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Forest Conference-Supplemental Environmental Impact Statement (SEIS)-Summary

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# Summary

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## INTRODUCTION

This Final Supplemental Environmental Impact Statement (Final SEIS) presents 10 alternatives and discloses their environmental effects. These alternatives propose alternate Forest Service and the Bureau of Land Management (BLM) management direction within the range of the northern spotted owl. These lands are in the Pacific Northwest and northern California. Each alternative consists of combinations of (1) land allocations managed to protect and enhance habitat for late-successional and old-growth forest related species and to protect and enhance aquatic resources, and (2) standards and guidelines for the management of these land allocations. Alternative 9 is identified as the preferred alternative, and represents the forest ecosystem plan proposed by President Clinton on July 1, 1993.

## BACKGROUND

The ongoing controversy concerning management of federal lands has resulted in what has been described as a gridlock of lawsuits, court rulings, appeals, and protests. The public debate has expanded from a focus on management of northern spotted owl habitat to include management of all old-growth forest associated species and old-growth ecosystems.

Recent court rulings require completion of environmental impact statements. The Forest Service is required by the U.S. District Court for the Western District of Washington to prepare a new or supplemental environmental impact statement (EIS) to correct deficiencies the court found in the 1992 *Final Environmental Impact Statement on Management for the Northern Spotted Owl in the National Forests*. The BLM is required by the U.S. District Court for the District of Oregon to prepare an EIS to incorporate new information on the effects of logging on the northern spotted owl and to consult on a conservation strategy. Both agencies are currently enjoined from selling timber in northern spotted owl habitat.

To seek a solution to the controversy, President Clinton held a Forest Conference in Portland, Oregon, on April 2, 1993. During the day-long conference, scientists, economists, representatives from the forest products industry and environmental groups, Indian tribes, and others were invited to present concerns, opinions, or proposals to the President concerning the various issues surrounding the management of federal lands in the Pacific Northwest and northern California.

After the Forest Conference, the Forest Ecosystem Management Assessment Team ("the Assessment Team") was assembled to prepare an assessment that took an ecosystem approach to forest management. The Assessment Team examined many options, evaluated them, and developed and presented 10 options in their report, *Forest Ecosystem Management: An Ecological, Economic, and Social Assessment* ("the FEMAT Report"). It is available on request.

Using the FEMAT Report, the SEIS Interdisciplinary Team prepared a Draft SEIS with the Assessment Team's 10 options as alternatives. The Draft SEIS was available to the public, agencies, tribes, and other governments for review on July 30, 1993. Following a 90-day comment period which included public

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hearings and which elicited over 100,000 comments, the SEIS Interdisciplinary Team considered these comments, utilized new information, modified some of the alternatives, and subsequently prepared this Final SEIS.

## The Underlying Needs and Purposes

The agencies are responding to dual needs: the need for forest habitat and the need for forest products.

The need for forest habitat is the need for a healthy forest ecosystem with habitat that will support populations of native species (particularly those associated with late-successional and old-growth forests) and includes protection for riparian areas and waters. This need was reflected by President Clinton in these words at the Forest Conference:

*[A]s we craft a plan, we need to protect the long-term health of our forests, our wildlife, and our waterways. . . . [W]e hold them in trust for future generations.*

The need for forest products from forest ecosystems is the need for a sustainable supply of timber and other forest products that will help maintain the stability of local and regional economies on a predictable and long-term basis. This need was reflected by President Clinton in these words at the Forest Conference:

*[W]e must never forget the human and the economic dimensions of these problems. Where sound management policies can preserve the health of forest lands, [timber] sales should go forward.*

*[T]he plan should produce a predictable and sustainable level of timber sales and nontimber resources that will not degrade or destroy the environment.*

Each of the alternatives in this SEIS meets both needs to some degree. While meeting the underlying needs, the agencies also strive to meet additional purposes.

The agencies must take an ecosystem management approach to forest management, with support from scientific evidence, and meet the requirements of existing laws and regulations. These requirements were reflected by President Clinton at the Forest Conference:

*[O]ur efforts must be, insofar as we are wise enough to know it, scientifically sound, ecologically credible, and legally responsible.*

The agencies must cooperate with all the federal agencies. As also stated by President Clinton at the Forest Conference:

*[W]e will do our best to make the federal government work together and work for you. We may make mistakes but we will try to end the gridlock within the Federal Government and we will insist on collaboration not confrontation.*

## Summary

The alternatives considered in detail in this SEIS respond to these underlying purposes and needs. Alternatives that would not meet these underlying purposes and needs were eliminated from detailed study.

## The Proposed Action

The proposed action is to adopt coordinated management direction for the lands administered by the Forest Service and the Bureau of Land Management within the range of the northern spotted owl that meets the underlying need and purposes. This regionwide management direction will provide overall coordination across administrative units, provinces, and watersheds. The action will amend the management direction established in all existing Forest Service and BLM land management plans for the areas and resources covered by this SEIS. This new management direction will apply to projects that will be conducted after site-specific environmental analysis. The existing management plans to be amended include existing Regional Guides, Forest Plans, Unit Plans, Timber Management Plans, Management Framework Plans, and Resource Management Plans for lands within the range of the northern spotted owl. The coordinated management direction established by the Record of Decision for this SEIS will also be incorporated into all land and resource management plans within the range of the northern spotted owl as they are completed or revised.

## The Issues

For more than two decades there has been growing controversy about the management of the old-growth forests on federal lands. When harvested, they have great economic value and make way for younger forests and the wildlife they support. If preserved, they provide an environment for many other species and contribute to other nontimber forest values and environmental qualities.

At the Forest Conference, President Clinton posed the fundamental question in his opening remarks:

*How can we achieve a balanced and comprehensive policy that recognizes the importance of the forests and timber to the economy and jobs of this region, and how can we preserve our precious old-growth forests, which are part of our national heritage and that, once destroyed, can never be replaced?*

President Clinton continued:

*The most important thing we can do is to admit, all of us to each other, that there are no simple or easy answers. This is not about choosing between jobs and the environment, but about recognizing the importance of both and recognizing that virtually everyone here and everyone in this region cares about both.*

The ecological systems within the range of the northern spotted owl are complex and varied. Managing these ecosystems to preserve and enhance late-successional and old-growth forests and aquatic resources will have major

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effects on the overall structure, function, and appearance of the region's forests; the water quality in streams and rivers; and the distribution, connectivity, diversity, and sustainability of its terrestrial and aquatic communities.

In the last decade, the northern spotted owl became the focus in the debate over how federal forest lands should be managed. However, the management of habitat for the northern spotted owl affects other terrestrial and aquatic species and the region's ecological systems collectively. There are 40 federally-listed threatened or endangered species that may occur within the range of the northern spotted owl; of these, about half use coniferous forest habitat on federal lands.

The northern spotted owl and the marbled murrelet are listed as threatened species. The long-term persistence of the spotted owl and other old-growth related species depends in large measure on providing habitat of adequate amount and distribution to support their life functions. While most people want the spotted owl and other old-growth species to survive, there is disagreement over the size of populations that should be provided for, and the forest management that will allow for long-term survival.

Aquatic and riparian areas are integral parts of the region's ecosystems and major factors in supporting the economy of the region. Damage to forest aquatic and riparian systems has contributed to degradation of some plant and animal communities. Of immediate concern is the loss of salmon and steelhead runs, which are major cultural and economic elements in the Pacific Northwest and northern California.

Since World War II, timber harvest and reforestation have been a major part of the Forest Service and Bureau of Land Management's role of actively managing federal lands for a variety of sustainable benefits for the Nation and to establish younger forest stands. Species that need young forests and species that need older forests are affected in different, often opposite, ways by changes in the age, composition, and distribution of the habitat each need. Older forests are essential habitat for many species; as the amount of older forests has decreased, the survival of old-growth related species, including the northern spotted owl, has become more uncertain.

The BLM and Forest Service's timber management programs provide raw material for the wood products industry that, after milling and processing, serve the needs of a large number and variety of consumers. The wood products industry's principal employment is located in small cities, towns, and rural areas. From 1986 to 1990, wood from federal forests supported half the industry's jobs. Additionally, a quarter of the receipts from timber sales on federal lands (and half of the receipts from the Oregon and California Revested Lands (O&C lands)) go to county governments.

