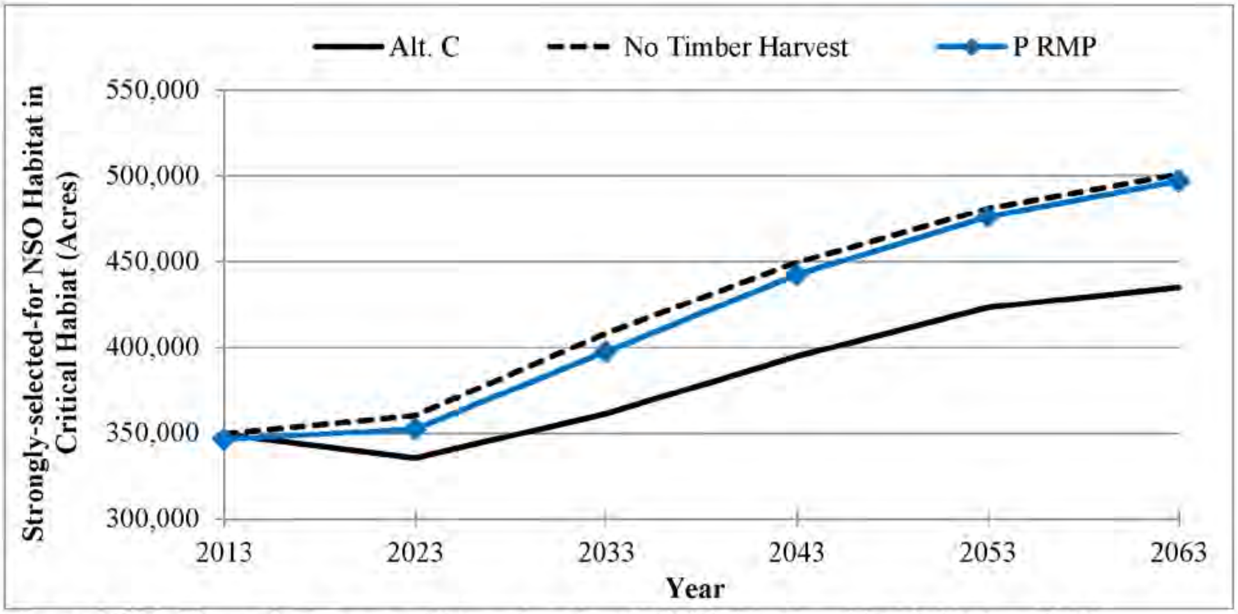

Figure 3-204. Change in the acres of 'strongly-selected-for' habitat in critical habitat on BLM-administered lands in western Oregon

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 <u>Consideration (2) for the Eastern Cascades and dry-forest portion of the Klamath Basin</u>, 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 <u>Considerations (3)–(8) for the Eastern Cascades and dry-forest portion of the Klamath Basin</u>, 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

USDI FWS. 2011. Revised Recovery Plan for the Northern Spotted Owl (*Strix occidentalis caurina*). U. S. Fish and Wildlife Service, Region 1, Portland, OR. 258 pp. http://www.fws.gov/wafwo/pdf/NSO%20Revised%20Recovery%20Plan%202011.pdf.

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

GeoBOB. 2013. BLM OR RWO GeoBOB Publication Fauna Observations Version 3 Point. Data snapshot – March 6,2013. USDI BLM, Portland, OR.

Oregon Biodiversity Information Center (ORBIC). 2015. ORBIC_ISSSSP_20130912_ssc. http://inr.oregonstate.edu/orbic/data-requests.

USDI FWS. 2001. Revised Recovery Plan for the Oregon Silverspot Butterfly (*Speyeria zerene hippolyta*). Portland, OR. 121 pp. http://www.fws.gov/pacific/ecoservices/endangered/recovery/silverspot/default.htm.

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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

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

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**). Under all alternatives and the Proposed RMP, the BLM would control invasive species infestations (e.g., reed canary grass) and avoid development in wetlands that would lead to spotted frog habitat loss.

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

Crumley, L. 2014. Personal communication. December 14, 2014 email re: acres of vacant allotments. USDI Bureau of Land Management, Lakeview, OR.

GeoBOB. 2013. BLM OR RWO GeoBOB Publication Fauna Observations Version 3 Point. Data snapshot – March 6, 2013. USDI BLM, Portland, OR.

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USDI FWS. 2011. U.S. Fish and Wildlife Service species assessment and listing priority assignment form: Oregon spotted frog (*Rana pretiosa*). May 9, 2011. U.S. Fish and Wildlife Service, Region 1, Portland, OR. 60 pp. http://www.fs.fed.us/r6/sfpnw/issssp/documents/planning-docs/cp-fws-candidate-ha-rana-pretiosa-2011-05.pdf.

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.

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

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).

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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 (*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, UDSI 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

(GeoBOB 2015), and the Low Down timber sale (GeoBOB 2015). Within the Oak Basin Prairie ACEC, the BLM and other cooperators have been monitoring Fender's blue butterflies since 2006, and the population of adult Fender's blue butterflies has ranged from 23–83 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 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.

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Wild Horses

Key Points

- The Pokegama herd is currently 40 percent over the maximum appropriate management level of 50 horses.
- The Pokegama herd relies primarily on private land within the Herd Management Area for forage and water.
- Alternative D, which would eliminate livestock grazing, would reduce competition for forage and provide the potential for increased growth of the Pokegama herd. Otherwise, the alternatives and the Proposed RMP would not differ in their effects on the Pokegama herd.

Summary of Notable Changes from Draft RMP/EIS

- Analysis for the Proposed RMP/EIS includes added data on herd numbers resulting from direct counts conducted in the summer of 2015.

Background

The Pokegama Herd Management Area (HMA) is the only HMA within the planning area. It encompasses a total of 85,022 acres in Oregon and California and includes private, state, and Federal lands. Approximately 83 percent of the HMA (70,550 acres) is within the planning area, with 23 percent of the HMA on BLM-administered lands managed by the Klamath Falls Field Office. The remainder of the HMA within the planning area is on private land. Most of the California portion of the HMA (95 percent, or 13,016 acres) is located on private and state land; only 5 percent is located on BLM-administered lands (outside of the planning area).

The Pokegama herd spends 94 percent of its time in meadows, open areas, and in tree cover on the edge of meadows (Gottlieb 1993). During the spring and summer, the horses are generally in the northern and central portions of the HMA. Due to the typically high winter snow accumulations in the northern and central portions of the HMA, the horses concentrate in the southern portion (California) from December through March, although they can be found in the northern and central areas at any time of the year.

The diet of the Pokegama herd is predominantly grasses and grass-like species. Their primary water sources include creeks, springs, and reservoirs. Most developed water sources for the Pokegama herd (70-80 percent) are on private land. The BLM and private landowners have constructed several exclosures to protect riparian areas from wild horses.

The Pokegama Wild Horse Herd Management Area Plan (USDI BLM 2002) identifies specific management objectives and actions for the management of the Pokegama HMA.

Issue 1

How would the alternatives affect BLM's ability to maintain the appropriate management level of 30 to 50 wild horses within the Pokegama Herd Management Area?

Summary of Analytical Methodology

The BLM qualitatively analyzed effects to wild horses within the Pokegama HMA, based on other resource management programs. Under all alternatives and the Proposed RMP, management of the Pokegama Herd and the HMA would continue as guided by the Pokegama Wild Horse HMA Plan (USDI BLM 2002). Wild horses in the Pokegama Herd would be managed the same under all alternatives and the Proposed RMP.

This analytical approach is a change from the Planning Criteria, which described analyzing changes in forage availability based on changes in forest structural stages (USDI BLM 2014, pp. 170–171). The alternatives and the Proposed RMP would result in negligible differences in the acreage of non-forested lands, and early successional and stand establishment stands within the HMA. In addition, a 2014 wildfire in the HMA has had a much greater influence on forest structure within the HMA than any changes that could occur under any of the alternatives or the Proposed RMP.

Affected Environment

The Pokegama herd is currently 40 percent over the appropriate management level (AML) of 30 to 50 horses, based on the Pokegama Wild Horse HMA Plan. Since designation of the HMA in 1971, census counts of the Pokegama wild horse population have ranged from 25 in 1972 to 71 in 2015[156] (**Figure 3-205**). The BLM has periodically completed captures to reduce herd numbers to within AML when needed. In 1996 and 2000, the BLM removed 20 and 18 horses, respectively. Continued captures would occur under all alternatives and the Proposed RMP to manage herd AML as guided by the Pokegama Wild Horse HMA Plan.

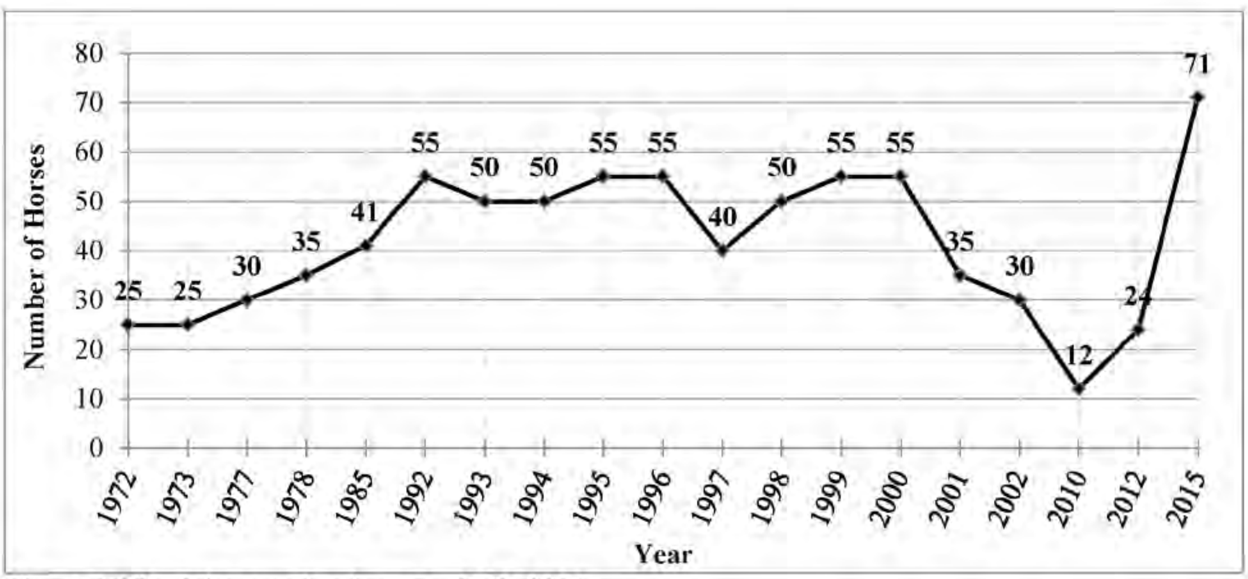

Figure 3-205. Pokegama herd census, 1972–2015

The average growth rate for the Pokegama herd is typically 4-5 percent per year, which is below the average rate of 20 percent for other wild horse herds. The lower growth rate for the Pokegama herd may be related to a higher ratio of male to female horses than is normally found in wild horse herds (Gottlieb

[156] 2015 data incorporated represents direct count numbers using simultaneous double-blind count methodologies. Census numbers are currently being processed for the 2015 data. The final census number may increase to account for horses obscured by canopy cover in forested habitats.

1993). The lower growth rate may also be related to young horses being killed by mountain lions during the winter or being illegally removed (USDI BLM 2002). The overall condition of the herd is excellent (USDI BLM 1996 and 2002). The current high population number may be attributed to a number of privately owned, unauthorized horses in the area being included in the wild horse count (personal communication, Alec Bryan, BLM, 2015).

The portion of the HMA within the planning area lies within the boundaries of two grazing allotments: the Dixie and Edge Creek allotments. The BLM allocates forage for livestock, wild horses, deer, and elk (USDI BLM 1994), and there is abundant forage and available water within the two allotments in the HMA. The BLM currently allocates 150 animal unit months of forage on BLM-administered lands within the planning area to the Pokegama herd. The remaining forage needs for the herd within the planning area are provided for on private lands. The Oregon Gulch Fire (2014) occurred entirely within the HMA and burned 41 percent of the acres within the HMA, but did not reduce available forage for the herd.

Environmental Consequences

Under all alternatives and the Proposed RMP, management of the Pokegama Herd and the HMA would continue as guided by the Pokegama Wild Horse HMA Plan (USDI BLM 2002), which currently manages the Pokegama herd unit to maintain a viable herd of approximately forty healthy animals - the mid-point of the determined AML range of 30 to 50 head. Wild horses in the Pokegama Herd would be managed the same under all alternatives and the Proposed RMP. As such, this analysis focuses on describing potential changes in forage availability based on changes in forest structural stages.

Vegetation management actions under the alternatives and the Proposed RMP would have very little if any effect on wild horses in the HMA. The Proposed RMP and all alternatives would manage all or most of the forested areas in the HMA with uneven-aged management. Unlike the Proposed RMP and all other alternatives, Alternative C includes a small portion of the High Intensity Timber Area, totaling 2,330 acres, within the HMA in which timber management actions would include clearcuts. This increased intensity of timber management under Alternative C could result in some increases in forage for a time within clearcut units within the High Intensity Timber Area. However, the small portions of the High Intensity Timber Area that would be within early-successional and stand establishment stages in any given decade would render these overall temporary increases in forage negligible in the context of the abundance of existing forage within the entire 85,022-acre HMA.

Vegetation management actions, road maintenance and construction, recreation areas, and travel management designations for public motorized access could affect wild horse movements, the habitat they occupy, and associated available forage. These activities would have only temporary and localized effects on horse distribution and movement with the HMA, which cannot be quantified at this scale of analysis with the data available.

The Alternatives A and D, and the Proposed RMP would designate the Upper Klamath River and Upper Klamath River Addition ACECs located within the herd management area. The designation of these ACECs would not affect the wild horse herd as the horses have little to no access to the areas. These ACECs are located within the steep confines of a canyon with limited access by horses.

There are two BLM-managed recreation sites located along the eastern boundary within the Pokegama HMA: the Klamath River Campground and Spring Island River Access. Both of these sites are located within the Klamath River Wild and Scenic River ERMA and in the confines of the canyon where horses are not known to occur. Designation of these sites as Special Recreation Management Areas would have no effect to the Pokegama herd.

Alternative D would eliminate livestock grazing throughout the planning area, including the Dixie and Edge Creek allotments, and would reduce competition for forage within the HMA. Alternative D would increase the animal unit months of forage available to horses on BLM-administered lands within the planning area by 627. This increase in forage would provide sufficient forage to support a horse population at the high end of the appropriate management level on BLM-administered lands in the planning area alone. This elimination of direct competitions for forage within the HMA would provide for the potential for an increased growth rate of the Pokegama herd greater than the current long-term average of 20 percent.

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Wild and Scenic Rivers

Key Points

- The 13 river segments found suitable for recommendation for inclusion into the National Wild and Scenic Rivers System through the previous western Oregon RMPs (1995) would be recommended under all alternatives and the Proposed RMP.
- Under the No Action Alternative, all 51 eligible Wild and Scenic River segments would continue to be managed as eligible, protecting the rivers and their associated values, until suitability determinations are made through subsequent land use planning processes.
- Under Alternative A, the BLM would not recommend the 51 eligible Wild and Scenic River segments for inclusion into the National Wild and Scenic River System and no protection management would be applied, which could result in effects to their associated values.
- Under Alternatives B and C, and the Proposed RMP, the BLM would recommend for inclusion into the National Wild and Scenic River System the 6 Wild and Scenic River segments found suitable during 2015 evaluations, resulting in protection for those segments. There are 45 eligible river segments that the BLM did not find suitable; these segments would not continue to receive protections, which could result in effects to their associated river values.
- Under Alternative D, the BLM would recommend all 51 eligible Wild and Scenic River segments for inclusion into the National Wild and Scenic River System, resulting in the most protection for all eligible segments and their associated river values.

Summary of Notable Changes from Draft RMP/EIS

The Proposed RMP updated data on river segments that the BLM identified as meeting suitability criteria to identify only the river segment lengths on BLM-administered lands.

Issue 1

How would the proposed management actions in each alternative affect the free-flowing condition, water quality, identified outstandingly remarkable values, and tentative classification, and on eligible Wild and Scenic River segments in western Oregon?

Background

Wild and Scenic Rivers (WSRs) are rivers or river segments designated by Congress for inclusion in the National Wild and Scenic Rivers System (National System) under the authority of the Wild and Scenic Rivers Act of 1968 (WSR Act; 16 U.S.C. 1271 *et seq.*). Congress designates rivers under this WSR Act for the purposes of preserving the river or river segment in its free-flowing condition, preserving water quality, and protecting identified outstandingly remarkable values (ORVs). Examples of river segment ORVs may include scenery, recreation, geology, fish, wildlife, historical, cultural, or other similar values.

Congress classifies all designated WSR segments as Wild, Scenic, or Recreational. The BLM, through the evaluation of rivers or river segments for possible inclusion into the National System, assigns these same classifications to all eligible rivers or river segments. Definitions of these classifications are the following:

- **Wild river segments**—Wild river segments are free of impoundments and generally inaccessible, except by trail. Their watersheds or shorelines are essentially primitive and their waters unpolluted.

- **Scenic river segments**—Scenic river segments are free of impoundments. Their shorelines or watersheds are largely undeveloped, but their shorelines are accessible in places by roads.
- **Recreational river segments**—Recreational river segments are readily accessible by road or railroad. They may have some development along their shorelines and may have undergone some impoundment or diversion in the past.

Section 5(d)(1) of the WSR Act directs Federal agencies to evaluate rivers to determine suitability during the land use process; suitable rives can be recommended for potential inclusion into the National System. To fulfill this requirement, the BLM inventoried and evaluated rivers as part of this plan revision.

The evaluation of a river for possible inclusion in the National System follows a three-step process: (1) determination of eligibility, (2) tentative classification (Wild, Scenic, or Recreational), and (3) determination of suitability. This process, outlined below, ultimately provides the basis for recommendations made to Congress, and provides guidance on interim management.

In order to be eligible for inclusion into the National System, a river segment must be free-flowing and contain at least one river-related value considered to be outstandingly remarkable (USDI BLM 2012). An eligible river's ORVs should be located in the river itself or on its immediate shore lands. As a part of this plan revision, the BLM evaluated 51 rivers for eligibility and found all 51 to meet the criteria to be eligible. The ORVs identified for these 51 rivers include values for scenery, recreation, geology, fish, wildlife, historical, cultural, and ecology.

The BLM then assigned tentative classification to rivers found to be eligible. This tentative classification is based upon the condition of the river and adjacent lands at the time of study. This tentative classification also serves as a guideline for management until either a suitability determination is made or until a Congressional designation. Of the 51 eligible rivers evaluated as a part of this plan revision, none were tentatively classified as Wild, 4 were tentatively classified as Scenic, and 49[157] were tentatively classified as Recreational.

Once assigned a tentative classification, the BLM further evaluates each eligible river segment to determine whether it is suitable for inclusion into the National System. The suitability analysis provides the basis for determining which rivers to recommend to Congress as potential additions to the National System by determining if certain river segments meet criteria for designation as a component of the National System, as specified in Section 4(a) of the WSR Act. The following questions are addressed when evaluating suitability:

- Should the river's free-flowing condition, water quality, and outstandingly remarkable values be protected, or are one or more other uses important enough to warrant doing otherwise?
- Will the river's free-flowing condition, water quality, and outstandingly remarkable values be protected through designation?
- Is designation the best method for protecting the river corridor?
- Is there a demonstrated commitment to protect the river by any non-Federal entities that may be partially responsible for implementing protective management?

The suitability assessments conducted as a part of this plan revision identified six river segments that are suitable for recommendation for potential inclusion into the National System.

[157] Two rivers, North Fork Clackamas River and North Santiam River, contain two river segments. Each of these rivers had one river segment the BLM tentatively classified as Scenic and one as Recreational.

