Final SEIS

*Final Supplemental Environmental Impact Statement*

# To Remove or Modify the Survey and Manage Mitigation Measure Standards and Guidelines

***Volume I — Summary, Chapters 1-4***

JANUARY 2004

BLM

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Cover artwork compliments of Elizabeth I. Gayner. Drawing includes the Great gray owl (*Strix nebulosa*), an orchid (*Cypripedium montanum*), a mushroom (*Gyromitra californica*), and a snail (*Monadenia fidelis*).

Final Supplemental Environmental Impact Statement

# To Remove or Modify the Survey and Manage Mitigation Measure Standards and Guidelines

*Forest Service National Forests in Regions 5 and 6*
*and Bureau of Land Management Districts*
*in Washington, Oregon, and California*
*Within the Range of the Northern Spotted Owl*

**January 2004**


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"With regard to plants and animals. . . , we are better for coming to a knowledge of them, for we are inhabitants of the same earth. They have a nearness and kinship to us. . . .In every natural object there is something to excite our imagination."

Aristotle
4th Century BC

# Notice

Readers should note that the Secretary of Agriculture and the Secretary of Interior are the responsible officials for this proposed action. Therefore, no administrative review (appeal) through the Forest Service will be available on the Record of Decision under 36 CFR 217, and no administrative review (protest) through the Bureau of Land Management will be available on the Record of Decision under 43 CFR 1610.5-2. Because there is no administrative review of the decision, the Record of Decision will not be signed until 30 days after the Notice of Availability for the Final SEIS appears in the Federal Register (see 40 CFR 1506.10(b)).

# Abstract

This Supplemental Environmental Impact Statement examines the environmental effects of a proposal by the Forest Service and BLM to remove or modify the Survey and Manage Standards and Guidelines of the Northwest Forest Plan. Alternatives considered in detail are: (1) Alternative 1, No-Action; (2) Alternative 2, an alternative that would amend 28 land and resource management plans by removing the Survey and Manage Standards and Guidelines; and, (3) Alternative 3, an alternative that would amend 28 land and resource management plans by modifying the Survey and Manage Standards and Guidelines. The need for the proposal was generated by concerns that the Survey and Manage Standards and Guidelines are frustrating Forest Service and BLM efforts to accomplish resource management objectives of the Northwest Forest Plan. The 296 Survey and Manage species affected by this proposal were analyzed to determine the environmental consequences under the three alternatives. Analyses show that the Survey and Manage Standards and Guidelines and the Special Status Species Programs add protection and reduce risk to species. Recognizing there is much that remains unknown about many of the species, for 142 species there would be insufficient habitat (including known sites) to support stable populations in the Northwest Forest Plan area under all alternatives due to factors beyond the control of the Forest Service and BLM. When compared to Alternative 1, there are 51 and 8 species that would have insufficient habitat (including known sites) to support stable populations in the Northwest Forest Plan area under Alternatives 2 and 3, respectively. These species would have sufficient habitat under Alternative 1. Potential mitigation is identified to reduce the adverse effects to these species. The analysis also showed annual timber harvest would be 70 MMBF higher under Alternative 2 and 60 MMBF higher under Alternative 3 compared to Alternative 1, No-Action. Cost of the No-Action Alternative was projected to be $25.9 million annually for the next 10 years, dropping to $16.8 million annually, thereafter. Short-term annual costs of Alternatives 2 and 3 were $10.0 million and $11.8 million, respectively. After 10 years, those annual costs fall to $9.5 million and $10.3 million, respectively. Alternatives 2 and 3 showed increases in annual employment and annual hazardous fuel treatment acreage relative to Alternative 1. The preferred alternative is Alternative 2 because it best meets the purpose and need. Specifically, Alternative 2 conserves rare and little known species, reduces cost and effort, and allows for achievement of healthy forests and timber outputs.

# Acronyms and Abbreviations

| | |
|---|---|
| ACEC | Area of Critical Environmental Concern |
| ACS | Aquatic Conservation Strategy |
| BLM | Bureau of Land Management |
| CEQ | Council on Environmental Quality |
| CFR | Code of Federal Regulations |
| EIS | Environmental Impact Statement |
| ESA | Endangered Species Act |
| FEMAT | Forest Ecosystem Management Assessment Team |
| FLPMA | Federal Land Policy and Management Act |
| FR | Federal Register |
| FSM | Forest Service Manual |
| FWS | U.S. Fish and Wildlife Service |
| GIS | Geographic Information System |
| ISMS | Interagency Species Management System |
| MMBF | million board feet |
| MUSY | Multiple Use Sustained Yield Act |
| NEPA | National Environmental Policy Act |
| NFMA | National Forest Management Act |
| NOAA Fisheries | National Marine Fisheries Service |
| NWFP | Northwest Forest Plan |
| O&C Act | Oregon and California and Coos Bay Wagon Road Grant Lands Act |
| O&C lands | lands that are the subject to the O&C Act |
| ONHP | Oregon Natural Heritage Program |
| ONHIC | Oregon Natural Heritage Information Center |
| PCFFA | Pacific Coast Federation of Fishermen's Association |
| PSQ | Probable Sale Quantity |
| PM | particulate matter |
| REO | Regional Ecosystem Office |
| RIEC | Regional Interagency Executive Committee |
| ROD | Record of Decision |
| SEIS | Supplemental Environmental Impact Statement |
| U.S.C. | United States Code |
| USDA | United States Department of Agriculture |
| USDI | United States Department of Interior |

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# Summary

## Introduction

This Supplemental Environmental Impact Statement (SEIS) presents the environmental consequences of undertaking different management strategies for rare and little known species that are associated with late-successional and old-growth forests within the range of the northern spotted owl. Currently, 296 species and 4 arthropod functional groups are managed under the Survey and Manage Standards and Guidelines. A proposal to remove the Survey and Manage Standards and Guidelines was put forth as the "proposed action" and was made public on October 21, 2002, through a Notice of Intent published in the Federal Register (67 FR 64601). The Notice of Intent provided preliminary information about the proposed action and invited public comment. A Draft SEIS was released in May 2003 and the public was again invited to comment. The 90-day public comment resulted in the Agencies receiving more than 5,100 letters, postcards, and e-mails.

The existing Survey and Manage Standards and Guidelines were originally added to agency land and resource management plans as part of the 1994 *Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl* (the Northwest Forest Plan). The Northwest Forest Plan primarily takes a landscape approach to providing habitat for late-successional and old-growth forest related species on Forest Service and Bureau of Land Management (BLM) (hereafter referred to as the Agencies) administrative units in western Washington and Oregon, and northwestern California. The Survey and Manage mitigation measure was added to the basic elements of the Northwest Forest Plan to provide benefits for rare and little known species. In January 2001, the Agencies modified the Survey and Manage Standards and Guidelines by identifying needed management, clarifying language, eliminating inconsistent and redundant practices, and establishing an annual species review process. Those modifications were embodied in the January 2001 *Record of Decision for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines.*

## Why is the Action Being Proposed?

Agency managers and the public have raised concerns that the Survey and Manage Standards and Guidelines are frustrating the Agencies' ability to meet the resource management goals and objectives as set forth in the Northwest Forest Plan. They assert that the costs of the Survey and Manage mitigation measure, both in dollars and time, are excessive. They also suggest that because 80 percent of federally managed lands within the Northwest Forest Plan area are allocated to reserves, it is not necessary to manage substantially more land for late-successional and old-growth forest related species. The Survey and Manage Standards and Guidelines require management of species sites within areas allocated to multiple use such as timber harvest or watershed restoration. Such management can prevent timber sales and other activities such as habitat conservation and restoration from going forward.

***The underlying needs to which the Agencies are responding are healthy forest ecosystems and a sustainable supply of timber and other forest products, to the extent these are frustrated by the Survey and Manage Standards and Guidelines.***

# What Would It Mean Not to Meet the Need?

To answer this question, the No-Action Alternative (Alternative 1) was analyzed. Alternative 1 continues implementation of all current elements of the Northwest Forest Plan including the Survey and Manage mitigation measure, the underlying land and resource management plans, and relevant agency programs and policies. Alternative 1 is described in detail in Chapter 2.

# What Action is Proposed?

The Agencies propose to remove the Survey and Manage Standards and Guidelines by amending 28 land and resource management plans within the range of the northern spotted owl. This proposal is referred to as the "proposed action" or Alternative 2. Under Alternative 2, the Agencies would rely on their existing Special Status Species Programs to conserve rare species. Alternative 2 is described in detail in Chapter 2.

# Would Other Alternatives Meet the Need?

During the scoping phase for this project (October through December 2002) many comments were received both internally and externally. Commenters suggested various ideas for meeting the need, and many of these are addressed in Chapter 2 under "Alternatives Considered, but Eliminated from Detailed Study." Several of these ideas were also incorporated into another alternative, Alternative 3. Alternative 3 would remove the uncommon species from the Survey and Manage mitigation measure while retaining rare species. Alternative 3 would also remove the requirement to conduct pre-disturbance surveys in forest stands that have not developed late-successional and old-growth characteristics. Alternative 3 is described in detail in Chapter 2.

# What are the Effects of the Alternatives?

This section summarizes the environmental consequences of the three alternatives discussed in detail in Chapter 3&4.

### Survey and Manage Species

The environmental consequences analysis in this SEIS supplements the previous analyses in the Northwest Forest Plan Final SEIS and 2000 Survey and Manage Final SEIS. Those analyses conclude the Survey and Manage Standards and Guidelines generally provide benefits to species and provide consistent processes for obtaining information about numbers, populations, and distribution.

The analysis in this SEIS determines one of the following outcomes for each species:

1. Habitat (including known sites) is sufficient to support stable populations in the Northwest Forest Plan area
2. Habitat (including known sites) is sufficient to support stable populations range-wide in the Northwest Forest Plan area, although there is insufficient habitat to support stable populations in a portion of the Northwest Forest Plan area.
3. Habitat (including known sites) is insufficient to support stable populations in the Northwest Forest Plan area.
4. There is insufficient information to determine an outcome.

These outcomes correlate to those found in the 2000 Survey and Manage Final SEIS with the following exceptions:

> Outcome 1 in this Final SEIS is a combination of Outcomes 1 and 2 from the 2000 Survey and Manage Final SEIS. In the 2000 Final SEIS, Outcome 1 described species as stabilizing "in a pattern similar to reference distribution" while Outcome 2 described species as stabilizing "in a pattern altered from reference distribution, with some limitations on biological functions and species interactions."
>
> Outcome 2 is new. It allows for an outcome of habitat that supports stable populations in most of the planning area while acknowledging that there are certain portions of the species range where habitat does not provide for stable populations. Populations may or may not be described by distinct population segments or evolutionarily significant units. The viability provision and the Survey and Manage persistence objectives define a viable population as "continued existence is well distributed in the planning area" (36 CFR 219.19). The 2000 Survey and Manage Final SEIS described well-distributed as "distributed sufficiently to permit normal biological function and species interactions..." (USDA, USDI 2000a, p. 189). Insufficient habitat to support stable populations in a portion of a species range could result in some restriction on normal biological function and species interactions. This would imply that the species is no longer well distributed in at least a part of the planning area which could result in a downward trend in distribution. So, while a species may be well distributed and have stable populations in most of the Northwest Forest Plan area, it is important to describe and disclose in the analysis of environmental consequences that a species may not have stable populations in a portion of its range.

Recognizing there is much that remains unknown about many of the species, the analysis in this SEIS concludes that there is a reasonable certainty that some species would have insufficient habitat (including known sites) to provide for stable populations in the Northwest Forest Plan area or in portions of the species range due to the proposed action. In addition, the analysis shows that some species have insufficient habitat or there is insufficient information to determine an outcome under any alternative. Table S-1 displays the outcomes for species under the three alternatives.

There would be a substantial difference in the outcomes for 51 species in the Northwest Forest Plan area due to differences between Alternatives 1 and 2. This includes 2 lichens, 10 mollusks, and 39 fungi. For these species, there is sufficient habitat (including known sites) to support stable populations under Alternative 1 while there is insufficient habitat (including known sites) to support stable populations under Alternative 2. Under Alternative 2, the difference in outcome for these species was caused by a species not qualifying for one or more of the Agencies' Special Status Species Programs in all or important parts of their range.

There would be a substantial difference in the outcomes for eight species in the Northwest Forest Plan area due to differences between Alternatives 1 and 3. This includes six fungi and two lichens. For these species, there is sufficient habitat (including known sites) to support stable populations under Alternative 1 while there is insufficient habitat (including known sites) to support stable populations under Alternative 3. Under Alternative 3, the difference in outcome for these species was caused by a species not qualifying for one or more of the Agencies' Special Status Species Programs in all or important part of their range.

For some of the species, even though they would have sufficient habitat (including known sites) to support stable populations range-wide in the Northwest Forest Plan area, they would have insufficient habitat (including known sites) to support stable

populations in a portion of their range under Alternatives 2 and 3. For Alternative 2, this includes two lichens, three mollusks, and one vascular plant. For Alternative 3, this includes one mollusk and one vascular plant.

## Potential Species Mitigation

Measures could be used to mitigate the adverse environmental effects for species that would have insufficient habitat (including known sites) to support stable populations in all or a portion of the Northwest Forest Plan area under Alternatives 2 and 3, but not under Alternative 1. Mitigation could include management of known sites where species are not included in the Agencies' Special Status Species Programs. In addition, mitigation for some of these species could include pre-project clearances.

There are 142 species with insufficient habitat (including known sites) to support stable populations in the Northwest Forest Plan area under all alternatives. This is due to factors such as limited potential habitat, few populations on federally managed lands, potential for stochastic events, low number of individuals, limited distribution, and narrow ecological amplitude. Since the insufficient habitat is not a result of federal actions, no alternative could be proposed that would change this outcome (USDA, USDI 1994a and USDA, USDI 2000a). There are 28 species for which there is insufficient information to determine an outcome under Alternatives 1 and 2. Under Alternative 3, there are 29 species that fit in this category.

Under Alternative 1, when the analyses shows that there is "insufficient information to determine an outcome" or "there is insufficient habitat (including known sites) to support stable populations" for a species, this outcome is the same for Alternatives 2 and 3 as well. Although the Survey and Manage Standards and Guidelines under Alternative 1 generally provide benefits to species, they do not substantively change the outcome or have as yet not resolved the insufficient information. However, many of these are species with few known sites or populations. For species with insufficient habitat under all alternatives that receive management under Alternative 1, but are not included in the Agencies' Special Status Species Programs under Alternatives 2 and 3, the differences in species management could somewhat increase the risk to these species. For species where there is "insufficient information to determine an outcome" that receive management under Alternative 1, but are not included in the Agencies' Special Status Species Programs under Alternatives 2 and 3, it is unknown if the lack of species management will increase the risk to these species. Mitigation that would eliminate the difference between the alternatives is possible. Mitigation would consist of conducting pre-project clearances and/or managing known sites. It is unknown to what degree mitigation lessens the risk for these species; however, it will not change the outcome or resolve the insufficient information needed to determine the outcome for a species.

## Timber Harvest

The amount of late-successional forest projected for management of known sites reduces the acres of late-successional forest in the Matrix and Adaptive Management Areas available for harvest. The projected Probable Sale Quantity (PSQ) reductions shown below are reductions from the current 805 million board foot (MMBF) baseline.

Under Alternative 1, there would be a 105 MMBF reduction in PSQ due to management of known sites.

Under Alternative 2, there would be a 35 MMBF reduction in PSQ due to management of known sites. Mitigation measures for 57 species, including management of known sites under Alternative 2, would reduce PSQ an additional 2 MMBF. Under Alternative 2 with mitigation, there would be a 35 MMBF (rounded to the nearest 5 MMBF) reduction in PSQ.

Under Alternative 3, there would be a 45 MMBF reduction in PSQ due to management of known sites. Mitigation measures for 10 species, including management of known sites under Alternative 3, would reduce PSQ an additional 5 MMBF. Under Alternative 3 with mitigation, the reduction in PSQ would be 50 MMBF.

## Prescribed Fire

Under Alternative 1, the annual acres available for hazardous fuel treatments would be 150,100 acres. The cost per acre to manage for species would be $94.

Under Alternative 2, the annual acres available for fuel treatments would be 158,600, an increase of 8,500 acres compared to Alternative 1. Fuel treatment costs to manage for species would be $37 per acre, a decrease of $57 compared with Alternative 1. Mitigation measures for 57 species under Alternative 2 would result in 200 fewer acres available for annual fuel treatments and an increase of approximately $3 per acre to protect species compared to Alternative 2 without mitigation.

Under Alternative 3, the annual acres available for fuel treatments would be 157,000, an increase of 6,900 acres compared to Alternative 1. Fuel treatment costs to manage for species would be $29 per acre, a decrease of $65 compared with Alternative 1. Mitigation measures for 10 species under Alternative 3 would result in 300 fewer acres available for annual fuel treatments and an increase of less than $1 per acre to protect species compared to Alternative 3 without mitigation.

## Costs of Management

Under Alternative 1, the Agencies' short-term annual costs would be $25.9 million. Long-term annual costs (after 10 years) would decrease to $16.8 million.

Under Alternative 2, the Agencies' short-term annual costs would be $10.0 million. This would result in a short-term cost savings of $15.9 million per year compared to Alternative 1. The Agencies' long-term annual costs would be $9.5 million. This would result in a long-term cost savings of $7.3 million per year compared to Alternative 1. The cost of mitigation under Alternative 2 would be $0.6 million dollars annually, mostly due to the need for additional clearance surveys.

Under Alternative 3, the Agencies' short-term annual costs would be $11.8 million. This would result in a short-term cost savings of $14.1 million per year compared to Alternative 1. The Agencies' long-term annual costs would be $10.3 million. This would result in a long-term cost savings of $6.5 million per year compared to Alternative 1. The cost of mitigation under Alternative 3 would be negligible.

## Socioeconomics

All alternatives have an adverse effect on PSQ that was not anticipated in the Northwest Forest Plan Final SEIS (see 2000 Survey and Manage Final SEIS, p. 429). The full harvest level under the Northwest Forest Plan is currently 805 MMBF which would support 7,309 timber-related jobs.

Under Alternative 1, the timber-related employment decrease from the Northwest Forest Plan harvest level would be 953. Survey-related employment would provide an additional 534 jobs. This would result in a net decrease of 419 jobs and a net loss in annual personal earnings of $18.8 million compared to projected employment under the Northwest Forest Plan.

Under Alternative 2, the timber-related employment decrease from the Northwest Forest Plan harvest level would be 318 jobs. Survey-related employment would provide an

additional 206 jobs. This would result in a net decrease of 112 jobs and a net loss in annual personal earnings of $5.7 million compared to projected employment under the Northwest Forest Plan. Mitigation under this alternative would result in an additional decrease of 5 jobs and an additional loss in annual personal earnings of $0.2 million when considering both timber and survey-related jobs.

Under Alternative 3, the timber-related employment decrease from the Northwest Forest Plan harvest level would be 409 jobs. Survey-related employment would provide an additional 243 jobs. This would result in a net decrease of 166 jobs and a net loss in annual personal earnings of $7.8 million compared to projected employment under the Northwest Forest Plan. Mitigation under this alternative would result in an additional decrease of 36 jobs and an additional loss in annual personal earnings of $1.1 million when considering both timber and survey-related jobs.

### Other Resources

For the other resources, including the aquatic ecosystem, late-successional forest ecosystem, air quality, water quality, soil productivity, late-successional mammals (excluding red tree vole), late-successional birds (excluding great gray owl), threatened and endangered species, and species associated with early-successional forest, the alternatives would either have relatively minor effects or would not change the analysis or outcomes developed in the Northwest Forest Plan Final SEIS and implemented through its Record of Decision (USDA, USDI 1994b). Table S-1 displays a brief summary of the environmental consequences of the alternatives.

## What Factors Will be Used in Making the Decision?

The Secretary of Agriculture and the Secretary of Interior will jointly decide which alternative best meets the underlying need for this proposal. In making the decision, they will also weigh how well each of the alternatives meets the following purposes:

1. Provide for diversity of plant and animal communities in accordance with the National Forest Management Act and conserve rare and little known species that may be at risk of becoming listed under the Endangered Species Act.

It has been longstanding policy in both the Forest Service and BLM to avoid taking actions that would lead to the listing of species under the Endangered Species Act. In addition, the Forest Service has regulations that require it "to provide for diversity of plant and animal communities based on the suitability and capability of the specific land area" (16 USC 1604(g)(3)(B)).

2. Reduce the Agencies' cost, time, and effort associated with rare and little known species conservation.

Pre-disturbance surveys, strategic surveys, and other elements of the Survey and Manage Standards and Guidelines are expensive and use a disproportionate share of available agency funding. Required pre-disturbance surveys can delay projects for 2 years and draw valuable personnel and resources away from other conservation efforts.

3. Restore the Agencies' ability to achieve resource management objectives that were established under the Northwest Forest Plan.

Some uncommon Survey and Manage species are so numerous that the acreage needed to protect them far exceeds that projected in previous analyses. As a result, some project areas become dotted with dozens of known sites, severely reducing project size or making the entire project infeasible. This problem has limited the Agencies' ability

**Table S-1. Summary of environmental consequences of the alternatives.**

| | | Alternative 1 | Alternative 2 | | Alternative 3 | |
|---|---|---|---|---|---|---|
| | | | Un-mitigated | Mitigated | Un-mitigated | Mitigated |
| Species and Functional Groups | Insufficient habitat to support stable populations not due to federal actions[1] | 142 | 142 | 142 | 142 | 142 |
| | Insufficient habitat to support stable populations due to actions under the alternative | 0 | 51 (6)[2] | 0 | 8 (2)[2] | 0 |
| | Sufficient habitat to support stable populations | 130 | 79 | 130 | 121 | 129 |
| | Insufficient information to determine outcome | 28 | 28 | 28 | 29 | 29 |
| Annual Timber Harvest (MMBF) | | -105 | -35 | -35 | -45 | -50 |
| Short-term Annual Cost (millions) | | $25.9 | $10.0 | $10.6 | $11.8 | $11.8 |
| Long-term (10 years) Annual Cost (millions) | | $16.8 | $9.5 | $10.1 | $10.3 | $10.3 |
| Employment Decrease from Full Harvest Level (per Northwest Forest Plan) | | -419 | -112 | -117 | -166 | -202 |
| Net Loss in Annual Personal Earnings (millions) | | -$18.8 | -$5.7 | -$5.9 | -$7.8 | -$8.9 |
| Hazardous Fuel Treatment (annual acres) | | 150,100 | 158,600 | 158,400 | 157,000 | 156,700 |
| Hazardous Fuel Treatment (cost to protect species per acre) | | $94 | $37 | $40 | $29 | $29 |

[1] Factors causing insufficient habitat are things such as limited potential habitat and few populations on federally managed lands, potential for stochastic events, low number of individuals, limited distribution, and narrow ecological amplitude.
[2] Under Alternative 2 there are 6 additional species that have insufficient habitat in a portion of the species' range; for Alternative 3, there are 2 species with insufficient habitat in a portion of the species' range.

to restore forest health including fuel treatments to reduce the threat of catastrophic wildfire to watersheds and communities at risk. This problem has also contributed to the Agencies' inability to achieve predictable and sustainable levels of timber outputs as anticipated in the Northwest Forest Plan.

## What Monitoring is Necessary that is Not Included in the Proposed Action or Alternatives?

Monitoring will continue in accordance with existing monitoring requirements for the Northwest Forest Plan and for the land and resource management plans for each of the Forest Service and BLM administrative units within the Northwest Forest Plan area. No new monitoring requirements are proposed under any of the alternatives.

## Which Alternative is Preferred?

Based on consideration of the environmental consequences, Alternative 2 was found to best meet the purpose and need, and is the preferred alternative.

# Chapter 1

**Changes between Draft and Final**

Minor corrections, explanations, and edits are not included in this list.

- Language in the purpose and need has been updated to reflect the recent review of the Northwest Forest Plan in National Forests in northern California.
- Changes have been made to reflect the results of data received from field units.

# Chapter 1 - Purpose and Need

## Introduction

This chapter specifies the purpose and need to which the Forest Service and Bureau of Land Management (BLM) (the Agencies) are responding in developing the proposed action and alternatives assessed in this Supplemental Environmental Impact Statement (SEIS). The Agencies propose to amend 28 land and resource management plans within the range of the northern spotted owl to remove or modify the Survey and Manage Standards and Guidelines. This includes land and resource management plans of the Forest Service and resource management plans of the BLM (collectively referred to as land and resource management plans) in the Pacific Northwest and northern California (Figure 1-1). The existing Survey and Manage Standards and Guidelines were added to land and resource management plans as part of the 1994 *Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl* (aka the Northwest Forest Plan). The Northwest Forest Plan was later modified by the January 2001 *Record of Decision for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines*. Although the 1994 and 2001 Records of Decision actually amended 28 land and resource management plans, the overall resource management strategy was and is continued to be called the Northwest Forest Plan.

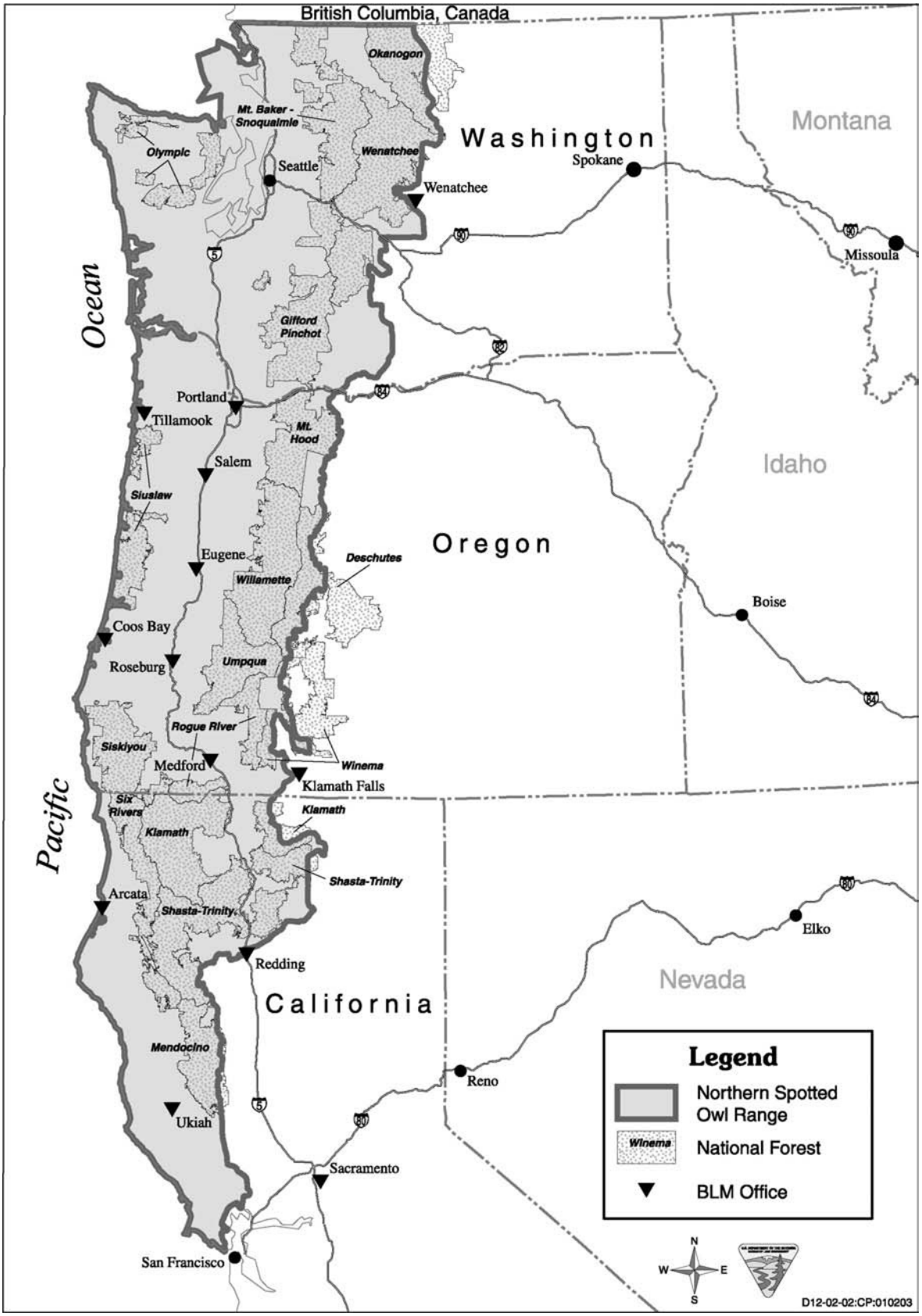
The Survey and Manage Standards and Guidelines currently provide procedures and requirements for the management of 296 rare and/or little-known species and 4 arthropod functional groups within the Northwest Forest Plan area. Species include fungi, lichens, vascular plants, mollusks, bryophytes, and vertebrates. The Survey and Manage Standards and Guidelines include species that are associated with late-successional or old-growth forests and for which other elements of the Northwest Forest Plan (such as reserves or other standards and guidelines) may not provide a reasonable assurance of persistence. Background information about the Survey and Manage Standards and Guidelines can be found in Chapter 2.

## The Need

Impacts of the Survey and Manage Standards and Guidelines have been much greater than the impacts anticipated when the mitigation measure was added to the SEIS for the Northwest Forest Plan in 1994 (see Reasons for the Purpose and Need section later in this chapter). As a result, they are one of the factors frustrating the achievement of the stated needs of the Northwest Forest Plan "… protect the long-term health of our forests, our wildlife and our waterways …," "[w]here sound management policies can preserve the health of forest land, [timber] sales should go forward," and "… produce a predictable and sustainable level of timber sales and nontimber resources that will not degrade or destroy the environment." (USDA, USDI 1994a, p. 1-4 and USDA, USDI 1994b, p. 3.)

Jack Ward Thomas, team leader for the Forest Ecosystem Management Assessment Team, was recently asked to evaluate the application of the Northwest Forest Plan in National Forests in northern California. In his report he stated his opinion "The NWFP made two promises – enhanced environmental protection and a sustained (though much reduced) flow of goods and services. The first promise has been kept ... Performance on the second promise has lagged in a number of aspects and has the potential of producing longer-term negative consequences to the environment." (Thomas 2003, p. 8).
The Survey and Manage Standards and Guidelines are one of several reasons for the Agencies not meeting a predictable and sustainable flow of good and services. The

**Figure 1-1.** Range of the Northern Spotted Owl.



Survey and Manage Standards and Guidelines are frustrating the Agencies' ability to protect the long-term health of forests, wildlife, and waterways because they restrict forest health treatments. They are also preventing timber sales that were predicted under the Northwest Forest Plan from being implemented.

***The underlying needs to which the Agencies are responding are healthy forest ecosystems and a sustainable supply of timber and other forest products, to the extent these are frustrated by the Survey and Manage Standards and Guidelines.***

# The Purposes

## Meet Terms of the Settlement Agreement

In response to a lawsuit against the Secretaries of Agriculture and Interior concerning the 2001 *Record of Decision for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines*, the Secretaries, on September 30, 2002, entered into a settlement agreement with the plaintiffs, Douglas Timber Operators and American Forest Resource Council (Douglas Timber Operators, et al. v. Secretary of Agriculture, et al. Civil No. 01-6378-AA (D. Oregon, filing December 24, 2001)). The lawsuit being settled alleges that the Survey and Manage amendments transferred more than 81,000 acres of timber-producing forest land into permanent reserves, resulting in a 7 percent reduction of the regional timber volume permitted under the Northwest Forest Plan. The lawsuit alleges that this equates to a loss of 51 million board feet (MMBF) of timber sales per year in perpetuity. Thus, the lawsuit alleges the Survey and Manage smendments are in violation of the substantive and procedural requirements of the Oregon and California Railroad and Coos Bay Wagon Road Grant Lands Act (O&C Act), 43 U.S.C. §1181a; the National Forest Management Act (NFMA), 16 U.S.C. §1600, et seq.; the Multiple-Use Sustained-Yield (MUSY) Act of 1960, 16 U.S.C. §528-531; and the Federal Land Policy and Management Act (FLPMA), 43 U.S.C. §1701, et seq. The settlement agreement requires the Agencies to examine, in an SEIS, an alternative "that replaces the Survey and Manage mitigation requirements with existing Forest Service and BLM special status species programs to achieve the goals of the Northwest Forest Plan through a more streamlined process."

***A purpose is to comply with the terms of the Settlement Agreement by considering, in detail, an alternative that removes the Survey and Manage Standards and Guidelines. Other elements of the Northwest Forest Plan and the Agencies' existing Special Status Species Programs would be relied on to provide for species viability and diversity while achieving other objectives of the Northwest Forest Plan.***

## Conserve Rare and Little Known Species

It has been longstanding policy in both the Forest Service and BLM to avoid taking actions that would lead to the listing of species under the Endangered Species Act. Policies to this effect are found in U.S. Department of Agriculture Regulation 9500-4, Forest Service Manual 2670.32, and BLM Manual 6840.22. These policies share two principles: assist in the recovery of threatened and endangered species and implement management practices to ensure that species do not become threatened or endangered because of federal actions. In addition, the Forest Service has regulations that require it "to provide for diversity of plant and animal communities based on the suitability and capability of the specific land area" (16 U.S.C. 1604(g)(3)(B)). The National Forest Management Act (NFMA) implementing regulations for the Forest Service at 36 CFR 219.19 (1982) require that "Fish and wildlife habitat shall be managed to maintain viable populations of existing native and desired non-native vertebrate species in the planning area."

***A purpose is to continue to provide for diversity of plant and animal communities in accordance with the National Forest Management Act and conserve rare and little known species that may be at risk of becoming listed under the Endangered Species Act.***

## Reduce Cost and Effort

Agency funding is important to accomplishing overall management objectives. A review of the Northwest Forest Plan in northern California found "Implementation of pre-disturbance surveys and management recommendations are expensive, time consuming ..." (USDA Forest Service 2003a, p. 4). The annual cost of the Survey and Manage Program is projected to be more than $25 million. While progress at streamlining processes has been made in the last 3 years, some Survey and Manage processes are still complex and time consuming, leading to delays and stalled projects. These problems limit the Agencies' ability to meet policy objectives and divert money from other work including watershed restoration projects, fuel reduction projects, timber management projects, and projects designed to improve habitat for threatened, endangered, and other species.

***A purpose is to reduce the Agencies' cost, time, and effort associated with rare and little known species conservation.***

## Healthy Forests and Timber Outputs

Some species in the "uncommon" category of Survey and Manage are so numerous or widespread that the acreage being set aside to protect them far exceeds that projected in previous analyses. A recent review of the Northwest Forest Plan in northern California found "Survey and Manage protection buffers have affected approximately 30% of the project areas proposed. The majority of fuels treatments and timber management activities are excluded within protection buffers." (USDA Forest Service 2003a, p. 3.) As a result, some project areas become dotted with dozens of known sites, severely reducing project size or making the entire project infeasible. This problem has limited the Agencies' ability to restore forest health including fuel treatments to reduce the threat of catastrophic wildfire to watersheds and communities at risk. This problem has also contributed to the Agencies' inability to achieve predictable and sustainable levels of timber outputs as predicted in the Northwest Forest Plan.

***A purpose is to restore the Agencies' ability to achieve resource management goals and timber outputs that were established under the Northwest Forest Plan.***

## Reasons for the Purpose and Need

1. <u>Effects of Survey and Manage were underestimated</u>. The Survey and Manage Final SEIS in 2000 stated:

   *"A 6 MMBF reduction in PSQ [probable sale quantity] was made for 1993 known sites, but the possibility of future sites was summarized as: '... other modifications made to Alternative 9 add to the uncertainty of the PSQ calculations. These changes include the requirement to survey and manage future sites of some late-successional forest associated species,…' (USDA, USDI 1994a, page 3&4-267). The Northwest Forest Plan SEIS made no PSQ adjustment for Survey and Manage sites that would be identified in the future. It was assumed that occurrences of these species would be rare and effects on lands available for harvest would be minimal."* (USDA, USDI 2000a.)

The Survey and Manage Final SEIS 2000 estimated that Probable Sale Quantity (PSQ) would be reduced by 51 MMBF per year due to implementation of the Survey and Manage Standards and Guidelines, and notes proportionate limitations on habitat

restoration, prescribed fire, and other forest management activities. With further implementation experience and new information gained over the last 3 years, effects of the Survey and Manage mitigation measure are estimated to be more than twice that projected in the 2000 Final SEIS (Chapter 3&4, Timber Harvest section).

Jack Ward Thomas, in a recent evaluation of the Northwest Forest Plan in the National Forest in northern California, said "There is no record of which I am aware that indicates that efforts were made to 'cost out' the changes and additions to Option 9, such as survey and manage" (Thomas 2003, p. 2). He also said "Responses (the addition of 'bells and whistles') that emerged in the NWFP to perceived problems with the adequacy of FEMAT Option 9 to stand up to judicial review do not seem to have been subjected to any economic assessment of costs and benefits, with survey and manage being the prime example. I find it hard to imagine that any Administration would have signed off on a NWFP that required $33,000,000 per year for S&M. If that figure were known, it would have been clear that most, likely all, land management activities would be destined to be carried out 'below costs.' Or, for projects not related to production of goods, at several times the actual cost of doing the project." (Thomas 2003, pp. 3-4.)