Reductions in the amount of timber sold for harvest directly affect employment and the economic health of the forestry and wood products industries. These, in turn, immediately affect the economic vitality of the communities dependent on them, and the well being of workers and families. These changes threaten the ability of some of these communities and their institutions to survive.

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There are other human uses of federal forest lands that would be enhanced, maintained or curtailed if forests were managed to benefit the northern spotted owl and other late-successional and old-growth related species. Road construction and use, recreation, mining, and other land uses will be affected. There are alternate paths for people and communities to take to adjust to changes. The effectiveness of those paths and the human costs of making those changes are dynamic and significant issues.

## **The Alternatives**

### **THE NO-ACTION ALTERNATIVE**

The No-Action Alternative is essentially comprised of the "No-Action" Alternatives in the EISs being supplemented by this SEIS. The No-Action Alternative in this SEIS basically represents management direction that was in place immediately before the release of the Interagency Scientific Committee's (ISC) *A Conservation Strategy for the Northern Spotted Owl* in the spring of 1990. Because of subsequent listings of the marbled murrelet and the northern spotted owl as threatened species, this No-Action Alternative is no longer a reasonable alternative and could not be implemented today.

### **INTRODUCTION TO THE ACTION ALTERNATIVES**

The 10 action alternatives presented in this SEIS are developed, with modification, from the 10 ecosystem management options developed by the Forest Ecosystem Management Assessment Team and described in the FEMAT Report. The management direction in the alternatives applies only to lands administered by the Forest Service and Bureau of Land Management within the range of the northern spotted owl. Each alternative assumes other federal lands, such as those administered by the Fish and Wildlife Service, National Park Service, and Department of Defense, will be managed according to existing management plans and applicable federal law.

### **HOW THE ALTERNATIVES ARE STRUCTURED**

Like other recent strategies for management of northern spotted owl habitat or old-growth forests of the Pacific Northwest, the alternatives presented in this SEIS propose a network of designated areas managed primarily to protect and enhance habitat for the northern spotted owl and other late-successional and old-growth forest related species (hereafter referred to as designated areas), and nondesignated areas referred to as the matrix. Within each of these areas, standards and guidelines set management direction and apply to management activities.

Each action alternative uses current plans and draft plan preferred alternatives as a starting point, or baseline. Therefore, unless specifically excepted, standards and guidelines of the current plans and draft plan preferred alternatives apply to all alternatives where they are more restrictive or provide greater benefits to late-successional forest related species than the provisions of these alternatives.

### **LAND ALLOCATIONS**

There are 24,455,300 acres of federal land within the range of the northern spotted owl. Each alternative in this SEIS allocates these acres to one of the following six categories of designated areas, or to the matrix. The categories are listed in the order that acreage was tabulated, and not necessarily in the order that corresponding standards and guidelines take precedence.

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## Designated Areas

### CONGRESSIONALLY RESERVED AREAS

All alternatives retain land allocations for existing lands that are congressionally reserved. These include lands with congressional designations that preclude timber harvest, as well as other federal lands not administered by the Forest Service or BLM. This includes National Parks and Monuments, Wildernesses, Wild and Scenic Rivers, National Wildlife Refuges, and military reservations. The location and size of these areas do not change among the alternatives. Management of these lands follows direction written in the applicable legislation or plans.

### LATE-SUCCESSIONAL RESERVES

Late-Successional Reserves are identified for each alternative. These areas would be managed 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. For most alternatives, some level of silvicultural treatment (such as thinning young stands) is permitted in stands of a certain age to accelerate the development of old-growth habitat characteristics, subject to review by the Regional Ecosystem Office. These reserves are designed to maintain a functional, interacting, late-successional and old-growth forest ecosystem. A management plan should be prepared for each large Late-Successional Reserve (or group of smaller Late-Successional Reserves) before habitat manipulation activities are designed and implemented. Silvicultural activities and Late-Successional Reserve plans are subject to review by the Regional Ecosystem Office.

### MANAGED LATE-SUCCESSIONAL AREAS

Managed Late-Successional Areas are identified for some alternatives in areas where regular and frequent fire was a natural part of the ecosystem. The objective for these areas is to produce and maintain an optimum level of late-successional and old-growth stands on a landscape scale. In these designated areas, certain silvicultural treatments and fire hazard reduction treatments would be allowed to help prevent complete stand destruction from large catastrophic events such as high intensity, high severity fires; or disease or insect epidemics. As with Late-Successional Reserves, each Managed Late-Successional Area should have a management plan.

### ADAPTIVE MANAGEMENT AREAS

Adaptive Management Areas occur only under Alternative 9. The objective for each of these areas is to develop and test new management approaches to integrate and achieve ecological and economic health, and other social objectives. Each of these 10 areas has a different emphasis to its prescription, such as maximizing the amount of late-successional forests or improving riparian conditions through silvicultural treatments. A complete description of the purpose for each Adaptive Management Area, as well as specific objectives, appears in Appendix B3, Adaptive Management Areas. Some scheduled timber harvest (that contributing to the probable sale quantity, also referred to as PSQ) takes place in some of the Adaptive Management Areas.

### ADMINISTRATIVELY WITHDRAWN AREAS

Administratively Withdrawn Areas are those areas identified in current plans and draft plan preferred alternatives as not scheduled for timber harvest and not included in calculations of allowable sale quantity (ASQ). Administratively Withdrawn Areas include recreation areas, lands not technically suitable for timber production, certain visual retention and riparian areas, and areas

removed from timber production for the protection of locally endemic species. For all alternatives, unless specifically excepted in this SEIS, Administratively Withdrawn Areas and all other standards and guidelines of the current plans and draft plan preferred alternatives apply where they are more restrictive or provide greater benefits to late-successional and old-growth related species than other provisions of these alternatives.

## RIPARIAN RESERVES

The Riparian Reserves provide an area along all streams, wetlands, ponds, lakes, and unstable and potentially unstable areas where riparian-dependent resources receive primary emphasis. Riparian Reserves are important to the terrestrial ecosystem as well, serving, for example, as dispersal habitat for certain terrestrial species. Riparian Reserves are not mapped; however, sample distributions of Riparian Reserves are shown on the Alternative 9 map included with this Final SEIS.

## Matrix

The matrix consists of those federal lands outside the six categories of designated areas listed above. Most timber harvest and other silvicultural activities would be conducted in that portion of the matrix with suitable forest lands, according to standards and guidelines. Most scheduled timber harvest (that contributing to the PSQ) takes place in the matrix. The matrix also includes nonforested areas, and forested areas that are technically unsuitable for timber production, and therefore do not contribute to PSQ. Many alternatives apply the ISC Conservation Strategy's 50-11-40 rule for management of the matrix. Each alternative also specifies the amount of green trees, snags, and down logs that will be left following management activities.

## Environmental Consequences

Chapter 3&4 describes in detail the environmental consequences of the alternatives. Under each of the alternatives considered, timber harvests of older forests will decline from historic levels. The environmental consequences associated with timber harvest, such as loss of late-successional forest habitat, new road construction, increased stream sedimentation, and water quality degradation, will be proportionately less. Social and economic impacts to timber-dependent communities will be proportionately greater. The preservation of late-successional and old-growth forests will have beneficial consequences to the fish, wildlife and plants associated with them, to water quality and to ecological diversity. The following discussion summarizes and compares the key impacts identified.