Interim Management of Eligible and Suitable Rivers

To the extent possible under legal authorities, the BLM's goal in providing interim management for eligible and suitable rivers is to manage their free-flowing condition, water quality, any outstandingly remarkable values, and tentative classification. This interim management is required for eligible and suitable river segments, until either—

- The BLM determines, through a suitability study, that an eligible river segment is unsuitable for recommendation for inclusion into the National System; or
- Congress adds or precludes the addition of a suitable river segment to the National System.

Since the BLM, through this planning process, conducted suitability assessments on all eligible river segments, no further protection of eligible segments not found suitable would be required for these segments under the WSR Act under the No Action Alternative and Alternative D.[158] In accordance with BLM policy (USDI BLM 2012), Alternative D would recommend all evaluated study segments for inclusion into the National System resulting in interim management for free-flowing condition, water quality, any outstandingly remarkable values, and tentative classification of these river segments until a Congressional decision was received.

River Designations Not Affected by this Planning Effort

There are currently 9 designated Wild and Scenic Rivers within the planning area, and previous planning efforts (1995 RMPs) identified 13 river segments as suitable, which were recommended for potential inclusion in the National System. The status of these 22 river segments would be unchanged by any decisions made under this planning process.

Designated Rivers in the National Wild and Scenic Rivers System

The BLM administers nine designated Wild and Scenic Rivers within the planning area (**Table 3-282**). These rivers were designated by Congress or the Secretary of the Interior for the preservation of the free-flowing condition, water quality, any outstandingly remarkable values, and tentative classification, which the BLM manages in accordance with the management and protection identified in each river's Comprehensive River Management Plan (USDA FS, USDI BLM, and OPRD 1992; USDI BLM and OPRD 1993, USDA FS and USDI BLM 1993; USDI BLM 1972, 1992, and 2004), which are incorporated by reference.

[158] The Nestucca River Segment B would continue to receive protections under an 'eligible' status awaiting a joint suitability study with the U.S. Forest Service under all alternatives and the Proposed RMP.

Table 3-282. Designated Wild and Scenic Rivers within the planning area

Designated River Name	Year Designated	District/Field Office	Classification	River Miles
Clackamas	1988	Salem	Recreational	0.5
Elkhorn Creek	1996	Salem	Wild/Scenic	3.0
Klamath (upper reach)	1994	Klamath Falls	Scenic	11.0
North Umpqua	1988	Roseburg	Recreational	8.4
Quartzville Creek	1988	Salem	Recreational	9.7
Rogue	1968	Medford	Wild/Recreational	47.0
Salmon	1988	Salem	Scenic/Recreational	8.0
Sandy	1988	Salem	Scenic/Recreational	12.5
South Fork Clackamas	2009	Salem	Wild	0.6
			Totals	**100.7**

Note: The Fish Creek Wild and Scenic River, which is entirely on Forest Service lands within the planning area, was designated in 2009. The Forest Service is completing surveys of the designated Wild and Scenic River corridor, which may result in a small acreage of adjacent BLM-administered lands on the Salem District being included in the corridor.

Previously Recommended Wild and Scenic River Segments

Under the 1995 RMPs, the BLM recommended 13 suitable river segments for inclusion in the National System (**Table 3-283**). The BLM currently manages these segments under interim protection until Congress designates the river segments or releases them for other uses. The BLM revalidated these findings of suitability for these 13 river segments during this planning process.

Table 3-283. 1995 RMPs suitable Wild and Scenic Rivers within the planning area

River Segment Name	District	Wild and Scenic River Tentative Classification	River Miles
Big Windy Creek Segment A	Medford	Wild	1.6
Big Windy Creek Segment B	Medford	Wild	5.7
Dulog Creek Segment A	Medford	Wild	0.5
Dulog Creek Segment B	Medford	Wild	0.9
East Fork Big Windy Creek Segment A	Medford	Wild	0.2
East Fork Big Windy Creek Segment B	Medford	Wild	3.6
Howard Creek Segment A	Medford	Wild	0.7
Howard Creek Segment B	Medford	Wild	6.8
McKenzie River Segment A	Eugene	Recreational	11.0
Molalla River Segment B	Salem	Recreational	13.5
Nestucca River Segment A	Salem	Recreational	13.1
Siuslaw River Segment B	Eugene	Recreational	46.3
Siuslaw River Segment C	Eugene	Recreational	11.7
		Total Mileage	**115.6**

Summary of Analytical Methods

The BLM established impact indicators based on key resources to measure the effects that the management actions associated with each alternative and the Proposed RMP would have on the ORVs and tentative classification of eligible segments.

The BLM originally included water quality as an impact indicator for this analysis, since it is an aspect of river values considered during eligibility and suitability assessments. However, the analysis conducted for this planning effort for water quality determined that no future implementation actions included in any of the alternatives or the Proposed RMP would result in changes to water quality within the decision area (see the Hydrology section in this chapter). That analysis has determined that there would be no changes under implementation actions included in any of the alternatives or the Proposed RMP; therefore, the indicator of water quality has been dropped from this discussion.

The BLM originally included an impact indicator for changes to free-flowing characteristics, since it is an aspect of river values considered during eligibility and suitability assessments. However, no actions included in any of the alternatives or the Proposed RMP would change current free-flowing values of any of the 51 eligible segments. As there is no action upon which to measure differences for this indicator, it has been dropped from this discussion.

The Planning Criteria provides additional information on analytical assumptions, methods and techniques, and geographic and temporal scales, which the BLM incorporates here by reference (USDI BLM 2014, pp. 120–122).

Descriptions of Indicators Used for Analysis

The effect of the alternatives and the Proposed RMP on eligible river segments is assessed by considering the extent of protection of two factors: the ORVs and tentative classification. The BLM considers these factors protected for a given eligible segment when that segment is recommended for designation into the National System in an action alternative or the Proposed RMP. The BLM considers these factors unprotected when a particular segment is not recommended for potential inclusion into the National System.

Where an alternative or the Proposed RMP does not protect a particular segment by recommending it for potential inclusion into the National System, the analysis considers the potential effect of other management (e.g., ACEC designations, RMA designations, and land use allocations) on the two factors. Other management designations or allocations have the potential to provide protections for or negatively affect river ORVs and tentative classifications. Several key resources will be used to determine effects to ORVs and tentative classifications. Impact indicators include: (1) RMAs, ACECs, land use allocations, allowable forest management, and visual resource management (VRM) designations; and (2) establishing limitations for land tenures and minerals resources (e.g., timing limitations, establishing no surface occupancy stipulations, and establishing right-of-way exclusion areas).

Effects Analysis Assumptions

- A no surface occupancy stipulation generally provides protection by prohibiting surface occupancy and surface-disturbing activities that might degrade or continue degradation of the ORVs, and by preventing projects that might affect the tentative classification (i.e., Wild, Scenic, or Recreational) or free-flowing nature of the segment.

- Timing limitation stipulations provide a similar level of protection as no surface occupancy, but only during certain times of the year. These are especially important in protecting aquatic and terrestrial wildlife species and their habitat during critical times.

- Non-native invasive weed treatments in the short term may affect eligible segments' ORVs or tentative classification as evidence of human activity may be seen. In the long term, weed treatment and eradication would benefit ORVs as riparian health improves.

- Eligible segments with scenery ORVs, VRM Class I and II management would provide the most protection to the scenery ORV. VRM Class I and II management may also provide indirect protection for other ORVs or tentative classification by preventing certain types of development that would affect the ORVs or tentative classification.

- For eligible segments with scenery ORVs, VRM Class III and IV management would most likely lead to effects on scenery ORVs by allowing development that would directly impair scenic quality. VRM Class III and IV management may also indirectly affect other ORVs or tentative classification by allowing certain types of development.

- Increased recreation has the potential to affect ORVs associated with eligible segments. Building infrastructure to keep people away from sensitive resources could mitigate impacts. Closing areas to motorized travel would protect areas from impacts associated with public motorized travel activities. Designating routes for public motorized travel uses would help protect ORVs to a lesser degree.

- Where eligible segments overlap ACECs, ACEC management would complement management for ORVs and tentative classification.

- The corridor width for suitable or eligible rivers would not exceed an average of 320 acres per mile, which if applied uniformly along the entire river segment, is 0.25 mile on each side of the rivers. For analysis purposes, the affected river corridors are 0.25 mile on both sides of the river.

Affected Environment

Eligible River Segments and Associated Values

Under the 1995 RMPs, the BLM found 51 river segments eligible (**Table 3-284**). These segments are currently managed under interim protection until the BLM makes land use plan decisions regarding their suitability. As part of the current planning effort, the BLM evaluated these 51 eligible segments for suitability. The BLM identified six segments that meet the suitability criteria for recommendation for potential inclusion in the National System (**Table 3-285**). The Suitability Report and subsequent determinations can be found in **Appendix U** are incorporated here by reference.

Table 3-284. All eligible river segments within the decision area

Study River Name	Outstandingly Remarkable Values	Tentative Classification	River Segment Length (Miles)	BLM-administered Lands within WSR Corridors (Acres)
Alsea River	Recreation, Fish, Wildlife	Recreational	1.1	404
Antelope Creek	Fish	Recreational	1.3	718
Applegate River	Fish	Recreational	1.3	839
Big Butte Creek	Fish	Recreational	2.0	706
Cheney Creek	Fish	Recreational	2.2	711
Clackamas River	Recreation, Fish, Wildlife	Recreational	0.0	30
Cow Creek	Fish, Wildlife, Historical, Cultural	Recreational	10.0	3,339
Drift Creek	Fish	Recreational	0.4	150
Elk Valley Creek	Fish	Recreational	1.6	464
Fall Creek - Eugene	Recreation	Recreational	0.4	87
Fall Creek - Salem	Fish	Recreational	2.4	670
Kilches River	Recreation, Fish, Wildlife	Recreational	0.0	66
Lake Creek Segment B	Recreation, Fish	Recreational	0.9	483
Left Fork Foots Creek	Fish	Recreational	0.1	131
Little Applegate River	Fish	Recreational	1.7	1,368
Little Luckiamute River	Ecology	Recreational	0.3	40
Little North Santiam River	Scenery, Recreation, Fish, Wildlife	Recreational	3.5	1,205
Lobster Creek Segment B	Fish	Recreational	0.1	352
Luckiamute River	Ecology	Recreational	2.2	624
McKenzie River Segment B	Scenery, Recreation, Fish, Wildlife	Recreational	1.0	56
Middle Santiam River	Cultural, Ecology	Recreational	0.6	193
Nehalem River	Recreation	Recreational	0.2	40
Nelson Creek	Fish	Recreational	2.6	833
Nestucca River Segment B*	Scenery, Recreation, Fish, Wildlife	Recreational	0.6	212
North Fork Clackamas River	Fish	Scenic (Seg. 1), Recreational (Seg. 2)	1.4	389
North Fork Gate Creek	Fish	Recreational	0.6	199
North Fork Siletz River	Fish, Wildlife, Ecology	Scenic	3.5	990
North Fork Trask River	Recreation, Fish	Recreational	3.0	778
North Santiam River	Scenery, Recreation, Fish, Wildlife (Seg. A), Recreation, Fish, Wildlife (Seg. B)	Scenic (Seg. A), Recreational (Seg. B)	1.2	376
Quines Creek	Fish	Recreational	2.7	816
Riffle Creek	Fish	Recreational	1.9	762
Rogue River	Recreation, Fish	Recreational	2.1	754
Sams Creek	Fish	Recreational	1.5	497
Sandy River	Scenery, Recreation, Fish, Cultural	Recreational	7.3	1,519
Siletz River	Scenery, Recreation, Fish, Wildlife	Recreational	0.7	54
Sixes River	Fish, Wildlife, Historical	Recreational	2.0	281
South Fork Coos River	Recreation, Fish, Wildlife	Recreational	1.4	551
South Fork Coquille	Fish, Cultural	Recreational	1.0	152
South Fork Gate Creek	Fish	Recreational	0.6	108

Study River Name	Outstandingly Remarkable Values	Tentative Classification	River Segment Length (Miles)	BLM-administered Lands within WSR Corridors (Acres)
South Fork Little Butte Creek	Fish	Recreational	1.4	452
South Fork Trask River	Fish	Recreational	0.0	69
South Umpqua	Fish, Wildlife, Historical, Cultural	Recreational	1.4	602
South Yamhill River†	Cultural, Ecology	Recreational	0.0	0
Table Rock Fork – Molalla River	Scenery, Cultural	Recreational	4.7	1,480
Trask River	Recreation	Recreational	0.4	444
Tualatin River	Cultural	Recreational	1.2	326
Umpqua River	Scenery, Recreation, Geology, Fish, Wildlife, Historical, Cultural, Ecology	Recreational	18.0	2,403
West Fork Illinois River	Scenery	Scenic	4.2	1,154
Willamette River	Recreation, Fish, Wildlife, Historical, Cultural, Ecology	Recreational	1.1	83
Wilson River	Recreation, Fish, Wildlife	Recreational	0.0	109
Yaquina River	Fish, Wildlife	Recreational	1.3	270
		Totals	**100.9**	**29,339**

* The BLM concluded through the suitability assessment that a joint suitability study with the U.S. Forest Service is needed to make a determination about the segment's suitability. This segment will continue to receive protection until completion of the joint study.

† The BLM discovered through a revalidation of the eligibility determinations that were made in 1992 that the South Yamhill River corridor does not include any BLM-administered lands. Therefore, this segment that was previously determined eligible did not move forward for suitability evaluation as part of this RMP revision.

Table 3-285. Eligible rivers within the decision area that the BLM identified as meeting suitability criteria

River Segment Name	District	Outstandingly Remarkable Values	Suitable River Tentative Classification	River Miles
Little North Santiam River	Salem	Scenery, Recreation, Fish, Wildlife	Recreational	3.5
North Fork Siletz	Salem	Fish, Wildlife, Ecology	Scenic	3.5
Rogue River	Medford	Recreation, Fish	Recreational	2.1
Sandy River	Salem	Scenery, Recreation, Fish, Cultural	Recreational	7.3
Table Rock Fork Molalla	Salem	Scenery, Cultural	Recreational	4.7
West Fork Illinois	Medford	Scenery	Scenic	4.2
			Total Miles	**25.3**

Environmental Consequences

This section analyzes the environmental impacts to eligible river segments within the decision area that could result from the implementation of the management actions proposed under the alternatives or the Proposed RMP in relation to other resources and resource uses. This analysis is two-part: (1) effects to ORVs and tentative classifications that would result from recommendation for inclusion into the National System under each alternative and the Proposed RMP; and (2) effects to ORVs and tentative classifications of segments that would not be recommended for inclusion into the National System under each alternative and the Proposed RMP.

Effects to Eligible River ORVs and Tentative Classifications Resulting from Recommendation for Inclusion in the National System

As described in more detail below, the No Action alternative and Alternative D would provide the most protection for the 51 current eligible river segments. Both of these alternatives fulfill regulation that requires analysis of a No Action alternative (where suitability assessments would not be considered completed and eligible rivers would continue with interim management based upon the tentative classification and ORVs), and analysis of an alternative that includes recommendation for national designation of all eligible segments, regardless of suitability determinations. The BLM would continue to manage all 51 eligible segments based upon the ORVs and tentative classifications under both of these alternatives. Alternative A fulfills regulation that requires analysis of an alternative that would not recommend any eligible river segments for inclusion into the National System, and no management for ORVs or tentative classification would occur. Alternatives B and C and the Proposed RMP would recommend the six eligible rivers found suitable through assessment for inclusion into the National System. **Table 3-286** compares the miles and acres of eligible river segments that would be protected in the action alternatives and the Proposed RMP.

Table 3-286. Eligible river segment protection totals within the decision area

Alternative/ Proposed RMP	Eligible Rivers Determined Suitable (Number of Segments)	Protected River Miles (Total Miles)	Protected River Acres (Total Acres)
No Action	51	100.9	29,339
Alt. A	-	-	-
Alt. B	6	25.3	7,102
Alt. C	6	25.3	7,102
Alt. D	51	100.9	29,339
PRMP	6	25.3	7,102

No Action Alternative

Under the No Action alternative, the BLM would continue to manage the 51 segments identified as eligible during the 1995 RMP process to protect their ORVs, water quality, free-flowing characteristics, and tentative classification as Wild, Scenic, or Recreational until suitability is determined during subsequent land use planning efforts on the 100.9 river miles and 29,339 acres within the study river corridors. Under this protective management, the BLM would not approve any action that would adversely affect the 51 segments' ORVs or tentative classification, and the BLM assumes that these characteristics would persist.

Alternative A

Under Alternative A, the BLM would not recommend any of the 51 eligible river segments in the planning area for inclusion into the National System. The BLM would not continue to manage these 100.9 river miles and 29,339 acres of land for river ORVs and tentative classification. While management under the guidance of the WSR Act would not occur, the BLM assumed that this change in management would only negatively affect miles and acres of eligible rivers that occur in land use allocations or special management areas where management direction would be in conflict with retention of the ORVs and tentative classification. The specific actions and acres that could result in long-term adverse impacts to the ORVs and tentative classification identified during the eligibility assessments are discussed below.

Alternatives B and C, and the Proposed RMP

Under Alternatives B and C, and the Proposed RMP, the BLM would recommend six segments for potential inclusion into the National System (**Table 3-285**). The BLM would continue to manage these 6 segments, totaling 25.3 river miles and 7,102 acres of land, to ensure the continued protection of their ORVs and tentative classification until Congress makes a determination whether to designate the segment(s) as part of the National System. The BLM would not recommend 45 segments for inclusion into the National System. While management under the guidance of the WSR Act would not occur, the BLM assumed that this change in management would only negatively affect miles and acres of eligible rivers that occur in land use allocations or special management areas where management direction would be in conflict with retention of the ORVs and tentative classification. The specific actions and acres that could result in long-term adverse impacts to the ORVs and tentative classification identified during the eligibility assessments are discussed below.

Alternative D

Under Alternative D, the BLM would recommend all 51 eligible segments for inclusion into the National System. The BLM would continue managing the segments to protect the ORVs and tentative classification. Implementation of Alternative D would result in effects similar to or the same as those described under the No Action alternative, as the BLM would provide interim protection to these river segments (**Appendix B**). The BLM assumes that these characteristics would persist.

Effects to Eligible Segment ORVs and Tentative Classifications from Management for Other Resources

In accordance with the WSR Act, the BLM would release some or all eligible river segments from interim protective management where they are not recommend for potential inclusion into the National System under Alternatives A, B, and C, or the Proposed RMP. Management of BLM-administered lands within these released river corridors would occur in conformance with the applicable land use allocations, of which some would result in effects that would potentially degrade released values. However, portions of these same segments would also receive indirect protection for their ORVs and tentative classification from management intended to protect other resources. These potential effects and indirect protections are detailed below.

The No Action alternative and Alternative D are not included in this section of the analysis. By continuing existing management, under the No Action alternative, study river corridors would continue to receive protective management under existing eligible determinations. In Alternative D, the BLM would recommend all river corridors for inclusion into the National System and, therefore, the BLM would continue to provide adequate protections to ORVs and tentative classifications within these study river segments.

Effects from Riparian Management

Fish have been identified as an ORV on 85 percent of BLM-administered acres within the eligible river corridors. Fish have been identified as the sole ORV on 19 river segments (37 percent of all eligible segments). Under all alternatives and the Proposed RMP, there would be no impact to fish-related ORVs for any of the 41 currently eligible segments with fish as an ORV, regardless of whether they are recommended for inclusion in the National System. As stated in the Fisheries and Hydrology sections of this chapter, the riparian management strategies would all have similar consequences in that they would be protective of stream shade and would not increase stream temperatures for any of the alternatives or the Proposed RMP. Absent any affect to stream temperature, there would be no affect to fish ORVs resulting from any of the alternatives or the Proposed RMP. However, the discussions below on the effects to ORVs from resource management do not exclude these 19 eligible stream segments only containing fish ORVs. As such, the discussions of effects from various programs to ORVs, outside of the specific discussions to recreation and scenery ORVs, are overstated.