The Survey and Manage Standards and Guidelines have clearly not had the relatively minor effects originally predicted. Some species in the "uncommon" category of Survey and Manage species are so numerous that the required avoidance substantially constrains other forest management activities including fuel reduction treatments, watershed and late-successional forest restoration, and timber harvests. There are a total of 66 Survey and Manage species that require pre-disturbance (clearance) surveys. Field units, on average, must look for 18 of the 66 species prior to undertaking habitat-disturbing activities. When a species is located during surveys, a "known site" is established and managed. Management usually includes a buffer ranging from 1/4 to 10 acres in size. For one fungus species, *Bridgeoporus nobilissimus*, 600 acres are managed for each site found until a management plan is written. For some species, so many sites are found that whole projects are cancelled. This has reduced silvicultural treatments designed to enhance old-growth development in Late-Successional Reserves and prevented the implementation of some fuel treatments in areas in National Forests in northern California at high risk of catastrophic wildfire. Currently, the Agencies manage more than 22,100 acres of known sites, typically to the exclusion of other forest management activities, regardless of the number of known sites nearby.

2. <u>Survey and Manage is costly and time consuming</u>. The Survey and Manage Standards and Guidelines drain agency resources and impact project implementation. The annual cost for the Survey and Manage Program, assuming full implementation of the Northwest Forest Plan, is projected to be more than $25 million. "While ... [this] is a small amount of money relative to the value of the land and resources in question, it is a significant amount in terms of the limited amount of money in the budget of a land management agency" (Thomas 2003, p. 4). Requirements for pre-disturbance surveys can extend project planning 1 to 2 additional years because "Survey protocols are time consuming to implement and survey windows are often less than several weeks in length due to inclement weather conditions. Project delays are often due to survey windows being too short" (USDA 2003, p. 4). Delays to complete pre-disturbance surveys, delay other needed work. Sixty-six (66) Survey and Manage species require pre-disturbance surveys and few habitat-disturbing activities are exempt. These factors reduce the Agencies' ability to complete work, such as, develop or expand recreation sites, prepare timber sales, or otherwise respond to management needs.

The various Survey and Manage administrative processes and procedures, originally intended to provide consistency of implementation, have turned out to be costly and time consuming. Survey and Manage Standards and Guidelines for species in the "rare" category generally require retention of all known sites regardless of local situations or resource objectives. For example, fuel reduction projects reintroducing fire

at the landscape scale have become difficult in some field units in northern California because of the requirement to protect sites even when the species occupying the site naturally occurs in fire-adapted ecosystems. The 2001 Record of Decision only requires management of high-priority sites for the "uncommon" category because of the large number of known sites for these species. Until Management Recommendations are revised to address high-priority sites, all sites are assumed high priority or field units must use the process described in the standards and guidelines to determine non-high priority sites on a case-by-case basis. To date, no Management Recommendations have been written that identify high-priority sites. Hence, all known sites must be managed even though not all sites are needed for a reasonable assurance of persistence for the species.

In some ways, protection measures for Survey and Manage species are more restrictive than those for federally listed threatened or endangered species. Jack Ward Thomas recently said that Survey and Manage "essentially treats all species ... identified as being 'at risk' to deserve protection until proven otherwise. This turns the concept of the Endangered Species Act (ESA) wherein species are declared as 'threatened' or 'endangered' upon the evaluation of evidence that a species in question qualifies for that distinction 'inside out.'" (Thomas 2003, p. 3). While the Endangered Species Act requires listing agencies to act on available information within a relatively short period of time following the application for permit or request for an opinion, the Survey and Manage Standards and Guidelines have required time-consuming surveys to prove that such species are not present in the project area.

The amendments in the 2001 Record of Decision significantly reduced costs and conflicts when compared with what the Agencies would have experienced under the original 1994 Northwest Forest Plan Survey and Manage Standards and Guidelines. However, even as amended, the complexity and cost of the Survey and Manage mitigation measure is reducing agency resources that would otherwise be available for implementation of other elements of the Northwest Forest Plan.

3. <u>The Survey and Manage Standards and Guidelines under the Northwest Forest Plan and the Agencies' Legal Requirements</u>. The Forest Service' NFMA implementing regulation at 36 CFR 219.19 (1982) requires that "Fish and wildlife habitat shall be managed to maintain viable populations of existing native and desired non-native vertebrate species in the planning area." The FEMAT, in crafting the ten alternatives considered in the 1994 SEIS, was instructed to "include alternatives that range from a medium to a very high probability of ensuring the viability of species" (USDA et al. 1993, p. II-5). The Survey and Manage mitigation measure was added well after the ten alternatives were developed and analyzed. The FEMAT did not include the Survey and Manage mitigation measure as a necessary component to achieving its task of identifying alternatives that would provide assurance of viability in the medium to high range of probability. The criteria used for identifying species to be included in the Survey and Manage mitigation measure did "not represent a judgment about what is required by the National Forest Management Act or the Endangered Species Act" (USDA, USDI 1994a, p. J2-2); therefore, inclusion in Survey and Manage does not necessarily mean species viability is dependent upon this mitigation measure. To a large extent, the species included in the Survey and Manage mitigation measure were species which had not been studied and little was known about them.

The BLM regulations, issued under the Federal Land Policy and Management Act (FLPMA) (43 U.S.C. 1701), have no diversity or viability requirements. The Ninth Circuit Court ruled in Headwaters vs. BLM (914 F.2d 1174 (9th Cr. 1990)) that the BLM has no authority under the O&C Act (43U.S.C. 1181a) to set aside timberlands for wildlife purposes. Yet, under Option 9, BLM administered lands were given the same species viability protections as National Forest System lands (USDA et al. 1993, p. II-5). Extending the viability requirements to BLM lands was not required by any law.

The Northwest Forest Plan states "By its own terms, the [Forest Service viability provision] regulation applies only to vertebrate species. Nonetheless, consistent with the statutory goals of providing for diversity of plant and animal communities and the long-term health of federal forests, as well as the agencies' conservation policies, our decision satisfies a similar standard with respect to non-vertebrate species to the extent practicable" (USDA, USDI 1994b, p. 44). Extending protection to non-vertebrate species on National Forests was not required by any law.

While the Agencies may not be prohibited from implementing greater protections for these species, there is no law or regulation requiring such protections. By doing so, species protection measures included in the Survey and Manage mitigation measure have constrained other programs and activities to an extent not anticipated in the Northwest Forest Plan.

4. Special Status Species Programs provide for species management. Rare and uncommon species in all other parts of the nation rely on the Agencies' Special Status Species Programs to meet legal and policy requirements for such species.

# Proposed Action

## The Proposal

The Agencies propose to amend 28 land and resource management plans within the range of the northern spotted owl to remove the Survey and Manage Standards and Guidelines.

Separate from this proposal, the Agencies reviewed the 296 Survey and Manage species to determine their eligibility for inclusion in the Agencies' existing Special Status Species Programs. Because the Regional Foresters and State Directors have not updated their Special Status Species lists, it is assumed that Survey and Manage species that are eligible for the Agencies' Special Status Species Programs will be added to those programs if the Survey and Manage Standards and Guidelines are removed. The Agencies' Special Status Species Programs seek to further the objectives of the Endangered Species Act by preventing future listings of species as threatened or endangered. Both programs require coordination with state agencies to achieve conservation goals of species identified by state governments (see Chapter 2 for description of Special Status Species Programs). The objectives of the Forest Service' program also include compliance with NFMA regulations requiring diversity of plant and animal communities.

Not all of the 296 rare or little known species (and 4 arthropod functional groups) meet the criteria for inclusion in the Agencies' Special Status Species Programs. The Agencies determined 152 of the 296 Survey and Manage species are already included or are eligible for inclusion in one or more of the programs. In making the determination, the Agencies used global and state biodiversity database rankings from the Oregon Natural Heritage Program (ONHP) along with existing agency policy. ONHP rankings and criteria for inclusion in the Agencies' Special Status Species Programs are not based solely on local abundance; they also consider habitat distribution, threats, global population levels, and other factors. None of the species affected by this proposal are currently listed as threatened or endangered or proposed for listing under the Endangered Species Act. The proposed action does not include any other changes to the Northwest Forest Plan. The proposed action is described in detail in Chapter 2.

## Decision to be Made

The decision to be made by the Secretaries of Agriculture and Interior is whether to select the proposed action or another alternative. The decision will be based on the degree to

which the proposed action and alternatives meet the purpose and need. Specifically, alternatives will be evaluated on how well they achieve the resource management objectives of the Northwest Forest Plan including healthy forests and timber outputs, conserving rare or little known species, and reducing costs. While the settlement agreement provides an impetus to prepare this SEIS, it does not require the selection of any particular alternative.

This SEIS is a supplement to the 2000 Survey and Manage Final SEIS, which was a supplement to the Northwest Forest Plan Final SEIS. The Agencies have chosen to focus this proposal on the Survey and Manage Standards and Guidelines. Separate from this action, the Agencies have recognized a need to " … make the Aquatic Conservation Strategy (ACS) in the [1994] Record of Decision consistent with the original intent of the report prepared by the Forest Ecosystem Management Assessment Team …" (67 FR 70575, November 25, 2002) and have chosen to do that in a separate SEIS.

The Agencies' are also preparing an SEIS on the Management of Port-Orford-cedar in Southwest Oregon. This SEIS is not an amendment to the Northwest Forest Plan but would the amend the land and resource management plans for the Coos Bay, Medford, and Roseburg Districts of the BLM and the Siskiyou National Forest. The amendment would remove the existing direction for management of Port-Orford-cedar and replace it with one of the management strategies considered in that SEIS.

# Scoping

A Notice of Intent to prepare the SEIS was published in the Federal Register on October 21, 2002 (67 FR 64601). The Notice of Intent provided preliminary information about the proposed action and invited public comment. Concurrently, a scoping letter was mailed to more than 3,300 individuals and groups identified as potentially interested in the proposed action and analysis. The Agencies received more than 650 letters in response to the Notice of Intent and the scoping letter. Public comments contained a wide variety of suggestions for issues and alternatives. Alternative 3 was developed in response to scoping comments suggesting ways to cut costs and achieve resource objectives by making changes to the Survey and Manage Standards and Guidelines. Chapter 2 of this SEIS includes a discussion of other alternatives that were considered, but eliminated from detailed study and explains why they were eliminated. Many issues raised during scoping are relevant to this analysis and are addressed in Chapter 3&4. Other issues were raised that are not pertinent to this analysis. For example, some comments suggested ending all commercial logging everywhere in the Northwest while another was concerned about the inadequacies of city planning rules intended to protect the environment. These issues have not been considered further.

Some comments suggested that all old-growth forests need to be protected and placed off-limits to logging. They suggested that protecting all remaining late-successional and old-growth forests on federally managed lands would meet the purpose and need. Protecting additional old-growth forests outside the Late-Successional and Riparian Reserves would be akin to changing land allocations by creating additional Late-Successional Reserves. Various levels of reserves, including one which protected all remaining old-growth stands, were a key element in designing the ten alternatives originally considered for the Northwest Forest Plan, the SEIS which this SEIS supplements.

Some comments suggested eliminating the Survey and Manage mitigation measure would lead to Survey and Manage species being listed as threatened or endangered. Others were concerned that eliminating the Survey and Manage mitigation measure could lead to loss of old-growth forests, unraveling of ecological systems, and loss of social values. Other commenters provided different viewpoints and suggested

eliminating the Survey and Manage mitigation measure was needed so that fuel reduction, thinning, and other restoration treatments could proceed without further delays.

# Preferred Alternative

The Agencies have identified Alternative 2 as the preferred alternative because it best meets the purpose and need. Alternative 2 relies on the Agencies' Special Status Species Programs and the other elements of the Northwest Forest Plan to conserve rare and little known species. Alternative 2 is the least costly and requires the least effort to implement. Management of species under Alternative 2 reduces conflicts with other programs to the lowest levels, resulting in higher timber outputs and more acres available for hazardous fuels treatment.

# Chapter 2

**Changes between Draft and Final**

Minor corrections, explanations, and edits are not included in this list.

- A section on changes to Survey and Manage since the 2000 SEIS has been added.
- Alternative 1 and Appendix 1 have been changed to reflect delegations from the RIEC and exemption for wildland fire for resource benefits in all land use allocations.
- Language has been added to better explain why this SEIS only assumes to add species to the Agencies' Special Status Species Programs.
- Language has been added to recognize that adding species to the Agencies' Special Status Species Programs can have effects outside the Northwest Forest Plan area.
- Clarified that the description of Alternative 2 is organized to follow the format of Alternative 1 and agency policies may have been summarized, condensed, or paraphrased to fit the format of Alternative 1. If there is a discrepancy between the language in the description of Alternative 2 and agency policy, the policy prevails.
- Clarified that when a species is included in more then one program, each agency will manage the species in accordance with their own policy.
- Clarified that BLM is not adding any species to the Special Status Species Program list in the State of Washington because no BLM managed land in Washington State is within the Northwest Forest Plan area.
- The section on Potential Mitigation has been revised to:
  - o explain the Responsible Officials will decide whether to apply mitigation.
  - o describe the actual mitigation proposed and how long it will be required.
  - o include additional mitigation for species that are at high risk under any alternative and for species where there is insufficient information to determine risk. This mitigation is only included if the species receives known site management or pre-disturbance surveys under the Survey and Manage Standards and Guidelines but not under the Special Status Species Programs.
- Clarified the criteria for species placements described in Alternative 3 and the standards and guidelines in Appendix 4.

# Chapter 2 - The Alternatives

## Introduction

This chapter presents three alternatives including the Proposed Action. Alternative 1 is the No-Action Alternative and would retain the Survey and Manage Standards and Guidelines. Under Alternative 2, the Proposed Action, the Agencies propose to amend 28 land and resource management plans within the range of the northern spotted owl by removing the Survey and Manage Standards and Guidelines. Alternative 3 was developed in response to comments received during scoping suggesting that the purpose and need would be better met by alternatives other than the proposed action. Alternative 3 is similar to the proposed action except the Agencies would amend 28 land and resource management plans by modifying the Survey and Manage Standards and Guidelines. These modifications include: (1) removing provisions for uncommon species; (2) eliminating the requirement to conduct pre-disturbance surveys in non-late-successional and non-old-growth forest stands; and (3) changing the review process for excepting known sites from management. All alternatives apply to lands administered by the Forest Service, BLM, and Coquille Tribe (approximately 5,400 acres of forest lands known as the Coquille Forest) within the Northwest Forest Plan area. Alternatives 2 and 3 are referred to collectively as the action alternatives.

The Northwest Forest Plan, adopted in 1994 and amended in 2001, amended land and resource management plans on all administrative units of the Forest Service and BLM in western Washington, western Oregon, and northwestern California. The Northwest Forest Plan provides direction for managing habitat for late-successional and old-growth forest related species within the range of the northern spotted owl. The Survey and Manage Standards and Guidelines proposed for removal in the Proposed Action were added to the Northwest Forest Plan as a mitigation measure for species that were rare or about which little was known.

References to the Northwest Forest Plan in this SEIS are intended as references to those portions of individual land and resource management plans that were amended by the 1994 and/or 2001 Records of Decision. The land and resource management plans are those for each of the Forest Service and BLM administrative units in the Pacific Northwest and northwestern California within the range of the northern spotted owl (see Figure 1-1).

## Background for Survey and Manage Standards and Guidelines

### The Northwest Forest Plan

In the late 1980's and early 1990's, conflicts between protecting late-successional and old-growth forest related species habitats and providing a predictable and sustainable level of timber harvest and other forest management activities brought many Forest Service and BLM forest management activities to an impasse. At a forest conference on April 2, 1993, then President Clinton directed the Agencies to prepare a plan that would balance an appropriate level of protection for wildlife, forest health, and waterways, with the human and economic dimensions dependent on timber sales.

The Northwest Forest Plan resulting from this charge was adopted in April 1994, and applies to Forest Service and BLM-administered lands within the range of the northern spotted owl in western Washington, western Oregon, and northwestern California. The

Northwest Forest Plan has the dual purpose of providing for management of habitat for northern spotted owl and other late-successional and old-growth forest related species while providing for a predictable and sustainable level of timber harvest.

The scientists who developed the proposal for the Northwest Forest Plan recommended a landscape approach to managing species associated with late-successional and old-growth forests. Of the 24.5 million federally-managed acres within the Northwest Forest Plan area, almost 20 million acres either provide for old-growth and late-successional forest conditions under designation of Congressionally Reserved Areas, or they are managed for such conditions in Late-Successional Reserves, Managed Late-Successional Areas, Administratively Withdrawn Areas, or Riparian Reserves. The remaining 4.5 million acres are allocated to Matrix or Adaptive Management Areas where the bulk of timber outputs are produced.

The Northwest Forest Plan was based on the Forest Ecosystem Management Assessment Team (FEMAT) report. The FEMAT was chartered in April 1993 by former President Clinton to write a scientifically based plan for "protecting the long-term health of our forests, our wildlife, and our waterways ... in balance with ... a predictable and sustainable level of timber sales and non-timber resources ..." within the range of the northern spotted owl (USDA, USDI 1994a, p. 1-4). In addition to a no-action option, the FEMAT developed nine options for meeting this charge. The nine options served as the basis for the alternatives presented in the Northwest Forest Plan Final SEIS (USDA, USDI 1994a).

## The Survey and Manage Standards and Guidelines

The FEMAT assembled panels of experts to assess the likelihood of meeting various population stability and distribution outcomes for 1,120 species for 7 of their 10 options, including Option 9, the basis for the Northwest Forest Plan (USDA et al. 1993, pp. IV-40 through IV-49, IV-77, and IV-185). The panels used an outcome-based scale to assess the likelihood that habitat would support populations of these species. Although the majority of these species, including the northern spotted owl and all other threatened or endangered species, rated well, the panels could not confidently say that Option 9 would provide for stabilized, well-distributed populations for 100 years across federally managed lands for some of the lichens, bryophytes, fungi, arthropods, mollusks, and other species. FEMAT (USDA et al. 1993, p. II-34) reported:

> *"[t]he lack of information on the species and their responses to habitat manipulations coupled with the large proportion that are inherently rare and/or locally endemic and likely sensitive to habitat disturbance gave the expert panels and our Team little confidence to predict many species/groups would find habitat well distributed within the range of the northern spotted owl for the next 100 years. These results are troubling."*

Option 9 was identified as the preferred alternative in the Northwest Forest Plan Draft SEIS published for public comment in July 1993. In this option, approximately 80 percent of the federally managed lands in the Northwest Forest Plan area were allocated to reserves. Late in the analysis process, in response to concerns about the above species, the SEIS team formed a scientist-staffed "Additional Species Analysis Team" to reconsider these species and suggest mitigation measures (USDA, USDI 1994a, Appendix J2). This team selected species for additional analysis based on: (1) species ratings in the FEMAT report; (2) expected changes in Alternative 9 after the Northwest Forest Plan Draft SEIS; (3) cumulative effects on species; and, (4) additional species-specific criteria (USDA, USDI 1994a, pp. J2-2 through J2-3). Through this screening process, the team identified 486 species and 4 arthropod functional groups for additional analysis.

Following their analysis, the team described 23 possible mitigation measures to improve conditions for these species. Eight mitigation measures were eventually adopted but

overall species ratings were not recalculated. Although these mitigation measures reduced the likelihood species would be disturbed by management activities, they are only a part of the overall strategy of the Northwest Forest Plan to meet species management objectives. The Northwest Forest Plan network of reserves and other designated areas, along with many other standards and guidelines, work together to provide habitat and protect species. The Survey and Manage mitigation measure was among the eight mitigation measures adopted, from the additional species analysis, in the final version of the Northwest Forest Plan (USDA, USDI 1994b, pp. C-4 through C-6 and Table C-3). Species were assigned to the Survey and Manage mitigation measure to increase the likelihood of a stable, well-distributed population of the species across federally managed lands or to decrease the likelihood of their extirpation on federally managed lands in the Northwest Forest Plan area.

The late addition of the Survey and Manage mitigation measure to the Northwest Forest Plan SEIS precluded a detailed effects analysis. For example, the Survey and Manage mitigation measure was predicted to have a "relatively minor" effect on maintaining a functional and interconnected late-successional forest ecosystem. Other effects were "likely to improve at least slightly" when compared to effects without the eight mitigation measures (USDA, USDI 1994a, p. 3&4-39). Similarly, except for a 6 million board foot (MMBF) reduction in Probable Sale Quantity (PSQ) to reflect management of Survey and Manage sites known at that time, the Northwest Forest Plan Final SEIS did not quantify socioeconomic effects of these mitigation measures, noting only that these measures "... add to the uncertainty of PSQ calculations" (USDA, USDI 1994a, p. 3&4-267). The Final SEIS provided only a rough estimate for some species, and no estimate at all for others, of the overall acreage involved in managing known sites for Survey and Manage species (USDA, USDI 1994a, p. J2-40 and others).

The original Survey and Manage Standards and Guidelines were developed for 23 bryophytes (mosses and liverworts), 234 fungi, 81 lichens, 58 mollusks (snails and slugs), 5 amphibians (salamanders), 17 vascular plants (plants with stems), 1 mammal (red tree vole), the great gray owl, and 4 arthropod functional groups (insects and related species). Species were assigned to one or more of the following four categories: (1) manage known sites where species are located; (2) survey prior to potential habitat-disturbing activities; (3) conduct extensive surveys; and, (4) conduct general regional surveys to find additional locations and learn more about the species and its habitat.

The Agencies have made changes to the Survey and Manage mitigation measure since it was first adopted in 1994. Changes were made in species assignments in 1995 and 1996, primarily to correct errors in the original category assignments. The Agencies also changed the implementation date for pre-disturbance surveys for 32 species in February 1999, and again for 7 of these same species in February 2000.

## The 2000 Survey and Manage SEIS

By 1998, the Agencies had sufficient experience implementing the Survey and Manage Standards and Guidelines to conclude the requirements were not clear, efficient, or practicable. An SEIS to assess alternative ways to correct these problems was begun in November 1998. The SEIS considered alternatives with an objective of continuing to provide the same level of protection intended by the 1994 Record of Decision.

In January 2001, the Agencies issued a Record of Decision, based on the Survey and Manage Final SEIS 2000, which amended the Survey and Manage Standards and Guidelines to: (1) clarify required management; (2) remove unnecessary and duplicative or conflicting requirements; (3) add a process for changing species between categories; and, (4) add a process for adding or removing species from Survey and Manage, based on new information. Species would be removed when they fail to meet the three

basic criteria for Survey and Manage: (1) does the species have suitable habitat in the Northwest Forest Plan area? (2) is the species associated with late-successional or old-growth forest? and, (3) does the reserve system and other standards and guidelines provide for a reasonable assurance of species persistence? The 2000 Survey and Manage Final SEIS, 2001 Record of Decision, and standards and guidelines are available on the internet at **http://www.or.blm.gov/nwfpnepa/**.

The 2001 Record of Decision led to removing 72 (of more than 400) species from Survey and Manage in all or part of their range. An additional 22 species were removed in June 2002 under the annual species review process established in the 2001 Record of Decision. The 2002 Annual Species Review resulted in removing 8 species (March 2003) and the 2003 Annual Species Review resulted in removing 8 more species in all of their range and one species (red tree vole) in a portion of its range (December 2003). For those species removed because they were not associated with late-successional or old-growth forests, their known sites continue to be managed until the Agencies decide whether to add them to the Special Status Species Programs. There are currently 296 species and 4 arthropod functional groups included in the Survey and Manage mitigation measure with management requirements for each species based on characteristics of relative rarity and whether they can be reasonably located and identified during site-specific field surveys.

For 66 species, Survey and Manage requires site-specific "pre-disturbance" surveys prior to most management activities. In addition, "strategic" surveys are required for all Survey and Manage species to learn more about the species and its habitat. Strategic surveys gather needed information on species for which pre-disturbance surveys are not practical. Information gathered through strategic surveys helps provide the basis for making species management decisions.

When surveys locate a species, a "known site" is established and is managed. These sites normally range from 1/4 to 10 acres in size. For about two-thirds of the species, each has been found on fewer than 20 sites. Only 8 species have been found on more than 200 sites.

The current Survey and Manage Standards and Guidelines are summarized under Alternative 1 (No-Action) later in this chapter. The current Survey and Manage Standards and Guidelines, Sections I through VIII and XII are included in Appendix 1.

## Changes since the 2000 Final SEIS

The Agencies have completed three Annual Species Reviews based on the standards and guidelines contained in the 2001 Record of Decision. The Annual Species Review process has resulted in several changes to species included in the Survey and Manage Standards and Guidelines. The following sections describe those changes.

Annual Species Review 2001

All 346 Survey and Manage species were evaluated during the 2001 Annual Species Review.

- Number of species that changed category: 25.
- Number of species removed in all of their range: 22.
- Number of species removed in part of their range: 9.
- Number of species that were removed and will need to be reviewed for sensitive status: 10.
- Number of species moved into a category with a pre-disturbance survey requirement: 4.
- Estimate of known sites released for other resource considerations: 6,000.
- Number of species with approved range change (extensions and contractions): 15.

Annual Species Review 2002

A total of 313 species were reviewed during the 2002 Annual Species Review. The four arthropod functional groups were not reviewed.

- Number of species that changed category: 8.
- Number of species removed in all of their range: 8.
- Number of species removed in part of their range: 5.
- Number of species that were removed and will need to be reviewed for sensitive status: 4.
- Number of species moved into a category with a pre-disturbance survey requirement: 1.
- Estimate of known sites released for other resource considerations: 1,895.
- Number of species with approved range change (extensions and contractions): 23.

Annual Species Review 2003

A total of 304 species were reviewed during the 2003 Annual Species Review. The four arthropod functional groups were not reviewed.

- Number of species that changed category: 4.
- Number of species removed in all of their range: 8.
- Number of species removed in part of their range: 1.
- Number of species that were removed and will need to be reviewed for sensitive status: 0.
- Number of species moved into a category with a pre-disturbance survey requirement: 1.
- Estimate of known sites released for other resource considerations: 2,140.
- Number of species with approved range change (extensions and contractions): 19.

The above numbers do not add up, since some of the species that were recorded as being removed in part of their range in one year, were removed in the remaining part of their range in subsequent years.

Delegation of Authority for Survey and Manage Related Reviews

On May 16, 2003, the Regional Interagency Executive Committee (RIEC) delegated certain reviews to the Survey and Manage Intermediate Managers Group (Survey and Manage IMG) (USDA, USDI 2003f). These delegated reviews include:

1. New or revised Management Recommendations.
2. New or revised Survey Protocols.
3. Management exceptions for high-priority sites.
4. Pre-disturbance survey exceptions:
   a. where the time required to complete the surveys greatly increases and creates an unacceptable environmental risk.
   b. proposed to minimize wildland fire hazards or maximize resource benefits in backcountry areas.
   c. proposed for Late-Successional Reserves (LSR), where the "LSR Assessment addresses the potential presence and likely effect on S&M species, and REO review of that aspect of the Assessment concludes such fire(s) will not prevent achievement of the persistence objectives of these S&G's."

The RIEC also delegated the Annual Species Review and Strategic Survey Implementation Guide to the RIEC Survey and Manage Subcommittee.

Exemption to Survey and Manage Pre-disturbance Survey Requirements for Wildland Fire for Resource Benefits

On July 31, 2003, the RIEC exempted wildland fires for resource benefits from pre-disturbance surveys, regardless of land allocation (USDA, USDI 2003g). Exemptions are allowed if the following conditions are met.

1. The fire is consistent with the Land and Resource Management Plan (Forest or District Plan).
2. A fire management plan has been developed that addresses wildland fire starts and appropriate prescriptions for the area.
3. The fire is burning within prescription, and the prescription is designed for resource benefits. (Note: A prescription designed for resource benefits provides for an adequate level of structural components such as snags, coarse woody debris, litter/duff, and mid and overstory canopy. Typically, the fire has a low to moderate rate of spread and flame lengths less than 4-6 feet.)
4. In Late-Successional Reserves (LSRs) only:
   a. The LSR Assessment, supplement to the LSR Assessment, or other large-scale analysis addresses the potential presence and likely effect on Survey and Manage species.
   b. The Forest Supervisor or District Manager review of the LSR Assessment (and/or other documentation noted in 4.a., above) concludes that such fires will not prevent achievement of the persistence objectives of the Standards and Guidelines.

No further REO or IMG review is required prior to implementation.

## The Lawsuit and Settlement Agreement

On December 26, 2001, the Douglas Timber Operators, Inc., and American Forest Resource Council filed a complaint against the Secretary of Agriculture and the Secretary of Interior in the United States District Court for the District of Oregon (Douglas Timber Operators, et al. v. Secretary of Agriculture, et al., Civil No. 01-6378-AA (D. Oregon)). The complaint alleged that the January 2001 amendment to the Survey and Manage Standards and Guidelines "… transferred more than 81,000 acres of timber-producing NWFP forest land into permanent reserves, resulting in a 7% reduction on the regional timber volume permitted under the NWFP - a loss of 51 million board feet (MMBF) of timber sales per year in perpetuity" and "added uncertainty." The complaint also alleged that the 2001 Survey and Manage amendment is "… in violation of substantive and procedural requirements of the Oregon and California and Coos Bay Wagon Road Grant Lands Act (O&C Act), 43 U.S.C. § 1181a, the National Forest Management Act (NFMA), 16 U.S.C. §§ 1600, et seq., the Multiple-Use Sustained-Yield (MUSY) Act of 1960, 16 U.S.C § 528-531, and the Federal Land Policy and Management Act (FLPMA), 43 U.S.C. §§ 1701, et seq." The Association of O&C Counties intervened on behalf of plaintiffs and filed an Intervener's Complaint substantially similar to the Douglas Timber Operators, et al., amended complaint. The Secretaries filed an answer denying all allegations.

On September 30, 2002, "to avoid further costly litigation, and without admission of any liability or wrongdoing by either party" the parties signed a Settlement Agreement. They agreed:

*"1. The BLM and Forest Service will supplement the 2000 FSEIS by considering an alternative that replaces the Survey and Manage mitigation requirements with existing Forest Service and BLM special status species programs to achieve the goals of the Northwest Forest Plan through a more streamlined process."*

*"2. The BLM and Forest Service will prepare a Biological Assessment to determine the effects of this alternative on species listed under the ESA, and will conduct consultation with the U.S.*

*Fish and Wildlife Service and the National Marine Fisheries Service to the extent required by the ESA."*

*"3. Within 30 days after publication of the Final Supplemental EIS the Secretaries will issue a Record of Decision (2003 ROD) determining whether to adopt the new alternative presented in the Final Supplemental EIS, and the 2003 ROD shall become effective 30 days after the date of issuance by the Secretaries."*

Unless the parties agree on an amendment to change the dates, Douglas Timber Operators, Inc., and American Forest Resource Council agreed to stay their complaint until February 20, 2004, or the issuance of the Record of Decision, whichever comes first, and agreed to dismiss their previous complaint and seek no reimbursement for related legal fees when the Record of Decision is issued.

Preparing this SEIS and the associated Record of Decision will fully meet the Secretaries' commitment under the Settlement Agreement.

# This Supplemental Environmental Impact Statement

The Council on Environmental Quality (CEQ) regulations for implementing the National Environmental Policy Act (NEPA) directs agencies to supplement an environmental impact statement:

> *"... if the agency makes substantial changes in the proposed action that are relevant to environmental concerns; or if there are significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts"* (40 CFR 1502.9(c)(1)(i) and (ii)).

In this case, the Settlement Agreement directs the agencies to consider "… an alternative that replaces the Survey and Manage mitigation measure with existing Forest Service and BLM special status species programs." This constitutes a significant new circumstance that warrants preparation of a supplemental environmental impact statement. Because the proposal is not an action separate and distinct from the Northwest Forest Plan and the land and resource management plans of the Agencies, a new EIS is not warranted. Therefore, it is appropriate to analyze the effects of this proposal in an SEIS to the Final SEIS for Amendment to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines; the Northwest Forest Plan Final SEIS; and the Final EISs for the BLM and Forest Service land and resource management plans referenced in the Northwest Forest Plan or prepared subsequent to it.

The analysis in this SEIS relies heavily on the analysis in the Northwest Forest Plan Final SEIS and the Final SEIS for Amendment to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines, and, to a lesser extent, on the EISs prepared for the land and resource management plans of the Agencies. Such data and analyses are incorporated in this SEIS by reference (per 40 CFR 1502.21) to the extent they continue to be relevant to, and are not superseded by, the contents of this SEIS. As described above and in more detail later in this chapter, selecting one of the action alternatives would result in amending the Agencies' land and resource management plans that either incorporate or were amended by the 1994 and 2001 Records of Decision.

# Changing Standards and Guidelines

The Northwest Forest Plan Standards and Guidelines specify that "decisions to change ... [these] standards and guidelines will be made only through the adoption, revision, or amendment of these documents following appropriate public participation, NEPA procedures, and coordination with the Regional Interagency Executive Committee" and

"the amendments will be reviewed by the Regional Interagency Executive Committee to assure consistency with the objectives of these standards and guidelines" (USDA, USDI 1994b, p. E-18). The alternative proposed for selection in this SEIS will be submitted to the RIEC for review prior to finalizing the Record of Decision.

# The Planning Area

The planning area for this SEIS is the federally administered land within the Northwest Forest Plan area, which corresponds to the range of the northern spotted owl as defined in 1994 (see Figure 1-1). These lands are generally located in western Washington, western Oregon, and northwestern California.

Although all federally managed lands within the Northwest Forest Plan area are included in the analysis and are considered to contribute habitat for late-successional and old-growth forest related species, including species affected by Survey and Manage, the management direction addressed in this SEIS applies only to those lands managed by the Forest Service, BLM, and 5,400 acres managed by the Coquille Tribe. No management direction is included here for other federally managed lands, other Native American trust lands, or state and private lands. However, cumulative impacts from expected management activities on these other lands, as appropriate, were considered as part of the effects analysis in this SEIS.

# Relationship of Alternatives to Existing Management Plans

If one of the action alternatives is selected, the direction established by the Record of Decision for this SEIS will remove or modify the Survey and Manage Standards and Guidelines in all land and resource management plans for Forest Service and BLM administrative units within the Northwest Forest Plan area.

The Coquille Indian Tribe currently manages approximately 5,400 acres of forest lands (Coquille Forest) under the same standards and guidelines as the adjacent federal land management agency (BLM Coos Bay District). By amending the land and resource management plans for the BLM Coos Bay District, the action alternatives would, in effect, also remove or modify the Survey and Manage Standards and Guidelines from 5,400 acres of tribal trust lands owned by the Coquille Indian Tribe.

## Bureau of Land Management

Adoption of one of the action alternatives would be consistent with 43 CFR 1610.5-5 and would amend the resource management plans for the Coos Bay, Eugene, Medford, Roseburg, and Salem districts in Oregon; the Klamath Falls Resource Area of the Lakeview District, also in Oregon; and the Arcata, Redding, and Ukiah field offices in California. The King Range National Conservation Area Management Plan in the Arcata Field Office would also be amended. Because the action alternatives would modify only a small portion of each of these resource management plans, plan revisions would not be necessary (43 CFR 1610.5-6).

When a decision is made to prepare an environmental impact statement, the amending process follows the same procedure required for preparation and approval of the plan (43 CFR 1610); consideration is limited to that portion of the plan being considered for amendment. The BLM resource management planning process includes nine steps. The planning steps that pertain to this SEIS include issue identification, data collection, formulation of alternatives, estimation of effects, selection of the preferred alternative,

and selection of the proposed plan amendment. If several plans are being amended simultaneously, a single environmental impact statement may be prepared to cover all amendments (43 CFR 1610.5-5).

## Forest Service

Adoption of one of the action alternatives would result in amendment of the National Forest land and resource management plans for the Gifford Pinchot, Mt. Baker-Snoqualmie, Okanogan, Olympic, and Wenatchee National Forests in Washington and the Deschutes, Mt. Hood, Rogue River, Siskiyou, Siuslaw, Umpqua, Willamette, and Winema National Forests in Oregon, in Region 6; and the Klamath, Lassen, Mendocino, Modoc, Shasta-Trinity, and Six Rivers National Forests in California in Region 5.

If an amendment to a Forest Plan results in "a significant change in the plan," the NFMA and its 1982 implementing regulations under which this SEIS is prepared, require that the amendment process follow the procedures used in the initial development of the plan. If the proposed change in the plan is not significant, public notification and completion of the NEPA procedures are still required (16 USC 1604 (f)(4) and 36 CFR 219.10(f)). Determining whether a plan amendment is a significant change uses different criteria than those used in evaluating significance in the NEPA process. For the NFMA requirement, the Forest Service Manual (FSM 1922.51 and .52) provides specific direction.

*FSM 1922.51 - Changes to the Forest Plan that are Not Significant*. Changes to the forest plan that are not significant can result from:

1. *Actions that do not significantly alter the multiple-use goals and objectives for the long-term land and resource management.*

The actions proposed in these alternatives would not alter the objectives and the multiple-use goals of the land and resource management plans as amended by the Northwest Forest Plan. The purpose of the action alternatives is to facilitate achieving those goals and objectives. The action alternatives will continue to provide species protection in compliance with all applicable laws and regulations, while making more Agency resources available for other forest management priorities and simplifying processes so needed management actions can move forward more expeditiously. The underlying need to which the action alternatives are responding is the need to achieve the objectives originally established for the Northwest Forest Plan, to the extent these objectives are frustrated by the Survey and Manage Standards and Guidelines.