## EFFECTS ON LATE-SUCCESSIONAL AND OLD-GROWTH FOREST ECOSYSTEMS

The evaluation of late-successional and old-growth forest ecosystems is expressed as an expected likelihood of achieving long-term past conditions based on three attributes that characterize the quantity and quality of the ecosystem. The attributes are 1) abundance and ecological diversity - the acreage and variety of plant communities and environments, 2) processes and functions - the ecological actions that lead to the development and maintenance of the

Table S-1. Summary and comparison of land allocations and standards and guidelines among alternatives

| Alternative                                                                |                                                                     | 1      | 2                                                                | 3                                                                                            | 4                                                                      | 5                     | 6                     | 7                                                     | 8                                                                                    | 9                                                                                              | 10                    |
|----------------------------------------------------------------------------|---------------------------------------------------------------------|--------|------------------------------------------------------------------|----------------------------------------------------------------------------------------------|------------------------------------------------------------------------|-----------------------|-----------------------|-------------------------------------------------------|--------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|-----------------------|
| Congress. Res.                                                             | Million acres                                                       | 7,321  | 7,321                                                            | 7,321                                                                                        | 7,321                                                                  | 7,321                 | 7,321                 | 7,321                                                 | 7,321                                                                                | 7,431                                                                                          | 7,501                 |
| Late-Successional Reserves                                                 | Million acres                                                       | 11,402 | 8,951                                                            | 7,359                                                                                        | 8,066                                                                  | 6,375                 | 7,501                 | 5,423                                                 | 7,501                                                                                | 7,431                                                                                          | 7,501                 |
|                                                                            | Timber harvest/salvage                                              | None   | Treatment of stands less than 50 years old. Very limited salvage | Same as Alternative 2                                                                        | Treatment of stands and salvage per Northern Spotted Owl Recovery Plan | Same as Alternative 4 | Same as Alternative 2 | Same as Alternative 4                                 | Treatment of stands in Murrelet Zone 1 up to 50 years. Other stands up to 180 years. | West - Treatment of less than 80 years old. East - Manage to reduce risk of catastrophic loss. | Same as Alternative 2 |
|                                                                            | Protection for sites occupied by marbled murrelets outside reserves | Yes    | Yes                                                              | Yes                                                                                          | Yes                                                                    | Yes                   | Yes                   | No <sup>1</sup>                                       | No <sup>1</sup>                                                                      | Yes                                                                                            | Yes                   |
|                                                                            | Protection of SAT species closely associated with old growth        | Yes    | No                                                               | Yes                                                                                          | Yes                                                                    | Yes                   | No                    | No                                                    | No                                                                                   | Yes                                                                                            | No                    |
| Managed Late-Successional Areas or Adaptive Management Areas (Alt. 9 only) | Million acres                                                       | 0      | 0                                                                | 1,700                                                                                        | 0,238                                                                  | 0,381                 | 0                     | 0,381                                                 | 0                                                                                    | 1,522 (AMA) 0,102 (MISA)                                                                       | 0                     |
|                                                                            | Timber harvest/salvage                                              | N/A    | N/A                                                              | West - Long rotation, 50 percent retention<br>East - Long rotation, or uneven-age management | Treatment of stands and salvage per Northern Spotted Owl Recovery Plan | Same as Alternative 4 | N/A                   | Same as Alternative 4                                 | N/A                                                                                  | Adaptive Management Areas and some Managed Late-Successional Areas                             | N/A                   |
| Administratively Withdrawn Areas                                           | Million acres                                                       | 1,080  | 1,589                                                            | 1,499                                                                                        | 1,652                                                                  | 2,067                 | 1,828                 | 2,282                                                 | 1,828                                                                                | 1,477                                                                                          | 1,828                 |
| Riparian Reserves                                                          | Million acres                                                       | 1,880  | 2,164                                                            | 2,134                                                                                        | 2,896                                                                  | 2,674                 | 2,513                 | 0,622                                                 | 1,503                                                                                | 2,628                                                                                          | 2,513                 |
|                                                                            | Widths <sup>1</sup>                                                 | 2:1:1  | 2:1:1 in Tier I Key Watersheds, 2:1:1/2 other watersheds         | Same as Alternative 2                                                                        | Same as Alternative 1                                                  | Same as Alternative 2 | Same as Alternative 2 | Variable, usually no reserves on intermittent streams | 2 <sup>1</sup> /2:1/2                                                                | Same as Alternative 1                                                                          | Same as Alternative 2 |
| Matrix                                                                     | Million acres                                                       | 2,773  | 4,511                                                            | 4,443                                                                                        | 4,284                                                                  | 5,637                 | 5,293                 | 8,428                                                 | 6,303                                                                                | 3,975                                                                                          | 5,293                 |
|                                                                            | 50-11-40                                                            | Yes    | Yes                                                              | Yes                                                                                          | Yes                                                                    | Yes                   | Yes                   | Natl. Forest-Yes<br>BLM-modified                      | No                                                                                   | No                                                                                             | No                    |
|                                                                            | Snags/logs:green trees per acre                                     | 2:2:6  | 2:2:6                                                            | Support 40% pop: West - 12, East - 2:10:4                                                    | Variable on National Forests. BLM - 2:2:6-9                            | Same as Alternative 4 | 2:2:6                 | Same as Alternative 4                                 | Same as Alternative 4                                                                | Coastal areas WA/OR: 2:8-12:8<br>Other areas 2:8-12:15%                                        | 2:2:6                 |

<sup>1</sup> Riparian Reserve Widths (e.g., 2:1:1), are expressed as multiples of the height of a maximum site-potential tree, measured on each side of fish-bearing streams, nonfish-bearing streams, and intermittent streams, respectively (see text).

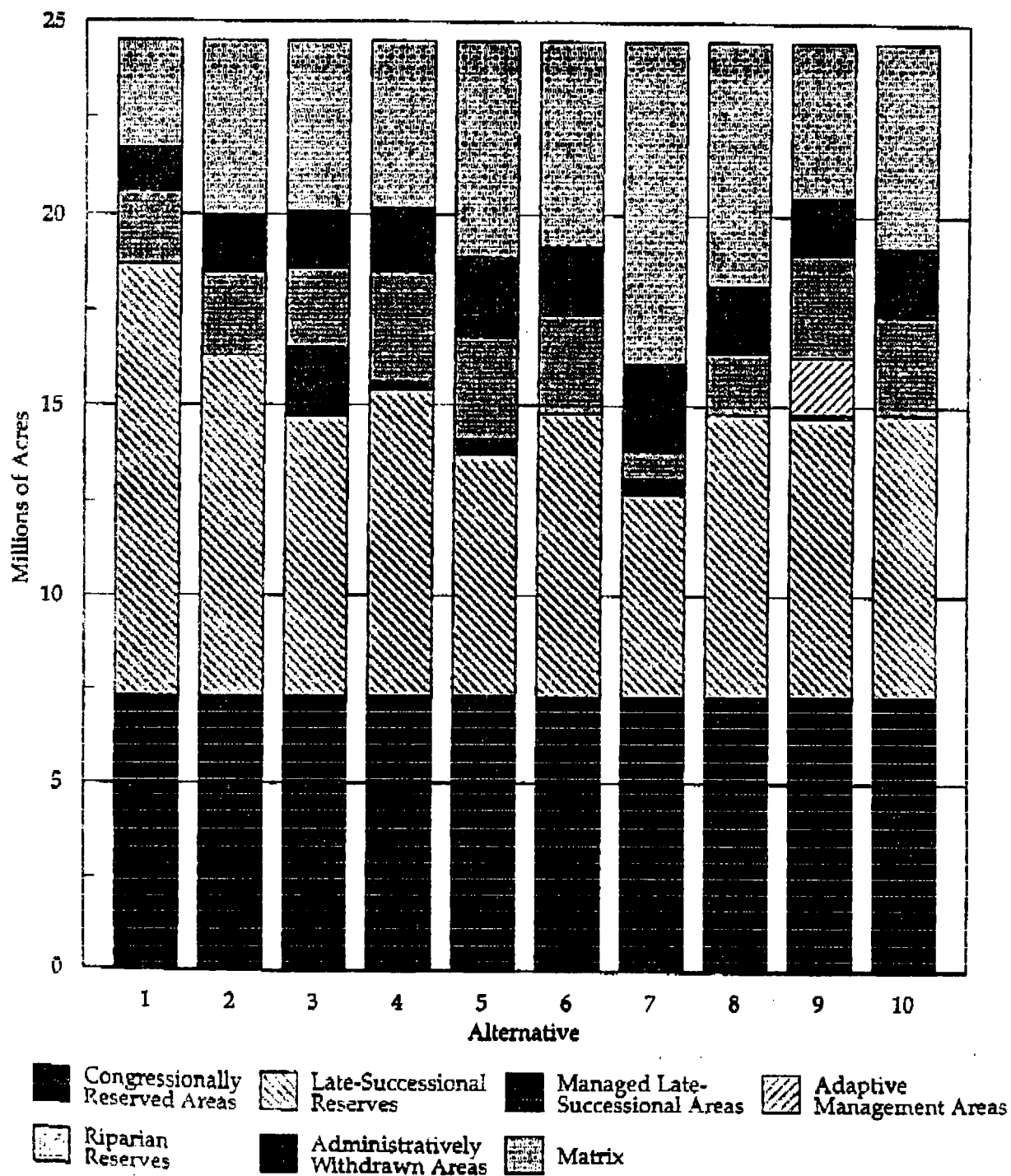
<sup>2</sup> Not specifically required in the alternative, but currently required under the Endangered Species Act.