Effects from Minerals and Right-of-Way Management

Development of leasable and locatable minerals has the potential to affect some ORVs and the tentative classification segments not recommended for inclusion into the National System. Similarly, the granting of rights-of-way along segments not recommended for inclusion in the National System could have adverse effects to, for example, tentative classifications through changes in access to river segments where low to no access is an element of the tentative classification. Mineral or right-of-way development along the segments not recommended for inclusion into the National System could result in a substantially higher level of surface disturbance, access changes, and visual effects. **Table 3-287** shows the incidental protection of river segments not recommended for inclusion into the National System from minerals and rights-of-way restrictions.

Table 3-287. River segments not recommended for inclusion in the National System receiving incidental protection from mineral and right-of-way management

Alternative/ Proposed RMP	River Segments Not Recommended for National System Inclusion (Number)	Stipulation	Right-of-way		Recommended for Withdrawal from Locatable Mineral Entry (Acres)	Closed to Salable Mineral Development (Acres)
		No Surface Occupancy, Controlled Surface Use, Timing Limitation (Acres)	Exclusion (Acres)	Avoidance (Acres)		
Alt. A	51	4,401	1,467	7,507	4,096	1,870
Alt. B	45	1,567	-	4,138	1,330	1,618
Alt. C	45	1,948	-	6,196	1,504	1,706
PRMP	45	3,348	444	3,063	976	1,389

Where alternatives and the Proposed RMP require leasable mineral stipulations for the protection of other resources along non-suitable river segments these stipulations would provide some level of protection for certain ORVs. In Alternative A, 15 percent of river segments not recommended for inclusion into the National System would receive incidental protection from mineral stipulations, compared to 7 percent in Alternative B, 9 percent in Alternative C, and 15 percent in the Proposed RMP.

River segments not recommended for inclusion in the National System may also receive incidental protection from being within right-of-way avoidance or exclusion areas designated for the protection of other resources. Right-of-way exclusion would provide the most protection to ORVs and tentative classification by not permitting new discretionary rights-of-way in the area. In Alternative A, 5 percent of river segments not recommended for inclusion in the National System would receive incidental protection from right-of-way exclusion and 25 percent from right-of-way avoidance. In Alternative B, 19 percent of segments not recommended for inclusion in the National System in Alternative would receive incidental protection from right-of-way avoidance compared to 28 percent in Alternative C. The 22,237 acres of river segments not recommended for inclusion in the National System in Alternatives B and C would receive no incidental protection from right-of-way exclusion but 14 percent would from right-of-way avoidance. Compared to Alternatives A, B, and C, the Proposed RMP protects fewer acres.

Effects from Visual Resource Management

Variations in VRM classes relative to the location of river segments not recommended for inclusion in the National System would potentially allow for impacts to the scenic quality and potential loss of a qualifying ORV. Rivers with a scenery ORV would be impacted if visual resources were degraded. VRM Class designations I and II preserve and retain the existing character of the landscapes, respectively. VRM Class III and IV partially retain and allow for major modification of the existing character of the landscape. **Table 3-288** identifies the nine river segments not recommended for inclusion under at least one alternative in the National System with scenery as a qualifying ORV in VRM Class I and II.

Table 3-288. Eligible river segment corridors with overlapping scenery ORVs and VRM Class I or II, where the river segment is not recommended for inclusion into the National System

Eligible River Segments with Scenery ORVs*	BLM-administered Lands within WSR Corridors (Acres)	BLM-administered Lands within WSR Corridors Managed as VRM Class I or II			
		Alt. A (Percent)	Alt. B† (Percent)	Alt. C* (Percent)	PRMP* (Percent)
Little North Santiam River	1,205	<1%	Recommended for Inclusion		
McKenzie River Segment B	56	100%	100%	100%	64%
North Santiam River	376	-	-	-	100%
Sandy River	1,519	100%	Recommended for Inclusion		
Siletz River	54	-	-	-	-
Table Rock Fork–Molalla River	1,480	21%	Recommended for Inclusion		
Umpqua River	2,403	1%	1%	1%	1%
West Fork Illinois River	1,154	8%	Recommended for Inclusion		
Totals	**8,459**	**24%**	**3%**	**3%**	**14%**

* In addition to the rivers listed, the Nestucca River Segment B would continue to receive protections under an 'eligible' status awaiting a joint suitability study with the U.S. Forest Service under all alternatives and the Proposed RMP.

† Total acre percentages are the percentage of the remaining five rivers' 3,101 corridor acres that would not be recommended for inclusion into the National System.

The extent to which management under a VRM Class III or IV designation could impact scenery ORVs to the point that they would no longer be present within the river segment corridor is unknown and not possible to assess at the scale of the planning area. While some river segments not recommended for inclusion into the national system do include acres managed as VRM Class III or IV, all river segments would also contain the Riparian Reserve land use allocation within the first 50 to one site-potential tree height distance from the river under all action alternatives and the Proposed RMP. Because the Riparian Reserve allows for limited forest management, depending on site-specific vegetation, slope, and terrain, the management direction of the Riparian Reserve could protect existing scenery ORVs to the extent that they would not be lost. Additionally, the location of land management resulting in a change in visual resources within the river segment corridor (i.e., visibility of the harvested stand or constructed road from the river) would greatly determine the magnitude of the effect of the change in visual resources on the river segment and existing ORVs.

Under Alternative A, no river segments would be recommended for inclusion into the National System. Of the nine river segments with scenery ORVs, Mackenzie River Segment B and Sandy River would receive incidental protection of scenery ORVs on all BLM-administered lands within the WSR corridor. Little North Santiam River, Table Rock Fork–Molalla River, Umpqua River, and West Fork Illinois River would receive minimal incidental protection of the BLM-administered corridor, and the North Santiam River and Siletz River would receive no incidental protection of their corridors.

Alternatives B and C and the Proposed RMP would recommend all rivers found suitable for inclusion into the National System. The Little North Santiam River, Sandy River, Table Rock Fork – Molalla River, and West Fork Illinois River would all be recommended for inclusion into the National System and would be managed as VRM II. Alternatives B and C would provide incidental protection of scenery ORVs on all BLM-administered lands within the WSR corridor of Mackenzie River Segment B, and minimal incidental protection of the BLM-administered corridor for Umpqua River. The North Santiam River and Siletz River segments not recommended for inclusion into the National System with scenery ORVs would receive no incidental protection to their river corridors.

The Proposed RMP would provide incidental protection of scenery ORVs on all BLM-administered lands within the WSR corridor of the North Santiam River segment, incidental protection to more than half of the acreage of the BLM-administered corridor for McKenzie River Segment B, and incidental protection on a minimal acreage of the BLM-administered corridor for the Umpqua River. The Siletz River segment not recommended for inclusion into the National System with scenery ORVs would receive no incidental protection to their river corridors. Compared to the alternatives, the Proposed RMP provides the most level of protection to eligible rivers with scenery ORVs when compared to the action alternatives because it would manage the four segments with scenery ORVs found suitable and recommended for inclusion into the National System as VRM II and would provide incidental protection to 14 percent of the remaining eligible rivers that would not be recommended for inclusion.

In addition to scenery ORVs, VRM could have affects to management of scenic tentative classifications on eligible rivers not recommended for inclusion in the National System. In Alternatives A, B and C, 8 percent of the 4 eligible rivers (North Fork Clackamas, North Fork Siletz, North Santiam, and West Fork Illinois) with scenic classifications that would not be recommended for inclusion into the National System, would receive incidental protection to the scenic classification through VRM Class I or II designation. In the Proposed RMP, the four eligible rivers with scenic classifications would receive incidental protection to the scenic classification through VRM Class I or II designation, except where these acres overlap the Harvest Land Base. Approximately 220 acres of the total 2,909 BLM-administered lands within the corridors for these 4 rivers overlap the Harvest Land Base and would be managed as VRM Class III.

Effects from ACEC Management

The relevant and important values for an ACEC are often identical to ORVs identified for an eligible river that occurs in the same area. In such cases, overlapping ACEC management for that relevant and important value would also directly maintain or enhance that ORV. Management for overlapping ACECs may also indirectly maintain or enhance an eligible river's ORVs, even if the ORV is not also an ACEC relevant and important value. **Table 3-289** displays acres of the 13 eligible river segments with overlapping ACEC designations.

Table 3-289. Eligible river segment corridors with overlapping ACEC designations where the river segment is not recommended for inclusion in the National System

Eligible River Segments with ACEC Overlap	BLM-administered Lands within WSR Corridors (Acres)	Alt. A (Acres)	Alt. B (Acres)	Alt. C (Acres)	PRMP (Acres)
Big Butte Creek	706	33	33	33	33
Cow Creek	3,339	138	138	138	138
Fall Creek – Salem	670	11	11	11	11
Lake Creek Segment B	483	54	54	54	54
Little Applegate River	1,368	10	10	10	10
McKenzie River Segment B	56	47	47	47	44
Middle Santiam River	193	172	172	172	172
North Fork Siletz River	990	353	Recommended for Inclusion		
Riffle Creek	762	9	9	9	2
Rogue River	754	47	Recommended for Inclusion		
Sandy River	1,519	1,516	Recommended for Inclusion		
Umpqua River	2,403	20	20	20	20
West Fork Illinois River	1,154	897	Recommended for Inclusion		
Total BLM-administered Lands within WSR Corridors that Overlap with ACECs (Acres)	**14,397**	**3,307**	**494**	**494**	**484**

In Alternative A, 13 eligible rivers not recommended for inclusion into the National System would overlap with ACECs with complementary management. The majority of this overlap is a relatively low percentage of each eligible river's corridor. The highest percentage of overlap occurs on the Sandy River segment (99.8 percent overlap), West Fork Illinois segment (77 percent overlap), and McKenzie River (72 percent overlap). Management of public lands to maintain or enhance relevant and important values within these ACECs would effectively maintain or enhance eligible river ORVs and tentative classification on these three segments under Alternative A. Since all other eligible river segments have relatively low percentages of corridor overlap, it is unlikely ACEC management would influence retention or maintenance of ORVs or tentative classification.

In Alternatives B and C, and the Proposed RMP, nine eligible rivers not recommended for inclusion into the National System overlap with ACECs with complementary management. Since all other eligible river segments have relatively low percentages of corridor overlap, it is unlikely ACEC management would influence retention or maintenance of ORVs or tentative classification.

Effects from Recreation and Visitor Services Management

Management of recreation outcomes and setting characteristics within Recreation Management Areas (RMAs) would generally be complementary to management for study river values where Recreation was identified as an ORV. In such cases, overlapping recreation management for recreation values would also directly maintain or enhance that ORV. **Table 3-290** identifies the eligible segments with recreation as a qualifying ORV and the acres that overlap with RMAs for all eligible river segments.

Table 3-290. Eligible river segments with recreation ORVs and overlapping Recreation Management Area designations, where the river segment is not recommended for inclusion into the National System.

Eligible River Segments with Recreation ORVs*	BLM-administered Lands within WSR Corridors (Acres)	Alt. A (Acres)	Alt. B (Acres)	Alt. C (Acres)	PRMP (Acres)
Alsea River	404	3	3	3	3
Clackamas River	30	-	-	-	-
Fall Creek – Eugene	87	-	-	-	-
Kilchis River	66	-	-	-	66
Lake Creek Segment B	483	2	2	2	2
Little North Santiam River	1,205	104	Recommended for Inclusion		
McKenzie River Segment B	56	3	3	3	3
Nehalem River	40	-	-	14	14
North Fork Trask River	778	-	-	-	-
North Santiam River	376	150	148	148	148
Rogue River	754	12	Recommended for Inclusion		
Sandy River	1,519	33	Recommended for Inclusion		
Siletz River	54	-	-	-	-
South Fork Coos River	551	-	-	-	-
Trask River	444	-	-	-	-
Umpqua River	2,403	53	52	269	481
Willamette River	83	68	-	-	-
Wilson River	109	-	-	48	61
Totals	**9,654**	**428**	**208**	**487**	**778**

* In addition to the rivers listed, the Nestucca River Segment B would continue to receive protections under an 'eligible' status awaiting a joint suitability study with the U.S. Forest Service under all alternatives and the Proposed RMP.

Alternative B has 208 acres, Alternative A has 428 Acres, Alternative C has 487 acres, and the Proposed RMP has 778 acres of eligible river segments not recommended for inclusion in the National System with recreation ORVs that are incidentally protected by RMAs. Compared to Alternative B, Alternative A has double the acreage of eligible with complimentary RMA designation and Alternative C has a slightly higher acreage than Alternative A. The Proposed RMP protects the largest acreage of eligible rivers not recommended for inclusion into the National System with recreation ORVs through complimentary RMA designation. The Proposed RMP provides the largest level of protection for recreation ORVs associated with non-suitable rivers when compared to all action alternatives.

Based on the tentative classification criteria for recreational river segments, some development and substantial evidence of human activity is present within 93 percent of eligible rivers. Lands within river areas with tentative recreational classifications are characterized by historical active management, including the full range of agricultural and forestry uses, showing evidence of past and ongoing timber harvest activities. Additional development, including that which supports increased recreation use along the non-suitable segments could result in slightly higher levels of surface disturbance and visual impacts then would occur under the No Action alternative. However, other resource protection measures for water, riparian areas, and wildlife would add protections that would indirectly protect segments found not suitable for inclusion into the National System from land and realty impacts.

Effects from Forest Management

The No Action alternative and Alternative D are not included in this section of the analysis. By continuing existing management, under the No Action alternative, study river corridors would continue to receive protective management under existing eligible determinations. In Alternative D, the BLM would recommend all river corridors for inclusion into the National System and, therefore, the BLM would continue to provide adequate protections to ORVs and tentative classifications within these study river segments.

For those eligible rivers not recommended for inclusion into the National System, ORVs could be negatively impacted where eligible river segment corridors overlap with the Harvest Land Base. **Table 3-291** displays acres of eligible river segment not recommended for inclusion in the National System that have corridor overlap with the Harvest Land Base.

Table 3-291. Eligible river segments that have corridor overlap with the Harvest Land Base land use allocation where the river segment is not recommended for inclusion into the National System

Alternative/ Proposed RMP	River Segments Not Recommended for Inclusion in the National System (Number)	Harvest Land Base within WSR Corridors (Acres)	Total BLM-administered Lands in River Corridors (Acres)
Alt. A	51	2,469	29,339
Alt. B	45	3,882	22,236
Alt. C	45	5,442	22,236
PRMP	45	3,723	22,236

Alternative A would have 8 percent of eligible river segment corridors not recommended for inclusion in the National System within the Harvest Land Base, the fewest when compared to Alternatives B and C and the Proposed RMP (17 percent, 24 percent, and 17 percent, respectively). Effects from forest management activities on ORVs for eligible segments not recommended for inclusion into the National System would be the least under Alternative A and the most under Alternative C, with Alternatives B and the Proposed RMP having similar effects.

Forest management could affect ORVs, specifically scenery, wildlife, botany, ecology, and recreation. However, the extent to which forest management could affect ORVs to the point that they would no longer be present within the river segment corridor is unknown and not possible to assess at the scale of the planning area. While some river segments not recommended for inclusion into the national system do include acres of the Harvest Land Base land use allocation, all river segments would also contain the Riparian Reserve land use allocation within the first 50 to one site-potential tree height distance from the river under all action alternatives and the Proposed RMP. Depending on site-specific vegetation, slope, terrain, and segment ORVs, the management direction of the Riparian Reserve could protect existing ORVs to the extent that they would not be lost. Additionally, the location of the Harvest Land Base within the river segment corridor (i.e., visibility of the stand from the river) would greatly determine the magnitude of the effects of forest management on the river segment and existing ORVs.

Effects from Comprehensive Trail and Transportation Management

Eligible river segments not recommended for inclusion in the National System could be affected by public motorized access designations. See the Trails and Travel Management section of this chapter (Issue 1) for more details on public motorized access designations. Designating areas as *closed* or *limited* for public motorized access would reduce effects in the corridors of the eligible segments. Damage to vegetation would be reduced or eliminated, which would protect ORVs, specifically historical, ecology, scenic, wildlife, and botany. **Table 3-292** displays public motorized access designations for river segments not recommended for inclusion into the National System by alternative and the Proposed RMP.

Table 3-292. Public motorized access designation designations for eligible river segments

Public Motorized Access Designations within River Segments	Alt. A (Acres)	Alt. B (Acres)	Alt. C (Acres)	PRMP (Acres)
Closed	327	1,760	3,243	1,398
Limited to Designated	110	218	1,501	-
Limited to Existing	29,052	27,619	26,136	28,614
Open	-	-	-	-
Totals	**29,489**	**29,597**	**29,880**	**30,012**

Under Alternatives A, B, and C, and the Proposed RMP, the majority of acres within eligible river segment corridors not recommended for inclusion into the National System are designated as *limited* for public motorized access. The remainder of the acres under these alternatives and the Proposed RMP are designated as *closed*. No acres would be designated as *open* for public motorized access under these alternatives. By shifting to *limited* from an *open* designation, the ORVs for eligible river segments not recommended for inclusion in the National System would be better protected from effects of public motorized access.

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Chapter 4 – Consultation and Coordination

Summary of Notable Changes from the Draft RMP/EIS

Chapter 4 of the Proposed RMP/Final EIS has—

- Updated the description of public involvement and cooperator meetings;
- Added a summary of the comments received on the Draft RMP/EIS;
- Added a discussion of the protest process; and
- Added a discussion of the Governor's consistency review.

Introduction

This chapter describes the public involvement and collaboration that occurred during the preparation of this Proposed RMP/Final EIS. That collaboration includes government-to-government relationships with Tribes, formal cooperators in the planning process, and consultation with Federal and State agencies. This chapter also includes a list of staff involved in the RMPs for Western Oregon.

Public Involvement

Formal scoping for the RMPs began with the publication of the Notice of Intent in the Federal Register on March 9, 2012 (77 FR 14414). The BLM initially requested that the public submit comments in response to the Notice of Intent by July 5, 2012. The BLM continued to accept public scoping comments for an additional 90 days. By October 5, 2012, the BLM had received 584 comment letters. During the scoping period, the BLM held public meetings in Medford, Grants Pass, Klamath Falls, Salem, Springfield, Coos Bay, Roseburg, and Portland.[159] At each of these meetings, the BLM provided a brief overview of the planning process and a list of questions to prompt feedback, and then opened the meeting for discussion. The BLM prepared a scoping report, which contains a summary of this scoping process. The scoping report and other scoping documents are available at http://www.blm.gov/or/plans/rmpswesternoregon/scoping.php.

During the winter of 2013, the BLM initiated a multi-phase outreach strategy to engage the public specifically on recreation management issues. The BLM sought to gain a better understanding of the social values associated with recreational users across western Oregon. This strategy included an interactive website and four regional workshops in Medford, Roseburg, Springfield, and Portland. The regional workshops included the participation of the National Park Service-Rivers, Trails and Conservation Assistance program, the Association of O&C Counties, the Outdoor Alliance, Travel Oregon, the Cow Creek Band of the Umpqua Tribe of Indians, and the Mazamas. The BLM designed this recreation outreach to answer planning questions, collect quantitative and qualitative data specific to recreation management area delineation, and to understand better the role, value, and importance that recreation plays within each planning region. Outreach also yielded data related to public demand for specific types of recreation activities, experiences, beneficial outcomes, and the desired character of BLM-administered recreation settings. A Recreation key findings report contains a summary of the results of this outreach effort and is available at http://www.blm.gov/or/plans/rmpswesternoregon/files/key-findings.pdf.

[159] The BLM has listed the cities in this chapter in order by meeting date.

In June of 2013, the BLM released the Purpose and Need Statement for the RMPs for Western Oregon. While this is not a typical step in the planning process, the BLM shared the Purpose and Need Statement earlier than usual in order to augment dialogue on the direction of the planning process. The Purpose and Need Statement is available at http://www.blm.gov/or/plans/rmpswesternoregon/files/purpose.pdf.