2. *Adjustments of management area boundaries or management prescriptions resulting from further on-site analysis when the adjustments do not cause significant changes in the multiple-use goals and objectives for long-term land and resource management.*

The action alternatives would change management on a portion of sites occupied by rare and uncommon species. The action alternatives would not reduce species protection below legally required levels or increase timber harvest beyond levels identified in the Northwest Forest Plan Final SEIS. The action alternatives would reduce costs and improve the Forest Service' ability to conduct forest management activities at a level described in the land and resource management plans. Selection of one of the action alternatives would enable the Forest Service to better meet the long-term goals and objectives currently identified in land and resource management plans.

3. *Minor changes in standards and guidelines.*

The action alternatives would remove or modify a mitigation measure added during preparation of the Northwest Forest Plan Final SEIS. The action alternatives would

not significantly change any key elements of the underlying strategy or standards and guidelines. Removing or modifying the Survey and Manage Standards and Guidelines would be a relatively minor change because: (1) the Northwest Forest Plan is an ecosystem-based approach that relies primarily on a system of reserves and standards and guidelines to accomplish its primary objectives; (2) the underlying land and resource management plans also provide habitat for the affected species; and, (3) Survey and Manage species that qualify are assumed to be given Sensitive Species status when the Regional Foresters update their Sensitive Species lists. The effects discussion in Chapter 3&4 helps quantify the change within the context of the Northwest Forest Plan.

4. *Opportunities for additional management practices that will contribute to achievement of the management prescription.*

The action alternatives are specifically designed to better and more efficiently meet the underlying needs identified in the Northwest Forest Plan Final SEIS.

*FSM 1922.52 - Changes to the Forest Plan that are Significant*. The following examples are indicative of circumstances that may cause a significant change to a forest plan.

1. *Changes that would significantly alter the long-term relationship between levels of multiple-use goods and services originally projected (36 CFR 219.10(e)).*

The changes proposed by the action alternatives would help achieve, not alter, the relationship between the levels of multiple-use goods and services originally projected. Species currently included in the Survey and Manage mitigation measure will continue to receive protection as required to meet all applicable laws and regulations.

2. *Changes that may have an important effect on the entire forest plan or affect land and resources throughout a large portion of the planning area during the planning period.*

The changes proposed would remove or modify a mitigation measure added late in the preparation of the Northwest Forest Plan. The action alternatives do not change land allocations or other elements of the Northwest Forest Plan. There will be a reduction in the area managed as known species sites; however, no other Northwest Forest Plan resource objective is dependent upon those sites. There is predicted to be an increase in timber harvest from current levels; the current levels are well below the predictions displayed in the Northwest Forest Plan Final SEIS. The purpose of the proposal is to achieve levels of timber harvest that were expected when the Northwest Forest Plan was established in 1994. Thus, the action alternatives will help achieve (and not change) the multiple-use goals and objectives set forth in the Northwest Forest Plan Record of Decision.

# The Alternatives

## Overview

- Alternative 1, the No-Action Alternative, would continue implementing all current elements of the Northwest Forest Plan including the Survey and Manage mitigation measure, the underlying land and resource management plans, and relevant agency programs and policies.
- Alternative 2, the Proposed Action, would amend 28 land and resource management plans within the range of the northern spotted by removing the Survey and Manage Standards and Guidelines. Conservation of rare and little known species would rely on the Agencies' Special Status Species Programs and other elements of the Northwest Forest Plan.

- Alternative 3 would amend 28 land and resource management plans by modifying the Survey and Manage Standards and Guidelines by: (1) removing provisions for uncommon species; (2) eliminating the requirement to conduct pre-disturbance surveys in non-late-successional and non-old-growth forest stands; and (3) changing the review process for excepting known sites from management. Conservation of uncommon species would rely on the Agencies' Special Status Species Programs and other elements of the Northwest Forest Plan.

The BLM's Special Status Species policies and the Forest Service' Sensitive Species policies, apply in the Northwest Forest Plan area. In this SEIS, these policies are referred to collectively as the Agencies' Special Status Species Programs. The objectives of the policies and, thus, the programs are for the Agencies' to avoid actions which may contribute to the need to list a Special Status Species under the Endangered Species Act, and to help maintain the diversity and viability of species on Forest Service managed lands. Species are included in these programs by the Regional Foresters and State Directors using national and regional policies. The action alternatives in this SEIS propose to remove or modify the Survey and Manage Standards and Guidelines. Although the Regional Foresters and State Directors have not exercised their authority to add species to the Special Status Species Program, this SEIS assumes, as part of the effects analysis, that species will be added to the Special Status Species Programs.

## Elements Common to All Alternatives

**Special Status Species Programs**

All alternatives include utilizing the Agencies' Special Status Species Programs. There are also several assumptions regarding these programs that are shared by all alternatives.

1. Any Survey and Manage species the Agencies have determined eligible for their Special Status Species Programs may be added to those programs at the discretion of the Agency. The Special Status Species Programs cover all lands managed by an agency in a region or state, while Survey and Manage is confined to the Northwest Forest Plan area. Adding Survey and Manage species to the Special Status Species Programs can result in species being included outside of the Northwest Forest Plan area.

2. For analysis purposes, any species removed from Survey and Manage will be added to the Agencies' Special Status Species Program for which it is eligible (see Table 2-6).

3. Within the Northwest Forest Plan area, where species have been included in both Survey and Manage and a Special Status Species Program, the species have been managed primarily under the Survey and Manage Standards and Guidelines. This is because the Survey and Manage Standards and Guidelines generally meet or exceed the requirements of the Special Status Species Programs. This policy will continue for species that become listed in both programs under any alternative selected.

4. Species that were previously removed from Survey and Manage because they were determined not to be closely associated with late-successional or old-growth forests, will continue to have their known sites managed until the Agencies' determine whether to add them to their Special Status Species Programs.

**Legal Requirements**

There are many laws that affect the Agencies management of lands and resources. In order to better understand the alternatives and their objectives, it is important to understand the key laws governing the Agencies' responsibilities. The key laws described below affect how the Agencies approach and manage various resources.

Endangered Species Act (16 U.S.C. 1531 et seq.)

A principle law affecting species management for both Agencies is the Endangered Species Act (ESA). Section 7(a)(2) of the ESA requires that Federal agencies consult with the U. S. Fish and Wildlife Service and National Marine Fisheries Service (NOAA Fisheries), as appropriate, to ensure that their actions do not jeopardize the continued existence of species listed as threatened or endangered under the ESA, or destroy or adversely modify their critical habitat. The Agencies prepare a biological assessment for any management activities that are likely to affect listed species and consult with U. S. Fish and Wildlife Service or NOAA Fisheries when such activities are likely to adversely affect listed species.

Conservation plans are developed by the U. S. Fish and Wildlife Service or NOAA Fisheries with the goal of recovering listed species and eventually de-listing them. The Agencies must abide by these recovery plans and are actively engaged with the U. S. Fish and Wildlife Service and NOAA Fisheries in carrying them out.

Federal Land Policy and Management Act (43 U.S.C. 1701 et seq.)

The Federal Land Policy and Management Act (FLPMA) requires the BLM to operate under a land use planning process that is based on multiple-use and sustained-yield principles. The law includes guidelines to be followed in the development and revision of resource management plans, including coordination with other federal agencies. The FLPMA requires that:

> "*goals and objectives be established by law as guidelines for public land use planning, and that management be on the basis of multiple use and sustained yield unless otherwise specified by law;*" (43 U.S.C. Section 1701(a)(7))
>
> "*the public lands be managed in a manner that will protect the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archeological values; that, where appropriate, will preserve and protect certain public lands in their natural condition; that will provide food and habitat for fish and wildlife and domestic animals; and that will provide for outdoor recreation and human occupancy and use;*" (43 U.S.C. Section 1701(a)(8))
>
> "*the public lands be managed in a manner which recognizes the Nation's need for domestic sources of minerals, food, timber, and fiber from the public lands …*" (43 U.S.C. Section 1701(a)(12)).

BLM planning regulations (43 CFR 1600) provide guidance in how to apply the FLPMA to BLM resource management.

> "*Multiple use means the management of the public lands and their various resource values so that they are utilized in the combination that will best meet the present and future needs of the American people; making the most judicious use of the lands for some or all of these resources or related services over areas large enough to provide sufficient latitude for periodic adjustments in use to conform to changing needs and conditions; the use of some lands for less than all of the resources; a combination of balanced and diverse resource uses that takes into account the long term needs of future generations for renewable and non-renewable resources, including, but not limited to, recreation, range, timber, minerals, watershed, wildlife and fish, and natural scenic, scientific and historical values; and harmonious and coordinated management of the various resources without permanent impairment of the productivity of the lands and the quality of the environment with consideration being given to the relative values of the resources and not necessarily to the combination of uses that will give the greatest economic return or the greatest unit output*"(43 CFR 1601.0-5).

Section 701 of FLPMA states that not withstanding any provision of FLPMA, in the event of conflict or inconsistency between FLPMA and the O&C Act, insofar as they relate to management of timber resource and disposition of revenues from lands and resources, the O&C Act shall prevail (43 U.S.C 1701 note 701(b)).

Oregon and California Railroad and Coos Bay Wagon Road Grant Lands Act (43 U.S.C. §§1181a-1181j)

The Oregon and California Railroad and Coos Bay Wagon Road Grant Lands Act (O&C Act) requires the Secretary of the Interior to manage O&C lands for permanent forest production; and such management must also be in accord with sustained-yield principles. Further, the O&C Act has required that management of O&C lands protect watersheds, regulate steam flow, provide for recreational facilities, and contribute to the economic stability of local communities and industries (43 U.S.C. 1181a). In Headwaters, Inc. vs. Bureau of Land Management (1990, CA9 Or) 914 F.2d 1174, the Ninth Circuit Court of Appeals held that Congress clearly intended that these lands be used primarily for sustained yield timber production, and not multiple use, including wildlife conservation. A U.S. District Court ruled that the Secretary of the Interior was within the authority of this mandate to designate the reserves in the Northwest Forest Plan for the purposes of fulfilling the conservation duties of the Endangered Species Act. This issue was not raised on the appeal of that decision. Seattle Audubon Society vs. Lyons, 871 F.Supp. 1291 (W.D. Wash. 1994), aff'd. 80 F.3d 1401 (9th Cir. 1996).

National Forest Management Act (16 U.S.C. §§ 1600-1614)

The National Forest Management Act (NFMA) requires the Secretary of Agriculture to assess forest lands, develop a management program based on multiple-use, sustained-yield principles, and implement a land and resource management plan for each unit of the National Forest System. It is the primary statute governing the administration of National Forests.

The NFMA directs the Forest Service to provide for diversity of plant and animal communities based on the suitability and capability of the specific land area, in order to meet overall multiple-use objectives. Forest Service planning regulations (36 CFR 219, September 30, 1982) provide guidance in how to apply the diversity requirement in NFMA to National Forest management. The 1982 planning regulations provide further direction with respect to diversity.

> *"219.27(g) Diversity. Management prescriptions, where appropriate and to the extent practicable, shall preserve and enhance the diversity of plant and animal communities, including endemic and desirable naturalized plant and animal species, so that it is at least as great as that which would be expected in a natural forest and the diversity of tree species similar to that existing in the planning area. Reductions in diversity of plant and animal communities and tree species from that which would be expected in a natural forest, or from that similar to the existing diversity in the planning area, may be prescribed only where needed to meet overall multiple-use objectives."*

The 1982 rule also introduced the management requirement to provide for the viability of vertebrate species

> *"219.19 Fish and wildlife resource. Fish and wildlife habitat shall be managed to maintain viable populations of existing native and desired non-native vertebrate species in the planning area. For planning purposes, a viable population shall be regarded as one which has the estimated numbers and distribution of reproductive individuals to insure its continued existence is well distributed in the planning area. In order to insure that viable populations will be maintained, habitat must be provided to support, at least, a minimum number of reproductive individuals and that habitat must be well distributed so that those individuals can interact with others in the planning area."*

The Forest Service is in the process of revising the implementing regulations for National Forest Management Act and intends to issue new regulations in the near future. It is not anticipated that the new regulations will compel any changes to the SEIS.

Multiple-Use Sustained-Yield Act (16 U.S.C. 528 et seq.)

This Act declares that the purposes of the National Forests include outdoor recreation, range, timber, watershed, and fish and wildlife (16 U.S.C. 528). The Act directs that the Secretary of Agriculture must develop and administer the renewable surface resources of the National Forests for multiple-use and sustained-yield of the various products and services obtained from these areas. The Secretary must give appropriate consideration to the relative values of the resources of particular areas (16 U.S.C. 529). Multiple use means: The management of all the various renewable surface resources of the National Forests so that they are utilized in the combination that will best meet the needs of the American people; making the most judicious use of the land for some or all of these resources or related services over areas large enough to provide sufficient latitude for periodic adjustments in use to conform to changing needs and conditions; that some land will be used for less than all of the resources; and harmonious and coordinated management of the various resources, each with the other, without impairment of the productivity of the land, with consideration being given to the relative values of the various resources, and not necessarily the combination of uses that will give the greatest dollar return or the greatest unit output. Sustained yield of the several products and services means the achievement and maintenance, in perpetuity, of a high-level annual or regular periodic output of the various renewable resources of the National Forests without impairment of the productivity of the land (16 U.S.C. 531).

All alternatives meet the legal and regulatory requirements of the ESA, FLPMA, O&C Act, NFMA, and Multiple-Use Sustained-Yield Act. Aside from the Survey and Manage mitigation measure, all alternatives retain all other elements of the Northwest Forest Plan. The alternatives include the standards and guidelines of the underlying land and resource management plans for the individual BLM and Forest Service administrative units.

Endangered Species Act Consultation

To conform to the terms of the Settlement Agreement, the BLM and Forest Service have prepared a Biological Assessment for the Final SEIS, and have initiated consultation with the U.S. Fish and Wildlife Service to comply with the Endangered Species Act.

Northwest Forest Plan Standards and Guidelines

The Northwest Forest Plan Standards and Guidelines were adopted in April 1994 as amendments to existing land and resource management plans, or were subsequently adopted into land and resource management plans completed since that date. The complete Northwest Forest Plan SEIS, appendices, Record of Decision, and standards and guidelines are available on the internet at **http://www.or.blm.gov/nwfpnepa/**. The Northwest Forest Plan Standards and Guidelines were amended in January 2001. The 2001 amendment, which primarily affected the Survey and Manage Standards and Guidelines, is also available on the internet at **http://www.or.blm.gov/nwfpnepa/** and is summarized under Alternative 1 below.

The Agencies have recognized a need to " … make the Aquatic Conservation Strategy (ACS) in the [1994] Record of Decision consistent with the original intent of the report prepared by the Forest Ecosystem Management Assessment Team …" (67 FR 70575, November 25, 2002) and have chosen to do this in a separate SEIS titled Clarification of

**Table 2-1. Northwest Forest Plan Land Allocations.**

| Allocation | Acres[1] (millions) |
|---|---|
| Congressionally Reserved Areas | 7.3 |
| Late-Successional Reserves and Managed Late-Successional Areas | 7.4 |
| Adaptive Management Areas | 1.5 |
| Administratively Withdrawn Areas | 1.5 |
| Riparian Reserves | 2.6 |
| Matrix | 4.0 |

[1] Acres do not total 24.5 million because of rounding.

Language in the 1994 Record of Decision for the Northwest Forest Plan; National Forests and Bureau of Land Management Districts Within the Range of the Northern Spotted Owl. The Final SEIS was made available to the public on October 31, 2003. Any change to the Northwest Forest Plan resulting from the Record of Decision for the Clarification of Language in the 1994 Record of Decision for the Northwest Forest Plan will be common to all alternatives in this SEIS.

The Northwest Forest Plan divides all BLM and Forest Service managed lands within the range of the northern spotted owl into specific land allocations. Each allocation comes with its own set of standards and guidelines to ensure management activities will meet plan objectives on those lands. About 80 percent of the area is designated as reserves or withdrawn areas. Table 2-1 displays how the 24.5 million acres of federally managed lands were allocated in the original Northwest Forest Plan.

# Alternative 1, No-Action (Northwest Forest Plan Including Survey and Manage)

Alternative 1, the No-Action Alternative, continues implementation of all current elements of the Northwest Forest Plan including the Survey and Manage mitigation measure, the underlying land and resource management plans for the individual administrative units, and relevant agency programs and policies. Key features of the Survey and Manage Standards and Guidelines are summarized below. The current Survey and Manage Standards and Guidelines, Sections I through VIII and XII are included in Appendix 1. The January 2001 Record of Decision and the complete Survey and Manage Standards and Guidelines are available on the internet at **http://www.or.blm.gov/nwfpnepa/**. The RIEC issued two memorandums in 2003 that are relevant to portions of the Survey and Manage Standards and Guidelines found in the 2001 Record of Decision. The first memorandum, dated May 16, 2003, titled Delegation of Authority for Survey and Manage Related Reviews, delegated all required reviews to either the Survey and Manage IMG or the RIEC Survey and Manage Subcommittee (USDA, USDI 2003f). The second memorandum, dated July 31, 2003, titled Exceptions to Survey and Manage Pre-disturbance Survey Requirement for Wildland Fire for Resource Benefits, exempted all wildland fire for resource benefits from pre-disturbance surveys. Copies of these memorandums are available on the internet at **http://www.reo.gov/library/policy/**.

## Program Objectives - Survey and Manage

In general, the Survey and Manage Standards and Guidelines are designed to help the Northwest Forest Plan provide for a reasonable assurance of persistence of late-successional and old-growth forest associated species. The objective is to provide roughly the same likelihood of persistence as that provided by the Northwest Forest Plan as originally adopted in the 1994 Record of Decision (USDA, USDI 2001, p. Standards and Guidelines - 3). In particular, the Northwest Forest Plan specified use of the Forest Service viability provision in the National Forest System Land and Resource Management Planning Regulation for the National Forest Management Act of 1976 (36 CFR 219.19). This viability provision requires that fish and wildlife habitat be managed to maintain viable populations of existing native and desired non-native vertebrate species. The Northwest Forest Plan Record of Decision (p. 44) identified compliance with this Forest Service regulation as a goal across both Forest Service and BLM administered lands as a means of serving the important policy goal of protecting the long-term health and sustainability of all federal forests within the range of the northern spotted owl and the species that inhabit them. For non-vertebrate species, the Northwest Forest Plan Record of Decision extended "a similar standard (to the one reflected in the NFMA viability provision for vertebrate species) … to the extent practicable" (p. 44).

## Number of Species and Taxa

The Survey and Manage mitigation measure currently applies to 296 species and 4 arthropod functional groups in all or part of their range. Taxa include: vertebrates, bryophytes, mollusks, vascular plants, fungi, and lichens, in addition to the 4 arthropod functional groups. Each species is assigned to one of six management categories as shown on Table 2-3.

## Standards for Inclusion

The Survey and Manage Standards and Guidelines have three basic criteria (see box) that must be met for a species to be included. Species no longer meeting these criteria will be removed; species meeting the criteria can be added.

Concern for persistence is one of the basic criteria for applying the Survey and Manage mitigation measure to a species. A concern for persistence exists when the reserve system and other standards and guidelines of the Northwest Forest Plan do not appear to provide a reasonable assurance of species persistence. Little or no concern for persistence exists when the reserve system and other standards and guidelines of the Northwest Forest Plan (not Survey and Manage) provide a reasonable assurance of persistence. When this assurance of species persistence exists, the species may be removed from the Survey and Manage mitigation measure.

### *Three Basic Criteria for Survey and Manage*

1. *The species must occur within the Northwest Forest Plan area, or occur close to the NFP area and have potentially suitable habitat within the NFP area.*

2. *The species must be closely associated with late-successional or old-growth forest (see Exhibit A (Note: Exhibit A intentionally omitted here. It can be viewed in the 2001 Record of Decision.)).*

3. *The reserve system and other Standards and Guidelines of the Northwest Forest Plan do not appear to provide for a reasonable assurance of species persistence.*

Criteria Indicating a **Concern for Persistence**. One or more of the following factors may indicate that persistence is a concern:

- Low-to-moderate number of likely extant known sites/records in all or part of a species range.
- Low-to-moderate number of individuals.
- Low-to-moderate number of individuals at most sites or in most populations.
- Very-limited to somewhat-limited range.
- Very-limited to somewhat-limited habitat.
- Distribution within habitat is spotty or unpredictable in at least part of its range.

Criteria Indicating **No Concern for Persistence**. Usually, most of the following criteria need to be met to indicate that a concern for persistence does not exist:

- Moderate-to-high number of likely extant sites/records.
- High proportion of sites and habitat in reserve land allocations, or limited number of sites within reserves, but the proportion or amount of potential habitat within reserves is high and there is a high probability that the habitat is occupied.
- Sites are relatively well distributed within the species range.
- Matrix Standards and Guidelines or other elements of the Northwest Forest Plan provide a reasonable assurance of species persistence.

Concern for persistence is based on existing knowledge and may change over time.

## Species Categories

Once species are included in Survey and Manage, they are assigned to one of six management categories (A-F) as shown in Table 2-2. Categories are based on: (1) relative rarity; (2) ability to reasonably and consistently locate occupied sites during surveys prior to habitat-disturbing activities; and, (3) the level of information known about the species or group of species. The species included in Survey and Manage, and the category to which each species, or portion of the range of each species, is assigned, are shown on Table 2-3.

### Table 2-2. Survey and Manage Categories and Management Requirements.

| Relative Rarity | Pre-Disturbance Surveys Practical | Pre-Disturbance Surveys Not Practical | Status Undetermined |
|---|---|---|---|
| Rare | **Category A** – 56 species<br>• Manage All Known Sites<br>• Pre-Disturbance Surveys<br>• Strategic Surveys | **Category B** – 184 species<br>• Manage All Known Sites<br>• N/A<br>• Strategic Surveys | **Category E** – 33 species<br>• Manage All Known Sites<br>• N/A<br>• Strategic Surveys |
| Uncommon | **Category C** – 7 species<br>• Manage High-Priority Sites<br>• Pre-Disturbance Surveys<br>• Strategic Surveys | **Category D** – 15 species[1]<br>• Manage High-Priority Sites<br>• N/A<br>• Strategic Surveys | **Category F** – 10 species<br>• N/A<br>• N/A<br>• Strategic Surveys |

Species do not total 296 because the 4 arthropod functional groups are included in Category F, and for 5 species, different areas of their geographic ranges are assigned to different categories. Four of these are both rare and uncommon, and 1 of the 5 is within two rare categories.

[1] Includes two species with pre-disturbance surveys practical but not necessary.

## Relative Rarity

Species that are "rare" have a higher concern for persistence than species that are "uncommon." Management direction for rare and uncommon species is different because relative rarity changes the level of concern and, subsequently, the management needed to provide for a reasonable assurance of persistence.

A determination that a species is "rare" is based on a combination of information, as described in the criteria for each category. A species may be rare if it has: (1) limited distribution; (2) a low number of sites or individuals per site; (3) highly specialized habitat requirements; (4) declining habitat or population trends; (5) reproductive characteristics that limit population growth rates; (6) restricted distribution pattern relative to range or potential habitat; and/or, (7) narrow ecological amplitude.

A determination that a species is "uncommon" is based on information that indicates a species may have: (1) more widespread distribution; (2) higher numbers of sites; (3) low-to-high number of individuals per site; (4) more stable populations or habitats; (5) less restricted distribution pattern relative to range or potential habitat; and/or, (6) moderate-to-broad ecological amplitude.

## Ability to Reasonably and Consistently Conduct Pre-Disturbance Surveys

Pre-disturbance surveys are "clearance" surveys that are completed when projects may disturb species habitats. They are conducted prior to signing NEPA documents with the goal of reducing the potential inadvertent loss of sites by searching specified habitats before habitat-disturbing activities occur.

Pre-disturbance surveys are defined as "practical" if a reasonable effort is likely to determine the presence of a species on a specific area. Put another way, practicality of surveys generally relates to the ability to confidently answer questions about species presence through surveys, while avoiding unreasonable costs or spending unreasonable amounts of time. Surveys before habitat disturbance are considered practical if <u>all</u> of the following criteria apply:

- The species appears annually or predictably, producing identifying structures that are visible for a predictable and reasonably long time.
- The species is not so minuscule or cryptic as to be barely visible.
- The species can authoritatively be identified by more than a few experts, or the number of available experts is not so limited that it would be impossible to accomplish all surveys or identifications for all proposed habitat-disturbing activities in the Northwest Forest Plan area needing identification within the normal planning period for the activity.
- The species can be readily distinguished in the field and needs no more than simple laboratory or office examination to confirm its identification.
- Surveys do not require unacceptable safety or species risks.
- Surveys can be completed in two field seasons (approximately 7-18 months).
- Credible survey methods for the species are known or can be developed within a reasonable time period (approximately 1 year).

## Level of Knowledge About a Species

Species are assigned to Categories E and F if there is insufficient knowledge to determine whether they meet the three basic criteria for inclusion in Survey and Manage mitigation measure.

## Project Analysis

Surveys prior to habitat-disturbing activities are required for some Survey and Manage species. Such surveys help gather relevant information during the NEPA process so that it is available to the decision-maker before actions are taken. Ideally, this information would be available to Interdisciplinary Teams during preparation of an EA or Draft EIS so it could be used in project analysis, formulation of alternatives, and evaluation of effects. Required surveys should be completed and their results included in an EA or Draft EIS whenever practicable. This would have the added advantage that results would be available during the public review and comment process.

Categories A and C (63 species) require that site-specific surveys be conducted prior to signing NEPA decisions or decision documents for habitat-disturbing activities. In Survey and Manage, these are called pre-disturbance surveys and they focus on the project unit with the objective of reducing the inadvertent loss of undiscovered sites by searching specified potential habitats prior to making decisions about habitat-disturbing activities. They are done according to the Survey Protocol for each species and can use methods such as transects or plots that focus on priority habitats, habitat features, or involve the entire project area. Generally pre-disturbance surveys are only prescribed for species for which they are practical. "Equivalent-effort" surveys are prescribed as a mitigation measure for three mollusk species whose characteristics, such as small size and identifying characteristics, prevent them from being consistently located during site-specific surveys.

Habitat-Disturbing Activities are disturbances likely to have a substantial negative impact on the species' habitat, its life cycle, microclimate, or life support requirements.

Survey Protocols provide guidelines for pre-disturbance surveys. These are interagency documents describing the survey techniques needed to have a reasonable chance of locating the species when it is present on the site, or needed to make an equivalent-effort of locating the species when it is present on the site.

Line officers should seek specialists' recommendations to help determine the need for a survey based on site-specific information.

The policy governing pre-disturbance surveys for wildland fires for resource benefits was updated on July 31, 2003 (USDA, USDI 2003g). A wildland fire for resource benefit is a fire that results from natural ignition (i.e. lightning strike) and is (1) permitted to burn because it is resulting in resource benefits; (2) consistent with the land and resource management plan; (3) consistent with the fire management plan; and, (4) burning within prescription. No pre-disturbance surveys are required for wildland fires for resource benefits, regardless of land allocation, if certain conditions are met. See "Exemption to Survey and Manage Pre-disturbance Survey Requirements for Wildland Fire for Resource Benefits" section earlier in this Chapter.

Pre-disturbance surveys are not required in the unusual circumstance that a delay in implementation of the activity (to permit pre-disturbance surveys) would result in greatly increased and unacceptable environmental risk. Such circumstances are subject to review by the Survey and Manage IMG (USDA, USDI 2003f) to ensure the urgency of the activity justifies the risk to species.

## Site Management

Known sites are historic and current locations of a species reported by a credible source, available to field offices, and that do not require additional species verification or survey by the Agency to locate the species. Known sites include those sites known prior to the

signing of the Northwest Forest Plan Record of Decision (USDA, USDI 1994b), as well as sites located since then. Known sites are typically found during pre-disturbance or strategic surveys. Known sites are documented and recorded in the ISMS (Interagency Species Management System) database.

Manage All Known Sites applies to rare species and means all current and future known sites will be managed according to the Management Recommendation for the species. Professional judgment, coupled with locally specific information, and advice from taxa specialists about the species, may be used to identify occasional sites not needed for persistence. These exceptions will be reviewed by the Survey and Manage IMG (USDA, USDI 2003f).

Manage High-Priority Sites applies to uncommon species and means only high-priority sites need to be managed according to the Management Recommendation for the species. However, until a Management Recommendation is written addressing high-priority sites for the species, either assume all sites are high priority or, with guidance from the Interagency Survey and Manage Program Manager, determine locally that the known site is not high priority. Professional judgment, coupled with locally specific information and advice from taxa specialists about the species, may be used to identify occasional high-priority sites not needed for persistence. These exceptions will be reviewed by the Survey and Manage IMG (USDA, USDI 2003f).

Management Recommendations are interagency documents that address how to manage known sites and provide guidance for conserving Survey and Manage species. They describe the habitat parameters that will provide for maintaining the species at the site. They are the responsibility of management working closely with taxa experts and are developed by taxa experts and land managers (at any administrative level) for use at field offices. They are subject to review by the Survey and Manage IMG (USDA, USDI 2003f).

Management Recommendations may also provide information on natural history, current species status, species distribution, management goals, and objectives. They can also include specific management actions or recommendations, monitoring needs, and needs for information and research to the extent such information supports management of known sites, identification of high-priority sites, and identification of survey priorities.

They also provide guidance for site-specific decisions about what management activities are appropriate within the site. The size of the area to be managed depends on the habitat and requirements for the species. Management may range from maintaining one or more habitat components (such as down logs or canopy cover) to complete exclusion from disturbance for many acres, and may allow loss of some individuals, areas, or elements not affecting continued site occupancy.

For uncommon species, Management Recommendations identify high-priority sites that must be managed, as well as sites that no longer need to be managed.

## Inventories

Inventory is conducted though "strategic surveys." Strategic surveys are landscape-scale surveys designed to collect information about a species, including its presence and habitat. They are required for all Survey and Manage species. Information provided by strategic surveys (as well as research and other information-gathering efforts) helps address fundamental questions about Survey and Manage species, including: (1) is there a concern for persistence? (2) is the species rare or uncommon? (3) is the species closely associated with late-successional forests? (4) what is the appropriate management for the species? and, (5) do the reserve land allocations and other standards and guidelines of the Northwest Forest Plan provide a reasonable assurance of species persistence?

Information from strategic surveys is used in the annual species review process and is incorporated into Management Recommendations and Survey Protocols. Strategic surveys are prescribed for all categories. Once strategic surveys have helped answer these questions, or further surveys are not expected to contribute significant additional information, strategic surveys may be complete even if few or no additional sites are found.

Strategic surveys are different from pre-disturbance surveys because they are focused on gathering information about the species and its habitat needs range-wide, and are not focused on determining presence or absence in specific areas prior to habitat-disturbing activities.

Because Category B species are rare and do not have pre-disturbance surveys, completing strategic surveys is a high priority. For this category, the standards and guidelines require "To reduce the inadvertent loss of undiscovered sites, the Agencies will not sign NEPA decisions or decision documents for habitat-disturbing activities in old-growth forest (a sub-set of late-successional forest - see glossary) in fiscal year 2006 (fiscal year 2011 for fungi) and beyond, unless either:

- "strategic surveys have been completed [as defined in the standards and guidelines] for the province that encompasses the project area, or
- "surveys equivalent to pre-disturbance surveys have been conducted in the old-growth habitat to be disturbed."

## Adding/Removing Species

The Annual Species Review is a detailed process for annually analyzing new information about species and moving them to new categories, removing them from, or adding them to Survey and Manage. This process is based on new information about the species regarding numbers, distribution, and other factors indicating risk to persistence. New information about species is also used to develop or revise Management Recommendations, Survey Protocols, and the Strategic Survey Implementation Guide.

The adaptive management process includes the following steps.

1. Acquiring new information relative to Survey and Manage species. New information about species status or needs is generated through strategic surveys, pre-disturbance surveys, and other sources. This information is maintained primarily in the ISMS database.

2. Evaluating new information. A regional-level, interagency group including taxa experts, meeting at least annually, weighs new information against the persistence and category criteria to determine if additions or deletions of species from Survey and Manage or changes of species among categories are warranted. Similarly, when new information indicates that a species no longer meets the Survey and Manage basic criteria, the species will be removed. Removed species can be considered for inclusion in the Agencies' Special Status Species Programs. In particular, for species that are removed from Survey and Manage because they are found not to be associated with late-successional or old-growth forests, their known sites will continue to be managed until it is determined whether they are eligible for the Agencies' Special Status Species Programs.

3. Implementing changes or refinements to Survey and Manage. Changes include adding and removing species, and changing species between categories, as well as changes to Management Recommendations, Survey Protocols, and the Strategic Survey Implementation Guide. Changes are the responsibility of management

working closely with taxa experts and may be made without further NEPA documentation. Changes are reflected in subsequent project planning documents.

The results are reviewed by the RIEC Survey and Manage Subcommittee (USDA, USDI 2003f) to ensure that current information about the species has been appropriately considered and weighed against the stated criteria, and that proposed reassignments continue to provide at least the level of protection intended by the standards and guidelines.

## Reports, Monitoring, and Review

Annual Status Reports are required and will, at minimum, include: (1) the results of adaptive management changes; (2) status of Management Recommendations and Survey Protocols; (3) a summary of the Strategic Survey Implementation Guide (including the status of strategic surveys); (4) status and results of ongoing monitoring; and, (5) important new management direction. This report is the primary tool for the public to learn about annual changes to species assignments and resultant application of surveys to activities. The Agencies maintain a mailing list for all persons wishing to receive all or part of this report.

Monitoring will continue in accordance with existing monitoring requirements for the Northwest Forest Plan and for the land and resource management plans for each of the Forest Service and BLM administrative units within the Northwest Forest Plan area.

Review by the Survey and Manage IMG or the RIEC Survey and Manage Subcommittee (USDA, USDI 2003f) is required for eight different documents or processes included in the Survey and Manage Standards and Guidelines. Three documents are referenced in these standards and guidelines: Management Recommendations, Survey Protocols, and Strategic Survey Implementation Guide. Each document plays an important role in accomplishing Survey and Manage objectives. The documents are typically written for a species range. The documents are the responsibility of management working closely with taxa experts; they are developed by taxa experts and land managers (at any administrative level) for use at field offices of the BLM and Forest Service. New or revised versions of Management Recommendations and Survey Protocols are subject to review by the Survey and Manage IMG (USDA, USDI 2003f) to ensure they identify and integrate the habitat or life-history factors key to managing the species to the level of protection intended in the standards and guidelines. New or revised versions of the Strategic Survey Implementation Guide are subject to review by the RIEC Survey and Manage Subcommittee (USDA, USDI 2003f). Other processes (e.g., exceptions to management of known sites, changes in categories resulting from the annual species review) are also subject to Survey and Manage IMG (or RIEC Survey and Manage Subcommittee) (USDA, USDI 2003f) review as described in these standards and guidelines. The Survey and Manage IMG or RIEC Survey and Manage Subcommittee (USDA, USDI 2003f) may develop criteria to exempt certain documents or processes from review.

