Wildlife

This analysis examines how the alternatives would affect wildlife habitat. The requirements for habitat and the responses to habitat changes vary by species. The northern spotted owl is examined first, the marbled murrelet next, followed by deer, elk, the bald eagle, the fisher, landbirds in general, the western snowy plover, the sage grouse, and special status species specifically.

Key Points

Northern spotted owl:

- The No Action Alternative and Alternative 1 would steadily increase the total amount of suitable habitat. Alternative 2 would maintain approximately the current amount of suitable habitat over time. Alternative 3 would maintain approximately the current amount of suitable habitat for the first 20 years, and then increase the amount of habitat to more than Alternative 1 in 2106.
- The No Action Alternative, Alternative 1, and Alternative 2 would contribute to large blocks of suitable habitat to support clusters of reproducing owls, distributed among the physiographic provinces, and spaced so as to facilitate owl movement between the blocks. However, the BLM contribution to large blocks would require 50 to 100 years to develop into almost all suitable habitat.
- Alternative 3 would not contribute to large blocks of suitable habitat that support clusters of reproducing owls, because it would fragment suitable habitat from current conditions.
- During the next 50 years, while large blocks are developing into suitable habitat, the No Action Alternative would increase the amount of suitable habitat outside of large blocks. Alternative 1 would approximately maintain the amount of suitable habitat outside of large blocks. Alternative 2 would decrease the amount of suitable habitat outside of large blocks.
- No Action and Alternative 1 would maintain the current total quantity of dispersal habitat, and would increase the quality of dispersal habitat from current conditions. Alternative 2 would decrease the total quantity of dispersal habitat, and would not increase the quality of dispersal habitat. Alternative 3 would decrease the total quantity of dispersal habitat, but would increase the quality of dispersal habitat over time.
- In the Rogue-Umpqua area of concern, No Action and Alternative 1 would steadily increase the amount of suitable habitat over time, but Alternative 2 and Alternative 3 would decrease the amount of suitable habitat for the next 50 years. In the South Willamette-North Umpqua and Ashland areas of concern, all alternatives would steadily increase the amount of suitable habitat.

Marbled Murrelet:

- By 2106, the quantity of marbled murrelet nesting habitat would increase under all alternatives.
- In the short term (50 years) there would be a decrease in the quantity of marbled murrelet nesting habitat of 16% under Alternative 2 and 14% under Alternative 3 compared to the current condition.
- Under No Action and Alternative 1 in the Coast Range province, and No Action in the Klamath province, there would be an increase in the mean patch and core area size and an increase in edge density compared to current condition. Under Alternatives 2 and 3 there would be decreasing patch size and core area and increasing edge density.

Northern Spotted Owl

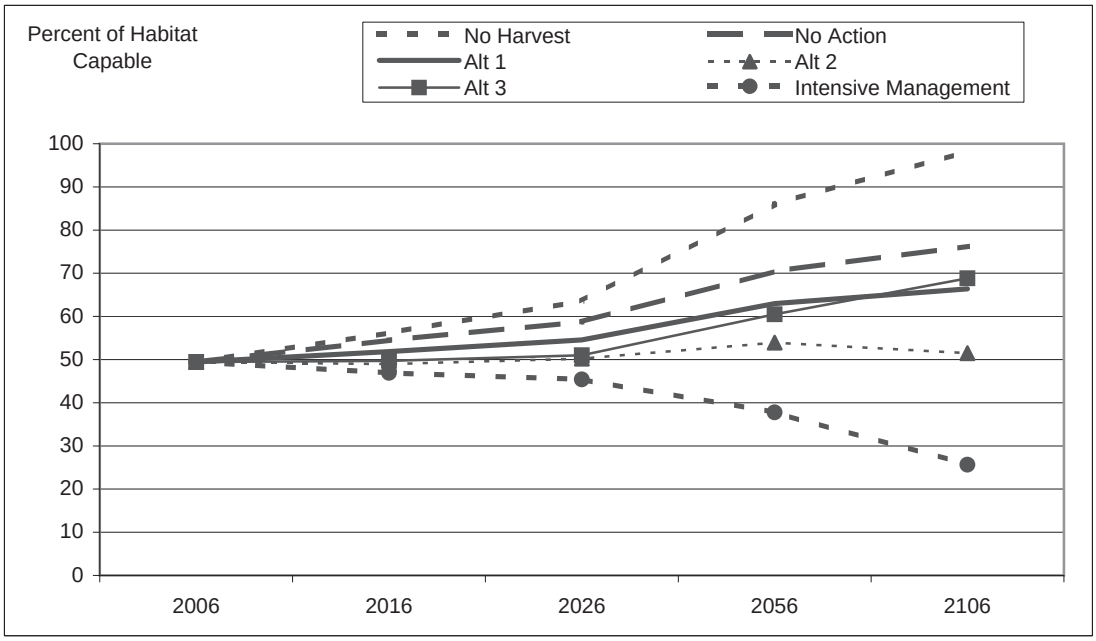
This analysis examines the effects of the alternatives on the quantity and quality of northern spotted owl suitable habitat and dispersal habitat. The analysis further examines the development, distribution and spacing of large blocks of suitable habitat and areas of concern.

Effects to populations were not analyzed because population size is affected by numerous factors other than habitat. As described in the *2007 Draft Recovery Plan for the Northern Spotted Owl*, the most important threat to the northern spotted owl is competition from the barred owl. The interaction of barred owl competition and habitat changes is currently unknown.

Development of Suitable Habitat

The reference analysis for no harvest on BLM-administered lands would steadily increase the amount of suitable habitat to 98% of the habitat-capable acres in 2106. The reference analysis of intensive management on most commercial timber lands would steadily decrease the amount of suitable habitat to 26% of habitat-capable acres in 2106. As shown in *Figure 216* (*Northern spotted owl suitable habitat on BLM-administered lands by alternative and reference analysis),* all of the alternative would result in amounts of suitable habitat between these two reference analyses. Note that while this analysis acknowledges that natural disturbances will occur and affect habitat under all four alternatives, the specific location, timing, severity, and extent of such disturbances are speculative (see the *Introduction* to this chapter). Some management actions may affect the likelihood of impact from natural disturbances (see the *Fire and Fuels* section of this chapter). For example, management actions may make the landscape more or less vulnerable to catastrophic wildfire. However, it is impossible to predict where or when wildfires would occur in specific areas.

Figure 216. Northern spotted owl suitable habitat on BLM-administered lands by alternative and reference analysis



No Action and Alternative 1 would steadily increase suitable habitat over the next 100 years:

- No Action would result in the greatest increase in suitable habitat of all alternatives with 76% of habitat-capable acres in suitable habitat by 2106.
- Alternative 1 would result in suitable habitat on 66% of habitat-capable acres in 2106.

The subalternatives of Alternative 1 would increase the amount of suitable habitat compared to Alternative 1. See *Table 186* (*Northern spotted owl suitable habitat on BLM-administered lands by alternative, reference analysis, and sub-alternatives*).

- The subalternative of no harvesting of stands that are older than 80 years would increase the amount of suitable habitat almost as much as No Harvest: 94% of habitat-capable acres in 2106.
- The subalternative of no harvesting of stands that are older than 200 years would result in suitable habitat on 72% of habitat-capable acres in 2106.
- The subalternative of including all currently designated northern spotted owl critical habitat units with the late-successional management area would result in suitable habitat on 74% of habitat-capable acres in 2106

Alternative 2 and Alternative 3 would each result in a nearly stable amount of suitable habitat until 2026. Alternative 2 would result in a slight increase in suitable habitat between 2026 and 2056, followed by a slight decrease to 51% of

habitat-capable lands in 2106 - an amount almost equal to the current condition. Alternative 3 would increase the amount of suitable habitat after 2026 to 69% of habitat-capable lands in 2106 – an amount slightly more than Alternative 1, but less than No Action.[7]

Table 186. Northern spotted owl suitable habitat on BLM-administered lands by alternative, reference analysis, and subalternative

	Habitat-Capable Acres	Percent of Habitat Capable (Acres)				
		2006	2016	2026	2056	2106
No Harvest	2,196,700	49 (1,085,800)	56 (1,234,600)	64 (1,396,100)	86 (1,889,200)	98 (2,158,000)
No Action	2,196,700	49 (1,085,800)	54 (1,196,500)	59 (1,290,300)	70 (1,547,700)	76 (1,674,800)
Alternative 1	2,196,700	49 (1,085,800)	52 (1,138,800)	55 (1,198,400)	63 (1,383,700)	66 (1,457,900)
Alt 1 No Harvest >80	2,196,700	49 (1,085,800)	56 (1,225,400)	62 (1,365,400)	81 (1,783,200)	94 (2,066,900)
Alt 1 No Harvest >200	2,196,700	49 (1,085,800)	52 (1,151,700)	56 (1,229,200)	66 (1,460,100)	72 (1,578,000)
Alt 1 + CHU	2,196,700	49 (1,085,800)	53 (1,159,800)	57 (1,241,700)	68 (1,487,800)	74 (1,635,400)
Alternative 2	2,196,700	49 (1,085,800)	49 (1,075,400)	50 (1,102,900)	54 (1,184,400)	51 (1,131,100)
Alternative 3	2,196,700	49 (1,085,800)	50 (1,092,000)	51 (1,119,200)	60 (1,329,000)	69 (1,512,000)
Intensive Management	2,196,700	49 (1,085,800)	47 (1,030,800)	45 (997,000)	38 (829,700)	26 (563,100)

The changes in suitable habitat by alternative would differ among the provinces. See *Figure 217* (*Northern spotted owl suitable habitat on BLM-administered lands by province by alternative*). In the Coast Range province, all alternatives would result in an increase in suitable habitat from current conditions. In the other provinces, the changes in suitable habitat are not consistent among alternatives.

The No Action Alternative would:

- Steadily increase the amount of suitable habitat over time in the Coast Range, Western Cascades, and Klamath provinces.

[7] Suitable habitat in Alternative 3 is classified by a combination of the habitat classification and the forest structural stage classification. This is because partial harvesting in Alternative 3 would create multi-cohort stands that are not accurately classified by the habitat classification alone. For Alternative 3, stands are classified as suitable habitat if they either are classified as such by the habitat classification, or if they are classified as dispersal habitat and are also classified as mature – multiple canopy or structurally complex forest by the structural stage classification. For other alternatives, the classification of suitable habitat is generally parallel with the structural stage classification of mature - multiple canopy and structurally complex forest, even though the habitat classification and structural stage classification used a different set of stand parameters. This combined classification is only used for results from the years 2056 and 2106; in the earlier years the results of the two different classification approaches are similar because the difference in classification is not apparent for several decades after the partial harvesting applied in Alternative 3. For further information, see *Appendix G - Wildlife*.

- Result in a fluctuating amount of suitable habitat in Eastern Cascades province, increasing until 2026, decreasing to 2056, and then increasing to an amount almost equal to current conditions in 2106.

Alternative 1 would:

- Steadily increase the amount of suitable habitat over time in the Coast Range, Western Cascades, and Klamath provinces, but less so than the No Action alternative.
- Decrease the amount of suitable habitat in Eastern Cascades province.

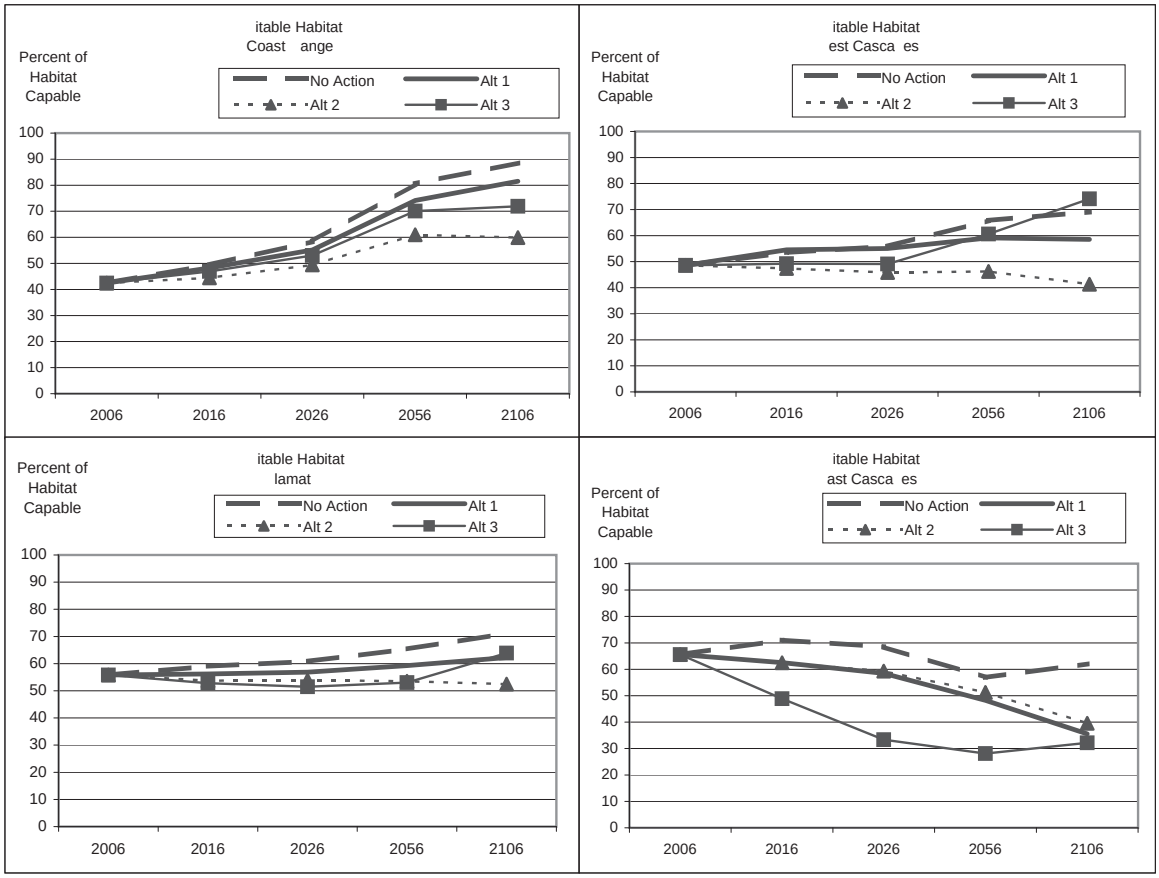
Alternative 2 would:

- Increase the amount of suitable habitat over the next 50 years in the Coast Range and Klamath provinces.
- Increase the amount of suitable habitat in the Western Cascades province over the next 50 years and then decrease from 50 to 100 years, resulting in an overall decrease from current conditions.
- Decrease the amount of suitable habitat in Eastern Cascades province, similar to Alternative 1.

Alternative 3 would

- Steadily increase the amount of suitable habitat over the next 50 years in the Coast Range province, but less so than No Action and Alternative 1.
- Maintain the current amount of suitable habitat in the Western Cascades province over the next 20 years, and then increase the amount of habitat to more than any other alternative by 100 years.
- Decrease the amount of suitable habitat in the Klamath province over the next 20 years, and then increase habitat to more than Alternative 2.
- Decrease the amount of suitable habitat in Eastern Cascades province more than any other alternative.

Figure 217. Northern spotted owl suitable habitat on BLM-administered lands by province by alternative



The amount of suitable habitat by designated critical habitat units is presented in *Appendix G - Wildlife.*

Large Blocks of Suitable Habitat

This section compares the development of blocks of suitable habitat on BLM-administered lands under each alternative. The distribution and spacing of those blocks are examined in subsequent sections.

Northern spotted owl conservation is predicated on providing blocks of suitable habitat that support clusters of owls. A cluster is at least 20 breeding pairs of owls that support each other demographically and thereby maintain a stable population (Thomas et al. 1990 p. 24). The Interagency Scientific Committee strategy (Thomas, et al. 1990), 1994 draft northern spotted owl recovery plan (USDI, USFWS 1992), northern spotted owl critical habitat designation (Federal Register 1992a), and the Northwest Forest Plan (USDA, USDI 1994) utilized this principle in developing systems of large blocks of habitat. Using assumptions from Thomas et al. (1990), the minimum size of a block of suitable habitat varies among the provinces in the planning area. See *Table 187* (*Minimum acreage of large blocks of suitable habitat*).

The land ownership pattern in most of the planning area limits the ability of BLM-administered lands to satisfy the minimum acreage for 20-pair blocks without the contribution of suitable habitat from other ownerships. In some parts of the planning area, suitable habitat on U.S. Forest Service lands could contribute along with BLM-administered lands to make a large block of suitable habitat. But in most of the planning area, BLM-administered lands could only form large blocks of suitable habitat together with nonfederal lands. Because of their different management objectives and different responsibilities under the Endangered Species Act, most nonfederal lands are unlikely to provide suitable habitat (Raphael et al. 2006; USDA, USDI 1994b pp. 3&4-244 – 2&4-245). Therefore, most potential large blocks would require that all or nearly all BLM-administered lands in the block be suitable habitat before the block would support clusters of the intended number of reproducing northern spotted owls. For the purpose of this analysis, the large blocks would not be considered functional until at least 90% of the BLM-administered lands are suitable habitat.

Table 187. Minimum acreage of large blocks of suitable habitat

Province	Acres	
	20-pair Block	10-19-pair Block
Coast Range	70,000	35,000 – 66,500
Western Cascades	45,000	22,500 – 42,750
Klamath	55,000	25,000 – 52,250

The analysis of the Northwest Forest Plan in the Northwest Forest Plan final supplemental environmental impact statement and the U.S. Fish and Wildlife Service biological opinion concluded that the mapped late-successional reserves on BLM-administered lands together with the mapped late-successional reserves on U.S. Forest Service lands would provide large blocks of habitat capable of supporting self-sustaining, breeding clusters of northern spotted owls (USDA, USDI 199b pp. 3&4-238 - 3&4-239; Appendix G-18; G-11). That analysis is incorporated by reference.

The No Action alternative would allocate 809,400 acres to large blocks in late-successional reserves. This number underestimates the actual amount of such reserves since it does not exclude occupied marbled murrelet sites and other unmapped late-successional reserves.[8] Alternative 1 would allocate 807,400 acres to late-successional management areas (excluding occupied marbled murrelet sites) that would be almost exactly coincident with the late-successional reserves in the No Action Alternative. Alternative 2 would allocate 521,500 acres to late-successional management areas (excluding occupied marbled murrelet sites) - 36% less than under the No Action Alternative and Alternative 1. Alternative 3 would allocate no late-successional management areas.

[8] Late-successional reserves in the Northwest Forest Plan were allocated for a variety of objectives, in addition to providing large blocks of suitable habitat for northern spotted owls: "[t]he objective of Late-successional reserves is to protect and enhance conditions of late-successional and old-growth forest ecosystems, which serve as habitat for late-successional and old-growth related species including the northern spotted owl…They are designed to incorporate key watersheds to the extent possible, while remaining consistent with other objectives. They also incorporate some or parts of…ecologically significant late-successional and old-growth forests (Northwest Forest Plan ROD, C-9).

Because the mapped late-successional reserves in the No Action Alternative would be almost coincident with the late-successional management areas in Alternative 1, the No Action Alternative and Alternative 1 would provide essentially the same large blocks of suitable habitat.

Late-successional reserves in the No Action Alternative and late-successional management areas in Alternative 1 would be 300,000 acres larger than the late-successional management areas in Alternative 2, and would largely overlap the late-successional management areas in Alternative 2 (see *Map 32, Overlap between Alternative 2 and Alternative 1 late-successional management areas*). The overlap would not be exact: 83% of the late-successional management areas acres in Alternative 2 would also be allocated to late-successional reserves in the No Action Alternative and late-successional management areas in Alternative 1.

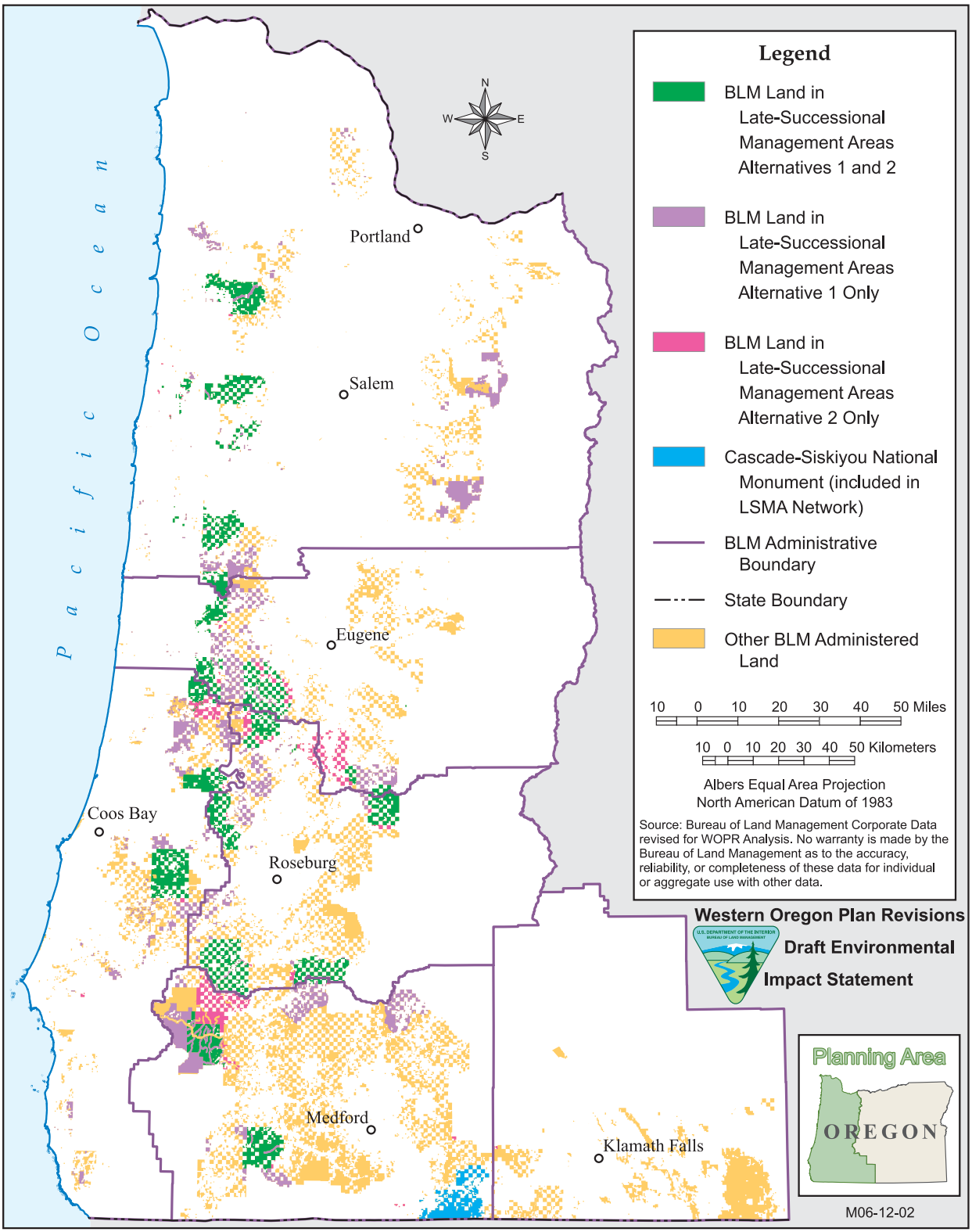
Because of this considerable overlap, the No Action Alternative and Alternative 1 would be at least as effective as Alternative 2 in developing large blocks of suitable habitat simply by the design of the land use allocations. The most notable exceptions to the overlap between the late-successional reserves in the No Action Alternative and late-successional management areas in Alternative 1 and the late-successional management areas in Alternative 2 would be the two areas (contained in Alternative 2 only) that are northeast and southwest of Roseburg as shown in *Map 32* (*Overlap between Alternative 2 and Alternative 1 late-successional management areas)*. These two areas would be allocated mostly to Matrix in the No Action Alternative and Timber Management Area in Alternative 1. The area northeast of Roseburg would be located within the South Willamette-North Umpqua area of concern, which is specifically addressed below under "Areas of Concern."

Alternative 3 would allocate no late-successional management areas, and therefore this analysis cannot directly compare the creation of large blocks under Alternative 3 to the other alternatives. However, examination of the total abundance of suitable habitat and the spatial pattern analysis of mature & structurally complex forest (see *Ecology* section of this chapter) reveals that Alternative 3 would not create large blocks of suitable habitat. Alternative 3 would not increase the total acreage of suitable habitat from current conditions on BLM-administered lands for the first twenty years and would progressively fragment suitable habitat compared to current conditions over the next 100 years.

Spatial pattern analysis (see *Ecology* section of this chapter) analyzed fragmentation of mature & structurally complex forest by measuring mean patch size and connectance of patches. Although mature & structurally complex forest does not directly equate to suitable habitat, there is sufficient overlap between the two classifications that changes in spatial patterns would be similar (USDA, USDI 1994b p. G-33). [9]

[9] Using mature and structurally complex forest structural stage classification as a surrogate for suitable habitat likely overestimates the amount of suitable habitat by approximately 5 to 10% in most years, based on evaluation of the two classifications on BLM-administered lands. Nevertheless, the trends in the amount of mature and structurally complex forest and the relative results for the alternatives are consistent with the results for suitable habitat. Therefore, using mature and structurally complex forest as a surrogate for suitable habitat in the evaluation of spatial pattern is sufficient for comparative analysis of the effects of the alternatives.

Map 32. Overlap between Alternative 2 and Alternative 1 late-successional management areas



Alternative 3 would decrease the mean patch size and connectance of mature & structurally complex forest from the current condition in all provinces and more than any other alternative (see *Ecology* section of this chapter). The current condition does not yet provide large blocks with the amounts of suitable habitat considered necessary to provide for the intended level of self-sustaining, breeding clusters of northern spotted owls in the future (USDA, USDI 1994b pp. 3&4-229 through 242; *Appendix G*) and Alternative 3 would fragment suitable habitat into patches smaller than the current condition. Therefore, Alternative 3 would not provide the large blocks of suitable habitat that are necessary to provide for self-sustaining, breeding clusters of northern spotted owls.

Development of Suitable Habitat Within Large Blocks

The development of suitable habitat within large blocks can be directly compared among The No Action Alternative, Alternative 1, and Alternative 2 by summarizing the development of suitable habitat within the late-successional reserves or late-successional management areas at the scale of the planning area and the District/Province divisions (e.g. Salem/Coast Range, Salem/West Cascades, etc.). Although both of these scales of analysis group together several blocks, it allows direct comparison of the alternatives within the large blocks allocations.[10]

As is the case with the nonharvest land base as a whole, the rate of development of suitable habitat within late-successional reserve/late-successional management areas is similar under The No Action Alternative, Alternative 1, and Alternative 2. See *Table 188* (*Suitable habitat within late-successional reserves/late-successional management areas*).

Table 188. Suitable habitat within late-successional reserves/late-successional management areas[11]

Alternatives	Habitat-capable acres	Percent of Habitat Capable (acres)				
		2006	2016	2026	2056	2106
No Action	809,400	57 (458,900)	61 (490,400)	66 (535,300)	86 (693,100)	99 (797,300)
Alternative 1	807,400	57 (456,800)	60 (485,600)	65 (528,000)	84 (682,000)	99 (796,500)
Alternative 2	521,500	54 (281,300)	58 (300,400)	64 (334,800)	87 (452,400)	99 (515,000)

The No Action Alternative, Alternative 1, and Alternative 2, when supported by the late-successional reserves on U.S. Forest Service lands, eventually would

[10] This analysis includes only the mapped late-successional reserves in the No Action Alternative and the portions of the Adaptive Management Areas in the North Coast and Applegate Adaptive Management Areas which are managed with objectives similar to late-successional reserves. It does not include occupied marbled murrelet sites or other unmapped late-successional reserves.

[11] Alternative 3 is not included, because it would not allocate late-successional management areas.

provide large blocks of habitat capable of supporting self-sustaining, breeding clusters of northern spotted owls. However, late-successional reserves/late-successional management areas would require about 50 years before the blocks will be close to the goal of having 90% of the BLM-administered lands providing suitable habitat in all District/Province divisions (see *Table 189*, *Suitable within late-successional reserves/late-successional management areas by district/ province divisions as percent of habitat-capable acres*). Note that this analysis does not include the effects of natural disturbances (see the *Introduction* section of this chapter).

Alternative 2 would explicitly allocate late-successional management areas in discrete and individually numbered blocks. Therefore, it is possible to examine the development of suitable habitat over time in individual blocks in Alternative 2. This analysis of individual blocks is not possible for the No Action Alternative or Alternative 1, because the blocks in those alternatives are not discrete (that is, the boundaries between "individual" late-successional reserves or late-successional management area are not explicitly delineated). Furthermore, because the late-successional reserves in the No Action Alternative and late-successional management areas in Alternative 1 would largely overlap the late-successional management areas in Alternative 2, the effects of the No Action Alternative, Alternative 1 and Alternative 2 would be approximately similar within the areas allocated to late-successional management areas in Alternative 2.

Of the late-successional management area blocks created in Alternative 2, only one (LSMA-24-27) would be able to satisfy the minimum acreage for a 20-pair block with BLM-administered lands alone (see *Table 190*, *Development of suitable habitat within Alternative 2 large blocks of late-successional management).* All other blocks would rely in part on suitable habitat on other ownerships within the block to meet the minimum acreage required for 20-pair or 10-19-pair blocks. Although the blocks in the No Action Alternative and Alternative 1 are not explicitly delineated, the land ownership pattern similarly limits the ability to satisfy the minimum acreage for 20-pair blocks with BLM-administered lands alone.

Table 189. Suitable Habitat within Late-successional reserves/Late-successional management areas by District/Province Divisions, as percent of habitat-capable acres[12]

District/ Province	Alternative	Habitat-capable acres	2006	2016	2026	2056	2106
Salem/ Coast Range	No Action	148,700	47	54	64	90	100
	Alt 1	148,700	47	52	61	89	100
	Alt 2	105,400	43	49	60	91	100
Salem/ West Cascades	No Action	53,600	61	62	63	85	100
	Alt 1	53,600	61	62	63	83	100
	Alt 2	-[13]	-	-	-	-	-
Eugene/ Coast Range	No Action	103,200	42	51	61	86	100
	Alt 1	102,900	42	50	59	85	100
	Alt 2	61,700	46	53	62	87	100
Eugene/ West Cascades	No Action	22,500	56	57	59	87	100
	Alt 1	22,500	56	57	59	86	100
	Alt 2	23,900	35	41	54	94	100
Roseburg/ Coast Range	No Action	79,500	61	63	65	81	92
	Alt 1	78,200	61	63	66	78	91
	Alt 2	48,900	59	61	64	80	94
Roseburg/ West Cascades	No Action	25,700	69	69	70	76	99
	Alt 1	25,700	69	69	70	75	99
	Alt 2	29,900	63	63	66	76	98
Roseburg/ Klamath	No Action	60,000	59	61	63	76	99
	Alt 1	59,900	59	62	65	76	100
	Alt 2	58,400	58	61	64	75	100
Coos Bay/ Coast Range	No Action	126,000	50	53	61	89	99
	Alt 1	125,800	50	53	60	89	99
	Alt 2	88,700	45	47	55	91	99
Coos Bay/ Klamath	No Action	9,000	68	69	82	97	100
	Alt 1	9,000	67	69	82	97	100
	Alt 2	-	-	-	-	-	-
Medford/ West Cascades	No Action	21,000	57	60	61	69	96
	Alt 1	21,000	57	60	60	68	96
	Alt 2	-	-	-	-	-	-
Medford/ Klamath	No Action	160,300	74	76	79	88	98
	Alt 1	160,300	73	75	78	87	99
	Alt 2	103,500	75	76	80	90	98

[12] Alternative 3 is not included, because it would not allocate late-successional management areas.

[13] Results are not reported where late-successional reserves or late-successional management areas total <500 acres: Salem/West Cascades, Coos Bay/Klamath, and Medford/West Cascades in Alternative 2, and Klamath Falls/East Cascades in all alternatives.

Table 190. Development of suitable habitat within Alternative 2 large blocks of late-successional management areas[14]

Late-Successional Management Areas	Total acres (all ownerships)	Total LSMA acres	Habitat-Capable acres	Suitable Habitat (acres)				
				2006	2016	2026	2056	2106
LSMA-10	70,800	100	100	-	-	-	100	100
LSMA-11a	75,300	26,400	25,100	7,500	9,000	12,800	22,400	24,400
LSMA-11b	46,900	30,100	28,700	19,600	19,600	19,800	22,600	28,700
LSMA-17	91,700	800	800	200	200	200	300	800
LSMA-19	55,600	400	400	300	200	300	400	400
LSMA-21a	55,000	36,200	35,100	27,200	27,600	28,500	31,000	33,900
LSMA-24-27	201,800	104,600	99,800	68,400	70,900	74,300	85,500	99,000
LSMA-26	55,200	400	400	400	400	400	400	400
LSMA-28	55,100	27,900	26,700	15,200	16,000	16,900	20,000	26,600
LSMA-29	71,400	46,300	43,900	24,000	25,300	29,700	39,900	43,400
LSMA-30	78,200	48,700	46,700	25,100	26,300	28,300	40,900	45,500
LSMA-32-34	70,300	39,400	37,100	13,500	14,400	16,500	33,000	37,000
LSMA-33	127,000	60,200	57,200	25,900	28,000	32,200	46,600	55,500
LSMA-36	58,700	26,400	25,500	12,700	16,000	19,000	23,600	25,500
LSMA-38	46,900	900	800	700	700	700	800	800
LSMA-39	70,100	25,500	24,100	14,200	15,200	17,300	21,900	24,100
LSMA-40	20,300	7,300	6,700	2,700	3,100	3,800	6,400	6,700
LSMA-41	48,200	26,400	25,000	5,400	7,900	13,700	22,800	24,700
LSMA-42	68,500	4,300	3,800	1,600	2,100	2,200	3,300	3,800
LSMA-43	72,600	37,000	33,600	16,500	17,200	18,100	30,500	33,600
Total	1,439,700	549,200	521,500	281,300	300,400	334,800	452,400	515,000

Figure 218 (*Suitable habitat within Alternative 2 large blocks of late-successional management areas by province*) also shows the development of suitable habitat as a percent of the habitat-capable acres on BLM-administered lands within the individual blocks of late-successional management area. Only those 9 blocks for which BLM-administered lands constitute at least 10% of the total acres in the block are shown. Data for the amount of suitable habitat in the remaining 11 blocks is shown in *Table 190* above.

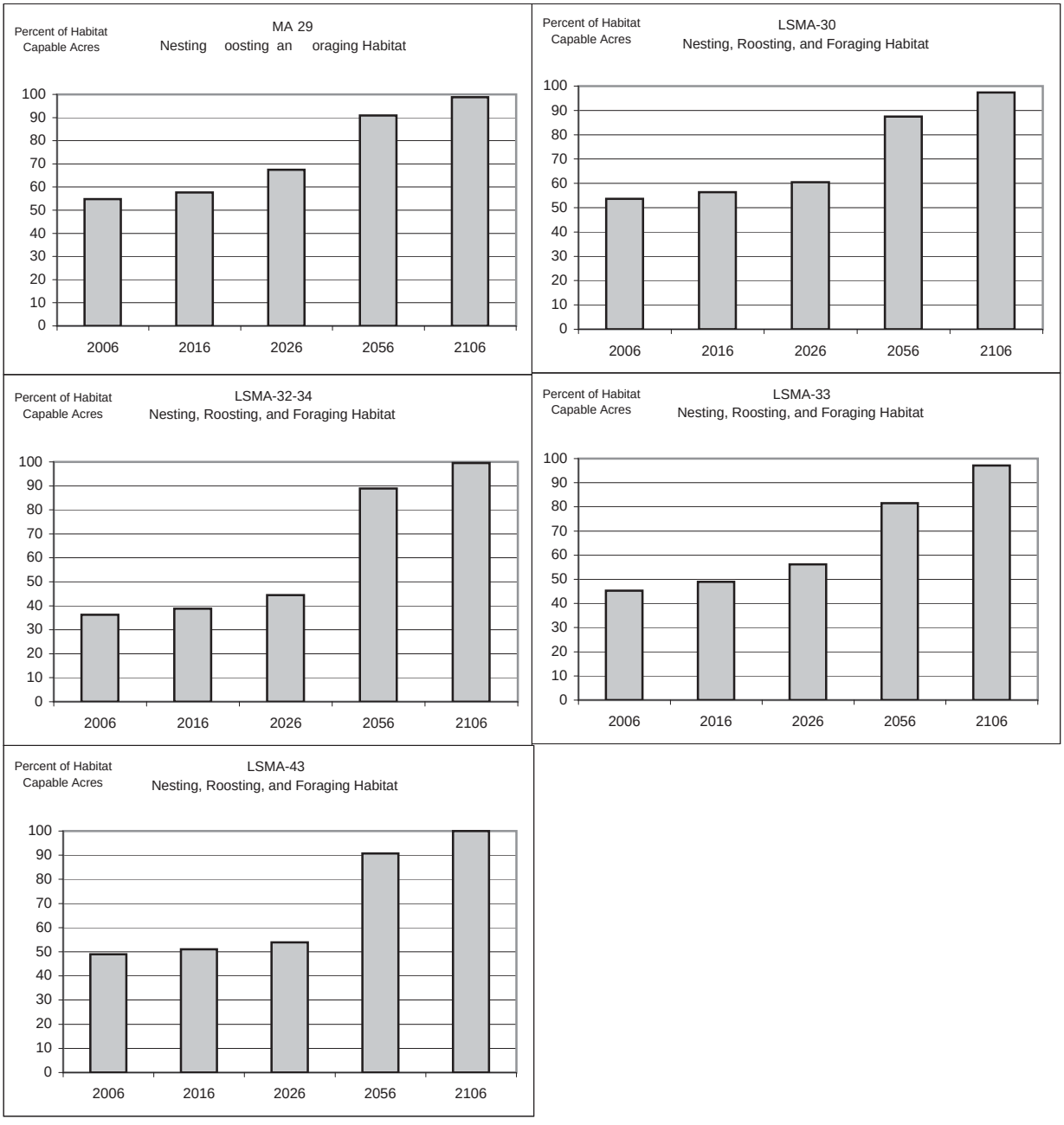
Under the current condition, suitable habitat averages 54% of habitat-capable acres in the Alternative 2 late-successional management areas. By 2026, the average amount of suitable habitat would increase to 64%, ranging from 44% to 81% on blocks with at least 10% BLM-administered lands. By 2056, average amount of suitable habitat would increase to 87%, ranging from 75% to 95% on blocks with at least 10% BLM-administered lands. All blocks would develop suitable habitat on 97% to 100% of habitat-capable acres by 2106.

[14] For most acreage numbers in this analysis, descriptions of conditions are rounded to the nearest 1,000 acres. However, these results are rounded to the nearest 100 acres because several individual blocks have less than 1,000 acres of late-successional management area.