In August of 2013, the BLM released the Analysis of the Management Situation for the RMPs for Western Oregon (USDI BLM 2013). The BLM managers use the Analysis of the Management Situation as a snapshot to understand the status of the BLM resources and management opportunities in western Oregon, and the BLM shared this document for informational purposes. The Analysis of the Management Situation is available at http://www.blm.gov/or/plans/rmpswesternoregon/files/ams-rmps-western-oregon.pdf.

During December of 2013, the BLM conducted four community listening sessions on elements of the RMP. The BLM held public meetings in Corvallis, Medford, Coos Bay, and Roseburg. The community listening sessions included BLM updates on the planning process, and attendees had a chance to share their input with the BLM and each other through small group discussions. A report (USDI BLM 2014a) on the community listening sessions is available at http://www.blm.gov/or/plans/rmpswesternoregon/files/comm-listen-report.pdf.

On February 24, 2014, the BLM released the Planning Criteria (USDI BLM 2014b), which provided an in-depth look at guidance, policy, analytical methodology, and preliminary alternatives. The comment period for the Planning Criteria continued until March 31, 2014. The BLM received approximately 3,000 comments during this comment period. During March 2014, the BLM conducted seven public meetings about the Planning Criteria and the preliminary alternatives. The BLM held public meetings in Portland, Springfield, Salem, Roseburg, Coos Bay, Medford, and Klamath Falls. The BLM also held an additional public meeting in Roseburg with invited elected officials. The Planning Criteria is available at http://www.blm.gov/or/plans/rmpswesternoregon/files/rmp-criteria.pdf.

Additionally, the BLM has provided information to the public through various digital media outlets, including the BLM's public website, Twitter, and Facebook. The public can send inquiries to the agency at any time through a publicly available email address, BLM_OR_RMPs_WesternOregon@blm.gov.

On April 24, 2015, the BLM released the Draft RMP/EIS, announcing, at that time, a 90-day comment period that would conclude on July 23, 2015. On July 13, 2015, the BLM extended the comment period on the Draft RMP/EIS until August 21, 2015. During the comment period, the BLM held 17 scheduled public meetings in May and June of 2015. These meetings included open houses in Roseburg, Springfield, Salem, Klamath Falls, Medford, Coos Bay, and Portland. These public meetings also included workshops on socioeconomics in Salem and Roseburg, workshops on recreation in Roseburg, Grants Pass, Salem, and Springfield, workshops on forest management and wildlife in Salem and Medford, and a workshop on riparian management in Springfield. The BLM also held a public meeting with an invitation for elected officials in Salem. The BLM announced these public meetings through the BLM website and news releases. The Report on Public Outreach Sessions is available at http://www.blm.gov/or/plans/rmpswesternoregon/files/Public_Outreach_Report_Aug2015.pdf.

The BLM received approximately 4,500 comments on the Draft RMP/EIS during the comment period. The BLM has compiled, analyzed, and summarized all comments received during the comment period on the Draft RMP/EIS. **Appendix W** presents a summary of substantive comments the BLM received during the comment period and provides a response indicating how the BLM modified the document or why the comment did not warrant a change to the document. Comment letters submitted during the comment period are available at http://www.blm.gov/or/plans/rmpswesternoregon/comments.php.

List of Recipients of the Proposed RMP/Final EIS

The BLM will distribute the Proposed RMP/Final EIS to a mailing list of those agencies, organizations, Tribes, and individuals that have requested copies. This mailing list, which includes approximately 750 mailings of the document, is incorporated here by reference (USDI BLM 2016b).

Protest Process

Pursuant to BLM's planning regulations at 43 CFR 1610.5–2, any person who participated in the planning process for this Proposed RMP and has an interest which is or may be adversely affected by the planning decisions may protest approval of the planning decisions within 30 days from the date the Environmental Protection Agency publishes the Notice of Availability in the Federal Register. Protests must comply with the requirements described in the BLM's planning regulations at 43 CFR 1610.5–2. Interested parties should take care to document all relevant facts. As much as possible, specific planning documents or available planning records (e.g., meeting minutes or summaries, and correspondence) should be referenced or cited.

Emailed protests will not be accepted as valid protests unless the protesting party also provides the original letter by either regular or overnight mail postmarked by the close of the protest period. Under these conditions, the BLM will consider the emailed protest as an advance copy and will afford it full consideration. If you wish to provide the BLM with such advance notification, please direct emailed protests to the attention of the BLM protest coordinator at protest@blm.gov.

All protests, including the follow-up letter (if emailing), must be in writing and mailed to one of the following addresses:

Regular Mail:
Director (210)
Attn: Protest Coordinator
P.O. Box 71383
Washington, D.C. 20024-1383

Overnight Delivery:
Director (210)
Attn: Protest Coordinator
20 M Street SE, Room 2134LM
Washington, D.C. 20003

Before including your address, phone number, email address, or other personal identifying information in your protest, be advised that your entire protest—including your personal identifying information—may be made publicly available at any time. While you can ask us in your protest to withhold from public review your personal identifying information, we cannot guarantee that we will be able to do so.

The BLM Director will make every attempt to render a decision on each protest promptly. The decision will be in writing and will be sent to the protesting party by certified mail, return receipt requested. The decision of the BLM Director shall be the final decision of the Department of the Interior.
Upon resolution of all land use plan protests, the BLM will issue two Records of Decision/Approved RMPs (RODs/RMPs). The Approved RODs/RMPs will be mailed to parties who have requested hard copies or email notifications the documents are available online.

Government-to-Government Relationships

Federally recognized Tribes have a unique relationship with the Federal government in that they are sovereign nations and retain inherent powers of self-government. They interact with the United States on a government-to-government level.

When preparing RMPs, the BLM consults with Tribes to provide Tribes with an opportunity to identify any issues or concerns that Tribes may have with the management of lands and resources in the decision area; to identify places of religious or cultural significance (and if any issues exist with access to places needed for the practice of traditional religions); and whether there are other Indian individuals or traditional cultural leaders who the BLM should also contact.

There are nine federally recognized Tribes located within, or that have interests within, the planning area:

- The Confederated Tribes of Grand Ronde: www.grandronde.org
- The Confederated Tribes of Siletz Indians: www.ctsi.nsn.us
- The Coquille Indian Tribe: www.coquilletribe.org
- The Confederated Tribes of Coos, Lower Umpqua, and Siuslaw Indians: www.ctclusi.org
- The Confederated Tribes of Warm Springs: www.warmsprings.com
- The Cow Creek Band of Umpqua Tribe of Indians: www.cowcreek.com
- The Klamath Tribes: www.klamathtribes.org
- The Quartz Valley Indian Reservation: www.qvir.com
- The Karuk Tribe: www.karuk.us

The BLM invited all of the above federally recognized Tribes to be formal cooperators in the RMP revisions because of their special expertise. The Confederated Tribes of Grand Ronde, the Confederated Tribes of Siletz Indians, the Coquille Indian Tribe, the Confederated Tribes of Coos, Lower Umpqua, and Siuslaw Indians, the Cow Creek Band of Umpqua Tribe of Indians, and the Klamath Tribes are formal cooperators in the RMP revisions, in addition to their government-to-government status. These Tribes along with other agencies that participated as formal cooperators made up the Cooperating Agencies Advisory Group (CAAG). The Tribal representatives along with BLM staff formed a Tribal Working Group. Details of the CAAG and working groups are in the following section "Formal Cooperators."

In 2013, the BLM offered all Tribes within, or that have interests within, the planning area an opportunity to schedule individual Tribal listening sessions. The BLM met with five Tribes on different dates spanning from May 14, 2013, to December 13, 2013. A summary of these listening sessions can be found in **Appendix R** along with biographies and maps for the six Tribes who have participated as formal cooperators in the planning process. These listening sessions and subsequent consultation also served to inform the Tribal Interests section of Chapter 3.

In October 2014, the BLM invited all nine Tribes to consult on the Draft RMP/EIS. Tribes wished to meet after the release of the Draft RMP/EIS. From May 18, 2015, to November 5, 2015, the BLM met with the Confederated Tribes of Grand Ronde, the Confederated Tribes of Siletz Indians, the Coquille Indian Tribe, the Confederated Tribes of Coos, Lower Umpqua, and Siuslaw Indians, the Cow Creek Band of Umpqua Tribe of Indians, and the Klamath Tribes. Some Tribes met with the BLM more than once during this timeframe.

In addition to formal consultation and participation in the CAAG and the Tribal Working Group, Tribal representatives maintained frequent email and phone dialogue with BLM managers and the BLM Tribal liaison.

The Coquille Indian Tribe has a representative on the Westside Steering Committee, as noted below, in addition to their government-to-government relationship and their role as a formal cooperator. The BLM has also met regularly with the Coquille Indian Tribe to facilitate open and recurring communication. The Coquille Indian Tribe is directly engaged in the planning process, because the management of the Coquille Forest is subject by law (25 U.S.C. 715c(d)) to the standards and guidelines of forest plans for adjacent or nearby Federal forestlands. Title V of the Oregon Resource Conservation Act of 1996 (Public Law 104-208) included the creation of the Coquille Forest to be held in trust for the benefit of the

Coquille Indian Tribe. The Act states that the Coquille Forest shall be managed "under applicable State and Federal forestry and environmental protection laws, and subject to critical habitat designations under the Endangered Species Act, and subject to the standards and guidelines of Federal forest plans on adjacent or nearby Federal lands, now and in the future." This Act also requires the Secretary of the Interior, through the Bureau of Indian Affairs, to take the Coquille Forest lands into trust for the benefit of the Coquille Indian Tribe. For the purposes of interpreting Title V of this Act, the management direction that will be described within the eventual RMP is synonymous with the "standards and guidelines" referenced in this Act.

Formal Cooperators

The FLPMA and NEPA provide direction regarding the coordination and cooperation of Federal agencies with other agencies and local and state governments and tribes. The FLPMA specifically emphasizes the need to ensure coordination and consistency of the BLM's proposed actions with the plans and policies of other relevant jurisdictions. The Council on Environmental Quality's regulations for implementing NEPA specifically requires cooperative relationships between lead and cooperating agencies.

Cooperating agency status provides a formal framework for governmental units (including local, State, Federal, and Tribal) to engage in active collaboration with a lead Federal agency to implement requirements of NEPA. For these RMP revisions, the BLM has worked with cooperators from many agencies. With all formal cooperators, the BLM has signed a memorandum of understanding, identifying the roles and responsibilities of the BLM and the cooperating agency in the planning process. **Table 4-1** contains a list of the formal cooperators for these RMP revisions.

Table 4-1. Formal cooperators

Government Type	Cooperator
County Governments*	Benton County
	Clackamas County
	Columbia County
	Coos County
	Curry County
	Douglas County
	Klamath County
	Lane County
	Lincoln County
	Linn County
	Marion County
	Multnomah County
	Polk County
	Tillamook County
	Washington County
	Yamhill County
State Government	State of Oregon†
Federal Government	Environmental Protection Agency
	National Marine Fisheries Service
	U.S. Fish and Wildlife Service
	U.S. Forest Service
Tribes	Confederated Tribes of Coos, Lower Umpqua, and Siuslaw Indians
	Confederated Tribes of Grand Ronde
	Confederated Tribes of Siletz Indians
	Coquille Indian Tribe
	Cow Creek Band of Umpqua Tribe of Indians
	Klamath Tribes

* With the exception of Benton County, all of the listed counties have authorized the Association of O&C Counties to act as the counties' agent and representative in their role as cooperating agencies in this planning process. Occasionally, some counties represented by the Association of O&C Counties have had a county commissioner participate in the activities of the planning process. When that has happened, the county commissioner, rather than the Association of O&C Counties, has represented the county.

† Department of Environmental Quality, Department of Fish and Wildlife, and Department of Forestry are the Oregon State agencies actively engaged in the planning process.

Working through a robust engagement process with neutral facilitation, the cooperators have provided expertise on much of the subject matter the BLM is addressing in the Proposed RMP/Final EIS, as well as advice based on experience with similar planning efforts. The cooperators have provided feedback on public outreach sessions, data sources and analytical methods, and components of the alternatives. They have provided oral and written feedback and ideas throughout the process of developing the Draft RMP/EIS and Proposed RMP/Final EIS. DS Consulting, working through Oregon Consensus, has facilitated all meetings of the Cooperating Agency Advisory Group and the five individual working groups described below.

The Cooperating Agency Advisory Group first met in the summer of 2012, when the facilitators led them through an orientation to the cooperating agency task and assisted the group in defining its desired outcomes. In the fall and winter of 2012, the Cooperating Agency Advisory Group met five times to provide and review RMP scoping comments and to discuss the RMP process. They also met three times to provide comments and review documents developed by the BLM for the planning effort, including the purpose and need for action and the planning criteria, in addition to providing written comments on the BLM's methodology for analyzing the effects of the alternatives. The Cooperating Agency Advisory Group met once to provide feedback on the public meetings held in 2013 and 2014. The BLM conducted a rehearsal of the public meetings with the Cooperating Agency Advisory Group, which provided feedback on the content and format, leading the BLM to make improvements to the outreach sessions. The Cooperating Agency Advisory Group also met five times to discuss the results of the analysis and to provide feedback to the BLM on the identification of a preferred alternative. After the publication of Draft RMP/EIS, the Cooperating Agency Advisory Group met twice to provide feedback to the BLM on the development of the Proposed RMP/Final EIS.

In addition to meeting as a full group periodically throughout the development of the Draft RMP/EIS and the Proposed RMP/Final EIS, the Cooperating Agency Advisory Group also created five working groups in the winter of 2013 in order to facilitate a more detailed level of engagement with the BLM. These groups focused, respectively, on the following topics: aquatics, outreach, terrestrial, socio-economics, and Tribal issues.

The Aquatics Working Group met six times during the development of the Draft RMP/EIS. The BLM updated the group on the status of alternative development. The working group provided comments on the development of the riparian management strategies and the methodology for analyzing impacts of the alternatives on aquatic habitat and water quality.

The Outreach Working Group met six times during the development of the Draft RMP/EIS. The group discussed outreach planning and goals and provided input on the outreach timeline. During the winter of 2013, they met to revisit ideas for outreach during the planning criteria comment period.

The Terrestrial Working Group met five times during the development of the Draft RMP/EIS. The BLM updated this group on the development of the terrestrial components of the alternatives (e.g., alternative approaches for the large block reserve design). The group reviewed and provided input on the methodology for analyzing the impacts of the alternatives on terrestrial resources and met to discuss and provide feedback on components of the alternatives related to timber harvest, northern spotted owl conservation, marbled murrelet conservation, and fire and fuels management.

The Socio-Economic Working Group met eight times during the development of the Draft RMP/EIS. This group reviewed and refined the methodology for analyzing the socio-economic analysis of the alternatives, including working with BLM and its contractors on the development of a method to analyze impacts to community capacity and resiliency. Members of this group assisted the BLM in obtaining county economic data and identifying city officials for information-collection interviews.

The Tribal Working Group met seven times during the development of the Draft RMP/EIS. This group provided input on the process by which the BLM conducted Tribal listening sessions and consultation. They also provided input on aspects of the alternatives and analytical methodology that address resources of concern to the Tribes represented in the group. Members of the group also reviewed and provided content for appendices to the Tribal Interests section of the Draft RMP/EIS.

Additionally, the Coquille Indian Tribe, in their capacity as a cooperating agency, suggested to the BLM a riparian strategy. The BLM worked with the Coquille Indian Tribe to develop this suggestion in detail and include it among the alternatives in the Draft RMP/EIS, in addition to the riparian strategies developed by the Riparian Technical Team described below.

The BLM district managers and planning personnel have met with individual county commissioners on an ongoing basis to provide updates on progress and key milestones. As noted above, several county governments are formal cooperators in the planning process. While the Association of O&C Counties represents most of the counties at the Cooperating Agency Advisory Group meetings, BLM district managers also maintain relationships with local county representatives.

Documenting Disagreement or Inconsistencies with Cooperating Agencies[160]

The Cooperating Agency Advisory Group and its working groups have provided the BLM with a unique opportunity to share the BLM's thinking early in the planning process and for the BLM to hear the ideas and concerns cooperating agencies have with how the BLM has been planning and analyzing thus far. At this point in the process, all cooperators have had numerous opportunities to express their opinions about content and process, and to make suggestions about how the BLM might improve its plan. Largely, most disagreements that have arisen have been resolved through dialogue at meetings of the full group and its work groups. Nearly all cooperators have been positive about the level of engagement and the general direction of the planning process. However, the Association of O&C Counties (which is the designated representative of 15 counties) has continued to express a high level of concern about the BLM's planning process.

Specifically, the Association of O&C Counties continues to assert that the BLM's Purpose and Need statement was fatally flawed by failing to place sustained-yield timber production as the primary purpose of the planning effort. In letters to the BLM Director, State Director, and Project Manager, and at nearly all Cooperating Agency meetings, the Association of O&C Counties representatives have maintained that the BLM should have placed sustained-yield timber production as the primary focus of the planning effort with all other actions required by other laws and treaties falling secondary to that purpose. As a result, the Association of O&C Counties has expressed disagreement with the purpose and need, the planning criteria, and the range of alternatives. The Association of O&C Counties maintains that the O&C Act and legal opinions that have stemmed from its mandate that the BLM should first provide a minimum of 500 million board feet of sustained yield timber harvest per year, then balance all other needs after that has been provided. The Association of O&C Counties and its member counties have stated that, because the BLM has sought to analyze what a balanced approach between the competing laws, treaties, and needs of all cooperating agencies might look like, the BLM has created a range of alternatives that is too narrow to achieve the primary purpose and the level of sustained yield required by law and court decisions.

That said, the Association of O&C Counties continues to attend and actively participate in the Cooperating Agency Advisory Group and its working groups, making certain that all members are aware of this fundamental disagreement and requesting that the BLM broaden the range of alternatives by including the alternative developed in the 2008 Western Oregon Plan Revision (USDI 2008).

Coordination with the Regional Interagency Executive Committee

The Regional Interagency Executive Committee serves as the senior regional entity to assure the prompt, coordinated, and successful implementation of the Northwest Forest Plan at the regional level. The Regional Interagency Executive Committee is composed of regional directors from the various land

[160] This summary documenting disagreement or inconsistencies with cooperating agencies was provided to the BLM by the outside, impartial facilitation team from Oregon Consensus after reviewing meeting summaries and letters from the Cooperating Agency Advisory Group. In their comments on the Draft RMP/EIS, the Association of O&C Counties states that they reject this summary, asserting that it misrepresents their position (**Appendix W**).

management, regulatory, research, and other relevant agencies in the Federal government located in northern California, western Oregon, and western Washington, including the following:

- Army Corps of Engineers
- BLM
- Bureau of Indian Affairs
- Environmental Protection Agency
- Environmental Protection Agency, Western Ecology Research Division
- U.S. Fish and Wildlife Service
- U.S. Forest Service
- U.S. Forest Service, Pacific Northwest Research Station
- U.S. Forest Service, Pacific Southwest Research Station
- U.S. Geological Survey, Western Research Region
- National Marine Fisheries Service, Northwest Region
- National Park Service
- Natural Resources Conservation Service

The BLM has coordinated with the Regional Interagency Executive Committee throughout this RMP revision process. As noted in Chapter 1, the BLM has considered the concepts contained in the Framework to Guide Forest Service and Bureau of Land Management Land Use Plan Revisions and Amendments (RIEC 2011) in developing the action alternatives for this RMP revision. The BLM met with the Regional Interagency Executive Committee eight times from 2012 to 2016 to provide information and to coordinate on the RMP revision process.

Governor's Consistency Review

Pursuant to BLM's planning regulations at 43 CFR 1610.3–2(e), the BLM has submitted this Proposed RMP to the Governor of Oregon for review. The Governor shall have 60 days in which to identify inconsistencies with State or local plans, policies, or programs and provide recommendations in writing to the BLM. If recommendations of the Governor recommend changes in the Proposed RMP which were not raised during the public participation process, the BLM will provide the public with an opportunity to comment on the recommendations.