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Figure S-1. Estimated federal land allocation by alternative



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ecosystem and the values of the ecosystem for species and populations, and 3) connectivity - the extent to which the landscape pattern of the ecosystem provides for biological flows that sustain animal and plant populations.

In general, forest plantations, fire suppression, logging, ownership patterns, and human population and environmental influences have altered the regional ecosystem on Federal lands to the extent that none of the alternatives can provide for a return to conditions that closely match those of previous centuries. Site conditions across all landscapes will not return to their presettlement conditions within the next 100 years. However, all of the alternatives reverse the management trend of the last 50 years on Federal lands, which, if continued, would have resulted in a steep decline in the quantity and quality of late-successional ecosystems and the eventual loss of these ecosystems in many Federal planning areas.

Some alternatives provide greater likelihoods than others of maintaining and enhancing late-successional ecosystems at levels that approach typical long-term conditions. Alternatives 1, 3, 4, and 9 received the highest ratings. Alternatives 3 and 4 provide for relatively high amounts of late-successional forest and strong connectivity through the presence of riparian reserves and retention of old-growth components in managed forest matrix. Alternatives 3 and 4 also provide relatively high acreage of low elevation late-successional ecosystems, which are relatively rare throughout the entire region. Although Alternative 1 provides for the highest acreage of Late-Successional Reserves, it did not rate as high as Alternatives 3 and 9 because it lacks restoration silviculture in the reserves.

The Assessment Team assumed that without restoration silviculture, the development of late-successional conditions would be retarded. Alternative 9 achieved a 60 to 80 percent or greater cumulative likelihood of reaching less than long-term average conditions or better in moist provinces. Alternative 9 might have achieved a higher overall rating if it provided for more acreage of late-successional ecosystems in the low elevations of Oregon. The Assessment Team concluded that the opportunities to increase knowledge about ecosystem function and management in the Adaptive Management Areas of Alternative 9 actually increased the likelihood that this alternative would provide late-successional characteristics in the future.

The assessment of maintenance of a functional and interconnected, late-successional forest ecosystem was not revised to reflect the changes described in Appendix B11, Standards and Guidelines Resulting From Additional Species Analysis and Changes to Alternative 9, because the changes to the Outcomes as described in this assessment are expected to be relatively minor. Several of these standards and guidelines are likely to enhance the attributes of late-successional and old-growth forest ecosystems. The overall outcomes for the ecosystem are likely to improve at least slightly as a result of the additional measures incorporated into Alternative 9, but are not reflected in the results of the assessment.

## EFFECTS ON AQUATIC ECOSYSTEMS

The Aquatic Conservation Strategy (Appendix B6) was designed to address all elements of the aquatic and riparian ecosystem, including maintenance of hydrologic function; high water quality; adequate amounts of coarse woody material; a stable, complex stream channel; and a riparian area with suitable microclimate and vegetation. The likelihood of achieving an outcome with sufficient quality, distribution and abundance of habitat to allow riparian-dependent plant and animal species to stabilize, well-distributed across Federal lands, is lower for Alternatives 2, 3, 5, 6, and 10 than for Alternatives 1 and 4, and Alternative 9 with the standards and guidelines added since the Draft SEIS. However, the Assessment Team determined that all alternatives except 7 and 8 would reverse the trend of degradation and begin recovery of aquatic ecosystems and habitat on Federal lands within the range of the northern spotted owl. Even if changes in land management practices and comprehensive restoration are initiated, it is possible that no alternative will completely recover all degraded aquatic systems within the next 100 years. Faster recovery rates are probable for aquatic ecosystems under Alternatives 1 and 4, and Alternative 9 with the standards and guidelines added since the Draft SEIS than other alternatives. Alternatives 1 and 4, and Alternative 9 with the standards and guidelines added since the Draft SEIS would reduce disturbance across the landscape due to application of a larger Late-Successional Reserve network and the use of wider Riparian Reserves for intermittent streams throughout the planning area.

## EFFECTS ON AIR AND WATER QUALITY AND SOIL PRODUCTIVITY

### Air Quality

All alternatives in this SEIS propose to continue the use of prescribed fire in the planning area. Consequently, all alternatives will have some smoke related impacts, which are the primary source of air quality degradation on federal lands under the proposed actions. This SEIS emphasizes the incorporation of ecosystem principles into forest management where fire is valued as a natural and necessary ecosystem process. Under ecosystem management, certain types of prescribed fire, such as understory burning, will be emphasized. Understory burning is designed to approximate natural low-to-moderate intensity wildfires, and generally burns with fewer particulate matter emissions than broadcast burning in clearcut harvest units. Total projected emissions aggregated over the planning area, therefore, are lower under all of the alternatives than historic emissions when fire use was primarily broadcast burning. While total particulate emissions are lower under each alternative than historic levels, the shift to lower intensity burning will result in different smoke dispersion characteristics that will need to be closely monitored to minimize air quality impacts.

Estimates of the expected acreage of prescribed fire use were calculated for all federally managed lands for each of the alternatives in this SEIS. Assumptions regarding the ecological need for prescribed burning, the hazard reduction necessary for risk management, and the amount of prescribed burning necessary for site preparation were made at this programmatic level. Results show that Alternative 9 would likely result in the greatest prescribed fire acreage at about 89,000 acres burned annually, followed by Alternatives 3, 7, 8, 5, 6, 10, 2, 4, and finally Alternative 1 with about 46,000 acres. All of these are below the 1985 to 1990 average of about 109,000 acres burned each year. Total

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emissions were estimated based on the acres of expected burning, the type of prescribed burning, and the emissions from each type of fuel consumed; so emissions by alternative would rank in a pattern similar to acreage burned.

The estimates are very generalized because many of the assumptions about the level of prescribed fire use for each land allocation within each province cannot be validated until watershed/landscape-level analysis or province-level planning are completed. Thus, air quality analysis at lower planning levels are critical in determining the actual amount of prescribed fire that may be needed on the landscape, and even more importantly, the air quality impacts of prescribed burning. The use of prescribed fire may reduce the likelihood of large, high-severity wildfire, as well as wildfire emissions. However, emissions tradeoff analyses are essential to document the optimum amount of prescribed burning necessary to offset wildfire emissions.

## Water Quality

The effects to water quality under the alternatives vary depending on the acreages and distribution of the various land allocations and the type and location of land disturbing activities occurring under the alternative. The most significant factors related to potential water quality effects for each alternative are the selected Riparian Reserve scenarios, the level and location of road building, and the amount and method of timber harvest proposed. Alternatives 1, 4, and 9 would have the greatest benefit to water quality. Alternatives 2, 3, 5, 6 and 10 have the potential for not as great an improvement to water quality than Alternatives 1, 4, and 9, primarily because they provide less protection for intermittent streams in Tier 2 Key Watersheds and non-Key Watersheds. Alternatives 7 and 8 have the greatest potential to affect water quality of the 10 alternatives analyzed in this SEIS. Based on the Riparian Reserves scenario and other components of the Aquatic Conservation Strategy, all of the alternatives, except 7 and 8, are expected to maintain or improve water quality, although watershed recovery rates would be quickest for Alternatives 1, 4, and 9. Subsequent environmental effects analysis at the province, watershed, and site-specific levels will be needed to develop and implement water quality protection measures.