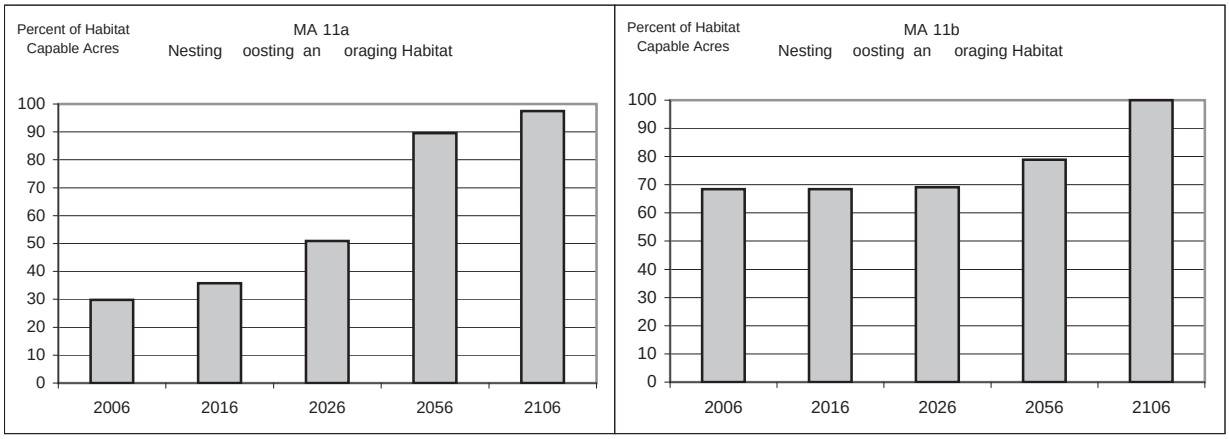
All of the individual blocks under Alternative 2 eventually would provide large blocks of habitat capable of supporting self-sustaining, breeding clusters of northern spotted owls. However, all blocks would require 50 years before reaching the threshold of 90% of BLM-administered lands providing suitable habitat.

Figure 218. Suitable Habitat within Alternative 2 large blocks of late-successional management areas by province

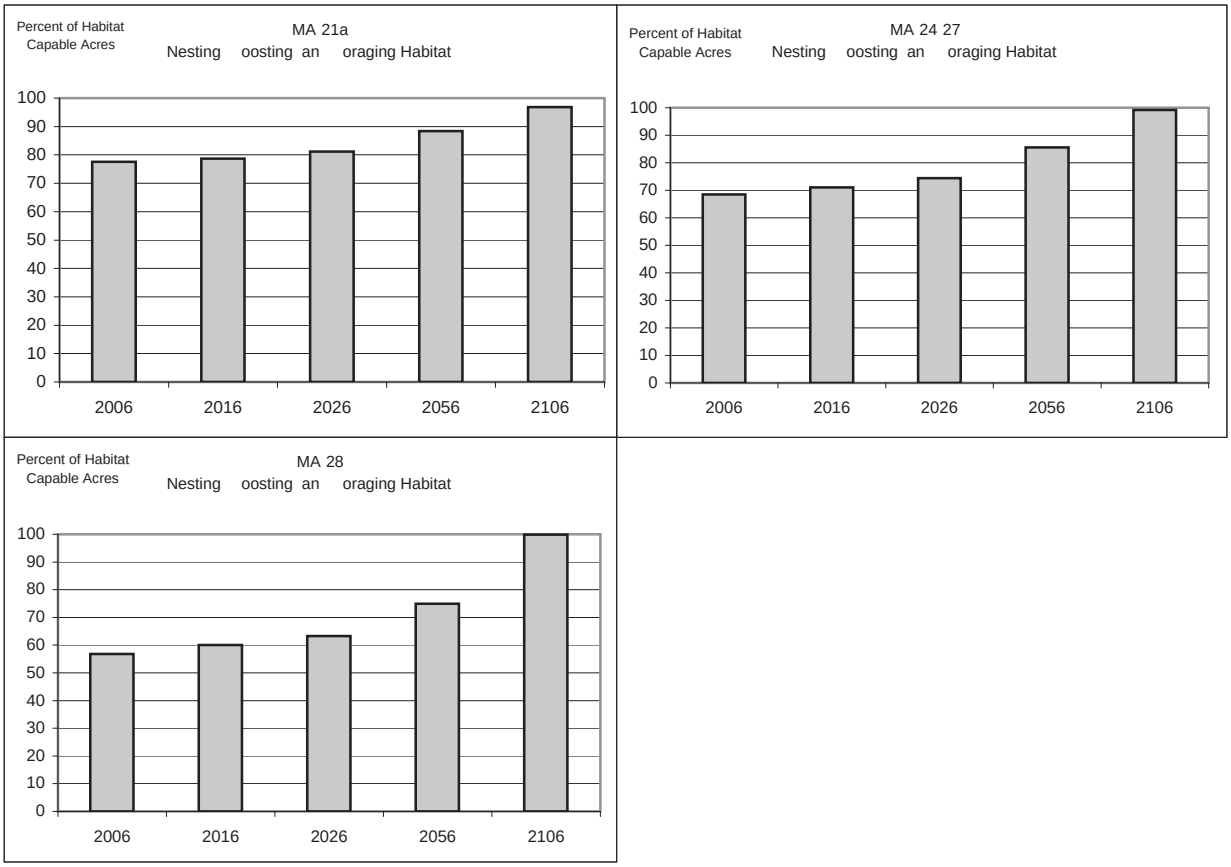
Coast Range Province:



Western Cascades province:



Klamath Province:



Examining the development of large blocks of suitable habitat from the two perspectives shows the same result: the No Action Alternative, Alternative 1, and Alternative 2 would all eventually contribute to blocks suitable habitat capable of supporting self-sustaining, breeding clusters of northern spotted owls.

- The late-successional management areas under Alternative 2 would generally be limited to those needed to provide for large blocks of suitable habitat, and therefore would allocate fewer acres to late-successional management areas than the No Action Alternative or Alternative 1.
- In all three alternatives, the development of suitable habitat would proceed at the same pace and would take 50 years before the BLM contribution to large blocks would be almost entirely (90%) in suitable habitat.
- The No Action Alternative and Alternative 1 would allocate 300,000 additional acres beyond the large blocks to late-successional reserve/ late-successional management areas, but these additional acres would not make large blocks of suitable habitat develop more quickly than under Alternative 2.

The land ownership pattern of BLM-administered lands and the current forest condition restrict the capability to speed the development of large blocks of suitable habitat by allocating additional acres to late-successional management areas. The additional acres of late-successional reserves in the No Action Alternative and late-successional management areas in Alternative 1 would result in more total acres of suitable habitat than Alternative 2, but would not result in faster development or a higher proportion of suitable habitat within large blocks.

Because it would take 50-100 years before the BLM contribution to large blocks would be almost entirely suitable habitat, habitat outside of large blocks would be important to owl populations until habitat within the blocks is capable of supporting clusters of reproducing owls (see “Suitable Habitat Outside of Large Blocks” later in this section).

Large Block Distribution

This section evaluates how blocks of suitable habitat would be distributed across a variety of ecological conditions under each alternative. Thomas et al. (1990) noted that species that are well distributed across their range are less prone to extinction than species confined to small portions of their range. Therefore, conservation planning for northern spotted owls includes distribution of large blocks of suitable habitat among the provinces.

The No Action Alternative would allocate to late successional reserves:

- 478,200 acres (60% of BLM-administered lands) in the Coast Range province,
- 131,400 acres (19% of BLM-administered lands) in the Western Cascades province,
- 239,300 acres (29% of BLM-administered lands) in the Klamath province.

Alternative 1 would allocate Late-successional management areas:

- 476,200 acres (60% of BLM-administered lands) in the Coast Range province,
- 131,300 acres (19% of BLM-administered lands) in the Western Cascades province,
- 239,200 acres (29% of BLM-administered lands) in the Klamath province.

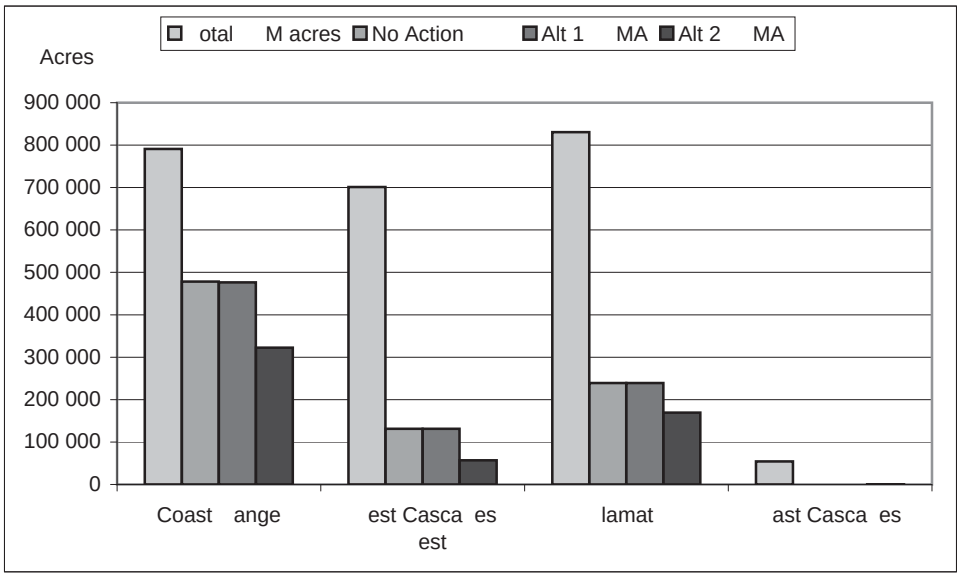
Alternative 2 would allocate Late-successional management areas:

- 322,400 acres (41% of BLM-administered lands) in the Coast Range province,
- 57,100 acres (8% of BLM-administered lands) in the Western Cascades province,
- 169,500 acres (20% of BLM-administered lands) in the Klamath province.

None of the alternatives would allocate large blocks in the Eastern Cascades province. The BLM-administered lands in the East Cascades make up only 2% of the habitat-capable acres within the planning area. The Northwest Forest Plan allocated late-successional reserves on U.S. Forest Service lands in the Eastern Cascades province and it is assumed that they will remain in place.

The No Action Alternative, Alternative 1, and Alternative 2 would all distribute large blocks among the Coast Range, Western Cascades, and Klamath provinces and therefore would provide habitat across a variety of ecological conditions (see *Figure 219*, *Acres of late-successional reserve/late-successional management area allocated by province*). This is consistent with the analysis of the No Action Alternative in the Northwest Forest Plan FSEIS, which concluded that the late-successional reserves would provide large blocks of habitat distributed among the provinces (USDA, USDI 1994b pp. 3&4-231 – 3&4-232). That analysis is incorporated by reference.

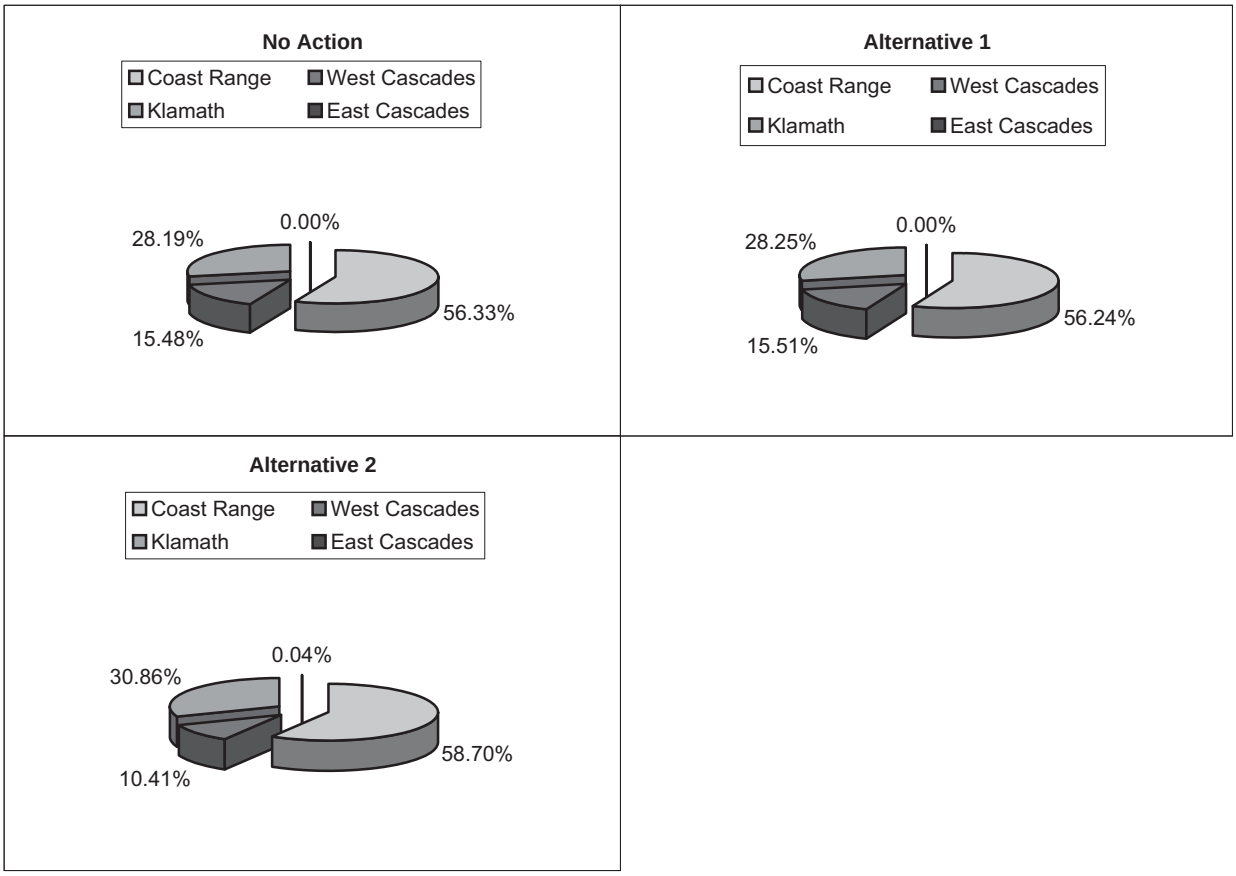
Figure 219. Acres of late-successional reserve/late-successional management area allocated by province



As shown in *Figure 220* (*Percentage of late-successional reserve/late-successional management area acres allocated by province),* Alternative 2 would allocate a smaller acreage of BLM-administered lands to late-successional management areas in the Coast Range, Western Cascades, and Klamath provinces than the No Action Alternative and Alternative 1. However, the percent of the total late-successional management area allocated to each province would be similar to the No Action Alternative and Alternative 1, with a slight increase in the Coast Range and Klamath provinces and a slight decrease in the Western Cascades province.

Alternative 3 would not provide large blocks of suitable habitat necessary to provide for self-sustaining, breeding clusters of northern spotted owls, and therefore the distribution of large blocks is not relevant to Alternative 3. Suitable habitat would develop as a consequence of long-rotation timber management, but it would be in a dispersed pattern rather than consolidated into large blocks.

Figure 220. Percentage of late-successional reserve/late-successional management area acres allocated by province



Large Block Spacing

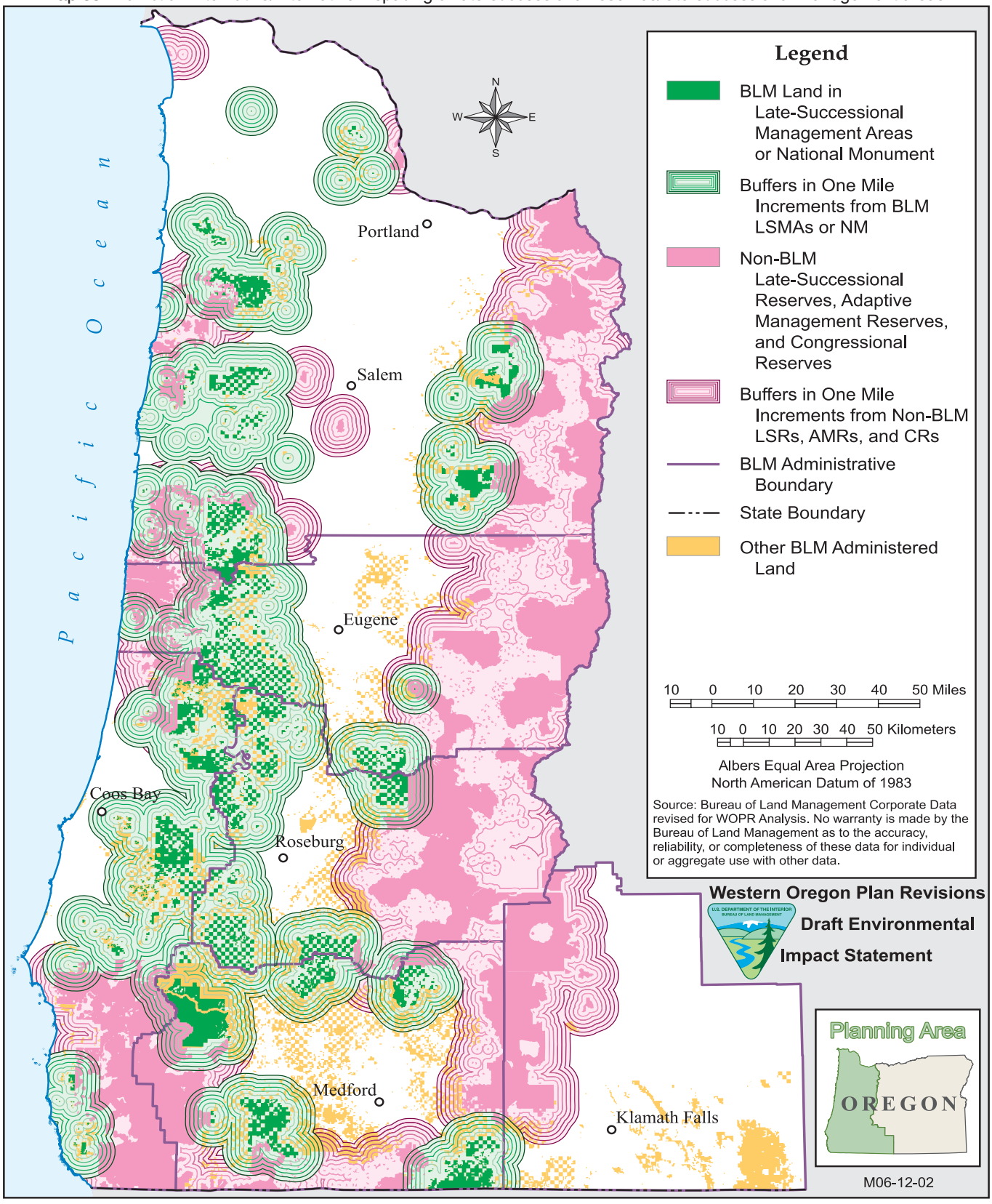
This section evaluates how blocks of suitable habitat would be spaced under each alternative. Thomas et al. (1990) and the Northwest Forest Plan determined that blocks of habitat should be of sufficient size to support 20 breeding pairs of northern spotted owl, should be spaced no more than 12 miles apart, and that smaller blocks should be spaced no more than 7 miles apart (USDA, USDI 1994b p. G-28).

The large blocks of suitable habitat that would be created under the No Action Alternative and Alternative 1 would be virtually identical. When supported by the large blocks of suitable habitat on U.S. Forest Service lands, the large blocks created under these two alternatives would be spaced so as to facilitate owl movement between the blocks. See *Map 33* (*No Action Alternative/Alternative 1 spacing of late-successional reserves/late-successional management areas*). This is consistent with the analysis of the No Action Alternative in the Northwest Forest Plan FSEIS, which concluded that the late-successional reserves would provide large blocks of habitat distributed among the provinces (USDA, USDI 1994b pp. 3&4-231 – 3&4-232). That analysis is incorporated by reference.

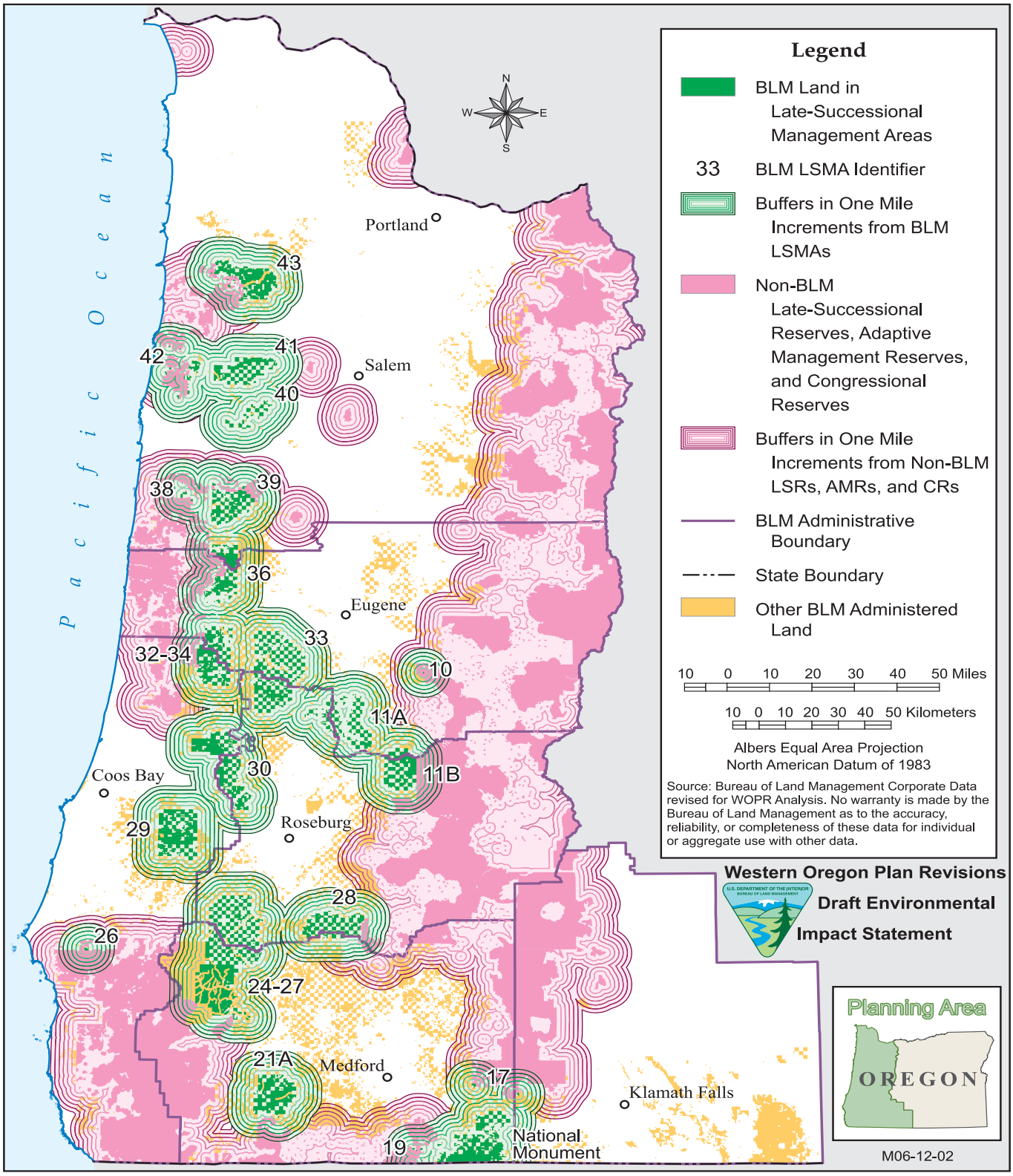
Late-successional management areas in Alternative 2 were allocated explicitly to create spacing of no more than 12 miles between blocks large enough to support 20 pairs, and to create spacing of no more than 7 miles between blocks large enough to support 10-19 pairs with the support of large blocks of suitable habitat on U.S. Forest Service lands. See *Map 34* (*Alternative 2 spacing of late-successional management areas*).

Alternative 3 would not provide large blocks of suitable habitat, even when supported by the large blocks of suitable habitat on U.S. Forest Service lands. Therefore the analysis of spacing of large blocks is not relevant to Alternative 3.

Map 33. No Action Alternative/Alternative 1 spacing of late-successional reserves/late-successional management areas



Map 34. Alternative 2 spacing of late-successional management areas



Suitable Habitat Outside of Large Blocks

The availability of suitable habitat outside of the large blocks is important because owl populations would need to rely on suitable habitat outside of the large blocks until habitat within the blocks is capable of supporting clusters of reproducing owls (Lint 2005, p. 75).

The amount of suitable habitat outside of the large blocks would differ widely among the alternatives as a result of differing amounts of riparian management area acres and differing management direction within the harvest land base. The late-successional reserves/late-successional management areas have a higher proportion of suitable habitat than the other land use allocations in each alternative. However, there are currently more total acres of suitable habitat outside of late-successional reserves/late-successional management areas than within late-successional reserves/late-successional management areas in the No Action Alternative, Alternative 1, and Alternative 2.

Although the development of suitable habitat within large blocks is similar among the No Action Alternative, Alternative 1, and Alternative 2, the development and maintenance of suitable habitat outside of large blocks would differ among the alternatives. See *Table 191* (*Acres of suitable habitat outside of late-successional reserves/late-successional management areas)* and *Figure 221 (Suitable habitat outside of late-successional reserves/late-successional management areas, as percentage of habitat-capable acres*).

- Under the No Action Alternative the percentage of suitable habitat outside of large blocks would increase.
- Under Alternative 1 the percentage of suitable habitat outside of large blocks would be maintained at the current level.
- Under Alternative 2 the percentage of suitable habitat outside of large blocks would decrease.

Table 191. Acres of suitable habitat outside of late-successional reserves/late-successional management areas[15]

Alternative	Habitat-Capable acres	Percent of Habitat Capable (acres)				
		2006	2016	2026	2056	2106
No Action	1,404,000	47 (661,300)	50 (706,100)	54 (755,000)	61 (854,700)	62 (877,500)
Alt 1	1,406,000	45 (637,900)	46 (653,200)	48 (670,400)	50 (701,700)	47 (661,400)
Alt 2	1,675,000	48 (808,100)	46 (774,900)	46 (767,900)	44 (731,800)	37 (615,900)
Alt 3	2,196,700	49 (1,085,800)	50 (1,092,000)	51 (1,119,200)	60 (1,329,000)	69 (1,512,000)

[15] For Alternative 3, this figure presents the amount of suitable habitat on all BLM-administered lands, because Alternative 3 does not allocate late-successional management areas.

Under the No Action Alternative the percentage of suitable habitat outside of the large blocks over the next 100 years would increase because:

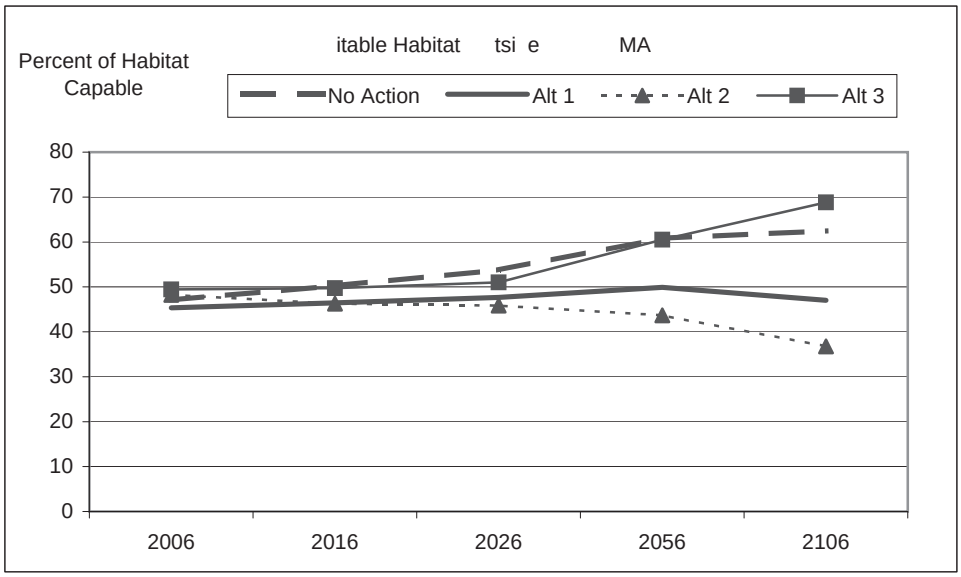
- more acres would be allocated to riparian reserves than the riparian management areas in any of the action alternatives;
- green trees would be retained within the harvest land base, which would speed the redevelopment of suitable habitat after timber harvest compared to Alternative 1 and Alternative 2; and
- the harvest of suitable habitat within the harvest land base would be more constrained than in Alternative 1 and Alternative 2 (see the *Ecology* section of this chapter).

Under Alternative 1 the percentage of suitable habitat outside of the large blocks would increase over the next 50 years (though less than the No Action Alternative), and then would decrease to an amount only slightly above the current condition in 2106.

Under Alternative 2, the percentage of suitable habitat outside of large blocks would steadily decrease over the next 100 years. Alternative 2 would result in a lower percentage of suitable habitat outside of large blocks than Alternative 1, because Alternative 2 would allocate fewer acres to riparian management areas.

Under Alternative 3, the percentage of suitable habitat within the harvest land base would be the highest of all alternatives after 2056 because of green tree retention and the long-rotation constraint on harvest. Since Alternative 3 would allocate no late-successional management areas, it would create and maintain less total suitable habitat than the No Action Alternative and Alternative 1 until 2106.

Figure 221. Suitable habitat outside of late-successional reserves/late-successional management areas, as percentage of habitat-capable acres[16]

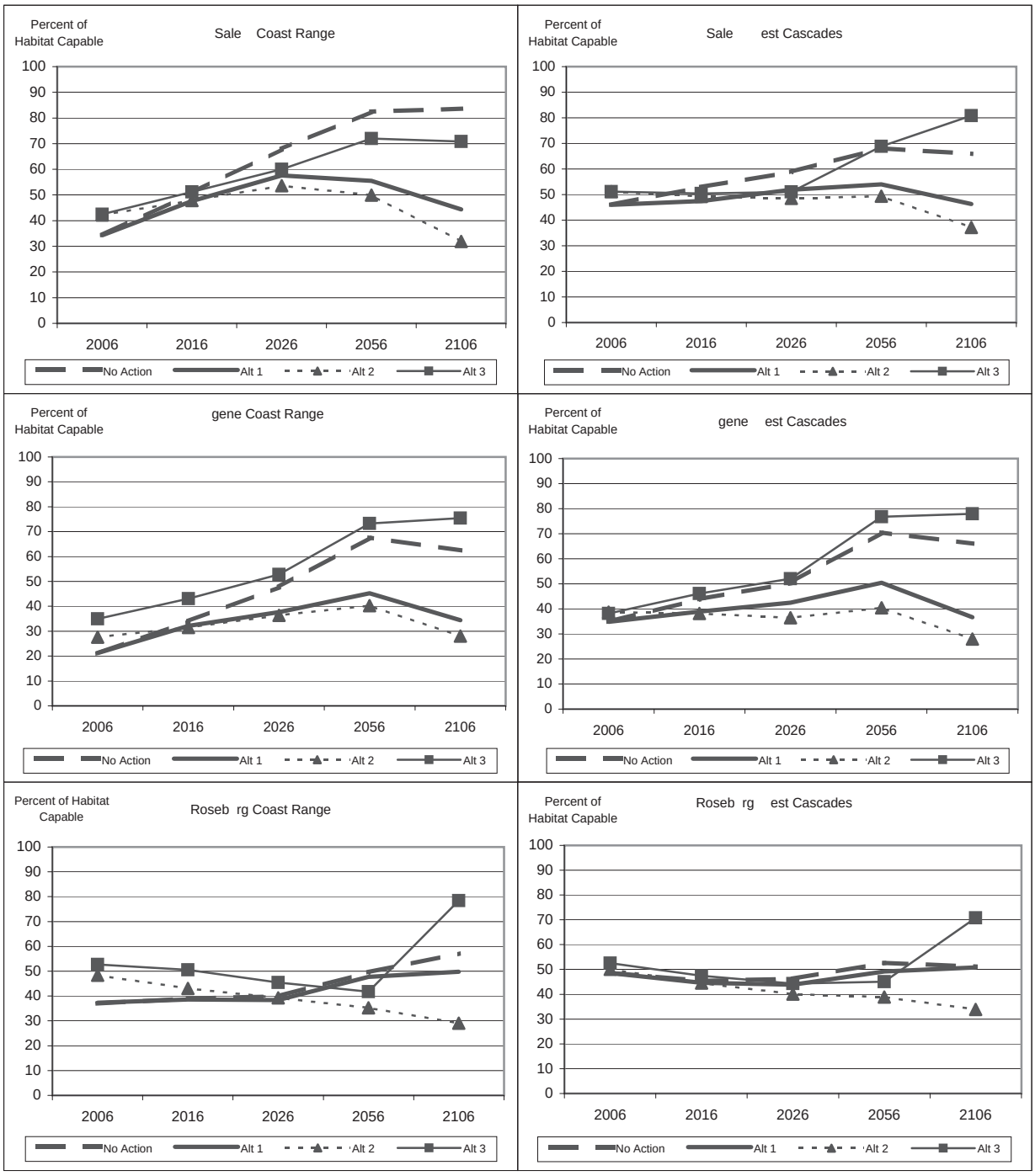


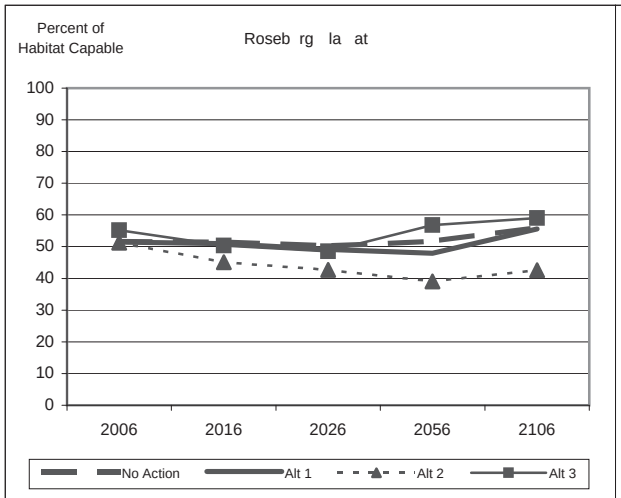
The amount of suitable habitat outside of late-successional reserves/late-successional management areas at the scale of the District/Province divisions is shown in *Figure 222* (*Suitable habitat outside of late-successional reserves/late-successional management areas, by district/province divisions, as percentage of habitat-capable acres).* The amount is generally consistent with the overall pattern at the planning area scale. As *Figure 222* shows:

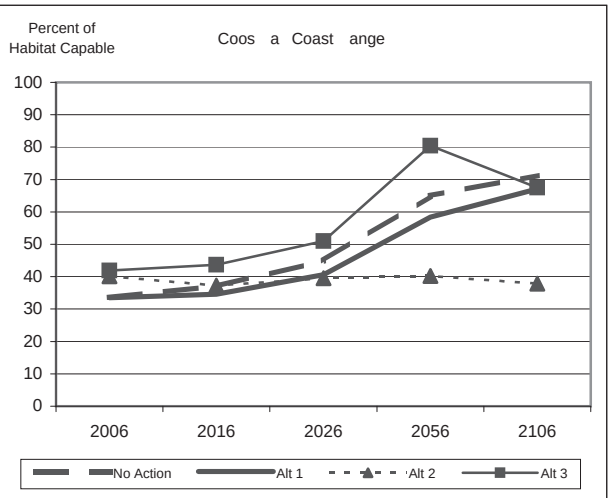
- In almost all District/Province divisions, the No Action Alternative and Alternative 3 would increase the amount of suitable habitat, and Alternative 2 would decrease the amount of suitable habitat.
- In all District/Province divisions except Klamath Falls/Eastern Cascades, Alternative 2 would result in the least suitable habitat outside of late-successional management areas.
- In Roseburg/Coast Range, Roseburg/West Cascades, Roseburg/Klamath, Coos Bay/Coast Range, and Coos Bay/Klamath, Alternative 1 would show a pattern similar to the No Action Alternative, but elsewhere would show a pattern similar to Alternative 2.

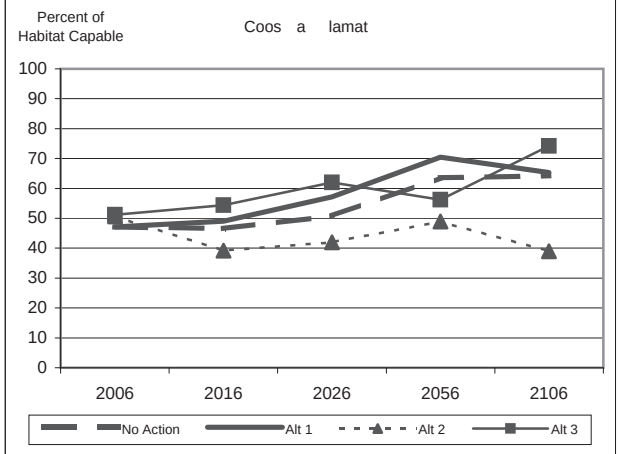
[16] For Alternative 3, this table presents the amount of suitable habitat on all BLM-administered lands, because Alternative 3 does not allocate Late-successional management areas.