Consultation

Endangered Species Act

Before signing a Record of Decision on the RMP revisions, the BLM will complete consultation with the U.S. Fish and Wildlife Service and the National Marine Fisheries Service under Section 7(a)(2) of the Endangered Species Act (ESA). The BLM, U.S. Fish and Wildlife Service, and National Marine Fisheries Service are conducting these consultations consistent with the final rule amending the incidental take statement provisions of the implementing regulations for Section 7 of the ESA (80 FR 26832–26845). The BLM, U.S. Fish and Wildlife Service, and National Marine Fisheries Service signed an ESA Consultation Agreement, which identifies responsibilities for each agency and defines the processes, products, actions, timeframe, and expectations for the consultation process. The ESA Consultation Agreement, signed June 18, 2013, is available at http://www.blm.gov/or/plans/rmpswesternoregon/files/esa-consult-agree.pdf.

As part of this consultation, the BLM has prepared biological assessments of the potential effects of implementing the Proposed RMP. The BLM submitted these biological assessments to the U.S. Fish and Wildlife Service and the National Marine Fisheries Service on February 1, 2016. In these biological assessments, the BLM has described the Proposed RMP, the geographic area addressed by the RMP, and the manner in which the Proposed RMP would affect threatened, endangered, and proposed species and their designated and proposed critical habitats.

As part of this consultation, the U.S. Fish and Wildlife Service and the National Marine Fisheries Service will provide their biological opinions. These biological opinions will include assessments of the status of the species and critical habitats involved, contain reviews of the potential effects of the Proposed RMP on these species and habitats, and provide evaluations of whether the Proposed RMP would be likely to jeopardize the continued existence of any species or destroy or adversely modify their critical habitats. The U.S. Fish and Wildlife Service and National Marine Fisheries Service will prepare separate biological opinions dealing with terrestrial and aquatic species under their respective ESA jurisdiction. Additional information on the biological assessments and biological opinions is available in the ESA Consultation Agreement.

In addition to their role as formal cooperators, the U.S. Fish and Wildlife Service and National Marine Fisheries Service have met with the BLM repeatedly throughout the RMP revision in preparation for the ESA consultation on the Proposed RMP. As part of that work, and consistent with the ESA Consultation Agreement, the BLM and U.S. Fish and Wildlife Service have met as a Terrestrial Technical Team in April 2013, September 2013, January 2014, February 2014, and March 2014 to discuss the analytical methodology for evaluating the effects of the alternatives on ESA-listed species and producing analytical information for the biological assessments. The BLM also met directly with the U.S. Fish and Wildlife Service in April 2014 to discuss specifically the forest management approach for northern spotted owl critical habitat in Alternative D considered in the Draft RMP/EIS.

The BLM convened a group including representatives of the National Marine Fisheries Service and Environment Protection Agency in April and May 2013 to develop a strategic proposal for riparian management. The Environmental Protection Agency has participated in these meetings in the capacity of their technical expertise related to water quality. The BLM, National Marine Fisheries Service, U.S. Fish and Wildlife Service, and Environmental Protection Agency met as a Riparian Technical Team to develop that strategic proposal in detail to be included among the alternatives in the Draft RMP/EIS. DS Consulting facilitated all meetings of the Riparian Technical Team. The Riparian Technical Team met seven times from August 2013 to January 2014 and presented their work to the Cooperating Agency Advisory Group on January 30, 2014. During the preparation of the Proposed RMP/Final EIS, the Riparian Technical Team met four times to explore development of the riparian management strategy for the Proposed RMP.

In June 2015, the BLM submitted to the U.S. Fish and Wildlife Service a conservation assessment, based on the preferred alternative identified in the Draft RMP/EIS. The BLM prepared that conservation assessment to provide the U.S. Fish and Wildlife Service with early identification of the data and analytical methodology the BLM would use to describe effects in its biological assessment, to ensure that its biological assessment met the needs of the U.S. Fish and Wildlife Service for consultation under section 7(a)(2) of the ESA, and to provide the U.S. Fish and Wildlife Service with an opportunity to provide advice or technical assistance to the BLM on how the eventual Proposed RMP could best contribute to the conservation and recovery of ESA-listed species. On December 17, 2015, the U.S. Fish and Wildlife Service provided the BLM with a conservation review in response to the conservation assessment. As part of that conservation assessment and conservation review process, the BLM met directly with the U.S. Fish and Wildlife Service repeatedly throughout the summer and fall of 2015 to address the U.S. Fish and Wildlife Service advice to the BLM on how the eventual Proposed RMP could best contribute to the conservation and recovery of ESA-listed species.

The BLM met directly with the National Marine Fisheries Service in March 2014, April 2014, and June 2014 to discuss analytical methodology for evaluating the effects of the alternatives on ESA-listed fish species and producing analytical information for the biological assessments. The BLM met again in December 2014 with the National Marine Fisheries Service, Environmental Protection Agency, and U.S. Fish and Wildlife Service to continue discussions on the biological needs of ESA-listed fish species. The BLM conducted an 'early review' process with the National Marine Fisheries Service to facilitate section 7(a)(2) consultation under the ESA. In this early review process, the BLM provided the National Marine Fisheries Service with early identification of the data and analytical methodology the BLM would use to describe effects in its biological assessment, to ensure that its biological assessment met the needs of the National Marine Fisheries Service for consultation under section 7(a)(2) of the ESA, and to provide the National Marine Fisheries Service with an opportunity to provide advice or technical assistance to the BLM on how the eventual Proposed RMP could best contribute to the conservation and recovery of ESA-listed species. The BLM met repeatedly with National Marine Fisheries Service and the U.S. Fish and Wildlife Service throughout summer and fall of 2015 to discuss the format and information for the biological assessments for ESA-listed fish species. The BLM has documented the meetings and correspondence of the early review process and that documentation is incorporated here by reference (USDI BLM 2016).

On December 18, 2015, the National Marine Fisheries Service sent the BLM a letter to clarify their comments on the Draft RMP/EIS (USDC NMFS 2015). In that letter, the National Marine Fisheries Service stated that they believe the best available science can support the concepts of an aquatic conservation strategy that they have discussed with the BLM, and that Alternatives A and D provide the building blocks of such a strategy. The National Marine Fisheries Service also identified portions of their comments on the Draft RMP/EIS that were in error and asked that those comments be ignored. That letter is incorporated here by reference.

National Historic Preservation Act

The BLM complies with the National Historic Preservation Act (54 U.S.C. 300101 *et seq.*) through the State Protocol with the Oregon State Historic Preservation Office (USDI BLM 2015) as directed by the National Programmatic Agreement (USDI BLM 2012). In accordance with the national Programmatic Agreement and the State Protocol, the BLM sent the Oregon State Historic Preservation Office a letter to initiate consultation on the RMP revision. The BLM did not receive a response to this letter. In the spring of 2015, the BLM sent the Draft RMP/EIS to the Oregon State Historic Preservation Office. The BLM did not receive comments from the Oregon State Historic Preservation Office on the Draft RMP/EIS. Upon implementation of the approved RMP, the BLM will consult with the Oregon State Historic Preservation Office on Federal undertakings with the potential to effect cultural resources in accordance with the 2015 State Protocol in order to comply with the National Historic Preservation Act.

Water and Air Quality Management

As part of these RMP revisions, the BLM has been concurrently coordinating with various agencies on water and air quality management. The BLM will continue to coordinate with the Environmental Protection Agency and the Oregon Department of Environmental Quality (the federally designated management agency) on water quality standards and other requirements of the federally designated management agency as authorized by the Clean Water Act. Similarly, the BLM will continue to coordinate with the Environmental Protection Agency, Oregon Department of Environmental Quality, and U.S. Forest Service when authorizing implementation actions to minimize the impacts of the emissions from prescribed burns.

List of Preparers

Westside Steering Committee

The Westside Steering Committee is comprised of BLM Oregon/Washington Deputy State Director - Division of Resources, the six BLM district managers represented in the RMP revisions, and a representative from the Coquille Indian Tribe. This committee provides leadership and direction to the RMP revisions planning process.

Key Project Staff

An interdisciplinary team of resource specialists and managers from the BLM districts and state office, and contract personnel prepared the Draft RMP/EIS and the Proposed RMP/Final EIS for the RMPs for Western Oregon. T**able 4-2** lists the staff, the organization where each staff member works, and their area of responsibility, followed by brief biographies for each BLM interdisciplinary team member.

Table 4-2. List of key project staff

Name	BLM Office	Area of Responsibility
Michael Allen	Oregon State Office	Management and Program Analyst
Stewart Allen	Oregon State Office	Socioeconomics
Peter Broussard	Coos Bay District	Sustainable Energy
Mark Brown	Oregon State Office	Project Manager
Dan Carpenter	Coos Bay District	Hydrology
Susan Carter	Roseburg District	Rare Plants and Fungi
J. Byron Clayton	Oregon State Office	Lands and Realty
John Colby	Coos Bay District	Hydrology
Lori Crumley	Lakeview District	Grazing and Wild Horses
Craig Ducey	Oregon State Office	Inventory Data Support
Louisa Evers	Oregon State Office	Air Quality and Climate Change
Paul Fyfield	Oregon State Office	Cartography
Eric Greenquist	Oregon State Office	Wildlife – Northern Spotted Owl
Richard Hardt	Oregon State Office	Interdisciplinary Team Leader
Claire Hibler	Salem District	Invasive Species and Areas of Critical Environmental Concern
Eric Hiebenthal	Oregon State Office	GIS Data Management
Aimee Hoefs	Coos Bay District	Writer, Editor, and Records
Carolina Hooper	Oregon State Office	Vegetation Modeling
Zach Jarrett	Salem District	Recreation, Visual Resource Management, and the National Landscape Conservation System
Racheal Jones	Coos Bay District	Assistant Editor
Craig Kintop	Roseburg District	Forest Management
Sarah Levy	Oregon State Office	Public Affairs Officer
Rex McGraw	Roseburg District	Wildlife – All but the Northern Spotted Owl
Arthur Miller	Oregon State Office	GIS and Data Analysis
Diane Parry	Medford District	Minerals
Heather Partipilo	Coos Bay District	Assistant Editor
Panchita Paulete	Oregon State Office	Associate Interdisciplinary Team Leader
Lauren Pidot	Oregon State Office	Associate Interdisciplinary Team Leader
Cory Sipher	Roseburg District	Fisheries
Dale Stewart	Oregon State Office	Soils
Brian Thauland	Oregon State Office	Roads
Shelli Timmons	Oregon State Office	Management Analyst
Heather Ulrich	Eugene & Salem Districts	Cultural Resources and Tribal Interests
Jena Volpe	Medford District	Fire and Fuels
Abe Wheeler	Roseburg District	Forest Management

Mike Allen – Management and Program Analyst. Mike earned a Bachelor of Science in Wildlife Management at Humboldt State University. Mike started his 38-year career with the BLM as a wildland firefighter on the Lakeview District. That led to wildlife biologist positions in Lakeview and Prineville. He worked 16 years on the Salem District as a Natural Resource Specialist performing wildlife surveys, timber sale preparation, and public outreach. Mike has been a Management and Program Analyst in the Oregon State Office for 4 years.

Stewart Allen – Socioeconomics. Stewart earned a Bachelor of Arts in Mass Communications and a Bachelor of Arts in Psychology at the University of Utah, a Master of Arts in Social/Environmental

Psychology at Claremont Graduate School, and a Ph.D. in Forestry (with a minor in Psychology) at the University of Montana. He has 35 years of experience in the human dimensions of natural resources including 21 years with the Federal Government and 1.5 years with the BLM as Socioeconomic Specialist, a zoned position shared by Oregon/Washington, California, and Alaska.

Peter Broussard – Sustainable Energy. Pete earned a Bachelor of Science in Mechanical Engineering at the University of Southwestern Louisiana. Registered as a professional engineer for 37 years, he currently holds professional engineering licenses in 3 states. Most of his private-sector career has been in the electric utility, gas pipeline, and petroleum industries. His public service includes 8 years in the military as a combat engineer, and 6 years with the BLM as the Engineering Supervisor in the Coos Bay District.

Mark Brown – Project Manager. Mark Brown currently serves as the RMPs for Western Oregon Project Manager in the BLM Oregon State Office. He previously served as the BLM Partnership Coordinator. His Federal career began as a Presidential Management Fellow with the National Park Service and U.S. Forest Service before joining the BLM in 2002. He earned a Master of Environmental Management from Yale University, School of Forestry and Environmental Studies, and a Master of Public Administration at Portland State University, Hatfield School of Government.

Dan Carpenter – Hydrology (2012-2015). Dan earned a Bachelor of Science in Soil Conservation from Washington State University. He has worked as a professional hydrologist for the past 36 years with the U.S. Forest Service and the BLM on the Oregon Coast, Western Cascades, and Great Basin in Nevada. At the time of the preparation of the Proposed RMP/Final EIS, he was the District Hydrologist in the Coos Bay District. He has since retired from the BLM.

Susan Carter – Rare Plants and Fungi. Susan earned a Bachelor of Arts in Botany and Environmental Biology (double major) from Humboldt State University and has 26 years of experience working as a botanist with the BLM and the U.S. Forest Service. She is currently the District Botanist in the Roseburg District.

J. Byron Clayton – Lands and Realty. Byron earned a Bachelor of Arts in Geography at Appalachian State University and a Master of Science in Geography at Portland State University. He began work for the BLM in 2001 as a student cartographer with the Land Records Team in the Branch of Lands and Minerals. He is currently the Supervisory Geographer of the Land Records Team in the Branch of Geographic Sciences in the BLM Oregon State Office.

John Colby – Hydrology (2016). John earned a Bachelor of Science in Natural Resources and Environmental Studies with an emphasis in Water Resources from the University of Minnesota. For the past 13 years, he has been a hydrologist in the Umpqua Field Office of the Coos Bay District BLM.

Lori Crumley – Grazing and Wild Horses. Lori earned a Bachelor of Science in Range Ecology and a Master of Science in Plant Science at the University of Idaho. She has 8 years of experience working for the Federal Government as a Range Management Specialist. For the last 4 years, she has been a Range Management Specialist in the Lakeview Field Office of the Lakeview District.

Craig Ducey – Inventory Data Support. Craig earned a Bachelor of Science in Botany at the University of Wyoming and a Master of Science in Geography at Portland State University. He has 15 years of experience as a GIS/Remote Sensing Specialist in the BLM Oregon State Office.

Louisa Evers – Air Quality and Climate Change. Louisa earned a Bachelor of Science in Forestry from the University of Tennessee, a Master of Science in Forestry with an emphasis in Fire Ecology from the University of Idaho, and a Ph.D. in Environmental Science with an emphasis in Rangeland Ecology from

Oregon State University. She has 29 years of experience with BLM and the U.S. Forest Service in fuels and fire management, fire ecology, vegetation ecology, and climate change. She is currently the Research Liaison and Climate Change Coordinator in the BLM Oregon State Office.

Paul Fyfield – Cartography. Paul earned a Bachelor of Arts and a Master of Science in Geography at Portland State University. He has worked for the BLM Oregon State Office in Portland since 2001. He is currently a Cartographer in the BLM Oregon State Office.

Eric Greenquist – Wildlife – Northern Spotted Owl. Eric earned a Bachelor of Arts in Biology at the University of Missouri and a Master of Science in Wildlife Ecology at Ohio University. He has worked as a professional wildlife biologist for 38 years, including 35 years with the BLM with the past 23 years in western Oregon. At the time of the preparation of the Proposed RMP/Final EIS, he was a wildlife biologist in the BLM Oregon State Office. He has since retired from the BLM.

Richard Hardt – Interdisciplinary Team Leader. Richard earned a Bachelor of Arts in Natural Sciences at the Johns Hopkins University, a Master of Landscape Architecture at Harvard University, and a Ph.D. in Forest Resources at the University of Georgia. He has 21 years of experience working for the BLM and is currently a planner in the BLM Oregon State Office.

Claire Hibler – Invasive Species and Areas of Critical Environmental Concern. Claire earned a Bachelor of Science in Forest Management at Oregon State University and a Bachelor of Arts in General Biology at Humboldt State University. Claire is a founding member of, and participates on, the steering committee for the Western Invasives Network, which spans northwest Oregon, part of southwest Washington, and the Columbia River Gorge. She has worked in the Salem District for more than 26 years, serving as the District Botanist since 2001.

Eric Hiebenthal – GIS Data Management. Eric earned a Bachelor of Science in Geography at Oregon State University. He has 19 years of experience with the BLM working with GIS, specializing in GIS Data Management. He is currently a GIS Data Management Specialist in the BLM Oregon State Office.

Aimee Hoefs – Writer, Editor, and Records. Aimee earned a Bachelor of Arts in Molecular Biology at Colgate University. She has worked for the BLM for 20 years and has been a NEPA specialist for the past 8 years. She is formerly the Myrtlewood Field Office Planning and Environmental Coordinator in the Coos Bay District.

Carolina Hooper – Vegetation Modeling Lead. Carolina earned a Bachelor of Science in Forestry at Humboldt State University and a Master of Science in Forestry at Oregon State University. She has worked in forest inventory and planning for the last 21 years with the U.S. Forest Service and the BLM. She is currently a Forester/Resource Information Analyst in the BLM Oregon State Office.

Zach Jarrett – Recreation, Visual Resource Management, and the National Landscape Conservation System. Zach earned a Bachelor of Science in Recreation Resource Management at Oregon State University and a Master of Science in Natural Resource Planning at Humboldt State University. He has 14 years of experience working for the BLM in western Oregon and is currently an outdoor recreation planner in the Oregon State Office working on regional recreation and travel planning projects.

Racheal Jones – Assistant Editor. Racheal earned a Bachelor of Arts in Geography at Western Washington University and a Master of Science degree in Water Science and Management at New Mexico State University. She has 9 years in of experience in planning. She is currently the Planning and Environmental Coordinator for the Myrtlewood Field Office in the Coos Bay District.

Craig Kintop – Forest Management. Craig earned a Bachelor of Science in Forest Resources Management at the University of Minnesota. He has more than 39 years of experience working for the U.S. Forest Service and the BLM and is currently the District Forester/Silviculturist in the Roseburg District.

Sarah Levy – Public Affairs Officer. Sarah earned a Bachelor of Arts at the University of Southern California, and a Master of Science in Natural Resources and Environment at the University of Michigan, School of Natural Resources and Environment. Sarah has 6 years of experience with the U.S. Forest Service working in public affairs, recreation, and research and is currently a Public Affairs Officer in the BLM Oregon State Office.

Rex McGraw – Wildlife. Rex earned a Bachelor of Science and a Master of Science in Wildlife Biology at the University of Montana, Missoula. He has 17 years of experience with the BLM and is currently the District Wildlife Biologist in the Roseburg District.

Arthur Miller – GIS and Data Analysis Lead. Arthur earned a Bachelor of Science and Bachelor of Arts in Geography at Oregon State University. He has over 26 years of experience working with the BLM in Oregon, with an emphasis on the use of geographic information systems for resource and land use planning. He is currently a Geographic Information Specialist in the BLM Oregon State Office.

Diane Parry – Minerals. Diane earned a Bachelor of Arts in Geology at Humboldt State University. She has 29 years of experience as a geologist with the BLM and is currently the Lead Geologist in the Medford District, zoned to the west side of Oregon.

Heather Partipilo – Assistant Editor. Heather earned a Bachelor of Science in Botany and Plant Pathology and a Master of Science in Botany and Plant Pathology from Oregon State University. She has worked on the Lakeview District as a botanist and is currently a Planning and Environmental Coordinator in the Umpqua Field Office of the Coos Bay District.

Panchita Paulete – Associate Interdisciplinary Team Leader (2015 – 2016). Panchita has a Bachelor of Arts in Professional Writing and Rhetoric from Elon University and a Master of Science in Forestry from Michigan Technological University. She has more than 9 years of experience as a NEPA specialist and is currently a planner in the BLM Oregon State Office.

Lauren Pidot – Associate Interdisciplinary Team Leader (2013 – 2014). Lauren earned a Bachelor of Arts in Government at Wesleyan University and a Master of Science in Natural Resource Policy at the University of Michigan. She has over 7 years of experience with the BLM and is currently a planner in the BLM Oregon State Office.