## Soil Productivity

Alternatives 7 and 8 have the most matrix and thus, have the highest potential to adversely affect long-term soil productivity. Land disturbing activities affect long-term soil productivity by affecting: (1) soil bulk density (untilled skid trails, etc.); (2) soil displacement (road building, skid trails, etc.); (3) erosion (exposure of mineral soil, road placement and drainage); (4) nutrient status (removal of organic material by prescribed burning and intense utilization); and (5) soil biology. Alternatives 1 and 4 would have the least amount of soil disturbance predicted from management actions since they have the most Late-Successional Reserves and thus, would have the highest probability of maintaining long-term soil productivity. Alternatives 2, 3, 5, 6, 9, and 10 would have intermediate levels of disturbance and probability of maintaining long term soil productivity relative to the previously described alternatives. These alternatives have fewer areas within reserves but more matrix than Alternatives 1 and 4.

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**EFFECTS ON  
THREATENED AND  
ENDANGERED SPECIES**

All of the alternatives provide for the continued existence of threatened and endangered species. In the case of the northern spotted owl and the marbled murrelet, many components of the alternatives were specifically designed to address the needs of these species. There are 39 federally listed and proposed species which may occur within the range of the northern spotted owl. The Fish and Wildlife Service also identified 10 of these species whose habitat use is known to include late-successional forest, or their occurrence is directly associated with such habitat. With this information, 23 of the listed and proposed species were eliminated from detailed discussion in the Final SEIS for one of three reasons: (1) they are not known to occur on the federal lands of the planning area, (2) they do not inhabit coniferous forests, or (3) their presence in the spotted owl's range is transitory or unaffected by forest management activities. It has been determined that the alternatives considered in the Final SEIS will have no effect on these species. The four salmon species are included in the narrative discussion to more completely describe the reasons for the determinations. The U.S. Fish and Wildlife Service and National Marine Fisheries Service have concurred with these determinations (see Appendix G).

The Fish and Wildlife Service identified six "species that are not restricted to only late-successional forests or that are associated with unique or specialized habitats that may not be considered late successional, but which may be affected by forest management activities." Some of these species were not evaluated by the Assessment Team because of their lack of association with late-successional forests, however, they are addressed in this SEIS to provide a complete accounting. The alternatives in this SEIS are not likely to adversely affect these species.

Four listed or proposed species are associated with late-successional forests: the bald eagle, the Oregon chub, the northern spotted owl, and the marbled murrelet. None of the alternatives is likely to adversely affect the bald eagle. Management of nonfederal lands and cumulative effects are affecting the Oregon chub, and cannot be mitigated by federal land management. The following discussion summarizes the effects of the alternatives on the other two species.

**Northern Spotted Owl**

The effectiveness of an alternative in providing for northern spotted owl recovery on Federal lands relies heavily on the spacing, size and location of the habitat. It was the conclusion of the Assessment Team that Alternatives 1 through 6 and 9 met or exceeded the conservation measures for federal lands for the Final Draft Spotted Owl Recovery Plan (USDI unpub. 1992a). Alternatives 7, 8 and 10 were found to have less assurance of owl recovery on federal lands, primarily due to inadequate provision of dispersal habitat. While Alternative 9 also lacked a specific dispersal habitat provision in the Draft SEIS, other aspects of this alternative were expected to provide adequate dispersal habitat. The additional standards and guidelines in Alternative 9 would increase this assessment of adequacy of the alternative. Therefore, selection of Alternatives 1 through 6, or Alternative 9 would provide the federal land allocations and standards and guidelines necessary to achieve recovery of the northern spotted owl.

summary

## Marbled Murrelet

In the short term, the alternatives will provide a varying degree of "reserve" protection for the population of murrelets known to occur in the planning area. However, eight alternatives (all but Alternatives 7 and 8) also provide for protection of murrelet sites outside of the reserves. The full impact of this protection outside reserves is not known at this time because of the limited surveys conducted for this species.

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Alternative 1 provides habitat that would allow greater than 90 percent likelihood of providing habitat conditions to support a marbled murrelet population occurring well distributed on the federal lands. Alternatives 2, 3, 4, 5, and 6, had ratings of 84 percent likelihood of a well-distributed population on federal lands, and Alternatives 9 and 10 were rated at 80 percent. The lowest ratings were assigned to Alternatives 7 and 8. Alternative 7 was rated low because of its lack of specific protection of murrelet sites in the matrix and less protection of old-growth in coastal areas. Alternative 8 rated low because of poor protection of murrelet sites in the matrix, and also because of its allowance for timber harvest in stands up to 180 years of age.

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In the Draft SEIS, Alternative 9 had a 80 percent likelihood of a murrelet population well distributed on federal lands. The modifications made to Alternative 9 have added protection of approximately 25,000 additional acres of Late-Successional Reserves in the Olympic Adaptive Management Area (AMA). Another change was for the Finney and Northern Coast Range AMAs, which have amended direction stating that this Late-Successional Reserve acreage may be reconsidered during development of the Adaptive Management Area plans, if the proposed actions are consistent with the Endangered Species Act requirements for the marbled murrelet. Other modifications to Alternative 9 which would likely improve the murrelet rating are: adoption of the Riparian Reserve Scenario 1, retention of 100 acres around spotted owl activity centers in the matrix, survey and manage provisions for a variety of other species, and retention of old-growth fragments in watersheds where little remains. These modifications would result in retention of more marbled murrelet habitat than the standards and guidelines for Alternative 9 described in the Draft SEIS. Based on the relative amount of Late-Successional Reserve acreage in the alternatives, it is likely that a rating of the modified Alternative 9 would fall between the ratings for Alternatives 2, 3, 4, 5 and 6 and the rating for Alternative 1.

### EFFECTS ON SPECIES NOT THREATENED OR ENDANGERED

The Assessment Team determined that 1,116 terrestrial species were closely associated with late-successional and old-growth forests. These species were grouped into bryophytes, fungi, lichens, vascular plants, mollusks, amphibians and reptiles, birds, and mammals. A list of 15 functional groups of arthropods was also considered. Twenty-nine species of fish were determined to occur in streams within late-successional and old-growth forests within the range of the northern spotted owl. Each of the alternatives were evaluated to determine the likelihood of habitat on Federal lands to support populations of these species or groups of species. Expert panels were asked to predict a percent likelihood whether habitat would be of sufficient quality, distribution and abundance for species populations to: a) stabilize, well distributed, b) stabilize with significant gains in distribution, c) continue existence only on refugia, or d) be at risk of

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extirpation. The assessment process and the potential outcomes that were predicted are described for each of the species or groups of species in Chapter 3&4. Additional species analysis was conducted between the Draft and Final Supplemental Environmental Impact Statements. The analysis focused on the likely outcomes for many of the species that were considered in the Draft SEIS. While the analysis focused most directly on responding to public comments on the preferred alternative (Alternative 9), much of it is also pertinent to the remaining nine alternatives.

The results of the original assessments and the additional analysis are summarized in Chapter 3&4, with extensive background material in Appendices A and J. Attempts to further summarize these results would be an oversimplification and possibly misleading. The following is a generalized comparison of the impacts anticipated for the alternatives based on the nature of the changes expected to occur to the habitat components important to the species or groups of species that were analyzed. The relative impacts described for Alternative 9 are those expected to occur with the standards and guidelines added between the Draft and Final SEIS.

### Nonvascular Plants and Allies

This includes bryophytes, fungi and lichens. Bryophytes include hornworts, liverworts and mosses. The habitat components important to bryophytes include live, old-growth trees, decaying wood, riparian zones and generally the habitat characteristics achieved by more extensive and interconnected late-successional and old-growth forested conditions. Alternatives 1, 3 and 9, are generally the most favorable to bryophytes, because they provide the set of allocations and management practices that best produces the habitat components for bryophytes. Alternatives 4, 5, 7 and 8, provide respectively, less of these habitat conditions. Based on their overall features, Alternative 2 would likely have effects between those of Alternatives 3 and 5, Alternative 6 would likely have effects similar to Alternative 5, and Alternative 10 would likely have effects between those of Alternatives 5 and 7.