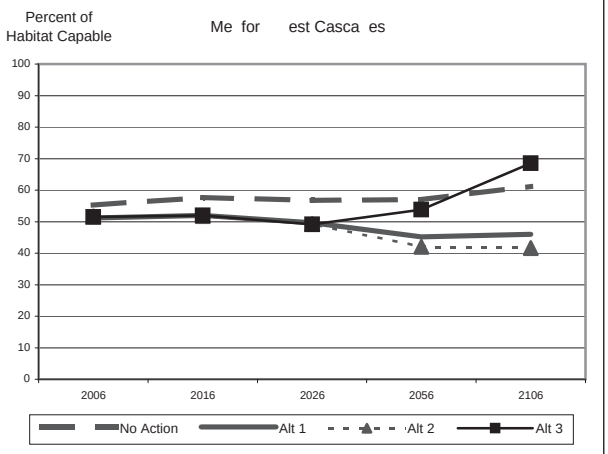
Figure 222. Suitable habitat outside of late-successional reserves/late-successional management areas, by district/province divisions, as percentage of habitat-capable acres

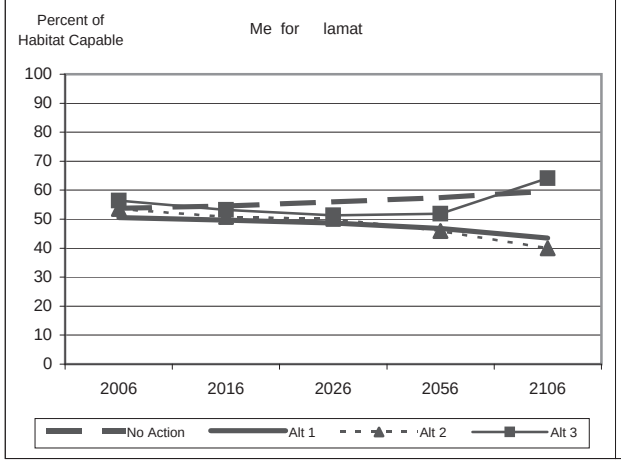


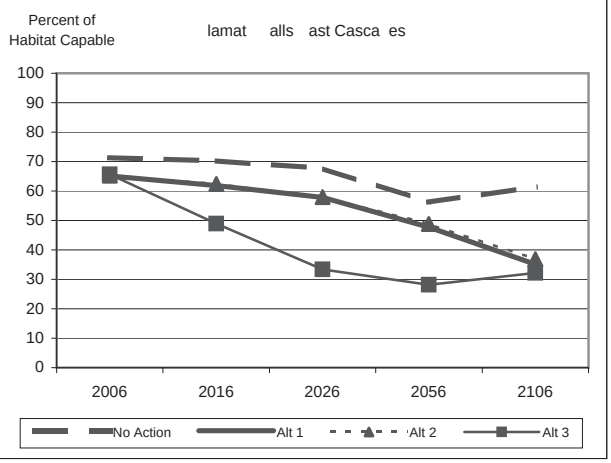

Percent of Habitat Capable
Roseb rg la at
100
90
80
70
60
50
40
30
20
10
0
2006
2016
2026
2056
2106
No Action
Alt 1
Alt 2
Alt 3


Percent of Habitat Capable
Coos a Coast ange
100
90
80
70
60
50
40
30
20
10
0
2006
2016
2026
2056
2106
No Action
Alt 1
Alt 2
Alt 3


Percent of Habitat Capable
Coos a lamat
100
90
80
70
60
50
40
30
20
10
0
2006
2016
2026
2056
2106
No Action
Alt 1
Alt 2
Alt 3


Percent of Habitat Capable
Me for est Casca es
100
90
80
70
60
50
40
30
20
10
0
2006
2016
2026
2056
2106
No Action
Alt 1
Alt 2
Alt 3


Percent of Habitat Capable
Me for lamat
100
90
80
70
60
50
40
30
20
10
0
2006
2016
2026
2056
2106
No Action
Alt 1
Alt 2
Alt 3


Percent of Habitat Capable
lamat alls ast Casca es
100
90
80
70
60
50
40
30
20
10
0
2006
2016
2026
2056
2106
No Action
Alt 1
Alt 2
Alt 3

Dispersal Habitat

This section evaluates whether dispersal habitat conditions within and between large blocks of suitable habitat would facilitate owl movement between the blocks. Dispersal habitat is comprised of both suitable habitat and additional habitat that supports only owl dispersal. The quality of dispersal quality increases with the portion of that habitat that is comprised of suitable habitat (see the *Wildlife* section of Chapter 3).

This analysis describes dispersal habitat at three scales:

- the quantity and quality of dispersal habitat on BLM-administered lands for the entire planning area;
- the quantity and quality of dispersal habitat on BLM-administered lands by the District/Province divisions; and
- the quantity of dispersal habitat across all ownerships by sixth-field watersheds.

The analysis by sixth-field watersheds is at a scale similar to the quarter-township scale (approximately 5,760 acres) of the original 50-11-40 rule (see Chapter 3 – Wildlife). The analysis by sixth-field watershed includes all land ownerships.

While the total quantity of dispersal habitat (dispersal habitat only and suitable habitat) on BLM-administered lands across the entire planning area would remain high under all alternatives, the quality of the dispersal habitat would differ among the alternatives. See *Figure 223* (*Dispersal habitat conditions on BLM-administered lands across the planning area by alternative*).

Under the No Action Alternative, the amount of total dispersal habitat would remain almost constant over time, fluctuating between 87% and 92% of habitat-capable acres on BLM-administered lands across the entire planning area. The amount of suitable habitat, however, would steadily increase over time, until it would constitute 76% of habitat-capable acres in 2106. Therefore, the No Action Alternative would maintain the current total quantity of dispersal habitat, and would increase the quality of dispersal habitat over time because the proportion of dispersal habitat that is suitable habitat would increase.

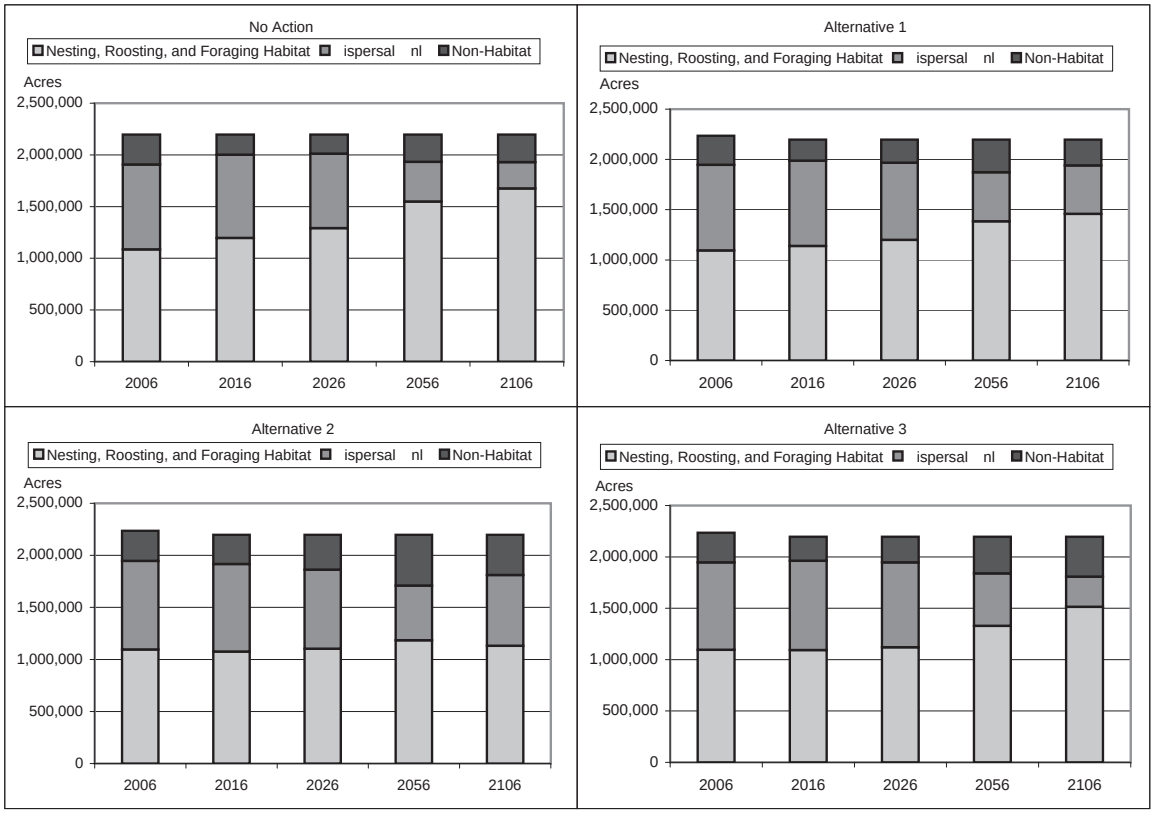
Under Alternative 1, the amount of total dispersal habitat would also remain almost constant over time, although fluctuating between 85% and 90% of habitat-capable acres on BLM-administered lands. The amount of suitable habitat, however, would steadily increase over time, but less so than under the No Action Alternative: suitable habitat would constitute 66% of habitat-capable acres in 2106. Therefore, like the No Action Alternative, Alternative 1 would maintain the current total quantity of dispersal habitat, and would increase the quality of dispersal habitat over time.

Under Alternative 2, the amount of total dispersal habitat would decrease, although it would fall only to 77% of habitat-capable acres on BLM-administered lands by 2056 and then increase to 82% by 2106). However, the amount of suitable habitat would not increase over time as in the No Action Alternative and Alternative 1; it would fluctuate between 49% and 53% to end at 49% by 2106. Therefore, Alternative 2 would decrease the total quantity of dispersal habitat, and would maintain approximately the current quality of dispersal habitat over time.

Alternative 3 would not create large blocks of suitable habitat, and the conservation need for dispersal habitat is predicated on a large block design. Therefore, dispersal habitat under Alternative 3 would not have the same relevance as under the other alternatives, and the analysis of dispersal habitat under Alternative 3 is provided here to provide comparison to the other alternatives.

Under Alternative 3, the amount of total dispersal habitat would steadily decrease to eventually reach the same total amount as Alternative 2 - 82% in 2106. However, unlike Alternative 2, the amount of suitable habitat would increase over time. After remaining stable for the first 20 years, the amount of suitable habitat would increase to 69% of habitat-capable acres - slightly more than Alternative 1. Therefore, Alternative 3 would decrease the total quantity of dispersal habitat, but eventually would increase the quality of dispersal habitat over time.

Figure 223. Dispersal habitat conditions on BLM-administered lands across the planning area by alternative



Under the No Action Alternative, Alternative 1, and Alternative 2, the changes in dispersal habitat quantity and quality at the district/province divisions would generally be consistent with the overall changes across the planning area, with the following slight variations:

- The No Action Alternative would result in a decrease in dispersal quantity in Roseburg/West Cascades, Medford/Western Cascades, and Medford/Klamath, although dispersal quality would increase.
- Alternative 1 and Alternative 2 would result in a decrease in dispersal quantity and quality in Klamath/Eastern Cascades.
- Alternative 2 would result in an increase in dispersal quality in the Salem/Coast Range, Eugene/Coast Range, and Coos Bay/Coast Range, because Alternative 2 would allocate more acres to late-successional management areas in the Coast Range than any other province. However, the increase in dispersal quantity and quality in the Coast Range under Alternative 2 would still be less than under the No Action Alternative and Alternative 1.
- Alternative 2 would result in a decrease in dispersal quantity and quality in Salem/Western Cascades, because it would allocate no late-successional management areas in Salem/Western Cascades.

Under Alternative 3, the changes in dispersal habitat quantity and quality would vary among the district/province divisions:

- In Roseburg/Coast Range and Roseburg/Western Cascades, dispersal quantity and quality would decrease until 2056, and then increase from 2056 to 2106.
- In Roseburg/Klamath, dispersal quality would fluctuate, but total dispersal quantity would decrease to 64% of habitat-capable acres in 2106 - lower than any other district/province divisions in any alternative.
- In Coos Bay/Coast Range, dispersal quantity and quality would increase until 2056, and then decrease from 2056 to 2106.
- In Klamath/Eastern Cascades, Alternative 3 would result in an increase in total dispersal quantity and a substantial decrease in dispersal quality – suitable habitat would decrease to 28% of habitat-capable acres in 2056.
- In other district/province divisions, the changes would generally be consistent with the overall changes across the planning area: a slight decrease in total dispersal habitat quantity and an increase in dispersal habitat quality.

Data on each district/province division by alternative is provided in *Appendix G, Wildlife.*

The evaluation of dispersal habitat across all ownerships requires use of the structural stage classifications, rather than the habitat classification, because the

habitat classification relies on some stand parameters that are not available for non-BLM lands, such as snag and coarse woody debris levels. The structural stages of young, mature, and structurally complex forest approximate dispersal habitat. The lower threshold for young forest is not exactly equivalent to the lower limit of dispersal habitat: the use of young, mature, and structurally complex forest probably overestimates dispersal habitat for stands without structural legacies and underestimates dispersal habitat for stands with structural legacies. Nevertheless, the structural stages are a close enough approximation of dispersal habitat to compare the relative effects of the alternatives and evaluate changes in dispersal habitat over time.

Currently, 35% of sixth-field watersheds have more than 50% dispersal habitat. See *Figure 224* (*Current conditions of dispersal habitat across all ownerships by sixth-field watershed*). The percentage of sixth-field watersheds that would have more than 50% dispersal habitat would increase under all alternatives over time. The percentage of sixth-field watersheds that would have 25-50% dispersal habitat would decrease under all alternatives over time. The percentage of sixth-field watersheds that would have less than 10% or 10-25% dispersal habitat would change very little over time under all alternatives.

For the reference analysis of allow no harvest on BLM-administered lands, the percentage of sixth-field watersheds that would have more than 50% dispersal habitat would increase to 44% in 2056 and would stay at that level until 2106. The percentage of sixth-field watersheds that would have more than 50% dispersal habitat would increase in 2106 to 41% under the No Action Alternative; 40% under Alternative 1; 39% under Alternative 2; and 38% under Alternative 3. Most of the sixth-field watersheds that would become more than 50% dispersal habitat in 2106 include U.S. Forest Service lands, especially in the Siskiyou National Forest and Siuslaw National Forest. See *Figure 225* (*Dispersal habitat across all ownerships by sixth-field watershed for the no harvest reference analysis 2106*).

Figure 224. Current condition of dispersal habitat across all land ownerships by sixth-field watershed

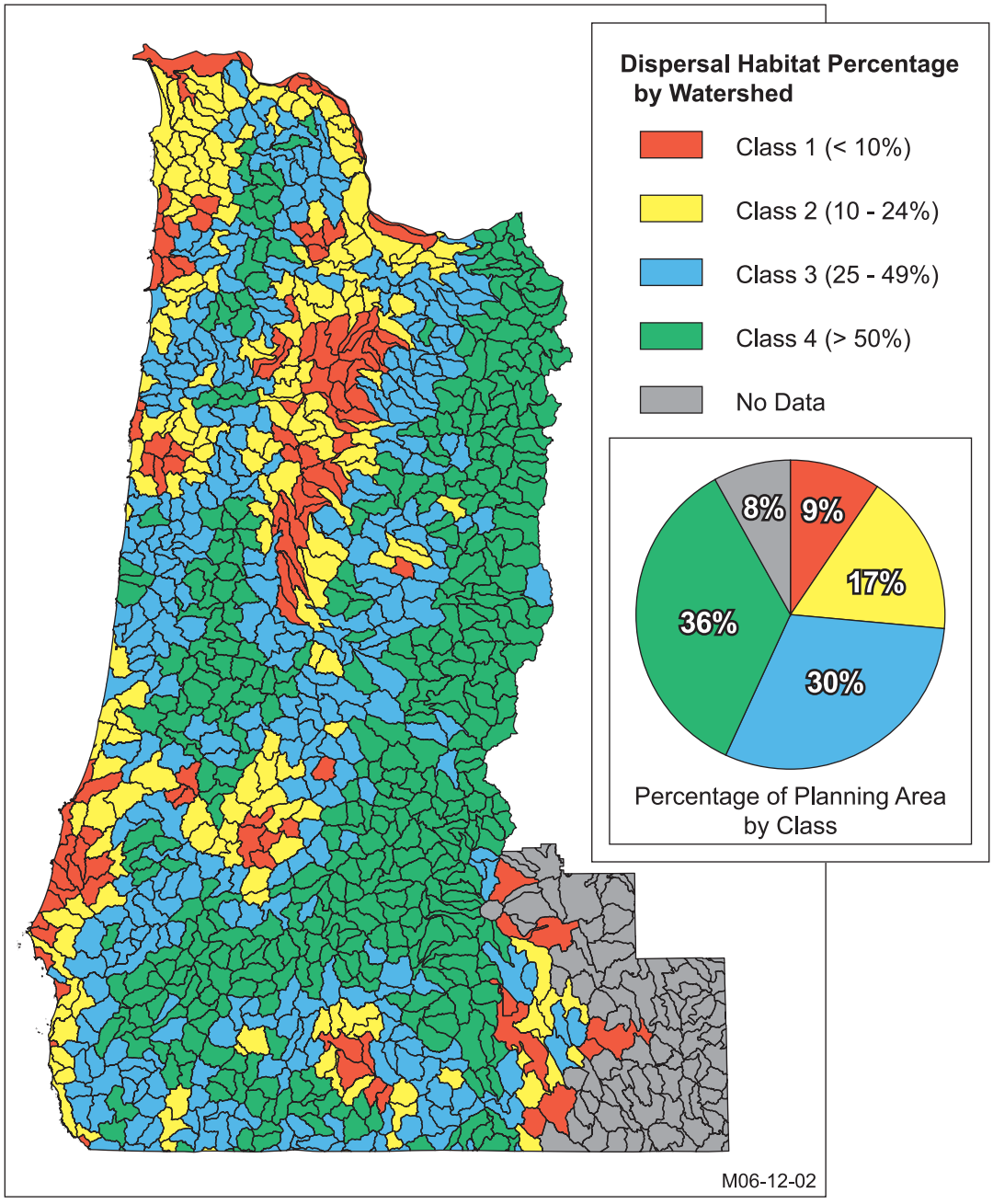
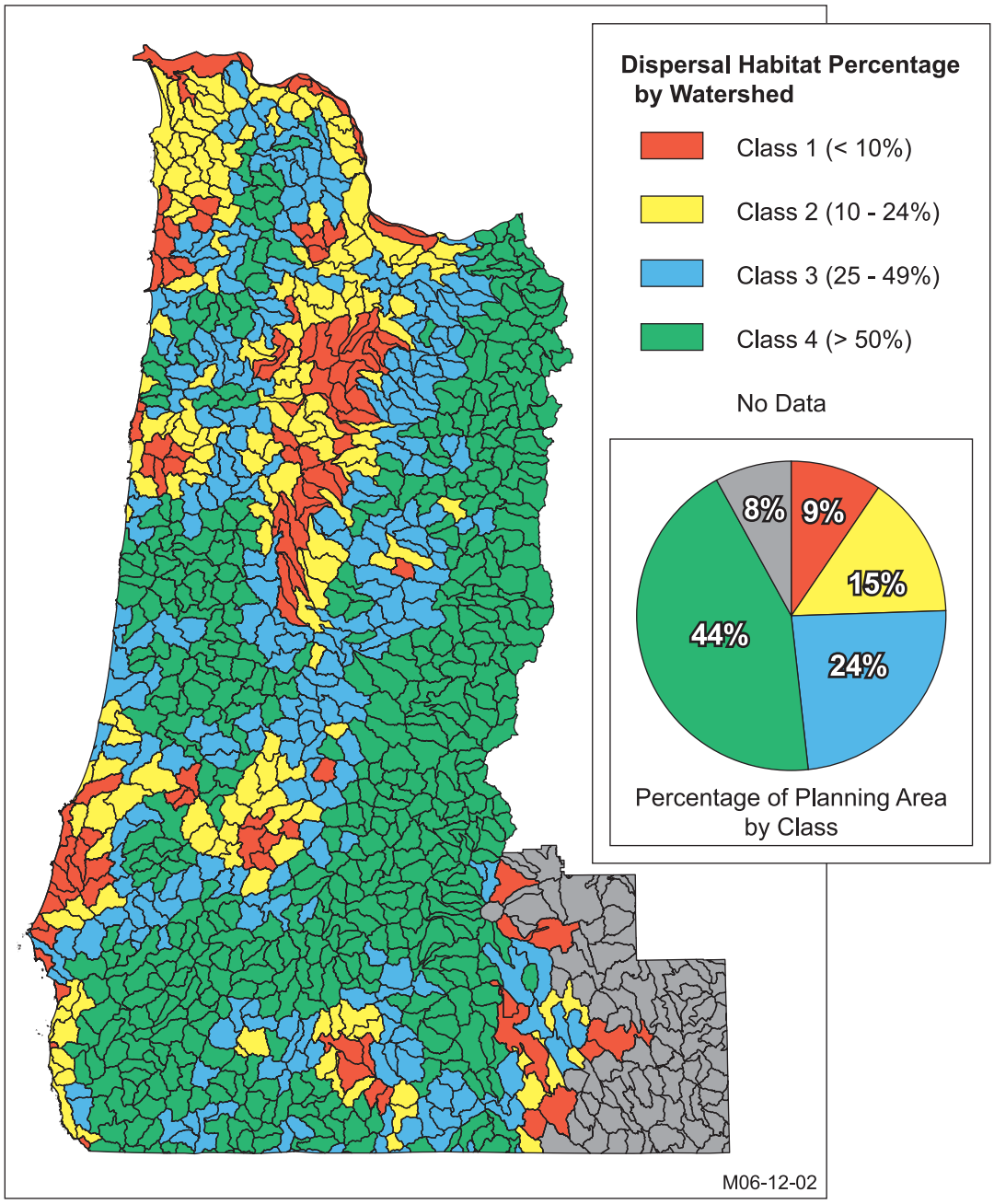


Figure 225. Dispersal habitat by 2106 across all land ownerships by six-field watershed for the no harvest reference analysis



Areas of Concern

This section evaluates the amount of total dispersal habitat and the amount of suitable habitat within the Areas of Concern on BLM-administered lands and across all ownerships. See *Table 192* (*Total dispersal habitat on BLM-administered lands in areas of concern);* and *Table 193* **(***Suitable habitat on BLM-administered lands in areas of concern*).

The areas of concern have limited federal ownership, which limits the ability of the federal land base to support the movement of northern spotted owl populations between the provinces. The three areas of concern are South Willamette-North Umpqua, Rogue-Umpqua, and Ashland (see the *Wildlife* section of Chapter 3). As with dispersal habitat, there are no explicit thresholds for habitat conditions with the areas of concern below which owl movement would be disrupted, but the ability of habitat conditions within an area of concern to maintain genetic interchange between northern spotted owl populations would increase with increasing amounts of total dispersal habitat, and increasing amounts of suitable habitat.

The evaluation of dispersal and suitable habitat on BLM-administered lands in the areas of concern uses the habitat classification directly. However, evaluation of dispersal and suitable habitat across all ownerships requires use of the forest structural stage classification, rather than the habitat classification, as explained above for the large block analysis of Alternative 3 and the analysis of dispersal habitat across all ownerships. Young, mature, and structurally complex forest structural stage classifications are used as a surrogate for total dispersal habitat, and mature and structurally complex forest structural stage classifications are used as a surrogate for suitable habitat. There are some differences in absolute results between the habitat classifications of BLM-administered lands in the areas of concern and the structural stage classifications of all ownerships, but the relative results and trends are generally similar.

Table 192. Total dispersal habitat on BLM-administered lands in areas of concern

Area of Concern	Habitat-capable acres		Percent of Habitat-Capable Acres				
			2006	2016	2026	2056	2106
South Willamette-North Umpqua	251,100	No Harvest	85	95	98	100	100
		No Action	85	93	94	90	89
		Alt 1	85	92	92	89	92
		Alt 2	85	90	88	84	88
		Alt 3	85	89	87	78	83
Rogue-Umpqua	224,400	No Harvest	86	90	95	100	100
		No Action	86	86	87	83	84
		Alt 1	86	86	88	84	89
		Alt 2	86	84	84	77	87
		Alt 3	86	81	78	70	65
Ashland	62,000	No Harvest	89	92	93	100	100
		No Action	89	90	89	90	86
		Alt 1	89	89	89	89	90
		Alt 2	89	90	89	89	88
		Alt 3	89	92	92	98	98

Table 193. Suitable Habitat on BLM-administered Lands in areas of concern

Area of Concern	Habitat-capable Acres		Percent of Habitat-capable Acres				
			2006	2016	2026	2056	2106
South Willamette-North Umpqua	251,100	No Harvest	44	50	57	85	100
		No Action	44	48	54	73	77
		Alt 1	44	46	50	64	68
		Alt 2	44	45	46	58	58
		Alt 3	44	45	46	60	77
Rogue-Umpqua	224,400	No Harvest	54	58	63	82	99
		No Action	54	55	56	64	74
		Alt 1	54	54	56	61	70
		Alt 2	54	52	52	54	60
		Alt 3	54	49	47	52	57
Ashland	62,000	No Harvest	51	57	61	72	86
		No Action	51	64	66	69	71
		Alt 1	51	59	56	59	66
		Alt 2	51	54	56	60	65
		Alt 3	51	55	56	61	81

In the South Willamette-North Umpqua area of concern, the current amount of total dispersal habitat is 85% of habitat-capable acres on BLM-administered lands and 50% across all ownerships. As *Table 192* (*Total dispersal habitat on BLM-administered lands in areas of concern)* and *Figure 226* (*South Willamette-North Umpqua area of concern: total dispersal habitat across all ownerships*) show:

- The reference analysis of allow no harvest on BLM-administered lands would result in dispersal habitat on 53% of habitat-capable acres across all ownerships in 2106.
- The amount of total dispersal habitat would fluctuate under all alternatives, but the alternatives would differ by less than 4% in the amount of dispersal habitat across all ownerships.
- The No Action Alternative is the only alternative that would not decrease total dispersal habitat from current conditions over the next 100 years.
- Alternative 1 would decrease total dispersal habitat in 2056, but increase to the same amount as the No Action Alternative in 2106.
- Alternative 3 would initially increase the amount of total dispersal habitat but would decrease to the lowest amount of all alternatives.

All alternatives would increase the amount of suitable habitat on BLM-administered lands and across all ownerships in the South Willamette-North Umpqua area of concern. See *Table 193* (*Suitable habitat on BLM-administered lands in areas of concern*) and *Figure 227* (*South Willamette-North Umpqua area of concern: suitable habitat across all ownerships*).

- Consistent with the overall trend for the planning area, the No Action Alternative would result in the most suitable habitat.
- Alternative 2 would result in the least suitable habitat.
- The difference among the alternatives would be less than 3% across all ownerships.

Note that even though Alternative 2 located several late-successional management area blocks within this area of concern, Alternative 2 would not create as much dispersal habitat or suitable habitat as the No Action Alternative or Alternative 1 in the area of concern.

Figure 226. South Willamette-North Umpqua area of concern: Total Dispersal Habitat across All Ownerships

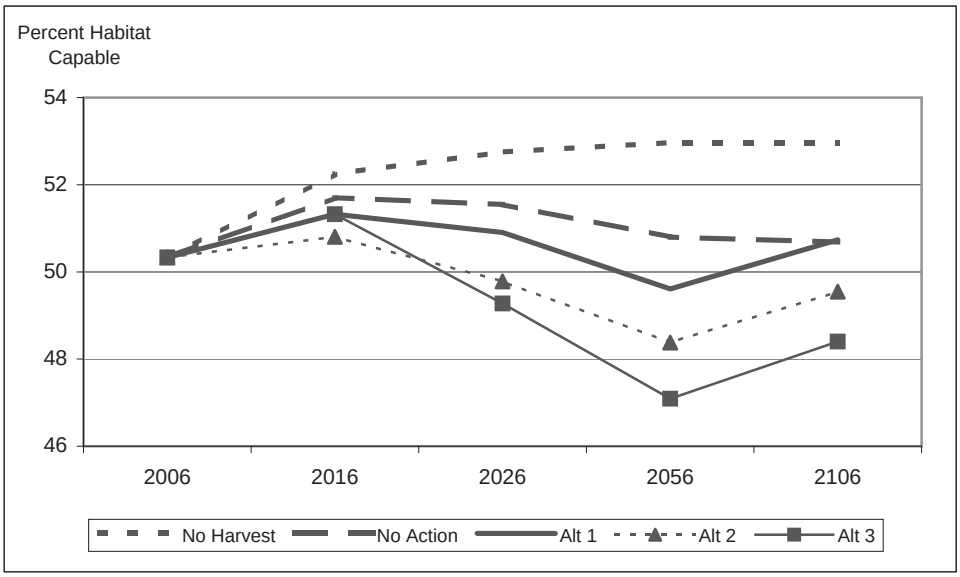
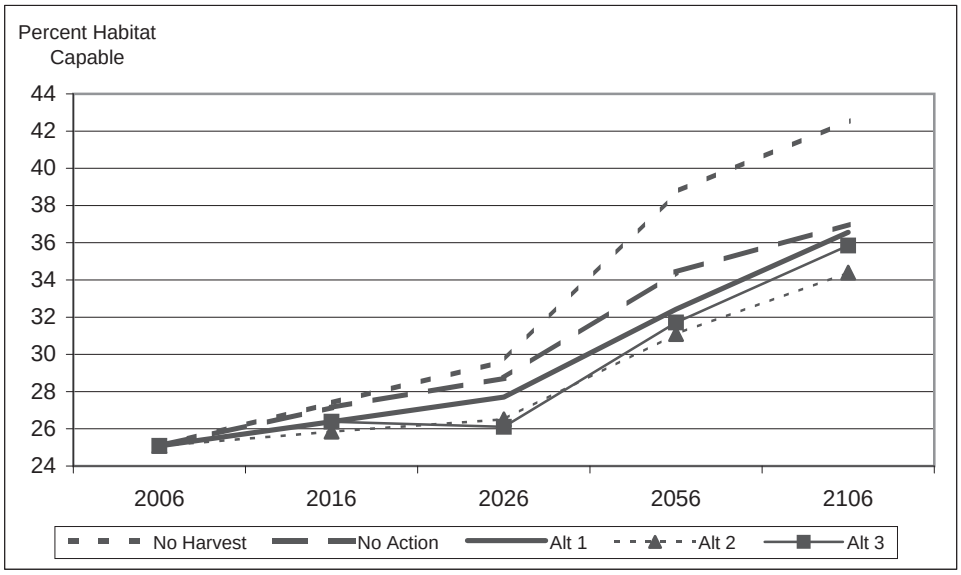


Figure 227. South Willamette-North Umpqua area of concern: suitable habitat across all ownerships*



*Note change in range of y-axis values

In the Rogue-Umpqua area of concern, the current amount of total dispersal habitat is 86% of habitat-capable acres on BLM-administered lands (almost the same as in South Willamette-North Umpqua area of concern) and 60% across all ownerships (much higher than in the South Willamette-North Umpqua area of concern). See *Table 192* (*Total dispersal habitat on BLM-administered Lands in areas of concern)* and *Figure 228* (*Rogue- Umpqua area of concern: total dispersal habitat across all ownerships*).

- The reference analysis of allow no harvest on BLM-administered lands would result in dispersal habitat on 65% of habitat-capable acres across all ownerships in 2106.
- The amount of total dispersal habitat would fluctuate under all alternatives, but the difference among the alternatives would result in less than a 4% difference across all ownerships.
- As in the South Willamette-North Umpqua area of concern, the No Action Alternative is the only alternative that would not decrease total dispersal habitat from current conditions.
- Alternative 1 and Alternative 2 would decrease total dispersal habitat in 2056, but increase to the same amount as the No Action Alternative in 2106.
- Alternative 3 would initially increase the amount of total dispersal habitat but would decrease to the lowest amount of all alternatives.

The current amount of suitable habitat (54% of habitat capable acres on BLM-administered lands and 47% on all ownerships) is higher than in the other Areas of Concern. As shown in *Table 193* (*Suitable habitat on BLM-administered lands in areas of concern*) and *Figure 229* (*Rogue-Umpqua area of concern: total suitable habitat across all ownerships*):

- Under all alternatives, the amount of suitable habitat across all ownerships would decrease for the first twenty years, and then increase after 2026.
- The No Action Alternative, Alternative 1, and Alternative 2 would increase the amount of suitable habitat in 2106 from current levels.
- Alternative 3 would result in approximately the same amount of suitable habitat across all ownerships in 2106 as the current condition.
- All alternatives would result in a 10% decrease in the amount of suitable habitat across all ownerships in 2106 – a bigger decrease than in the other Areas of Concern.

Figure 228. Rogue-Umpqua area of concern: total dispersal habitat across all ownerships

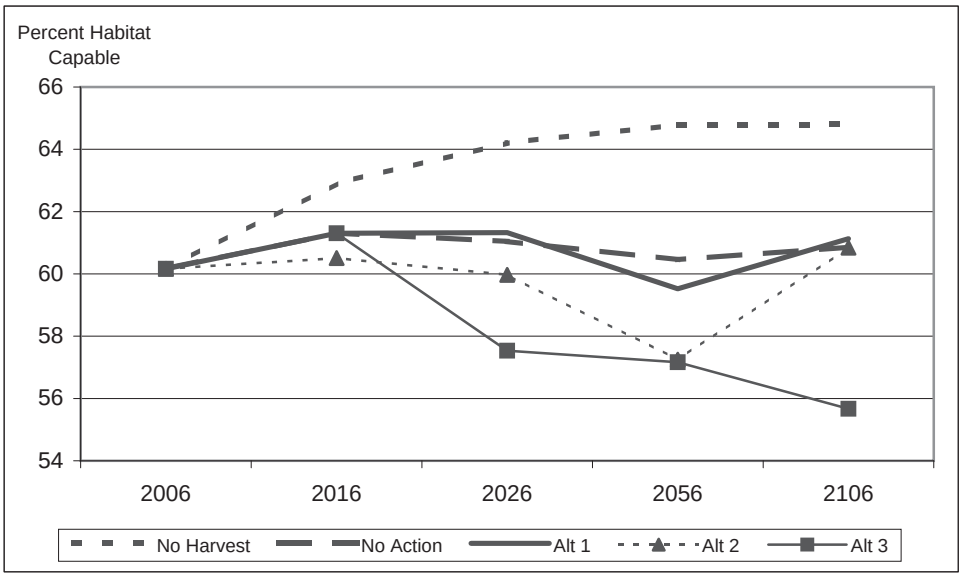
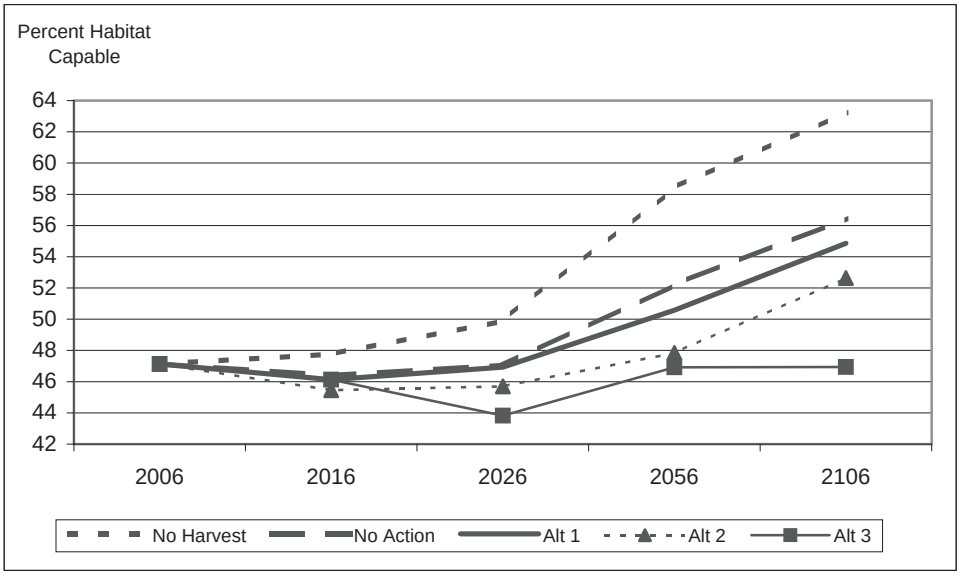


Figure 229. Rogue-Umpqua area of concern: suitable habitat across all ownerships.*



*Note change in range of y-axis values.

In the Ashland area of concern, the current amount of total dispersal habitat is 89% of habitat-capable acres on BLM-administered lands and 61% across all ownerships - higher than in the other Areas of Concern. See *Table 192* (*Total Dispersal Habitat on BLM-administered Lands in Areas of Concern)* and *Figure 230* (*South Willamette-North Umpqua area of concern: total dispersal habitat across all ownerships*).

- The reference analysis of "Allow No Harvest" on BLM-administered lands would result in dispersal habitat on 63% of habitat-capable acres across all ownerships in 2106.
- The amount of total dispersal habitat would decrease from current conditions under all alternatives.
- There is a 4% difference among the alternatives across all ownerships.
- As in the other Areas of Concern, the No Action Alternative would result in the most total dispersal habitat, and Alternative 3 would result in the least total dispersal habitat of all alternatives.

All alternatives would increase the amount of suitable habitat in the Ashland area of concern. See *Table 193* (*Suitable habitat on BLM-administered lands in areas of concern*) and *Figure 231* (*Ashland area of concern: suitable habitat across all ownerships*).

- The No Action Alternative would consistently result in at least 4% more suitable habitat than other alternatives.
- Unlike in other Areas of Concern and the planning area as a whole, Alternative 1 would result in approximately the same amount of suitable habitat as Alternative 2 and both would be less than the No Action Alternative and Alternative 3 in 2106.

Figure 230. Ashland area of concern: total dispersal habitat across all ownerships

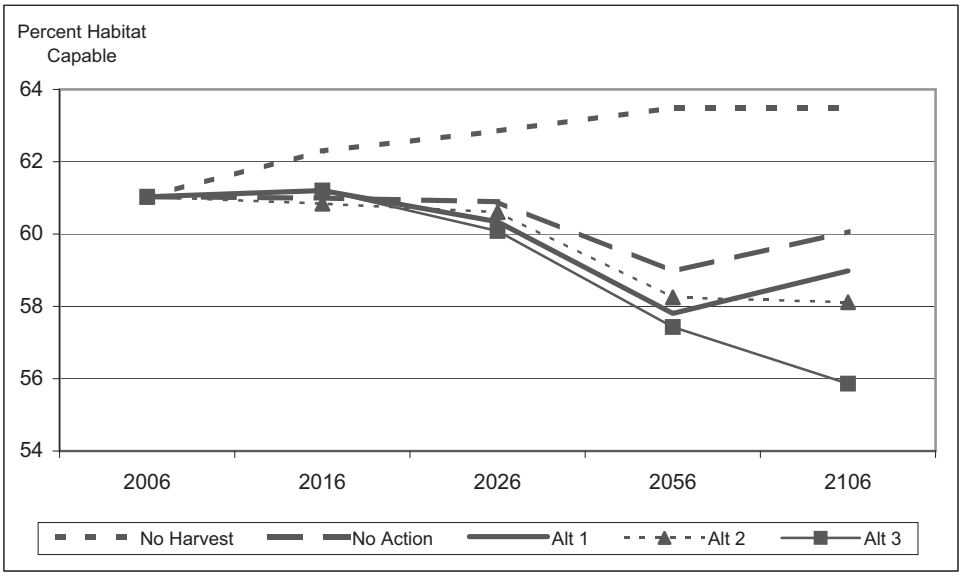
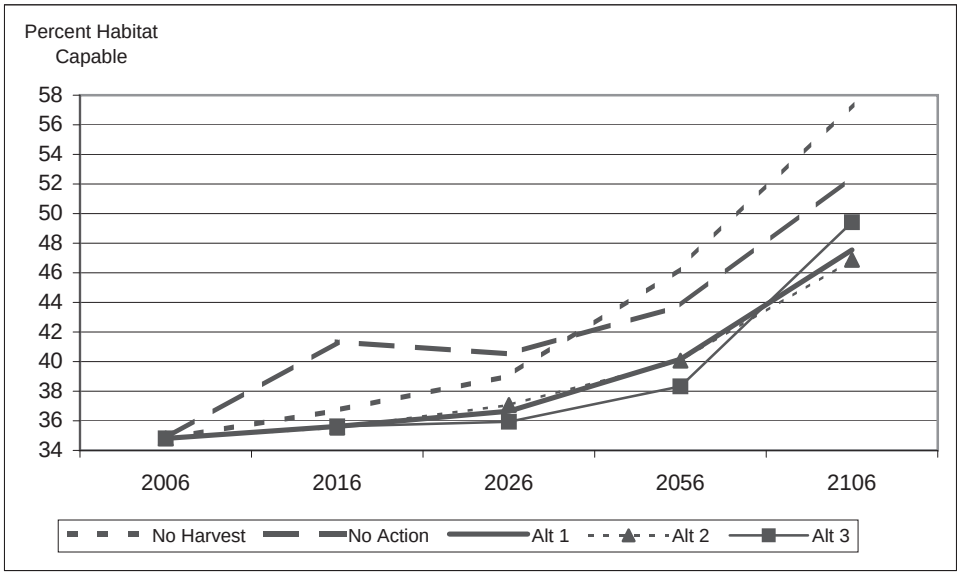


Figure 231. Ashland area of concern: suitable habitat across all ownerships*



*Note change in range of y-axis values.