Cory Sipher – Fisheries. Cory earned a Bachelor of Science in Biology at the State University of New York at Cortland and a Master of Science in Fishery Biology at Colorado State University. Cory has been with the BLM for 13 years, starting his career as a Fisheries Biologist in the South River Field Office of the Roseburg District. He has served as the District Fisheries Biologist in the Roseburg District since 2012.

Dale Stewart – Soils. Dale earned a Bachelor of Science in Forestry and a Master of Science in Biological Sciences at Michigan Technological University. He has over 36 years of experience working in the forestry, soil, and hydrology disciplines with the BLM and U.S. Forest Service in Oregon. He is currently the Soil, Water, and Air Program Lead in the BLM Oregon State Office.

Brian Thauland – Roads. Brian earned a Bachelor of Science in Forest Management at Iowa State University. He has 37 years of experience with the BLM in forest engineering and currently provides transportation program support in the BLM Oregon State Office.

Shelli Timmons – Management Analyst (2012 – 2014). Shelli earned a Bachelor of Arts in Business Communication at the University of Phoenix. Shelli has over 15 years of experience in the administration and management fields, the last 4 of which have been in the BLM Oregon State Office.

Heather Ulrich – Cultural Resources and Tribal Interests. Heather earned a Bachelor of Arts and Master of Science in Anthropology at the University of Oregon. She has been with the BLM since 2007 and currently works as the District Archaeologist and Tribal Liaison in both the Salem and Eugene Districts.

Jena Volpe – Fire and Fuels. Jena earned a Master of Science in Biology/Fire Ecology from Southern Oregon University. She has 13 years of experience in fire ecology and fuels management with the National Park Service and the BLM in southwest Oregon and is currently a Fire Ecologist in the Medford District.

Abe Wheeler – Forest Management. Abe earned an Associate of Arts in Business Administration at Linn Benton Community College, and a Bachelor of Science in Forest Management at Oregon State University. He has 8 years of experience with the BLM in field forestry, timber sale contract preparation, sale planning, and project leadership. Abe was also a key player in the recent design, analysis, and implementation of Roseburg District's Secretarial Pilot Project, as well as other more recent ecological forestry projects. He is currently the O&C Forester in the Oregon State Office.

Several contract efforts support the work of the interdisciplinary team:

- A team of specialists at Mason, Bruce, & Girard, Inc., under the project management of Mark Rasmussen (Mason, Bruce, & Girard, Inc.), has conducted vegetation modeling of the alternatives using the Woodstock Optimization Platform model (Woodstock). Carolina Hooper of the interdisciplinary team has directed this work.
- A team of specialists at Environmental Resources Management (ERM) and subcontractors, under the project management of Clive Graham and Benjamin Sussman, ERM, has conducted socioeconomic analysis of the alternatives. Stewart Allen of the interdisciplinary team has directed this work.
- David W. LaPlante of Natural Resource Geospatial in Yreka, California, and Jeffrey R. Dunk of Humboldt State University in Arcata, California, have assisted the BLM with its evaluation of the northern spotted owl. They used the MaxEnt computer model to forecast how northern spotted owl habitat conditions would change on BLM-administered lands in western Oregon under different management scenarios. They used the spatially explicit, individual-based population model HexSim to forecast how northern spotted owls would respond demographically to such changes. Eric Greenquist and Craig Ducey of the interdisciplinary team have directed this work.
- A team of specialists at ECONorthwest assisted the BLM with its evaluation of recreation supply and demand throughout the project area. ECONorthwest collected recreation supply and demand data to identify particularly valuable recreation activities or resources for development, and estimate the value of recreation use and improvements. Zach Jarrett of the interdisciplinary team has directed this work.

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Acronyms and Abbreviations

This section provides the main acronyms and abbreviations used in the document.

µg	micron
ACEC	Area of Critical Environmental Concern
ACS	Aquatic Conservation Strategy
AM	annual maintenance
ASQ	allowable sale quantity
AUM	animal unit month
bf	board foot or board feet
BLM	Bureau of Land Management
BMP	best management practice
BTU	British thermal unit
C	carbon
CAAG	Cooperating Agencies Advisory Group
CBWR	Coos Bay Wagon Road
CDP	Census Designated Place
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CMAI	culmination of mean annual increment
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
COLE	Carbon OnLine Estimator
CVS	Current Vegetation Survey
CWPP	Community Wildfire Protection Plan
DBH	diameter at breast height
DM	deferred maintenance
DOGAMI	Department of Geology and Mineral Industries
DPS	distinct population segment
EIS	environmental impact statement
ENSO	El Niño-Southern Oscillation
EPA	Environmental Protection Agency
ERMA	Extensive Recreation Management Area
ESA	Endangered Species Act
ESU	evolutionarily significant unit
FEIS	final environmental impact statement
FEMAT	Forest Ecosystem Management Assessment Team
FERC	Federal Energy Regulatory Commission
FLPMA	Federal Land Policy and Management Act
FOI	Forest Operations Inventory
FR	Federal Register
FRI	fire return interval
FS	U.S. Forest Service
FTE	full-time equivalent
FUDS	Formerly Used Defense Sites
FVS	Forest Vegetation Simulator
FWS	U.S. Fish and Wildlife Service
GFMA	General Forest Management Area
GIS	geographic information system

GNN	gradient nearest neighbor
ha	hectare
HITA	High Intensity Timber Area
HLB	Harvest Land Base
HMA	herd management area
HUC	hydrologic unit code (e.g., HUC-10 watershed)
ILAP	Integrated Landscape Assessment Project
IPCC	Intergovernmental Panel on Climate Change
IWG	Interagency Working Group
km	kilometer
LEMMA	Landscape, Ecology, Modeling, Mapping, and Analysis
LITA	Low Intensity Timber Area
LSR	Late-Successional Reserve
m	meter
Mbf	thousand board feet
Mg	megagram
MITA	Moderate Intensity Timber Area
Mbf	thousand board feet
MMbf	million board feet
MMT	million metric tons
MSA	Metropolitan Statistical Area
NAAQS	National Ambient Air Quality Standards
NAICS	North American Industry Classification System
NEPA	National Environmental Policy Act
NLCS	National Landscape Conservation System
NMFS	National Marine Fisheries Service
NO_x	nitrogen oxides
NREL	National Renewable Energy Laboratory
NWFP	Northwest Forest Plan
O_3	ozone
O&C Act	Oregon and California Lands Act
OAR	Oregon Administrative Rules
OBRA	Omnibus Budget Reconciliation Act of 1993
ODEQ	Oregon Department of Environmental Quality
ODF	Oregon Department of Forestry
ODFW	Oregon Department of Fish and Wildlife
OHTA	Owl Habitat Timber Area
OHV	off-highway vehicle
ONA	Outstanding Natural Area
ORBIC	Oregon Biodiversity Information Center
ORV	outstandingly remarkable value
PCT	Pacific Crest Trail
PDO	Pacific Decadal Oscillation
PILT	Payment in Lieu of Taxes
$PM_{2.5}$	particulate matter with a diameter less than or equal to 2.5 micrometers
PM_{10}	particulate matter with a diameter less than or equal to 10 micrometers
ppb	parts per billion
ppm	parts per million
PRMP	Proposed RMP
QMD	quadratic mean diameter
RCP	representative concentration pathway

RD	relative density
RMA	recreation management area
RMIS	Recreation Management Information System
RMP	resource management plan
RNA	Research Natural Area
ROD	record of decision
ROW	right-of-way
SCC	social cost of carbon
SDI	Stand Density Index
SFP	special forest product
SO_2	sulfur dioxide
SPTH	site-potential tree height
SRMA	Special Recreation Management Area
SRS	Secure Rural Schools
SSRA	Smoke Sensitive Receptor Area
SYU	Sustained Yield Unit
TDSA	Tribal Designated Statistical Area
Tg	teragram
TMDL	Total Maximum Daily Load
TMP	travel management plan
TPA	trees per acre
TPCC	Timber Productivity Capability Classification
TTM	travel and transportation management
UTA	Uneven-aged Timber Area
USDA	United States Department of Agriculture
USDC	United States Department of Commerce
USDOE	United States Department of Energy
USDI	United States Department of Interior
USC	United States Code
VRI	visual resource inventory
VRM	visual resource management
WARSEM	Washington Road Surface Erosion Model
WSR	Wild and Scenic River
WTP	willingness to pay
WUI	Wildland Urban Interface

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Glossary

1954 Boundary – The reservation that was home to the Klamath Tribes after the signing of the 1864 treaty ceding their lands until 1954 when the Tribe was terminated from Federal recognition and the reservation was removed.

Aboriginal homelands – Lands referenced in treaties and or legislation, although not officially ceded by a ratified treaty. It can also describe an area where people originated from prior to being relocated to reservations.

Acquired lands – Public lands that the Federal government has obtained by purchase, condemnation, gift, or exchange, as distinguished in the decision area from Coos Bay Wagon Road lands, O&C lands, and public domain lands.

Active crown fire – A solid flame consistently maintained in the canopy of the stand of trees or shrubs.

Age class – A system that categorizes forest stands by interval of years. For this analysis, the interval is 10-year increments. For example, a stand of ten-year age class of 60 includes ages 56–65.

Aggregated retention – See *variable-retention regeneration harvest.*

Air quality attainment area – A geographic area with air quality as good as or better than the National Ambient Air Quality Standards as defined in the Clean Air Act. An area may be in attainment for one or more criteria pollutants but also be in nonattainment for one or more other criteria pollutants.

Air quality maintenance area – A geographic area that had a history of nonattainment, but are now consistently meeting the National Ambient Air Quality Standards. Maintenance areas have been re-designated by the U.S. Environmental Protection Agency (EPA) from "nonattainment" to "attainment with a maintenance plan," or designated by the Environmental Quality Commission.

Air quality nonattainment area – A geographic area that has not consistently met the clean air levels set by the U.S. Environmental Protection Agency in the National Ambient Air Quality Standards.

Allotment – An area of land in which one or more livestock operators graze their livestock. Allotments generally consist of BLM-administered lands but may include other federally managed, state-owned, and private lands.

Allowable Sale Quantity – The timber volume that a forest can produce continuously under the intensity of management described in the RMP for those lands allocated for permanent timber production. The terms 'annual productive capacity,' 'annual sustained yield capacity,' 'sustained yield capacity,' and 'allowable sale quantity' are synonymous.

Anadromous fish – Fish that are born and reared in freshwater, move to the ocean to grow and mature, and return to freshwater to reproduce.

Ancestral territory – Homelands and traditional territory of ancestral Tribes. Lands that may or may not have been formally ceded by a Tribe. May reference lands from which Tribes were forcibly removed and may or may not have been compensated for later. May also reference reservation lands that were taken back later.

Animal Unit Month (AUM) – The amount of forage necessary for the sustenance of one cow or its equivalent for 1 month.

Annual productive capacity – See *allowable sale quantity.*

Annual sustained yield capacity – See *allowable sale quantity.*

Aquatic habitat – Habitat that occurs in free water.

Area of Critical Environmental Concern (ACEC) – Lands where special management attention is needed to protect and prevent irreparable damage to important historic, cultural, or scenic values, fish, and wildlife resources or other natural systems or processes or to protect life and provide safety from natural hazards.

Basal area – The cross-sectional area of a single plant stem, of all stems of a species in a stand, or of all plants in a stand (including the bark) that is measured at breast height (about 4.5 feet up from the ground) for larger plants (like trees) or measured at ground level for smaller plants.

Bed load – Coarse sediment particles with a relatively fast settling rate that move by sliding, rolling, or bouncing along the streambed in response to higher stream flows.

Beneficial use – In water use law, reasonable use of water for a purpose consistent with the laws and best interest of the people of the state. Such uses include, but are not limited to, the following: instream, out of stream, and ground water uses, domestic, municipal, industrial water supply, mining, irrigation, livestock watering, fish and aquatic life, wildlife, fishing, water contact recreation, aesthetics and scenic attraction, hydropower, and commercial navigation.

Best Management Practices (BMPs) – Methods, measures, or practices designed to prevent or reduce water pollution. Usually, BMPs are applied as a system of practices rather than a single practice.

Bioclimatic envelope – The range of climatic conditions in which a species can survive and reproduce.

Bioengineering – Techniques combining the biological elements of live plants with engineering design concepts for slope protection and erosion reduction.

Biological legacies – An organism, a reproductive portion of an organism, or a biologically derived structure or pattern inherited from a previous ecosystem. Biological legacies often include large trees, snags, and down logs left after harvesting to provide refugia and to enrich the new stand structurally. See *variable-retention harvest*.

Biological Opinion – The document resulting from formal consultation that states the opinion of the Fish and Wildlife Service or National Marine Fisheries Service as to whether or not a Federal action is likely to jeopardize the continued existence of ESA-listed species or results in destruction or adverse modification of critical habitat.

Biomass – Plant materials used as a source of renewable combustible fuel. Also includes woody material ground up into fiber and used in secondary wood products.

Board foot (bf) – A lumber or timber measurement term. The amount of wood contained in an unfinished board 1 inch thick, 12 inches long, and 12 inches wide.

Breeding, nesting, roosting, foraging habitat – The vegetation with the age class, species composition, structure, sufficient area, and adequate food source to meet some or all of the life needs of specific species.

British thermal unit (BTU) – A common unit of measuring energy in the English Inch-Pound (vs. Metric) system; the amount of heat required to raise 1 pound of water 1 °F.

Broad based dip – Shallow gradual dips in the constructed road grade with a higher than road surface embankment angled across the road in the direction of water flow. The dip portion is used to drain ditch flows to the other side of the road where drainage can dissipate at ground level or exit upon an erosion resistant surface, if needed, to prevent erosion.

Broadcast burn(ing) – A prescribed burning activity where fire is applied generally to most or all of an area within well-defined boundaries for reduction of fuel hazard, as a resource management treatment, or both. Canopy is generally either non-existent or not an objective to retain.

Bureau Sensitive species – Plant or animal species eligible for ESA-listed or candidate, state listed, or state candidate (plant) status, are on list 1 in the Oregon Natural Heritage Data Base, or are approved for this category by the BLM State Director.

Cable yarding – The movement of cut trees or logs from the area where they are felled to the *landing* on a system composed of suspended cables.

Candidate species – Taxa for which the U.S. Fish and Wildlife Service has sufficient information on their status and threats to propose the species for listing as endangered or threatened under the Endangered Species Act, but for which issuance of a proposed rule is currently precluded by higher priority listing actions. Separate lists for plants, vertebrate animals, and invertebrate animals are published periodically in the Federal Register.

Canopy – The area consisting of branches and foliage formed collectively by adjacent trees and other woody species in a forest stand. Where significant height differences occur between trees within a stand, formation of a multi-layered condition can result.

Canopy base height – The average distance (height) from the ground level to the lower branches of the trees that form the main forest canopy where there is sufficient crown loading in needle and 1-hour fuels for a certain level of surface fire intensity to transition into the crown.

Canopy bulk density – The mass of available canopy fuel per unit canopy volume.

Canopy cover – A measure of the percentage of ground covered by a vertical projection of the tree crowns.

Canopy closure – The proportion of the sky hemisphere obscured by vegetation when viewed by a single point.

Ceded lands – Tribal lands acquired by the United States government that a tribe ceded, granted, relinquished, sold, or lost rights to under a treaty or other agreement or law of the United States in exchange for rights or benefits (or both).

Channel migration zone – the area along low-gradient alluvial shifting channel(s) within which the channel(s) can be reasonably predicted to migrate over time as a result of natural and normally occurring hydrological and related processes when considered with the characteristics of the channels and their surroundings.

Checkerboard ownership – A land ownership pattern in which every other section (square mile) is in Federal ownership as a result of Federal land grants to early western railroad companies.

Clearcut – A timber harvesting method that removes essentially all trees in an area, producing a fully exposed microclimate over the majority of the harvested area.

Climatype – A population defined primarily by the temperature and precipitation ranges to which it is presumably adapted genetically.

Climax stage – See *seral stages.*

Closed canopy – The degree to which the canopy (forest layers above one's head) blocks sunlight or obscures the sky. It can only be accurately determined from measurements taken under the canopy to account for openings in the branches and crowns.

Coarse woody debris – See *down woody debris.*

Conditional crown fire – A crown fire that will not initiate within the stand under given conditions, but canopy fuels are sufficiently dense to support an active crown fire entering from an adjacent stand.

Commercial forest land base – Forestlands declared suitable for producing timber and having a minimum level of productivity of 20 cubic feet/acre/year. Contrast with *Harvest Land Base*.

Commercial thinning – Stand thinning in which some or all of the cut trees are removed from the stand for timber. 'Commercial thinning' in this context does not include individual tree falling or stand thinning in which all the cut trees are left in the stand or some of the cut trees are moved for restoration purposes, or fuels reduction treatments in which cut trees are burned, chipped, or otherwise disposed of without removal from the stand for timber. 'Commercial thinning' may be implemented through a variety of mechanisms, including timber sale contracts and stewardship agreements or contracts.

Commercial use (of roads) – The primary purpose for development and use of the BLM road system is access for forest management activities and the transportation of forest products. Commercial use of BLM's road system typically includes log hauling and aggregate hauling and is authorized by either 1) perpetual reciprocal right-of-way agreements between the United States and private timberland owners, or 2) BLM timber sale contracts.

Condition class (fire regimes) – Fire regime condition classes are a measure describing the degree of departure from historical fire regimes, possibly resulting in alterations of key ecosystem components, such as species composition, structural stage, stand age, canopy closure, and fuel loadings. One or more of the following activities may have caused this departure: fire suppression, timber harvesting, livestock grazing, introduction and establishment of exotic plan species, introduced insects or disease, or other management activities.

Conservation strategy – A management plan for a species, group of species, or ecosystem that prescribes standards and guidelines that if implemented provide a high likelihood that the species, groups of species, or ecosystem, with its full complement of species and processes, will continue to exist well distributed throughout a planning area.

Consultation – A formal interaction between the U.S. Fish and Wildlife Service and another Federal agency when it is determined that the agency's action may affect a species that has been ESA-listed as threatened or endangered or its critical habitat

Convection – Transfer of heat by the automatic circulation of fluids.

Cooperating agency – A Tribe or Federal, State, or local government agency that assists a lead Federal agency in developing an environmental assessment or environmental impact statement. These can be any agency with jurisdiction by law or special expertise for proposals covered by NEPA (40 CFR 1501.6).

Coos Bay Wagon Road (CBWR) Lands – Public lands that were granted to the Southern Oregon Company for construction of a military road, but were subsequently reconveyed to the United States.

Council on Environmental Quality (CEQ) – An advisory council to the President of the U.S. that was established by the National Environmental Policy Act of 1969. It reviews Federal programs to analyze and interpret environmental trends and information.

County service area – Refers to those counties where tribal members reside that all tribally operated programs and services are available to them. The particular number and specific counties vary from Tribe to Tribe.

Criteria pollutants – Six principle pollutants considered most harmful to public health and the environment and that can be monitored effectively. They include carbon monoxide (CO), lead (Pb), nitrogen oxides (NO_x), sulfur dioxide (SO_2), ozone (O_3), and particulate matter of two different aerodynamic diameters (PM_{10} and $PM_{2.5}$).

Critical habitat – Under the Endangered Species Act, critical habitat is defined as: (1) the specific areas within the geographic area occupied by an ESA-listed species on which are found physical and biological features essential to the conservation of the species, and that may require special management considerations or protection; and (2) specific areas outside the geographic area occupied by an ESA-listed species, when it is determined that such areas are essential for the conservation of the species.

Cross drain culvert – Culverts strategically installed to pass ditch runoff or drain seeps and springs safely under the road prism (often referred to as relief culverts).

Crown (of road) – The center of the road being higher than the outer edges, creating a nearly flat A-shape with a normal cross slope of ½" to ¾" per foot.

Crown (of tree) – Upper part of a tree or other woody plant that carries the main system of branches and the foliage.