**Table 2-3**. Survey and Manage Species and Categories for Alternative 1.

| **TAXA GROUP** ***Species*** | *Note: Where taxon has more than one name indicated, first name is current accepted name, second one (in parentheses) is name used in Northwest Forest Plan (Table C-3).* | **Survey and Manage Category[1]** |
|---|---|---|
| **FUNGI** | | |
| *Acanthophysium farlowii (Aleurodiscus farlowii)* | | B |
| *Albatrellus avellaneus* | | B |
| *Albatrellus caeruleoporus* | | B |
| *Albatrellus ellisii* | | B |
| *Albatrellus flettii*, In Washington and California | | B |
| *Alpova alexsmithii* | | B |
| *Alpova olivaceotinctus* | | B |
| *Arcangeliella camphorata* (*Arcangeliella* sp. nov. #Trappe 12382; *Arcangeliella* sp. nov. #Trappe 12359) | | B |
| *Arcangeliella crassa* | | B |
| *Arcangeliella lactarioides* | | B |
| *Asterophora lycoperdoides* | | B |
| *Asterophora parasitica* | | B |
| *Baeospora myriadophylla* | | B |
| *Balsamia nigrens (Balsamia nigra)* | | B |
| *Boletus haematinus* | | B |
| *Boletus pulcherrimus* | | B |
| *Bondarzewia mesenterica (Bondarzewia montana)*, In Washington and California | | B |
| *Bridgeoporus nobilissimus (Oxyporus nobilissimus)* | | A |
| *Cantharellus subalbidus*, In Washington and California | | D |
| *Catathelasma ventricosa* | | B |
| *Chalciporus piperatus* (*Boletus piperatus*) | | D |
| *Chamonixia caespitosa* (*Chamonixia pacifica* sp. nov. #Trappe #12768) | | B |
| *Choiromyces alveolatus* | | B |
| *Choiromyces venosus* | | B |
| *Chroogomphus loculatus* | | B |
| *Chrysomphalina grossula* | | B |
| *Clavariadelphus ligula* | | B |
| *Clavariadelphus occidentalis* (*Clavariadelphus pistillaris*) | | B |
| *Clavariadelphus sachalinensis* | | B |
| *Clavariadelphus subfastigiatus* | | B |
| *Clavariadelphus truncatus* (syn. *Clavariadelphus borealis*) | | D |
| *Clavulina castanopes* v. *lignicola* (*Clavulina ornatipes*) | | B |
| *Clitocybe senilis* | | B |
| *Clitocybe subditopoda* | | B |
| *Collybia bakerensis* | | F |
| *Collybia racemosa* | | B |
| *Cordyceps ophioglossoides* | | B |
| *Cortinarius barlowensis* (syn. *Cortinarius azureus*) | | B |
| *Cortinarius boulderensis* | | B |
| *Cortinarius cyanites* | | B |
| *Cortinarius depauperatus* (*Cortinarius spilomeus*) | | B |
| *Cortinarius magnivelatus* | | B |

**Table 2-3**. Survey and Manage Species and Categories for Alternative 1.

| **TAXA GROUP** ***Species*** | *Note: Where taxon has more than one name indicated, first name is current accepted name, second one (in parentheses) is name used in Northwest Forest Plan (Table C-3).* | **Survey and Manage Category[1]** |
|---|---|---|
| **FUNGI** | | |
| *Cortinarius olympianus* | | B |
| *Cortinarius speciosissimus (Cortinarius rainierensis)* | | B |
| *Cortinarius tabularis* | | B |
| *Cortinarius umidicola (Cortinarius canabarba)* | | B |
| *Cortinarius valgus* | | B |
| *Cortinarius variipes* | | B |
| *Cortinarius verrucisporus* | | B |
| *Cortinarius wiebeae* | | B |
| *Cudonia monticola* | | B |
| *Cyphellostereum laeve* | | B |
| *Dermocybe humboldtensis* | | B |
| *Destuntzia fusca* | | B |
| *Destuntzia rubra* | | B |
| *Dichostereum boreale (Dichostereum granulosum)* | | B |
| *Elaphomyces anthracinus* | | B |
| *Elaphomyces subviscidus* | | B |
| *Endogone acrogena* | | B |
| *Endogone oregonensis* | | B |
| *Entoloma nitidum (Rhodocybe nitida)* | | B |
| *Fayodia bisphaerigera (Fayodia gracilipes)* | | B |
| *Fevansia aurantiaca (Alpova* sp. nov. #Trappe 1966) (*Alpova aurantiaca*) | | B |
| *Galerina cerina* | | B |
| *Galerina heterocystis* | | E |
| *Galerina sphagnicola* | | E |
| *Gastroboletus imbellus* | | B |
| *Gastroboletus ruber* | | B |
| *Gastroboletus subalpinus* | | B |
| *Gastroboletus turbinatus* | | B |
| *Gastroboletus vividus* (*Gastroboletus* sp. nov. #Trappe 2897; *Gastroboletus* sp. nov. #Trappe 7515) | | B |
| *Gastrosuillus amaranthii* (*Gastrosuillus* sp. nov. #Trappe 9608) | | E |
| *Gastrosuillus umbrinus* (*Gastroboletus* sp. nov. #Trappe 7516) | | B |
| *Gautieria magnicellaris* | | B |
| *Gautieria otthii* | | B |
| *Gelatinodiscus flavidus* | | B |
| *Glomus radiatum* | | B |
| *Gomphus bonarii* | | B |
| *Gomphus clavatus* | | F |
| *Gomphus kauffmanii* | | E |
| *Gymnomyces abietis* (*Gymnomyces* sp. nov. #Trappe 1690, 1706, 1710; *Gymnomyces* sp. nov. #Trappe 4703, 5576; *Gymnomyces* sp. nov. #Trappe 5052; *Gymnomyces* sp. nov. #Trappe 7545; *Martellia* sp. nov. #Trappe 1700; *Martellia* sp. nov. #Trappe 311; *Martellia* sp. nov. #Trappe 5903) | | B |
| *Gymnomyces nondistincta* (*Martellia* sp. nov. #Trappe 649) | | B |
| *Gymnopilus punctifolius*, In California | | B |
| *Gyromitra californica* | | B |
| *Hebeloma olympianum (Hebeloma olympiana)* | | B |

**Table 2-3**. Survey and Manage Species and Categories for Alternative 1.

| **TAXA GROUP** ***Species*** | *Note: Where taxon has more than one name indicated, first name is current accepted name, second one (in parentheses) is name used in Northwest Forest Plan (Table C-3).* | **Survey and Manage Category**[1] |
|---|---|---|
| **FUNGI** | | |
| *Helvella crassitunicata* | | B |
| *Helvella elastica* | | B |
| *Hydnotrya inordinata* (*Hydnotrya* sp. nov. #Trappe 787, 792) | | B |
| *Hydnotrya subnix (Hydnotrya subnix* sp. nov. #Trappe 1861) | | B |
| *Hydropus marginellus (Mycena marginella)* | | B |
| *Hygrophorus caeruleus* | | B |
| *Hygrophorus karstenii* | | B |
| *Hygrophorus vernalis* | | B |
| *Hypomyces luteovirens* | | B |
| *Leucogaster citrinus* | | B |
| *Leucogaster microsporus* | | B |
| *Macowanites chlorinosmus* | | B |
| *Macowanites lymanensis* | | B |
| *Macowanites mollis* | | B |
| *Marasmius applanatipes* | | B |
| *Martellia fragrans* | | B |
| *Martellia idahoensis* | | B |
| *Mycena hudsoniana* | | B |
| *Mycena overholtsii* | | D |
| *Mycena quinaultensis* | | B |
| *Mycena tenax* | | B |
| *Mythicomyces corneipes* | | B |
| *Neolentinus adhaerens* | | B |
| *Neolentinus kauffmanii* | | B |
| *Nivatogastrium nubigenum*, In entire range except OR Eastern Cascades and CA Cascades Physiographic Provinces | | B |
| *Octavianina cyanescens* (*Octavianina* sp. nov. #Trappe 7502) | | B |
| *Octavianina macrospora* | | B |
| *Octavianina papyracea* | | B |
| *Otidea leporina* | | D |
| *Otidea smithii* | | B |
| *Phaeocollybia attenuata* | | D |
| *Phaeocollybia californica* | | B |
| *Phaeocollybia dissiliens* | | B |
| *Phaeocollybia fallax* | | D |
| *Phaeocollybia gregaria* | | B |
| *Phaeocollybia kauffmanii* | | D |
| *Phaeocollybia olivacea*, In Oregon[3] | | F |
| *Phaeocollybia olivacea*, In Washington and California | | E |
| *Phaeocollybia oregonensis* (syn. *Phaeocollybia carmanahensis*) | | B |
| *Phaeocollybia piceae* | | B |
| *Phaeocollybia pseudofestiva* | | B |
| *Phaeocollybia scatesiae* | | B |
| *Phaeocollybia sipei* | | B |

**Table 2-3**. Survey and Manage Species and Categories for Alternative 1.

| **TAXA GROUP** ***Species*** | *Note: Where taxon has more than one name indicated, first name is current accepted name, second one (in parentheses) is name used in Northwest Forest Plan (Table C-3).* | **Survey and Manage Category[1]** |
|---|---|---|
| **FUNGI** | | |
| *Phaeocollybia spadicea* | | B |
| *Phellodon atratus (Phellodon atratum)* | | B |
| *Pholiota albivelata* | | B |
| *Podostroma alutaceum* | | B |
| *Polyozellus multiplex* | | B |
| *Pseudaleuria quinaultiana* | | B |
| *Ramaria abietina* | | B |
| *Ramaria amyloidea* | | B |
| *Ramaria araiospora* | | B |
| *Ramaria aurantiisiccescens* | | B |
| *Ramaria botryis* var. *aurantiiramosa* | | B |
| *Ramaria celerivirescens* | | B |
| *Ramaria claviramulata* | | B |
| *Ramaria concolor f. marrii* | | B |
| *Ramaria concolor f. tsugina* | | B |
| *Ramaria conjunctipes* var. *sparsiramosa (Ramaria fasciculata* var. *sparsiramosa)* | | B |
| *Ramaria coulterae* | | B |
| *Ramaria cyaneigranosa* | | B |
| *Ramaria gelatiniaurantia* | | B |
| *Ramaria gracilis* | | B |
| *Ramaria hilaris* var. *olympiana* | | B |
| *Ramaria largentii* | | B |
| *Ramaria lorithamnus* | | B |
| *Ramaria maculatipes* | | B |
| *Ramaria rainierensis* | | B |
| *Ramaria rubella* var. *blanda* | | B |
| *Ramaria rubribrunnescens* | | B |
| *Ramaria rubrievanescens* | | B |
| *Ramaria rubripermanens,* In Oregon | | D |
| *Ramaria rubripermanens,* In Washington and California | | B |
| *Ramaria spinulosa* var. *diminutiva* (*Ramaria spinulosa*) | | B |
| *Ramaria stuntzii* | | B |
| *Ramaria suecica* | | B |
| *Ramaria thiersii* | | B |
| *Ramaria verlotensis* | | B |
| *Rhizopogon abietis* | | B |
| *Rhizopogon atroviolaceus* | | B |
| *Rhizopogon brunneiniger* | | B |
| *Rhizopogon chamaleontinus* (*Rhizopogon* sp. nov. #Trappe 9432) | | B |
| *Rhizopogon ellipsosporus* (*Alpova* sp. nov. # Trappe 9730) | | B |
| *Rhizopogon evadens* var. *subalpinus* | | B |
| *Rhizopogon exiguus* | | B |
| *Rhizopogon flavofibrillosus* | | B |
| *Rhizopogon inquinatus* | | B |
| *Rhizopogon truncatus* | | D |
| *Rhodocybe speciosa* | | B |
| *Rickenella swartzii (Rickenella setipes)* | | B |
| *Russula mustelina* | | B |

**Table 2-3**. Survey and Manage Species and Categories for Alternative 1.

| **TAXA GROUP** ***Species*** | *Note: Where taxon has more than one name indicated, first name is current accepted name, second one (in parentheses) is name used in Northwest Forest Plan (Table C-3).* | **Survey and Manage Category[1]** |
|---|---|---|
| **FUNGI** | | |
| *Sarcodon fuscoindicus* | | B |
| *Sedecula pulvinata* | | B |
| *Sowerbyella rhenana (Aleuria rhenana)* | | B |
| *Sparassis crispa* | | D |
| *Spathularia flavida* | | B |
| *Stagnicola perplexa* | | B |
| *Thaxterogaster pavelekii* (*Thaxterogaster* sp. nov. #Trappe 4867, 6242, 7427, 7962, 8520) | | B |
| *Tremiscus helvelloides* | | D |
| *Tricholoma venenatum* | | B |
| *Tricholomopsis fulvescens* | | B |
| *Tuber asa* (*Tuber* sp. nov. #Trappe 2302) | | B |
| *Tuber pacificum* (*Tuber* sp. nov. #Trappe 12493) | | B |
| *Tylopilus porphyrosporus (Tylopilus pseudoscaber)* | | D |
| **LICHENS** | | |
| *Bryoria pseudocapillaris* | | A |
| *Bryoria spiralifera* | | A |
| *Bryoria subcana* | | B |
| *Buellia oidalea* | | E |
| *Calicium abietinum* | | B |
| *Calicium adspersum* | | E |
| *Cetrelia cetrarioides* | | E |
| *Chaenotheca chrysocephala* | | B |
| *Chaenotheca ferruginea* | | B |
| *Chaenotheca subroscida* | | E |
| *Chaenothecopsis pusilla* | | E |
| *Collema nigrescens*, In WA and OR, except in OR Klamath Physiographic Province | | F |
| *Dendriscocaulon intricatulum*, In California | | E |
| *Dendriscocaulon intricatulum*, In Washington and Oregon except Coos, Curry, Douglas, Josephine, and Jackson Counties | | A |
| *Dermatocarpon luridum* | | E |
| *Fuscopannaria saubinetii* (syn. *Pannaria saubinetii*) | | E |
| *Heterodermia sitchensis* | | E |
| *Hypogymnia duplicata* | | C |
| *Hypogymnia vittata* (misspelled in FEMAT as *Hygomnia vittiata*) | | E |
| *Hypotrachyna revoluta* | | E |
| *Leptogium burnetiae* var. *hirsutum* | | E |

**Table 2-3**. Survey and Manage Species and Categories for Alternative 1.

| **TAXA GROUP** ***Species*** | *Note: Where taxon has more than one name indicated, first name is current accepted name, second one (in parentheses) is name used in Northwest Forest Plan (Table C-3).* | **Survey and Manage Category[1]** |
|---|---|---|
| **LICHENS** | | |
| *Leptogium cyanescens* | | A |
| *Leptogium rivale* | | E |
| *Leptogium teretiusculum* | | E |
| *Lobaria linita*, Entire range except WA Western Cascades Physiographic Province north of Snoqualmie Pass and Olympic Peninsula | | A |
| *Lobaria oregana,* In California | | A |
| *Microcalicium arenarium* | | B |
| *Nephroma bellum*, In Oregon: Klamath, Willamette Valley, Eastern Cascades; WA; Western Cascades (outside GPNF), Eastern Cascades, Olympic Peninsula Physiographic Provinces | | E |
| *Nephroma isidiosum* | | E |
| *Nephroma occultum* | | C |
| *Niebla cephalota* | | A |
| *Pannaria rubiginosa* | | E |
| *Peltigera pacifica* | | E |
| *Platismatia lacunosa,* Except in Oregon Coast Range Physiographic Province | | E |
| *Pseudocyphellaria perpetua* (misapplied name – *P. mougeotiana* in FEMAT and NWFP. Also called *Pseudocyphellaria* sp. 1 in Management Recommendations) | | A |
| *Pseudocyphellaria rainierensis* | | A |
| *Stenocybe clavata* | | E |
| *Teloschistes flavicans* | | A |
| *Tholurna dissimilis*, south of Columbia River | | B |
| *Usnea hesperina* | | E |
| *Usnea longissima*, In California and in Curry, Josephine, and Jackson Counties, Oregon | | A |
| *Usnea longissima*, In Oregon, except in Curry, Josephine, and Jackson Counties and in Washington | | F |
| **BRYOPHYTES** | | |
| *Brotherella roellii* | | E |
| *Buxbaumia viridis*, In California | | E |
| *Diplophyllum plicatum* | | B |
| *Herbertus aduncus* | | E |
| *Iwatsukiella leucotricha* | | B |
| *Kurzia makinoana* | | B |
| *Marsupella emarginata* var. *aquatica* | | B |
| *Orthodontium gracile* | | B |
| *Ptilidium californicum*, In California | | A |
| *Racomitrium aquaticum* | | E |
| *Rhizomnium nudum,* Outside Washington | | B |
| *Schistostega pennata* | | A |
| *Tetraphis geniculata* | | A |
| *Tritomaria exsectiformis* | | B |

**Table 2-3**. Survey and Manage Species and Categories for Alternative 1.

| **TAXA GROUP** ***Species*** | *Note: Where taxon has more than one name indicated, first name is current accepted name, second one (in parentheses) is name used in Northwest Forest Plan (Table C-3).* | **Survey and Manage Category[1]** |
|---|---|---|
| **LICHENS** | | |
| *Tritomaria quinquedentata* | | B |
| **VERTEBRATES** | | |
| Larch Mountain salamander *Plethodon larselli* | | A |
| Shasta salamander *Hydromantes shastae* | | A |
| Siskiyou Mountains salamander *Plethodon stormi*, North Range | | D[2] |
| Siskiyou Mountains salamander *Plethodon stormi*, South Range | | A |
| Van Dyke's salamander *Plethodon vandykei*, Cascade population only | | A |
| Great Gray Owl *Strix nebulosa* | | A |
| Oregon Red Tree Vole *Arborimus longicaudus*, In xeric and northern mesic portion of its range | | C |
| **MOLLUSKS** | | |
| *Cryptomastix devia* | | A |
| *Cryptomastix hendersoni* | | A |
| *Deroceras hesperium* | | B[3] |
| *Fluminicola* n. sp. 3 | | A |
| *Fluminicola* n. sp. 11 | | A |
| *Fluminicola* n. sp. 14 | | A |
| *Fluminicola* n. sp. 15 | | A |
| *Fluminicola* n. sp. 16 | | A |
| *Fluminicola* n. sp. 17 | | A |
| *Fluminicola* n. sp. 18 | | A |
| *Fluminicola* n. sp. 19 | | A |
| *Fluminicola* n. sp. 20 | | A |
| *Fluminicola seminalis* | | A |
| *Helminthoglypta talmadgei* | | D[2] |
| *Hemphillia burringtoni* | | E |
| *Hemphillia glandulosa*, In WA Western Cascades Physiographic Province | | E |
| *Hemphillia malonei*, In Washington | | C |
| *Hemphillia pantherina* | | B[3] |
| *Juga (O)* n. sp. 2 | | A |
| *Juga (O)* n. sp. 3 | | A |
| *Lyogyrus* n. sp. 1 | | A |
| *Lyogyrus* n. sp. 2 | | A |
| *Lyogyrus* n. sp. 3 | | A |
| *Monadenia chaceana* | | B[3] |
| *Monadenia fidelis minor* | | A |
| *Monadenia troglodytes troglodytes* | | A |
| *Monadenia troglodytes wintu* | | A |
| *Oreohelix* n. sp. | | A |
| *Pristiloma arcticum crateris* | | A |
| *Prophysaon coeruleum*, In California and Washington | | A |
| *Trilobopsis roperi* | | A |

**Table 2-3**. Survey and Manage Species and Categories for Alternative 1.

| **TAXA GROUP** ***Species*** | *Note: Where taxon has more than one name indicated, first name is current accepted name, second one (in parentheses) is name used in Northwest Forest Plan (Table C-3).* | **Survey and Manage Category**[1] |
|---|---|---|
| **MOLLUSKS** | | |
| *Trilobopsis tehamana* | | A |
| *Vertigo* n. sp. | | A |
| *Vespericola pressleyi* | | A |
| *Vespericola shasta* | | A |
| *Vorticifex* n. sp. 1 | | E |
| *Arceuthobium tsugense mertensianae*, In Washington only | | F |
| *Bensoniella oregana*, In California only | | A |
| *Botrychium minganense*, In Oregon and California | | A |
| *Botrychium montanum* | | A |
| **VASCULAR PLANTS** | | |
| *Coptis asplenifolia* | | A |
| *Coptis trifolia* | | A |
| *Corydalis aquae-gelidae* | | A |
| *Cypripedium fasciculatum*, Entire Range except WA Eastern Cascades Physiographic Province | | C |
| *Cypripedium montanum*, Entire range except WA Eastern Cascades Physiographic Province | | C |
| *Eucephalus vialis (Aster vialis)* | | A |
| *Galium kamtschaticum*, Olympic Peninsula, WA Eastern Cascades, OR and WA Western Cascades Physiographic Provinces, south of Snoqualmie Pass | | A |
| *Platanthera orbiculata* var. *orbiculata* (*Habenaria orbiculata*) | | C |
| **ARTHROPODS** | | |
| Canopy herbivores (south range) | | F |
| Coarse wood chewers (south range) | | F |
| Litter and soil dwelling species (south range) | | F |
| Understory and forest gap herbivores (south range) | | F |

[1]There are six Survey and Manage Categories based on level of relative rarity, ability to reasonably and consistently locate occupied sites during surveys prior to habitat-disturbing activities, and the level of information known about the species or group of species. These categories are described in detail on Table 2-2 and in Appendix 1.
[2]Although pre-disturbance surveys are deemed practical for these two species, continuing pre-disturbance surveys is not necessary to meet management objectives.
[3]Equivalent-effort pre-disturbance surveys are required for these mollusk species.

# Alternative 2, Proposed Action (Northwest Forest Plan without Survey and Manage)

The Agencies propose to remove the Survey and Manage Standards and Guidelines by amending 28 land and resource management plans within the range of the northern spotted owl to remove the Survey and Manage Standards and Guidelines. The Survey and Manage Standards and Guidelines Sections I-VIII and XII (USDA, USDI 2001a, Attachment 1) would be removed in their entirety. The description of Management Recommendations and the explanation of how they are revised would continue to apply to certain cavity nesting birds and some bat roosts as referenced in Sections IX and XI, respectively. The Canada lynx Standard and Guideline, Section X, would also continue to apply.

If the Survey and Manage Standards and Guidelines are removed the BLM's Special Status Species policies and the Forest Service' Sensitive Species policies, would continue to apply in the Northwest Forest Plan area. In this SEIS, these policies are referred to collectively as the Agencies' Special Status Species Programs. The guidance for these programs is found in the following national and regional/state policies:

BLM

1. National Policy - BLM Manual 6840 (Release 6-121 11/09/01).
2. OR/WA - OR/WA Instruction Memorandum OR-91-57 dated November 5, 1990, and OR/WA Instruction Memorandum 2003-054 dated March 24, 2003.
3. CA - BLM Manual Supplement 6840 (Release No. 6-24, dated March 25, 1996) and 6840 Handbook Special Status Plant Management (Release 6-25 4/15/96).

Forest Service

1. National Policy - Forest Service Manual - Chapter 2670 Threatened, Endangered, and Sensitive Plants and Animals (effective June, 23, 1995) and Forest Service Manual Chapter 2620 - Habitat Planning and Evaluations (effective July 19, 1991).
2. Region 6 - 2670 letter to Forest Supervisors updating the Regional Forester's Sensitive Animal List dated November 28, 2000, and 2670 letter to Forest Supervisors updating the Regional Forester's Sensitive Plant List dated May 13, 1999.
3. Region 5 - Regional Forester's 2670 letter dated June 10, 1998.

## Standards for Inclusion

This SEIS does not establish, update, amend, modify, or change existing policies for the Agencies' Special Status Species Programs; it merely analyzed the effects of implementing the existing programs on the Survey and Manage species that were eligible for inclusion in one or more of the Agencies' Special Status Species Programs. This SEIS assumes for the analysis of effects that once species are included in the Agencies' Special Status Species Programs they will be managed under each agency's policy. The Agencies' have the authority to update, amend, modify, change, or eliminate their policy. Species are included or removed from the Special Status Species Programs based on new information and the application of the Agencies' policies in effect at that time. Existing policies that guide the activities and actions required for the Special Status Species Programs are described below.

The Agencies update their Special Status Species lists on a regular schedule, when state heritage programs publish new rankings, or when other information indicates a need. Both Forest Service regions delayed or deferred inclusion of additional species in their Sensitive Species programs because the species were already included in the Survey and

Manage mitigation measure. With the proposed removal of the Survey and Manage Standards and Guidelines, and with new information about Survey and Manage species as a result of recent pre-disturbance and strategic surveys, the Agencies requested updated rankings from state natural heritage programs.

The Agencies' program managers used the updated rankings and other species information to review the 296 Survey and Manage species to determine their eligibility for inclusion in the Agencies' existing Special Status Species Programs. Based on that review, the Agencies' Special Status Species Program Managers provided the list of eligible species to be analyzed in this SEIS. For analysis purposes, it is assumed that the Survey and Manage species that are eligible for the Agencies' Special Status Species Programs will be added to those programs if the Survey and Manage Standards and Guidelines are removed. Under Alternative 2, 152 of the 296 Survey and Manage species would be eligible for inclusion in one or more of the Agencies' existing Special Status Species Programs. Species that meet the criteria for inclusion are displayed on Table 2-6 (located near the end of the description of Alternative 2). The Regional Foresters and State Directors have not exercised their authority to add species to the Special Status Species Program at this time. If Alternative 2 is selected, the analysis in this SEIS assumes that the Regional Foresters and State Directors will exercise their authority to add species to the Special Status Species Programs.

Alternative 2 continues implementation of all other elements of the Northwest Forest Plan, continues the underlying land and resource management plans for the individual administrative units, and continues relevant agency programs and policies. None of the species affected by this proposal are currently listed as threatened, endangered, or proposed for listing under the Endangered Species Act.

If Alternative 2 is selected for implementation, there are three possible scenarios that would apply to individual projects and their implementation.

1. Surveys may have already been completed for individual projects. No additional work is required for projects that have fully complied with the current Survey and Manage Standards and Guidelines and existing Special Status Species Policies. Known sites released from the Survey and Manage Standards and Guidelines for species not included in Special Status Species Programs or having mitigation applied will be immediately available for other uses.

2. Surveys have been started but are not complete. Projects that are in development but have not fully complied with the Survey and Manage Standards and Guidelines can continue under those standards and guidelines or comply with the Special Status Species Policies for those Survey and Manage species that were added to the Special Status Species Programs. Known sites released from the Survey and Manage Standards and Guidelines for species not included in Special Status Species Programs or having mitigation applied will be immediately available for other uses.

3. Surveys have not been started. Projects that are initiated after the Record of Decision for this SEIS will comply with the Special Status Species Policies.

## Policy Objectives - Special Status Species

The Forest Service' Sensitive Species Policies and the BLM's Special Status Species Policies, and thus the Special Status Species Programs, have similar objectives (a comparison table for both programs, and Survey and Manage, and excerpts from the Agencies' policies are found in Appendix 2). The objectives of the policies, and thus the programs, are for the Agencies' to avoid actions which may contribute to the need to list a Special Status Species under the Endangered Species Act. Both programs require

coordination with state and other federal agencies to achieve conservation goals of species identified by state governments. The objectives of the Forest Service' Sensitive Species Policy also include compliance with NFMA regulations requiring diversity of plant and animal communities, and requiring habitat to be managed to maintain viable populations of existing native and desired non-native vertebrate species.

BLM: To ensure that actions requiring authorization or approval by the BLM are consistent with the conservation needs of special status species and do not contribute to the need to list any special status species, either under provisions of the Endangered Species Act or other provisions of this policy (BLM Manual 6840.02 B).

Forest Service:

1. Develop and implement management practices to ensure that species do not become threatened or endangered because of Forest Service actions.
2. Maintain viable populations of all native and desired non-native wildlife, fish, and plant species in habitats distributed throughout their geographic range on National Forest System lands.
3. Develop and implement management objectives for populations and/or habitat of sensitive species. (Forest Service Manual 2670.22)

The following describes, for analysis purposes, how Survey and Manage species that have been included in one or more of the Agencies' Special Status Species Programs would be managed under those programs. Policies and descriptions of the programs may have been summarized, condensed, or paraphrased. If there is a discrepancy between the language in the description of Alternative 2 and Agency policy, the policy prevails. Each Agency will follow their own policy for the species added to their programs. This SEIS does not establish or change existing policies; it merely analyzes their implementation. Selected excerpts specific to the Special Status Species Programs can be found in Appendix 2 and on the internet by starting at **http://www.or.blm.gov/surveyandmanage/**.

## Number of Species and Taxa

Not all of the 296 rare or little known Survey and Manage species (and 4 arthropod functional groups) qualify for the Agencies' Special Status Species Programs. Agency personnel, using the existing criteria specific to their agency and region, identified which Survey and Manage species are eligible for inclusion in one or more of the Agencies' Special Status Species Programs.

Out of the 296 Survey and Manage Species, 152 species are eligible for one or more of the Agencies' "sensitive" or "assessment" (Oregon /Washington BLM only) categories, including 36 species that were already listed as sensitive or assessment. Sensitive and assessment categories are described below. The numbers of species by taxa that are assumed to be included in these programs under Alternative 2 are shown in Table 2-4. Forest Service Regional Foresters and BLM State Directors are responsible for designating or removing species from their programs. It is assumed that qualifying species shown in Table 2-5 will be added to the Agencies' Special Status Species Programs as a reasonably foreseeable result of selecting Alternative 2. For analysis purposes, this assumption is considered in the environmental consequences discussions in Chapter 3&4.

Of the 152 species eligible for inclusion in the Agencies' Special Status Species Programs, only 2 species are included in all programs. However, many species are eligible for inclusion in more than one program. When a species is included in more than one program, each agency will manage the species in accordance with their own policy.

**Table 2-4**. Number of Survey and Manage Species Eligible to be Included in the Agencies' Special Status Species Programs.

| Taxon* | BLM OR/WA[1, 5] | | BLM CA | | FS R-6 | | FS R-5 | | ANY[2] | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2002[3] | Add[4] | 2002[3] | Add[4] | 2002[3] | Add[4] | 2002[3] | Add[4] | 2002[3] | Add[4] | **Total** |
| Fungi (187) | 0 | 24 | 0 | 31 | 0 | 36 | 0 | 9 | 0 | 70 | **70** |
| Lichens (40) | 4 | 8 | 1 | 8 | 0 | 22 | 0 | 2 | 5 | 22 | **27** |
| Bryophytes (15) | 9 | 2 | 0 | 4 | 0 | 4 | 0 | 2 | 9 | 4 | 13 |
| Vertebrates (6) | 2 | 1 | 0 | 1 | 4 | 1 | 1 | 2 | 4 | 2 | **6** |
| Mollusks (36) | 8 | 5 | 0 | 4 | 0 | 18 | 0 | 8 | 8 | 18 | **26** |
| Vasc Plants (12) | 3 | 3 | 0 | 2 | 9 | 0 | 5 | 0 | 10 | 0 | **10** |
| **Totals** | **26** | **43** | **1** | **50** | **13** | **81** | **6** | **23** | **36** | **116** | **152** |

*The total number of species currently included in the Survey and Manage Standards and Guidelines is included in parens next to the taxon.
[1] Includes both Bureau Sensitive and Bureau Assessment species. Bureau Tracking species are not included.
[2] The ANY column is the total number of species in one or more Agencies' Sensitive or Assessment (BLM OR/WA) categories. This is not the total of the other four columns.
[3] The number of Survey and Manage species that were already included in the Agencies' Special Status Species Programs as of December 2003.
[4] The number of Survey and Manage species that would probably be added to the Agencies' Special Status Species Programs under Alternative 2, but were not already included in those programs as of December 2003.
[5] This table does not include additional Survey and Manage species that would become Bureau Tracking (including 26 Survey and Manage species that were already listed as Bureau Tracking) in BLM OR/WA as of December 2003.

## Project Analysis

BLM: The BLM should obtain and use the best available information deemed necessary to evaluate the status of special status species in areas affected by land use plans or other proposed actions and to develop sound conservation practices. Land use plans shall be sufficiently detailed to identify and resolve significant land use conflicts with special status species without deferring conflict resolution to implementation-level planning. Implementation-level planning should consider all site-specific methods and procedures which are needed to bring the species and their habitats to the condition under which the provisions of the Endangered Species Act are not necessary, current listings under special status species categories are no longer necessary, and future listings under special status species categories would not be necessary (BLM manual 6840.22 A).

Bureau Sensitive. Analyze effects of the proposed action on potentially affected species. Request technical assistance, if appropriate, from U.S. Fish and Wildlife Service, NOAA Fisheries, or other qualified sources. Avoid taking actions that would contribute to the need to list the species under the Endangered Species Act (BLM 6840).

Bureau Assessment (OR/WA only). Analyze effects of the proposed action on potentially affected species. Avoid taking actions that would contribute to the need to list the species under the Endangered Species Act. Impacts by BLM actions to the population and to the species as a whole will be determined in the NEPA process (BLM Instruction Memorandum Nos. OR 91-57 and OR 2003-054).

Bureau Tracking (OR/WA only). To enable the state natural heritage program to determine appropriate state rankings, collection of occurrence data is encouraged and reported if observed. Bureau Tracking is not considered a special status species for management purposes (BLM Instruction Memorandum No. OR 91-57).

Forest Service: The Forest Service' 2670 Manual (June 23, 1995) requires:

As part of the NEPA process, review programs and activities through a biological evaluation, to determine their potential effect on sensitive species. The biological evaluation analyzes the proposed action and the significance of potential adverse effects on the population or its habitat within the area and on the species as a whole, and makes recommendations for removing, avoiding, or compensating for any adverse effect. It must be prepared by a journey-level biologist or botanist and include: (1) sensitive species that may be present; (2) identification of occupied and unoccupied habitat; (3) an analysis of the effects of the proposed action on the species or their occupied habitat; (4) a discussion of cumulative effects; (5) a determination of no effect, beneficial effect, or may affect; and, (6) recommendations for avoiding or mitigating any adverse effects.

Region 5 Watch List: These species make an important contribution to forest biodiversity and should be maintained under the provisions of NFMA, and addressed as appropriate through the NEPA process (Region 5 Regional Forester letter).

Pre-project clearances are activities conducted to learn whether a species is present or potentially present in a geographic area. Pre-project clearances may include, but are not limited to,

- clearance surveys;
- field clearances;
- field reconnaissance;
- inventories;
- habitat examinations;
- habitat evaluation;
- evaluation of species-habitat associations and presence of suitable or potential habitat;
- review of existing survey records, inventories, and spatial data;
- utilization of professional research, literature, and other technology transfer sources; or
- use of expertise, both internal and external, that is based on documented, substantiated professional rationale.

Pre-project clearances are completed prior to habitat-disturbing activities to determine the presence of a species or its habitat and the effect of management actions on the species.

BLM: In general, BLM only conducts pre-project clearances for those sensitive species where BLM administered lands or actions have a significant effect on their status.

Bureau Sensitive: To ensure that actions authorized, funded, or carried out by the BLM do not contribute to the need to list any sensitive species as threatened or endangered, conduct inventories (i.e., pre-project clearances) to determine the impacts of such actions on any sensitive species that might be within the area of a proposed project. Inventories (i.e., pre-project clearances) are to be conducted at the time of year when species can be found (BLM Instruction Memorandum No. OR 91-57 and CA Supplement 6840).

The manual for BLM California goes on to present a decision key for determining the minimum level of inventory, at least for sensitive plants, based on the probability of occurrence of the species and the level of habitat disturbance associated with the proposed activity. Survey exceptions require approval by the State Director. Potential effects to sensitive species and their habitats are discussed in the environmental assessment for the proposed activity (BLM CA 6840 Handbook III).

Bureau Assessment (OR/WA only): Pre-project clearances are required contingent upon available funding and personnel. When funding and personnel are not available, a review of likely habitats on maps and aerial photos, and available data from other federal

and state agencies and State Heritage Programs, will be the minimum acceptable level for clearances (BLM Instruction Memorandum No. OR 91-57).

Bureau Tracking (OR/WA only): Pre-project clearances are not required (BLM Instruction Memorandum No. OR 91-57).

Forest Service: Forest Service policy is to complete a Biological Evaluation to review potential impacts of proposed actions on sensitive species, as described in the "Project Analysis" discussion above. The biological evaluation identifies all occupied and unoccupied habitat for sensitive species that may occur in the project area. Surveys may be conducted in suitable habitat to determine if a species is present, but are not required. If suitable habitat is identified, the assumption may be made that it is occupied and measures are recommended to avoid impacts (Forest Service Manual 2670).

Region 5 Watch List: To analyze potential impacts to these species, consider the context, intensity, and duration of likely effects. Appropriate analysis may range from formal surveys to simple documentation of a lack of potential habitat. Do not incorporate analysis for the Watch List species into the biological evaluation, which is reserved for Sensitive Species. Regardless of inclusion on any list, concerns related to NFMA diversity and viability requirements for any species or its habitat can be raised as a NEPA issue, and should be tracked through the planning process (Region 5 Regional Forester letter).

## Site Management

Manual direction concerning species site management is slightly different between the Agencies. It is the policy of both Agencies to avoid actions that would contribute to a need to list a Special Status species as threatened or endangered under the Endangered Species Act. Authority to disturb sensitive species sites lies with the agency official who is responsible for authorizing the proposed habitat-disturbing activity.

BLM: The protection provided by the policy for candidate species shall be used as the minimum level of protection for BLM sensitive species (BLM Manual 6840.06 E). Consistent with existing laws, the BLM shall conserve sensitive species and their habitats and shall ensure that actions authorized, funded, or carried out by the BLM do not contribute to the need for the species to become listed.

Specifically, BLM shall:

1. Determine, to the extent practicable, the distribution, population dynamics, current threats, abundance, and habitat needs for sensitive species occurring on lands administered by the BLM; evaluate the significance of lands administered by the BLM or actions undertaken by the BLM in maintaining and restoring those species.

2. For sensitive species where lands administered by the BLM or BLM authorized actions have a significant effect on their status, manage the habitat to conserve the species by:
   a. Ensuring candidate species are appropriately considered in land use plans.
   b. Developing, cooperating with, and implementing range-wide or site-specific management plans, conservation strategies, and assessments for sensitive species that include specific habitat and population management objectives designed for conservation, as well as management strategies necessary to meet those objectives.
   c. Ensuring that BLM activities affecting the habitat of sensitive species are carried out in a manner that is consistent with the objectives for managing those species.
   d. Monitoring populations and habitats of candidate species to determine whether management objectives are being met (BLM Manual 6840.06 C).

Forest Service: Avoid or minimize impacts to species whose viability has been identified as a concern. If impacts cannot be avoided, analyze the significance of potential adverse

effects on the population or its habitat within the area of concern and on the species as a whole. The line officer with project approval authority makes the decision to allow or disallow impact, but the decision must not result in loss of species viability or create significant trends toward federal listing (Forest Service Manual 2670.32).