Marbled Murrelet

This analysis describes the abundance and development of marbled murrelet nesting habitat and the patch dynamics of marbled murrelet nesting habitat.

Effects to populations were not analyzed because population size is affected by numerous factors other than habitat. A large portion of the marbled murrelet life cycle is tied to at-sea conditions including food supplies and mortality due to oil spills. Changes in sea conditions are likely to vary widely over the next 100 years. The interaction of sea conditions and habitat changes is currently unknown.

Surveys and Marbled Murrelet Sites

Under all alternatives, known, occupied marbled murrelet sites would receive protection from harvest. There are currently 226 known, occupied marbled murrelet sites on BLM-administered lands. These sites were found between 1993 and 2006.

The No Action Alternative includes management direction that would require marbled murrelet surveys prior to any habitat-disturbing activities which is consistent with the recommendation in the marbled murrelet recovery plan. The analysis for Alternatives 1 and 3 also assumes that surveys would occur.

The analysis for the No Action Alternative, Alternative 1, and Alternative 3 projects discovery and protection of future marbled murrelet sites. Based on past find rates (between 1993 and 2006), the analysis projects that surveys over the next 10 years would discover:

- 592 new sites under the No Action Alternative,
- 601 new sites under Alternative 1, and
- 801 new sites under Alternative 3.

Under the No Action Alternative and Alternative 1, the analysis assumes that these additional sites would be protected from timber harvest. Under Alternative 3, occupied marbled murrelet sites would be protected from harvest until 50% of the acres in an assessment area are older than defined threshold stand ages. The year until which marbled murrelet sites would be protected under Alternative 3 is shown in *Table 194* (*Year at which the threshold age would be reached under Alternative 3*).

Analysis of Alternative 2 assumes that surveys would not occur. Because of the hidden nature of nesting marbled murrelets, it is not reasonably foreseeable that additional sites would be found without surveys. Therefore, the analysis of Alternative 2 does not project protection of additional sites beyond the currently known, occupied sites.

Table 194. Year at which the threshold age would be reached under Alternative 3

Sustained Yield Unit (District) /Province	Year
Salem/Coast Range	2046
Eugene/Coast Range	2046
Roseburg/Coast Range	2016
Roseburg/Klamath	2106
Coos Bay/Coast Range	2056
Coos Bay/Klamath	2026
Medford/Klamath	2056

Marbled Murrelet Nesting Habitat

There are 891,000 acres of BLM-administered lands that are capable of growing nesting habitat for the marbled murrelet. As shown in *Table 195* (*Available marbled murrelet nesting habitat on BLM-administered lands within the planning area*), 641,000 acres occur within marbled murrelet Zone 1 and 250,000 acres occur within marbled murrelet Zone 2. A map of the two Zones is contained in the *Wildlife* section of Chapter 3.

For this analysis, marbled murrelet habitat is classified as the mature, multiple canopy and structurally complex structural stage classifications. This classification is based on marbled murrelet nesting suitability category 4 from Raphael et al. (2006). Category 4 structural classifications are generally stands greater than 20 inches quadratic mean diameter with complex canopy structures. Raphael et al. (2006) also classified simple canopy stands with a quadratic mean diameter greater than 30 inches as nesting suitability class 4. Although the data used for this analysis does not distinguish between the 30 inch and greater diameter class, the assumption is that the majority of those stands would fall into the structurally complex structural stage classification.

By the year 2106, marbled murrelet nesting habitat would increase from the current condition of 373,000 acres to:

- 715,000 acres under the No Action Alternative (an increase of 92%)
- 620,000 acres under Alternative 1 (an increase of 66%)
- 439,000 acres under Alternative 2 (an increase of 18%)
- 493,000 acres under Alternative 3 (an increase of 32%)

Figure 232 (*Marbled murrelet nesting habitat by the year 2106*) shows how habitat develops over time. In the first 50 years, there would be a decrease in marbled murrelet nesting habitat under Alternatives 2 and 3 compared to the current condition of 373,000 acres. There would be a 16% decrease (to 313,000 acres) under Alternative 2 and a 14% decrease (to 321,000 acres) under Alternative 3.

Figure 232. Marbled murrelet nesting habitat by the year 2106

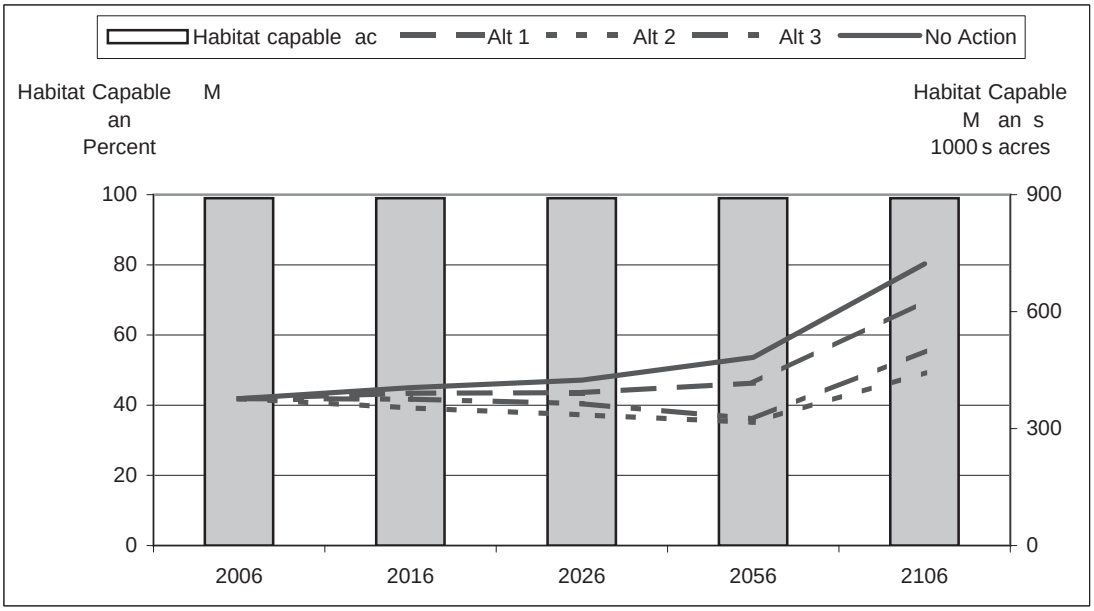


Table 195. Available marbled murrelet nesting habitat on BLM-administered lands within the planning area

	District	Alternative	Habitat-capable (acres)	Marbled murrelet nesting habitat (acres)				
				2006	2016	2026	2056	2106
ZONE 1	Coos Bay	Alt 1	298,000	122,000	118,000	117,000	124,000	199,000
		Alt 2		122,000	104,000	93,000	83,000	129,000
		Alt 3		122,000	119,000	117,000	108,000	144,000
		No Action		122,000	123,000	126,000	137,000	227,000
	Eugene	Alt 1	108,000	37,000	43,000	47,000	52,000	80,000
		Alt 2		37,000	38,000	40,000	37,000	49,000
		Alt 3		37,000	41,000	46,000	45,000	68,000
		No Action		37,000	44,000	51,000	61,000	93,000
	Medford	Alt 1	1,000	500	600	600	600	900
		Alt 2		500	400	300	300	300
		Alt 3		500	500	500	600	600
		No Action		500	600	600	600	800

	District	Alternative	Habitat-capable (acres)	Marbled murrelet nesting habitat (acres)				
				2006	2016	2026	2056	2106
ZONE 1	Roseburg	Alt 1	37,000	18,000	18,000	18,000	18,000	25,000
		Alt 2		18,000	17,000	17,000	16,000	21,000
		Alt 3		18,000	17,000	15,000	9,000	21,000
		No Action		18,000	19,000	19,000	20,000	28,000
	Salem	Alt 1	197,000	67,000	81,000	84,000	92,000	151,000
		Alt 2		67,000	74,000	76,000	77,000	114,000
		Alt 3		67,000	77,000	75,000	63,000	114,000
		No Action		67,000	84,000	92,000	111,000	169,000
	Total Zone 1	Alt 1	641,000	244,500	260,600	266,600	286,600	455,900
		Alt 2		244,500	233,400	226,300	213,300	313,300
		Alt 3		244,500	254,500	253,500	225,600	347,600
		No Action		244,500	270,600	288,600	329,600	517,800
ZONE 2	Coos Bay	Alt 1	4,000	1,300	1,000	900	1,000	2,200
		Alt 2		1,300	1,100	700	500	700
		Alt 3		1,300	1,200	1,000	1,200	2,300
		No Action		1,300	1,400	1,500	1,400	2,700
	Eugene	Alt 1	40,000	12,000	14,000	15,000	15,000	25,000
		Alt 2		12,000	14,000	14,000	14,000	24,000
		Alt 3		12,000	13,000	14,000	14,000	24,000
		No Action		12,000	15,000	17,000	19,000	31,000
	Medford	Alt 1	46,000	24,000	24,000	23,000	24,000	27,000
		Alt 2		24,000	21,000	18,000	19,000	22,000
		Alt 3		24,000	23,000	22,000	22,000	25,000
		No Action		24,000	27,000	26,000	33,000	36,000
	Roseburg	Alt 1	142,000	81,000	77,000	75,000	78,000	103,000
		Alt 2		81,000	71,000	66,000	60,000	76,000
		Alt 3		81,000	70,000	59,000	50,000	82,000
		No Action		81,000	77,000	77,000	84,000	114,000
	Salem	Alt 1	18,000	10,000	10,000	8,000	8,000	7,000
		Alt 2		10,000	9,000	7,000	6,000	3,000
		Alt 3		10,000	10,000	11,000	9,000	13,000
		No Action		10,000	10,000	10,000	11,000	14,000
	Total Zone 2	Alt 1	250,000	128,300	126,000	121,900	126,000	164,200
		Alt 2		128,300	116,100	105,700	99,500	125,700
		Alt 3		128,300	117,200	107,000	96,200	146,300
		No Action		128,300	130,400	131,500	148,400	197,700

Marbled Murrelet Habitat in Zone 1

In Zone 1, the increase in marbled murrelet nesting habitat by the year 2106 would range from 68,800 acres or a 28 % increase under Alternative 2 to 273,300 acres or a 112% increase under the No Action Alternative. Zone 1 is important because it represents the approximate area identified in the marbled murrelet recovery plan as the recovery area for the species (USDI, USFWS 1997).

Alternative 1 would increase nesting habitat 86% (to 455,900 acres) by 2106 in Zone 1. In all districts, Alternative 1 would increase marbled murrelet nesting habitat. The increase would range from 39 and 125%. The Coos Bay District would be the only district with a short-term decline in marbled murrelet nesting habitat. The decline would be 3.3% over the next 10 years.

Alternative 2 would increase marbled murrelet nesting habitat in all districts by 2106 in Zone 1 with one exception. The Medford District would decline 200 acres. The Salem District would have an increase in marbled murrelet nesting habitat in each time increment.

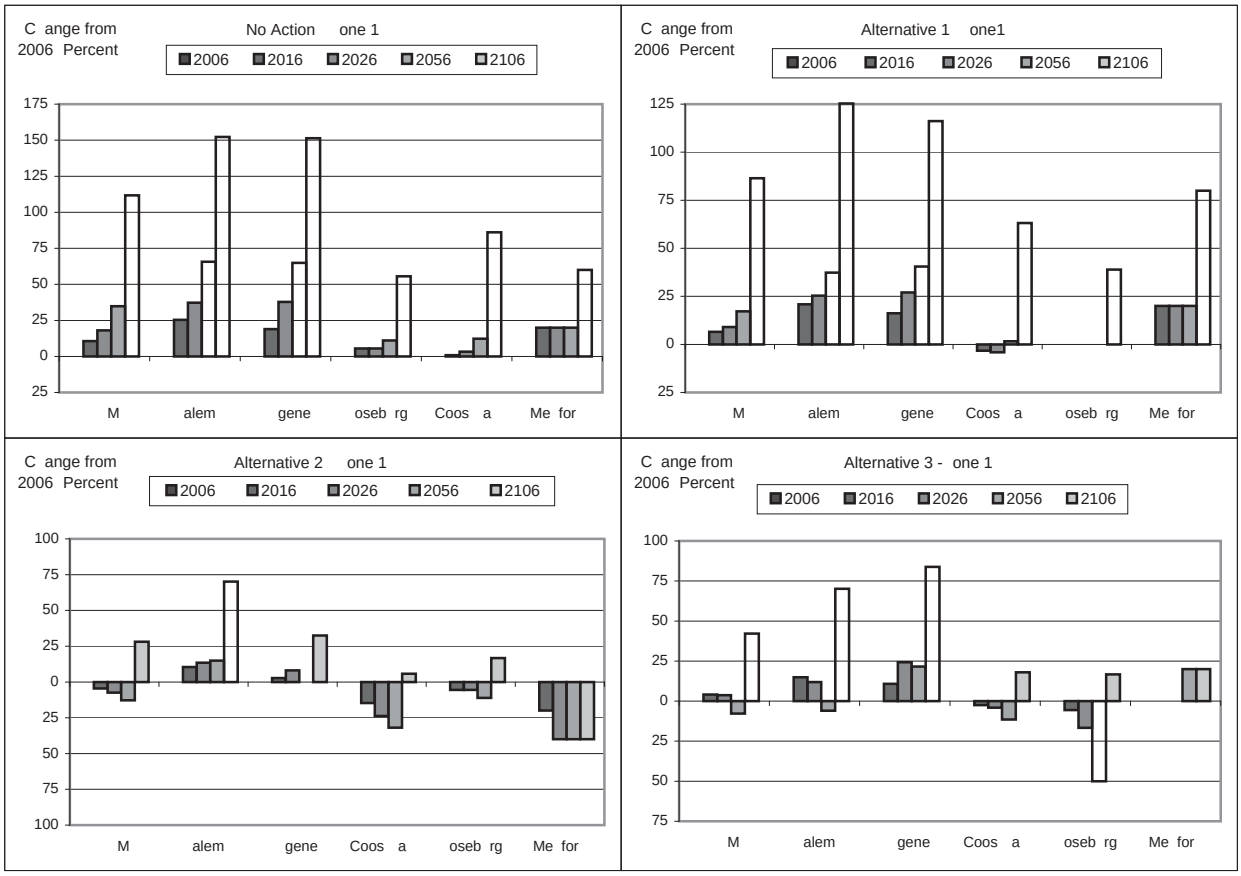
Alternative 3 would increase marbled murrelet nesting habitat 42% (or 103,000 acres) in Zone 1 by 2106. The largest increases in nesting habitat would occur in the Eugene, Coos Bay, and Salem districts.

In the shorter term (50 years), there would be an overall decrease in marbled murrelet nesting habitat of 16% under Alternative 2 and 14% under Alternative 3 compared to the current condition. The Coos Bay and Roseburg districts show decreases at 10, 20, and 50 years under Alternatives 2 and 3.

Declines in the amount of marbled murrelet nesting habitat are caused by the increase in the amount of lands being harvested each decade, compared to No Action and Alternative 1. The decline is also attributable to the lack of legacy retention after harvest which delays the development of new nesting habitat (See the *Ecology* section of this Chapter).

Figure 233 (*District marbled murrelet nesting habitat fluctuations in Zone 1*) compares habitat fluctuations by district in Zone 1.

Figure 233. District marbled murrelet nesting habitat fluctuations in Zone 1.



Marbled Murrelet Habitat in Zone 2

In Zone 2, marbled murrelet nesting habitat would increase by 2106 from the current condition of 128,000 acres to 198,000 acres under the No Action Alternative, 164,000 acres under Alternative 1, and 146,000 acres under Alternative 3. Under Alternative 2, nesting habitat would decrease approximately 2000 acres by 2106.

Under the No Action Alternative, marbled murrelet nesting habitat would increase in all districts, in Zone 2 by 2106. There would be a decrease in habitat in the shorter term in the Roseburg District in 2026.

Under Alternative 1 overall nesting habitat on BLM-administered lands in the planning area would decline 12% over the next 10 years. Specifically, there would be a 23% decrease in the Coos Bay District and a 5% decrease in the Roseburg District. There would be no change in habitat in the Medford and Salem districts. By 2056, overall nesting habitat in Zone 2 would decline 2%. There would be a decline of 23% in the Coos Bay District, 4% in the Roseburg District, and 20% in the Salem District. Salem would be the only district in which marbled murrelet nesting habitat would decline in Zone 2 in 2106. The decline of 3,000 acres represents 30% of nesting habitat.

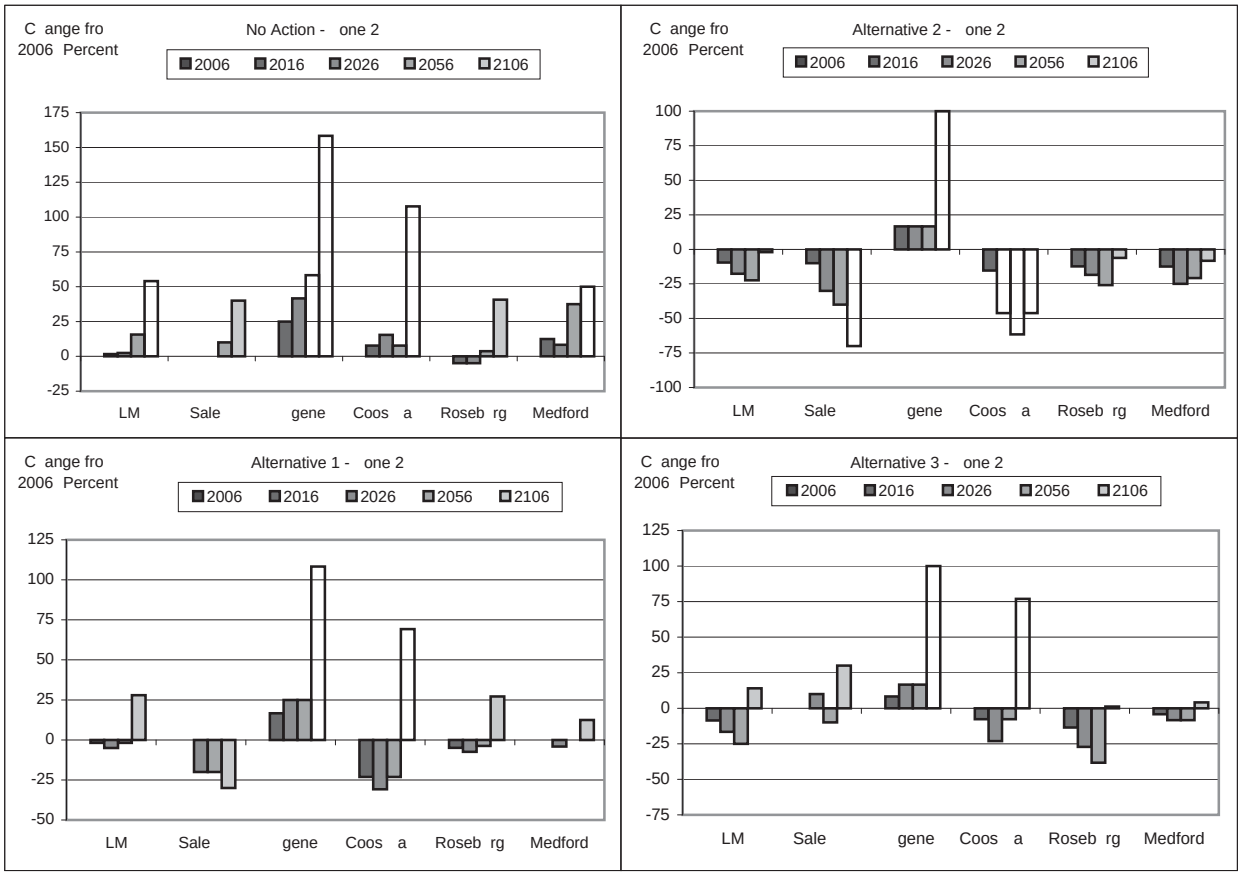
Short-term declines in habitat are important to consider, especially with a threatened or endangered species. This is because the short-term decline of habitat could depress the population abundance to a level from which they may not recover. The larger the short-term decline, the greater the impact to recovery.

Under Alternative 2, there would be less marbled murrelet nesting habitat in Zone 2 in all time periods compared to the current condition in all districts except Eugene. There would be an overall decrease of 22% in 2056 compared to 2006 on BLM-administered lands in the planning area. By 2106, however, there would be an upward trend in the amount of overall habitat in the planning area to the point that there would only be 2% less habitat than in 2006.

Under Alternative 3, overall marbled murrelet nesting habitat on BLM-administered lands in the planning area would increase 14% (18,000 acres) in Zone 2 by 2106. There would be an increase in marbled murrelet nesting habitat in all districts. These increases would range from 1% to 100%. The largest increases in habitat would occur in the Eugene, Coos Bay, and Salem Districts. In the shorter term (by 2056), marbled murrelet nesting habitat would decrease 17% in the first two decades and would decrease 25% by 2056 compared to current conditions. Eugene is the only district in which there would be an increase in marbled murrelet nesting habitat in all time periods.

Figure 234 (*District Marbled murrelet nesting habitat fluctuations in zone 2*) compares habitat fluctuations by district in Zone 2

Figure 234. District marbled murrelet nesting habitat fluctuations in Zone 2.



Patch and Core Area Size

The *Ecology* section of this chapter analyzed the development of patch size over time for the mature and structurally complex forest structural stage classifications. Marbled murrelet habitat includes the mature, structurally complex forest structural stage classification, so the absolute patch sizes would be different, but relative relationships would be similar. In the Coast Range physiographic province, in comparing the current patch size of 111 acres to the patch size that would exist in 2106, the mean patch size of mature and structurally complex forest on BLM-administered lands in the planning area would:

- increase to 338 acres under the No Action Alternative,
- increase to 254 acres under Alternative 1,
- decrease to 101 acres under Alternative 2, and
- decrease to 37 acres under Alternative 3.

Mean core area size would follow the same trends as mean patch size. An increase in the size of core areas would indicate that more nesting opportunities further from edge habitat would develop. This would result in a decrease in potential nest predation.

Edge density would increase under all alternatives. The increase compared to the current condition of 54 feet per acre would range from 72 feet per acre under the No Action Alternative to 96 feet per acre under Alternative 3. Potential nest predation increases with increased forest fragmentation and the amount of edge (Raphael et al. 2002a and 2002b, Meyer et al. 2002).

In the Klamath province, in comparing the current patch size of 137 acres to the patch size that would exist in 2106, the mean patch size of mature and structurally complex forest on BLM-administered lands in the planning area would:

- increase to 192 acres under the No Action Alternative,
- decrease to 91 acres under Alternative 1,
- decrease to 79 acres under Alternative 2, and
- decrease to 27 acres under Alternative 3.

Edge density would increase under all alternatives. The increase compared to the current condition of 62 feet per acre, would range from 73 feet per acre under Alternative 2 to 91 feet per acre under Alternative 3.

The quantity of marbled murrelet nesting habitat on BLM-administered lands in the planning area would increase under all alternatives, in 100 years. In the shorter term (50 years), there would be decreases in the quantity of marbled murrelet nesting habitat under Alternatives 2 and 3.

The quality of marbled murrelet nesting habitat (as measured by patch and core area size and edge density) would vary under the alternatives.

Under the No Action Alternative, long term patch and core area size increases in mature and structurally complex stands in the Coast Range and Klamath provinces would indicate improving habitat conditions for the marbled murrelet. The increase in core area size would offset increases in edge density. Edge density would only become a limiting factor when core area sizes remain the same. There would also be an increase in overall marbled murrelet nesting habitat.

Under Alternative 1, long term patch size and core area size increases in mature and structurally complex stands in the Coast Range province would indicate improving habitat conditions. In the Klamath province, considering increases in the quantity of marbled murrelet nesting habitat and a decrease in patch size area, habitat conditions would be maintained.

Under both the No Action Alternative and Alternative 1, short term impact to available nesting habitat would be nonexistent or small (less than 5% available habitat).

Under Alternatives 2 and 3 in Coast Range and Klamath provinces, a decline in habitat conditions would be expected given decreased patch size, decreased core area, increasing edge density, and decreases in nesting habitat over the next 50 years.

Deer

The Douglas County population segment of the Columbian white-tailed deer would continue to be managed on the North Bank Habitat Management Area in accordance with the habitat management plan (BLM 2001c).

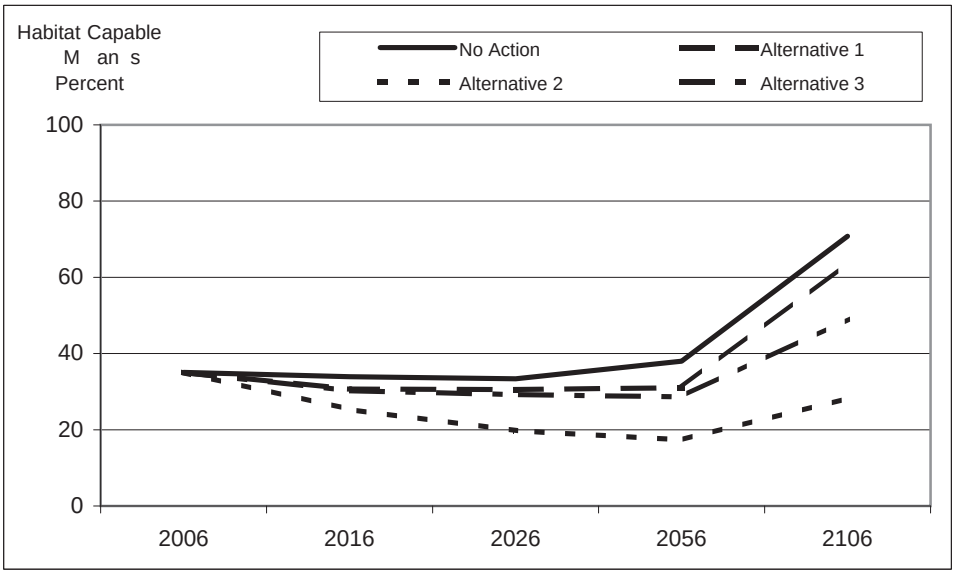
Management that converts forest from the mature and structurally complex forest structural stages to the stand establishment stage would result in the loss of winter cover. This would occur only in those stands located adjacent to the valley bottom habitats utilized as foraging habitat. Under all alternatives, there would be incidental impacts to the Columbian white-tailed deer commensurate with the amount of regeneration harvest activities that would occur and the amount of mature and structurally complex forest habitat located adjacent to occupied valley bottomlands.

Management of the BLM's forests that are adjacent to the Umpqua Valley and Columbia River, where the deer are located, would have little impact on the survival of the species. This is because the recovery of the Douglas County population is tied to the presence of secure valley habitat and not the upland coniferous forest where timber harvest under the alternatives would occur. The recovery of the Columbia River population is tied to habitat conditions on the Julia Butler Hansen National Wildlife Refuge and surrounding valley bottom habitat.

Mule deer and black-tailed deer occur across BLM-administered lands within the planning area. Specific limited habitat includes important wintering areas and areas that provide summer thermal cover. There are 26 such designated deer habitat management areas (See *Wildlife* section of Chapter 3). Stable thermal conditions and summer thermal habitat are provided by mature, multiple canopy and structurally complex structural stage classifications. Five of the 26 deer habitat management areas (approximately 30,000 acres) would be designated to provide summer thermal cover in the Coos Bay District. With the exception of Alternative 2, all other alternatives would exhibit little change in these habitat management units until 2056. Thermal cover, primarily a function of stand age, would develop predominantly after 50 years. See *Figure 235* (*Average summer thermal habitat availability on deer habitat management units in the Coos Bay District*). These five habitat management areas would have stable to increasing levels of thermal habitat under the No Action Alternative and Alternatives 1 and 3. All habitat management areas would develop at least 50% thermal cover under the No Action Alternative and Alternative 1. Four out of five habitat management areas would remain stable or decline up to 28% in available thermal cover under Alternative 2.

Other habitat factors include core area size (or distance from edge) and open road density on BLM-administered lands. Habitat models indicate that cover values increase with distance from the edge and decrease with increasing density of open roads open to vehicles. Compounding the effects of decreasing thermal cover under Alternatives 2 and 3 are the decreasing patch size, and core area size of thermal cover (mature or structurally complex forests) from the current condition in the Coast Range, on BLM-administered lands (see the *Ecology* section in this chapter for complete analysis of patch size).

Figure 235. Average summer thermal habitat availability on the deer habitat management units in the Coos Bay District.*



* Expressed as a percentage of the habitat-capable BLM-administered lands (n=5).

There would be 21 deer habitat management areas totaling 191,000 acres designated as winter habitat areas in the Medford District and the Klamath Falls Resource Area. These deer habitat management areas would provide areas of adequate forage habitat and limited disturbance.

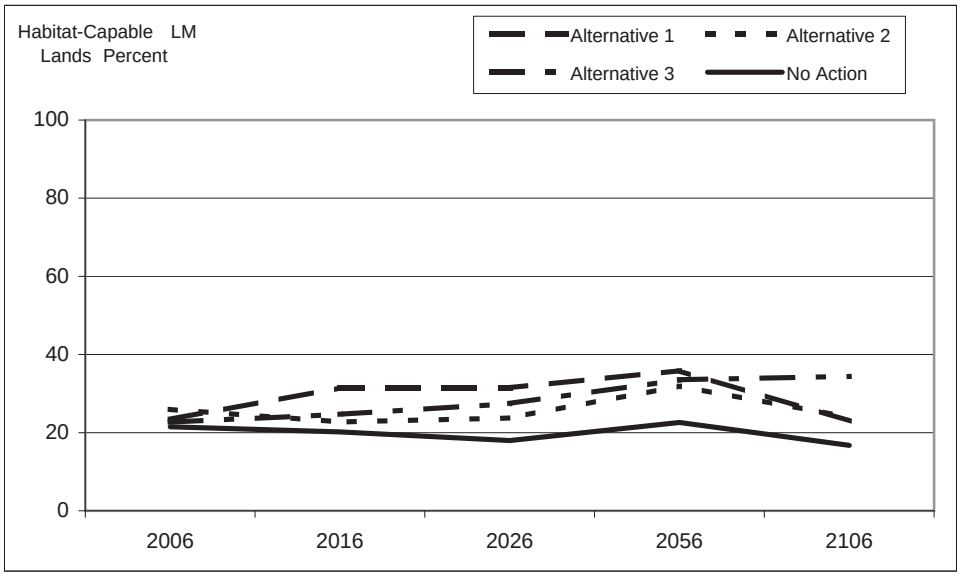
There are 12 of the 21 areas within the western part of the planning area. The amount of forage habitat would remain relatively stable or slightly decrease under all alternatives. On average, the alternatives would vary no more than 11% as shown in *Figure 236* (*Percent of foraging habitat availability on the deer habitat management units in the Medford District and Klamath Falls Resource Area*). Factors affecting the quality of foraging habitat include:

- Fuels treatment after harvesting and its effects on the resulting vegetation.
- Size of the forage units. Deer use would decrease with an increased distance from hiding cover.
- Disturbance caused by vehicles. Forage habitat quality would decrease with increasing density of roads open to vehicular traffic.

The creation of foraging habitat would occur as a result of regeneration harvests. Forest stands would remain in the stand establishment phase and provide foraging habitat for up to two or three decades following regeneration harvest. Non-forested areas would provide stable background levels of foraging habitat.

Under the No Action Alternative, the amount of foraging habitat would decrease from the current condition up to 16 % on nine deer habitat management areas in western Oregon. Under Alternatives 1 and 2, foraging habitat would decrease 16% on six areas and 32% on five areas. Alternative 3 would increase the amount of foraging habitat up to 36% in 10 management areas.

Figure 236. Percent of foraging habitat availability on the deer habitat management units in the Medford District and Klamath Falls Resource Area

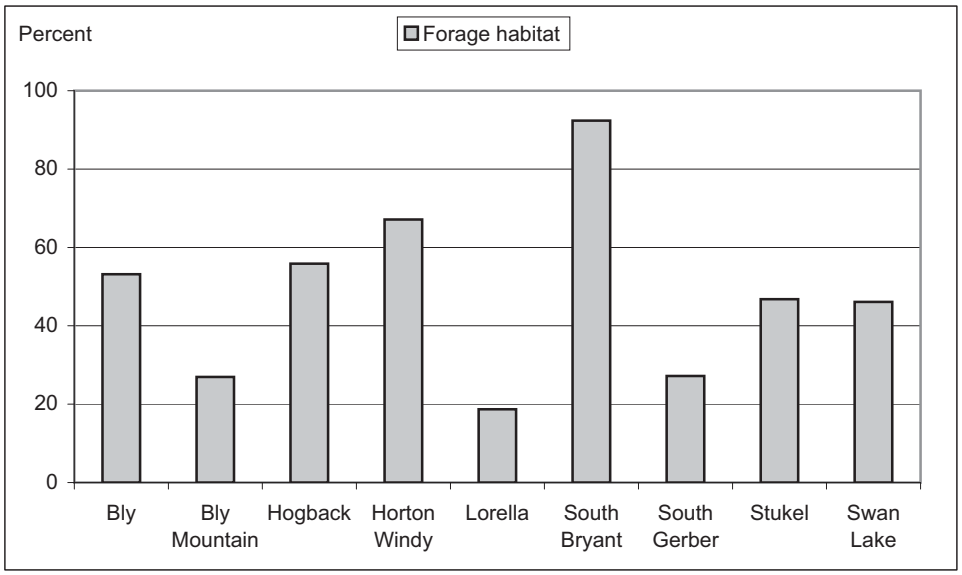


Note: Does not include eastside management lands.

There are 9 of the 21 deer habitat management areas on eastside management lands in the Klamath Falls Resource Area. Forests in those areas would be managed with an uneven-aged management regime under all alternatives. It is assumed that the overall distribution of forest structural stages would not change in this area as a result of uneven-aged management. Current conditions on these eastside management lands vary from approximately 20 to 90 % foraging habitat as shown in *Figure 237* (*Percent of foraging habitat in deer habitat management areas on eastside management lands in the Klamath Falls Resource Area*).

Foraging habitat would be created as harvested stands regenerate, but would not persist as long as foraging habitat created under even-aged management. This is because the openings created to regenerate the stand would be much smaller. Intensive forest management on intermingled private forestlands would provide more foraging habitat per unit area than BLM-administered lands, because the foraging habitat would last longer.

Figure 237. Percent of foraging habitat in Deer Habitat Management Areas on eastside management lands in the Klamath Falls Resource Area.



The standard for density of roads that are open is 1.5 miles per square mile in deer habitat management areas. Under all alternatives, road density on BLM-administered lands within the habitat management areas would vary from 4.65 to 0.56 miles per square mile. When considering roads that are open, the density varies from 4.12 to 0.26 miles per square mile as shown in *Table 196* (*Current road density on BLM-administered lands within deer habitat management units*).

There are twelve deer habitat management areas currently exceed the 1.5 mile standard of which seven are important deer wintering areas**.** Up to 65% of all existing, open roads in some deer habitat management areas would be seasonally restricted to meet these objectives.

Table 196. Current road density on BLM-administered lands within deer habitat management units

Deer habitat management area	District	Road density (mi/mi^2)		Miles of road closures to meet standard	
		Open Roads	All Roads	(mile)	(%)
Camp Creek	Coos Bay	3.02	3.70	29.9	50
Edson Butte	Coos Bay	1.55	3.34	0.35	4
Millicoma Tree Farm N Edge	Coos Bay	4.12	4.21	2.56	65
Millicoma Tree Farm NE Edge	Coos Bay	2.98	4.15	14.09	49
Rock Creek	Coos Bay	3.82	4.65	24.91	61
Bly	Klamath Falls	1.39	1.39		
Bly Mt	Klamath Falls	1.42	1.42		
Hogback	Klamath Falls	0.98	0.98		
Horton Windy	Klamath Falls	1.09	1.09		
Keno Worden	Klamath Falls	1.38	1.38		
Lorella	Klamath Falls	0.94	0.94		
South Bryant	Klamath Falls	1.55	1.55	0.14	2
South Gerber	Klamath Falls	0.64	0.64		
Stukel	Klamath Falls	1.13	1.13		
Swan Lake	Klamath Falls	0.64	0.56		
Topsy Pokegama	Klamath Falls	2.92	3.54	30.25	48
Little Applegate	Medford	1.30	1.99		
Little Butte Creek South[b]	Medford	1.12	2.26		
		0.26	1.64		
Burnt Creek	Medford	0.59	1.62		
Elk Creek	Medford	3.33	4.02	54.53	55
Salt Creek	Medford	2.00	2.50	13.79	25
Shady Cove West	Medford	1.61	1.78	1.33	7
Camel Hump	Medford	1.47	1.94		
Williams	Medford	2.74	4.34	56.54	45
DHMA Monument East	Medford	1.58	3.03	1.29	5
DHMA Monument West	Medford	0.52	2.10		
Total All DHMAs		1.83	2.53	129.5	18

An estimated 12 miles of new, permanent roads would be constructed over the next 10 years in 23 deer habitat management areas under the No Action Alternative, along with and 25, 22, and 21 miles under Alternatives 1, 2, and 3 (respectively). This would slightly increase road densities in the deer habitat management areas under all alternatives. As shown in the shaded area of *Table 197*, 18 deer habitat management units would exceed the standard of 1.5 miles per square mile. There are 13 of these 18 that are designated for winter range.

Table 197. Road densities by 2016 for deer habitat management areas

Deer Habitat Management Area	District	Projected Road Density (all roads) (mi/mi^2)			
		No Action	Alt 1	Alt 2	Alt 3
Camp Creek	Coos Bay	3.79	3.88	3.93	3.78
Edson Butte	Coos Bay	3.38	3.37	3.44	3.37
Millicoma Tree Farm N Edge	Coos Bay	4.80	4.45	4.44	4.44
Millicoma Tree Farm NE Edge	Coos Bay	4.15	4.22	4.16	4.38
Rock Creek	Coos Bay	4.89	5.07	5.01	4.80
Bly	Klamath Falls	1.42	1.42	1.42	1.42
Bly Mt	Klamath Falls	1.45	1.45	1.45	1.45
Hogback	Klamath Falls	1.07	1.07	1.07	1.07
Horton Windy	Klamath Falls	1.09	1.09	1.09	1.09
Keno Worden	Klamath Falls	1.41	1.43	1.40	1.44
Lorella	Klamath Falls	0.94	0.94	0.94	0.94
South Bryant	Klamath Falls	1.53	1.53	1.53	1.53
South Gerber	Klamath Falls	0.65	0.65	0.65	0.65
Stukel	Klamath Falls	1.14	1.14	1.14	1.14
Swan Lake	Klamath Falls	0.70	0.70	0.70	0.70
Topsy Pokegama	Klamath Falls	3.57	3.54	3.56	3.56
Burnt Peak	Medford	1.60	1.61	1.66	1.60
Camel hump	Medford	1.94	2.03	2.04	1.99
Elk Creek	Medford	4.05	4.09	4.17	4.19
Little Applegate	Medford	2.03	2.07	2.06	2.06
DHMA Monument East	Medford	3.02	3.02	3.02	3.02
DHMA Monument West	Medford	2.11	2.12	2.11	2.11
Little Butte Creek South	Medford	2.27	2.29	2.31	2.35
		1.66	1.68	1.67	1.69
Salt Creek	Medford	2.55	2.60	2.60	2.58
Shady Cove West	Medford	1.78	1.84	1.92	1.91
Williams	Medford	4.37	4.56	4.49	4.58
Total for all areas		2.57	2.61	2.62	2.62

Under all alternatives, off-highway vehicles travel would be limited to designated roads and trails. These limitations, along with the closure of roads in deer management areas, would limit the amount of disturbance caused to wintering animals. Reduced disturbance would decrease the amount of unnecessary movements animals would make and therefore would reduce energy expenditure. Additionally, road closures would result in more available foraging habitat since animals would not need to shift away from frequently used roads and trails.