Crown fire – A fire in the upper tree or shrub canopy. Crown fires are sometimes classified as independent (conditional) or dependent (active or passive) to distinguish the degree of independence from the surface fire.

Cubic foot – A unit of solid wood one foot square and one foot thick.

Culmination of mean annual increment (CMAI) – The age in the growth cycle of a tree or stand at which the mean annual increment (MAI) for which some attribute (e.g., wood volume of a tree or stand growth) is at maximum. At culmination, MAI equals the periodic annual increment.

Cultural resources – Locations of human activity, occupation, or use. Cultural resources include archaeological, historic, or architectural sites, structures, or places with important public and scientific uses, and locations of traditional cultural or religious importance to specified social or cultural groups.

Culvert – Enclosed channels of various materials and shapes designed to convey stream or ditch water under and away from the roadway.

Cumulative effect – The impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions. Cumulative impacts can result from individually minor, but collectively significant actions taking place over a period of time.

Current Vegetation Survey (CVS) – BLM's regional permanent plot inventory. Each sampling point has a series of nested concentric sub-plots, in which trees of different diameter classes are measured. Live and dead trees, down woody debris, and understory vegetation are measured. The plots are located on a 1.7-mile grid, on BLM land, if at least one subplot is forested.

Debris flow – A rapid moving mass of rock fragments, soil, and mud, with more than half of the particles being larger than sand size

Decision area – The lands within the planning area of this RMP revisions for which the BLM has authority to make land use and management decisions. In general, the BLM has jurisdiction over all BLM-administered lands (surface and subsurface) and over mineral estate in areas of split estate (i.e., areas where the BLM administers Federal mineral estate, but the surface is not owned by the BLM).

Deciview – A unit of visibility proportional to the logarithm of the atmospheric extinction; a measure of how hazy the atmosphere is over a period; the smaller the number, the clearer the air

Decommissioning (of roads) – See *road closure.*

Desired future condition – For rangeland vegetation, the condition of rangeland resources on a landscape scale that meet management objectives. It is based on ecological, social, and economic considerations during the land planning process. It is usually expressed as ecological status or management status of vegetation (species composition, habitat diversity, and age and size class of species) and desired soil qualities (soil cover, erosion, and compaction). In a general context, desired future condition is a portrayal of the land or resource conditions that are expected to result if goals and objectives are fully achieved.

Detrimental soil disturbance – The limit where the naturally occurring soil properties change to a reduced state and the inherent soil capacity to sustain growth of desired vegetation is reduced. Detrimental soil disturbance generally represents any one or all of the following; unacceptable levels of erosion (i.e., formation of rills, gullies, pedestals, or soil deposition), loss of organic matter (removal of more than half the organically enriched upper horizon), soil compaction (increase in natural bulk density that restricts root growth or wheel (or track) ruts > 2" deep), soil heating (physical and biological changes to the soil resulting from elevated temperatures of long duration), or soil displacement (removal of ≥ 1" of any surface horizon from a contiguous area greater than 100 sq. ft.).

Diameter breast height (DBH) – The diameter of the stem of a tree measured at 4.5 feet above the ground level on the uphill side of the stem. See *quadratic mean diameter*.

Dispersal habitat (northern spotted owl) – Forest stands with average tree diameters of greater than11 inches, and conifer overstory trees having closed canopies (greater than 40 percent canopy closure) with open space beneath the canopy to allow owls to fly.

Dispersed retention – See *variable-retention harvest system.*

Disposal – Transfer of public land out of Federal ownership to another party through sale or exchange as authorized by the Recreation and Public Purposes Act of 1926, Desert Land Entry or other land law statutes

Distinct population segment (DPS) – a discrete population of a species and the smallest portion of a vertebrate species that can be protected under the Endangered Species Act.

Disruption (ESA-listed wildlife) – A type of disturbance that that creates the likelihood of injury to ESA-listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering (see 50 CFR 17.3**)**. Disruption is a subset of disturbance. An action that would disrupt the normal behavior of an ESA-listed species may affect, and would be likely to adversely affect, the species and would cause the taking of affected individual(s).

Disturbance (ESA-listed wildlife) – A human action that may affect an ESA-listed animal species by the addition, above ambient condition, of noise or human intrusion, or the mechanical movement of habitat (e.g., the shaking of the forest canopy from helicopter rotor wash). Disturbance is temporary/short term (minutes to days) and does not modify habitat structure, or water/air flow or quality. Disturbance should not be confused with "surface disturbance," which refers to an action that modifies soil, water, or vegetation. Disturbance requires the presence of an ESA-listed animal.

Disturbance (natural) – A force that causes significant change in structure or composition through natural events such as fire, flood, wind, or earthquake, mortality caused by insect or disease outbreaks, or by human-caused events such as the harvest of forest products.

Down woody debris/coarse woody debris – Portion of a tree that has fallen, or been cut and left in the woods. Usually refers to pieces at least 20 inches in diameter.

Durable rock surfacing – Durability is an indicator of the relative quality or competence of an aggregate to resist abrasion, impact or grinding to produce clay like fines when subjected to commercial hauling. Durable rock surfacing will support commercial timber or rock haul in the winter with a minimal level of fines produced due to wear.

Dry season (for roads) – An annually variable period of time, starting after spring rains cease and when hillslope subsurface flow declines; drying intermittent streams and roadside ditches. Generally June through October, but may start or end earlier depending on seasonal precipitation influences.

Effective depth of decompaction – The depth to which the soil is tilled or loosened to provide infiltration capacity that is near to the adjacent undisturbed forest floor. Measured depth is from road surface to bottom of evidence of platy soil or increased bulk density that impedes water transmission.

Eligible river – A river or river segment found to meet criteria found in Sections 1(b) and 2(b) of the Wild and Scenic Rivers Act of being free flowing and possessing one or more outstandingly remarkable value.

Endangered species – Any species of plant or animal defined through the Endangered Species Act as being in danger of extinction throughout all or a significant portion of its range, and published in the Federal Register.

Energy dissipater – Any device or installation of material used to reduce the energy of flowing water.

Environmental Impact Statement (EIS) – A detailed statement prepared by the responsible official in which a major Federal action that significantly affects the quality of the human environment is described, alternatives to the proposed action are provided, and effects are analyzed.

Even-aged management – A silvicultural system, which creates forest stands that are primarily of a single age or very narrow range of ages. See *even-aged stand.*

Even-aged stand – A stand composed of a single distinct *age class* managed as a discrete operational unit. See *even-aged management.*

Fire frequency – The number of times that fires occur within a defined area and time period.

Fire hazard – A fuel complex, defined by volume, type condition, arrangement, and location, that determines the degree of ease of ignition and of resistance to control.

Fire regime – Description of the patterns of fire occurrences, frequency, size, severity, and sometimes vegetation and fire effects as well, in a given area or ecosystem. A fire regime is a generalization based on fire histories at individual sites.

Fire resilient forest – A forest having characteristics that limit fire severity and increase the resistance of the forest to mortality

Fire return interval – The time between fires in a defined area, usually at the scale of a point, stand or relatively small landscape area. This is called Mean Fire Interval (MFI) in the LANDFIRE system, where it refers to the average number of years between fires in representative stands.

Fire suppression – Fire management actions taken to extinguish a fire or confine fire spread.

Fifth-field watershed – Individual watershed within a Hydrologic Unit as defined by the U.S. Geological Survey, typically averages 87,000 acres in size.

Floodplain – Level lowland bordering a stream or river onto which the flow spreads at flood stage.

Forage – All browse and herbaceous foods available to grazing animals, including wildlife and domestic livestock

Forest Operations Inventory (FOI) – An intensive inventory that provides managers with information regarding age, species, stand location, size, silvicultural needs, and recommended treatment based on individual stand conditions and productivity.

Forestland – Land at least 10 percent stocked by forest trees of any size, and including land that formerly had such tree cover and capable of redeveloping forested conditions.

Fluid minerals – Oil, gas, coal bed natural gas, and geothermal resources.

Fuel loads – The amount of combustible material present per unit area.

Full decommissioning (of roads) – See *road closure.*

Genetic gain – The average improvement of a specific trait in a population of progeny over the average of the parental population (e.g., height growth increase).

Geographic Information System (GIS) – A system of computer hardware, software, data, people, and applications that capture, store, edit, analyze, and display a potentially wide array of geospatial information.

Geotextile – A geosynthetic fabric or textile manufactured from synthetic plastic polymers, not biodegradable, in woven or non-woven types, and used for various purposes ranging from reinforcement and separation to drainage filtration and sediment control.

Geothermal energy – Natural heat from within the Earth, captured for production of electric power, space heating or industrial steam.

Grade break – A long, gradual break in grade on a road with a relatively gradual downhill slope that improves drainage. Grade breaks limit water flow by decreasing concentration and velocity from a reduced area of road section.

Gradient Nearest Neighbor – A method to characterize forest vegetation across a region that integrates vegetation measurements from regional networks of field plots, mapped environmental data, and Landsat TM data. The method applies direct gradient analysis (canonical correspondence analysis) and nearest-neighbor imputation to ascribe detailed ground attributes of vegetation to each patch in a regional landscape.

Gravel interstitial space – The pockets between pieces of gravel.

Green tree – A live tree.

Green-tree retention – A stand management practice in which live trees are left within harvest units to provide a legacy of habitat components over the next management cycle. See *Variable-retention harvest*.

Ground-based yarding – The movement of cut trees or logs from the area where they are felled to the landing through the use of mechanical equipment or animals that move along the ground.

Group selection harvest – Areas in a *commercial thinning* or *selection harvest* entry where trees are harvested in groups of varying sizes. Synonymous with 'patch cut,' and 'gap creation.' See also *group selection opening*.

Group selection opening – The resulting forest condition, which exists after *group selection harvesting* is employed. An area in the *stand* with a low level of *canopy cover* and relatively few remaining *overstory* trees. Synonymous with 'gap.'

Growth and yield modeling – Simulated projections of forest stand growth and development, from which timber volume estimates and other stand attributes expected to be produced per unit area under a certain set of conditions are derived.

Hand pile – Piling of fuels by hand.

Harvesting – The process of cutting and removing of merchantable trees from a forested area.

Harvest Land Base – Those lands on which the determination and declaration of the Annual Productive Capacity/Allowable Sale Quantity (ASQ) is based. The ASQ is based on implementing a set of specific timber management activities and assumes those practices will be repeated over time and results in a sustainable harvest level.

Helicopter yarding – The movement of cut trees or logs from the area where they are felled to the landing through the use of helicopters.

Herbaceous vegetation – Seed-producing annual, biennial, or perennial vegetation that does not develop persistent woody tissue, but dies down at the end of a growing season.

Herd Management Area – Public land under the jurisdiction of the BLM that has been designated for special management emphasizing the maintenance of an established wild horse or burro herd.

High intrinsic potential streams – streams with the habitat features that are known to be highly productive for an individual fish species.

High sediment producing roads – Roads whose physical characteristics and rights of way vegetation, in combination with precipitation in the watershed and traffic result in high erosion rates.

High-severity fire – Greater than 75 percent of the total canopy cover, or basal area, is killed by the sum of all fire effects.

Insloping – Constructing and maintaining the entire surface of the road toward the cutslope side of the road.

Intermittent stream – A non-permanent drainage feature with a dry period, normally for three months or more. Flowing water forms a channel feature with well-defined bed and banks, and bed-forms showing annual scour or deposition, within a continuous channel network.

Intrinsic potential (stream) – A stream's inherent ability to provide high quality habitat for salmonids.

Integrated vegetation management – A combination of silviculture treatments, fire and fuels management activities, and harvest methods. Activities include planting, prescribed fire, thinning, single-tree selection harvest, and group selection harvest.

Invasive species – A non-native species whose introduction does, or is likely to, cause economic or environmental harm or harm to human health.

Ladder fuel – Fuel that provides vertical continuity between forest strata, thereby allowing fire to carry from surface fuels into the crowns of trees or shrubs with relative ease.

Landing – A cleared area in the forest to which logs are yarded for loading onto trucks for transport.

Landscape – A heterogeneous land area with interacting ecosystems that are repeated in similar form throughout.

Land Use Allocation – The identification in a land use plan of the activities and foreseeable development that are allowed, restricted, or excluded for all or part of the planning area, based on desired future conditions.

Lead-off ditch – A formed channel that diverts ditch water away from the road, usually angled in the direction of water flow and placed at locations to empty into vegetative filtering areas.

Leasable minerals – Minerals generally found in bedded deposits and include oil, gas, coal, chlorides, sulfates, carbonates, borates, silicates, and nitrates of potassium (potash) or sodium and related products; sulfur; phosphate and its associated and related minerals; asphalt; and gilsonite.

Locatable minerals – Metallic minerals (e.g., gold, silver, lead, copper, zinc, and nickel) and nonmetallic minerals (fluorspar, mica, certain limestone and gypsum, tantalum, heavy minerals in placer form and gemstones) in land belonging to the United States that are open to citizens of the United States for exploration, discovery, and location which conveys the possessory right to extract the locatable minerals upon receiving all required authorizations in accordance with regulations at 43 CFR 3802 for lands in wilderness review and 43 CFR 3809 for other public lands.

Lop and scatter – The cutting of branches, tops, and unwanted boles into lengths that will lie close to the ground and spreading debris more or less evenly.

Low-severity fire – Less than 25 percent of the total canopy cover or basal area is killed by the sum of all fire effects.

Low volume road – A road that is functionally classified as a resource road and has a design average daily traffic volume of 20 vehicles per day or less.

Machine pile – The piling of activity fuels with machinery.

Management direction – Rules in an RMP that identify where future actions may or may not be allowed and what restrictions or requirements may be placed on those future actions to achieve the objectives set for the BLM-administered lands and resources.

Management objective – Descriptions of desired outcomes for BLM-administered lands and resources in an RMP; the resource conditions that the BLM envisions or desires would eventually result from implementation of the RMP. As such, management objectives are not rules, restrictions, or requirements by which the BLM determines which implementation actions to conduct or how to design specific implementation actions.

Mass wasting – The downslope movement of earth materials caused by gravity. This is an all-inclusive term that includes, but is not limited to landslides, rock falls, debris avalanches, and creep; however, it does not include surface erosion by running water.

Mean annual increment (MAI) – the total cumulative quantity produced over time of some attribute of a tree or stand growth (e.g., wood volume divided by the total age of the tree or stand).

Mechanical mastication – The mechanical crushing, grinding, shredding of shrubs, small trees, and downed woody material, leaving a low profile, matted, continuous surface fuel bed.

Merchantable – Trees or stands having the size, quality, and condition suitable for marketing under a given economic condition, even if not immediately accessible for logging.

Mineral estate – The ownership of minerals, including rights necessary for access, exploration, development, mining, ore dressing, and transportation operations.

Mining claim – A parcel of land that a miner takes and holds for mining purposes, having acquired the right of possession by complying with the Mining Law and local laws and rules. A mining claim may contain as many adjoining locations as the locator may make or buy. There are four categories of mining claims: lode, placer, millsite, and tunnel site.

Mitigation – The act of reducing or eliminating an adverse environmental impact.

Mixed-severity fire – The severity of fires varies between nonlethal understory and lethal stand-replacement fire with the variation occurring in space or time. The result may be a mosaic of young, older, and multiple-aged vegetation patches as a function of landscape complexity or vegetation patterning. Typically, more than 25 percent and less than 75 percent of the total canopy cover or basal area is killed by the sum of all effects. Fires may also vary over time between low-intensity surface fires and longer-interval stand replacement fires.

Modeling – A scientific method that operates by a structured set of rules and procedures to simulate current conditions and predict future conditions.

Monitoring – The review on a sample basis, of management practices to determine how well objectives are being met, as well as the effects of those management practices on the land and environment.

Multi-layered canopy – Forest *stands* with two or more distinct *canopy* layers.

Multi-aged stand – *Two*-aged and *uneven*-aged stands.

National Landscape Conservation System – Special Congressional or Presidential land use designations such as National Monuments, Wild and Scenic Rivers, and Wilderness Areas.

Non-commercial thinning (management) – Cutting merchantable trees but not removing them from the *stand.*

No Surface Occupancy – A fluid minerals leasing major constraint that prohibits occupancy or disturbance on all or part of the lease surface to protect special values or uses. Lessees may exploit the fluid mineral resources under the leases restricted by this constraint through use of directional drilling from sites outside the No Surface Occupancy area, or application of waivers, exceptions, or modifications.

O&C lands – Public lands granted to the Oregon and California Railroad Company and subsequently revested to the United States.

Occupied stand (marbled murrelet) – Marbled murrelet occupied stand refers to all forest stands, regardless of age or structure, within 1/4 mile (1,320 feet) of the location of marbled murrelet behavior indicating occupancy and not separated from the location of marbled murrelet behavior indicating occupancy by more than 328 feet of non-forest.

ODFW in stream work period – Oregon Department of Fish and Wildlife designated guidelines that identify periods of time for in-water work that would have the least impact on important fish, wildlife and habitat resources. Work periods are established to avoid the vulnerable life stages of fish including migration, spawning and rearing. Work periods are established for the named stream, all upstream tributaries, and associated lakes within a watershed (ODFW 2008, Oregon Guidelines for Timing of In-Water Work to Protect Fish and Wildlife Resources).

Obliteration (of roads) – See *road closure.*

Off-Highway Vehicle (OHV) – Any motorized track or wheeled vehicle designed for cross-country travel over any type of natural terrain.

Ordinary high water line – The line on the stream bank or shore to which the high water ordinarily rises each year and is the waterward limit of upland vegetation and soil. This line is not established based on the level to which the water rises during major floods.

Outsloping – Constructing and maintaining the entire surface of the road toward the fillslope side of the road.

Outstandingly Remarkable Values – Values among those listed in Section 1(b) of the Wild and Scenic Rivers Act of 1968: "scenic, recreational, geological, fish and wildlife, historical, cultural, or other similar values..." Other similar values that may be considered include ecological, biological, or botanical.

Overstory – That portion of trees forming the uppermost canopy layer in a forest stand and that consists of more than one distinct layer.

Paleontological resource – Any fossilized remains, traces, or imprints of organisms, preserved in or on the earth's crust, that are of paleontological interest and that provide information about the history of life on earth.

Particulate matter (PM) – A complex mixture consisting of varying combinations of dry solid fragments, solid cores with liquid coatings, and small droplets of liquid, typically measured in micrometers (e.g., $PM_{2.5}$ – particular matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers).

Passive crown fire – A fire that initiates from the surface fuels, up through the ladder fuels, and into the aerial fuels in the crowns of trees in which individual trees or groups of trees torch.

Peak flow – The highest amount of stream or river flow occurring in a year, or from a single storm event.

Peak to Peak Boundary – The boundary the Klamath Tribes identified as their intended reservation upon ceding their lands to the Federal government. The 1954 boundary is what was established as the actual reservation.

Perennial stream – A stream that typically has running water on a year-round basis. Their base level is at, or below, the water table.

Periodic annual increment – the difference in a stand attribute at two successive measurements, divided by the number of years between measurements. Periodic annual increment is an approximation to current annual increment, which is not directly measurable.

Physiographic province – A geographic area having a similar set of biophysical characteristics and processes due to effects of climate and geology, which result in patterns of soils and broad-scale plant communities. Habitat patterns, wildlife distributions, and historical land use patterns may differ significantly from those of adjacent provinces.

Pile burning – Activity fuels, once piled by machine or by hand, are burned in place.

Pioneer road – Temporary access ways, within the path of the permanent road, used to facilitate construction and equipment access. When building permanent roads, pioneer roads exist within the template of the finished road.

Planning area – All lands within the geographic boundary of this RMP revision regardless of jurisdiction.

Planned ignition – The intentional initiation of a wildland fire by hand-held, mechanical or aerial device where the distance and timing between ignition lines or points and the sequence of igniting them is determined by environmental conditions (weather, fuel, topography), firing technique, and other factors which influence fire behavior and fire effects.