## Conservation Strategies

BLM: The protection provided by the policy for "candidate" species (taxa for which the U.S. Fish and Wildlife Service has sufficient information on their status and threats to support proposing the species for listing as endangered or threatened under the Endangered Species Act, but for which issuance of a proposed rule is currently precluded by higher priority listing actions) is used as the minimum level of protection for BLM sensitive species (BLM Manual 6840.06 E). Policy regarding conservation strategies for BLM sensitive species is:

1. In coordination with U.S. Fish and Wildlife Service and/or NOAA Fisheries determine, to the extent practicable, the distribution, population dynamics, current threats, abundance, and habitat needs for candidate species occurring on lands administered by the BLM. Evaluate the significance of lands administered by the BLM or actions undertaken by the BLM in maintaining and restoring those species.

2. For sensitive species where lands administered by the BLM or BLM authorized actions have a significant effect on their status, manage the habitat to conserve the species by:
   a. Ensuring sensitive species are appropriately considered in land use plans.
   b. Developing, cooperating with, and implementing range-wide or site-specific management plans, conservation strategies, and assessments for candidate species that include specific habitat and population management objectives designed for conservation, as well as management strategies necessary to meet those objectives.
   c. Ensuring that BLM activities affecting the habitat of sensitive species are carried out in a manner that is consistent with the objectives for managing those species.
   d. Monitoring populations and habitat of sensitive species to determine whether management objectives are being met.

In an effort to eliminate the need for listings under the Endangered Species Act, the BLM shall participate in developing habitat conservation assessments leading to conservation agreements for proposed, candidate, and sensitive species, groups of species, or specific ecosystems. A conservation assessment is a technical document that describes the current state of the knowledge for the life history, habitat requirements, and management considerations for a species or group of species throughout its occupied range on the lands managed by the cooperating agencies. Habitat conservation assessments are often done as a forerunner to preparation of a conservation agreement (BLM Manual 6840.22.C.2).

State Directors and line managers should identify opportunities for habitat conservation assessments or, if none exists, initiate the development of these assessments and conservation agreements for the purpose of furthering the conservation of the subject species on BLM administered and other lands (BLM 6840.22 C.2.b).

The BLM should use habitat conservation assessments to develop conservation agreements that outline the procedural assurance necessary to: (1) reduce, eliminate, or mitigate specific threats to proposed, candidate, or sensitive species; (2) develop an ecosystem management approach to conservation on federal lands; and, (3) facilitate coordination and cooperation with others, such as States and private entities, to achieve species and habitat conservation through an ecosystem management approach that extends beyond federally managed lands (BLM 6840.22 C.2.c).

Regional manual supplements for Oregon/Washington and California summarize this policy, stating that for sensitive species where lands administered by the BLM, or BLM actions, have a significant effect on their status: (1) manage the habitat to conserve the species; (2) prepare management plans when necessary; and, (3) implement active management where needed to prevent listing or to conserve the species. Progress toward meeting species management objectives will be monitored periodically (BLM Instruction Memorandum No. OR 91-57).

Forest Service: To preclude trends toward endangerment that would result in the need for federal listing, units must develop conservation strategies for those sensitive species whose continued existence may be negatively affected by the forest plan or a proposed project. To devise conservation strategies, first conduct biological assessments of identified sensitive species. In each assessment, meet these requirements:

1. Base the assessment on the current geographic range of the species and the area affected by the plan or project. If the entire range of the species is contained within the plan or project area, limit the area of analysis to the immediate plan or project area. If the geographic range of the species is beyond the plan or project area, expand the area of analysis accordingly.

2. Identify and consider, as appropriate for the species and area, factors that may affect the continued downward trend of the population, including such factors as: distribution of habitats, genetics, demographics, habitat fragmentation, and risk associated with catastrophic events.

3. Display findings under the various management alternatives considered in the plan or project (including the no action alternative) (FSM 2621.2).

For sensitive plants in Region 5, the interim Threatened, Endangered, and Sensitive Plant Handbook (Region 5 Forest Service Handbook 2609.25) requires that, when information on a sensitive species is needed, a professional botanist directs the botanical investigation of species in order to determine the status of the species. The botanical investigation is an in-depth investigation conducted to gather information on distribution, abundance, trends, ecological requirements, and management needs. Based on the botanical investigation, a Species Management Guide is produced. A Species Management Guide is a biological and administrative action document that contains the information and guidance necessary for successful management of a species through time. A guide specifies monitoring and periodic review to ensure that it is working to benefit the species. As new data becomes available, it is incorporated into species management guides. Effective implementation of these guides should ensure the long-term viability of sensitive species, thereby, preventing the need to list the species under the Endangered Species Act.

In Region 6, conservation strategies are developed for candidate and sensitive species. The strategy is based on the best scientific information available for the species and usually includes an outline of the biological limiting factors, recommended conservation measures to manage or protect the species, and a monitoring plan (Region 6 Regional Forester letter dated August 17, 1995).

## Inventories

General inventories are similar to Strategic Surveys. They are conducted to learn more about a species distribution and status. These surveys can be conducted to help develop conservation strategies.

BLM: State Directors are responsible for establishing programs to determine which special status species occur on public land, and the condition of the populations and their

habitats (BLM Manual 6840.04 E.3). Field managers are responsible for conducting and maintaining current inventories for special status species on public lands (BLM Manual 6840.04 F.1).

BLM OR/WA: For sensitive species, general inventories are required where needed to determine species distribution and status, and monitoring to determine the species' requirements and trends (BLM Instruction Memorandum No. OR 91-57).

BLM CA: It is policy to conduct inventories to determine the occurrence and status of all special status plant species on lands managed by BLM or affected by BLM actions. This includes pro-active inventories directed toward development of plans or determining the status of plant species. Such inventories are to be conducted at the time of year when such plant species can be found and positively identified (BLM CA 6840 Handbook III).

Forest Service: Inventories are encouraged where needed to support biological evaluations and establish management objectives for conservation of sensitive species. Inventories are not required.

## Adding/Removing Species

The heritage program rankings are updated on a regular cycle of 2-3 years, depending on the state. These rankings are then published or posted on their websites. The BLM sensitive species list in Oregon is considered to include all ONHP List 1 species, with few exceptions, when new rankings are published. The State Director is able to accept, add, or remove ranked species as information warrants. In addition, BLM District managers can nominate species for addition or deletion.

Forest Service sensitive species lists are updated at the discretion of the Regional Forester. These lists are updated as demand warrants.

## Reports, Monitoring, and Review

Monitoring will continue in accordance with existing monitoring requirements for the Northwest Forest Plan and for the land and resource management plans for each of the Forest Service and BLM administrative units within the Northwest Forest Plan area. No new monitoring requirements are proposed.

Formal reviews or reports regarding special status species are not required.

BLM: The Special Status Species Program Manager is responsible for monitoring implementation of the special status species program and recommending changes to ensure compliance with law, regulation, and policy and to maintain effectiveness of the program (BLM Manual 6840.04 E.8). BLM policy is to monitor populations and habitats of sensitive species to determine whether management objectives are being met (BLM Manual 6840.06 C.2.d). Field Managers are responsible for ensuring actions are evaluated to determine if special status species objectives are being met (BLM Manual 6840.04 F.5).

BLM OR/WA: Monitoring is required for Bureau Sensitive species where lands administered by the BLM or BLM actions have a significant effect on their status. Monitoring should be designed on a case-by-case basis at the intensity appropriate for the monitoring objective (related to an EA, to species trend, or species/habitat management). Monitoring may include any of the following: (1) Compliance monitoring to determine if protection and mitigation measures included in project EAs were implemented in the field; (2) Impact analysis monitoring to determine if protection and mitigation implemented in the field achieved management objectives; or (3) Research and studies to determine biological status, taxonomic status, threats, trend, etc., by qualitative

and quantitative data collection. Monitoring is optional for Bureau Assessment and Bureau Tracking species (BLM Instruction Memorandum No. OR 91-57).

BLM CA: For sensitive plants, BLM California prioritizes sensitive species for monitoring based upon degree of rarity, existing threats, and potential conflicts. Plant species with the highest rating are monitored annually while others are monitored every 3-5 years. A study plan is developed and peer reviewed for each species being monitored (BLM CA 6840 Handbook IV).

Forest Service: Monitoring should be proposed as necessary to determine if wildlife, fish, and other resource objectives are being met. Develop and implement management strategies (objectives, management prescriptions, and monitoring) to meet riparian habitat goals for dependent fish and wildlife species.

Regional Foresters are responsible for ensuring Region-wide consistency in standards, technologies, and methods used in habitat planning and evaluation and monitoring of wildlife and fish resources (Forest Service manual 2620.43).

Region 6: Include a monitoring plan in conservation strategies for candidate and sensitive species.

Region 5: For sensitive plants, monitor key populations and specify monitoring and periodic review in species management guides to ensure that the guide is working to benefit the species.

## Potential Mitigation

Mitigation measures avoid, minimize, rectify, reduce, or compensate for adverse environmental impacts of management actions. Mitigation measures were not included as part of Alternative 2 to inform the Responsible Officials of the consequences of mitigation. The Responsible Officials will then decide whether to implement mitigation. NEPA implementing regulations require agency's to "Include appropriate mitigation measures not already included in the proposed action or alternatives" and include a discussion of "Means to mitigate adverse environmental impacts." The regulations also require that in the Record of Decision the Responsible Officials "State whether all practicable means to avoid or minimize environmental harm from the alternative selected have been adopted, and if not, why they were not."

There are two different potential mitigation measures discussed in this section. The first is for species with insufficient habitat caused by management actions under Alternative 2. The second mitigation measure is for species with insufficient habitat under all alternatives or species where there is insufficient information to determine an outcome.

### Species with Insufficient Habitat Caused by Management under Alternative 2

The analysis of environmental consequences for Alternative 2 indicates that removing the Survey and Manage requirements for known site management and/or pre-disturbance surveys results in some species having insufficient habitat (including known sites) to support stable populations in all or part of their range. In these cases, mitigation to eliminate this adverse environmental effect has been identified. Mitigation was developed by comparing the management actions in Alternative 1 to those in Alternative 2 to isolate what caused the difference in species outcomes. Mitigation consists of conducting pre-project clearances and/or managing known sites that are necessary to prevent the species from moving closer to listing under the Endangered Species Act.

**Table 2-5.** Assumed Special Status Species Program Assignments by Agency and Region for Alternative 2.

| **TAXA GROUP** ***Species*** | *Note: Where taxon has more than one name indicated, first name is current accepted name, second one (in parentheses) is name used in NWFP (Table C-3).* | **Special Status Species Programs** | | | |
|---|---|---|---|---|---|
| | | **BLM OR/WA[1]** | **BLM CA** | **FS R-6** | **FS R-5** |
| **FUNGI** | | | | | |
| *Albatrellus avellaneus* | | SS | - | SS | - |
| *Albatrellus caeruleoporus* | | - | SS | - | - |
| *Albatrellus ellisii* | | - | SS | SS-W | - |
| *Albatrellus flettii* | | - | SS | - | - |
| *Alpova alexsmithii* | | SS | - | - | - |
| *Arcangeliella camphorata* (*Arcangeliella* sp. nov. #Trappe 12382; *Arcangeliella* sp. nov. #Trappe 12359) | | SS | - | - | - |
| *Boletus haematinus* | | - | SS | - | - |
| *Boletus pulcherrimus* | | SS | - | SS | SS |
| *Bridgeoporus nobilissimus (Oxyporus nobilissimus)* | | SS | - | SS | SS |
| *Choiromyces venosus* | | - | SS | - | - |
| *Chroogomphus loculatus* | | SS | - | - | - |
| *Clavariadelphus ligula* | | - | SS | - | - |
| *Clavariadelphus occidentalis* (*Clavariadelphus pistillaris*) | | - | - | SS-W | - |
| *Clavariadelphus sachalinensis* | | - | - | SS-W | - |
| *Clavulina castanopes* v. *lignicola* (*Clavulina ornatipes*) | | - | SS | - | - |
| *Clitocybe subditopoda* | | - | SS | - | - |
| *Collybia racemosa* | | - | SS | - | SS |
| *Cordyceps ophioglossoides* | | - | SS | - | - |
| *Cortinarius barlowensis* (syn. *Cortinarius azureus*) | | - | - | SS-O | - |
| *Cudonia monticola* | | - | - | SS | SS |
| *Dermocybe humboldtensis* | | SS | SS | - | - |
| *Destuntzia rubra* | | SS | - | - | - |
| *Entoloma nitidum (Rhodocybe nitida)* | | - | SS | - | - |
| *Gastroboletus imbellus* | | SS | - | - | - |
| *Gastroboletus vividus* (*Gastroboletus* sp. nov. #Trappe 2897; *Gastroboletus* sp. nov. #Trappe 7515) | | SS | - | - | - |
| *Gomphus bonarii* | | - | - | SS | SS |
| *Gomphus kauffmanii* | | - | - | SS | - |
| *Gymnomyces nondistincta* (*Martellia* sp. nov. #Trappe 649) | | SS | - | - | - |
| *Gymnopilus punctifolius* | | - | SS | - | - |
| *Gyromitra californica* | | - | - | SS | - |
| *Hydropus marginellus (Mycena marginella)* | | - | SS | - | - |
| *Leucogaster citrinus* | | - | SS | SS | |
| *Macowanites mollis* | | SS | - | - | - |
| *Martellia fragrans* | | SS | - | - | - |
| *Martellia idahoensis* | | SS | - | - | - |
| *Mycena quinaultensis* | | - | SS | - | - |
| *Octavianina macrospora* | | SS | - | - | - |
| *Otidea smithii* | | - | - | SS | SS |
| *Phaeocollybia attenuata* | | - | - | SS | - |

**Table 2-5.** Assumed Special Status Species Program Assignments by Agency and Region for Alternative 2.

| **TAXA GROUP** *Species* | *Note: Where taxon has more than one name indicated, first name is current accepted name, second one (in parentheses) is name used in NWFP (Table C-3).* | **Special Status Species Programs** | | | |
|---|---|---|---|---|---|
| | | **BLM OR/WA[1]** | **BLM CA** | **FS R-6** | **FS R-5** |
| **FUNGI** | | | | | |
| *Phaeocollybia dissiliens* | | - | - | SS-O | - |
| *Phaeocollybia fallax* | | - | - | SS-W | - |
| *Phaeocollybia gregaria* | | SS | - | - | - |
| *Phaeocollybia olivacea* | | SS | SS | SS-O | SS |
| *Phaeocollybia oregonensis* (syn. *Phaeocollybia carmanahensis*) | | SS | - | SS | - |
| *Phaeocollybia piceae* | | - | SS | SS | - |
| *Phaeocollybia pseudofestiva* | | - | SS | SS | - |
| *Phaeocollybia scatesiae* | | - | SS | SS | - |
| *Phaeocollybia sipei* | | - | - | SS-O | - |
| *Phaeocollybia spadicea* | | - | SS | SS | - |
| *Polyozellus multiplex* | | - | SS | - | - |
| *Ramaria amyloidea* | | - | SS | SS | - |
| *Ramaria araiospora* | | - | - | SS-W | - |
| *Ramaria aurantiisiccescens* | | - | SS | SS | - |
| *Ramaria cyaneigranosa* | | - | SS | SS-W | - |
| *Ramaria gelatiniaurantia* | | - | - | SS | - |
| *Ramaria largentii* | | - | SS | SS | - |
| *Ramaria rubrievanescens* | | - | - | SS-W | - |
| *Ramaria rubripermanens* | | - | - | SS-W | - |
| *Ramaria spinulosa* var. *diminutiva* (*Ramaria spinulosa*) | | SS | - | - | - |
| *Ramaria stuntzii* | | - | - | SS-W | - |
| *Rhizopogon chamaleontinus* (*Rhizopogon* sp. nov. #Trappe 9432) | | SS | - | - | - |
| *Rhizopogon ellipsosporus* (*Alpova* sp. nov. # Trappe 9730) | | SS | - | - | - |
| *Rhizopogon exiguus* | | SS | - | - | - |
| *Sarcodon fuscoindicus* | | - | SS | SS-W | - |
| *Sowerbyella rhenana (Aleuria rhenana)* | | - | SS | SS | SS |
| *Sparassis crispa* | | - | SS | - | - |
| *Spathularia flavida* | | - | SS | SS-W | - |
| *Thaxterogaster pavelekii* (*Thaxterogaster* sp. nov. #Trappe 4867, 6242, 7427, 7962, 8520) | | SS | - | - | - |
| *Tricholomopsis fulvescens* | | - | - | - | SS |
| **LICHENS** | | | | | |
| *Bryoria pseudocapillaris* | | SS | SS | SS | - |
| *Bryoria spiralifera* | | SS | SS | SS-O | - |
| *Bryoria subcana* | | As | - | - | - |
| *Calicium adspersum* | | As | - | - | SS |
| *Cetrelia cetrarioides* | | - | - | SS-W | - |
| *Chaenotheca subroscida* | | - | - | SS | - |
| *Collema nigrescens* | | - | - | SS-W | - |

**Table 2-5.** Assumed Special Status Species Program Assignments by Agency and Region for Alternative 2.

| **TAXA GROUP** ***Species*** | *Note: Where taxon has more than one name indicated, first name is current accepted name, second one (in parentheses) is name used in NWFP (Table C-3).* | **Special Status Species Programs** | | | |
|---|---|---|---|---|---|
| | | **BLM OR/WA[1]** | **BLM CA** | **FS R-6** | **FS R-5** |
| **LICHENS** | | | | | |
| *Dendriscocaulon intricatulum* | | - | SS | SS-W | - |
| *Dermatocarpon luridum* | | - | - | SS | - |
| *Heterodermia sitchensis* | | As | - | - | - |
| *Hypogymnia duplicata* | | - | - | SS-O | - |
| *Hypotrachyna revoluta* | | As | - | SS | - |
| *Leptogium burnetiae* var. *hirsutum* | | - | - | SS | - |
| *Leptogium cyanescens* | | - | - | SS | - |
| *Lobaria linita* | | As | - | SS-O | - |
| *Lobaria oregana* | | - | SS | - | - |
| *Microcalicium arenarium* | | As | - | - | - |
| *Nephroma bellum* | | - | SS | SS-W | - |
| *Nephroma occultum* | | - | - | SS | - |
| *Niebla cephalota* | | As | SS | SS | - |
| *Pannaria rubiginosa* | | As | SS | SS | - |
| *Peltigera pacifica* | | - | - | SS | - |
| *Platismatia lacunosa* | | - | - | SS-W | - |
| *Pseudocyphellaria rainierensis* | | - | - | SS | - |
| *Teloschistes flavicans* | | As | SS | SS-O | - |
| *Tholurna dissimilis* | | As | - | SS | - |
| *Usnea longissima* | | - | SS | SS | SS |
| **BRYOPHYTES** | | | | | |
| *Buxbaumia viridis* | | - | SS | - | SS |
| *Diplophyllum plicatum* | | As | - | - | - |
| *Herbertus aduncus* | | As | - | - | - |
| *Iwatsukiella leucotricha* | | As | - | SS | - |
| *Kurzia makinoana* | | As | - | - | - |
| *Marsupella emarginata* var. *aquatica* | | As | - | - | - |
| *Orthodontium gracile* | | As | SS | - | - |
| *Ptilidium californicum* | | - | SS | - | SS |
| *Rhizomnium nudum* | | As | - | SS-O | - |
| *Schistostega pennata* | | As | - | SS | - |
| *Tetraphis geniculata* | | As | SS | SS | - |
| *Tritomaria exsectiformis* | | As | - | - | - |
| *Tritomaria quinquedentata* | | As | - | - | - |
| **VERTEBRATES** | | | | | |
| Larch Mountain salamander *Plethodon larselli* | | As | - | SS | - |
| Shasta salamander *Hydromantes shastae* | | - | SS | - | SS |
| Siskiyou Mountains salamander *Plethodon stormi* | | SS | - | SS-O | SS |

**Table 2-5.** Assumed Special Status Species Program Assignments by Agency and Region for Alternative 2.

| **TAXA GROUP** *Species* | *Note: Where taxon has more than one name indicated, first name is current accepted name, second one (in parentheses) is name used in NWFP (Table C-3).* | **Special Status Species Programs** | | | |
|---|---|---|---|---|---|
| | | **BLM OR/WA[1]** | **BLM CA** | **FS R-6** | **FS R-5** |
| **VERTEBRATES** | | | | | |
| Van Dyke's salamander *Plethodon vandykei* | | - | - | SS-W | - |
| Great Gray Owl *Strix nebulosa* | | - | - | SS-W | SS |
| Oregon Red Tree Vole *Arborimus longicaudus*, In xeric and northern mesic portion of its range | | SS[2] | - | SS[2] | - |
| **MOLLUSKS** | | | | | |
| *Cryptomastix devia* | | SS | - | SS | - |
| *Cryptomastix hendersoni* | | SS | - | SS | - |
| *Deroceras hesperium* | | SS | - | SS | - |
| *Fluminicola* n. sp. 3 | | SS | - | SS-O | - |
| *Fluminicola* n. sp. 11 | | SS | - | - | - |
| *Fluminicola seminalis* | | - | - | SS-O | SS |
| *Helminthoglypta talmadgei* | | - | SS | - | - |
| *Hemphillia burringtoni* | | SS | - | SS-W | - |
| *Hemphillia glandulosa* | | - | - | SS-W | - |
| *Hemphillia malonei* | | SS | - | SS-W | - |
| *Hemphillia pantherina* | | - | - | SS-W | - |
| *Juga (O)* n. sp. 2 | | SS | - | SS-O | - |
| *Lyogyrus* n. sp. 1 | | SS | - | SS | - |
| *Lyogyrus* n. sp. 2 | | SS | - | SS | - |
| *Monadenia chaceana* | | SS | SS | SS-O | - |
| *Monadenia fidelis minor* | | SS | - | SS | - |
| *Monadenia troglodytes troglodytes* | | - | - | - | SS |
| *Monadenia troglodytes wintu* | | - | - | - | SS |
| *Oreohelix* n. sp. | | - | - | SS-W | - |
| *Pristiloma arcticum crateris* | | SS | - | SS-O | - |
| *Prophysaon coeruleum* | | - | - | SS-W | SS |
| *Trilobopsis roperi* | | - | - | - | SS |
| *Trilobopsis tehamana* | | - | SS | - | SS |
| *Vertigo* n. sp. | | - | - | SS-W | - |
| *Vespericola pressleyi* | | - | SS | - | SS |
| *Vespericola shasta* | | - | - | - | SS |
| **VASCULAR PLANTS** | | | | | |
| *Bensoniella oregana* | | SS | - | SS-O | SS |
| *Botrychium minganense* | | - | - | SS-O | SS |
| *Botrychium montanum* | | As | - | SS-O | SS |
| *Coptis asplenifolia* | | - | - | SS-W | - |
| *Coptis trifolia* | | As | - | SS | - |
| *Corydalis aquae-gelidae* | | SS | - | SS | - |
| *Cypripedium fasciculatum* | | As | SS | SS | SS |
| *Cypripedium montanum* | | - | SS | - | SS |
| *Eucephalus vialis (Aster vialis)* | | SS | - | SS-O | - |
| *Galium kamtschaticum* | | - | - | SS | - |

[1]BLM OR/WA list is inclusive of any Oregon Natural Heritage Program List 1 or List 2 species. For effects analysis and disclosure, Bureau Tracking species are not included because site management or pre-project clearances are not required.
[2]Species recommended for inclusion as Special Status species in the northwestern Oregon coast area only (north of Highway 20, west of the Willamette Valley).

As=Bureau Assessment
SS=Bureau Sensitive or Forest Service Sensitive
SS-O=FS Sensitive in Oregon
SS-W=FS Sensitive in Washington
Hyphens (-) indicate not included, may result from species not occurring in the state.

Pre-project clearances are activities conducted to learn whether a species is present or potentially present in a geographic area. Pre-project clearances may include, but are not limited to,

- clearance surveys;
- field clearances;
- field reconnaissance;
- inventories;
- habitat examinations;
- habitat evaluation;
- evaluation of species-habitat associations and presence of suitable or potential habitat;
- review of existing survey records, inventories, and spatial data;
- utilization of professional research, literature, and other technology transfer sources; or
- use of expertise, both internal and external, that is based on documented, substantiated professional rationale.

Pre-project clearances are completed prior to habitat-disturbing activities to determine the presence of a species or its habitat and the effect of management actions on the species.

Managing a known site is an activity that maintains a species at an occupied site to prevent contributing to a need to list that species as threatened or endangered under the Endangered Species Act. Site management is designed to maintain the habitat elements needed to provide for persistence of the species at the site. Management may range from maintaining one or more habitat components such as down logs or canopy cover, up to complete exclusion from disturbance for many acres, and may permit loss of some individuals, area, or elements not affecting continued site occupancy. Authority to disturb sites lies with the agency official who is responsible for authorizing the proposed habitat-disturbing activity.

If the Responsible Officials adopt mitigation in the Record of Decision for the SEIS, the analysis indicates that site management and/or pre-project clearances would effectively eliminate the adverse effects caused by management actions (refer to Chapter 3&4). If adopted, mitigation will remain in effect until the species is added to the Agencies' Special Status Species Programs, where appropriate, or a conservation agreement or a conservation strategy has been approved for the species. A conservation strategy is an interagency technical document based on the available scientific information for a species or group of species that discuss the biological and ecological factors of the species and determines if management actions are necessary for a species or group of species to persist over time. If actions are necessary, the strategy describes the actions land management agencies must take to maintain a species or group of species and usually include a monitoring plan. Conservation strategies can also be known as management strategies.

Table 2-6 below, displays the species with insufficient habitat (including known sites) to support stable populations in all (51 species) or part of their range (6 species) if Alternative 2 were selected, and identifies mitigation that would eliminate these adverse effects.

Species with Insufficient Habitat under all Alternatives or with Insufficient Information to Determine an Outcome.

Under Alternatives 1 and 3, when the analyses shows that there is "insufficient information to determine an outcome" or "there is insufficient habitat (including known sites) to support stable populations not caused by federal action" for a species, this outcome is the same for Alternative 2 as well. Although the Survey and Manage Standards and Guidelines under Alternatives 1 and 3 generally add protection and

**Table 2-6**. Mitigation Identified to Eliminate Adverse Effects of Alternative 2.

| SPECIES | FS WA | | FS OR | | BLM OR | | FS CA | | BLM CA | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Manage Sites | Pre-Project Clearance | Manage Sites | Pre-Project Clearance | Manage Sites | Pre-Project Clearance | Manage Sites | Pre-Project Clearance | Manage Sites | Pre-Project Clearance |
| **FUNGI** | | | | | | | | | | |
| *Albatrellus ellisii* | SSSP | | M | -- | M | -- | M | -- | SSSP | |
| *Albatrellus flettii* | M | -- | -- | -- | -- | -- | M | -- | SSSP | |
| *Clavariadelphus ligula* | M | -- | M | -- | M | -- | M | -- | SSSP | |
| *Clavariadelphus occidentalis* | SSSP | | M | -- | M | -- | M | -- | M | -- |
| *Clavariadelphus sachalinensis* | SSSP | | M | -- | M | -- | M | -- | M | -- |
| *Cortinarius barlowensis* | M | -- | SSSP | | M | -- | -- | -- | -- | -- |
| *Cudonia monticola* | SSSP | | SSSP | | M | -- | SSSP | | - | -- |
| *Galerina heterocystis* | M | -- | M | -- | M | -- | M | -- | M | -- |
| *Gomphus bonarii* | SSSP | | SSSP | | M | -- | SSSP | | M | -- |
| *Gomphus kauffmanii* | SSSP | | SSSP | | M | -- | M | -- | M | -- |
| *Gymnopilus punctifolius* | -- | -- | -- | -- | -- | -- | M | -- | SSSP | |
| *Gyromitra californica* | SSSP | | SSSP | | M | -- | M | -- | -- | -- |
| *Leucogaster citrinus* | SSSP | | SSSP | | M | -- | M | -- | SSSP | |
| *Phaeocollybia attenuata* | SSSP | | SSSP | | M | -- | M | -- | M | -- |
| *Phaeocollybia californica* | -- | -- | SSSP | | SSSP | | M | -- | SSSP | |
| *Phaeocollybia dissiliens* | -- | -- | SSSP | | M | -- | -- | -- | -- | -- |
| *Phaeocollybia fallax* | SSSP | | M | -- | M | -- | M | -- | M | -- |
| *Phaeocollybia piceae* | SSSP | | SSSP | | M | -- | M | -- | SSSP | |
| *Phaeocollybia pseudofestiva* | SSSP | | SSSP | | M | -- | M | -- | SSSP | |
| *Phaeocollybia scatesiae* | SSSP | | SSSP | | M | -- | M | -- | SSSP | |
| *Phaeocollybia sipei* | -- | -- | SSSP | | M | -- | -- | -- | -- | -- |
| *Phaeocollybia spadicea* | SSSP | | SSSP | | M | -- | M | -- | SSSP | |
| *Polyozellus multiplex* | M | -- | M | -- | M | -- | M | -- | SSSP | |
| *Ramaria amyloidea* | SSSP | | SSSP | | M | -- | M | -- | SSSP | |
| *Ramaria araiospora* | SSSP | | M | -- | M | -- | M | -- | M | -- |
| *Ramaria aurantiisiccescens* | SSSP | | SSSP | | M | -- | M | -- | SSSP | |
| *Ramaria celerivirescens* | M | -- | M | -- | M | -- | M | -- | M | -- |
| *Ramaria cyaneigranosa* | SSSP | | M | -- | M | -- | M | -- | SSSP | |
| *Ramaria gelatiniaurantia* | SSSP | | SSSP | | M | -- | M | -- | M | -- |
| *Ramaria largentii* | SSSP | | SSSP | | M | -- | M | -- | SSSP | |
| *Ramaria rubrievanescens* | SSSP | | M | -- | M | -- | M | -- | M | -- |
| *Ramaria rubripermanens* | SSSP | | M | -- | M | -- | M | -- | M | -- |
| *Ramaria stuntzii* | SSSP | | M | -- | M | -- | M | -- | M | -- |
| *Rhizopogon truncatus* | M | -- | M | -- | M | -- | M | -- | M | -- |

**Table 2-6**. Mitigation Identified to Eliminate Adverse Effects of Alternative 2.

| SPECIES | FS WA | | FS OR | | BLM OR | | FS CA | | BLM CA | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Manage Sites | Pre-Project Clearance | Manage Sites | Pre-Project Clearance | Manage Sites | Pre-Project Clearance | Manage Sites | Pre-Project Clearance | Manage Sites | Pre-Project Clearance |
| **FUNGI** | | | | | | | | | | |
| *Sarcodon fuscoindicus* | SSSP | | M | -- | M | -- | M | -- | SSSP | |
| *Sowerbyella rhenana* | SSSP | | SSSP | | M | -- | SSSP | | SSSP | |
| *Sparassis crispa* | M | -- | M | -- | M | -- | M | -- | SSSP | |
| *Spathularia flavida* | SSSP | | M | -- | M | -- | M | -- | SSSP | |
| *Tremiscus helvelloides* | M | -- | M | -- | M | -- | M | -- | M | -- |
| **LICHENS** | | | | | | | | | | |
| *Dendriscocaulon intricatulum*[2] | SSSP | | M[1] | M[1] | -- | -- | M | M | SSSP | SSSP |
| *Nephroma occultum* | SSSP | | SSSP | | M | M | -- | -- | -- | -- |
| *Peltigera pacifica*[2] | SSSP | | SSSP | | M | -- | -- | -- | -- | -- |
| *Pseudocyphellaria rainierensis* | SSSP | | SSSP | | M | M | -- | -- | -- | -- |
| **MOLLUSKS** | | | | | | | | | | |
| *Fluminicola* n. sp. 14 | -- | -- | -- | -- | -- | -- | M | M | M | M |
| *Fluminicola* n. sp. 15 | -- | -- | -- | -- | -- | -- | M | M | -- | -- |
| *Fluminicola* n. sp. 16 | -- | -- | -- | -- | -- | -- | M | M | -- | -- |
| *Fluminicola* n. sp. 17 | -- | -- | -- | -- | -- | -- | M | M | -- | -- |
| *Fluminicola* n. sp. 18 | -- | -- | -- | -- | -- | -- | M | M | M | M |
| *Fluminicola* n. sp. 19 | -- | -- | -- | -- | -- | -- | M | M | M | M |
| *Fluminicola* n. sp. 20 | -- | -- | -- | -- | -- | -- | M | M | M | M |
| *Fluminicola seminalis*[2] | -- | -- | SSSP | | -- | -- | SSSP | | M | M |
| *Helminthoglypta talmadgei*[2] | -- | -- | -- | -- | -- | -- | M | -- | SSSP | |
| *Juga* (*O.*) n. sp. 3 | -- | -- | -- | -- | -- | -- | M | M | -- | -- |
| *Lyogyrus* n. sp. 3 | -- | -- | -- | -- | -- | -- | M | M | M | M |
| *Monadenia chaceana*[2] | -- | -- | SSSP | | SSSP | | M | M | SSSP | |
| *Vorticifex* n. sp. 1 | -- | -- | -- | -- | -- | -- | M | -- | M | -- |
| **VASCULAR PLANTS** | | | | | | | | | | |
| *Cypripedium montanum*[2] | -- | -- | M | M | M | M | SSSP | | SSSP | |

M = Mitigation identified to eliminate adverse effects in all or part of a species range. Mitigation would apply to Northwest Forest Plan administrative units where habitat is suspected.
SSSP = Assumed to be included in the Special Status Species Programs; site management and pre-project clearances would be conducted in accord with those programs. No mitigation needed.
- = Mitigation not needed because not within species range, not included in Survey and Manage mitigation measure, or species has sufficient habitat in this geographic area.
[1] On the Mt. Hood National Forest only.
[2] For these six species, there is insufficient habitat only in a portion of the species' range.

reduce risk to species by completing pre-disturbance surveys and managing known sites (compared to Alternative 2), it does not change the outcome of insufficient habitat or resolve the inadequate information needed to determine the outcome for a species. However, many of these are species with few known sites or populations. Some of these species were not eligible for inclusion in one or more of the Agencies' Special Status Species Programs and the lack of management would increase the risk to these species under Alternative 2. In these cases, mitigation to eliminate the difference between the alternatives has been identified. Mitigation consists of conducting pre-project clearances and/or managing known sites for species that currently have these requirements under the Survey and Manage Standards and Guidelines. The requirements for conducting pre-project clearances and managing known sites are the same as those described in the previous mitigation. It is unknown to what degree mitigation lessens the risk to the species; however, it will not change the outcome of insufficient habitat or resolve the inadequate information needed to determine the outcome for a species.

There is insufficient information to determine an outcome for the four arthropod functional groups. Since pre-disturbance surveys and known site management are not required under Alternative 1, pre-project clearances and known site management are not offered as mitigation under Alternative 2. No mitigation was identified for the four arthropod functional groups because the effects of Alternative 2 are similar to the effects of Alternatives 1 and 3.

If the Responsible Officials adopt mitigation in the Record of Decision for this SEIS, the analysis indicates that site management and/or pre-project clearances would effectively reduce the risk to these species to the same level for all alternatives (refer to Chapter 3&4). If adopted, mitigation will remain in effect until the species is added to the Agencies' Special Status Species Programs, where appropriate, or a conservation agreement or conservation strategy has been approved for the species.

Table 2-7 displays the species that would have insufficient habitat under all alternatives or where there is insufficient information to determine an outcome under all alternatives, and identifies mitigation that would lessen the risk to species to Alternative 1 levels.