Assuming that winter forage was the only limiting factor to population growth, population numbers in deer habitat management areas in the Klamath Falls Resource Area and Medford District would increase in response to newly created or newly available forage areas.

By 2056, available forage habitat and deer population responses under the No Action Alternative would remain stable. Under the action alternatives, available foraging habitat and populations would increase approximately 50 %.

By 2106, Alternative 3 would increase available forage habitat and deer population responses by almost 50%. Under Alternatives 1 and 2, habitat and populations would remain stable. Under the No Action Alternative, habitat and populations would decrease approximately 25%.

In the Coos Bay District, winter road closures would not have any effect on the five deer habitat management areas since these areas were created for summer thermal protection. Road density is projected to increase under all alternatives and would cause corresponding increases in deer disturbance within patches of thermal cover.

The No Action Alternative and Alternatives 1 and 3 would create additional mature-multiple canopy and structurally complex forest stands capable of providing summer thermal habitat and would therefore result in a corresponding increases in deer populations. This is based on the assumption that summer thermal cover is the only limiting factor.

Mitigation could be applied that would mitigate increased road densities in the deer habitat management areas that exceed the 1.5 miles of open road per square mile standard on the Coos Bay District. Any new roads on BLM-administered lands in deer habitat management areas should be temporary rather than permanent. Where there are no reciprocal rights-of-way, existing roads could be closed or seasonal closures could be applied to BLM-administered roads. Sufficient closures would be necessary to achieve a density of 1.5 miles of open road per square mile, on BLM-administered lands. Summer seasonal restrictions would need to be applied between May 1 and August 31.

Elk

There are 16 elk habitat management areas on BLM-administered lands (see the *Wildlife* section of Chapter 3). These areas provide specific limited habitat needs for elk. Specific limited habitat includes important wintering areas and areas that provide summer thermal cover. Elk forage on grasses, forbs, shrubs, and trees species that are characteristic of the nonforest or stand establishment forest structural stage classifications. Additional forage (lichens) would be found in older structural stages. Stable thermal conditions and summer thermal habitat are provided by stands in the mature, multiple canopy or structurally complex forest structural stage classifications.

Five of the 16 elk habitat management areas (approximately 30,000 acres) would be designated to provide summer thermal cover in the Coos Bay District.

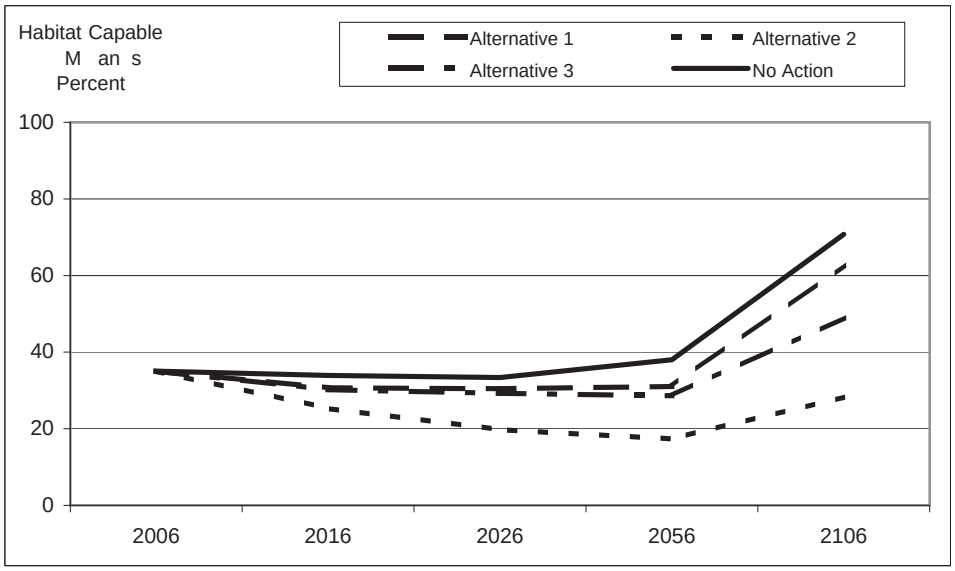
Under the No Action Alternative and Alternatives 1 and 3, thermal cover would increase or remain stable in all elk habitat management areas in the Coos Bay District.

On average, the No Action Alternative would increase thermal cover from 35 to 71 % compared to existing conditions while Alternative 1 would increase it to 63 %, and Alternative 3 would increase it to 49 %. See *Figure 238* (*Average summer thermal habitat availability on the elk habitat management units in the Coos Bay District*) for how summer thermal habitat would change over time.

Under Alternative 2, thermal cover would remain stable or decrease in four of five elk habitat management areas. The amount would average between the current amount of 35% to a low of 28%.

Other habitat factors include core area size (or distance from edge) and open road density. Habitat models indicate that cover value increases from the edge up to 200 yards into the stand. Cover value decreases with increasing density of roads that are open to vehicles (Wisdom et al. 2004). Thermal cover patch size on BLM-administered lands would increase by 2106 under the No Action Alternative and Alternative 1 and would decrease under Alternative 2 and 3. See discussion of patch size in the *Ecology* section of this chapter.

Figure 238. Average summer thermal habitat availability on the elk habitat management units in the Coos Bay District



Under all alternatives, nine elk habitat management areas (totaling 123,700 acres) would be designated in areas of important winter habitat in the Medford District.

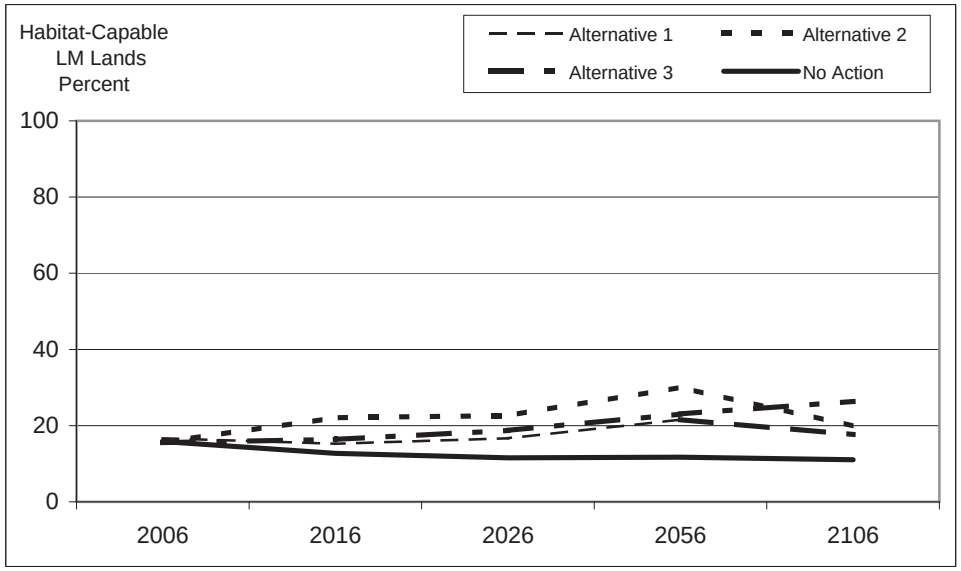
Following are several factors that affect the quality of elk foraging habitat:

- The affect to vegetation of fuels treatment after harvesting.
- The size of the forage units. Elk use would decrease with increased distance (greater than 100 yards) from hiding cover (Wisdom et al. 2004).
- The disturbance caused by vehicles. Forage habitat quality would decrease with increasing density of roads open to vehicular traffic (Wisdom et al. 2004).

The creation of foraging habitat would occur as a result of regeneration harvests. Forest stands would remain in the stand establishment phase and provide foraging habitat for up to two to three decades following regeneration harvest. The differences between alternatives would be a result of regeneration harvests and partial harvests that would create the stand establishment forest structural stage classification. Nonforested areas would provide stable background levels of foraging habitat. Intensive forest management on intermingled private forestlands would provide additional foraging habitat. It is assumed that the amount of forage habitat on privately owned commercial forest lands would remain approximately the same over time.

Forage habitat would vary little across the alternatives. Foraging habitat would increase from the current condition of 16% to 18% under Alternatives 1, to 20% under Alternative 2, and to 26% under Alternative 3. Forage habitat would decrease to 11% under the No Action Alternative. *Figure 239* (*Average foraging habitat on the elk habitat management units in the Medford District*) shows how the habitat would change over time.

Figure 239. Average foraging habitat on the elk habitat management units in the Medford District



Two elk management areas (totaling 5600 acres) in the Salem District would limit the disturbances caused by roads and off-highway vehicles. As shown in *Table 198* (*Current road density on BLM-administered lands within elk habitat management units*), the density of roads that are open in these areas ranges from 0.92 and 0.24 miles per square mile. The density of all roads ranges from 2.11 miles per square mile to 2.78 miles per square mile. New permanent road construction would range from 0.3 miles under the No Action Alternative to 1.3 miles under Alternative 3.

New roads would raise the density of roads in the Luckiamute elk management area. Road density would increase from 2.11 miles of road per square mile to 2.12 miles under the No Action Alternative, to 2.15 miles under Alternative 1, to 2.13 miles under Alternative 2, and to 2.32 miles under Alternative 3. The new roads would also raise road densities in the Bummer Ridge elk management area. Road density would increase from

2.78 miles of road per square mile to 2.83 miles under the No Action Alternative, to 2.90 miles under Alternative 1, to 2.99 miles under Alternative 2, and to 2.88 miles under Alternative 3.

Under all alternatives, there would be a road density target of 1.5 miles of roads that are open to vehicles per square mile of BLM-administered lands within the habitat management areas designated for winter habitat in the Medford District. As shown in *Table 198* (Current *road density on BLM-administered lands within elk habitat management units*)**,** road densities on BLM-administered lands in these areas vary from 4.71 to 1.62 miles per square mile. Road densities for the roads that are open vary from 4.12 to 0.24 miles per square mile Twelve elk habitat management areas currently exceed the 1.5 mile standard. Seven of these areas, occurring in the Medford District, are important elk wintering areas. Up to 65% of all roads that are open in some elk habitat management areas would need to be seasonally restricted to meet the road density target.

Table 198. Current road density on BLM-administered lands in elk habitat management units

Elk Habitat Management Area	District	Road density (mi/mi²)		Amount of road closure necessary to meet density targets	
		Open Roads	All Roads	(miles)	(%)
SALT CREEK	Medford	2.01	2.52	13.93	25
CAMEL HUMP	Medford	1.47	1.94		
SHADY COVE WEST	Medford	1.81	1.79	1.33	7
BURNT PEAK	Medford	0.59	1.62		
ELK CREEK	Medford	3.33	4.02	54.38	55
PEAVINE	Medford	1.92	2.82	17.55	22
FAR OUT	Medford	2.42	3.57	12.74	38
ELK VALLEYI	Medford	3.46	4.71	43.81	57
MULE CREEK	Medford	1.77	3.63	8.26	15
CAMP CREEK	Coos Bay	3.02	3.7	29.9	50
MILLICOMA TREE FARM NE EDGE	Coos Bay	2.98	4.16	14.09	49
MILLICOMA TREE FARM N EDGE	Coos Bay	4.12	4.21	2.56	65
ROCK CREEK	Coos Bay	3.82	4.65	24.91	61
EDSON BUTTE	Coos Bay	1.55	3.34	0.35	4
LUCKIAMUTE	Salem	0.92	2.11		
BUMMER RIDGE	Salem	0.24	2.78		
Total ALL EHMAS		2.35	3.34	212.2	36

An estimated 18.6 miles of new, permanent road would be constructed in the first decade in 15 elk habitat management areas under the No Action Alternative, 38.5 miles would be constructed Under Alternative 1, 43.0 miles under Alternative 2, and 32.6 miles under Alternative 3 This would slightly increase road densities in all elk habitat management areas under all alternatives. All elk habitat management areas would exceed the road

density target of 1.5 miles per square miles as shown in *Table 199 (Road densities in 2016 for all elk habitat management areas).*

Table 199. Road densities in 2016 for all elk habitat management areas

Elk Habitat Management Area	District	Projected Road density (all roads) (mi/mi^2)			
		No Action	Alt 1	Alt 2	Alt 3
SALT CREEK	Medford	2.56	2.62	2.62	2.60
CAMEL HUMP	Medford	1.94	2.03	2.04	1.99
SHADY COVE WEST	Medford	1.78	1.84	1.92	1.92
BURNT PEAK	Medford	1.60	1.61	1.66	1.60
ELK CREEK	Medford	4.03	4.08	4.16	4.18
PEAVINE	Medford	2.86	2.89	2.87	3.00
FAR OUT	Medford	3.61	3.77	3.92	3.81
ELK VALLEY	Medford	4.87	5.01	4.95	4.79
MULE CREEK	Medford	3.83	3.96	3.95	3.77
CAMP CREEK	Coos Bay	3.80	3.88	3.96	3.79
MILLICOMA TREE FARM NE EDGE	Coos Bay	4.14	4.14	4.14	4.14
MILLICOMA TREE FARM N EDGE	Coos Bay	4.89	5.35	4.59	6.99
ROCK CREEK	Coos Bay	4.89	5.07	5.01	4.80
EDSON BUTTE	Coos Bay	3.38	3.37	3.44	3.37
LUCKIAMUTE	Salem	2.12	2.15	2.13	2.32
BUMMER RIDGE	Salem	2.83	2.90	2.99	2.88
Total All Areas		3.41	3.49	3.51	3.47

Under all alternatives, off-highway vehicles travel would be limited to designated roads and trail. These limitations along with the closure of roads in elk management areas would limit the amount of disturbance and risks of poaching. Reduced disturbance would decrease the amount of unnecessary movements animals would make and therefore would reduce energy expenditure. Additionally, road closures would result in more available foraging habitat since animals would not need to shift use away from frequently used roads and trails.

Assuming that winter forage was the only limiting factor to population growth, population numbers in elk habitat management areas in the Medford District would increase in response to newly created or newly available forage areas.

By 2056, available forage habitat and elk population responses under the No Action Alternative would decrease by 25%. Available foraging habitat and populations would increase by 37% under Alternative 1, would increase by 87% under Alternative 2, and would increase by 43% under Alternative 3.

By 2106, the No Action Alternative would decrease available forage habitat and deer population responses by 30%. Under Alternative 1, habitat and populations would remain stable. Under Alternative 2, habitat and populations would increase by 25%. Under Alternative 3 habitat and populations would increase by almost 62%.

Winter road closures would not have any effect on the elk habitat management areas in the Coos Bay and Salem districts since these areas were created for summer thermal protection and year-round protection from disturbance. An increase in the density of roads that are open would result in decreased use of cover and forage habitat adjacent to those roads.

The No Action Alternative and Alternatives 1 and 3 would create additional mature-multiple canopy or structurally complex forest structural classifications capable of providing summer thermal habitat and would result in an increase in elk populations. This assumes that summer thermal cover is the only limiting factor to population growth.

Mitigation could be applied that would mitigate adverse effects due to increased road densities in the Coos Bay and Salem districts. Any new roads on BLM-administered lands in elk habitat management areas should be temporary rather than permanent. Where there are no reciprocal rights-of-way, existing roads could be closed or seasonal closures could be applied to BLM-administered roads. Sufficient closures would be necessary to achieve a density of 1.5 miles of open road per square mile, on BLM-administered lands. Summer seasonal restrictions would need to be applied between May 1 and August 31.

Bald Eagle

There are approximately 1,630,000 acres of BLM-administered land capable of growing bald eagle nesting and roosting habitat within the planning area (those forest-capable lands within 4 miles of foraging waters). Approximately 800,000 acres are currently providing bald eagle nesting and roosting habitat. There are 3,600 miles of stream and 291,000 acres of pond and lakes which have been identified as bald eagle foraging habitat.

As shown in *Figure 240* (*Bald eagle nesting and roosting habitat development under the alternatives*), under the No Action Alternative, bald eagle nesting and roosting habitat would increase from approximately 800,000 acres to 1,290,000 acres by 2106. Under Alternative 1, this habitat would increase to 1,150,000 acres. Approximately 965,000 and 1,000,000 acres of eagle nesting and roosting habitat would develop by 2106 under Alternatives 2 and 3 respectively.

Eastside management lands in the Klamath Falls Resource Area contain approximately 50,000 acres of bald eagle nesting and roosting habitat; approximately 31% of the available lands within 4 miles of assumed foraging habitat. Uneven-aged management (under all of the alternatives) would not change the availability of bald eagle nesting and roosting habitat. Since management of these lands does not change under any of the alternatives, they will not be discussed further.

Figure 240. Bald eagle nesting and roosting habitat development under the alternatives

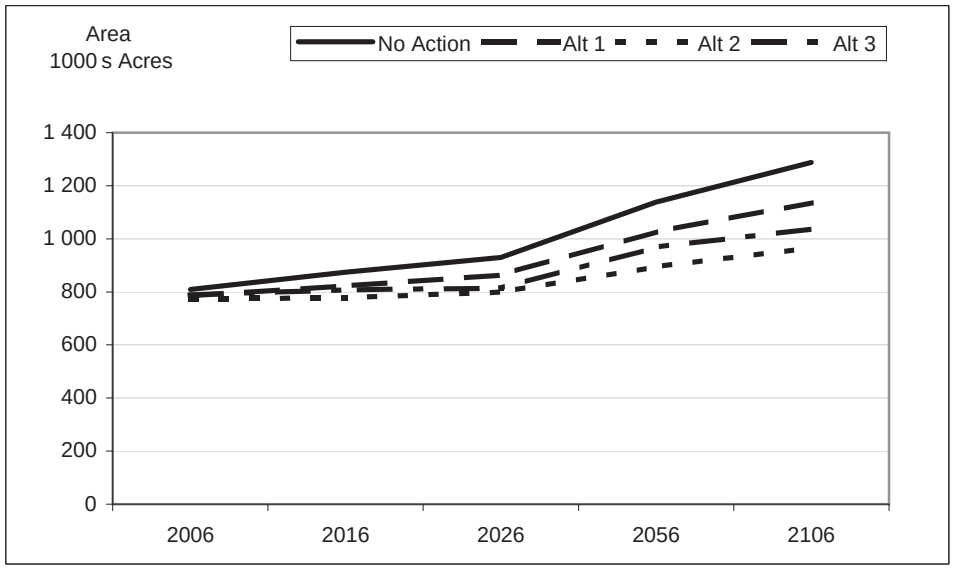
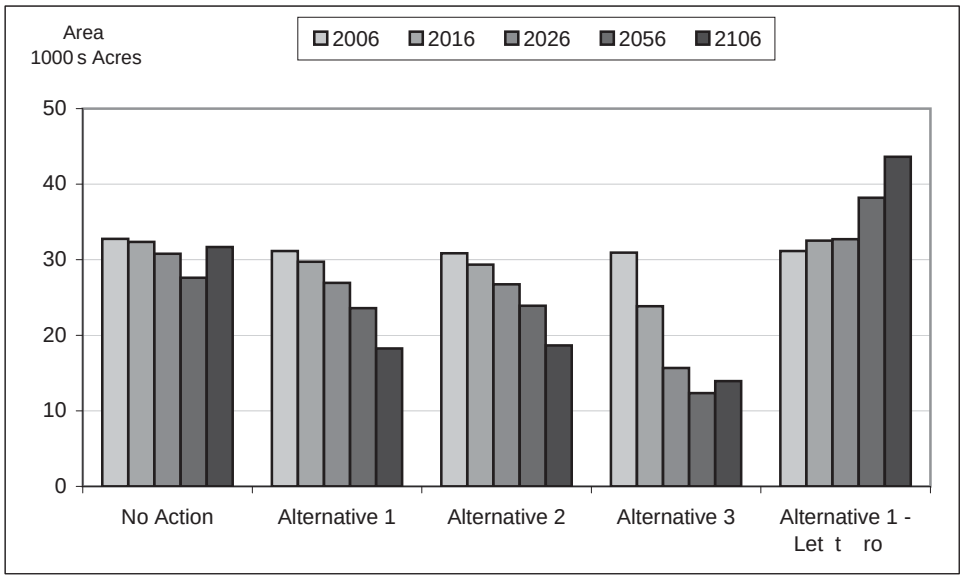


Figure 241 (*Summary of bald eagle nesting and roosting habitat development in the west-side of the Klamath Falls Resource Area*) shows how bald eagle nesting and roosting habitat changes over time on the west-side lands of the Klamath Falls Resource Area. Bald eagle nesting and roosting habitat would remain relatively stable or decrease in 100 years. The amount of habitat would change from the current condition of 31,000 acres to:

- 31,500 acres under the No Action Alternative,
- 18,000 acres under Alternative 1,
- 19,000 acres under Alternative 2, and
- 14,000 acres under Alternative 3.

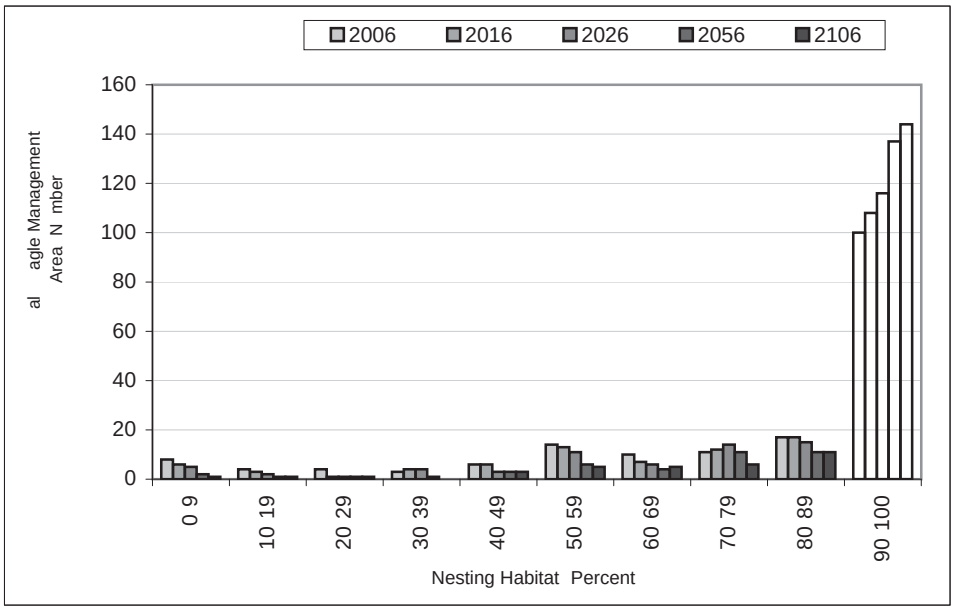
Over 100 years, bald eagle nesting and roosting habitat would decline under Alternatives 1 and 2 due to lower site classes on the forests of the Klamath Falls Resource Area and a lack of retention trees in the harvest units. Both of these factors decrease the rate at which habitat would recover from timber harvest activities. Under Alternative 3, uneven-aged management coupled with the higher rate of stand entry would cause a higher rate of habitat loss compared to the other alternatives. Uneven-aged management would remove trees equally from all size classes and stands would be entered more frequently. Structural stage development may be delayed or reversed depending on the resultant numbers of large diameter trees and how they compare against structural stage thresholds. Under Alternative 3 the amount of available nesting and roosting habitat would stabilize around 13,000 acres in the west-side of the Klamath Falls Resource Area.

Figure 241. Summary of bald eagle nesting and roosting habitat development in the west-side of the Klamath Falls Resource Area



Under all alternatives, occupied bald eagle nest sites, historic sites, potential sites and wintering and congregation areas would be protected. Under all alternatives, the only management activity that would occur in bald eagle management areas would be treatments to lower fire risk and thinning to foster the development of large trees. All bald eagle management areas would increase in the amount of available eagle nesting and roosting habitat (see *Figure 241)*. In 2106, 144 bald eagle management areas (out of a total of 177) would contain more than 90% suitable nesting and roosting habitat. This is an increase of 44% from the current condition of 100 bald eagle management areas that contained more than 90% nesting and roosting habitat as shown in *Figure 242* (*A histogram illustrating the abundance and development of bald eagle nesting and roosting habitat in bald eagle management areas*). Under the bald eagle recovery plan, the BLM activities that would disturb nesting bald eagle would be restricted during critical nesting periods (1 January – 31 August).

Figure 242. A histogram illustrating the abundance and development of bald eagle nesting and roosting habitat in bald eagle management areas



Under all alternatives, in the Salem, Eugene, Coos Bay, Roseburg and Medford districts, current or higher levels of eagle nesting and roosting habitat would be maintained. This would provide ample opportunities for the movement of existing bald eagle pairs and the addition of new sites. Under all alternatives, in the Klamath Falls Resource Area, nesting and roosting habitat would decline and the opportunities for additional nest sites on BLM-administered lands would diminish. BLM-administered lands account for 16% of all the federal lands within the Klamath Falls Resource Area. Although habitat would decline in the Klamath Falls Resource Area, the bald eagle population in the Klamath Basin is increasing (Anthony and Isaacs 2007). The Bald Eagle Protection Act would provide protection for sites on both federal and private lands. Monitoring indicates increasing population and productivity numbers (Anthony and Isaacs 2007) and under all alternatives available nesting and roosting habitat would be stable or would increase.

Measures could be implemented to mitigate the decrease in nesting and roosting habitat in the Klamath Falls Resource Area. These measures include maintaining all trees greater than forty inches in diameter at breast height in all stands within 4 miles of bald eagle foraging habitat.

Fisher

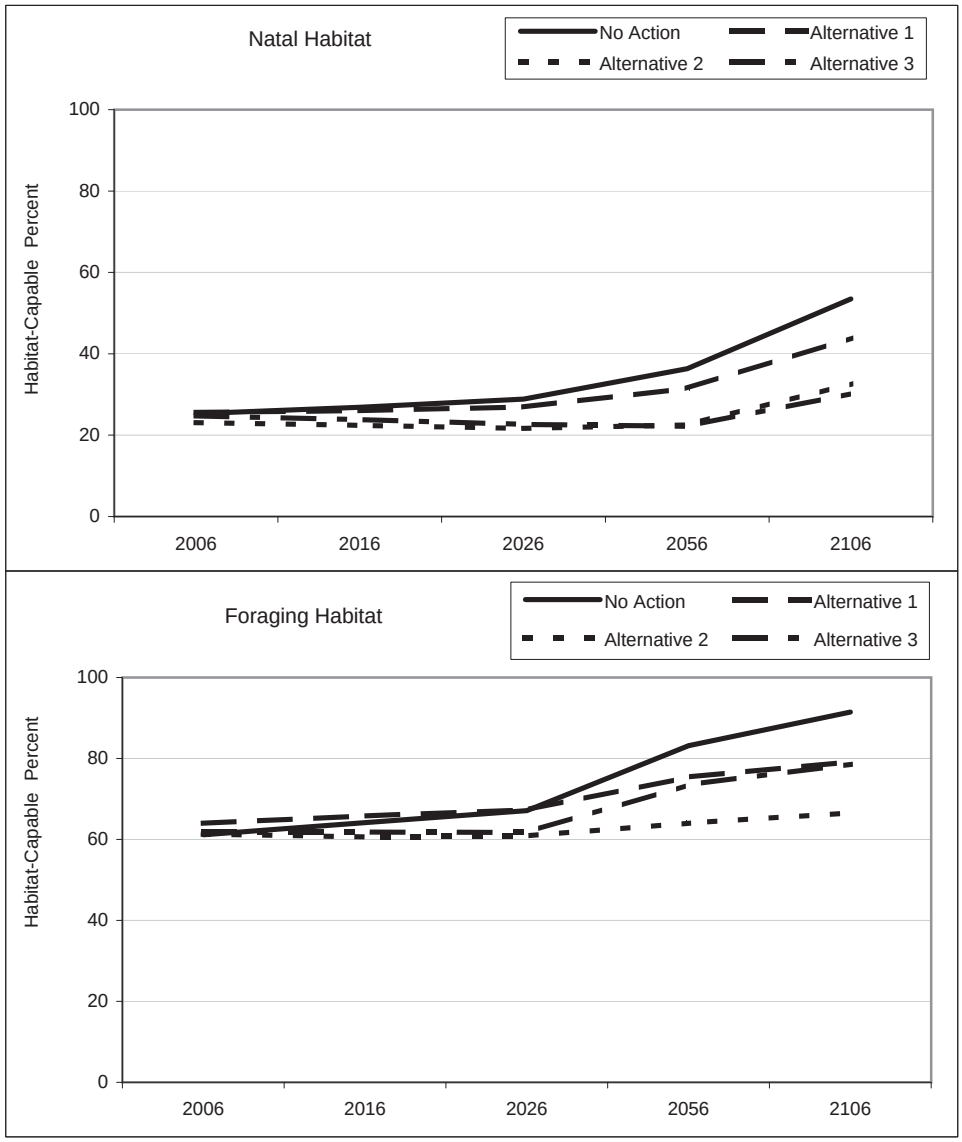
Fisher historically ranged throughout BLM-administered lands within the planning area. The only remaining recognized population centers are in the southern Cascade Mountains and the northern Siskiyou Mountains of the Medford District. The fisher selects habitat based on factors measured at the home-range scale or higher and are strongly associated with forest cover (Carroll et al. 1999). There are currently 560,000 acres of natal habitat on BLM-administered lands within the planning area (25% of breeding habitat-capable lands) and 1,354,000 acres (61%) of foraging habitat (includes overlap with natal habitat).

Table 200. Available fisher natal and foraging habitat on BLM-administered lands within the planning area

Alternative	Habitat-capable (ac)	Natal habitat (percent of habitat-capable)				
		2006	2016	2026	2056	2106
No Action	2,197,000	25	27	29	37	54
Alt 1	2,197,000	25	25	26	30	42
Alt 2	2,197,000	25	22	22	23	33
Alt 3	2,197,000	25	24	23	22	30
		Foraging Habitat (percent of habitat-capable)				
No Action	2,197,000	62	65	68	84	92
Alt 1	2,197,000	62	63	65	73	76
Alt 2	2,197,000	62	61	61	64	67
Alt 3	2,197,000	62	62	62	74	79

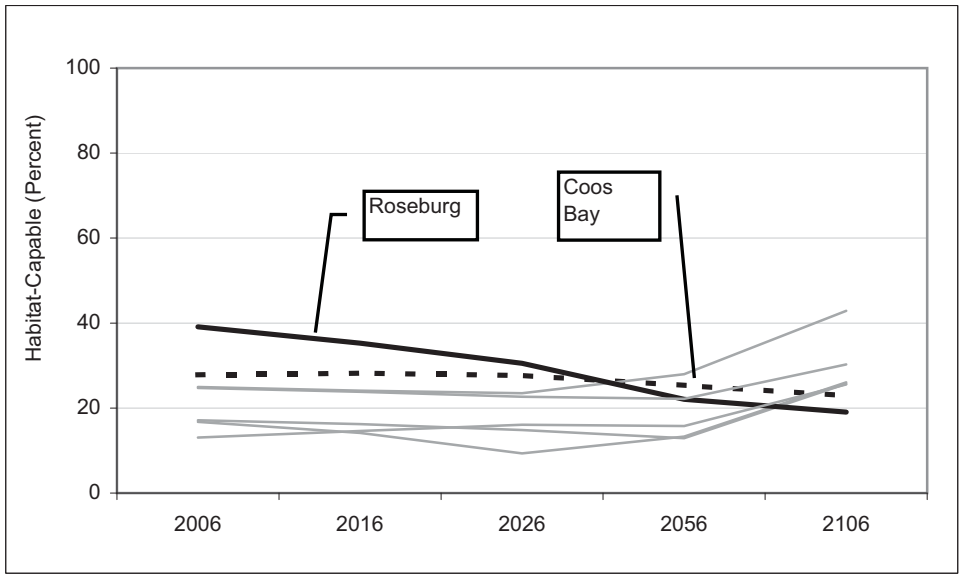
Across BLM-administered lands, within the planning area, fisher natal habitat would increase under all alternatives as shown in *Figure 243* (*Fisher natal and foraging habitat summarized for BLM-administered land within the planning area*) and *Table 200 (Available fisher natal and foraging habitat on BLM-administered lands within the planning area)*. The No Action Alternative would increase habitat to 53% of habitat-capable acres while Alternatives 1, 2, and 3 would increase habitat to 44, 33, and 30%, respectively.

Figure 243. Fisher natal and foraging habitat summarized for BLM-administered lands within the planning area



Natal habitat would decrease under Alternative 3 from 395 to 19% in the Roseburg District and from 285 to 23 % in the Coos Bay District as shown in *Figure 244* (*Abundance of fisher natal habitat under Alternative 3*). This is due to the increase in the areas of partial and regeneration harvesting in this alternative. Areas of regeneration or partial harvesting would only provide natal habitat for a short period under Alternative 3 at which point they would be scheduled for treatment again. In some areas stands would never again reach natal habitat conditions.

Figure 244. Abundance of fisher natal habitat under Alternative 3



Natal habitat in the Klamath Falls Resource Area would decline under all of the action alternatives initially, but would be slightly higher in 2106 than in 2006. These habitat trends would occur as a result of the small amount of habitat-capable areas that would be reserved from regeneration harvest. Continued and repeated entry into the stands would preclude fisher natal habitat from developing. Fisher populations are not known to occur in the Klamath Falls Resource Area, but this area is adjacent to the southern Cascade Mountain population center (Hayner, pers comm. 2007).

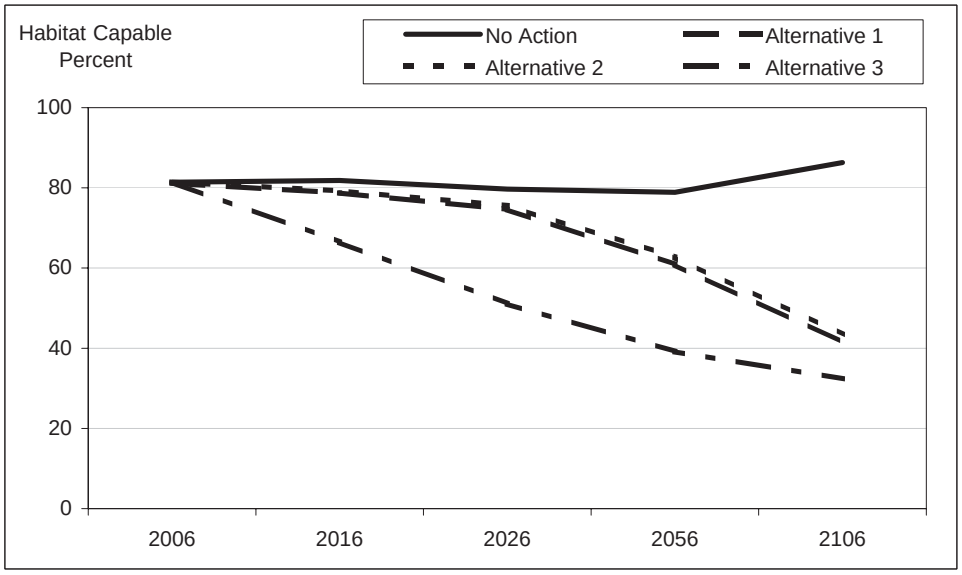
For this analysis, fisher are assumed to forage in all habitat types that are capable of providing high canopy cover and which have some legacy component. Foraging habitat estimates are likely underestimates because they do not include the stand establishment with legacy forest structural stage classification that would provide foraging habitat. This underestimate would be higher for the No Action Alternative and Alternative 3, where legacy retention would be required for all timber harvesting. Under all alternatives, fisher foraging habitat would increase on BLM-administered lands within the planning area. As shown in *Table 200,* by 2106, foraging habitat would increase by:

- 30% under the No Action Alternative,
- 15% under Alternative 1,
- 6% under Alternative 2, and
- 17% under Alternative 3.

All BLM districts would follow this trend with the exception of the Klamath Falls Resource Area. As shown in *Figure 245* (*Response of fisher foraging habitat in the Klamath Falls Resource Area*), by 2106, foraging habitat would decrease from 81% of habitat capable acres to:

- 41% under Alternative 1,
- 43% under Alternative 2, and
- 32% under Alternative 3

Figure 245. Response of fisher foraging habitat in the Klamath Falls Resource Area



In the Klamath Falls Resource Area, the two factors that would cause the decline in fisher foraging habitat include the large percentage of the resource area in the harvest land base (approximately 60% in the No Action Alternative and 70% under the action alternatives) and lower site productivity compared to the other districts. Lower site productivity causes an increase in the amount of time it takes for foraging habitat to recover after timber harvest.

The spatial configuration of natal habitat is as important as the amount. Lewis and Hayes (2004) concluded that landscapes comprised of large, contiguous patches of late-seral forests were more likely to support the fisher than a more fragmented landscapes. Large blocks of mature or structurally complex forest habitat would be expected to form within the late-successional reserves under the No Action Alternative and the late-successional management areas under Alternatives 1 and 2.

The patterns found in mature and structurally complex forest habitat are used as indicators of natal habitat development. Landscape comparisons were done between the current condition and the condition in 2106 (see the *Ecology* section of this Chapter). The analysis concludes that the principal controls on the condition of the entire forested landscape are the development of the U.S. Forest Service reserves into mature & structurally complex forest and the continued intensive management of the nonfederal forests. BLM-administered lands play a significant role at the provincial scale by linking the physiographic provinces and the U.S. Forest Service lands within them. Genetic research on the fisher population centers in the southern Cascade Mountains and the

northern Siskiyou Mountains indicate no genetic exchange has occurred (Aubry et al. 2004). The specific reasons for this lack of genetic exchange are unknown but could include poor habitat quality and anthropogenic barriers (Aubry et al. 2004).

Patch size, core area and connectance would vary on BLM-administered lands in the physiographic provinces as follows:

- Coast Range: Mean patch size and mean core area of mature and structurally complex forest would increase under the No Action Alternative and Alternative 1. Mean patch size would increase from 44 acres to 138 and 103 acres, under the No Action Alternative and Alternative 1, respectively. Connectance would increase over time in the No Action Alternative and Alternatives 1 and 2 but would decrease under Alternative 3.
- Western Cascades and Klamath: Mean patch size and mean core area of mature and structurally complex forests would increase under the No Action Alternative. Mean patch size would decrease under all action alternatives. Connectance would remain stable over time under the No Action Alternative and Alternative 1, while patch size would decrease under Alternatives 2 and 3.
- Eastern Cascades: Mean patch size of mature and structurally complex forests would decrease under all alternatives. Connectance would decline under all alternatives.