Plant association group – A vegetation classification including five to ten closely related plant associations, or groupings of plants that occur together in similar environments, typically defined by their climates (temperature and moisture), soils, and history of natural disturbances, such as wildfires, diseases and insect outbreaks.

Pre-commercial thinning (PCT) – The practice of reducing the density of trees within a stand by manual cutting, girdling, or herbicides to maintain or promote growth increases of desirable tree species. The trees killed are generally not *merchantable* and not removed from the treated area.

Preferred Alternative – Term used in the Council on Environmental Quality's implementing regulations of the National Environmental Policy Act (NEPA) and BLM planning regulations. Guidance from the Council on Environmental Quality explains that the preferred alternative is the alternative that the agency believes would fulfill its statutory mission and responsibilities, considering economic, environmental, technical, and other factors.

Prescribed fire – A wildland fire originating from a planned ignition to meet specific objectives identified in a written, approved, prescribed fire plan for which NEPA requirements have been met prior to ignition. See *planned ignition*.

Progeny test site – A test area for evaluating parent seed trees by comparing the growth of their offspring seedlings.

Public domain lands – Original holdings of the United States never granted or conveyed to other jurisdictions, or reacquired by exchange for other public domain lands.

Public land – Land or interest in land owned by the U.S. and administered by the Secretary of the Interior through the BLM without regard to how the U.S. acquired ownership, except lands located on the Outer Continental Shelf and land held for the benefit of Indians, Aleuts, and Eskimos.

Public motorized access designation – Designation of lands made in a land use plan for public **motorized travel activities:**

> ***Open***—All types of public motorized travel activities are permitted at all times, anywhere in the area, subject only to certain operating regulations and vehicle standards.

Limited—Public motorized travel activities are restricted at certain times, in certain areas, to certain routes, or to certain types of motorized vehicular use.
Closed—Public motorized travel activities are prohibited anywhere in the area.

Quadratic mean diameter – The diameter of the tree of average basal area in a stand at breast height. See *diameter breast height*.

Recovery plan – A plan for the conservation and survival of an endangered species or a threatened species listed under the Endangered Species Act, for the purpose of improving the status of the species to the point where listing is no longer required.

Regeneration – (n.) Tree seedlings or saplings existing in a stand. (v.) The process of re-establishing trees on a tract of forestland where harvest or some natural event has removed existing trees.

Regeneration harvest(ing) – Any removal of trees intended to assist regeneration already present or make regeneration possible.

Relative density (RD) – A means of describing the level of competition among trees or site occupancy in a stand, relative to some theoretical maximum based on tree density, size, and species composition. Relative density percent is calculated by expressing *Stand Density Index (SDI)* **(**Reineke 1933) as a percentage of the theoretical maximum SDI, which varies by tree species and range. Curtis's relative density (Curtis 1982**)** is determined mathematically by dividing the stand basal area by the square root of the *quadratic mean diameter*. See also *Stand Density Index*.

Relevant and important resource value – Criteria used to evaluate nominated Areas of Critical Environmental Concern.

Renewable energy – See *sustainable energy*.

Renovation (of roads) – Work done to an existing road, restoring it to its original design standard

Resource Management Plan (RMP) – A land use plan as prescribed by the Federal Land Policy and Management Act that establishes, for a given area of land, land-use allocations, management objectives, and management direction.

Resource road – Roads that provide a point of access to public lands and connect with local or collector roads.

Right-of-way – Authorization to use public lands for certain specified purposes, commonly for pipelines, roads, telephone lines, electric lines, reservoirs, and so on; also, the lands covered by an easement or permit.

Riparian area – A geographic area containing an aquatic ecosystem and adjacent upland areas that directly affect it.

Road closure – Closing roads to use in any of the following categories:

- Temporary/Seasonal/Limited Access – These are typically resource roads, closed with a gate or barrier. The road will be closed to public vehicular traffic but may be open for BLM/Permittee commercial activities. The road may or may not be closed to BLM administrative uses on a seasonal basis depending upon impacts to the resources. Drainage structures will be left in place.

- Decommission (long-term) –The road segment will be closed to vehicles on a long-term basis, but may be used again in the future. Prior to closure the road will be left in an erosion-resistant condition by establishing cross drains, eliminating diversion potential at stream channels, and stabilizing or removing fills on unstable areas. Exposed soils will be treated to reduce sediment delivery to streams. The road will be closed with an earthen barrier or its equivalent. This category can include roads that have been or will be closed due to a natural process (abandonment) and may be opened and maintained for future use.
- Full Decommission (permanent) – Roads determined to have no future need may be subsoiled (or tilled), seeded, mulched, and planted to reestablish vegetation. Cross drains, fills in stream channels, and unstable areas will be removed, if necessary, to restore natural hydrologic flow. The road will be closed with an earthen barrier or its equivalent. The road will not require future maintenance. This category includes roads that have been closed due to a natural process (abandonment) and where hydrologic flow has been naturally restored.
- Obliteration (full site restoration/permanent) – Roads receiving this level of treatment have no future need. All drainage structures will be removed. Fill material used in the original road construction will be excavated and placed on the subgrade in an attempt to reestablish the original ground line. Exposed soil will be vegetated with native trees or other native vegetation. Road closure by obliteration is rarely used.

Rotation [age] – The planned number of years between the establishment of an even-aged or two-aged forest stand and its regeneration harvest.

Salable minerals – Minerals including but not limited to petrified wood and common varieties of sand, stone, gravel, pumice, pumicite, cinder, clay, and rock.

Salvage harvest(ing) – Removal of dead trees or of trees damaged or dying because of injurious agents other than competition, to recover their economic value.

Sediment – Fine particles of inorganic or organic matter carried by water.

Seed orchard – A plantation of clones or seedlings from selected trees; isolated to reduce pollination from outside sources, weeded of undesirables, and cultured for early and abundant production of seed.

Selection harvest(ing) – A method of uneven-aged management involving the harvesting of single trees from stands (single-tree selection) or in groups up to four (4) acres in size (group selection) without harvesting the entire stand at any one time.

Seral stages – The series of relatively transitory plant communities that develop during ecological succession from bare ground to the climax stage.

Shelterwood harvest(ing) – A regeneration harvest method under an even-aged silvicultural system. With this method a portion of the mature stand is retained as a source of protection during the regeneration period. The retained trees are removed when protection requirements have been met.

Shotgun culverts – Ditch relief or stream culverts where the outlet extends beyond the natural ground line.

Silvicultural practices (or treatments or system) – The set of field techniques and general methods used to modify and manage a forest stand over time to meet desires conditions and objectives. Examples include reforestation, pre-commercial thinning, and commercial thinning.

Silvicultural prescription – A planned series of treatments designed to change current stand structure to one that meets management goals.

Silvicultural system – A planned series of treatments for tending, harvesting, and reestablishing a *stand*. The system name is based on the number of age classes managed within a stand (e.g., even-aged, two-aged, and uneven-aged).

Site class – A classification of an area's relative productive capacity for tree growth commonly expressed in terms of the heights of the largest trees in a stand at a common 'index' age, usually 50 or 100 years old. Site classes are numbered from 1 (most productive) to 5 (least productive).

Site potential tree height – The average maximum height of the tallest dominant trees (200 years or older) for a given site class. Site-potential tree heights generally range from 140 feet to 240 feet across the decision area, depending on site productivity.

Skips – Portions of a *stand* generally left untreated after a *commercial thinning* or *selection harvest*. Skips are used to increase variability of forest conditions in the post-harvest stand, and to create desirable habitats and ecological conditions.

Slash – The branches, bark, tops, cull logs, and broken or uprooted trees left on the ground after logging has been completed.

Slope stability – The resistance of a natural or artificial slope, or other inclined surface, to failure by landsliding (mass movement).

Snag – Any standing dead, partially dead, or defective (cull) tree at least 10 inches in diameter at breast height and at least 6 feet tall. A hard snag is composed primarily of sound wood, generally merchantable. A soft snag is composed primarily of wood in advanced stages of decay and deterioration, generally not merchantable.

Soil compaction – An increase of the soil bulk density (weight per unit volume) compared to undisturbed soil, and a decrease in porosity (particularly macropores) resulting from applied loads, vibration or pressure.

Soil productivity – Capacity or suitability of a soil, for establishment and growth of a specified crop or plant species.

Soil quality – The capacity of a soil to function for specific land uses or within ecosystem boundaries. This capacity is an inherent characteristic of a soil and varies from soil to soil. Indicators such as organic-matter content, salinity, tilth, compaction, available nutrients, and rooting depth help measure the health or condition of the soil-its quality-in any given place.

Special forest products – Those plant and fungi resources that are harvested, gathered or collected by permit, and have social, economic, or spiritual value. Common examples include mushrooms, firewood, Christmas trees, tree burls, edibles and medicinals, mosses and lichens, floral and greenery, and seeds and cones, but not soil, rocks, fossils, insects, animal parts, or any timber products of commercial value.

Special status species – Plant or animal species in any of the following categories:

- Threatened or endangered species
- Proposed threatened or endangered species
- Candidate species

- State-listed species
- Bureau sensitive species

Stand – An aggregation of trees occupying a specific area managed as a discrete operational or management unit. A stand may be composed of trees and groups of trees of a variety of ages, species, and conditions, or it may be relatively uniform. A stand may also contain multiple *land use allocations*.

Stand conversion – Converting one type of forest stand to another type. Typically refers to changing areas dominated by hardwood species to one dominated by conifer species.

Stand Density Index (SDI) – Reineke's (1933) stand density index is a function of quadratic mean diameter and number of trees per unit area. SDI can be interpreted as the number of 10 inch trees that would experience approximately the same level of inter-tree competition as the observed number of trees with the observed mean diameter. See also *Relative Density*.

Stand replacement fire – A fire that is lethal to most of the dominant above ground vegetation and substantially changes the vegetation structure. Stand replacement fires may occur in forests, woodlands and savannas, annual grasslands, and shrublands. They may be crown fires, high-severity surface fires, or ground fires.

State-listed species – Plant or animal species listed by the State of Oregon as threatened or endangered pursuant to ORS 496.004, ORS 498.026, or ORS 564.040.

Storm-proof – Roads having a self-maintaining condition, allowing unimpeded flows at channel crossings and surface conditions that reduce chronic sediment input to stream channels.

Stream reach – An individual first order stream or a segment of another stream that has beginning and ending points at a stream confluence. Reach end points are normally designated where a tributary confluence changes the channel character or order. Although reaches identified by BLM are variable in length, they normally have a range of 0.5 mile to 1.5 miles in length unless channel character, confluence distribution, or management considerations dictate variance. See also *Turbidity*.

Structural stage classification – Forest stand classification system based on quantitative stand metrics used to evaluate changes in forest conditions through time. Classifications include:

1. Early Successional
   - Moist: forests that are ≤ 30 years old, with < 30 percent canopy cover.
   - Dry: forests that are ≤ 50 years old, with < 30 percent canopy cover.
2. Stand Establishment
   - Moist: forests that are ≤ 30 years old, with ≥ 30 percent canopy cover.
   - Dry: forests that are ≤ 50 years old, with ≥ 30 percent canopy cover.
3. Young
   - Moist: forests that are over 30 years old, with < 24 trees per acre ≥ 20 inches diameter at breast height.
   - Dry: forests that are over 50 years old, with < 12 trees per acre ≥ 20 inches diameter at breast height.
4. Mature
   - Moist: forests that are over 30 years, with ≥ 24 trees per acre ≥ 20 inches diameter at breast height.
   - Dry: forests that are over 50 years, with ≥ 12 trees per acre ≥ 20 inches diameter at breast height.
5. Structurally-complex

5.1 (SC-Dev) Developed Structurally-complex

- Moist: forests that are over 30 years old, ≥ 24 trees per acre that are ≥ 20 inches diameter at breast height, and ≥ 4.7 trees per acre ≥ 40 inches diameter at breast height. The coefficient of variation of tree diameters over 10 inches ≥ 0.35
- Dry: forests that are over 50 years old, ≥ 12 trees per acre that are ≥ 20 inches diameter at breast height, and ≥ 2.1 trees per acre ≥ 40 inches diameter at breast height. The coefficient of variation of tree diameters over 10 inches ≥ 0.34.

5.2 (SC-OF) Existing Old Forest

- Stands currently ≥ 200 years old, but < 400 years old.

5.3 (SC-VOF) Existing Very Old Forest

- Stands currently ≥ 400 years old

Stumpage price – The value of standing timber.

Suitable River – An eligible river segment found through administrative study to meet the criteria for designation as a component of the National System, as specified in Section 4(a) of the Wild and Scenic Rivers Act.

Surface fire – A fire that burns on the surface of the ground and consumes surface fuels.

Surface fuel – Fuels lying on or near the surface of the ground, consisting of leaf and needle litter, dead branch material, downed logs, bark, tree cones, and low stature living plants.

Sustainable energy – Energy that comes from resources that are naturally replenished on a human timescale such as sunlight, wind, rain, tides, waves, and geothermal heat, as opposed to 'fossil energy' which comes from resources replenished on a geological timescale.

Sustained yield – The board foot volume of timber that a forest can produce in perpetuity at a given intensity of management; the achievement and maintenance in perpetuity of a high-level annual or regular periodic output of the various renewable resources.

Sustained yield capacity – See *allowable sale quantity.*

Sustained yield unit (SYU) – An administrative unit for which an allowable sale quantity is calculated; in western Oregon, the six sustained yield units correspond to the Coos Bay, Eugene, Medford, Roseburg, and Salem Districts, and the western portion of the Klamath Falls Field Office.

Temporary Road – A short-term use road authorized for the development of a project that has a finite lifespan (e.g., a timber sale spur road). Temporary roads are not part of the permanent designated transportation network and must be reclaimed when their intended purpose has been fulfilled.

Thinning – A silvicultural treatment made to reduce the density of trees primarily to improve tree/stand growth and vigor, or recover potential mortality of trees, generally for commodity use. See *pre-commercial thinning*, *commercial thinning*, *variable-density thinning.*

Timber Production Capability Classification (TPCC) – The process of partitioning forestland within the sustained yield unit into major classes based on the biological and physical capability of the site to support and produce forest products on a sustained yield basis using operational management practices.

Timber volume – Amount of timber contained in a log, a stand, or a forest, typically measured in board feet or cubic feet.

Threatened species – Those plant or animal species likely to become endangered species throughout all or a significant portion of their range within the foreseeable future. A plant or animal identified and defined in accordance with the 1973 Endangered Species Act and published in the Federal Register.

Torching – The burning of the foliage of a single tree or a small group of trees, from the bottom up. See *passive crown fire*.

Tree-tipping – Mechanically tipping or pulling over trees with root wads attached, generally into or near a stream, to simulate natural wood recruitment.

Tribal fee land – Lands in which a Tribe has acquired title to through purchase or donation but the Federal government has not put into trust, therefore state and local laws apply including payment of property and timber harvest taxes.

Trust land – Land in which the Federal government holds title to for the use and benefit of a Tribe.

Turbidity – The cloudiness exhibited by water carrying sediment; the degree to which suspended sediment interferes with light passage through water.

Two-aged stand – A stand composed of two (2) distinct age classes intimately mixed or in aggregated groups producing a two-story structure managed as a discrete operational unit.

Two-aged system – A silvicultural system intended to regenerate and maintain stands with two distinct age classes.

Underburn – A fire that consumes surface fuels but not the overstory canopy.

Underburning – Prescribed burning under a forest canopy.

Underdrain – Culverts installed to convey water from springs, and seeps encountered during road construction, under the road.

Understory – That portion of trees or other woody vegetation, which form the lower layer in a forest stand, which consists of more than one distinct layer.

Uneven-aged management – A silvicultural system that simultaneously maintains high degree of tall forest cover, recurring regeneration of desirable species, and the orderly growth and development of trees through a range of diameter or age classes. Harvesting methods that develop and maintain uneven-aged stands are single-tree selection, group selection, and thinning.

Uneven-aged stand – A stand composed of at least three (3) distinct age classes intimately mixed or in aggregated groups producing a multi-layered canopy structure managed as a discrete operational unit.

Use of wildland fire – Management of either wildfire or prescribed fire to meet resource objectives.

Usual and accustomed areas – Areas regularly utilized and accessed by antecedent tribes or bands prior to treaty signing.

Variable-density thinning (VDT) – A thinning method where two or more densities of retained trees are used to promote stand heterogeneity through the development of multi-layered canopies. Provision of conditions conducive to the initiation and growth of regeneration is usually an objective of VDT.

Variable-retention regeneration harvest or variable retention harvest (VRH) – An approach to regeneration harvesting that is based on the retention of structural elements or biological legacies from the harvested stand for integration into the new stand to achieve various ecological objectives. The resultant stand is generally two-aged or multi-aged. The major variables in variable- retention harvest systems are the types, densities and spatial arrangement of the retained structures; (1) aggregated retention is the retention of structures as (typically) intact forest patches within or adjacent to the harvest unit; (2) dispersed retention is the retention of structures or biological legacies in a more or less scattered pattern. Variable-retention regeneration harvest is synonymous with green-tree retention, retention harvest, retention forestry.

Visual Resource Management (VRM) – The inventory and planning actions to identify values and establish objectives for managing those values and the management actions to achieve those objectives

Visual Resource Management classes – Categories assigned to public lands based on scenic quality, sensitivity level, and distance zones. There are four classes. Each class has an objective that prescribes the amount of change allowed in the characteristic landscape.

Water drafting site – Site to provide a short duration, small pump operation that withdraws water from streams or impoundments to fill conventional tank trucks or trailers.

Water quality – The chemical, physical, and biological characteristics of water with respect to its suitability for a particular use.

Water harvesting pond – Ponds constructed to capture and store rainwater or snowmelt.

Waters of the State – Includes lakes, bays, ponds, impounding reservoirs, springs, wells, rivers, streams, creeks, estuaries, marshes, inlets, canals, the Pacific Ocean within the territorial limits of the State of Oregon and all other bodies of surface or underground waters, natural or artificial, inland or coastal, fresh or salt, public or private which are wholly or partially within or bordering the State or within its jurisdiction. ORS 468B.005(10).

Watershed – An area in which all surface waters flow to a common point.

Wet season (for roads) – An annually variable period of time, starting after precipitation amounts saturate soils. This occurs after the onset of fairly continuous fall rains, which result in seasonal runoff in ephemeral and intermittent stream channels and from the road surface and ditches. Generally November through May, but could start or end earlier depending on seasonal precipitation influences.

Wetland – Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions, as defined by the 1972 Federal Clean Water Act. These wetlands generally meet the jurisdictional wetland criteria.

Wild and Scenic Rivers system – A system of nationally designated rivers and their immediate environments that have outstanding scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values and are preserved in a free-flowing condition.

Wilderness – An area defined in Section 2(c) of the Wilderness Act, and formally designated by Congress as part of the National Wilderness Preservation System.

Wilderness characteristics – These attributes include the area's size, its apparent naturalness, and outstanding opportunities for solitude or a primitive and unconfined type of recreation. They may also include supplemental values. Lands with wilderness characteristics are those lands that have been inventoried and determined by the BLM to contain wilderness characteristics as defined in section 2(c) of the Wilderness Act.

Wilderness Study Area – Areas with wilderness characteristics identified and designated through the inventory and study processes authorized by Section 603 of the FLPMA, and, prior to 2003, through the planning process authorized by Section 202 of the FLPMA.

Wildfire – Unplanned ignition of a wildland fire (such as a fire caused by lightning or unauthorized and accidental human – caused fires) and escaped prescribed fires.

Wildfire risk – The likelihood and susceptibility for a wildfire to adversely affect human values (e.g., life, property, and ecological functions and resources).

Wildland Developed Areas – A delineation of where people live in the wildland, classifying a minimum of one structure per 40 acres as a developed area.

Wildland fire – A general term describing a non-structure fire that occurs in the wildland.

Wildland Urban Interface (WUI) – The line, area, or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetation fuels.

Windthrow – A tree or trees uprooted or felled by the wind.

Yarding – The process of moving cut logs to a landing, particularly by cable, ground-based or helicopter yarding systems

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