Fungi are neither plants nor animals but are recognized as a separate kingdom of organisms, both in structure and function. Species diversity of fungi appears highest in late-successional forests because of the diversity of habitat structures and host species, and the abundance of coarse woody debris and standing dead trees. Habitat components important to the fungi include dead, down wood; standing dead trees; and live, old-growth trees; as well as a diversity of host species and microhabitats. Also important for fungi is a well-distributed network of late-successional forest. Small forest fragments can function as refugia where fungi may persist until suitable habitat conditions become available in adjacent stands. Alternatives that retain more of these habitat features generally had higher ratings for species. Alternatives 1, 3, 4, and 9, are generally the most favorable to bryophytes, because they provide the set of allocations and management practices that best produces the habitat components for bryophytes. Alternative 5 would provide intermediate levels of this habitat. Alternatives 7 and 8 are similar in their effects, and would provide less favorable habitat conditions for bryophytes. Based on their overall

## Summary

features, Alternative 2 would likely have effects between those of Alternatives 3 and 5, Alternative 6 would likely have effects similar to Alternative 5, and Alternative 10 would likely have effects between those of Alternatives 5 and 7.

Lichens are a conspicuous component of old-growth forest ecosystems where they play an important ecological role. The habitat components important to lichens include live, old-growth trees, decaying wood, riparian zones and extensive and interconnected late-successional and old-growth forested conditions. Alternatives 1, 4, and 9, are generally the most favorable to lichens, because they provide the set of allocations and management practices that best produces the habitat components for lichens. Alternatives 3 and 5 would provide intermediate levels of this habitat. Alternatives 7 and 8 are similar in their effects, and would provide less favorable habitat conditions for lichens. Based on their overall features, Alternative 2 would likely have effects between those of Alternatives 3 and 5, Alternative 6 would likely have effects similar to Alternative 5, and Alternative 10 would likely have effects between those of Alternatives 5 and 7.

## Vascular Plants

The largest and most dominant organisms of the late-successional and old-growth forest ecosystem are the vascular plants. Vascular plants are defined as those that contain conducting or vascular tissue. The habitat components important to vascular plants are those which generally increase amounts of late-successional, riparian, and old-growth habitat. Alternative 1 is generally the most favorable to vascular plants, because it provides the set of allocations and management practices that best produces the habitat components for vascular plants. Alternatives 3, 4, 5, and 9 are similar in providing intermediate levels of these habitat conditions. Alternatives 7 and 8 are similar in their effects, and would provide less favorable habitat conditions for vascular plants. Based on their overall features, Alternative 2 would likely have effects between those of Alternatives 3 and 5, Alternative 6 would likely have effects similar to Alternative 5, and Alternative 10 would likely have effects between those of Alternatives 5 and 7.

## Invertebrates

This includes arthropods and their allies, and mollusks. Arthropods include insects, crustaceans, arachnids, and myriapods and collectively constitute over 85 percent of biological diversity in late-successional and old-growth forests in the Pacific Northwest. The habitat components important to arthropods include all the features that comprise an extensive and interconnected late-successional and old-growth forested conditions, including a diversity of live, old-growth trees; standing dead trees; dead and downed wood; canopy structure; and riparian habitats. Alternatives 1, 3, and 4 are generally the most favorable to arthropods, because they provide the set of allocations and management practices that best produces the habitat components for arthropods. Alternatives 5, 7, and 9 would provide intermediate levels of habitat protection. Alternative 8 would provide less favorable habitat

*Summary*

conditions for arthropods. Based on their overall features, Alternative 2 would likely have effects between those of Alternatives 3 and 5, Alternative 6 would likely have effects similar to Alternative 5, and Alternative 10 would likely have effects between those of Alternatives 5 and 7.

Mollusk species of northwest coniferous forests are comprised of land snails, slugs, aquatic snails and clams. The habitat components important to mollusks include moist forest environments; areas around springs, bogs, and marshes; basalt and limestone talus slopes; diverse vegetative cover; and the habitat characteristics provided in the Riparian Reserves and influenced by Late-Successional Reserve sizes. Alternatives 1, 3, and 9 are generally the most favorable to land snails, because they provide the set of allocations and management practices that best produces the habitat components for land snails. Alternative 4, 5, 7, and 8 would provide less favorable habitat conditions for the land snails. Alternatives 1, 4, and 9 are generally the most favorable to slugs, freshwater snails and clams, because they provide the set of allocations and management practices that best produces the habitat components for these species. Alternatives 3, 5, 7 and 8 would provide less favorable habitat conditions for slugs, freshwater snails and clams. Based on their overall features, Alternatives 2, 6, and 10 which were not rated by the Assessment Team would likely have effects on mollusk habitat similar to Alternative 5.

**Vertebrates**

This includes amphibians and reptiles, birds, mammals and fish. The number of species of amphibians and reptiles in coniferous forests of the Pacific Northwest is not large compared to the number of birds and mammals; however, amphibians and reptiles comprise a distinct and important component of the vertebrate fauna. No reptiles are closely associated with late-successional forests. The habitat components important to amphibians are those which would provide cool, moist old-growth conditions; cool water; reduced sedimentation; protection of headwater streams; and coarse woody debris, riparian zones and more extensive and interconnected late-successional and old-growth forested conditions. For the Riparian groups, Alternatives 1, 4, and 9, are generally the most favorable to amphibians, because they provide the set of allocations and management practices that best produces the habitat components for amphibians. Alternatives 3 and 5 would provide intermediate levels of habitat protection. Alternatives 7 and 8 are similar in their effects, and would provide less favorable habitat conditions for these amphibians. For the Terrestrial groups, Alternatives 1 and 9, are generally the most favorable to amphibians, because they provide the set of allocations and management practices that best produce the habitat components for amphibians. Alternatives 3, 4, and 5 would provide intermediate levels of habitat protection. Alternatives 7 and 8 are similar in their effects, and would provide less favorable habitat conditions for these amphibians. Based on their overall features, Alternative 2 would likely have effects between those of Alternatives 3 and 5, Alternative 6 would likely have effects similar to Alternative 5, and Alternative 10 would likely have effects between those of Alternatives 5 and 7.

The habitat components important to birds are those which would increase large reserves, riparian protection and analysis, and retain green trees, snags, and down woody material within the matrix. Alternatives 1, 3, 4, 5, and 9, are

generally the most favorable to birds, because they provide the set of allocations and management practices that best produces the habitat components for birds. Alternatives 7 and 8 are similar in their effects, and would provide less favorable habitat conditions for birds. Based on their overall features, Alternative 2 would likely have effects between those of Alternatives 3 and 5, Alternative 6 would likely have effects similar to Alternative 5, and Alternative 10 would likely have effects between those of Alternatives 5 and 7.

Temperate coniferous forests of the Pacific Northwest provide habitat for a diverse array of mammal species. Habitat components important to mammals other than bats include: dead, standing wood; dead, downed wood; live, old-growth trees; and riparian zones. Large, decayed logs and snags are important to many mammals as resting and denning sites. Large expanses of live, old-growth trees are important to some mammals such as the fisher because they provide continuous canopy cover. Fisher may be negatively affected by forest fragmentation. Riparian zones provide potential habitat (including large snags and cover) for mammals such as fishers and American martens. In general, those alternatives that provide for greater amounts of late-successional and old-growth habitat resulted in higher ratings for mammal species. Alternatives 1, 3, and 9, are generally the most favorable to mammals, because they provide the set of allocations and management practices that best produces the habitat components for mammals. Alternatives 4 and 5 would provide intermediate levels of habitat conditions. Alternatives 7 and 8 are similar in their effects, and would provide less favorable habitat conditions for mammals. Based on their overall features, Alternative 2 would likely have effects between those of Alternatives 3 and 5, Alternative 6 would likely have effects similar to Alternative 5, and Alternative 10 would likely have effects between those of Alternatives 5 and 7.

Bats are a diverse order of mammals. There may be more species of bats in North American temperate forests than any other group of mammals. The habitat components important to bats are those which would increase late-successional and old-growth forests, riparian areas, snags and down woody material. Alternatives 1, 3, and 9, are generally the most favorable to bats, because they provide the set of allocations and management practices that best produces the habitat components for bats. Alternatives 4 and 5 would provide intermediate levels of habitat conditions. Alternatives 7 and 8 are similar in their effects, and would provide less favorable habitat conditions for bats. Based on their overall features, Alternative 2 would likely have effects between those of Alternatives 3 and 5, Alternative 6 would likely have effects similar to Alternative 5, and Alternative 10 would likely have effects between those of Alternatives 5 and 7.