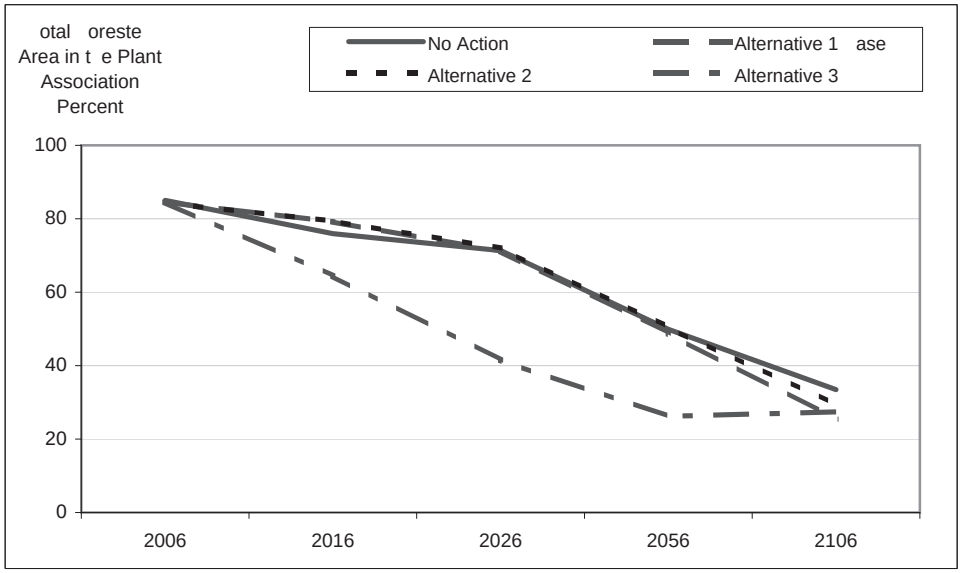
Assuming fisher respond positively to the increases in the amount, mean patch size, mean core patch size, and connectance of natal habitat, the number of fishers would increase under the No Action Alternative and Alternative 1 in the Coast Range province. Fisher populations would increase under the No Action Alternative in the Klamath and Western Cascades provinces. Decreasing patch size, mean core area size, and connectance would lead to decreasing populations of fishers under Alternatives 2 and 3. Habitat connectivity between the provinces is a limiting factor to fisher movements between the Klamath Province and the Western Cascades province. Connectance would remain relatively stable in the Klamath and Western Cascade provinces and the mean patch size of mature and structurally complex forest habitat would increase under the No Action Alternative.

Landbirds

Landbirds are associated with stand establishment, young, mature and structurally complex forest structural stage classifications. The amount of these structural stages that currently exist and would develop under the alternatives is described in the *Ecology* section of this chapter. Landscape objectives developed by the group Partners-in-Flight "…provide targets for designing management plans and benchmarks for measuring success of management actions" (Altman 1999). Although they are not BLM objectives, they are useful for comparing the effects of the alternatives.

Conservation objectives identified by Altman (2000a) for landbirds in the East Cascade Mountains identify the need for "no net loss" of structurally complex eastside conifer forests and the retention of large diameter trees (greater than 20 inches in diameter). Under all alternatives, in the Klamath Falls Resource Area, BLM-administered lands would not meet the objective of "no net loss" of habitat. As shown in *Figure 246* (*Klamath Falls Resource Area landbird habitat trends for eastside coniferous forests, expressed as a percentage of total forested area in the plant association*), mature or structurally complex forest habitat would decrease under all alternatives; from over 80% of the habitat-capable area to approximately 30%.

Figure 246. Klamath Falls Resource Area landbird habitat trends for eastside coniferous forests, expressed as a percentage of total forested area in the plant association



Assuming that bird abundance responds directly to habitat abundance, this loss of habitat would result in a corresponding decrease of approximately 50% of the birds associated with large trees, snags, and multi-layered dense canopy within eastside conifer forests on BLM-administered lands. *Table 201* (*Habitat features and focal bird species of conservation concern in the eastside conifer plant group in central, eastside Oregon and Klamath Basin*) shows habitat features and associated species (Altman 2000a). Private forest lands would not contribute to structurally complex forest habitat because it is assumed that private forest lands are generally managed on short rotations.

Table 201. Habitat features and focal bird species of conservation concern in the eastside conifer plant group in central, eastside Oregon and Klamath Basin

Habitat Feature/Conservation Focus	Focal species
Large trees	Brown creeper
Large snags	Williamson's sapsucker
Multi-layered dense canopy	Hermit thrush

Bird abundance is assumed to follow habitat abundance in a one to one relationship. That is, a 10% increase in habitat abundance results in a 10% increase in bird abundance. This

simplistic assumption allows a relative comparison of the alternatives. In reality, other factors such as immigration rates, home range size, food abundance, and nesting structure abundance would contribute to the ability of bird populations to respond to newly available habitat.

Uneven-aged management under Alternative 3 would result in multi-layered stands. Because it is assumed that all size classes would be harvested proportional to their occurrence in the stand, the harvested stands under this alternative would not meet the mature, multiple canopy, or structurally complex forest structural stage classifications. This would result in a decrease in those structural stages. In the Klamath Falls Resource Area, private forest lands would provide stand establishment and young forest habitat while on the U.S. Forest Service lands, it is assumed the amount of mature, multiple canopy, or structurally complex forest would increase in the late successional reserves.

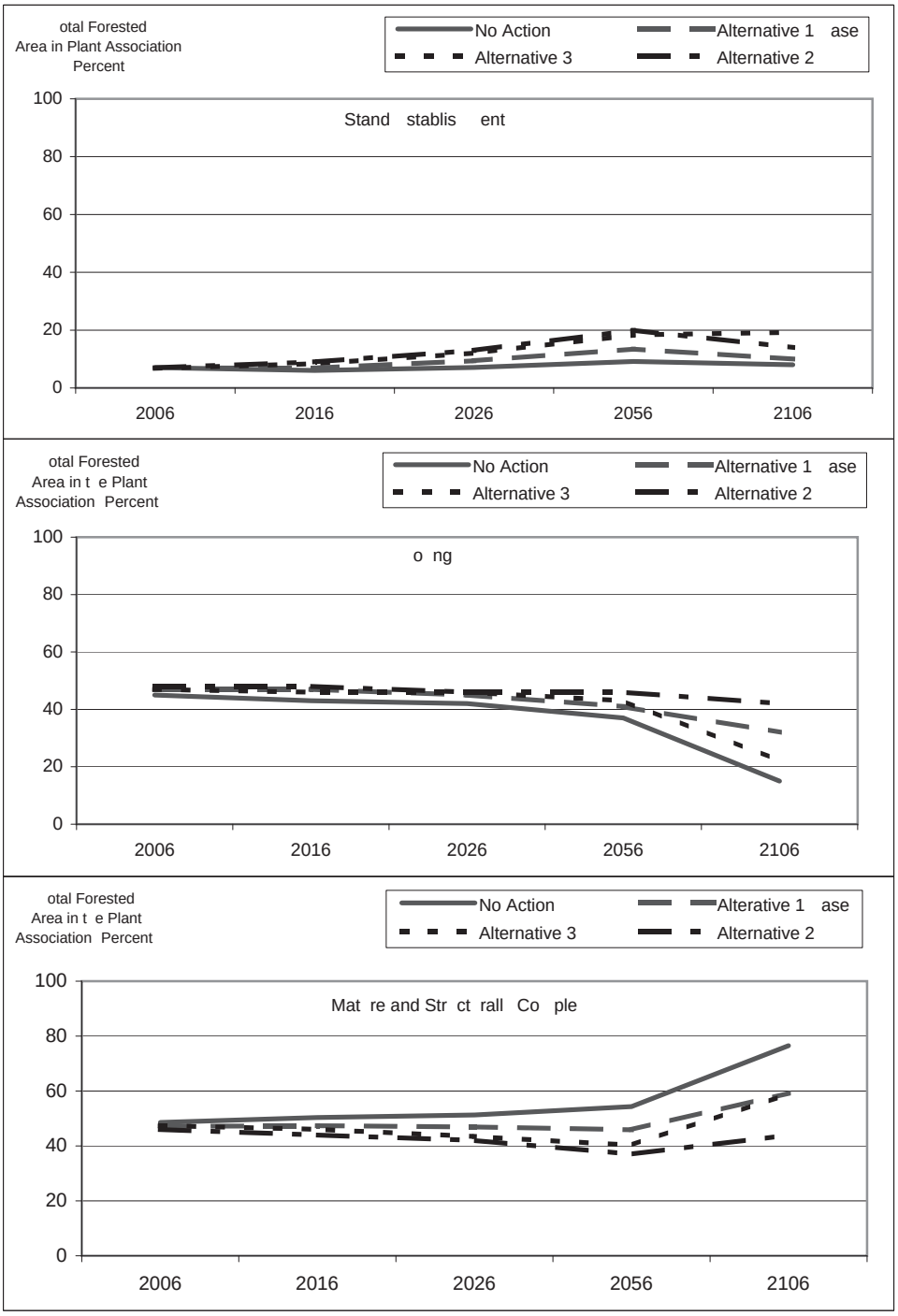
The Oregon-Washington Partner's in Flight published the following habitat objectives for coniferous forests west of the Cascade Mountains.

- Maintain existing old-growth forest where there is less than 15% of the landscape within a sub-province (physiographic province), and initiate actions to develop old-growth forest to provide greater than 15% old-growth forest in each sub-province.
- Maintain existing mature, multiple canopy forest where there is less than 15% of the landscape within a sub-province, initiate actions to develop mature, multiple canopy forest to provide greater than 15% forest in each physiographic province (Altman 1999).

A landscape that would provide for landbirds in western Oregon coniferous forests would contain roughly one third each of the stand establishment, young forest, and mature and structurally complex forest structural stage classifications within each physiographic province (Altman 1999).

Under all alternatives, the landbird conservation objectives for mature and structurally complex forests would be met on BLM-administered lands as shown in *Figure 247* (*Westside coniferous forest landbird habitat trends, expressed as a percentage of total forested acres in the plant association*).

Figure 247. Westside coniferous forest landbird habitat trends, expressed as a percentage of total forested area in the plant association



The *Ecology* section of this chapter analyzed the development of patch size over time for the mature and structurally complex forest structural stage classifications. Landbird habitat includes the mature, structurally complex forest structural stage classification, so the absolute patch sizes would be different, but relative relationships would be similar. An analysis of all ownerships in the planning area, however, reveals that all alternatives would decrease the abundance of stand establishment and young forests from current

levels (see Chapter 4, Ecology). Mature, multiple canopy and structurally complex forests would increase in abundance under the No Action Alternative and Alternatives 1 and 3 from the current condition of 47% to 77% under the No Action Alternative and to 59% under Alternatives 1 and 3. Alternative 2 would maintain a relatively stable amount of habitat. Landbird species reliant on mature, multiple canopy and structurally complex forests are shown in *Table 202* (*Habitat features and focal bird species of conservation concern in the western Oregon conifer forests*). Their abundance would be expected to increase, similarly, from 10-30 % (assuming bird abundance responds directly to habitat abundance) across BLM-administered lands in western Oregon.

Table 202. Habitat features and focal bird species of conservation concern in the western Oregon conifer forests

Habitat Feature	Focal Species
Structurally Complex	
Large snags	Vaux's swift
Large trees	Brown creeper
Conifer cones	Red crossbill
Mature Forest Multi-canopy	
Large snags	Pileated woodpecker
Large trees	Brown creeper
Conifer cones	Red crossbill
Closed canopy	Hermit warbler
Deciduous canopy trees	Pacific-slope flycatcher
Mid-story tree layers	Varied thrush
Open mid-story	Hammond's flycatcher
Deciduous understory	Wilson's warbler
Forest floor complexity	Winter wren
Young structural stage ***(Young stand initiation and Pole stem exclusion[a])***	
Closed canopy	Hermit warbles
Deciduous canopy trees	Pacific-slope flycatcher
Open mid-story	Hammond's flycatcher
Deciduous canopy trees	Black-throated gray warbler
Deciduous understory	Wilson's warbler
Forest floor complexity	Winter wren
Deciduous subcanopy/understory	Hutton's vireo
Stand Establishment	
Residual canopy trees	Olive-sided flycatcher
Snags	Western bluebird
Deciduous vegetation	Orange-crowned warbler
Nectar-producing plants	Rufous hummingbird

[a]Altman's seral stages (Altman 1999) are in italics.

Over 100 years, young stands would decline on BLM-administered lands under all alternatives. The current level of 47% if west-side coniferous forests would decline to 15% under the No Action Alternative, and to 32, 42, and 22% under Alternatives 1, 2, and 3 respectively. Populations of bird species which rely exclusively on the young

forest structural stage classification would similarly decline in abundance on BLM-administered lands.

The abundance of the specific habitat components important to landbirds including snags, residual trees, deciduous shrubs, and nectar producing flowers would vary between the alternatives. The No Action Alternative and Alternative 3 would retain residual trees and snags in regeneration harvest units while Alternatives 1 and 2 would not retain residual trees or snags as shown in *Table 203* (*Comparison of snag and residual tree retention by alternative*). Under Alternatives 1 and 2, the stand establishment and young forest structural stage classifications created as a result of regeneration harvest would have little or no value for landbird species which require residual trees or snags.

Table 203. Comparison of snag and residual tree retention by alternative

Retention Component	No Action (# per acre)	Alternative 1 (# per acre)		Alternative 2 (# per acre)		Alternative 3 (# per acre)	
		LSMA	TMA	LSMA	TMA	GLMA (Regen)	GLMA (Partial)
Snags created or retained*	1.1	2-6	0 1	2-6	0 1	2-4	2-4
Residual trees	6-8 (north) 18-25 (south) 12-18 (connectivity)	0	0	0	0	6-9	20-30

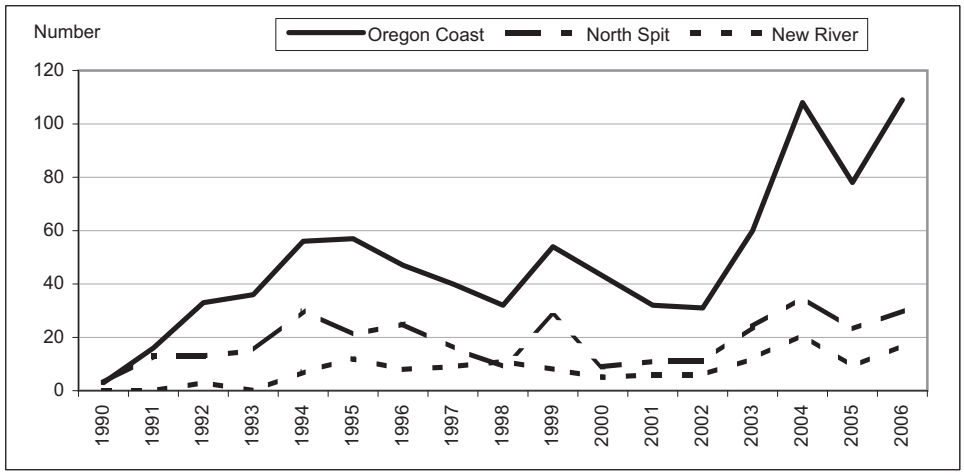
As analyzed in the *Ecology* section of this chapter, mature and structurally complex forests would be provided on BLM-administered lands along with U.S. Forest Service lands under all alternatives. Private forest lands are expected to contribute a stable amount of the stand establishment and young forest structural stage classifications. The No Action Alternative and Alternative 3 would create the best quality stand establishment and young forest habitat compared to Alternatives 1 and 2 because of the requirements to retain snags, and legacy trees. The stand establishment and young forests located on private forest land would generally contain low amounts of legacy components (old, large trees, and snags) and limited amounts of hardwood shrubs and other herbaceous material which are important to a diverse bird community.

Western Snowy Plover

Under all alternatives, existing plans for the western snowy plover habitat at North Spit and New River areas of critical environmental concern would continue to be implemented. These plans are designed to prevent disturbance to known western snowy plover nest sites, to restore natural dune process with a goal of providing additional nesting habitat, and provide predator control. Designated critical habitat for the western snowy plover is located within the North Spit and New River areas of critical environmental concern.

The Pacific coast distinct population segment of the western snowy plover has exhibited "significant" progress towards recovery as shown in *Figure 248* (*Total number of western snowy plover young fledged along the Oregon Coast from 1990-2006*) (Lauten et al. 2006). Since the management that has led to this recovery would continue, it is anticipated that population numbers and nesting success in the long term would remain stable or increase under all alternatives.

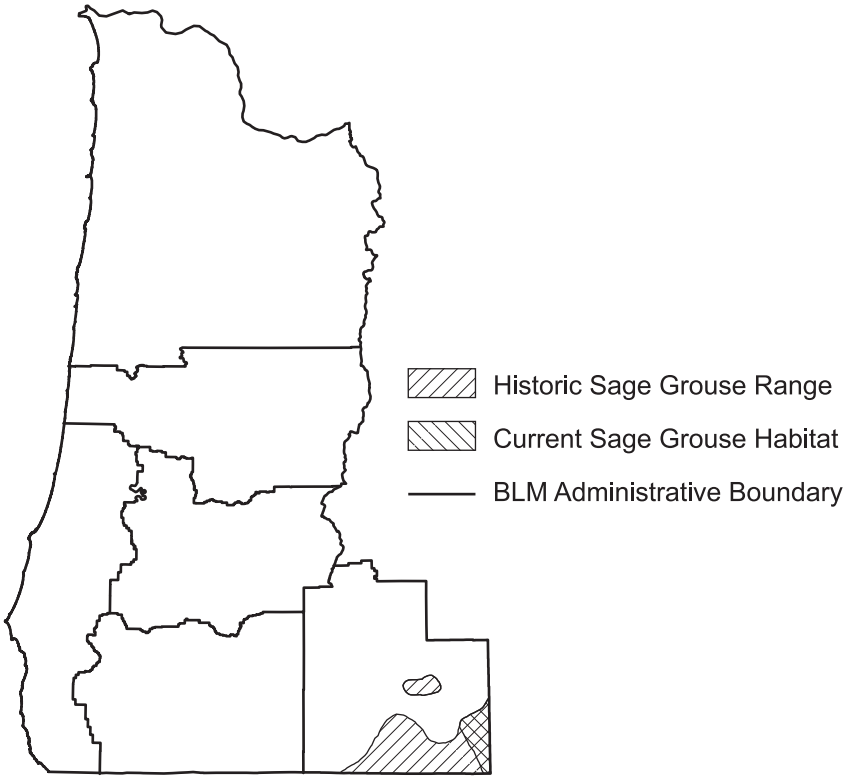
Figure 248. Total number of western snowy plover young fledged along the Oregon Coast from 1990-2006)



Sage Grouse

Sage grouse are not currently known to occupy any lands within the Klamath Falls resource Area or in the planning area. The last occupied lek, of the four historically known leks on BLM-administered lands, was in 1993 (Hagen 2005). The historic range for sage grouse encompasses 630,000 acres (all ownerships) in the Klamath Falls Resource Area as shown in *Figure 249* (*Historic range of sage grouse within the planning are of the western Oregon plan revision*).

Figure 249. Historic range of sage grouse within the planning area of the western Oregon plan revision



Approximately 47,000 acres of potential habitat (including all biological and behavioral needs; lekking, nesting, brood rearing, and wintering habitat) were identified on BLM-administered lands using data derived from the Ecological Site Inventory as shown in *Table 204* (*Sage grouse habitat on the Gerber block, Klamath Falls Resource Area*).

Table 204. Sage grouse habitat on the Gerber block, Klamath Falls Resource Area

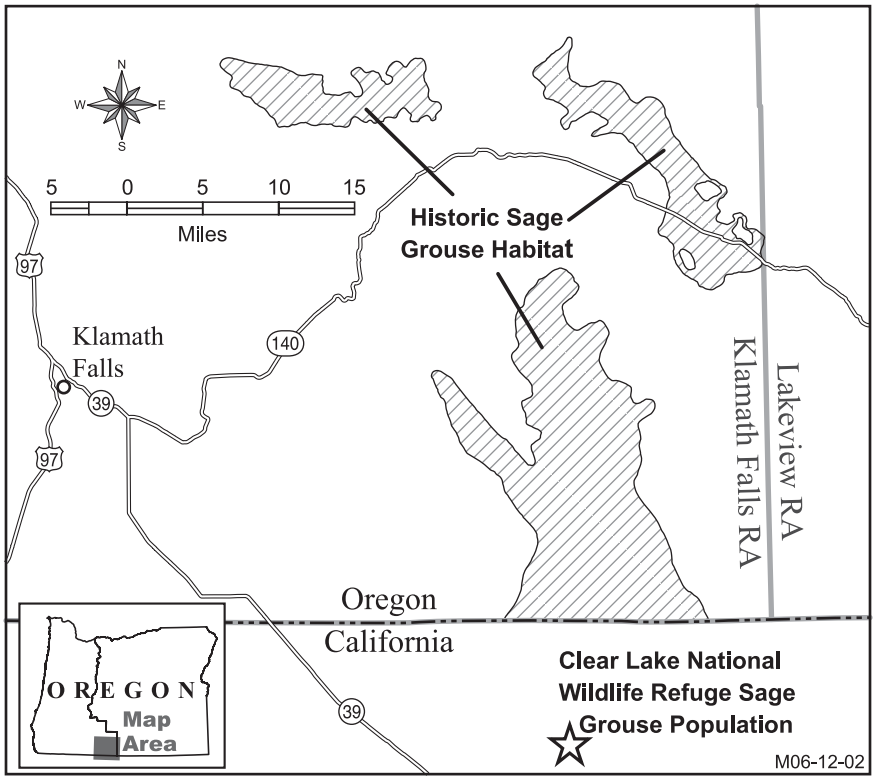
Unit	Total BLM Area (acre)	Habitat-Capable[b]		Habitat[a]		Non-habitat	
		(acre)	(%)	(acre)	(%)[c]	(acre)	(%)[c]
Gerber block	83,276	47,143	57	27,707	59	19,436	41

a Provides for all biological and behavioral needs – lekking, nesting, brood rearing, wintering.
b Vegetative communities the would likely develop into, or could be converted into sage grouse habitat.
c Percent of habitat-capable.

Ecological Site Inventory data does not contain sufficient information to differentiate between the individual habitat needs (lekking, nesting, brood rearing, and wintering). Therefore, they are lumped together and referred to as suitable sage grouse habitat. Potential habitat includes sage brush communities, meadows, ephemeral wetlands, and non-forested riparian habitats. Potential natural communities (within the natural range of plant species occurrences) and late seral habitats provide for the biological needs for the sage grouse.

Figure 250 (*Sage grouse habitat within the Klamath Falls Resource Area*) shows that suitable sage grouse habitat occurs on BLM-administered lands in two units, the Campbell and the Gerber blocks. The Campbell block contains less than 10% of BLM-administered lands and will not be analyzed further because of the dispersed nature of the BLM-administered lands. The Gerber block contains 83,176 acres and is the largest and most important block of potential sage grouse habitat on BLM-administered lands within the planning area. The Gerber block currently contains approximately 27,000 acres of sage grouse habitat.

Figure 250. Sage grouse habitat within the Klamath Falls Field Office



The treatment of the lands east of Highway 97 in the Klamath Falls Resource Area would not vary between the alternatives; therefore the following impacts would occur under all alternatives.

The Oregon conservation strategy for sage grouse was completed in 2005. The BLM was a partner in that process, along with the U.S. Forest Service and state agencies (Hagen et al. 2005). The conservation strategy for sagebrush habitat includes managing for at

least 70% of the sage grouse habitat-capable lands in habitat condition and 30% in a potential condition. Within the Gerber block this would equate to approximately 33,000 acres out of the 47,000 acres of habitat-capable lands. Currently there are 27,000 acres of sage grouse habitat (59% of habitat-capable) within the Gerber block. Current levels of juniper removal, grazing, and wildfire suppression activities would increase the amount of sage grouse habitat. These activities would continue under all alternatives.

Juniper encroachment prevents sage grouse non-habitat from developing into suitable habitat because it competes for moisture and light. Juniper encroachment is a major cause of the loss of sage grouse habitat in the Gerber block. Juniper woodlands occupy approximately 40,000 acres within the Gerber block. Juniper expansion has increased by a factor of 10 since the 1880s (Miller and Tausch 2001, as cited in Hagen 2005).

It is assumed that forest management activities in the next decade would occur at the same rate as in the past decade in the Klamath Falls Resource Area. This would result in removal of between 12,000 and 30,000 acres of juniper for fuels reduction and an additional 3,000 to 6,000 acres for biomass production and/or utilization for chips, sawlogs, firewood and other commercial uses over the next 10 years. Removal of juniper would remove competing vegetation and allow sage grouse habitat to re-establish.

The spread of invasive, non-native grasses also causes the loss of sage grouse habitat. Site disturbing activities can include the use of heavy equipment or burning which allows the spread of invasive, non-native grasses. These non-native grasses prevent the establishment of sagebrush and other native forage species for sage grouse. Similar to juniper, they limit the availability of food source and hiding cover for the sage grouse.

Measures that would mitigate the spread of invasive grasses to sage grouse habitat include eradicating isolated patches of invasive plants, prioritizing sage brush areas for invasive control and prevention, and maximizing site occupancy of desired vegetation (Hagen 2005).

Grazing allotments overlay the entire Gerber block. Rangeland surveys in the Gerber block have shown that range conditions have been on an upward trend towards late successional forest and potential natural community since the late 1930's. In 1938, surveys indicated that 68% of range was dominated by cheatgrass communities. A 2004 report states: "[n]ative perennial bunchgrasses, desirable shrub species, and native forbs have all increased in abundance [since 1938], leaving only 4.5% dominated by cheatgrass (and other non-native annual grasses) and in an early to mid-seral successional forest state (USDI unpublished)." Grazing under the No Action Alternative has been compatible with the maintenance and the creation of sage grouse habitat. Grazing levels and practices in the Gerber block would not change under the action alternatives, therefore grazing would not result in the loss of sage grouse habitat under any of the alternatives.

Sage grouse do not utilize forested areas; therefore any timber harvest of the eastside lands in the Klamath Falls Resource Area would have no impact on the sage grouse.

Wildfires have had very little impact on sage grouse habitat in the Klamath Falls Resource Area. In the last 15 years, wildfire has affected less than 1,000 total acres

(Hayner, pers. com. 2007). With continuing fuels reduction efforts and aggressive suppression under all alternatives, wildfire would continue to have little or no impact on sage grouse habitat.

Sage grouse do not occur within the planning area, therefore effects to sage grouse populations are difficult to predict. Disturbances, primarily noise, would limit suitable grouse habitat from becoming occupied. Conservation measures to reduce or restrict disturbances would be implemented if a site were to become occupied or if reintroduction were attempted. Off-highway vehicle use in the Gerber block would be restricted to designated roads and trails. This would result in a reduction of disturbance due to off-highway vehicle use. No new campground or other large-scale recreation developments would occur under any of the alternatives. There would be 18.2 miles of potential trail development for non-motorized users in the action alternatives. Avoiding historic lekking areas and seasonal trail closures would limit disturbance impacts to any new leks.

Currently, sage grouse show no resistance to West Nile virus and mortality is assumed to be 100% (Naugle et al. 2004). West Nile virus has not been documented in sage grouse in Oregon (Hagen 2005). None of the alternatives would affect the likelihood of West Nile virus from occurring.

Special Status Species

There are 117 special status animal species known or suspected to occur on BLM-administered lands within the planning area. For analytical purposes, they have been place into seven groups based on habitat needs. *Table 205* (*BLM special status animal species known or suspected to occur on BLM-administered lands in the planning area*) shows species by group. Species in groups 1 and 3 are analyzed elsewhere in this *Wildlife* section. Species in group 2 are found either inconsistently on BLM-administered lands or on highly specialized non-forested habitats such as noncommercial forests, oak woodlands, shrublands, grasslands, cliffs, rock outcrops, talus slopes, meadows, wetlands, spring, fens, ponds, and vernal pools where harvest would not occur. These species are assumed to not be affected by the alternatives and are not further analyzed here. Species in groups 4 and 5 are analyzed below.

Table 205. BLM special status animal species known or suspected to occur on BLM-administered lands within the planning area

Group	Habitat	Species	Discussion
Species Group 1.	Various	BALD EAGLE	Analyzed Individually elsewhere in Wildlife Section
		WESTERN SNOWY PLOVER	
		SAGE GROUSE	
		NORTHERN SPOTTED OWL	
		MARBLED MURRELET	
		FISHER	
		COLUMBIANN WHITE-TAILED DEER	

Group	Habitat	Species	Discussion
Species Group 2.	Includes species associated with special habitats or features (non O&C Timber lands). Assume protection of known sites for all alternatives. Also includes accidental or occasional migrants where impacts are unlikely.	RHINOCEROS AUKLET	Not affected. According to Birds of Oregon, marine island associate
		CASSIN'S AUKLET	Not affected. According to Birds of Oregon, marine island associate
		TUFTED PUFFIN	Not affected. According to Birds of Oregon, marine island with deep soils and coastal headland nester
		UPLAND SANDPIPER	Not affected- According to Birds of Oregon, only 4 records from western OR, 3 within boundaries of Coos Bay BLM, question if on BLM-administered land? Accidental occurrence on BLM.
		FORK-TAILED STORM PETREL	Not affected- marine species breeds on off-shore islands. Only inland record was dead bird used as prey item, probably of great-horned owl according to Birds of Oregon.
		ALEUTIAN CANADA GOOSE	Non breeding migrant, delisted ESA SSS on BLM-administered land. Has its own plan on New River ACEC which is non forested Public Domain area. Assume effect of all action alt the same.
		DUSKY CANADA GOOSE	Non breeding, unlikely migrant on BLM-administered land, Not Affected
		CALIFORNIA BROWN PELICAN	Not affected, according to Birds of Oregon a coastal marine species that rarely occurs inland.
		AMERICAN WHITE PELICAN.	Use on the BLM is non breeder. Open and wetland associate. Not affected.
		RED-NECKED GREBE	According to Birds of Oregon, the only consistent breeding population in OR is found at Upper Klamath Lake NWR. Winters mainly along the coast. Unlikely migrant on BLM-administered land, Not Affected.
		TRUMPETER SWAN	According to Birds of Oregon, non-breeding west of the Cascades, unlikely migrant on BLM-administered land, Not Affected.
		FERRUGINOUS HAWK	Klamath Basin, open arid plain associate. Occasional winter visitor west of the Cascades.
		COMMON NIGHTHAWK (Willamette Valley Population)	Non-forest species, unlikely to be affected, no BLM-administered land.
		TULE GOOSE	Not Affected. Uses open water and ag wetlands. Accidental on the BLM.
		MERLIN	Insufficient data; no way to analyze. Occasional - non breeder?

Group	Habitat	Species	Discussion
		WHITE-TAILED KITE	Ag land, wet meadows, prairie and open land associate. Not affected by forest activities.
		YELLOW RAIL	Upper Klamath Basin Plan, PD wetland
		AMERICAN PEREGRINE FALCON	Nests on cliff features, possible effects to prey species (landbirds). Covered with landbird analysis.
		INSULAR BLUE (BUTTERFLY)	Coastal Grasslands, clover is the host plant. No known sites on BLM-administered lands. Potential habitat on the BLM.
		HOARY ELFIN (BUTTERFLY)	No known populations on the BLM or FS lands. Kinnikinnik associate on coastal bluffs. Potential habitat on the BLM.
		OREGON SILVERSPOT BUTTERFLY	Coastal species associated with salt-spray meadows.
		FENDER'S BLUE BUTTERFLY	Westside prairie species associated with - Lupine suphereus var. kincaidii, use the lupine analysis
		NEWCOMB'S LITTORINE SNAIL	Intertidal species; was documented on N Spit; most likely does occur on the BLM as pickerel weed (their closely associated plant) occurs on both the BLM and state land on the bay side of the Spit. Primary impact = OHV use.
		VERNAL POOL FAIRY SHRIMP	Vernal Pools. Has own plan for Table Rock which is non forested PD area. May be stand alone plan from WOPR. Assume effect of all action alt may be the same. Potential recreational effects.
		LARCH MOUNTAIN SALAMANDER	New data showing it restricted to Columbia Gorge and talus-skree habitat. The BLM does not have this habitat. Based on extensive surveys on Mt Hood NF. WA habitat data not seem to apply to OR.
		AMERICAN GRASS BUG	Associated with Deschampsia cespitosa in wet native grasslands in Benton and Yamhill counties.
		SISKIYOU SHORT-HORNED GRASSHOPPER	Grassland/herbaceous habitats associated with elderberry plants. Assumes forest mgmt will encourage more habitat or not negatively impact if elderberry is maintained and enhanced. If herbicides are applied, it will be a negative effect.
		WHULGE (Taylor's) CHECKERSPOT (BUTTERFLY)	No known sites on BLM or FS lands. Westside prairie species, with strawberry appearing to be a principal adult nectar source in OR.

Group	Habitat	Species	Discussion
		MARDON SKIPPER (BUTTERFLY)	Westside grass/shrub - open; grazing and burning effects. Associated with fescue. Only known sites are on Medford.
		DIMINUTIVE PEBBLESNAIL	Springs with perennial flows. Actions that effect groundwater flow to spring is a concern.
		FALL CREEK PEBBLESNAIL	Springs with perennial flows. Actions that effect groundwater flow to spring is a concern.
		KEENE CREEK PEBBLESNAIL	Springs with perennial flows
		KLAMATH PEBBLESNAIL	Springs with perennial flows
		NERITE PEBBLESNAIL	Springs with perennial flows
		CRATER LAKE TIGHTCOIL - (SNAIL)	Springs, wetlands
		MONTANE PEA CLAM	Springs, wetlands. On Coos Bay District, this species most likely does occur on the BLM as pickerel weed (their closely associated plant) occurs on both the BLM and state land on the bay side of the Spit. Primary impact = OHV use.
		EVENING FIELDSLUG	Springs, wetlands
		CROWNED TIGHTCOIL-(SNAIL)	Springs, wetlands
		ROBUST WALKER	Springs, seeps, wetlands
		PACIFIC WALKER	Springs, seeps, wetlands
		TOOTHED PEBBLESNAIL	Springs with perennial flows
		PISTOL RIVER POCKET GOPHER	Coastal meadow, agriculture/pasture/ mixed environs associate. Any alternatives' effects to coastal meadows could have negative effect. Very little known. Very limited range - no known BLM sites. This species only collected from mouth of Pistol River.
		GOLD BEACH POCKET GOPHER	Coastal meadow associate. Any alternative effects to this habitat could have negative effect. Very little known. Very limited range - no known BLM sites. Taxonomy questionable. May not have enough data to analyze.
		TOWNSEND'S BIG-EARED BAT	Caves, mines, tunnels, bridges, old buildings
		SPOTTED BAT	Cliffs
		FRINGED MYOTIS	Caves, mines, tunnels, bridges
		PALLID BAT (Pacific Pallid and Pallid considered the same)	Caves, mines, tunnels, bridges, old buildings

Group	Habitat	Species	Discussion
Species Group 3.	Various	PURPLE MARTIN	Analysis covered in Landbird section
		YELLOW BREASTED CHAT	
		WHITE-HEADED WOODPECKER	
		THREE-TOED WOODPECKER	
		BLACK-BACKED WOODPECKER	
		GRASSHOPPER SPARROW	
		TRICOLORED BLACKBIRD	
		BURROWING OWL	
		FLAMMULATED OWL	
		LEWIS WOODPECKER	
		OREGON VESPER SPARROW	
		WESTERN MEADOWLARK	
		STREAKED HORNED LARK	
	Snag Dependent	FRINGED MYOTIS	See landbird discussion for stand establishment species
		PALLID BAT (Pacific Pallid and Pallid considered the same)	
	Mature and structurally complex structural stage associate	RED TREE VOLE	Assume similar effects as those for the northern spotted owl.
		NORTHERN GOSHAWK	
		JOHNSON'S HAIRSTREAK (BUTTERFLY)	
		SURVEY AND MANAGE SPECIES	Included under the No Action Alternative only. Assume similar effects as those for the northern spotted owl.
Species Group 4.	Aquatic/Riparian Associates	HADDOCK'S RHYACOPHILAN CADDIS FLY	Stream Order 1 & 2
		COPE'S GIANT SALAMANDER	Stream Order 1 & 2- any healthy salmon stream is healthy for this species
		SCOTT'S APATANIAN CADDIS FLY	Stream Order 1 & 2
		CASCADE TORRENT SALAMANDER	Stream Order 1 & 2
		COLUMBIA TORRENT SALAMANDER	Stream Order 1 & 2
		WILLAMETTE FLOATER - (MUSSEL)	Stream Order 3 & 4
		HARLEQUIN DUCK	Stream Order 3 & 4
		FOOTHILL YELLOW-LEGGED FROG	Slow moving water with rocky substrate
		OREGON SPOTTED FROG	Slow moving water

Group	Habitat	Species	Discussion
		SCALE LANX - (SNAIL)	Fast water, on the BLM in Klamath River Canyon (WSR, ACEC)
		ROTUND LANX - (SNAIL)	Fast Water, main stream of Umpqua -limited in range
		NORTHWESTERN POND TURTLE	Slow water / wetlands
		PAINTED TURTLE	Slow water / wetlands
Species Group 5.	Forest Floor Associates	PUGET OREGONIAN	Range is Salem, Eugene, and Roseburg districts
		TILLAMOOK WESTERNSLUG	
		SALAMANDER SLUG	
		SPOTTED TAIL-DROPPER	
		BALD HESPERIAN	
		OAK SPRINGS HESPERIAN	
		OREGON GIANT EARTHWORM	
		ROTH'S BLIND GROUND BEETLE	
		OREGON SLENDER SALAMANDER	
		TRAVELING SIDEBAND - (SNAIL)	Range is Southern Oregon Cascades Province including South River Resource Area - east, Glendale, Butte Falls, Ashland, and Klamath Falls Resource Areas
		KLAMATH TAILDROPPER	
		MODOC SIDEBAND (SNAIL)	
		SISKIYOU HESPERIAN	
		CHASE SIDEBAND (SNAIL)	
		CALIFORNIA SLENDER SALAMANDER	
		OREGON SHOULDERBAND (SNAIL)	
		BLACK SALAMANDER	
		SISKIYOU MTNS SALAMANDER	
		SISTERS HESPERIAN	Range is Coos Bay and Roseburg Districts
		GREEN SIDEBAND - (SNAIL)	

Under all alternatives, the 12 federal candidate and listed species identified in *Table 206* (*Federally listed candidate, threatened, and endangered species not associated with forested ecosystems*) would be managed to provide for the conservation of the species. Individual and programmatic actions would be consistent with the conservation needs of the species.