**Table 2-7**. Species with insufficient information to determine an outcome or having insufficient habitat under both Alternatives 1 and 2; identified mitigation would reduce the effects under Alternative 2 to Alternative 1 levels[1].

| SPECIES | S&M Cat. | BLM OR/ WA[2] | BLM CA | FS R6 | FS R5 | Insufficient Information to Determine Outcome | Insufficient Habitat Not Caused by Federal Action | Manage Known Sites | Pre-Project Clearance |
|---|---|---|---|---|---|---|---|---|---|
| **FUNGI** | | | | | | | | | |
| *Acanthophysium farlowii* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Albatrellus avellaneus* | B | SS | ~ | SS | ~ | | ✔ | M | |
| *Albatrellus caeruleoporus* | B | ~ | SS | ~ | ~ | | ✔ | M | |
| *Alpova alexsmithii* | B | SS | ~ | ~ | ~ | | ✔ | M | |
| *Alpova olivaceotinctus* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Arcangeliella camphorata* | B | SS | ~ | ~ | ~ | | ✔ | M | |
| *Arcangeliella crassa* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Arcangeliella lactarioides* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Asterophora lycoperdoides* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Asterophora parasitica* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Baeospora myriadophylla* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Balsamia nigrens* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Boletus haematinus* | B | ~ | SS | ~ | ~ | | ✔ | M | |
| *Boletus pulcherrimus* | B | SS | ~ | SS | SS | | ✔ | M | |
| *Bridgeoporus nobilissimus* | A | SS | ~ | SS | SS | | ✔ | M | M |
| *Catathelasma ventricosa* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Chamonixia caespitosa* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Choiromyces alveolatus* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Choiromyces venosus* | B | ~ | SS | ~ | ~ | | ✔ | M | |
| *Chroogomphus loculatus* | B | SS | ~ | ~ | ~ | | ✔ | M | |
| *Chrysomphalina grossula* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Clavariadelphus subfastigiatus* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Clavulina castanopes v. lignicola* | B | ~ | SS | ~ | ~ | | ✔ | M | |
| *Clitocybe senilis* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Clitocybe subditopoda* | B | ~ | SS | ~ | ~ | | ✔ | M | |
| *Collybia racemosa* | B | ~ | SS | ~ | SS | | ✔ | M | |
| *Cordyceps ophioglossoides* | B | ~ | SS | ~ | ~ | | ✔ | M | |
| *Cortinarius boulderensis* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Cortinarius cyanites* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Cortinarius depauperatus* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Cortinarius magnivelatus* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Cortinarius olympianus* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Cortinarius speciosissimus* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Cortinarius tabularis* | B | ~ | ~ | ~ | ~ | ✔ | | M | |
| *Cortinarius umidicola* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Cortinarius valgus* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Cortinarius variipes* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Cortinarius verrucisporus* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Cortinarius wiebeae* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Cyphellostereum laeve* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Dermocybe humboldtensis* | B | SS | SS | ~ | ~ | | ✔ | M | |

| SPECIES | S&M Cat. | BLM OR/ WA[2] | BLM CA | FS R6 | FS R5 | Insufficient Information to Determine Outcome | Insufficient Habitat Not Caused by Federal Action | Manage Known Sites | Pre-Project Clearance |
|---|---|---|---|---|---|---|---|---|---|
| **FUNGI** | | | | | | | | | |
| *Destuntzia fusca* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Destuntzia rubra* | B | SS | ~ | ~ | ~ | | ✔ | M | |
| *Dichostereum boreale* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Elaphomyces anthracinus* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Elaphomyces subviscidus* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Endogone acrogena* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Endogone oregonensis* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Entoloma nitidum* | B | ~ | SS | ~ | ~ | | ✔ | M | |
| *Fayodia bisphaerigera* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Fevansia aurantiaca* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Galerina cerina* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Galerina sphagnicola* | E | ~ | ~ | ~ | ~ | ✔ | | M | |
| *Gastroboletus imbellus* | B | SS | ~ | ~ | ~ | | ✔ | M | |
| *Gastroboletus ruber* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Gastroboletus turbinatus* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Gastroboletus vividus* | B | SS | ~ | ~ | ~ | | ✔ | M | |
| *Gastrosuillus amaranthii* | E | ~ | ~ | ~ | ~ | ✔ | | M | |
| *Gastrosuillus umbrinus* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Gautieria magnicellaris* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Gautieria otthii* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Gelatinodiscus flavidus* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Glomus radiatus* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Gymnomyces abietis* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Gymnomyces nondistincta* | B | SS | ~ | ~ | ~ | | ✔ | M | |
| *Hebeloma olympianum* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Helvella crassitunicata* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Hydnotrya inordinata* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Hydnotrya subnix* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Hydropus marginellus* | B | ~ | SS | ~ | ~ | | ✔ | M | |
| *Hygrophorus caeruleus* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Hygrophorus karstenii* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Hygrophorus vernalis* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Hypomyces luteovirens* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Leucogaster microsporus* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Macowanites chlorinosmus* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Macowanites lymanensis* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Macowanites mollis* | B | SS | ~ | ~ | ~ | | ✔ | M | |
| *Marasmius applanatipes* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Martellia fragrans* | B | SS | ~ | ~ | ~ | | ✔ | M | |
| *Martellia idahoensis* | B | SS | ~ | ~ | ~ | | ✔ | M | |
| *Mycena hudsoniana* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Mycena quinaultensis* | B | ~ | SS | ~ | ~ | | ✔ | M | |
| *Mycena tenax* | B | ~ | ~ | ~ | ~ | | ✔ | M | |

| SPECIES | S&M Cat. | BLM OR/ WA[2] | BLM CA | FS R6 | FS R5 | Insufficient Information to Determine Outcome | Insufficient Habitat Not Caused by Federal Action | Manage Known Sites | Pre-Project Clearance |
|---|---|---|---|---|---|---|---|---|---|
| **FUNGI** | | | | | | | | | |
| *Mythicomyces corneipes* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Neolentinus adhaerens* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Neolentinus kauffmanii* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Octavianina cyanescens* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Octavianina macrospora* | B | SS | ~ | ~ | ~ | | ✔ | M | |
| *Octavianina papyracea* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Otidea smithii* | B | ~ | ~ | SS | SS | | ✔ | M | |
| *Phaeocollybia gregaria* | B | SS | ~ | ~ | ~ | | ✔ | M | |
| *Phellodon atratus* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Pholiota albivelata* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Podostroma alutaceum* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Pseudaleuria quinaultiana* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Ramaria abietina* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Ramaria botryis var. aurantiiramosa* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Ramaria claviramulata* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Ramaria concolor f. tsugina* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Ramaria concolor marrii* | B | ~ | ~ | ~ | ~ | ✔ | | M | |
| *Ramaria conjunctipes var. sparsiramosa* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Ramaria coulterae* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Ramaria gracilis* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Ramaria hilaris* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Ramaria lorithamnus* | B | ~ | ~ | ~ | ~ | ✔ | | M | |
| *Ramaria maculatipes* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Ramaria rainierensis* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Ramaria rubella* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Ramaria rubribrunnescens* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Ramaria spinulosa var. diminutiva* | B | SS | ~ | ~ | ~ | | ✔ | M | |
| *Ramaria suecica* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Ramaria thiersii* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Ramaria verlotensis* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Rhizopogon abietis* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Rhizopogon atroviolaceus* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Rhizopogon brunneiniger* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Rhizopogon chamaleontinus* | B | SS | ~ | ~ | ~ | | ✔ | M | |
| *Rhizopogon ellipsosporus* | B | SS | ~ | ~ | ~ | | ✔ | M | |
| *Rhizopogon evadens var. subalpinus* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Rhizopogon exiguus* | B | SS | ~ | ~` | ~ | | ✔ | M | |
| *Rhizopogon flavofibrillosus* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Rhizopogon inquinatus* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Rhodocybe speciosa* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Rickenella swartzii* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Russula mustelina* | B | ~ | ~ | ~ | ~ | ✔ | | M | |
| *Sedecula pulvinata* | B | ~ | ~ | ~ | ~ | | ✔ | M | |

| SPECIES | S&M Cat. | BLM OR/ WA[2] | BLM CA | FS R6 | FS R5 | Insufficient Information to Determine Outcome | Insufficient Habitat Not Caused by Federal Action | Manage Known Sites | Pre-Project Clearance |
|---|---|---|---|---|---|---|---|---|---|
| **FUNGI** | | | | | | | | | |
| *Stagnicola perplexa* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Thaxterogaster pavelekii* | B | SS | ~ | ~ | ~ | | ✔ | M | |
| *Tricholoma venenatum* | B | ~ | ~ | ~ | ~ | ✔ | | M | |
| *Tricholomopsis fulvescens* | B | ~ | ~ | ~ | SS | | ✔ | M | |
| *Tuber asa* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Tuber pacificum* | B | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Tylopilus porphyrosporus* | D | ~ | ~ | ~ | ~ | | ✔ | M | |
| **LICHENS** | | | | | | | | | |
| *Bryoria pseudocapillaris* | A | SS | SS | SS | ~ | | ✔ | M | M |
| *Bryoria spiralifera* | A | SS | SS | SS-O | ~ | | ✔ | M | M |
| *Bryoria subcana* | B | As | ~ | ~ | ~ | | ✔ | M | |
| *Buellia oidalea* | E | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Calicium abietinum* | B | ~ | ~ | ~ | ~ | ✔ | | M | |
| *Calicium adspersum* | E | As | ~ | ~ | SS | ✔ | | M | |
| *Chaenotheca chrysocephala* | B | ~ | ~ | ~ | ~ | ✔ | | M | |
| *Chaenotheca ferruginea* | B | ~ | ~ | ~ | ~ | ✔ | | M | |
| *Chaenotheca subroscida* | E | ~ | ~ | SS | ~ | | ✔ | M | |
| *Chaenothecopsis pusilla* | E | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Fuscopannaria saubinetii* | E | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Heterodermia sitchensis* | E | As | ~ | ~ | ~ | ✔ | | M | |
| *Hypogymnia vittata* | E | ~ | ~ | ~ | ~ | ✔ | | M | |
| *Hypotrachyna revoluta* | E | As | ~ | SS | ~ | | ✔ | M | |
| *Leptogium burnetiae var. hirsutum* | E | ~ | ~ | SS | ~ | ✔ | | M | |
| *Leptogium cyanescens* | A | ~ | ~ | SS | ~ | | ✔ | M | M |
| *Leptogium teretiusculum* | E | ~ | ~ | ~ | ~ | | ✔ | M | |
| *Lobaria oregana* | A | ~ | SS | ~ | ~ | | ✔ | M | M |
| *Microcalicium arenarium* | B | As | ~ | ~ | ~ | ✔ | | M | |
| *Nephroma isidiosum* | E | ~ | ~ | ~ | ~ | ✔ | | M | |
| *Niebla cephalota* | A | As | SS | SS | ~ | | ✔ | M | M |
| *Pseudocyphellaria perpetua* | A | ~ | ~ | ~ | ~ | | ✔ | M | M |
| *Stenocybe clavata* | E | ~ | ~ | ~ | ~ | ✔ | | M | |
| *Teloschistes flavicans* | A | As | SS | SS-O | ~ | | ✔ | M | M |
| *Tholurna dissimilis* | B | As | ~ | SS | ~ | ✔ | | M | |
| *Usnea hesperina* | E | ~ | ~ | ~ | ~ | | ✔ | M | |
| **BRYOPHYTES** | | | | | | | | | |
| *Brotherella roellii* | E | ~ | ~ | ~ | ~ | ✔ | | M | |
| *Herbertus aduncus* | E | As | ~ | ~ | ~ | ✔ | | M | |
| *Kurzia makinoana* | B | As | ~ | ~ | ~ | ✔ | | M | |
| *Racomitrium aquaticum* | E | ~ | ~ | ~ | ~ | ✔ | | M | |
| *Tritomaria exsectiformis* | B | As | ~ | ~ | ~ | ✔ | | M | |
| *Tritomaria quinquedentata* | B | As | ~ | ~ | ~ | ✔ | | M | |

[1] Mitigation would apply to any administrative unit where the species was not recommended for addition to the Special Status Species Programs, and habitat is known or suspected to occur there. For example, for *Albatrellus avellaneus*, manage known site mitigation would apply to administrative units in BLM CA or FS-R5, where sites are known. Mitigation is not needed in Oregon, since the species is recommended for inclusion in those Agencies' Special Status Species Programs.
[2] Tracking is a category included in the BLM OR/WA Special Status Species Program. Tracking species are not listed here because the Tracking category requires no site management or clearance surveys.

A - Rare species, pre-disturbance surveys required
B - Rare species, pre-disturbance surveys not required
D - Uncommon species, pre-disturbance surveys not required
E - Rare species, status undetermined

As - Bureau Assessment
SS - BLM or Forest Service Sensitive
M - Mitigation to reduce the risk of Alternative 2 to Alternative 1 levels.

# Alternative 3 (Northwest Forest Plan with Modified Survey and Manage)

Under Alternative 3, the Agencies would amend 28 land and resource management plans within the range of the northern spotted owl by modifying the Survey and Manage Standards and Guidelines. Modifications include: (1) removing the uncommon species category and all requirements pertaining to them; (2) eliminating the requirement to conduct pre-disturbance surveys in non-late-successional and non-old-growth forest stands; and, (3) changing the review requirements for excepting known sites from management.

Twenty-eight Survey and Manage species plus 4 arthropod functional groups are currently categorized as uncommon (see Table 2-3). Only 24 species would be removed entirely from the Survey and Manage Standards and Guidelines because 4 of the 28 species have part of their range in the rare species category, and the species would remain in Survey and Manage in that portion of the species' range. The Agencies have reviewed the eligibility of the uncommon species for inclusion in the Special Status Species Programs and found 14 of the 28 species would be eligible (details about the Agencies' Special Status Species Programs are summarized under Alternative 2), including 3 species that are already included. The Survey and Manage Standards and Guidelines, as modified by Alternative 3, are included in Appendix 4. Key features of Alternative 3 are summarized below. If there is a conflict between the standards and guidelines found in Appendix 4 and the text in this document, the standards and guidelines in Appendix 4 prevail.

If Alternative 3 is selected, the analysis in this SEIS assumes that the Regional Foresters and State Directors will make decisions under their existing procedures for modifying their Special Status Species Program lists, and add the 14 eligible uncommon species (Categories C, D, and F) as displayed on Table 2-10 (located at end of the description of Alternative 3).

If Alternative 3 is selected for implementation, there are three possible scenarios that would apply to individual projects and their implementation.

1. Surveys may have already been completed for individual projects. No additional work is required for projects that have fully complied with the current Survey and Manage Standards and Guidelines and existing Special Status Species Policies. Known sites released from the Survey and Manage Standards and Guidelines for species not included in Special Status Species Programs or having mitigation applied will be immediately available for other uses.

2. Surveys may have been started but are not complete. Projects that are in development but have not fully complied with the Survey and Manage Standards and Guidelines can continue under those standards and guidelines or comply with the Special Status Species Policies for those Survey and Manage species that were added to the Special Status Species Programs. Known sites released from the Survey and Manage Standards and Guidelines for species not included in Special Status Species Programs or having mitigation applied will be immediately available for other uses.

3. Surveys have not been started. Projects that are initiated after the Record of Decision for this SEIS will comply with the Special Status Species Policies.

Alternative 3 continues implementation of all other elements of the Northwest Forest Plan, continues the underlying land and resource management plans for the individual administrative units, and continues relevant agency programs and policies. None of the species affected by this alternative are currently listed as threatened, endangered, or proposed for listing under the Endangered Species Act.

## Program/Policy Objectives

Program objectives for the Survey and Manage mitigation measure are the same as those described under Alternative 1. Policy objectives for the Agencies' Special Status Species Programs are the same as those described under Alternative 2.

## Number of Species and Taxa

Alternative 3 removes standards and guidelines for the "uncommon" categories in Survey and Manage. The 272 species currently assigned to Category A, B, or E as shown on Table 2-10 would continue to be included in the Survey and Manage mitigation measure. Taxa would include: vertebrates, bryophytes, mollusks, vascular plants, fungi, and lichens. Twenty-four species currently assigned to Category C, D, or F, and the 4 arthropod functional groups would not be included in the Survey and Manage mitigation measure. For the four additional species that are listed in both the "rare" and "uncommon" categories, the species would be removed from Survey and Manage in the "uncommon" portion of the species' range, and would be retained in Survey and Manage in the "rare" portion of the range.

Fourteen of the 28 species currently in Category C, D, or F are eligible for and assumed to be added to one or more of the Agencies' Special Status Species Programs (see Table 2-8). Taxa would include: vertebrates, mollusks, vascular plants, fungi, and lichens.

## Standards for Inclusion

Survey and Manage has three basic criteria (see box included with Alternative 1 description) that must be met for a species to be included in the Survey and Manage Standards and Guidelines. Species no longer meeting these criteria will be removed; species meeting the criteria can be added. (Note: Since uncommon species are not included in Survey and Manage under Alternative 3, the criteria addressing concern for persistence reflects a higher threshold of concern than under Alternative 1.)

Concern for persistence is one of the basic criteria for applying the Survey and Manage mitigation measure to a species. A concern for persistence exists when the reserve system and other standards and guidelines of the Northwest Forest Plan do not appear to provide a reasonable assurance of species persistence. Little or no concern for persistence exists when the reserve system and other standards and guidelines of the Northwest Forest Plan (not Survey and Manage) provide a reasonable assurance of persistence. When this assurance of species persistence exists, the species may be removed from the Survey and Manage mitigation measure.

**Table 2-8. Number of Uncommon Survey and Manage Species Eligible to be Included in the Agencies' Special Status Species Programs.**

| Taxon* | BLM OR/WA[1,5] | | BLM CA | | FS Region-6 | | FS Region-5 | | ANY[2] | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2002[3] | Add[4] | 2002[3] | Add[4] | 2002[3] | Add[4] | 2002[3] | Add[4] | 2002[3] | Add[4] | Total |
| Fungi (16) | 0 | 1 | 0 | 1 | 0 | 3 | 0 | 0 | 0 | 4 | 4 |
| Lichens (4) | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 4 | 4 |
| Bryophytes (0) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Vertebrates (2) | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 2 |
| Mollusks (2) | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 2 | 2 |
| Vasc Plants (4) | 1 | 0 | 0 | 2 | 1 | 0 | 2 | 0 | 2 | 0 | 2 |
| Totals | 2 | 2 | 0 | 4 | 2 | 9 | 2 | 0 | 3 | 11 | 14 |

*The total number of uncommon species currently included in the Survey and Manage Standards and Guidelines is included in parens next to the taxon.
[1] Includes both Bureau Sensitive and Bureau Assessment species. Bureau Tracking species are not included.
[2] The ANY column is the total number of species in one or more Agencies' Sensitive or Assessment (BLM OR/WA) categories. This is not the total of the other four columns.
[3] The number of uncommon Survey and Manage species that were already included in the Agencies' Special Status Species Programs as of December 2003.
[4] The number of uncommon Survey and Manage species that would probably be added to the Agencies' Special Status Species Programs under Alternative 3, but were not already included in those programs as of December 2003.
[5] Table does not include additional uncommon Survey and Manage species that would become Bureau Tracking (including two Survey and Manage species that were already listed as Bureau Tracking) in BLM OR/WA Special Status Species Program as of December 2003).

Criteria Indicating a **Concern for Persistence**. A combination of one or more of criteria 1 through 9 and criteria 10 or 11, considered in the context of the reserve system and other standards and guidelines of the Northwest Forest Plan, may indicate a concern for species persistence. These criteria must be considered separate from the Survey and Manage mitigation measure and must apply within the Northwest Forest Plan area.

1. Low number of likely extant known sites/records or low number of estimated sites predicted from statistical analysis of random-grid surveys or comparable statistical surveys.
2. Low numbers of individuals throughout the species range.
3. Low number of individuals at most sites or in most populations.
4. Reproductive characteristics that limit population growth rates.
5. Found or suspected in only one physiographic province or a similar small area.
6. Limited habitat or narrow ecological amplitude within known or suspected range.
7. Not well distributed within range or habitat or distribution is unpredictable in a significant part of its range.
8. Declining habitat or populations in a significant part of its range.
9. Habitat fragmentation significant enough to cause genetic isolation.
10. Low proportion of sites and habitat in reserve land allocations or limited number of sites within reserves, but the proportion or amount of potential habitat within reserves is high and there is a low probability that the habitat is occupied.
11. Matrix Standards and Guidelines or other elements of the Northwest Forest Plan do not provide for a reasonable assurance of species persistence.

Criteria Indicating Little or **No Concern for Persistence**. Any one of criteria 1 through 9 or either 10 or 11 indicates that a concern for persistence may not exist. These criteria must apply within the Northwest Forest Plan area.

1. Moderate-to-high number of likely extant sites/records or moderate-to-high number of estimated sites predicted from statistical analysis of random-grid surveys or comparable statistical surveys.
2. Moderate-to-high numbers of individuals throughout the species range.
3. Moderate-to-high number of individuals at most sites or in most populations.
4. Population growth rates are not limited by reproductive characteristics.
5. Found or suspected in more than one physiographic province or similar small area.
6. Habitat is not limited or moderate-to-broad ecological amplitude within known or suspected range.
7. Well distributed in a significant part of its range.
8. Stable or increasing habitat or populations in a significant part of its range.
9. Habitat continuity allows reasonable flow of genetic material.
10. Moderate-to-high proportion of sites and habitat in reserve land allocations, or limited number of sites within reserves, but the proportion or amount of potential habitat within reserves is high and there is a moderate-to-high probability that the habitat is occupied.
11. Matrix Standards and Guidelines or other elements of the Northwest Forest Plan provide a reasonable assurance of species persistence.

Concern for persistence is based on existing knowledge and may change over time. While concern will remain for some species that are truly rare, the concern for many species will be alleviated as more information is accumulated through pre-disturbance and strategic surveys, and considered with the criteria indicated above. A species for which there is no longer a concern for persistence will be removed from the Survey and Manage mitigation measure as described in the adaptive management section.

The criteria for adding species to the Special Status Species Programs are described under Alternative 2.

## Species Categories

Species included in Survey and Manage would be assigned to one of three management categories (A, B, or E) as shown in Table 2-9. Categories are based on: (1) ability to reasonably and consistently locate occupied sites during surveys prior to habitat-

**Table 2-9. Alternative 3 Survey and Manage Categories and Management Requirements.**

| Pre-Disturbance Surveys Practical | Pre-Disturbance Surveys Not Practical | Status Undetermined |
|---|---|---|
| **Category A** – 56 species<br>• Manage All Known Sites<br>• Pre-Disturbance Surveys in LS/OG<br>• Strategic Surveys | **Category B** – 184 species<br>• Manage All Known Sites<br>• N/A<br>• Strategic Surveys | **Category E** – 33 species<br>• Manage All Known Sites<br>• N/A<br>• Strategic Surveys |

Species do not total 272 because for 1 species, different areas of its geographic range are assigned to different categories.
LS/OG = Late-successional and/or old-growth forest stands

disturbing activities, and (2) the level of information known about the species or group of species. The species included in Survey and Manage, and the category to which each species, or portion of the range of each species, is assigned, are shown on Table 2-10.

**Ability to Reasonably and Consistently Conduct Pre-Disturbance Surveys**

Pre-disturbance surveys are completed for projects that may disturb species habitats. They are conducted prior to signing NEPA documents with the goal of reducing the inadvertent loss of sites by searching specified habitats.

Pre-disturbance surveys are defined as practical, if a reasonable effort is likely to determine the presence of a species on a specific area. Put another way, practicality of surveys generally relates to the ability to confidently answer questions about species presence through surveys, while avoiding unreasonable costs or spending unreasonable amounts of time.

Surveys prior to habitat disturbance are considered practical if all of the following criteria apply:

- The species appears annually or predictably, producing identifying structures that are visible for a predictable and reasonably long time.
- The species is not so minuscule or cryptic as to be barely visible.
- The species can authoritatively be identified by more than a few experts, or the number of available experts is not so limited that it would be impossible to accomplish all surveys or identifications for all proposed habitat-disturbing activities in the Northwest Forest Plan area needing identification within the normal planning period for the activity.
- The species can be readily distinguished in the field and needs no more than simple laboratory or office examination to confirm its identification.
- Surveys do not require unacceptable safety or species risks.
- Surveys can be completed in two field seasons (approximately 7-18 months).
- Credible survey methods for the species are known or can be developed within a reasonable time period (approximately 1 year).

**Level of Knowledge About a Species**

Species are assigned to Category E if there is insufficient knowledge to determine whether they meet the three basic criteria for inclusion in the Survey and Manage mitigation measure.

Species categories for Special Status Species are described under Alternative 2.

## Project Analysis

Project analysis requirements for Survey and Manage species would be the same as described for Alternative 1. Project analysis requirements for Special Status Species would be the same as described for Alternative 2.

Category A requires that pre-disturbance surveys be conducted prior to signing NEPA decisions or decision documents for habitat-disturbing activities in late-successional and/or old-growth forests. They focus on the project unit with the objective of reducing the inadvertent loss of undiscovered sites by searching specified potential habitats prior to making decisions about habitat-disturbing activities. They are done according to the Survey Protocol for each species and can use methods such as transects or plots that focus on priority habitats, habitat features, or involve the entire project area. Generally pre-disturbance surveys are only prescribed for species for which they are practical. "Equivalent-effort" surveys are prescribed as a mitigation measure for three Category B mollusk species whose characteristics, such as small size and identifying characteristics, prevent them from being consistently located during site-specific surveys.

Habitat-Disturbing Activities are disturbances likely to have a substantial negative impact on the species' habitat, its life cycle, microclimate, or life support requirements.

Survey Protocols provide guidelines for pre-disturbance surveys. These are interagency documents describing the survey techniques needed to have a reasonable chance of locating the species when it is present on the site, or needed to make an equivalent-effort of locating the species when it is present on the site.

Line officers should seek specialists' recommendations to help determine the need for a survey based on site-specific information.

Pre-disturbance and equivalent-effort surveys are not required in stands which have not yet become late-successional and/or old-growth forest. The unit proposing the project will be responsible for applying the following definition in making the determination whether a forest stand is late-successional.

> **Late-successional forests** - Forest stands consisting of trees, structural attributes, supporting biological communities, and processes associated with old-growth and/or mature forests (USDA, USDI 1994a). Forest seral stages that include mature and old-growth age classes (USDA, USDI 1994a). These stands exhibit increasing stand diversity, patchy multi-layered canopy, trees of several age classes, larger standing dead trees (snags), large woody debris and species that represent the potential natural community (FEMAT 1993). Age is not a defining characteristic but has been used as a proxy or indicator in the past. Minimum ages vary depending on the site quality, species, rate of stand development, and other factors.

The policy governing pre-disturbance surveys for wildland fires for resource benefits was updated on July 31, 2003 (USDA, USDI 2003g). A wildland fire for resource benefit is a fire that results from natural ignition (i.e. lightning strike) and is (1) permitted to burn because it is resulting in resource benefits; (2) consistent with the land and resource management plan; (3) consistent with the fire management plan; and, (4) burning within prescription. No pre-disturbance surveys are required for wildland fires for resource benefits, regardless of land allocation, if certain conditions are met. See "Exemption to Survey and Manage Pre-disturbance Survey Requirements for Wildland Fire for Resource Benefits" section earlier in this chapter.

Pre-disturbance surveys are not required in the unusual circumstance such that a delay in implementation of the activity (to permit pre-disturbance surveys) would result in greatly increased and unacceptable environmental risk. Such circumstances are subject to review by the line officer at the next level above the official responsible for the proposal to ensure the urgency of the activity justifies the risk to species.

Pre-project clearances for Special Status Species would be the same as described under Alternative 2.

## Site Management

Known sites are historic and current locations of a species reported by a credible source, available to field offices, and that do not require additional species verification or survey by the Agency to locate the species. Known sites include those sites known prior to the signing of the Northwest Forest Plan Record of Decision (USDA, USDI 1994b), as well as sites found since then. Known sites are typically found during pre-disturbance or strategic surveys.

Known site management for Survey and Manage species would be the same as Alternative 1, except it would only apply to Categories A, B, and E. In addition, exceptions to known site management would be approved by the line officer at the next level above the official responsible for the proposal.

For the uncommon species removed under Alternative 3, existing known sites would no longer be managed and would be made available for multiple use.

For the 10 uncommon species that qualify for the Agencies' Special Status Species Programs, site management would be the same as described under Alternative 2.

## Conservation Strategies

Conservation strategies for Special Status Species would be the same as described under Alternative 2.

## Inventories

For species remaining in Survey and Manage, inventory will continue through strategic surveys. Strategic surveys are landscape-scale surveys designed to collect information about a species, including its presence and habitat. Information provided by strategic surveys (as well as research and other information-gathering efforts) helps address fundamental questions about Survey and Manage species, including: (1) is there a concern for persistence? (2) is the species closely associated with late-successional forests? (3) what is the appropriate management for the species? and, (4) do the reserve land allocations and other standards and guidelines of the Northwest Forest Plan provide a reasonable assurance of species persistence? Information from strategic surveys is used in the annual species review process and is incorporated into Management Recommendations and Survey Protocols. Strategic surveys are prescribed for all categories. Once strategic surveys have helped answer these questions, or further surveys are not expected to contribute significant additional information, strategic surveys may be complete even if few or no additional sites are found.

Strategic surveys are different from pre-disturbance surveys because they are focused on gathering information about the species and its habitat needs range-wide, and are not focused on determining presence or absence in specific areas prior to habitat-disturbing activities.

Because Category B species are rare and do not have pre-disturbance surveys, completing strategic surveys is a high priority. For this category, the standards and guidelines require "To reduce the inadvertent loss of undiscovered sites, the Agencies will not sign NEPA decisions or decision documents for habitat-disturbing activities in old-growth forest (a sub-set of late-successional forest - see glossary) in fiscal year 2006 (fiscal year 2011 for fungi) and beyond, unless either:

- "strategic surveys have been completed [as defined in the standards and guidelines] for the province that encompasses the project area, or
- "surveys equivalent to pre-disturbance surveys have been conducted in the old-growth habitat to be disturbed."

Inventories for Special Status Species would be the same as described under Alternative 2.

## Adding/Removing Species

For Survey and Manage species, the process for adding or removing species would be the same as described under Alternative 1. For Special Status Species, the process for adding or removing species would be the same as described under Alternative 2.

## Reports, Monitoring, and Review

Requirements for reports, monitoring, and review for Survey and Manage species would be the same as described under Alternative 1. Reports, monitoring, and review for Special Status Species would be the same as described for Alternative 2.

## Potential Mitigation

Mitigation measures avoid, minimize, rectify, reduce, or compensate for adverse environmental impacts of management actions. Mitigation was not included as part of Alternative 3 to inform the Responsible Officials of the benefits and cost of mitigation. The Responsible Officials will decide whether to implement mitigation in the Record of Decision. NEPA implementing regulations require agencies to "Include appropriate mitigation measures not already included in the proposed action or alternatives" and include a discussion of "Means to mitigate adverse environmental impacts." The regulations also require that in the Record of Decision the Responsible Officials "State whether all practicable means to avoid or minimize environmental harm from the alternative selected have been adopted, and if not, why they were not."

There are two different potential mitigations discussed in this section. The first mitigation measure is for those species with insufficient habitat (including known sites) to support stable populations caused by management actions under Alternative 3. The second mitigation measure is for species with insufficient habitat (including known sites) to support stable populations under all alternatives or those species with insufficient information to determine an outcome.

Species with Insufficient Habitat Caused by Management under Alternative 3

The analysis of environmental consequences for Alternative 3 indicates that removing the Survey and Manage requirements for known site management and/or pre-disturbance surveys would result in habitat (including known sites) insufficient to support stable populations for some species in all or part of their range. In these cases, mitigation to eliminate this adverse environmental effect has been identified. Mitigation was developed by comparing the management actions in Alternative 1 to those in Alternative 3 to isolate what caused the difference in species outcomes. Mitigation consists of

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| **TAXA GROUP** ***Species*** | *Note: Where taxon has more than one name indicated, first name is current accepted name, second one (in parentheses) is name used in NWFP (Table C-3).* | **S&M Cate-gory[2]** | **Special Status Species Programs** | | | |
|---|---|---|---|---|---|---|
| | | | **BLM OR/WA[3]** | **BLM CA** | **FS R-6** | **FS R-5** |
| **FUNGI** | | | | | | |
| *Acanthophysium farlowii (Aleurodiscus farlowii)* | | B | - | - | - | - |
| *Albatrellus avellaneus* | | B | - | - | - | - |
| *Albatrellus caeruleoporus* | | B | - | - | - | - |
| *Albatrellus ellisii* | | B | - | - | - | - |
| *Albatrellus flettii*, In Washington and California | | B | - | - | - | - |
| *Alpova alexsmithii* | | B | - | - | - | - |
| *Alpova olivaceotinctus* | | B | - | - | - | - |
| *Arcangeliella camphorata* (*Arcangeliella* sp. nov. #Trappe 12382; *Arcangeliella* sp. nov. #Trappe 12359) | | B | - | - | - | - |
| *Arcangeliella crassa* | | B | - | - | - | - |
| *Arcangeliella lactarioides* | | B | - | - | - | - |
| *Asterophora lycoperdoides* | | B | - | - | - | - |
| *Asterophora parasitica* | | B | - | - | - | - |
| *Baeospora myriadophylla* | | B | - | - | - | - |
| *Balsamia nigrens (Balsamia nigra)* | | B | - | - | - | - |
| *Boletus haematinus* | | B | - | - | - | - |
| *Boletus pulcherrimus* | | B | - | - | - | - |
| *Bondarzewia mesenterica (Bondarzewia montana),* In Washington and California | | B | - | - | - | - |
| *Bridgeoporus nobilissimus (Oxyporus nobilissimus)* | | A | - | - | - | - |
| *Catathelasma ventricosa* | | B | - | - | - | - |
| *Chamonixia caespitosa* (*Chamonixia pacifica* sp. nov. #Trappe #12768) | | B | - | - | - | - |
| *Choiromyces alveolatus* | | B | - | - | - | - |
| *Choiromyces venosus* | | B | - | - | - | - |
| *Chroogomphus loculatus* | | B | - | - | - | - |
| *Chrysomphalina grossula* | | B | - | - | - | - |
| *Clavariadelphus ligula* | | B | - | - | - | - |
| *Clavariadelphus occidentalis* (*Clavariadelphus pistillaris*) | | B | - | - | - | - |
| *Clavariadelphus sachalinensis* | | B | - | - | - | - |
| *Clavariadelphus subfastigiatus* | | B | - | - | - | - |
| *Clavulina castanopes* v. *lignicola* (*Clavulina ornatipes*) | | B | - | - | - | - |
| *Clitocybe senilis* | | B | - | - | - | - |
| *Clitocybe subditopoda* | | B | - | - | - | - |
| *Collybia racemosa* | | B | - | - | - | - |
| *Cordyceps ophioglossoides* | | B | - | - | - | - |
| *Cortinarius barlowensis* (syn. *Cortinarius azureus*) | | B | - | - | - | - |
| *Cortinarius boulderensis* | | B | - | - | - | - |
| *Cortinarius cyanites* | | B | - | - | - | - |
| *Cortinarius depauperatus* (*Cortinarius spilomeus*) | | B | - | - | - | - |
| *Cortinarius magnivelatus* | | B | - | - | - | - |
| *Cortinarius olympianus* | | B | - | - | - | - |
| *Cortinarius speciosissimus (Cortinarius rainierensis)* | | B | - | - | - | - |
| *Cortinarius tabularis* | | B | - | - | - | - |
| *Cortinarius umidicola (Cortinarius canabarba)* | | B | - | - | - | - |
| *Cortinarius valgus* | | B | - | - | - | - |

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| **TAXA GROUP** ***Species*** | *Note: Where taxon has more than one name indicated, first name is current accepted name, second one (in parentheses) is name used in NWFP (Table C-3).* | **S&M Cate-gory[2]** | **Special Status Species Programs** | | | |
|---|---|---|---|---|---|---|
| | | | **BLM OR/WA[3]** | **BLM CA** | **FS R-6** | **FS R-5** |
| **FUNGI** | | | | | | |
| *Cortinarius variipes* | | B | - | - | - | - |
| *Cortinarius verrucisporus* | | B | - | - | - | - |
| *Cortinarius wiebeae* | | B | - | - | - | - |
| *Cudonia monticola* | | B | - | - | - | - |
| *Cyphellostereum laeve* | | B | - | - | - | - |
| *Dermocybe humboldtensis* | | B | - | - | - | - |
| *Destuntzia fusca* | | B | - | - | - | - |
| *Destuntzia rubra* | | B | - | - | - | - |
| *Dichostereum boreale (Dichostereum granulosum)* | | B | - | - | - | - |
| *Elaphomyces anthracinus* | | B | - | - | - | - |
| *Elaphomyces subviscidus* | | B | - | - | - | - |
| *Endogone acrogena* | | B | - | - | - | - |
| *Endogone oregonensis* | | B | - | - | - | - |
| *Entoloma nitidum (Rhodocybe nitida)* | | B | - | - | - | - |
| *Fayodia bisphaerigera (Fayodia gracilipes)* | | B | - | - | - | - |
| *Fevansia aurantiaca (Alpova* sp. nov. #Trappe 1966) (*Alpova aurantiaca*) | | B | - | - | - | - |
| *Galerina cerina* | | B | - | - | - | - |
| *Galerina heterocystis* | | E | - | - | - | - |
| *Galerina sphagnicola* | | E | - | - | - | - |
| *Gastroboletus imbellus* | | B | - | - | - | - |
| *Gastroboletus ruber* | | B | - | - | - | - |
| *Gastroboletus vividus* (*Gastroboletus* sp. nov. #Trappe 2897; *Gastroboletus* sp. nov. #Trappe 7515) | | B | - | - | - | - |
| *Gastrosuillus amaranthii* (*Gastrosuillus* sp. nov. #Trappe 9608) | | E | - | - | - | - |
| *Gastrosuillus umbrinus* (*Gastroboletus* sp. nov. #Trappe 7516) | | B | - | - | - | - |
| *Gautieria magnicellaris* | | B | - | - | - | - |
| *Gautieria otthii* | | B | - | - | - | - |
| *Gelatinodiscus flavidus* | | B | - | - | - | - |
| *Glomus radiatum* | | B | - | - | - | - |
| *Gomphus bonarii* | | B | - | - | - | |
| *Gomphus kauffmanii* | | E | - | - | - | - |
| *Gymnomyces abietis* (*Gymnomyces* sp. nov. #Trappe 1690, 1706, 1710; *Gymnomyces* sp. nov. #Trappe 4703, 5576; *Gymnomyces* sp. nov. #Trappe 5052; *Gymnomyces* sp. nov. #Trappe 7545; *Martellia* sp. nov. #Trappe 1700; *Martellia* sp. nov. #Trappe 311; *Martellia* sp. nov. #Trappe 5903) | | B | - | - | - | - |
| *Gymnomyces nondistincta* (*Martellia* sp. nov. #Trappe 649) | | B | - | - | - | - |
| *Gymnopilus punctifolius*, In California | | B | - | - | - | - |
| *Gyromitra californica* | | B | - | - | - | - |
| *Hebeloma olympianum (Hebeloma olympiana)* | | B | - | - | - | - |
| *Helvella crassitunicata* | | B | - | - | - | - |
| *Helvella elastica* | | B | - | - | - | - |
| *Hydnotrya inordinata* (*Hydnotrya* sp. nov. #Trappe 787, 792) | | B | - | - | - | - |
| *Hydnotrya subnix (Hydnotrya subnix* sp. nov. #Trappe 1861) | | B | - | - | - | - |