The fish species that are analyzed include resident fish and anadromous fish. There are an estimated 313 anadromous fish stocks at risk in the planning area. Habitat loss and degradation are principal factors in the decline of these fish on federal lands. Alternatives 1, 4 and 9 benefit aquatic and riparian habitats more than the other alternatives. These benefits are principally due to: (1) the application of Riparian Reserve Scenario 1 to intermittent streams in Tier 2 Key Watersheds and non-Key Watersheds, (2) the highest amounts of Late-Successional Reserves within Key Watersheds and throughout the range of the northern spotted owl, and (3) the least amount of the matrix contained within inventoried roadless areas. Aquatic and riparian habitats are expected to

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## Summary

recover faster in part, due to these factors under Alternatives 1, 4 and 9. Alternatives 2, 3, 5, 6, and 10 benefit aquatic and riparian habitats to a greater degree than Alternatives 7 and 8, but to a lesser degree than Alternatives 1, 4 and 9. Some of the reasons for the differences are that Alternatives 2, 3, 5, 6, and 10 have less Late-Successional Reserves, include Riparian Reserve Scenario 2, and have more land in the matrix than Alternatives 1, 4, and 9. The opposite is true when comparing the benefits of Alternatives 2, 3, 5, 6, and 10 to aquatic and riparian habitat relative to Alternatives 7 and 8. Even though Alternatives 2, 3, 5, 6, and 10 benefit aquatic and riparian habitats to a lesser degree than Alternatives 1, 4 and 9, they would reverse the trend of aquatic and riparian habitat degradation and begin recovery of these habitats. The standards and guidelines for Alternatives 7 and 8 are not adequate to reverse the trend of aquatic and riparian habitat degradation and begin recovery of these habitats. The principal reasons are the lack of explicitly defined Riparian Reserves for Alternative 7, and the application of Riparian Reserve Scenario 3 for Alternative 8.

## EFFECTS ON TIMBER HARVEST LEVELS

Annual harvest levels from Federal forests within the range of the northern spotted owl averaged 4.5 billion board feet during the period 1980 to 1989. The alternatives considered to protect the habitat of the northern spotted owl and associated late-successional species will restrict timber harvest in these forests, resulting in substantial social and economic costs.

The probable levels of federal timber sales for the first decade for each alternative are summarized in Figure S-2, First Decade Probable Average Annual Timber Sale Levels (PSQ) by Historic Period and Alternative. The PSQ estimates in Figure S-2 include "other wood" which is the volume of cull, salvage, and other products that is not normally part of allowable sale quantity calculations. Historically, this has accounted for about 10 percent of the total harvest volume from timber suitable federal lands in the planning area.

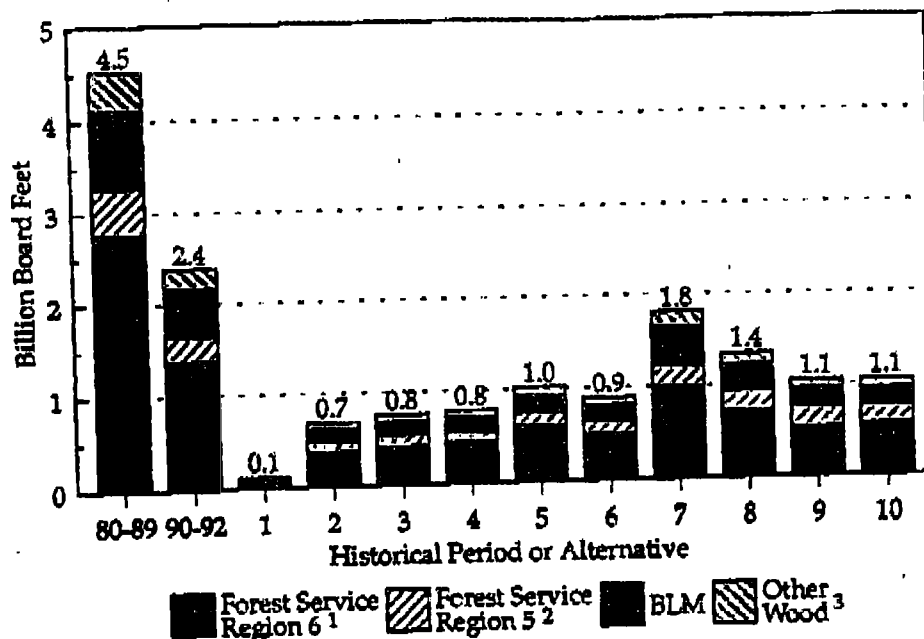
The PSQ figures for Alternative 9 are changed from the Draft SEIS to reflect modifications made to Alternative 9 as a result of public comments and internal review. The overall result of the revisions to PSQ for Alternative 9 between the Draft SEIS and the Final SEIS is a reduction of 92 MMBF per year; from 1,050 MMBF to 958 MMBF per year, not including the "other wood."

Estimated sale levels under all alternatives are below program levels of the 1980s, as well as below the harvest levels of 1990-1992 when most new federal timber sales were enjoined. In 1990-1992, harvests consisted of sales under contract from the 1980's. The sale quantities of the alternatives will not permit 1990-1992 levels of timber harvest in the future. Due to several factors, it is likely that sale levels of the selected alternative will take one to three years to reach the decadal average sales potential.

In addition to reduced harvest quantities in the decade ahead, wood quality is also apt to decrease. In the first decade, thinning and other partial harvests would account for a large portion of the volume harvested under the various alternatives. Secondary wood products manufacturers may see an even greater decline in raw materials than the probable sale quantities would indicate as a result of smaller average tree size.

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Figure S-2. First decade probable average annual timber sale levels (PSQ) by historical period and alternative



<sup>1</sup> Region 6 = Pacific Northwest Region

<sup>2</sup> Region 5 = Pacific Southwest Region

<sup>3</sup> Includes cull, submerchantable material, firewood and other products.

## EFFECTS ON REGIONAL ECONOMICS AND COMMUNITIES

Under all of the alternatives, direct employment in timber harvesting and processing will decline as a result of reduced harvest levels as shown in Table S-2, Historic and Projected Employment in the Timber Industry in the Next Decade by Sub-Region and Alternative. The table compares the projected employment levels to employment in 1990 and estimated employment in 1992. The projections imply a range of job displacement from 4,600 to 15,900 jobs, relative to 1992. Compared to 1990, the potential displacement is 24,100 to 35,400 jobs.

The Final SEIS job displacement estimates are higher than the estimates displayed in the Draft SEIS. The differences result from corrections in predicting nonfederal harvest levels and, for Alternative 9, the reduction in PSQ from federal forests between Draft and Final SEIS. The majority of the affected jobs are in Oregon and are concentrated in southwestern Oregon.

The alternatives presented in this SEIS would have the greatest effect on the timber industry sector. In addition to displaced workers, there would be indirect effects caused by fluctuating business expenditures in the region and induced effects caused by changes in personal expenditures in the region. These ripple effects tend to increase the ramifications of job gains or losses in communities or regions. There is roughly one job affected outside the timber industry for every job affected within the timber industry.