Table 206. Federally listed candidate, threatened, and endangered species not associated with forested ecosystems

Status[a]	**Scientific Name**	Common Name	Habitat Conditions
FC	Eremophila alpestris strigata	Streaked Horned Lark	Found in the Willamette Valley. Nesting habitat included native prairies and a wide range of agricultural fields (Marshall et al. 2003)
FC	Euphydryas editha taylori	Whulge Checkerspot (Butterfly)	Low-elevation upland prairies; host plant is narrow-leaved plantain (Plantago lanceolata) (ODFW 2006)
FC	Polites mardon	Mardon Skipper (Butterfly)	Meadow habitats; host plants are native fescues (ODFW 2006).
FC	Rana pretiosa	Oregon Spotted Frog	Permanent ponds, marhses and meandering streams through meadows; bottom of dead and decaying vegetation. Springs and other slow moving water (ODFW 2006)
FT	Branchinecta lynchi	Vernal Pool Fairy Shrimp	Ephemeral pools, small, cooler (ODFW 2006). Found on the BLM in Medford District;
	Critical Habitat		432 acres in the Medford District
FT	Eumetopias jubatus	Steller Sea Lion	Marine habitats include coastal waters near shore and over the continental slope; sometimes rivers are ascended in pursuit of prey. The most commonly used terrestrial habitat types are beaches used as rookeries and haulouts (NatureServe 2006)
FT	Speyeria zerene hippolyta	Oregon Silverspot Butterfly	Salt spray meadows; host plants early blue and western blue violets (Viola spp.) (ODFW 2006
	Critical Habitat		Critical habitat not designated for BLM-administered lands.
FE	Balaenoptera musculus	Blue Whale	Mainly pelagic; generally prefers cold waters and open seas (NatureServe 2006).
FE	Eschrichtius robustus	Gray Whale	Mostly in coastal and shallow shelf waters. Young are born in lagoons and bays (NatureServe 2006).
FE	Icaricia icarioides fenderi	Fender's Blue Butterfly	Seasonally wet native prairies; host plant is Kincaid's lupine (Lupinus sulphureus kincaidii) (ODFW 2006).
	Critical Habitat		Eugene District
FE	Megaptera novaeangliae	Humpback Whale	Pelagic and coastal waters, sometimes frequenting inshore areas such as bays (NatureServe 2006).
FE	Pelecanus occidentalis californicus	California Brown Pelican	A coastal marine species rarely found inland. Roost on sandy shores and offshore rocks; nests on islands and offshore rocks (Marshall et al. 2003)

[a] Status Codes: FC - Federal candidate for listing, FT - Federally listed as threatened, FE - Federally listed as endangered.

On all BLM-administered lands under the No Action Alternative, and on public domain lands and on the non-harvest land base on O&C lands under the action alternatives, special status species would be managed to avoid contributing to the need to list as threatened or endangered under the Endangered Species Act. This management would be consistent with existing conservation strategies. Public domain lands account for 16% of the BLM-administered lands in the planning area. The majority of these lands are in the Klamath Falls Resource Area. Public domain lands account for 10% of BLM-administered lands in the Salem, Eugene, Coos Bay, Roseburg and Medford districts (See the *Introduction* section of Chapter 3).

Species in group 4 are aquatic or riparian species that are highly dependent on water quality and aquatic and terrestrial species. The discussion of the environmental consequences of the alternatives to fisheries and water quality (See the *Fish* and *Water* sections of this chapter) are important in understanding the effects to these species.

Analysis of effects to fisheries and water quality that effect anadromous fish species and drinking water supplies, water temperature, and sedimentation are pertinent to species in group 4. Riparian management areas would constitute approximately 37% of BLM-administered lands under the No Action Alternative, 20% under Alternative 1, 13% under Alternative 2, and 11% under Alternative 3 as shown in *Table 207* (*Riparian management areas across all land use allocations under the alternatives*).

Table 207. Riparian management areas across all land use allocations under the alternatives

Alternative	Riparian Management Area (% Total BLM-administered Lands)
No Action	37
Alternative 1	20
Alternative 2	13
Alternative 3	11

Riparian reserves under the No Action Alternative and riparian management areas under the action alternatives are designated along streams. While the areas in riparian reserves or riparian management areas beyond the width of one site-potential tree (generally greater than 150 feet in western Oregon) on either side of the stream would add little to maintenance of lotic and riparian species assemblages (Cockle and Richardson 2003, McComb et al 1993, Vessely and McComb 2002, Haggerty et al. 2004, Gomez and Anthony 1996) studies found differences for at least some species out to 150-300 feet. Vesely and McComb (2002) found buffer strips 66 feet wide contained approximately 80% of detectable torrent, Pacific giant and Dunn's salamanders. Additional width, out to 90-100 feet would assist in stabilizing diurnal variations in temperature and relative humidity. Riparian and stream associated species abundance would be maintained under the No Action Alternative and Alternative 1 along intermittent streams because riparian management areas 100 feet wide would be sufficient to maintain the environmental conditions, moisture and temperature, necessary to support the riparian associates.

Under Alternatives 2 and 3, riparian management areas would extend to 100 feet on either side of perennial and fish bearing streams. Additionally, under Alternative 2,

intermittent streams at high risk of debris flows would have a 100 feet stream buffer. These riparian management areas would be managed to maintain stream temperature, organic matter inputs, and large wood. Stands would be managed to maintain or develop mature or structurally complex forest structural stage classifications. Habitat for species associated with the stream channel and the area immediately adjacent to the streams would be maintained. Species not as strongly associated with the stream would decline in abundance, because the canopy openings that would occur in the area between 25 and 100 feet from the stream and the regeneration of habitat beyond 100 feet from the stream channel would create habitat unfavorable to those species. Thinnings have been shown to increase the amount of solar radiation reaching the forest floor, increasing both air and soil temperature and decreasing relative humidity (Anderson et al. in press). Stream salamanders are thinned skinned and especially vulnerable to desiccation.

Riparian management areas under Alternative 2 would allow harvest within 25 feet of intermittent streams, except for debris-flow prone areas which would allow no harvest within 25 feet and in addition would develop into mature or structurally complex forests between 25 out to 100 feet on either side of the stream channel. The non-commercial vegetation which would be retained within 25 feet of intermittent streams (except debris-flow prone) would not maintain the thermal regime of the streamside ecosystem.

The retention of trees in the 25 feet riparian management area under Alternative 3 would have similar effects to Alternative 2. This is because, the canopy provided by trees within 25 feet of the stream channel would be sparse and the forest edges created between riparian management areas and upland regeneration harvest would increase diurnal and seasonal temperature fluctuation and decrease the relative humidity and the microclimate within the riparian management area (Vesely and McComb 2002, Anderson et al. in press). Plethodontid salamanders found in and adjacent to streams are especially susceptible to desiccation in dry environments.

Bury (2005) concluded that "…the retention of shade from riparian zones and adjacent forests may be critical to the survival and dispersal of even those stream amphibians with high fidelity to the stream channel." The effects of clearcut harvesting are seen in stream amphibian populations last from 25 to over 50 years post harvest (Karraker and Welsh 2006, Bury and Pearl 1999, Ashton et al. 2006).

Approximately 4,000 acres of harvest would occur over the next 10 years along non-debris flow prone, non-fish bearing intermittent streams under Alternative 2 (approximately 1% of the total area within 100 feet of all intermittent streams) on BLM-administered lands within the planning area. A similar amount of harvest would occur within riparian management areas under Alternative 3. At a local scale, riparian management areas under Alternatives 2 and 3 adjacent to these intermittent streams would not maintain a stable assemblage of stream and riparian associated species. With 4,000 acres of harvest per decade adjacent to intermittent streams, at the 5th field watershed or larger scale, impacts to species assemblages and their connectivity are not anticipated under Alternatives 2 and 3.

Species in group 5 are comprised of amphibians and mollusk species associated with mature or structurally complex forests, upland, forest floor communities. These species respond to changes to canopy cover, down wood, and soil moisture. Regeneration harvests

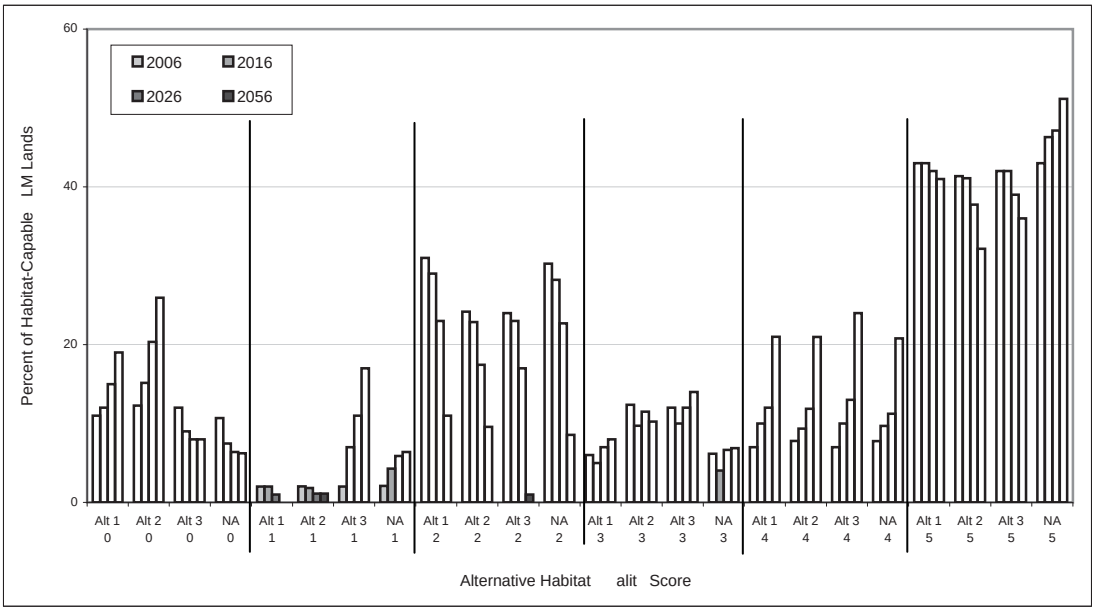
and the associated impact to adjacent forests would result in the loss of habitat. This is due to the breakage and movement of existing forest structure during harvest and the decreases in soil and down wood moisture levels due to increased light and wind penetration into adjacent stands. Twenty random watersheds were modeled to evaluate the effects of regeneration harvests and legacy requirements on forest floor species. Structural stages from nonforest and stand establishment to structurally complex stands were scored based on habitat value as shown in *Table 208* (*Forest floor habitat quality ratings*). Structural stage scores were decreased if there was a lack of legacy, if canopy cover was low, and if location occurred within 50 feet of a stand in the stand establishment structural stage. Habitat values for young stands (without legacy) were increased one point when they reached 50 years of age to account for the natural development of legacy. The habitat quality scores have no proportional relationship to each other. A stand with a score of 4 would not provide twice as much habitat benefit as a score of 2.

Table 208. Forest floor habitat quality rating criteria

Structural stage condition	Habitat quality score	Structural stage condition	Habitat quality score
Road and Non-Forest	0	Young high density with legacy	3
Stand establishment with legacy	1	Young high density without legacy	2
Stand establishment without legacy	0	Young high density without legacy, >50 years old	3
Young low density with legacy	2	Mature single canopy	4
Young low density without legacy	1	Mature multiple canopy	5
Young low density without legacy, > 50 years old	2	Structurally complex	5

As shown in *Figure 251* (*Forest floor habitat quality summary for each alternative*), under all alternatives at least 50% of the forested habitat would receive a habitat quality score of 4 or 5 by 2056. Differences between the alternatives in the amount of habitat within habitat quality categories 0 to 3 would occur as a result of legacy retention and the amount of harvesting activities. Since Alternatives 1 and 2 do not have legacy retention requirements, they would have more habitat with a 0 to 3 score compared to the No Action Alternative and Alternative 1. Habitat quality 2, under Alternative 3, would be comprised mainly of young, low density forest stands with legacy; this category would drop to 1% of the BLM-administered lands in 2056. This is due primarily to the fact that harvested stands under Alternative 3 would move more quickly from the stand establishment (with legacy) structural stage directly to the mature, or structurally complex structural stages. Legacy structures (downed wood and snags) are key habitat features in enabling forest floor species to maintain a presence in a stand when regeneration harvests occur.

Figure 251. Forest floor habitat quality summary for each alternative



Under all alternatives, trends in each physiographic province would resemble those displayed in Figure 251. The model assumes that forest floor associates persist through harvest activities or recolonize from adjacent habitats, either riparian management areas or upland areas. Based on the results of this modeling, at least 50% of the forest floor habitat would persist in habitat quality category 4 or 5, and therefore, forest floor associates would persist on BLM-administered lands under all alternatives.

Under the action alternatives, 60,000 to 143,000 acres (2.6 – 6.5% of forest capable lands) would be harvested over the next 10 years as shown in *Table 209* (*Harvest levels as percent of forest capable acres under each alternative*). Given the low percentage of harvest over the next 10 years, only species with fewer than 20 known sites and highly endemic to one or several locations would be at risk of declines in abundance and distribution severe enough that extinction might become a concern. In this case, protection measures would be applied to maintain populations of the species (see *Chapter 2, Management Common to All Action Alternatives, Wildlife*).

Table 209. Harvest levels as percent of forest capable acres under each alternative

Alternative	Harvest* (acres)	Forest capable (%)
No Action	62,000	2.6
Alternative 1	91,000	3.8
Alternative 2	143,000	6.5
Alternative 3	133,000	6.1

[1]*Note: Total of regeneration and selection harvest activities.

Fish

This analysis examines how the alternatives would affect fish habitat by the delivery of large wood and fine sediments to streams and by the alterations to peak water flows and stream temperature.

Key Points

- Large wood contributions would be the same in all four alternatives and would nearly reach the maximum potential in two of the five representative watersheds. In the other three representative watersheds, large wood contributions would be nearly the same under the No Action Alternative, Alternative 1, and the no harvesting reference analysis, but lower under Alternatives 2 and 3.
- The No Action Alternative would have nearly twice the acres in the riparian management areas as Alternative 1, and three times the acreage of Alternatives 2 and 3.
- Increases in large wood contribution would cause similar increases in the potential fish productivity under all four alternatives in two of the five representative watersheds. In the other three representative watersheds, fish productivity would be nearly the same under the No Action Alternative, Alternative 1, and the no harvesting reference analysis, and in few cases slightly lower under Alternatives 2 and 3.
- The effect of the alternatives on fish productivity would be highly dependant on the amount of high intrinsic potential stream channels that are within any one watershed.
- Increases in fine sediment delivery under all four alternatives would be less than 1% of the baseline sediment rates, and therefore would not degrade fish habitat under any of the alternatives.
- None of the alternatives would result in increases in peak flows in fifth-field watersheds to a level that would affect fish habitat.
- None of the alternatives would result in increases in stream temperature that would affect fish habitat or populations, except under Alternatives 2 and 3, where there would be some localized increases in stream temperatures in the Coquille management area.

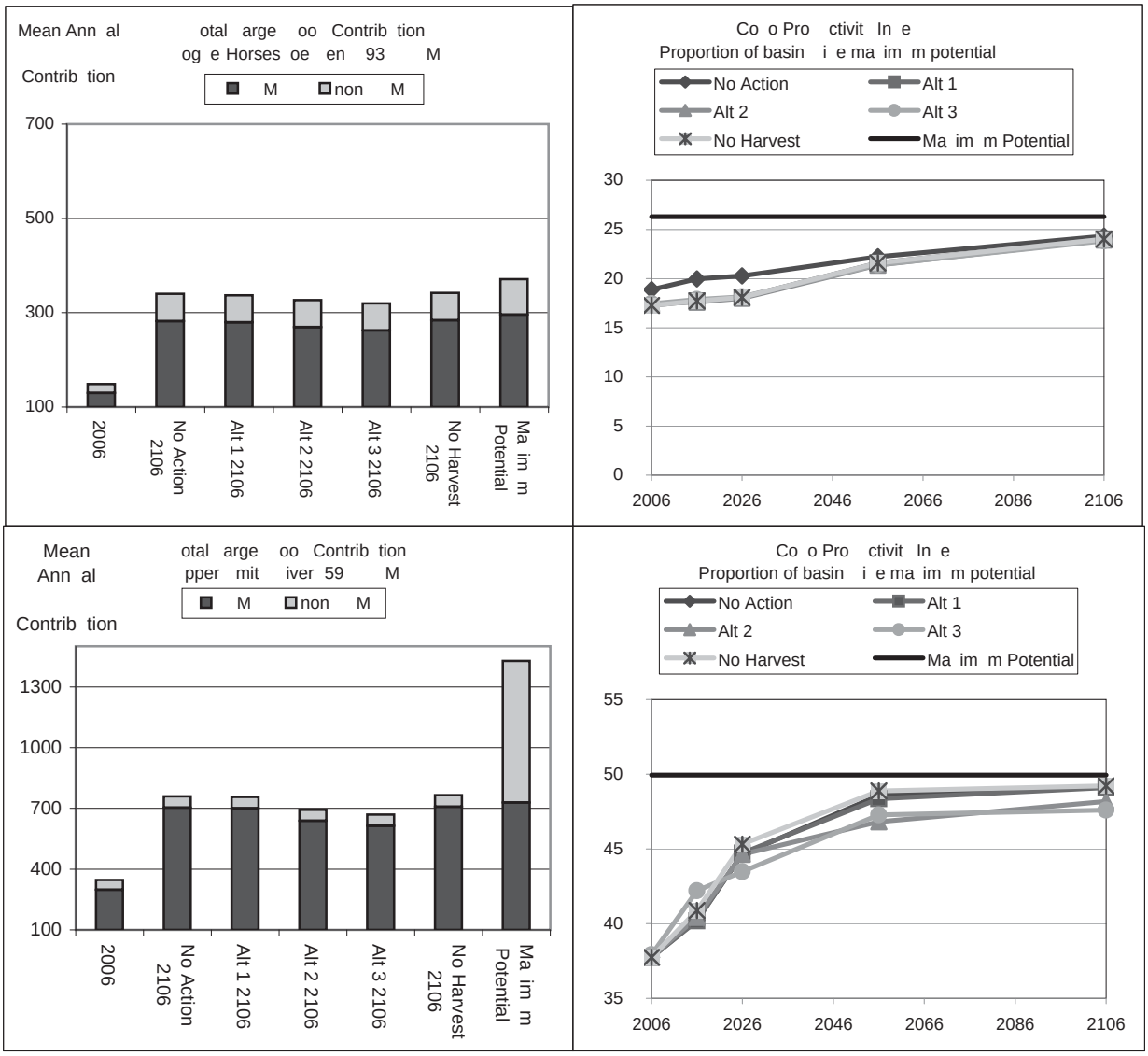
A variety of anadromous and resident fish species occur throughout the planning area (see the *Fish* section in *Chapter 3*). The requirements for habitat and the responses to habitat changes vary by species and vary among age groups within species. However, the fish species that would be affected by the BLM's management are similar enough to permit an analysis of how any changes to large wood, sediment, flow, or temperature would affect fish habitat.

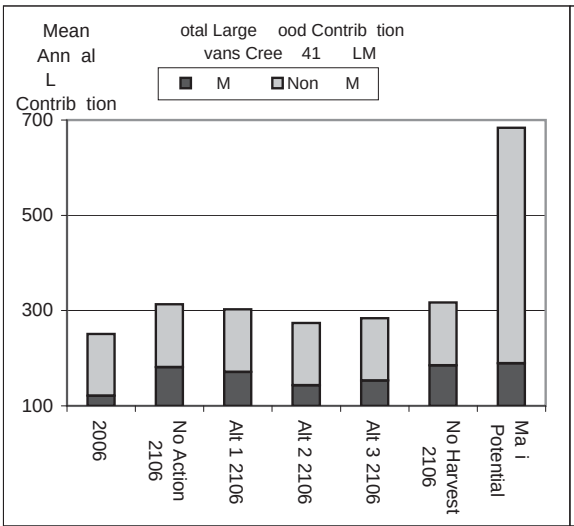
Large Wood

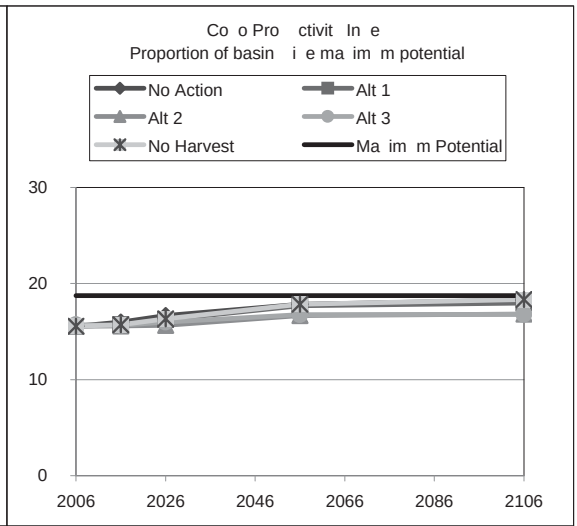
This analysis uses a large wood model to determine the mean annual large wood contribution under each alternative and the maximum potential large wood contribution to fish-bearing streams from BLM-administered lands and non-BLM-administered lands in representative watersheds. See the *Fish* section in *Chapter 3* for the descriptions of the five representative fifth-field watersheds. The model output of mean annual large wood contribution is not a prediction of actual instream conditions at a specific point in time, but represents a potential contribution to instream wood based on forest conditions over time. This analysis compares the mean annual large wood contribution to a maximum biological potential large wood contribution and determines a relative fish productivity index for coho salmon, chinook salmon, and steelhead trout based on the potential large wood contribution. Because the trends are similar for each species, fish productivity indices are displayed only for coho salmon.

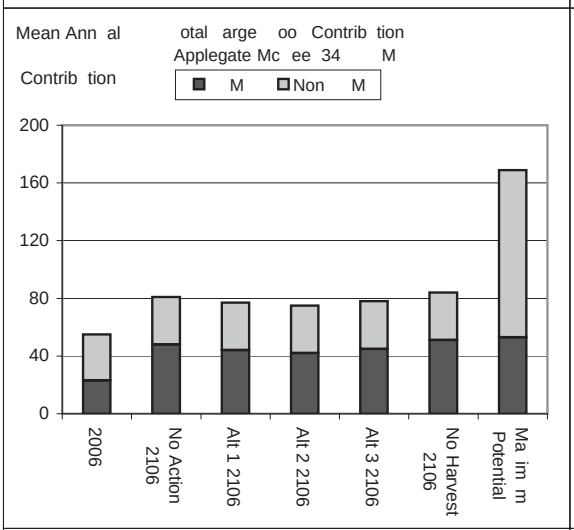
See *Figure 252 (Total large wood contribution and potential coho productivity index for the five representative fifth-field watersheds on the BLM-administered lands)* for the mean annual large wood contribution from BLM-administered lands and non-BLM-administered lands from 2006 to 2106 and the potential coho productivity index from BLM-administered lands in the five representative fifth-field watersheds.

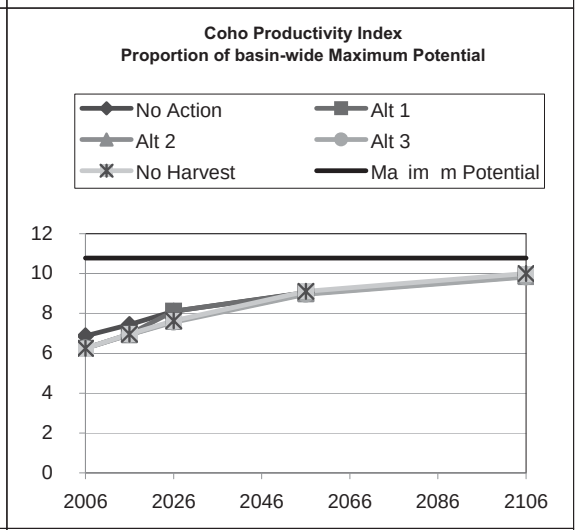
Figure 252. Total large wood contribution and potential coho productivity index for the five representative fifth-field watersheds on the BLM-administered lands

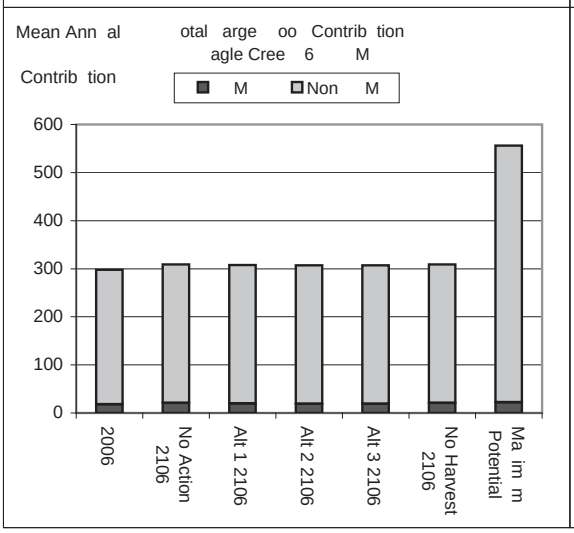


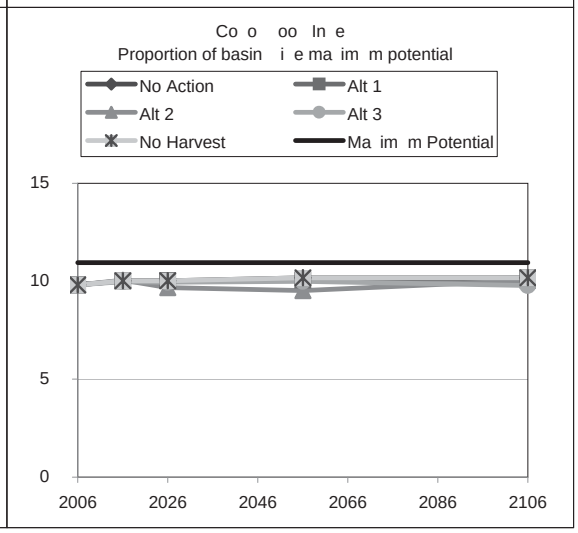

Mean
Ann al
L
Contrib tion
otal Large ood Contrib tion
vans Cree 41 LM
M
Non M
700
500
300
100
2006
No Action 2106
Alt 1 2106
Alt 2 2106
Alt 3 2106
No Harvest 2106
Ma i Potential


Co o Pro ctivit In e
Proportion of basin i e ma im m potential
No Action
Alt 1
Alt 2
Alt 3
No Harvest
Ma im m Potential
30
20
10
0
2006
2026
2046
2066
2086
2106


Mean Ann al
Contrib tion
otal arge oo Contrib tion
Applegate Mc ee 34 M
M
Non M
200
160
120
80
40
0
2006
No Action 2106
Alt 1 2106
Alt 2 2106
Alt 3 2106
No Harvest 2106
Ma im m Potential


Coho Productivity Index
Proportion of basin-wide Maximum Potential
No Action
Alt 1
Alt 2
Alt 3
No Harvest
Ma im m Potential
12
10
8
6
4
2
0
2006
2026
2046
2066
2086
2106


Mean Ann al
Contrib tion
otal arge oo Contrib tion
agle Cree 6 M
M
Non M
600
500
400
300
200
100
0
2006
No Action 2106
Alt 1 2106
Alt 2 2106
Alt 3 2106
No Harvest 2106
Ma im m Potential


Co o oo In e
Proportion of basin i e ma im m potential
No Action
Alt 1
Alt 2
Alt 3
No Harvest
Ma im m Potential
15
10
5
0
2006
2026
2046
2066
2086
2106

In all five fifth-field representative watersheds, the large wood contribution from the BLM-administered lands would increase under all four alternatives to near the maximum potential large wood contribution over the 100 year period. The proportion of large wood contribution from the BLM-administered lands would also increase under all four alternatives from 2006 to 2106. The results focus on long-term effects (100 years), which are driven by the changes in vegetative patterns that result from growth and harvesting. In the short term (within the next 10 years), the differences in effects between the alternatives are no greater than in the long term.

- Under the No Action Alternative, Alternative 1, and the no harvesting reference analysis, the large wood contribution would be nearly the same in all five fifth-field representative watersheds.[17]
- Under all four alternatives, the mean annual large wood contribution from the BLM-administered lands would be nearly the same over the 100-year period for two of the five representative watersheds (Eagle Creek and Applegate River/McKee Bridge).
- Under Alternatives 2 and 3, the mean annual large wood contribution from the BLM-administered lands would be slightly lower than under the No Action Alternative and Alternative 1 in three of the five representative watersheds (Evans Creek, Upper Smith River, and Rogue River/Horseshoe Bend).

In the Evans Creek representative watershed, the proportion of the maximum large wood contribution from the BLM-administered lands would increase from the current level of 64% to 96% by 2106 under the No Action Alternative, to 90% under Alternative 1, to 76% under Alternative 2, to 81% under Alternative 3, and to 98% under the no harvesting reference analysis.

In the Upper Smith River representative watershed, the proportion of the maximum large wood contribution from the BLM-administered lands would increase from the current level of 41% to 97% by 2106 under the No Action Alternative, to 96% under Alternative 1, to 88% under Alternative 2, to 84% under Alternative 3, and to 97% under the no harvesting reference analysis.

In the Rogue-Horseshoe Bend representative watershed, the proportion of the maximum large wood contribution from the BLM-administered lands would increase from the current level of 44% to 95% by 2106 under the No Action Alternative, to 94% under Alternative 1, to 91% under Alternative 2, to 89% under Alternative 3, and to 96% under the no harvesting reference analysis. The differences in percentages would account for less than 10 pieces of large wood per year over the entire representative watershed.

[17] The differences among the alternatives are slight when compared to the total wood contribution, and sources of error in modeling may be greater than any differences in large wood contributions in these representative watersheds. For example, there is a slight difference in how the modeling classified open water as nonforest for each alternative (see the *Ecology* section in *Chapter 3*). As a result, initial large wood contributions may be overestimated until 2056 for the No Action Alternative and Alternative 1 compared to Alternatives 2 or 3. This may in part explain the higher fish productivity values for the No Action Alternative in the Rogue-Horseshoe Bend watershed by 2016 and 2026.

Although the mean annual large wood contribution would increase in all five representative watersheds, it would be lower than the maximum potential in 2106, because not all forests that are capable of delivering large wood to fish-bearing streams would become mature or structurally complex forests by 2106, even under the no harvesting reference analysis.

In three of the five representative watersheds, the mean annual large wood contribution from non-BLM-administered lands would remain the same from 2006 to 2106. In the Eagle Creek representative watershed, non-BLM-administered lands comprise 94% of the watershed. For these non-BLM lands, the proportion of the mean annual large wood contribution of the maximum would increase by 2% from 52% in 2006 to 54% by 2106. In the Rogue-Horseshoe Bend representative watershed, the proportion of the mean annual large wood contribution of the maximum large wood contribution from non-BLM-administered lands would increases by 52% from 25% in 2006 to 77% by 2106. However, the non BLM-administered lands make up only 7% of the watershed. This analysis assumes that U.S. U.S. Forest Service reserves would continue to develop and all other lands would maintain their current abundances. See the *Ecology* section in this chapter.

See *Figure 253 (Riparian reserve and riparian management area widths and large wood contribution)* for an illustration of the riparian reserves and riparian management areas for each alternative and the average annual large wood contribution for the Upper Smith and Eagle Creek representative watersheds at the year 2106.

Figure 253. Riparian reserve and riparian management area widths and large wood contribution

No Action Alternative

Riparian reserve: 960,348 acres (37%)

Smith: 704 pieces per year

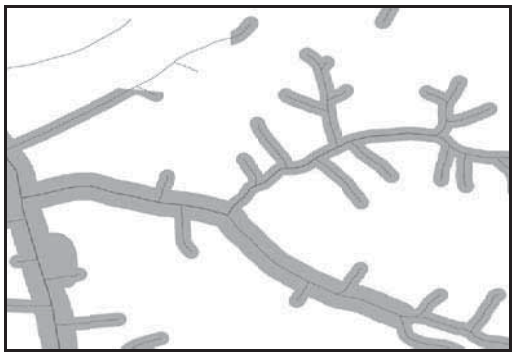
Eagle: 21 pieces per year

Alternative 1

Riparian management area: 508,763 acres (20%)

Smith: 701 pieces per year

Eagle: 20 pieces per year

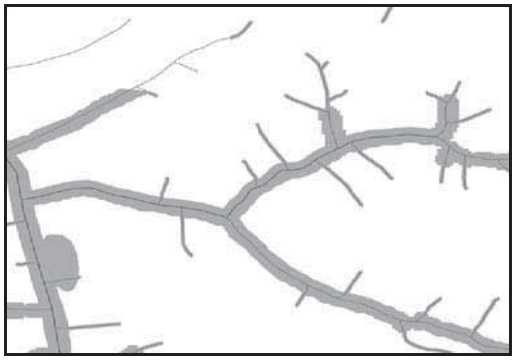


Alternative 2

Riparian management area: 196,421 acres (13%)

Smith: 638 pieces per year

Eagle: 19 pieces per year

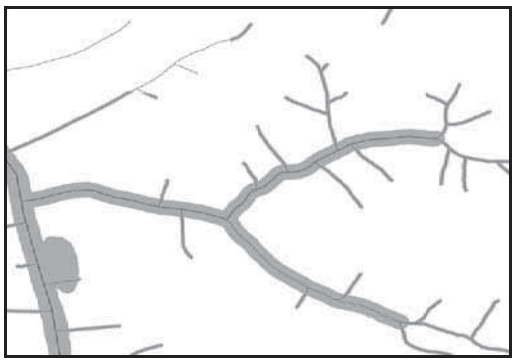


Alternative

Riparian management area: 282,837 acres (11%)

Smith: 614 pieces per year

Eagle: 19 pieces per year



The No Action Alternative has twice as many acres in a riparian reserve as Alternative 1. However, in all five representative watersheds, the large wood contribution would be nearly the same for the No Action Alternative and Alternative 1. The large wood contribution is slightly less under Alternatives 2 and 3 in several representative watersheds and nearly the same in the other representative watersheds. However, the amount of acres within the riparian management areas are far less (up to two-thirds less) than the riparian reserves under the No Action Alternative.

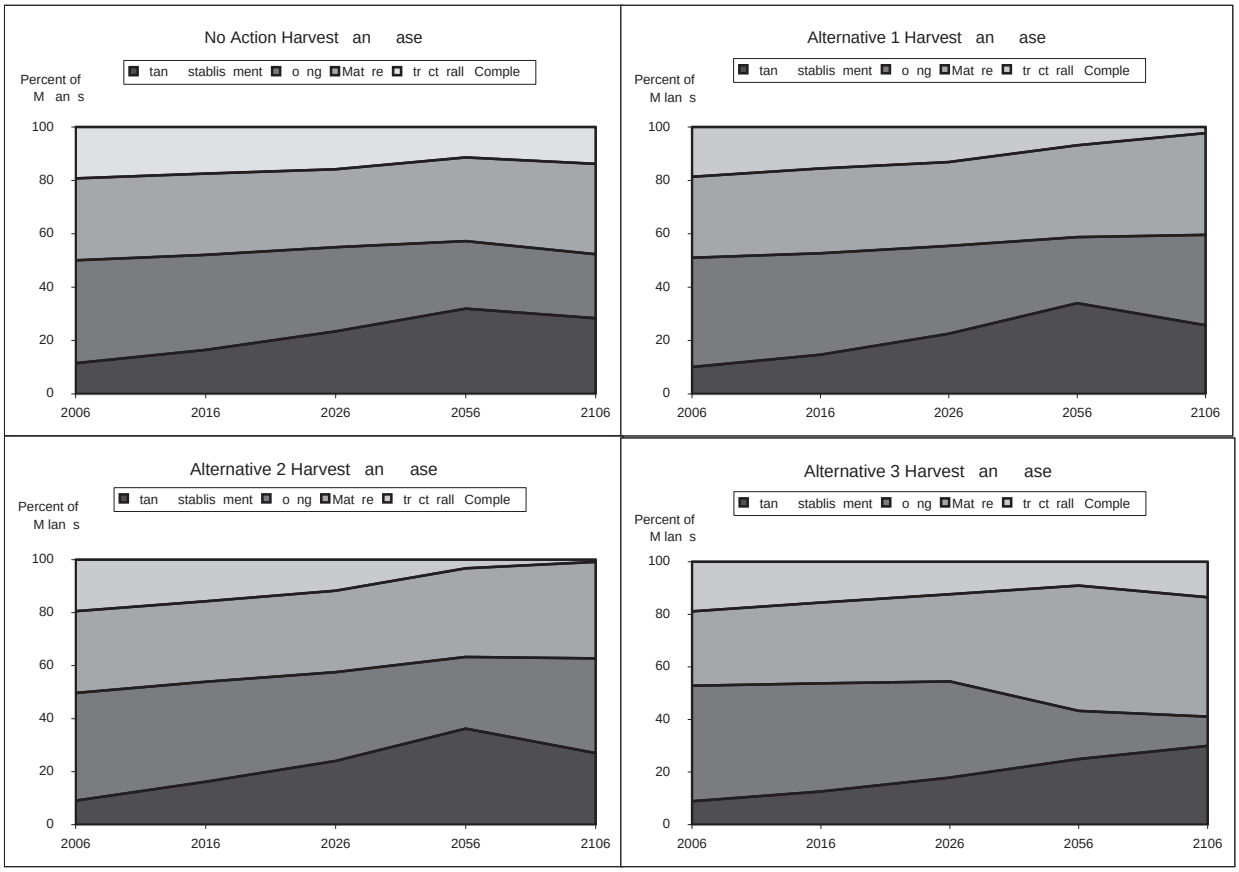
The large wood contributions would increase over time under all four alternatives and vary only slightly among the alternatives for several reasons, as follows.

Reason 1. Areas outside of the riparian management areas would contribute large wood to streams.

Large wood source areas that are not allocated to riparian management areas would contribute large wood to fish-bearing streams if they are in a mature&structurally complex forest condition. For example, large wood source areas would occur in areas withdrawn under the timber productivity capability classification (TPCC) or allocated to late-successional management areas. Under all four alternatives, the amount of the mature&structurally complex forests outside of riparian management areas would increase from 2006 to 2106. See *Figure 254 (Structural stage abundances in the harvest land base by alternative)*.

The large wood model considered all Stand Establishment and Young forests as not capable of providing large wood to streams. This underestimates large wood contribution from outside Riparian management areas under the No Action Alternative and Alternative 3. The No Action Alternative and Alternative 3 require green tree retention in regeneration harvests and partial harvest, which would ensure that future Stand Establishment and Young forests would include some trees greater than 20 inches in diameter, and therefore could provide some large wood to streams (see the *Ecology* section of this Chapter).