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|---|---|---|---|---|---|---|
| | | | **BLM OR/WA[3]** | **BLM CA** | **FS R-6** | **FS R-5** |
| **FUNGI** | | | | | | |
| *Hydropus marginellus (Mycena marginella)* | | B | - | - | - | - |
| *Hygrophorus caeruleus* | | B | - | - | - | - |
| *Hygrophorus karstenii* | | B | - | - | - | - |
| *Hygrophorus vernalis* | | B | - | - | - | - |
| *Hypomyces luteovirens* | | B | - | - | - | - |
| *Leucogaster citrinus* | | B | - | - | - | - |
| *Leucogaster microsporus* | | B | - | - | - | - |
| *Macowanites chlorinosmus* | | B | - | - | - | - |
| *Macowanites lymanensis* | | B | - | - | - | - |
| *Macowanites mollis* | | B | - | - | - | - |
| *Marasmius applanatipes* | | B | - | - | - | - |
| *Martellia fragrans* | | B | - | - | - | - |
| *Martellia idahoensis* | | B | - | - | - | - |
| *Mycena hudsoniana* | | B | - | - | - | - |
| *Mycena quinaultensis* | | B | - | - | - | - |
| *Mycena tenax* | | B | - | - | - | - |
| *Mythicomyces corneipes* | | B | - | - | - | - |
| *Neolentinus adhaerens* | | B | - | - | - | - |
| *Neolentinus kauffmanii* | | B | - | - | - | - |
| *Nivatogastrium nubigenum*, In entire range except OR Eastern Cascades and CA Cascades Physiographic Provinces | | B | - | - | - | - |
| *Octavianina cyanescens* (*Octavianina* sp. nov. #Trappe 7502) | | B | - | - | - | - |
| *Octavianina macrospora* | | B | | - | - | - |
| *Octavianina papyracea* | | B | - | - | - | - |
| *Otidea smithii* | | B | - | - | - | - |
| *Phaeocollybia attenuata* | | - | - | - | SS | - |
| *Phaeocollybia californica* | | B | - | - | - | - |
| *Phaeocollybia dissiliens* | | B | - | - | - | - |
| *Phaeocollybia fallax* | | - | - | - | SS-W | - |
| *Phaeocollybia gregaria* | | B | - | - | - | - |
| *Phaeocollybia olivacea* | | - | SS-O | - | SS-O | - |
| *Phaeocollybia olivacea*, In Washington and California | | E | - | - | - | - |
| *Phaeocollybia oregonensis* (syn. *Phaeocollybia carmanahensis*) | | B | - | - | - | - |
| *Phaeocollybia piceae* | | B | - | - | - | - |
| *Phaeocollybia pseudofestiva* | | B | - | - | - | - |
| *Phaeocollybia scatesiae* | | B | - | - | - | - |
| *Phaeocollybia sipei* | | B | - | - | - | - |
| *Phaeocollybia spadicea* | | B | - | - | - | - |
| *Phellodon atratus (Phellodon atratum)* | | B | - | - | - | - |
| *Pholiota albivelata* | | B | - | - | - | - |
| *Podostroma alutaceum* | | B | - | - | - | - |
| *Polyozellus multiplex* | | B | - | - | - | - |
| *Pseudaleuria quinaultiana* | | B | - | - | - | - |

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|---|---|---|---|---|---|---|
| | | | **BLM OR/WA[3]** | **BLM CA** | **FS R-6** | **FS R-5** |
| **FUNGI** | | | | | | |
| *Ramaria abietina* | | B | - | - | - | - |
| *Ramaria amyloidea* | | B | - | - | - | - |
| *Ramaria araiospora* | | B | - | - | - | - |
| *Ramaria aurantiisiccescens* | | B | - | - | - | - |
| *Ramaria botryis* var. *aurantiiramosa* | | B | - | - | - | - |
| *Ramaria celerivirescens* | | B | - | - | - | - |
| *Ramaria claviramulata* | | B | - | - | - | - |
| *Ramaria concolor f. marrii* | | B | - | - | - | - |
| *Ramaria concolor f. tsugina* | | B | - | - | - | - |
| *Ramaria conjunctipes* var. *sparsiramosa (Ramaria fasciculata* var. *sparsiramosa)* | | B | - | - | - | - |
| *Ramaria coulterae* | | B | - | - | - | - |
| *Ramaria cyaneigranosa* | | B | - | - | - | - |
| *Ramaria gelatiniaurantia* | | B | - | - | - | - |
| *Ramaria gracilis* | | B | - | - | - | - |
| *Ramaria hilaris* var. *olympiana* | | B | - | - | - | - |
| *Ramaria largentii* | | B | - | - | - | - |
| *Ramaria lorithamnus* | | B | - | - | - | - |
| *Ramaria maculatipes* | | B | - | - | - | - |
| *Ramaria rainierensis* | | B | - | - | - | - |
| *Ramaria rubella* var. *blanda* | | B | - | - | - | - |
| *Ramaria rubribrunnescens* | | B | - | - | - | - |
| *Ramaria rubrievanescens* | | B | - | - | - | - |
| *Ramaria rubripermanens,* In Washington and California | | B | - | - | - | - |
| *Ramaria spinulosa* var. *diminutiva* (*Ramaria spinulosa*) | | B | - | - | - | - |
| *Ramaria stuntzii* | | B | - | - | - | - |
| *Ramaria suecica* | | B | - | - | - | - |
| *Ramaria thiersii* | | B | - | - | - | - |
| *Ramaria verlotensis* | | B | - | - | - | - |
| *Rhizopogon abietis* | | B | - | - | - | - |
| *Rhizopogon atroviolaceus* | | B | - | - | - | - |
| *Rhizopogon brunneiniger* | | B | - | - | - | - |
| *Rhizopogon chamaleontinus* (*Rhizopogon* sp. nov. #Trappe 9432) | | B | - | - | - | - |
| *Rhizopogon ellipsosporus* (*Alpova* sp. nov. # Trappe 9730) | | B | - | - | - | - |
| *Rhizopogon evadens* var. *subalpinus* | | B | - | - | - | - |
| *Rhizopogon exiguus* | | B | - | - | - | - |
| *Rhizopogon flavofibrillosus* | | B | - | - | - | - |
| *Rhizopogon inquinatus* | | B | - | - | - | - |
| *Rhodocybe speciosa* | | B | - | - | - | - |
| *Sowerbyella rhenana (Aleuria rhenana)* | | B | - | - | - | - |
| *Sparassis crispa* | | - | - | SS | - | - |
| *Spathularia flavida* | | B | - | - | - | - |
| *Stagnicola perplexa* | | B | - | - | - | - |

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|---|---|---|---|---|---|---|
| | | | **BLM OR/WA[3]** | **BLM CA** | **FS R-6** | **FS R-5** |
| **FUNGI** | | | | | | |
| *Thaxterogaster pavelekii* (*Thaxterogaster* sp. nov. #Trappe 4867, 6242, 7427, 7962, 8520) | | B | - | - | - | - |
| *Tricholoma venenatum* | | B | - | - | - | - |
| *Tricholomopsis fulvescens* | | B | - | - | - | - |
| *Tuber asa* (*Tuber* sp. nov. #Trappe 2302) | | B | - | - | - | - |
| *Tuber pacificum* (*Tuber* sp. nov. #Trappe 12493) | | B | - | - | - | - |
| **LICHENS** | | | | | | |
| *Bryoria pseudocapillaris* | | A | - | - | - | - |
| *Bryoria spiralifera* | | A | - | - | - | - |
| *Bryoria subcana* | | B | - | - | - | - |
| *Buellia oidalea* | | E | - | - | - | - |
| *Calicium abietinum* | | B | - | - | - | - |
| *Calicium adspersum* | | E | - | - | - | - |
| *Cetrelia cetrarioides* | | E | - | - | - | - |
| *Chaenotheca chrysocephala* | | B | - | - | - | - |
| *Chaenotheca ferruginea* | | B | - | - | - | - |
| *Chaenotheca subroscida* | | E | - | - | - | - |
| *Chaenothecopsis pusilla* | | E | - | - | - | - |
| *Collema nigrescens* | | - | - | - | SS-W | - |
| *Dendriscocaulon intricatulum,* In California | | E | - | - | - | - |
| *Dendriscocaulon intricatulum,* In Washington and Oregon except Coos, Curry, Douglas, Josephine, and Jackson Counties | | A | - | - | - | - |
| *Dermatocarpon luridum* | | E | - | - | - | - |
| *Fuscopannaria saubinetii* (syn. *Pannaria saubinetii*) | | E | - | - | - | - |
| *Heterodermia sitchensis* | | E | - | - | - | - |
| *Hypogymnia duplicata* | | - | - | - | SS-O | - |
| *Hypogymnia vittata* (misspelled in FEMAT as *Hygomnia vittiata*) | | E | - | - | - | - |
| *Hypotrachyna revoluta* | | E | - | - | - | - |
| *Leptogium burnetiae* var. *hirsutum* | | E | - | - | - | - |
| *Leptogium cyanescens* | | A | - | - | - | - |
| *Leptogium rivale* | | E | - | - | - | - |
| *Leptogium teretiusculum* | | E | - | - | - | - |
| *Lobaria linita,* Entire range except WA Western Cascades Physiographic Province north of Snoqualmie Pass and Olympic Peninsula | | A | - | - | - | - |
| *Lobaria oregana,* In California | | A | - | - | - | - |
| *Microcalicium arenarium* | | B | - | - | - | - |
| *Nephroma bellum*, In Oregon: Klamath, Willamette Valley, Eastern Cascades; WA; Western Cascades (outside GPNF), Eastern Cascades, Olympic Peninsula Physiographic Provinces | | E | - | - | - | - |
| *Nephroma isidiosum* | | E | - | - | - | - |
| *Nephroma occultum* | | - | - | - | SS | - |
| *Niebla cephalota* | | A | - | - | - | - |
| *Pannaria rubiginosa* | | E | - | - | - | - |
| *Peltigera pacifica* | | E | - | - | | - |

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|---|---|---|---|---|---|---|
| | | | **BLM OR/WA[3]** | **BLM CA** | **FS R-6** | **FS R-5** |
| **LICHENS** | | | | | | |
| *Platismatia lacunosa*, Except in Oregon Coast Range Physiographic Province[3] | | E | - | - | - | - |
| *Pseudocyphellaria perpetua* (misapplied name – *P. mougeotiana* in FEMAT and NWFP. Also called *Pseudocyphellaria* sp. 1 in Management Recommendations (Lesher et al. 2000)) | | A | - | - | - | - |
| *Pseudocyphellaria rainierensis* | | A | - | - | - | - |
| *Stenocybe clavata* | | E | - | - | - | - |
| *Teloschistes flavicans* | | A | - | - | - | - |
| *Tholurna dissimilis*, south of Columbia River | | B | - | - | - | - |
| *Usnea hesperina* | | E | - | - | - | - |
| *Usnea longissima*, In California and in Curry, Josephine, and Jackson Counties, Oregon | | A | - | - | - | - |
| *Usnea longissima*, In Oregon, except in Curry, Josephine, and Jackson Counties and in Washington | | - | - | - | SS | - |
| **BRYOPHYTES** | | | | | | |
| *Brotherella roellii* | | E | - | - | - | - |
| *Buxbaumia viridis*, In California | | E | - | - | - | - |
| *Diplophyllum plicatum* | | B | - | - | - | - |
| *Herbertus aduncus* | | E | - | - | - | - |
| *Iwatsukiella leucotricha* | | B | - | - | - | - |
| *Kurzia makinoana* | | B | - | - | - | - |
| *Marsupella emarginata* var. *aquatica* | | B | - | - | - | - |
| *Orthodontium gracile* | | B | - | - | - | - |
| *Ptilidium californicum*, In California | | A | - | - | - | - |
| *Racomitrium aquaticum* | | E | - | - | - | - |
| *Rhizomnium nudum*, Outside Washington | | B | - | - | - | - |
| *Schistostega pennata* | | A | - | - | - | - |
| *Tetraphis geniculata* | | A | - | - | - | - |
| *Tritomaria exsectiformis* | | B | - | - | - | - |
| *Tritomaria quinquedentata* | | B | - | - | - | - |
| **VERTEBRATES** | | | | | | |
| Larch Mountain salamander *Plethodon larselli* | | A | - | - | - | - |
| Shasta salamander *Hydromantes shastae* | | A | - | - | - | - |
| Siskiyou Mountains salamander *Plethodon stormi*, North Range | | - | SS | - | SS-O | - |
| Siskiyou Mountains salamander *Plethodon stormi*, South Range | | A | - | - | - | - |
| Van Dyke's salamander *Plethodon vandykei*, Cascade population only | | A | - | - | - | - |
| Great Gray Owl *Strix nebulosa* | | A | - | - | - | - |
| Oregon Red Tree Vole *Arborimus longicaudus*, In xeric and northern mesic portion of its range | | - | SS[4] | - | SS[4] | - |
| **MOLLUSKS** | | | | | | |
| *Cryptomastix devia* | | A | - | - | - | - |
| *Cryptomastix hendersoni* | | A | - | - | - | - |
| *Deroceras hesperium* | | B[5] | - | - | - | - |
| *Fluminicola* n. sp. 3 | | A | - | - | - | - |

**Table 2-10.** Survey and Manage Categories and Assumed Special Status Species Program Assignments by Agency and Region[1] for Alternative 3.

| **TAXA GROUP** *Species* | *Note: Where taxon has more than one name indicated, first name is current accepted name, second one (in parentheses) is name used in NWFP (Table C-3).* | **S&M Cate-gory[2]** | **Special Status Species Programs** | | | |
|---|---|---|---|---|---|---|
| | | | **BLM OR/WA[3]** | **BLM CA** | **FS R-6** | **FS R-5** |
| **MOLLUSKS** | | | | | | |
| *Fluminicola* n. sp. 11 | | A | - | - | - | - |
| *Fluminicola* n. sp. 14 | | A | - | - | - | - |
| *Fluminicola* n. sp. 15 | | A | - | - | - | - |
| *Fluminicola* n. sp. 16 | | A | - | - | - | - |
| *Fluminicola* n. sp. 17 | | A | - | - | - | - |
| *Fluminicola* n. sp. 18 | | A | - | - | - | - |
| *Fluminicola* n. sp. 19 | | A | - | - | - | - |
| *Fluminicola* n. sp. 20 | | A | - | - | - | - |
| *Fluminicola seminalis* | | A | - | - | - | - |
| *Helminthoglypta talmadgei* | | - | - | SS | - | - |
| *Hemphillia burringtoni* | | E | - | - | - | - |
| *Hemphillia glandulosa*, In WA Western Cascades Physiographic Province | | E | - | - | - | - |
| *Hemphillia malonei* | | - | SS | - | SS-W | - |
| *Hemphillia pantherina* | | B[5] | - | - | - | - |
| *Juga (O)* n. sp. 2 | | A | - | - | - | - |
| *Juga (O)* n. sp. 3 | | A | - | - | - | - |
| *Lyogyrus* n. sp. 1 | | A | - | - | - | - |
| *Lyogyrus* n. sp. 2 | | A | - | - | - | - |
| *Lyogyrus* n. sp. 3 | | A | - | - | - | - |
| *Monadenia chaceana* | | B[5] | - | - | - | - |
| *Monadenia fidelis minor* | | A | - | - | - | - |
| *Monadenia troglodytes troglodytes* | | A | - | - | - | - |
| *Monadenia troglodytes wintu* | | A | - | - | - | - |
| *Oreohelix* n. sp. | | A | - | - | - | - |
| *Pristiloma arcticum crateris* | | A | - | - | - | - |
| *Prophysaon coeruleum*, In California and Washington | | A | - | - | - | - |
| *Trilobopsis roperi* | | A | - | - | - | - |
| *Trilobopsis tehamana* | | A | - | - | - | - |
| *Vertigo* n. sp. | | A | - | - | - | - |
| *Vespericola pressleyi* | | A | - | - | - | - |
| *Vespericola shasta* | | A | - | - | - | - |
| *Vorticifex* n. sp. 1 | | E | - | - | - | - |
| **VASCULAR PLANTS** | | | | | | |
| *Bensoniella oregana*, In California only | | A | - | - | - | - |
| *Botrychium minganense*, In Oregon and California | | A | - | - | - | - |
| *Botrychium montanum* | | A | - | - | - | - |
| *Coptis asplenifolia* | | A | - | - | - | - |
| *Coptis trifolia* | | A | - | - | - | - |
| *Corydalis aquae-gelidae* | | A | - | - | - | - |
| *Cypripedium fasciculatum* | | - | As | SS | SS | SS |
| *Cypripedium montanum* | | - | - | SS | - | SS |
| *Eucephalus vialis (Aster vialis)* | | A | - | - | - | - |

**Table 2-10.** Survey and Manage Categories and Assumed Special Status Species Program Assignments by Agency and Region[1] for Alternative 3.

| **TAXA GROUP** *Species* | *Note: Where taxon has more than one name indicated, first name is current accepted name, second one (in parentheses) is name used in NWFP (Table C-3).* | **S&M Cate-gory[2]** | **Special Status Species Programs** | | | |
|---|---|---|---|---|---|---|
| | | | **BLM OR/WA[3]** | **BLM CA** | **FS R-6** | **FS R-5** |
| **VASCULAR PLANTS** | | | | | | |
| *Galium kamtschaticum*, Olympic Peninsula, WA Eastern Cascades, OR and WA Western Cascades Physiographic Provinces, south of Snoqualmie Pass | | A | - | - | - | - |

[1] For purposes of comparing alternatives, assumed Special Status Species placements for "rare" species are not shown because the species would meet both Survey and Manage and Special Status Species criteria and would be managed under the Survey and Manage Program.
[2]There are three Survey and Manage Categories based on ability to reasonably and consistently locate occupied sites during surveys prior to habitat-disturbing activities, and the level of information known about the species or group of species. These categories are described in detail in Table 2-9 and Appendix 4.
[3]BLM OR/WA list is inclusive of any Oregon Natural Heritage Program List 1 or List 2 species. For effects analysis and disclosure, Bureau Tracking species are not included because site management or pre-project clearances are not required.
[4]Species recommended for inclusion as Special Status species in the northwestern Oregon coast area only (north of Highway 20, west of the Willamette Valley).
[5]Equivalent-effort pre-disturbance surveys are required for these three mollusk species.

As=Bureau Assessment
SS=Bureau Sensitive or Forest Service Sensitive
SS-O=FS Sensitive in Oregon
SS-W=FS Sensitive in Washington
Hyphens (-) indicate not included, may result from species not occurring in the state.

conducting pre-project clearances and/or managing known sites that are necessary to prevent the species from moving closer to listing under the Endangered Species Act.

Pre-project clearances are activities conducted to learn whether a species is present or potentially present in a geographic area. Pre-project clearances may include, but are not limited to,

- clearance surveys;
- field clearances;
- field reconnaissance;
- inventories;
- habitat examinations;
- habitat evaluation;
- evaluation of species-habitat associations and presence of suitable or potential habitat;
- review of existing survey records, inventories, and spatial data;
- utilization of professional research, literature, and other technology transfer sources; or
- use of expertise, both internal and external, that is based on documented, substantiated professional rationale.

Pre-project clearances are completed prior to habitat-disturbing activities to determine the presence of a species or its habitat and the effect of management actions on the species.

Managing a known site is an activity that maintains a species at an occupied site to prevent contributing to a need to list that species as threatened or endangered under the Endangered Species Act. Site management would be designed to maintain the habitat elements needed to provide for persistence of the species at the site. Management may range from maintaining one or more habitat components such as down logs or canopy cover, up to complete exclusion from disturbance for many acres, and may permit loss of some individuals, area, or elements not affecting continued site occupancy. Authority to disturb sites lies with the agency official who is responsible for authorizing the proposed habitat-disturbing activity.

If the Responsible Officials adopt mitigation in the Record of Decision for this SEIS, the analysis indicates that site management and/or pre-project clearances would effectively eliminate the adverse effects caused by management actions under Alternative 3 (refer to Chapter 3&4). If adopted, mitigation will remain in effect until the species is added to the Agencies' Special Status Species Programs, where appropriate, or a conservation agreement or conservation strategy has been approved for the species. A conservation strategy is an interagency technical document based on the available scientific information for a species or group of species that discuss the biological and ecological factors of the species and determines if management actions are necessary for a species or group of species to persist over time. If actions are necessary, the strategy describes the actions land management agencies must take to maintain a species or group of species and usually include a monitoring plan. Conservation strategies can also be known as management strategies.

Table 2-11 below, displays the species that would have insufficient habitat (including known sites) to support stable populations in all or part of their range if Alternative 3 were selected. Table 2-11 also displays the identified mitigation that would eliminate these adverse effects.

**Species with Insufficient Habitat Under all Alternatives or with Insufficient Information to Determine an Outcome**

When the analyses shows that there is "insufficient information to determine an outcome" or "there is insufficient habitat (including known sites) to support stable populations not caused by federal action" for a species, this outcome is the same for all alternatives. Although the Survey and Manage Standards and Guidelines generally add protection and reduce risks to species by completing pre-disturbance surveys and managing known sites, it does not change the outcome of insufficient habitat or resolve the inadequate information needed to determine the outcome for a species. Many of these are species with few known sites or populations. Some of these species did not meet the criteria for inclusion in one or more of the Agencies' Special Status Species Programs and the lack of managing known sites or completing pre-disturbance surveys would increase the risk to these species. In these cases, mitigation to eliminate the difference between the alternatives has been identified. Mitigation consists of conducting pre-project clearances and/or managing known sites for species that currently have these requirements under the Survey and Manage Standards and Guidelines. The requirements for conducting pre-project clearances and managing known sites are the same as those described in the previous mitigation. It is unknown to what degree mitigation lessens the risk to the species; however, it will not change the outcome of insufficient information or resolve the inadequate information needed to determine the outcome for a species.

There is insufficient information to determine an outcome for the four arthropod functional groups. Since pre-disturbance surveys and known site management are not required under Alternative 1, pre-project clearances and known site management are not offered as mitigation under Alternative 3. No mitigation was identified for the four arthropod functional groups because the effects of Alternative 3 are similar to the effects of Alternatives 1 and 2.

If the Responsible Officials adopt mitigation in the Record of Decision for this SEIS, the analysis indicates that site management and/or pre-project clearances would effectively reduce the risk to the same level for all alternatives (refer to Chapter 3&4). If adopted, mitigation will remain in effect until the species is added to the Agencies' Special Status Species Programs, where appropriate, or a conservation agreement or conservation strategy has been approved for the species.

**Table 2-11. Mitigation Identified to Eliminate Adverse Effects of Alternative 3.**

| SPECIES | FS WA | | FS OR | | BLM OR | | FS CA | | BLM CA | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Manage Sites | Pre-Project Clearance | Manage Sites | Pre-Project Clearance | Manage Sites | Pre-Project Clearance | Manage Sites | Pre-Project Clearance | Manage Sites | Pre-Project Clearance |
| **FUNGI** | | | | | | | | | | |
| *Phaeocollybia attenuata* | SSSP | | SSSP | | M | -- | M | -- | M | -- |
| *Phaeocollybia fallax* | SSSP | | M | -- | M | -- | M | -- | M | -- |
| *Ramaria rubripermanens* | SSSP | | M | -- | M | -- | M | -- | M | -- |
| *Rhizopogon truncatus* | M | -- | M | -- | M | -- | M | -- | M | -- |
| *Sparassis crispa* | M | -- | M | -- | M | -- | M | -- | SSSP | |
| *Tremiscus helvelloides* | M | -- | M | -- | M | -- | M | -- | M | -- |
| **LICHENS** | | | | | | | | | | |
| *Nephroma occultum* | SSSP | | SSSP | | M | M | -- | -- | -- | -- |
| *Pseudocyphellaria rainierensis* | SSSP[1] | | SSSP[1] | | M[2] | M[2] | -- | -- | -- | -- |
| **MOLLUSKS** | | | | | | | | | | |
| *Helminthoglypta talmadgei*[3] | -- | -- | -- | -- | -- | -- | M | -- | SSSP | |
| **VASCULAR PLANTS** | | | | | | | | | | |
| *Cypripedium montanum*[3] | -- | -- | M | M | M | M | SSSP | | SSSP | |

M = Mitigation identified to eliminate adverse effects in all or part of a species range. Mitigation would apply to Northwest Forest Plan administrative units where habitat is suspected.
SSSP = Assumed to be included in the Special Status Species Programs; site management and pre-project clearances would be conducted in accord with those Programs. No mitigation needed.
-- = Mitigation not needed because not within species range, not included in Survey and Manage mitigation measure, or species has sufficient habitat in this geographic area.

[1]This species is included in both the Survey and Manage and Special Status Species Program for Region 6; however, due to the species not being surveyed for in younger forests under Survey and Manage, this species would have insufficient habitat. Mitigation for this species would be to manage the species under the Special Status Species Program for Region 6 instead of Survey and Manage.
[2]This species is included in the Survey and Manage Program. However, due to the species not being surveyed for in younger forests under Alternative 3, this species would have insufficient habitat. Mitigation for this species would be to not manage the species under Survey and Manage, and instead manage all known sites and conduct pre-project clearances in suitable habitat.
[3] Species has insufficient habitat in a portion of the species range only

**Table 2-12. Species with insufficient habitat under both Alternative 1 and 3 where there is a difference in management between these two alternatives; mitigation identified to reduce the risk under Alternative 3 to Alternative 1 levels.** [1]

| SPECIES | S&M Cat. | BLM OR/ WA[2] | BLM-CA | FS R6 | FS R5 | Insufficient Information to Determine Outcome | Insufficient Habitat Not Caused by Federal Action | Manage Known Sites | Pre-Project Clearance |
|---|---|---|---|---|---|---|---|---|---|
| FUNGI | | | | | | | | | |
| *Tylopilus porphyrosporus* | D | ~ | ~ | ~ | ~ | | ✔ | M | |

M - Mitigation to reduce the risk caused by Alternative 3 to Alternative 1 levels. Mitigation can be management of known sites and/or pre-project clearances.

[1] Mitigation would apply to any Administrative unit where habitat is expected to occur, and includes BLM OR/WA, BLM CA, FS-R6, and FS R5.
[2] Tracking is a category included in the BLM OR/WA Special Status Species Program. Tracking species are not listed here because the Tracking category requires no site management or clearance surveys.

Table 2-12 displays the species with insufficient information to determine an outcome or with insufficient habitat under both Alternative 1 and 3 where there is a difference in management between the two alternatives (this "uncommon" species is removed from Survey and Manage under Alternative 3). Table 2-12 also displays the identified mitigation that would lessen the risk under Alternative 3 to Alternative 1 levels.

# Alternatives Considered but Eliminated from Detailed Study

An environmental impact statement must rigorously explore and objectively evaluate all reasonable alternatives. The range of alternatives is limited by the requirement to fulfill the Purpose and Need to which the Agencies are responding in proposing the action.

Many of the alternatives considered by the interdisciplinary team were eliminated from detailed study in attempts to find reasonable alternatives that would fulfill the Underlying Need for the Proposed Action and the Purpose of this SEIS. The Purpose and Need, as described in Chapter 1, is the need for "… *healthy forest ecosystems and a sustainable supply of timber and other forest products, to the extent these are frustrated by the Survey and Manage Standards and Guidelines*." This includes purposes to conserve rare and little known species, reduce costs, and improve the Agencies' ability to provide healthy forests and timber outputs. The Purpose and Need substantially limited the range of reasonable alternatives available for analysis and provided a relatively narrow scope for this action. It was not the objective or intent of this SEIS to re-examine the overall strategy of the Northwest Forest Plan.

Among potential alternatives considered were various strategies proposed by the public during the scoping process, as well as some strategies proposed by Agency staff. Some proposals reflected a desire to make fundamental changes in the Northwest Forest Plan, some proposals were technical in nature, and others were based on broad generalizations. Overall, the interdisciplinary team discovered that few strategies were available that would meet the goal of improving the Agencies' ability to meet the underlying needs of the Northwest Forest Plan by addressing the problems associated with the Survey and Manage Standards and Guidelines. Additional alternatives would have been possible if a broader revision of the Northwest Forest Plan had been the objective of this action; however, no such broad revision was deemed necessary to meet the Purpose and Need.

Alternatives considered but eliminated from detailed study are described below.

## No Late-Successional and Old-Growth Harvest

This alternative addresses concerns that the proposed action would result in the loss of some late-successional and old-growth forests that are not already protected by the Late-Successional and Riparian Reserves in the Northwest Forest Plan. By prohibiting harvest of these forests, proponents hope to avoid negative impacts to ecological systems and social values like spiritual renewal, scenic beauty, and recreation. This alternative would extend prohibitions on harvest of late-successional and old-growth forests to the remaining 20 percent of federally managed lands not already included in the reserve system in the Northwest Forest Plan. During the scoping process, several variations of this theme were proposed including no old-growth harvest both with and without the Survey and Manage Standards and Guidelines. Many scoping respondents cited an alternative proposed by the Oregon Natural Resources Council. This variation prohibits late-successional and old-growth harvest, retains the Survey and Manage Standards and Guidelines, and eliminates pre-disturbance survey requirements for some projects.

In 1994, the Northwest Forest Plan Record of Decision (USDA, USDI 1994b) resolved the issue of late-successional and old-growth forest protection through selection of Alternative 9. Alternative 9 allocated about 80 percent of federally managed lands to reserves, leaving about 20 percent for sustainable timber production. In making that decision, the Secretaries of Agriculture and Interior considered nine other alternatives that included varying levels of late-successional and old-growth forest preservation. In particular, Alternative 1 retained essentially all remaining old-growth and reduced lands available for sustainable timber production to 11 percent (USDA, USDI, 1994a, p. 2-41). Alternative 1 was rejected in the 1994 Record of Decision.

Protecting additional late-successional and old-growth forests outside reserves would be similar to Alternative 1 in the 1994 Final SEIS, and would be akin to expanding the reserve land allocation decision in the 1994 Record of Decision. As previously stated, the Agencies have not identified a need to make changes to the Northwest Forest Plan land allocations. Therefore, any alternative that includes no harvest of late-successional and old-growth forests is considered outside the scope of this proposal.

## Keep Survey and Manage for Vertebrate Species Only

The intent of this alternative is to reduce costs by removing all species from the Survey and Manage mitigation measure except for vertebrate species. Some have suggested that only vertebrate species warrant protection because the viability provision in the National Forest Management Act planning regulations at 36 CFR 219.19 refers only to "existing native and desired non-native vertebrate species." This alternative reduces the list of Survey and Manage species from 296 to 6.

This alternative is similar to the proposed action and does not merit further consideration because it would be redundant to the proposed action in terms of environmental consequences. First, under the proposed action, 152 species could be added to the Agencies' Special Status Species Programs; under this alternative, 146 species would be added. Therefore, effects would only differ from the proposed action for the six species that would be retained in Survey and Manage under this alternative. Second, under Survey and Manage, of these six, all require pre-disturbance surveys in all or part of their range and all are expected to be added to one or more of the Agencies' Special Status Species Programs although the red tree vole would be included in the Special Status Species Programs in only a portion of its range. Under those programs, pre-disturbance surveys will also be used where needed or required to assure species persistence. Thus, the only substantial difference between this alternative and the proposed action is

in treatment of the red tree vole. Effects of including the red tree vole in Survey and Manage, or not, are already discussed in Chapter 3&4. Repeating that analysis for this alternative would be redundant.

## Keep Survey and Manage, Use the Natural Heritage Program Process to Determine which Species to Include

This alternative would use the natural heritage program species ranking process as the basis for determining which species would be subject to the Survey and Manage Standards and Guidelines. Proponents have suggested that this process would remove potential agency bias and result in a more credible Survey and Manage species list. Other elements of the Survey and Manage Standards and Guidelines would remain. Criteria would need to be developed for determining which species to include in Survey and Manage. Without such criteria, it is impossible to predict exactly which species would be included in Survey and Manage under this alternative.

Survey and Manage focuses on providing for rare species persistence at the Northwest Forest Plan scale. The Natural Heritage Programs do not assess species threats and rarity at this scale. Instead these programs look at State and Global scales as a means to determine species ranks. These differences in scales make use of the Natural Heritage Programs ranking system impossible to use for determining species concerns at the Northwest Forest Plan scale.

## Eliminate Survey and Manage, Coordinate Agency Policies Regarding Special Status Species Management

This alternative responds to concerns that there are differences in the Agencies' Special Status Species Programs, between the Agencies, between BLM state offices, and between Forest Service regions. Differences in programs can lead to inconsistencies in Special Status Species listings between and within agencies. This alternative is the same as the Proposed Action except it goes further by requiring the Agencies to coordinate their Special Status Species Programs so they are consistent throughout the Northwest Forest Plan area.

Coordinating Special Status Species Programs between agencies already occurs as appropriate. Existing agency policies include guidance aimed at coordinating their respective programs with States and other federal agencies:

- Regional Foresters are responsible for coordinating Regional programs with States, other federal agencies, groups, and individuals concerned with the management of threatened, endangered, and sensitive species (Forest Service Manual 2670.44).
- BLM State directors are responsible for coordinating the special status species program with adjoining BLM State Offices, State, and other federal agencies, various private organizations, and BLM constituents (BLM Manual 6840.04 E.2).

The different laws governing the two agencies and the different habitat capabilities associated with agency lands explain most of the inconsistencies. While there may be some benefits from additional coordination of Special Status Species Programs between and within agencies, this alternative is outside the scope of this proposal since it involves policies and processes independent of the Northwest Forest Plan. The purpose and need for this proposal is focused on reducing costs and management limitations associated with the Survey and Manage Standards and Guidelines. How the Agencies manage and coordinate their Special Status Species Programs does not address the purpose and need for this proposal. These programs are national in scope and their management and coordination go well beyond the Northwest Forest Plan area. The Proposed Action removes the Survey and Manage Standards and Guidelines and identifies species that

are likely to gain Special Species status after they are removed from Survey and Manage. The Agencies have the discretion to add or remove species from their Special Status Species Programs as appropriate. Coordinating such programs is an administrative function; nothing in this proposal prevents the Agencies from coordinating their Special Status Species Programs at any time.

## Keep Survey and Manage, Eliminate the Pre-Disturbance Survey Requirement

This alternative seeks to reduce costs by eliminating the requirement for pre-disturbance surveys. All other elements of the Survey and Manage mitigation measure would continue. Of the 296 Survey and Manage species, pre-disturbance surveys apply to 66 species (including 3 receiving equivalent-effort surveys as a mitigation measure). Yet, pre-disturbance surveys are the most expensive mitigation measure in the Survey and Manage Standards and Guidelines and account for about half the cost of the program.

This alternative shares some similarities with Alternative 3, which eliminates pre-disturbance surveys for the seven uncommon species (Category C) and eliminates the pre-disturbance survey requirement for projects in non-late-successional and non-old-growth forest stands. However, it differs in the requirement to survey for the 56 rare species in late-successional and old-growth forest stands. Without this requirement, many species would have insufficient habitat to support stable populations. Therefore, eliminating the pre-disturbance requirement in its entirety, would not meet the purpose to conserve rare and little known species and is eliminated from further study.

## Keep Survey and Manage, Cut Costs by Exempting Certain Projects

This alternative seeks to reduce Survey and Manage costs by exempting certain projects from requirements for pre-disturbance surveys. All other elements of the Survey and Manage Standards and Guidelines would remain. Examples include no pre-disturbance surveys for precommercial thinning, prescribed fire, or fire salvage projects; low intensity surveys in Matrix and in plantations in Late-Successional Reserves; and no surveys required for stands below specified age limits (e.g. less than 80 years old). This alternative was considered, but eliminated from further consideration because it is similar to Alternative 3. Alternative 3 eliminates requirements for pre-disturbance surveys for projects in non-late-successional and non-old-growth forest stands. All other elements of Survey and Manage would be retained except for the 28 uncommon species and some requirements for REO review. As such, this alternative was considered, but eliminated from detailed study because it would be redundant to the alternatives already considered in detail.

## Eliminate Survey and Manage, Keep Strategic Surveys

This alternative would be similar to the Proposed Action except that Strategic Surveys would continue until they were completed. It continues information-gathering through strategic surveys, but eliminates all other elements of Survey and Manage including pre-disturbance surveys and management of known sites. As with the Proposed Action, Survey and Manage species would probably be added to the Agencies' Special Status Species Programs. The Agencies' Special Status Species Programs have provision for general inventories which are similar to strategic surveys. This alternative was considered, but eliminated from further consideration because it is basically the same as Alternative 2.

## Stop All Timber Harvest

This alternative prohibits all timber harvest and recommends only custodial management of federal forests in the Northwest Forest Plan area. Prohibiting timber harvest would not fulfill the underlying need because the need for timber outputs would not be met. In addition, fuel treatment projects that include commercial timber harvest would not be undertaken. This would leave many forests at risk of catastrophic wildfire and compromise forest health. This alternative would also violate the O&C Act which mandates that lands managed under the Act be managed for the sustained-yield of timber. This alternative was eliminated because it does not meet the underlying need for the proposal and violates federal law.