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Table S-2. Historical and projected employment in the timber industry in the next decade, by subregion and alternative<sup>1</sup>

| State/Owl Region <sup>2</sup> | Actual Estimated |              | Alternative  |              |              |              |              |              |              |              |              |              |
|-------------------------------|------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
|                               | 1990             | 1992         | 1            | 2            | 3            | 4            | 5            | 6            | 7            | 8            | 9            | 10           |
| ——thousand jobs——             |                  |              |              |              |              |              |              |              |              |              |              |              |
| <b>Washington</b>             |                  |              |              |              |              |              |              |              |              |              |              |              |
| Olympic Peninsula             | 13.9             |              | 11.6         | 11.7         | 11.6         | 11.7         | 11.7         | 11.7         | 11.6         | 11.2         | 11.6         | 11.6         |
| Puget Sound                   | 25.7             |              | 20.3         | 20.4         | 20.4         | 20.4         | 20.3         | 20.4         | 20.3         | 20.5         | 20.3         | 20.4         |
| Lower Columbia                | 14.1             |              | 12.4         | 12.6         | 12.6         | 12.6         | 12.7         | 12.6         | 12.7         | 12.6         | 12.6         | 12.6         |
| Central                       | 4.2              |              | 3.8          | 4.0          | 4.1          | 4.0          | 4.0          | 4.1          | 4.1          | 4.3          | 3.9          | 4.2          |
| <b>Total</b>                  | <b>57.9</b>      | <b>51.3</b>  | <b>48.1</b>  | <b>48.7</b>  | <b>48.7</b>  | <b>48.7</b>  | <b>48.7</b>  | <b>48.8</b>  | <b>48.7</b>  | <b>49.0</b>  | <b>48.4</b>  | <b>48.8</b>  |
| <b>Oregon</b>                 |                  |              |              |              |              |              |              |              |              |              |              |              |
| Northwest                     | 21.9             |              | 19.8         | 20.3         | 20.3         | 20.4         | 20.7         | 20.0         | 21.6         | 20.8         | 20.5         | 20.5         |
| West-Central                  | 20.9             |              | 13.7         | 14.4         | 14.5         | 14.6         | 15.0         | 14.3         | 16.0         | 15.4         | 15.0         | 14.9         |
| Southwest                     | 21.4             |              | 10.3         | 12.0         | 12.1         | 12.4         | 12.8         | 12.1         | 15.3         | 13.8         | 12.8         | 12.9         |
| Central                       | 8.9              |              | 7.4          | 8.0          | 8.0          | 8.0          | 8.1          | 8.0          | 8.4          | 8.2          | 8.1          | 8.1          |
| <b>Total</b>                  | <b>73.1</b>      | <b>62.8</b>  | <b>51.2</b>  | <b>54.7</b>  | <b>54.9</b>  | <b>55.4</b>  | <b>56.6</b>  | <b>54.4</b>  | <b>61.3</b>  | <b>58.2</b>  | <b>56.4</b>  | <b>56.4</b>  |
| <b>California</b>             |                  |              |              |              |              |              |              |              |              |              |              |              |
| <b>Total</b>                  | <b>13.9</b>      | <b>11.3</b>  | <b>10.2</b>  | <b>10.6</b>  | <b>10.7</b>  | <b>10.6</b>  | <b>10.7</b>  | <b>10.8</b>  | <b>10.8</b>  | <b>10.9</b>  | <b>11.1</b>  | <b>10.9</b>  |
| <b>3 State Total</b>          | <b>144.9</b>     | <b>125.4</b> | <b>109.5</b> | <b>114.0</b> | <b>114.3</b> | <b>114.7</b> | <b>116.0</b> | <b>114.0</b> | <b>120.8</b> | <b>118.1</b> | <b>115.9</b> | <b>116.1</b> |

<sup>1</sup> Includes self-employed individuals in all solid wood products and pulp and paper sectors. Wage and salary employment is approximately 7.5 percent less than total employment.

<sup>2</sup> Owl Region = The range of the northern spotted owl.

Timber-based employment would decline under all alternatives considered as a result of reduced harvests. Subregions characterized as heavily timber dependent are apt to experience the most severe impacts. While service employment in forestry also appears to be faced with job declines, these declines could be offset through investments in reforestation, timber stand improvement, monitoring, inventory, and restoration activities.

Some employment gains could be made in recreation and tourism, as well as in special forest products. It may, however, be difficult to absorb displaced loggers and mill workers into these fields due to skill considerations and geographic locations. In the long run, the alternatives presented in this SEIS may provide an increased supply to commercial fisheries. Yet, in light of the current issues and the potential over-capacity of the industry, these gains may not be substantial. Restoration of salmon and trout runs, however, could have positive effects on coastal recreation.

## Summary

### Rural Communities

Washington, Oregon, and California differ in the pattern, severity, and regional distribution of the effects of reduced timber harvest to communities. The results of the analyses are discussed in terms of the severity and direction of the consequences, the communities' capacity to cope, and the resultant risk to the communities. The Assessment Team conducted a detailed analysis of Alternatives 1, 3, and 7. It found relatively few differences among the effects of the alternatives because the timber harvest levels in Alternatives 1 through 10 are far below recent averages. Impacts associated with Alternative 9 would likely fall between those presented for Alternatives 3 and 7.

Communities with combinations of low capacity to cope with change and negative consequences from the alternatives are "most at risk"; those with high capacity to cope and positive consequences are "least at risk." Using these definitions, Alternatives 1, 3, and 7 would result in about one-third of the 167 surveyed communities falling in the "most at risk" category. In all three alternatives, however, the changes are great compared to those for the 1985-87 harvest level scenario in which only 3 percent of the communities were so ranked. The majority of the communities "most at risk" in Alternatives 1, 3, and 7 are those highly dependent on the timber industry and on Federal forest lands as the source for much of their timber supply. Alternatives 1, 3, and 7 would likely lead to additional mill closures and reduced forest related employment, and to real damage to the economic and social infrastructure.

The "most at risk" communities differ from others in significant ways. These communities are smaller (average population 3,000), and they are located in counties with low population density. Isolated communities are more likely to experience negative consequences with Alternatives 1, 3, and to a lesser degree 7, because they have few options available locally or in nearby communities, and because of limited access to capital, transportation links, and other resources. Communities that are small, isolated, and lacking economic diversity are more likely to be "at risk" than others. These communities may find it difficult to mobilize and respond to changing conditions which may affect a variety of groups. These communities are likely to experience unemployment, increased poverty, and social disruption in the absence of assistance.

### People Coping With Change

Changes in the management of the federal forests in the spotted owl region, administered by the Forest Service and BLM, have effects (impacts) on people and the families, groups, and communities to which they belong. The social, community, and cultural changes resulting from implementation of any of these alternatives will be disproportionately intense in rural and timber-dependent areas. The social effects of the alternatives stem fairly directly from changes in the timber harvest levels of the alternatives. This is not meant to indicate that timber harvest is the only meaningful link between the Forest Service/BLM and people, but it is the most crucial variable among these alternatives.

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The changes in timber harvest from Alternatives 1-6, 9 and 10 will last longer than any firm or worker's ability to "wait it out." The changes in timber harvest under Alternative 8 would have less impact than under Alternatives 1-6, 9 and 10, but still result in a downturn from Alternative 7. All alternatives will force timber harvest levels lower than experienced in Washington, Oregon, and California in the last two decades, with Alternatives 1-4 and 6 reducing the timber harvest levels most, while Alternatives 5 and 9-10 have the smaller reductions, and Alternatives 7 and 8 which continue high timber harvests. However, this high level is lower than the historical averages in the 1980's and early 1990's.

**American Indian People and Cultures**

Given both traditional and contemporary links between American Indians and forests, it is clear that tribal members depend on public lands and resources for employment, subsistence, and cultural identity. It is recognized that Indians tribes have an interest in Forest Service and BLM administered forest resources and it is emphasized that the Indian rights and interests are not set aside by this SEIS nor does it impose any extra conservation burden on the tribes or Indian reservations. Timber harvest and management on tribal and Indian owned lands are not controlled or modified by this SEIS. The SEIS has examined the potential to impair or restrict the rights of various tribes and finds that none fall into that category.

Every alternative has some amount of logging and road construction activities on the federal forest lands which are potentially disturbing to the land, fisheries, and cultural sites. Yet the amounts of disturbance are well below historic levels. There appears to be little difference in consequences associated with the low levels of land disturbance in Alternatives 1, 2, 3, and 4. The degree of disturbance to vegetation, land, and cultural sites under Alternatives 5, 6, 8, 9, and 10 is slightly higher, but lower than Alternative 7, which would have the highest ground disturbance. On the other hand, since a large number of archaeological and historic places are discovered while conducting ground searches prior to ground disturbing activity, there may be fewer total archaeological and culturally important sites discovered under the alternatives that have reduced timber harvest and road construction activities. All alternatives except Alternatives 7 and 8 would reverse the trend of aquatic and riparian habitat degradation and begin recovery of these habitats. Application of the Aquatic Conservation Strategy within the range of the northern spotted owl would improve habitat conditions for stocks of fish important to American Indians.

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