Figure 254. Structural stage abundances in the harvest land base by alternative

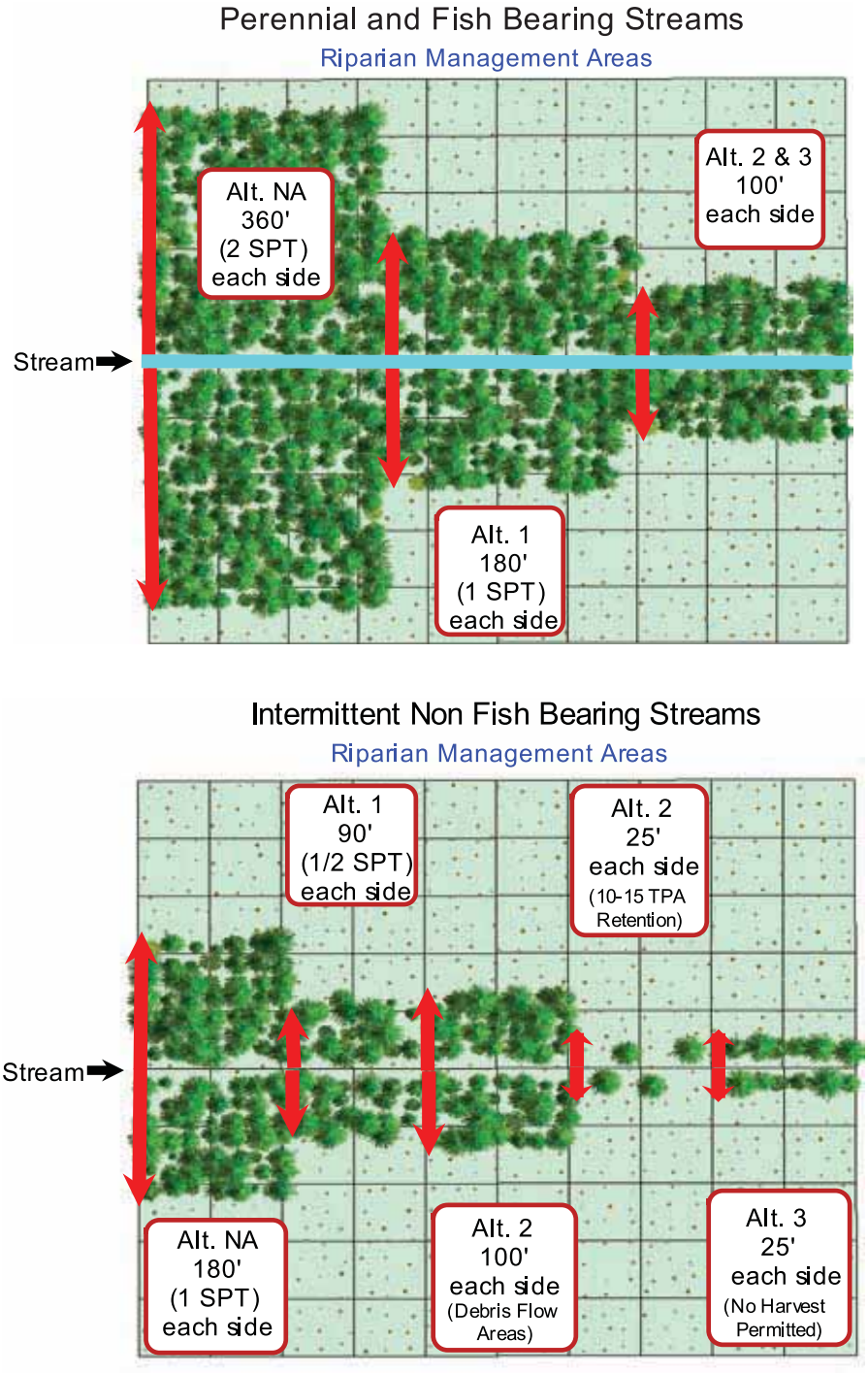


Reason 2. All four alternatives would incorporate most large wood source areas into the riparian reserves or the riparian management areas.

The acreage in the riparian reserves or the riparian management areas under the alternatives would vary more than the large wood contribution. This is because all four alternatives would incorporate most of the large wood source areas into the riparian management areas. In the five representative watersheds, the majority of the large wood comes from streamside areas. See *Figure 255 (Example of riparian management areas under all four alternatives)*.

Under all four alternatives, the riparian management areas would include a distance of at least 100 feet from all perennial streams, which would include most of the riparian sources of large wood to streams. Meleason et al. (2002) found that 90% of streamside large wood input originated from within 46 feet of streams when adjacent stands are 80 to 200 years of age and within 118 feet when adjacent stands are greater than 200 years of age. McDade et al. (1990) found that 90% of large wood recruitment from streamside sources occurs within 157 feet when adjacent stands are 80 to 200 years of age and 180 feet when adjacent stands are greater than 200 years of age. May and Gresswell (2003) found that 80% of large wood originated from trees that are rooted within 50 meters (164 feet) of the channel in colluvial streams and within 30 meters (98 feet) in alluvial channels.

Figure 255. Example of riparian management areas under all four alternatives

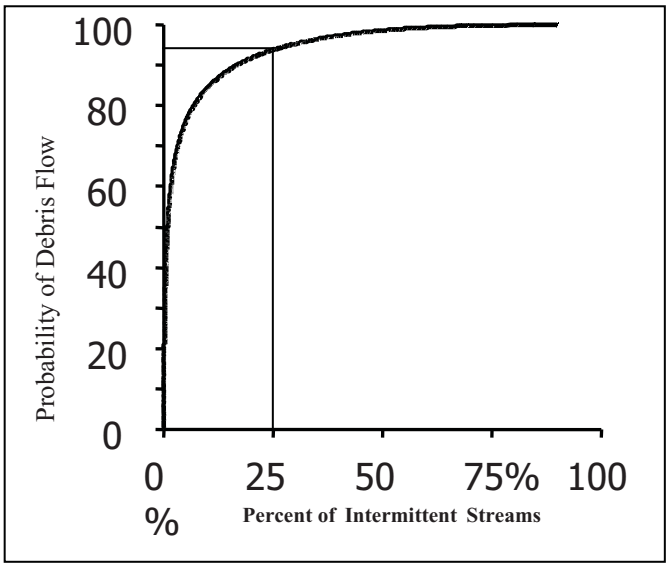


The widths of the riparian management areas also vary by alternative along headwater streams (non-fish-bearing intermittent channels).

Headwater streams differ in susceptibility to debris flows. The Coastal Landscape Analysis and Modeling Study (CLAMS), see *Figure 256 (Percent intermittent streams with highest probability of debris flow to fish-bearing stream channels)*

showed that a relatively small amount of intermittent channels deliver most of the large wood from these sources.

Figure 256. Percent intermittent streams with highest probability of debris flow to fish-bearing stream channels



Along intermittent streams, all four alternatives would incorporate some portion of large wood source areas into the riparian reserves or the riparian management areas. Alternative 3 would include the smallest proportion of large wood source areas along intermittent streams within riparian management areas, which explains why large wood contributions would be slightly lower in two of the five representative watersheds under Alternative 3.

Although Alternatives 2 and 3 would have similar riparian management areas along perennial streams, Alternative 2 would allocate larger riparian management areas on debris-flow prone intermittent streams and permit timber harvesting along other intermittent streams. The large wood contribution under Alternative 2 would be nearly the same as the No Action Alternative and Alternative 1 in two of the five watersheds, and nearly the same as Alternative 3 in all five representative watersheds. This is because there would be 100 foot riparian management areas under Alternative 2 along debris-flow prone intermittent channels having a high probability of delivering large wood to fish-bearing stream channels.

Reason 3. The abundance of structural stages within riparian management areas would change similarly over time under all four alternatives.

The contribution of large wood to streams would depend on the amount of mature&structurally complex forests within large wood source areas. Under all four alternatives, the amount of mature&structurally complex forests

would increase in the riparian reserves and the riparian management areas from 2006 to 2106. See the *Water* section in this chapter. As the amount of the mature&structurally complex forests increase in large wood source areas, the large wood contribution would also increase. The development of mature & structurally complex forests within the riparian management areas would be similar for all four alternatives. See the *Ecology* section in this chapter.

Fish Productivity

In all five representative watersheds, the relative potential of fish productivity for coho salmon, chinook salmon, and steelhead trout from BLM-administered lands would increase under all four alternatives between 2006 and 2106 to nearly the maximum potential. See *Table 210 (Relative potential of fish productivity index in 100 years compared to basin-wide maximum).*

Table 210. Relative potential of fish productivity index in 100 years compared to basin-wide maximum

Representative Watersheds	Fish Species	No Action Alt.	Alt. 1	Alt. 2	Alt. 3	No Harvesting Ref. Anal.	Maximum Potential
Upper Smith River	Coho	49	49	48	48	49	50
	Steelhead	53	53	51	51	53	53
	Chinook	48	48	48	47	48	49
Rogue River/ Horseshoe Bend	Coho	24	24	24	24	24	26
	Steelhead	29	29	29	29	29	32
	Chinook	18	18	18	18	18	20
Applegate River/ McKee Bridge	Coho	10	10	10	10	10	11
	Steelhead	11	11	11	11	11	13
	Chinook	5	5	5	5	5	6
Evans Creek	Coho	18	18	17	17	18	19
	Steelhead	21	21	19	19	21	22
	Chinook	15	15	14	14	14	16
Eagle Creek	Coho	10	10	10	10	10	11
	Steelhead	13	13	13	13	13	14
	Chinook	12	12	12	11	12	12

Note: The fish productivity index is estimated based on the surface area of the available stream habitat weighted by the intrinsic habitat potential value. The intrinsic habitat potential is based on topographical attributes of each stream reach including valley width, channel width, and channel gradient. This provides a comparison of the potential fish production between BLM and other land ownerships. As the proportion of the large wood contribution changes compared to the maximum potential large wood contribution, the fish productivity index would also change.

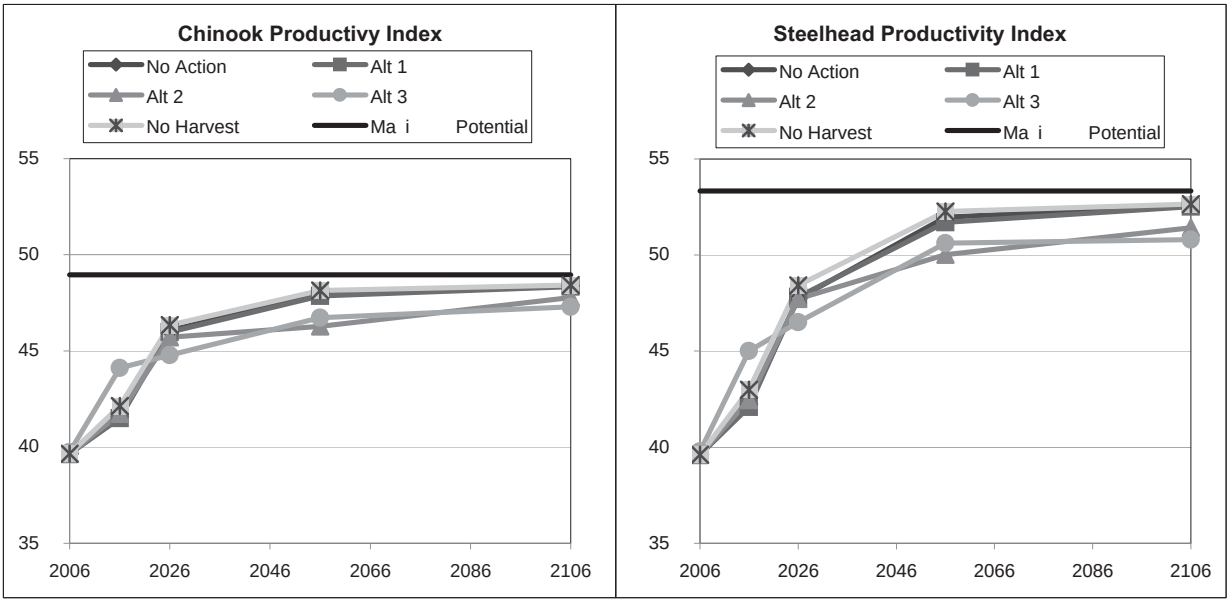
In the Rogue River/Horseshoe Bend and Applegate River/Mckee Bridge watersheds, there is no difference between all four alternatives in terms of the relative potential of fish productivity for coho salmon, chinook salmon, and steelhead trout.

In the other three representative watersheds, the relative potential of fish productivity for coho salmon, chinook salmon, and steelhead trout is the same under the No Action Alternative and Alternative 1, and slightly lower for some species under

Alternatives 2 and 3 (less than a 2% difference under Alternative 2 and 3 compared to the No Action Alternative).

For example, in the Upper Smith River, the relative proportion of the maximum potential watershed coho salmon productivity from BLM-administered lands would increase from the current level of 38% to 2106 levels of 49% under the No Action Alternative, Alternative 1, and the no harvesting reference analysis, 48% under Alternative 2, and 48% under Alternative 3. This trend for the three fish species is the same in the other four representative watersheds, and the difference in the proportion of the maximum watershed fish productivity from BLM-administered lands among the alternatives would be less than 2%. See *Figure 257 (Chinook salmon productivity index and steelhead trout productivity index for the Upper Smith River representative watershed).*

Figure 257. Chinook salmon productivity index and steelhead trout productivity index for the Upper Smith River representative watershed



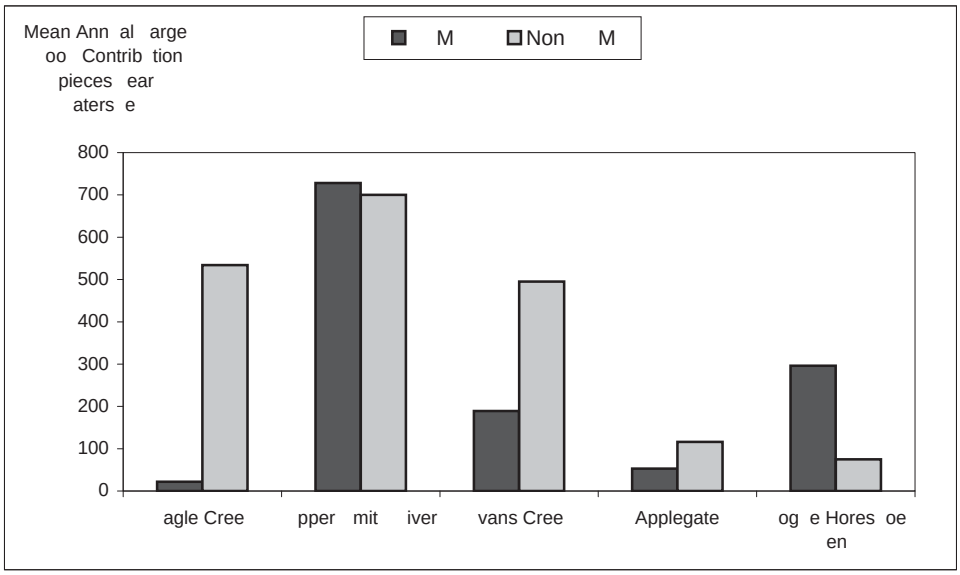
Although the proportion of the maximum large wood contribution would vary slightly among the alternatives in the Evans Creek representative watershed (14% difference among the alternatives) and the Rogue River/Horseshoe Bend representative watershed (7% difference among the alternatives), the differences among the alternatives in terms of fish productivity from the BLM-administered lands would be far smaller (less than 2%). The differences in the increase in large wood contribution in the Evans Creek and the Rogue River/Horseshoe Bend representative watersheds would have little effect on fish productivity because there are few high intrinsic potential streams on BLM-administered lands in those watersheds and the mature&structurally complex forest stands likely occur along the high intrinsic potential streams.

The effect of the four alternatives on fish productivity in the five representative watersheds would be influenced by the large wood contribution and the amount of high intrinsic potential streams on BLM-administered lands, as follows.

Reason 1. The maximum potential large wood contribution varies among watersheds.

In general, the potential for large wood to be delivered to a fish-bearing stream channel would vary among the watersheds. Some watersheds have a greater potential to deliver large wood to fish-bearing stream channels than others. See Figure 258 (*Maximum large wood contribution to fish bearing streams)* for how the maximum large wood contribution varies between the five representative watersheds.

Figure 258. Maximum large wood contribution to fish-bearing streams



The differences among watersheds, in general, explain why the maximum large wood contribution would vary greatly among the representative watersheds.

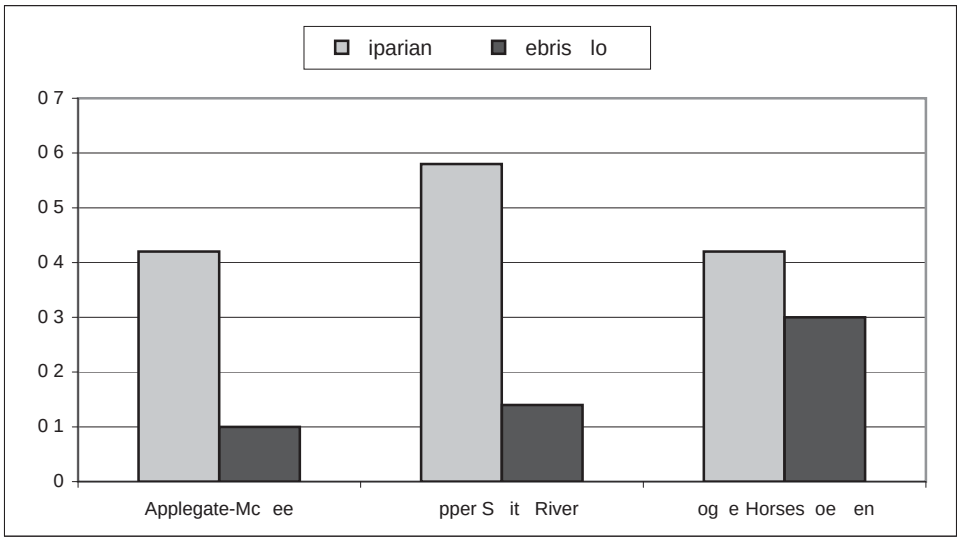
For example, the maximum large wood contribution from the BLM-administered lands in the Upper Smith River representative watershed (728 pieces per year) is more than twice that in the Rogue River/Horseshoe Bend representative watershed (296 pieces per year), even though the percentage of the BLM-administered land within the Upper Smith River representative watershed is about one-third less (59% and 93%, respectively). See the *Fish* section in *Chapter 3*.

Reason 2. The relative importance of each source area differs between watersheds.

The majority of large wood is delivered from riparian and flood plain source areas. All four alternatives include at least a 100 foot riparian management area around these large wood source riparian areas. The slight differences are a result of the differences in riparian management area widths along intermittent channels. Headwater streams differ in susceptibility to debris flows within watersheds and among watersheds. The rate and amount of wood recruited

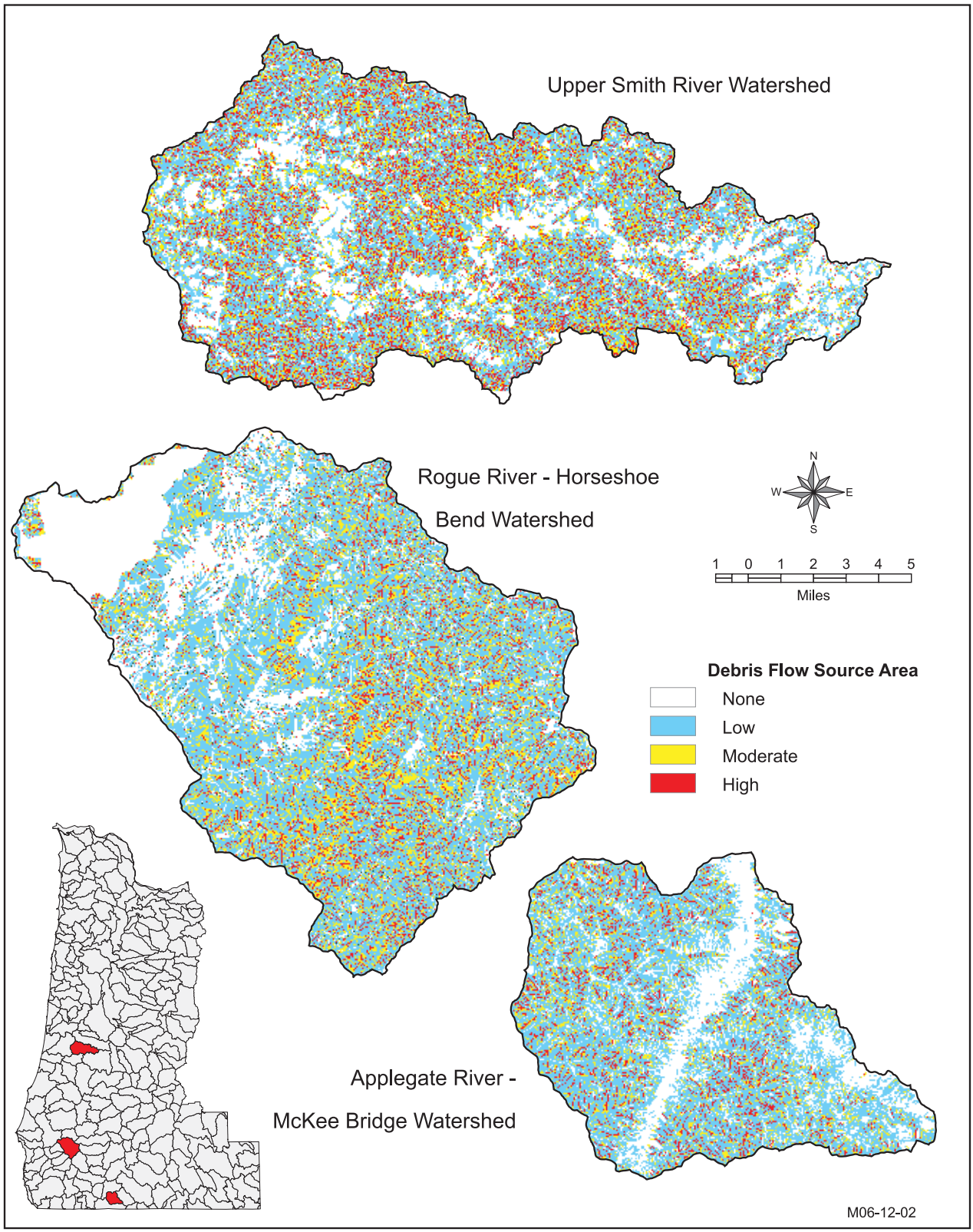
from these upslope debris-flow sources varies between watersheds. See *Figure 259 (Wood contribution by source)* and *Figure 260 (Debris flow probabilities between watersheds)*.

Figure 259. Wood contribution by source



Although the Rogue River/Horseshoe Bend representative watershed has a greater percentage of large wood coming from debris flow sources and a similar amount coming from riparian and floodplain sources as does the Upper Smith River representative watershed, it has a lower density of fish-bearing stream channels in the watershed on the BLM-administered lands. In these watersheds, the low density of fish-bearing streams suggests that there are some watersheds where timber harvesting would have a lesser effect on wood recruitment to fish-bearing channels. In the Upper Smith River representative watershed, the high density of fish-bearing channels suggests that timber harvesting has a greater potential to effect wood recruitment to fish-bearing streams.

Figure 260. Debris flow probabilities between watersheds



Reason 3. Increasing the large wood contribution along high intrinsic potential streams affects fish productivity more than increasing it along low intrinsic potential streams.

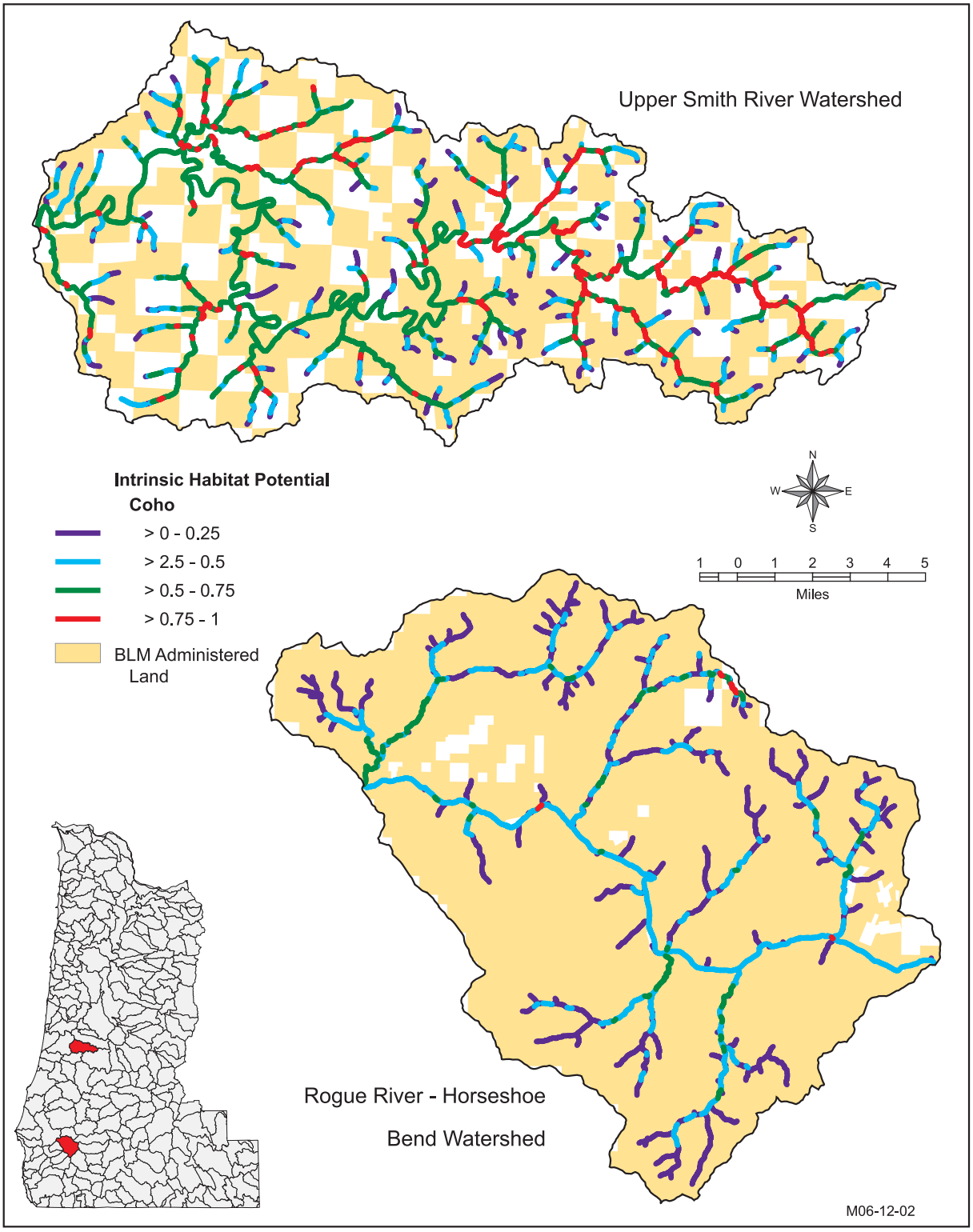
Fish productivity is largely dependant on the number of miles of high intrinsic potential streams within a watershed. The amount of high intrinsic potential streams varies among the watersheds. See *Figure 261 (Differences in the number of miles of high intrinsic potential streams between watersheds on BLM-administered lands)*.

In the Evans Creek representative watershed, the BLM-administered lands are 41% of the watershed, but would only affect approximately 16%, 19%, and 22% of the maximum potential productivity for the coho salmon, chinook salmon, and steelhead trout, respectively, because the majority of the high intrinsic potential stream habitat is on the non-BLM-administered lands.

In the Rogue River/Horseshoe Bend representative watershed, the BLM-administered land is 93% of the watershed, but there are very few high intrinsic potential stream channels, and most are on non-BLM-administered land.

In the Upper Smith River representative watershed, where there is a greater amount of BLM-administered land along high intrinsic potential stream channels than in the other representative watersheds, there would be a slightly greater difference (2%) among the alternatives in their effect on steelhead trout productivity compared to other representative watersheds.

Figure 261. Differences in the number of miles of high intrinsic potential streams between watersheds on BLM-administered lands

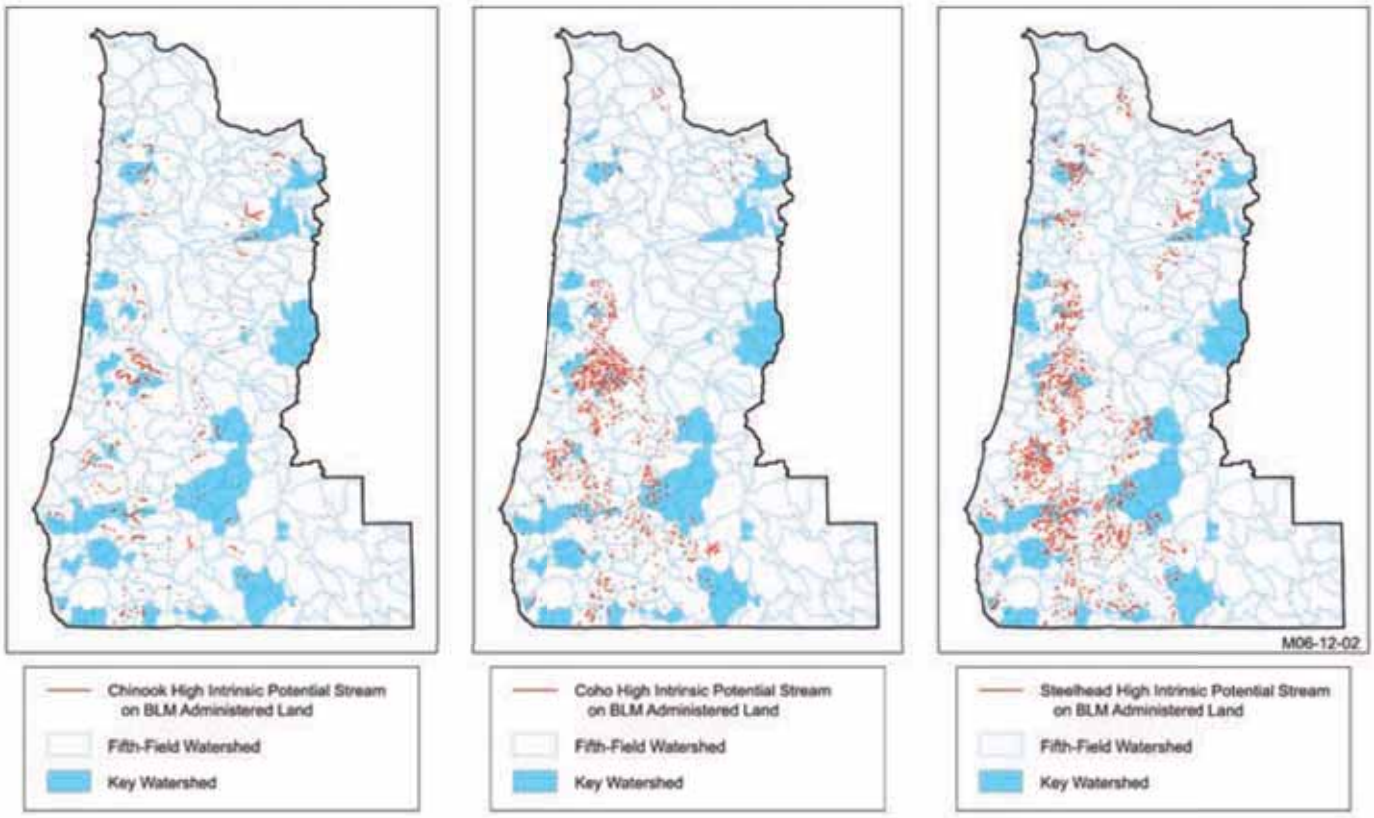


Instream Restoration

It is assumed that the annual instream restoration would be 11 miles under all four alternatives (based on the level of instream restoration that has occurred from 1995 to 2006), but would be applied in different areas. Under the No Action Alternative, key watersheds would continue to be high priority areas for instream restoration. Key watersheds do not always coincide with high intrinsic potential streams (see the *Fish* section in *Chapter 3*).

Figure 262 (Distribution of high intrinsic potential streams for chinook salmon, coho salmon, and steelhead trout within key watersheds of the planning area) shows that a relatively small portion of the high intrinsic potential streams occur within key watersheds.

Figure 262. Distribution of high intrinsic potential streams for chinook salmon, coho salmon, and steelhead trout within key watersheds of the planning area



Under the action alternatives, priority for instream restoration would be given to areas along high intrinsic potential streams. Because increasing the large wood in high intrinsic potential streams would be more effective in improving habitat complexity and fish productivity than increasing the large wood in other streams (see the *Fish* section in *Chapter 3*), instream restoration under the action alternatives would be more effective in improving fish productivity than under the No Action Alternative.

Nutrient Input

As noted in the *Fish* section of *Chapter 3*, the thresholds for the amount of organic input that are adequate to maintain food supplies for fish are unknown. All four alternatives would maintain nutrient input because all four alternatives would maintain some type of streamside vegetation.

Organic inputs under the No Action Alternative and Alternative 1 would be increasingly dominated by conifer needles, because the riparian reserves and the riparian management areas, which include the area along streams that would provide organic inputs, would develop into mature&structurally complex conifer forests over time (see the *Ecology* section in this chapter).

Under Alternatives 2 and 3, the organic inputs along perennial streams would be similar to the No Action Alternative and Alternative 1. However, along non-fish-bearing intermittent streams, some localized shifts in vegetation would occur because the riparian management areas would not include all of the areas that provide organic inputs to streams. Timber harvesting would alter the vegetation in these areas, which would create younger forest conditions with more shrub and hardwood organic input than the No Action Alternative or Alternative 1. This shift in stand ages and species composition would provide a variety of organic materials at varying rates, thereby adding to habitat heterogeneity. However, there is inadequate information to conclude that shifts in nutrient inputs would result in any difference in the effects of the alternatives on fish productivity.

Fine Sediment Delivery

As noted in the *Fish* section of *Chapter 3*, thresholds have not been established for the levels of sediment delivery that would cause impairment to fish. This analysis focuses on the management activities that would change the magnitude, timing, or duration of sediment transport and overwhelm the ability of fish to cope with or avoid the stress. This analysis assumes that every 1% increase in fine sediment from management activities would result in a 3.4% decrease in fish survival (see the *Fish* section in *Chapter 3*).

The proximity of ground disturbances to streams is an important factor for controlling sediment delivery. The potential for an increase of fine sediment delivery to fish-bearing stream channels could occur from soil disturbances from timber harvesting activities, road construction and use, culvert replacement, instream restoration activities, and grazing.

The potential for increased fine sediment delivery from timber harvesting activities would be greatest under Alternative 2. Over 10 years under Alternative 2, approximately 400 acres of regeneration timber harvesting would occur along non-debris-flow prone intermittent channels across the planning area (less than 0.5% of total BLM-intermittent stream miles). Although more harvesting would occur near the stream channel under Alternative 2 than in other alternatives, best management practices would reduce the amount of disturbances near stream channels. See the *Water* section in this chapter.

Fine sediment production would increase with road construction, use, maintenance, and decommissioning. Actions that expose the soil surface or disturb road or ditch surfaces would increase erosion potential. Once fine particles have been produced, they would be available for transport to streams where they could impact the quality of salmonid habitat (IMST 1999). Under all four alternatives, new roads would be located outside of a stream influence zone where possible, and these miles most likely would not deliver fine sediment to streams channels. See the *Water* section in this chapter. During the next 10 years under all four alternatives, the potential fine sediment delivery from new roads would be less than 1% of the fine sediment delivery from existing roads. Best management practices for road-related activities would also reduce the amount of fine sediment that is delivered to stream channels.

Under all four alternatives, the rate of susceptibility to shallow landsliding from timber harvesting and road construction over the next 10 years would not increase. This is because fragile soils susceptible to landsliding are either currently withdrawn under the timber productivity capability classification system as nonsuitable forest or would be withdrawn when identified with a project activity. See the *Water* section in this chapter.

The placement of culverts and instream structures could result in an increase in turbidity and potential downstream sediment delivery, and often would occur during low flow periods when fish are most vulnerable to fine sediment. Under all four alternatives, culvert replacements and other instream activities would cause short-term, localized increases in turbidity (less than eight hours and less than 300 feet). The increase in turbidity would not affect fish populations because:

- Best management practices, such as diverting water around a site, use of containment and filtering techniques (e.g., silt curtains), and limiting mechanized equipment along streambanks, would mitigate increases in turbidity.
- The majority of culverts that are barriers to anadromous salmonids have already been replaced on BLM-administered lands (see the *Fish* section in *Chapter 3*), so future culvert replacements would occur infrequently and the effects would be spread out over a large area.
- Fish have the ability to avoid short-term and localized turbidity. The amount of instream restoration activities and the best management practices applied to minimize increases in turbidity would be the same under all four alternatives.

Grazing in riparian areas can reduce and eliminate streambank vegetation and can increase sediment to stream channels. Within the planning area, sedimentation is a limiting factor for endangered Lost River and Shortnose suckers (USDI, USFWS 2003d). Under the three action alternatives, up to 29 reservoirs and 48 miles of fence would be constructed within the Klamath Falls Resource Area of the Lakeview District. These range improvements would be used to improve livestock distribution by shifting the grazing pressure from riparian and wetland areas to upland areas, and shift the grazing distribution on the upland areas (including those areas that are not currently used). These actions would be consistent with conservation measures of the recovery plan for the Lost

River and Shortnose suckers to fence portions of streams to reduce cattle-caused erosion and to replant streambanks with native vegetation (USDI, USFWS 2003d).

Even though there would be short-term (less than one year), localized increases in fine sediment delivery from culvert, grazing, and other management activities under all four alternatives, there would be less than a 1% increase in fine sediment compared to existing rates from road-related activities, which often accounts for the majority of sediment that is delivered to stream channels. See the *Water* section in this chapter.

Peak Flows

Peak flows would not increase in fifth-field watersheds under any of the alternatives to a level that would affect fish habitat, because they would not cause 5-year, 24-hour flow to occur at the 2-year, 24-hour interval. See the *Fish* section in *Chapter 3*.

One sixth-field subwatershed out of 635 would be susceptible to increases in peak flow in rain-dominated areas (where the 2-year, 24-hour bankfull channel forming peak flow is greater than the 5-year, 24-hour peak flow). For rain-on-snow-dominated areas, three sixth-field subwatersheds out of 471 would be susceptible to peak flow increases. See the *Water* section of this chapter.

In these four sixth-field watersheds, some intermediate streamflows may be elevated in the short term (a few hours to a few days), but this does not automatically imply adverse effects on stream morphology and fish habitat. Site-specific information regarding stream types and the resistance to the adjustment of bed and banks, as well as existing fisheries habitat information, would need to be analyzed during project implementation.

Stream Temperature

None of the alternatives would contribute to an increase in stream temperatures, except for the following temporary and localized exceptions. There are 31 miles of perennial streams on BLM-administered lands that are adjacent to the Coquille Forest (including 10 miles within the East Fork Coquille watershed and 20 miles within the Middle Fork Coquille Watershed). Under Alternatives 2 and 3, trees in the primary shade zone would be fully retained. However, the secondary shade zone would have varying amounts of tree retention. This would decrease effective shade by 10 to 20% and result in a probable temperature change of up to 1ºF per mile. See the *Water* section in this chapter. This increase in temperature would occur on a limited amount of stream miles relative to the entire planning area (less than 0.05%). However, streams in the Coquille basin are listed as temperature-limited by the Oregon Department of Environment Quality. In these areas, increases in stream temperature could cause stress to fish by limiting their ability to absorb oxygen at certain temperatures. Mitigation could be applied to eliminate these adverse effects and it is described in the *Water* section of this chapter.

Mitigation

To mitigate for the slightly reduced large wood contributions that would occur under Alternatives 2 and 3, apply the width of one site potential tree height to riparian management area along intermittent channels where the large wood contribution from BLM-administered lands would be delivered to a greater percentage of high intrinsic potential stream channels within the watershed.