## Strengthen the Survey and Manage Standards and Guidelines

This alternative would expand the current Survey and Manage Standards and Guidelines by retaining more species in the program, increasing the frequency and intensity of strategic and pre-disturbance surveys, and managing more known sites. This alternative addresses two concerns. First, some commenters feel the current Survey and Manage Standards and Guidelines are a good model for species management and should be expanded to other species. Second, other commenters believe the current Survey and Manage Standards and Guidelines were weakened by the 2001 Record of Decision and need to be restored to the requirements in the 1994 Record of Decision.

Alternative 3 in the Survey and Manage Final SEIS 2000 had objectives similar to this alternative including pre-disturbance surveys for 322 species, and known site management for 346 species. Alternative 3 in the Survey and Manage Final SEIS 2000 would have reduced the PSQ to 455 MMBF per year with a cost of $60 million per year (USDA, USDI 2000a, pp. 417 and 434). The No-Action Alternative in the Survey and Manage Final SEIS 2000 would have maintained a program similar to that in the 1994 Record of Decision, and would also be representative of this alternative. It included pre-disturbance surveys for 87 species and management of known sites for 272 species. The No-Action Alternative in the Survey and Manage Final SEIS 2000 would have reduced the PSQ to 510 MMBF with a cost of $117 million per year (USDA, USDI 2000a, pp. 417 and 434). Analysis for Timber Harvest (Chapter 3&4) indicates that the PSQ under Alternative 1 (No-Action) would be 665 MMBF per year. Since both Survey and Manage Final SEIS 2000 alternatives would reduce the PSQ well below the 665 MMBF PSQ predicted under Alternative 1, strengthening the Survey and Manage Standards and Guidelines as suggested would fail to meet the underlying need of the proposal to achieve the objectives of the Northwest Forest Plan, in particular, timber outputs. In addition, this alternative would fail to reduce costs below that of the No-Action Alternative ($25.9 million) and fails to meet the purpose to reduce costs. By failing to meet the purpose and need of this proposal, this alternative was eliminated from detailed study.

## List Survey and Manage Species under the Endangered Species Act

This alternative moves all Survey and Manage species into threatened or endangered species status under the Endangered Species Act. This alternative addresses concerns that the Survey and Manage program is flawed and that species would be better conserved through the Endangered Species Act. There is no evidence suggesting that all Survey and Manage species are at sufficient risk to warrant listing under the Endangered Species Act.

The Department of the Interior, acting through the U.S. Fish and Wildlife Service, is responsible for protecting most threatened and endangered species. The Department of Commerce, through NOAA Fisheries, is responsible for marine species, including

marine mammals and anadromous fish such as salmon. The process for listing involves a rigorous consideration of rarity, threat, and other factors. Currently, none of the Survey and Manage species are listed as threatened or endangered.

Listing species under the Endangered Species Act is outside the authority of the Agencies. Threatened and endangered species listing would need to be carried out by the regulatory agencies separate from this SEIS.

Although this alternative eliminates the Survey and Manage Standards and Guidelines, there is no evidence that it would address the purposes of providing protection for rare and little known species while reducing costs and improving the Agencies' ability to accomplish forest health projects. In fact, it is likely that managing 296 species under terms of the Endangered Species Act would be more costly and time consuming than either the Proposed Action or No-Action Alternatives. Both Survey and Manage and the Special Status Species Programs are designed to prevent species from becoming imperiled to the degree they warrant listing under the Endangered Species Act. There is no evidence to suggest that these programs are not working as intended. For these reasons, this alternative was eliminated from detailed study.

### Eliminate Survey and Manage, Do Not Add Species to Agency Special Status Species Programs

This alternative is similar to Alternative 2, the Proposed Action, except the Agencies would not add Survey and Manage species to their Special Status Species Programs. This alternative would assure the maximum achievement of Northwest Forest Plan resource objectives with little or no cost for species conservation other than for species listed under the Endangered Species Act. This alternative was not considered in detail because it would be contrary to agency policy that established the Special Status Species Programs and requires their implementation.

## Comparison of Alternatives

Tables 2-13 and 2-14 summarize the key features and environmental consequences for all three alternatives in a comparative format. Alternatives differ primarily in the number of species that would be managed under the Survey and Manage Standards and Guidelines versus the Agencies' Special Status Species Programs. The key differences between the current Survey and Manage Standards and Guidelines and the Special Status Species Programs relevant to this analysis are briefly described below:

1. Species are included in the Survey and Manage mitigation measure if the three basic criteria are met:
   a. The species must occur within the Northwest Forest Plan area, or occur close to the Northwest Forest Plan area and have potentially suitable habitat within the Northwest Forest Plan area.
   b. The species must be closely associated with late-successional or old-growth forest.
   c. The reserve system and other standards and guidelines of the Northwest Forest Plan do not appear to provide for a reasonable assurance of species persistence. For the Agencies' Special Status Species Programs, species are generally included only if they are rare, there is enough known about the species and its habitat to affect management, and agency actions could possibly move the species toward listing under the Endangered Species Act.

2. For the 272 species in Survey and Manage categories A, B and E, the Standards and Guidelines require management of all known sites. Exceptions are permitted following review by another office. For Special Status Species, final decisions about

the management of occupied sites are up to local line officers following analysis documented in a biological evaluation or NEPA document. That analysis can weigh a variety of factors including the condition of the species and habitat locally, the potential short and long-term benefits, and other effects of the proposed management activity.

3. Survey and Manage only considers concerns for persistence in the Northwest Forest Plan area, and the standards and guidelines only apply to that area. The Agencies' Special Status Species Programs consider the conservation status of the species state-wide and globally, and inclusion of species in one of those programs includes it for the entire state or region, not just the Northwest Forest Plan area. Survey and Manage species with few sites known within the Northwest Forest Plan area but with extensive sites outside the area may be considered secure and not be included in the Special Status Species Programs.

4. The Survey and Manage mitigation measure only focuses on species closely associated with late-successional or old-growth forests because that habitat was decreasing up until the early 1990's when work on the Northwest Forest Plan was begun (such habitat has subsequently increased, see Assumptions and Information Common to All Alternatives sections in Chapter 3&4). Species not closely associated with late-successional or old-growth forests are removed from Survey and Manage and, where they qualify, would be added to the Agencies' Special Status Species Programs. The Special Status Species Programs include species associated with a variety of terrestrial and aquatic habitat types and seral stages.

5. Finally, there is a difference between the Agencies' Special Status Species Programs and Survey and Manage regarding the taxa potentially included. Before the additional evaluation done for this SEIS, certain taxa groups had not been included in the Agencies' Special Status Species Programs either because of: (1) an absence of perceived threats; (2) the rules embedded in agency regulations and policies pertaining to inclusion of Special Status Species; (3) a lack of sufficient information to evaluate potential management effects; (4) a lack of available agency expertise; (5) absence of heritage rankings; (6) a lack of suitable habitat on agency lands; or, (7) other reasons. For example, the Forest Service in California excludes species about which so little is known that effective surveys and management strategies cannot be designed. And BLM Oregon/Washington maintains a broad list at the state level that can be modified at the District level to exclude species that do not inhabit federally managed lands in the vicinity of the local administrative unit.

**Table 2-13. Summary of the key features of the Alternatives.**

| Feature | Alternative 1 | Alternative 2 | | | | Alternative 3 |
|---|---|---|---|---|---|---|
| **Program** | **Survey and Manage** | **BLM Special Status Species** | | **FS Sensitive Species** | | **Survey and Manage and Special Status Species** |
| Program Objectives | Continued persistence of old-growth and late-successional species in the Northwest Forest Plan area. | Prevent listing under ESA. | | Prevent listing under ESA and maintain viable populations of fish, plants, and wildlife. | | For Survey and Manage species, objectives are the same as Alternative 1. For special status species, objectives are the same as Alternative 2 |
| Standards for Inclusion | Northwest Forest Plan area inhabitant, late-successional and old-growth related, and a concern for persistence. | Concern for listing and knowledge of decline and threat from state natural heritage programs. Capability to significantly affect the conservation status of the species. | | Concern for viability or listing based on current or predicted downward trends in population or habitat capability. | | For Survey and Manage species, must be Northwest Forest Plan area inhabitant, late-successional and old-growth related, and a concern for persistence. For special status species, same as Alternative 2. |
| Species Categories | 6 (A-F) based on rarity, uncertainty, and survey practicality. | 3 - Sensitive, Assessment, Tracking | 1- Sensitive | 1 - Sensitive | 2 - Sensitive and Watch | For Survey and Manage species: 3 (A, B, E) based on uncertainty and survey practicality. For special status species, same as Alternative 2. |
| Project Analysis Requirements | Follow Survey Protocols, Management Recommendations and include in NEPA documents. | Impacts and mitigation considered in NEPA documents. | | Analyze effects through BE and recommend mitigation in NEPA documents. | | For Survey and Manage species, same as Alternative 1. For special status species, same as Alternative 2. |
| Pre-Project Surveys | Pre-disturbance surveys required for 66 species (includes 3 w/equivalent - effort surveys). Exceptions are limited and require REO review. | Multiple sources of survey data are utilized as needed to determine potential impacts. Required for sensitive species in OR/WA BLM. Exceptions require State Director approval. | | As needed to conduct BE effects analysis. Usually needed, unless habitat assumed occupied or prior surveys are adequate. | | For Survey and Manage species, pre-disturbance surveys required for 59 species in late-successional/old-growth forest stands. Exceptions are limited and require approval by the line officer at next level above the official responsible for the proposal. For special status species, same as Alternative 2. |
| Site Management | Manage all Category A, B, and E sites and all high-priority C and D sites, exceptions reviewed by REO. | Manage site if loss would contribute to need to list. | | Manage site if loss would create significant trend toward listing or loss of species viability. | | For Survey and Manage species, manage all known sites. Exceptions approved by the line officer at next level above the official responsible for the proposal. For special status species, same as Alternative 2. |

**Table 2-13. Summary of the key features of the Alternatives.**

| Feature | Alternative 1 | Alternative 2 | | Alternative 3 |
|---|---|---|---|---|
| **Program** | **Survey and Manage** | **BLM Special Status Species** | **FS Sensitive Species** | **Survey and Manage and Special Status Species** |
| Conservation Strategies | Management Recommendations describe managing known sites and guidance for conserving species, including high-priority sites for 22 Category C and D species. | To eliminate the need for listings under the ESA, the BLM shall participate in developing habitat conservation assessments leading to conservation agreements for some species. | Include objectives in LRMPs to ensure viable populations throughout geographic ranges. Develop conservation strategies for sensitive species where continued existence can be negatively affected by the LRMP or a planned project. | For Survey and Manage species, Management Recommendations describe how to manage known sites and provide guidance for conserving species. For special status species, same as Alternative 2. |
| Inventory | Strategic surveys required for all species. | Recommended where needed to determine species status on BLM lands. Not required. | Encouraged as needed to support BEs. Not required. | Strategic surveys required for all Survey and Manage species. For special status species, same as Alternative 2. |
| Adding/ Removing Species | Annual Species Review includes new information and recommendations for category changes/ additions/deletions. RIEC review required. | Generally bi-annual, when heritage rankings or state lists are updated. State Director authorizes changes/additions/ deletions. | As needed. Regional Forester authorizes changes/ additions/deletions. | For Survey and Manage species, Annual Species Review includes new information and recommendations for category changes/additions/deletions. RIEC review required. For special status species, same as Alternative 2. |
| Reports, Monitoring, Review | Annual Status Reports required. RIEC/REO review required for most information products. Monitoring in accordance with LRMPs. | Formal reviews/reports not required. Monitor populations and habitats to determine if management objectives are being met. Monitoring in accordance with RMPs. | Formal reviews/reports not required. Monitoring recommended depending on level of concern. Monitoring in accordance with LRMPs. | For Survey and Manage species, Annual Status Reports required. RIEC/REO review required for most information products. Monitoring in accordance with LRMPs. For special status, species same as Alternative 2. |
| Potential Mitigation | None | Continued site management and/or pre-project clearances for species with insufficient habitat due to Alternative 2. | | Continued site management and/or pre-project clearances for species with insufficient habitat due to Alternative 3. |

BE = Biological Evaluation
ESA = Endangered Species Act
LRMP = Land and Resource Management Plan (FS)
NEPA = National Environmental Policy Act
REO = Regional Ecosystem Office
RIEC = Regional Interagency Executive Committee
RMP = Resource Management Plan (BLM)

**Table 2-14. Summary of Environmental Consequences.**

| | | Alternative 1 | Alternative 2 | | Alternative 3 | |
|---|---|---|---|---|---|---|
| | | | Un-mitigated | Mitigated | Un-mitigated | Mitigated |
| Species and Groups | Insufficient habitat not due to federal actions [1] | 142 | 142 | 142 | 142 | 142 |
| | Insufficient habitat due to actions under the alternative | 0 | 51 (6[2]) | 0 | 8 (2[2]) | 0 |
| | Sufficient Habitat | 130 | 79 | 130 | 121 | 129 |
| | Insufficient Information to Determine Outcome | 28 | 28 | 28 | 29 | 29 |
| Effect on Annual Timber Harvest (MMBF) | | -105 | -35 | -35 | -45 | -50 |
| Short-term Annual Cost (millions) | | $25.9 | $10.0 | $10.6 | $11.8 | $11.8 |
| Long-term (10 years) Annual Cost (millions) | | $16.8 | $9.5 | $10.1 | $10.3 | $10.3 |
| Employment Decrease From Full Harvest Level (per Northwest Forest Plan) | | -953 | -318 | -336 | -409 | -445 |
| Survey Related Employment | | +419 | +206 | +219 | +243 | +243 |
| Net Loss in Annual Personal Earnings (millions) | | -$18.8 | -$5.7 | -$5.9 | -$7.8 | -$8.9 |
| Hazardous Fuel Treatment (Annual Acres) | | 150,100 | 158,600 | 158,400 | 157,000 | 156,700 |
| Hazardous Fuel Treatment (Cost to Protect Species/Acre) | | $94 | $37 | $40 | $29 | $29 |

[1] Factors resulting in insufficient habitat are things such as limited potential habitat and few populations on federal lands, potential for stochastic events, low number of individuals, limited distribution, or narrow ecological amplitude.
[2] Species with insufficient habitat in a portion of the species' range only. These species are not included in 51 or 8 species listed in this column.

There are no meaningful differences in environmental consequences between alternatives for any of the following environmental components: Aquatic Ecosystem, Late-Successional Forest Ecosystem, Air Quality, Water Quality, Soil Productivity, Threatened and Endangered Species, and Species Associated with Early-Successional Forest.

# Table 2-15. Summary of Environmental Consequences for all 296 Survey and Manage Species and 4 Arthropod Functional Groups.

| This table summarizes, by alternative, the outcome, management, and identified mitigation that would change an outcome for each Survey and Manage species. | Alternative 1 | | Alternative 2 | | | | | Alternative 3 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Outcome | Survey & Manage Category | Outcome | BLM OR/ WA[1] | BLM CA | FS R-6 | FS R-5 | Outcome | Survey & Manage Category | BLM OR/ WA[1] | BLM CA | FS R-6 | FS R-5 |
| **FUNGI** | | | | | | | | | | | | | |
| *Acanthophysium farlowii* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Albatrellus avellaneus* | 3 | B | 3 | SS | - | SS | - | 3 | B | - | - | - | - |
| *Albatrellus caeruleoporus* | 3 | B | 3 | - | SS | - | - | 3 | B | - | - | - | - |
| *Albatrellus ellisii* | 1 | B | 3 | MK | SS | SS-W MK-O | MK | 1 | B | - | - | - | - |
| *Albatrellus flettii*, In Washington and California[2] | 1 | B | 3 | - | SS | MK-W | MK | 1 | B | - | - | - | - |
| *Alpova alexsmithii* | 3 | B | 3 | SS | - | - | - | 3 | B | - | - | - | - |
| *Alpova olivaceotinctus* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Arcangeliella camphorata* | 3 | B | 3 | SS | - | - | - | 3 | B | - | - | - | - |
| *Arcangeliella crassa* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Arcangeliella lactarioides* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Asterophora lycoperdoides* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Asterophora parasitica* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Baeospora myriadophylla* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Balsamia nigrens* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Boletus haematinus* | 3 | B | 3 | - | SS | - | - | 3 | B | - | - | - | - |
| *Boletus pulcherrimus* | 3 | B | 3 | SS | - | SS | SS | 3 | B | - | - | - | - |
| *Bondarzewia mesenterica,* In Washington and California[2] | 1 | B | 1 | - | - | - | - | 1 | B | - | - | - | - |
| *Bridgeoporus nobilissimus* | 3 | A | 3 | SS | - | SS | SS | 3 | A | - | - | - | - |
| *Cantharellus subalbidus*, In Washington and California[2] | 1 | D | 1 | - | - | - | - | 1 | - | - | - | - | - |
| *Catathelasma ventricosa* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Chalciporus piperatus* | 1 | D | 1 | - | - | - | - | 1 | | - | - | - | - |
| *Chamonixia caespitosa* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Choiromyces alveolatus* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Choiromyces venosus* | 3 | B | 3 | - | SS | - | - | 3 | B | - | - | - | - |
| *Chroogomphus loculatus* | 3 | B | 3 | SS | - | - | - | 3 | B | - | - | - | - |
| *Chrysomphalina grossula* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Clavariadelphus ligula* | 1 | B | 3 | MK | SS | MK | MK | 1 | B | - | - | - | - |
| *Clavariadelphus occidentalis* | 1 | B | 3 | MK | MK | SS-W MK-O | MK | 1 | B | - | - | - | - |
| *Clavariadelphus sachalinensis* | 1 | B | 3 | MK | MK | SS-W MK-O | MK | 1 | B | - | - | - | - |
| *Clavariadelphus subfastigiatus* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Clavariadelphus truncatus* | 1 | D | 1 | - | - | - | - | 1 | - | - | - | - | - |
| *Clavulina castanopes* v. *lignicola* | 3 | B | 3 | - | | | | 3 | B | - | - | - | - |
| *Clitocybe senilis* | 3 | B | 3 | - | SS | - | - | 3 | B | - | - | - | - |
| *Clitocybe subditopoda* | 3 | B | 3 | - | SS | - | - | 3 | B | - | - | - | - |

## Table 2-15. Summary of Environmental Consequences for all 296 Survey and Manage Species and 4 Arthropod Functional Groups.

| This table summarizes, by alternative, the outcome, management, and identified mitigation that would change an outcome for each Survey and Manage species. | Alternative 1 | | Alternative 2 | | | | | Alternative 3 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Outcome | Survey & Manage Category | Outcome | BLM OR/ WA[1] | BLM CA | FS R-6 | FS R-5 | Outcome | Survey & Manage Category | BLM OR/ WA[1] | BLM CA | FS R-6 | FS R-5 |
| **FUNGI** | | | | | | | | | | | | | |
| *Collybia bakerensis* | 1 | F | 1 | - | - | - | - | 1 | | - | - | - | - |
| *Collybia racemosa* | 3 | B | 3 | - | SS | - | SS | 3 | B | - | - | - | - |
| *Cordyceps ophioglossoides* | 3 | B | 3 | - | SS | - | - | 3 | B | - | - | - | - |
| *Cortinarius barlowensis* | 1 | B | 3 | MK | - | SS-O MK-W | - | 1 | B | - | - | - | - |
| *Cortinarius boulderensis* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Cortinarius cyanites* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Cortinarius depauperatus* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Cortinarius magnivelatus* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Cortinarius olympianus* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Cortinarius speciosissimus* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Cortinarius tabularis* | 4 | B | 4 | - | - | - | - | 4 | B | - | - | - | - |
| *Cortinarius umidicola* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Cortinarius valgus* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Cortinarius variipes* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Cortinarius verrucisporus* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Cortinarius wiebeae* | 3 | B | 3 | - | - | SS | SS | 3 | B | - | - | - | - |
| *Cudonia monticola* | 1 | B | 3 | MK | - | SS | SS | 1 | B | - | - | - | - |
| *Cyphellostereum laeve* | 3 | B | 3 | SS | SS | - | - | 3 | B | - | - | - | - |
| *Dermocybe humboldtensis* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Destuntzia fusca* | 3 | B | 3 | SS | - | - | - | 3 | B | - | - | - | - |
| *Destuntzia rubra* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Dichostereum boreale* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Elaphomyces anthracinus* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Elaphomyces subviscidus* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Endogone acrogena* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Endogone oregonensis* | 3 | B | 3 | - | SS | - | - | 3 | B | - | - | - | - |
| *Entoloma nitidum* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Fayodia bisphaerigera* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Fevansia aurantiaca* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Galerina cerina* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Galerina heterocystis* | 1 | E | 3 | MK | MK | MK | MK | 1 | E | - | - | - | - |
| *Galerina sphagnicola* | 4 | E | 4 | - | - | - | - | 4 | E | - | - | - | - |
| *Gastroboletus imbellus* | 3 | B | 3 | SS | - | - | - | 3 | B | - | - | - | - |
| *Gastroboletus ruber* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Gastroboletus subalpinus* | 1 | B | 1 | - | - | - | - | 1 | B | - | - | - | - |
| *Gastroboletus turbinatus* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Gastroboletus vividus* | 3 | B | 3 | SS | - | - | - | 3 | B | - | - | - | - |
| *Gastrosuillus amaranthii* | 4 | E | 4 | - | - | - | - | 4 | E | - | - | - | - |

## Table 2-15. Summary of Environmental Consequences for all 296 Survey and Manage Species and 4 Arthropod Functional Groups.

| This table summarizes, by alternative, the outcome, management, and identified mitigation that would change an outcome for each Survey and Manage species. | Alternative 1 | | Alternative 2 | | | | | Alternative 3 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Outcome | Survey & Manage Category | Outcome | BLM OR/ WA[1] | BLM CA | FS R-6 | FS R-5 | Outcome | Survey & Manage Category | BLM OR/ WA[1] | BLM CA | FS R-6 | FS R-5 |
| **FUNGI** | | | | | | | | | | | | | |
| *Gastrosuillus umbrinus* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Gautieria magnicellaris* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Gautieria otthii* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Gelatinodiscus flavidus* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Glomus radiatum* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Gomphus bonarii* | 1 | B | 3 | MK | MK | SS | SS | 1 | B | - | - | - | - |
| *Gomphus clavatus* | 1 | F | 1 | - | - | - | - | 1 | - | - | - | - | - |
| *Gomphus kauffmanii* | 1 | E | 3 | MK | MK | SS | MK | 1 | E | - | - | - | - |
| *Gymnomyces abietis* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Gymnomyces nondistincta* | 3 | B | 3 | SS | - | - | - | 3 | B | - | - | - | - |
| *Gymnopilus punctifolius*, In California [2] | 1 | B | 3 | - | SS | - | MK | 1 | B | - | - | - | - |
| *Gyromitra californica* | 1 | B | 3 | MK | - | SS | MK | 1 | B | - | - | - | - |
| *Hebeloma olympianum* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Helvella crassitunicata* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Helvella elastica* | 1 | B | 1 | - | - | - | - | 1 | B | - | - | - | - |
| *Hydnotrya inordinata* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Hydnotrya subnix* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Hydropus marginellus* | 3 | B | 3 | - | SS | - | - | 3 | B | - | - | - | - |
| *Hygrophorus caeruleus* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Hygrophorus karstenii* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Hygrophorus vernalis* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Hypomyces luteovirens* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Leucogaster citrinus* | 1 | B | 3 | MK | SS | SS | MK | 1 | B | - | - | - | - |
| *Leucogaster microsporus* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Macowanites chlorinosmus* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Macowanites lymanensis* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Macowanites mollis* | 3 | B | 3 | SS | - | - | - | 3 | B | - | - | - | - |
| *Marasmius applanatipes* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Martellia fragrans* | 3 | B | 3 | SS | - | - | - | 3 | B | - | - | - | - |
| *Martellia idahoensis* | 3 | B | 3 | SS | - | - | - | 3 | B | - | - | - | - |
| *Mycena hudsoniana* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Mycena overholtsii* | 1 | D | 1 | - | - | - | - | 1 | | - | - | - | - |
| *Mycena quinaultensis* | 3 | B | 3 | - | SS | - | - | 3 | B | - | - | - | - |
| *Mycena tenax* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Mythicomyces corneipes* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Neolentinus adhaerens* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Neolentinus kauffmanii* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Nivatogastrium nubigenum*, In entire range except OR Eastern Cascades and CA Cascades Physiographic Provinces[2] | 1 | B | 1 | - | - | - | - | 1 | B | - | - | - | - |

## Table 2-15. Summary of Environmental Consequences for all 296 Survey and Manage Species and 4 Arthropod Functional Groups.

| This table summarizes, by alternative, the outcome, management, and identified mitigation that would change an outcome for each Survey and Manage species. | Alternative 1 | | Alternative 2 | | | | | Alternative 3 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Outcome | Survey & Manage Category | Outcome | BLM OR/ WA[1] | BLM CA | FS R-6 | FS R-5 | Outcome | Survey & Manage Category | BLM OR/ WA[1] | BLM CA | FS R-6 | FS R-5 |
| **FUNGI** | | | | | | | | | | | | | |
| *Octavianina cyanescens* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Octavianina macrospora* | 3 | B | 3 | SS | - | - | - | 3 | B | - | - | - | - |
| *Octavianina papyracea* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Otidea leporina* | 1 | D | 1 | - | - | - | - | 1 | | - | - | - | - |
| *Otidea smithii* | 3 | B | 3 | - | - | SS | SS | 3 | B | - | - | - | - |
| *Phaeocollybia attenuata* | 1 | D | 3 | MK | MK | SS | MK | 3 | - | MK | MK | SS | MK |
| *Phaeocollybia californica* | 1 | B | 3 | SS | SS | SS-O | MK | 1 | B | - | - | - | - |
| *Phaeocollybia dissiliens* | 1 | B | 3 | MK | - | SS-O | - | 1 | B | - | - | - | - |
| *Phaeocollybia fallax* | 1 | D | 3 | MK | MK | SS-W MK-O | MK | 3 | - | MK- | MK | SS-W MK-O | MK |
| *Phaeocollybia gregaria* | 3 | B | 3 | SS | - | - | - | 3 | B | - | - | - | - |
| *Phaeocollybia kauffmanii* | 1 | D | 1 | - | - | - | - | 1 | - | - | - | - | - |
| *Phaeocollybia olivacea*, In Oregon[2] | 1 | F | | | | | | 1 | - | SS | - | SS-O | - |
| *Phaeocollybia olivacea*, In Washington and California[2] | 1 | E | 1 | SS | SS | SS-O | SS | 1 | E | - | - | - | - |
| *Phaeocollybia oregonensis* | 1 | B | 1 | SS | - | SS | - | 1 | B | - | - | - | - |
| *Phaeocollybia piceae* | 1 | B | 3 | MK | SS | SS | MK | 1 | B | - | - | - | - |
| *Phaeocollybia pseudofestiva* | 1 | B | 3 | MK | SS | SS | MK | 1 | B | - | - | - | - |
| *Phaeocollybia scatesiae* | 1 | B | 3 | MK | SS | SS | MK | 1 | B | - | - | - | - |
| *Phaeocollybia sipei* | 1 | B | 3 | MK | - | SS-O | - | 1 | B | - | - | - | - |
| *Phaeocollybia spadicea* | 1 | B | 3 | MK | SS | SS | MK | 1 | B | - | - | - | - |
| *Phellodon atratus* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Pholiota albivelata* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Podostroma alutaceum* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Polyozellus multiplex* | 1 | B | 3 | MK | SS | MK | MK | 1 | B | - | - | - | - |
| *Pseudaleuria quinaultiana* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Ramaria abietina* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Ramaria amyloidea* | 1 | B | 3 | MK | SS | SS | MK | 1 | B | - | - | - | - |
| *Ramaria araiospora* | 1 | B | 3 | MK | MK | SS-W MK-O | MK | 1 | B | - | - | - | - |
| *Ramaria aurantiisiccescens* | 1 | B | 3 | MK | SS | SS | MK | 1 | B | - | - | - | - |
| *Ramaria botryis* var. *aurantiiramosa* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Ramaria celerivirescens* | 1 | B | 3 | MK | MK | MK | MK | 1 | B | - | - | - | - |
| *Ramaria claviramulata* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Ramaria concolor f. marrii* | 4 | B | 4 | - | - | - | - | 4 | B | - | - | - | - |
| *Ramaria concolor f. tsugina* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Ramaria conjunctipes* var. *sparsiramosa* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Ramaria coulterae* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Ramaria cyaneigranosa* | 1 | B | 3 | MK | SS | SS-W MK-O | MK | 1 | B | - | - | - | - |

## Table 2-15. Summary of Environmental Consequences for all 296 Survey and Manage Species and 4 Arthropod Functional Groups.

| This table summarizes, by alternative, the outcome, management, and identified mitigation that would change an outcome for each Survey and Manage species. | Alternative 1 | | Alternative 2 | | | | | Alternative 3 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Outcome | Survey & Manage Category | Outcome | BLM OR/ WA[1] | BLM CA | FS R-6 | FS R-5 | Outcome | Survey & Manage Category | BLM OR/ WA[1] | BLM CA | FS R-6 | FS R-5 |
| **FUNGI** | | | | | | | | | | | | | |
| *Ramaria gelatiniaurantia* | 1 | B | 3 | MK | MK | SS | MK | 1 | B | - | - | - | - |
| *Ramaria gracilis* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Ramaria hilaris* var. *olympiana* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Ramaria largentii* | 1 | B | 3 | MK | SS | SS | MK | 1 | B | - | - | - | - |
| *Ramaria lorithamnus* | 4 | B | 4 | - | - | - | - | 4 | B | - | - | - | - |
| *Ramaria maculatipes* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Ramaria rainierensis* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Ramaria rubella* var. *blanda* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Ramaria rubribrunnescens* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Ramaria rubrievanescens* | 1 | B | 3 | MK | MK | SS-W MK-O | MK | 1 | B | - | - | - | - |
| *Ramaria rubripermanens*, In Oregon[2] | 1 | D | 3 | MK | MK | SS-W MK-O | MK | 3 | - | MK | - | MK-O | - |
| *Ramaria rubripermanens*, In Washington and California[2] | 1 | B | | | | | | 1 | B | - | - | - | - |
| *Ramaria spinulosa* var. *diminutiva* | 3 | B | 3 | SS | - | - | - | 3 | B | - | - | - | - |
| *Ramaria stuntzii* | 1 | B | 3 | MK | MK | SS-W MK-O | MK | 1 | B | - | - | - | - |
| *Ramaria suecica* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Ramaria thiersii* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Ramaria verlotensis* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Rhizopogon abietis* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Rhizopogon atroviolaceus* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Rhizopogon brunneiniger* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Rhizopogon chamaleontinus* | 3 | B | 3 | SS | - | - | - | 3 | B | - | - | - | - |
| *Rhizopogon ellipsosporus* | 3 | B | 3 | SS | - | - | - | 3 | B | - | - | - | - |
| *Rhizopogon evadens* var. *subalpinus* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Rhizopogon exiguus* | 3 | B | 3 | SS | - | - | - | 3 | B | - | - | - | - |
| *Rhizopogon flavofibrillosus* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Rhizopogon inquinatus* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Rhizopogon truncatus* | 1 | D | 3 | MK | MK | MK | MK | 3 | - | MK | MK | MK | MK |
| *Rhodocybe speciosa* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Rickenella swartzii* | 3 | B | 1 | - | - | - | - | 3 | B | - | - | - | - |
| *Russula mustelina* | 4 | B | 4 | - | - | - | - | 4 | B | - | - | - | - |
| *Sarcodon fuscoindicus* | 1 | B | 3 | MK | SS | SS-W MK-O | MK | 1 | B | - | - | - | - |
| *Sedecula pulvinata* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Sowerbyella rhenana* | 1 | B | 3 | MK | SS | SS | SS | 1 | B | - | - | - | - |
| *Sparassis crispa* | 1 | D | 3 | MK | SS | MK | MK | 3 | | MK | SS | MK | MK |
| *Spathularia flavida* | 1 | B | 3 | MK | SS | SS-W MK-O | MK | 1 | B | - | - | - | - |

## Table 2-15. Summary of Environmental Consequences for all 296 Survey and Manage Species and 4 Arthropod Functional Groups.

| This table summarizes, by alternative, the outcome, management, and identified mitigation that would change an outcome for each Survey and Manage species. | Alternative 1 | | Alternative 2 | | | | | Alternative 3 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Outcome | Survey & Manage Category | Outcome | BLM OR/ WA[1] | BLM CA | FS R-6 | FS R-5 | Outcome | Survey & Manage Category | BLM OR/ WA[1] | BLM CA | FS R-6 | FS R-5 |
| **FUNGI** | | | | | | | | | | | | | |
| *Stagnicola perplexa* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Thaxterogaster pavelekii* | 3 | B | 3 | SS | - | - | - | 3 | B | - | - | - | - |
| *Tremiscus helvelloides* | 1 | D | 3 | MK | MK | MK | MK | 3 | - | MK | MK | MK | MK |
| *Tricholoma venenatum* | 4 | B | 4 | - | - | - | - | 4 | B | - | - | - | - |
| *Tricholomopsis fulvescens* | 3 | B | 3 | - | - | - | SS | 3 | B | - | - | - | - |
| *Tuber asa* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Tuber pacificum* | 3 | B | 3 | - | - | - | - | 3 | B | - | - | - | - |
| *Tylopilus porphyrosporus* | 3 | D | 3 | - | - | - | - | 3 | - | - | - | - | - |
| **LICHENS** | | | | | | | | | | | | | |
| *Bryoria pseudocapillaris* | 3 | A | 3 | SS | SS | SS | - | 3 | A | - | - | - | - |
| *Bryoria spiralifera* | 3 | A | 3 | SS | SS | SS-O | - | 3 | A | - | - | - | - |
| *Bryoria subcana* | 3 | B | 3 | As | - | - | - | 3 | B | - | - | - | - |
| *Buellia oidalea* | 3 | E | 3 | - | - | - | - | 3 | E | - | - | - | - |
| *Calicium abietinum* | 4 | B | 4 | - | - | - | - | 4 | B | - | - | - | - |
| *Calicium adspersum* | 4 | E | 4 | As | - | - | SS | 4 | E | - | - | - | - |
| *Cetrelia cetrarioides* | 1 | E | 1 | - | - | SS-W | - | 1 | E | - | - | - | - |
| *Chaenotheca chrysocephala* | 4 | B | 4 | - | - | - | - | 4 | B | - | - | - | - |
| *Chaenotheca ferruginea* | 4 | B | 4 | - | - | - | - | 4 | B | - | - | - | - |
| *Chaenotheca subroscida* | 3 | E | 3 | - | - | SS | - | 3 | E | - | - | - | - |
| *Chaenothecopsis pusilla* | 3 | E | 3 | - | - | - | - | 3 | E | - | - | - | - |
| *Collema nigrescens*, In WA and OR, except OR Klamath Physiographic Province[2] | 1 | F | 1 | - | - | SS-W | - | 1 | - | - | - | SS-W | - |
| *Dendriscocaulon intricatulum*, In California[2] | 1 | E | 2 | - | SS | SS-W MK-O[3] PPC-O[3] | MK PPC | 1 | E | - | - | - | - |
| *Dendriscocaulon intricatulum*, In Washington and Oregon except Coos, Curry, Douglas, Josephine, and Jackson Counties[2] | 1 | A | | | | | | 1 | A | - | - | - | - |
| *Dermatocarpon luridum* | 1 | E | 1 | - | - | SS | - | 1 | E | - | - | - | - |
| *Fuscopannaria saubinetii* | 3 | E | 3 | - | - | - | - | 3 | E | - | - | - | - |
| *Heterodermia sitchensis* | 4 | E | 4 | As | - | - | - | 4 | E | - | - | - | - |
| *Hypogymnia duplicata* | 1 | C | 1 | - | - | SS-O | - | 1 | | - | - | - | - |
| *Hypogymnia vittata* | 4 | E | 4 | - | - | - | - | 4 | E | - | - | - | - |
| *Hypotrachyna revoluta* | 3 | E | 3 | As | - | SS | - | 3 | E | - | - | - | - |
| *Leptogium burnetiae* var. *hirsutum* | 4 | E | 4 | - | - | SS | - | 4 | E | - | - | - | - |
| *Leptogium cyanescens* | 3 | A | 3 | - | - | SS | - | 3 | A | - | - | - | - |
| *Leptogium rivale* | 1 | E | 1 | - | - | - | - | 1 | E | - | - | - | - |
| *Leptogium teretiusculum* | 3 | E | 3 | - | - | - | - | 3 | E | - | - | - | - |
| *Lobaria linita*, Entire range except WA Western Cascades Physiographic Province north of Snoqualmie Pass and Olympic Peninsula[2] | 1 | A | 1 | As | - | SS-O | - | 1 | A | - | - | - | - |
| *Lobaria oregana*, In California[2] | 3 | A | 3 | - | SS | - | - | 3 | A | - | - | - | - |
| *Microcalicium arenarium* | 4 | B | 4 | As | - | - | - | 4 | B | - | - | - | - |

## Table 2-15. Summary of Environmental Consequences for all 296 Survey and Manage Species and 4 Arthropod Functional Groups.

| This table summarizes, by alternative, the outcome, management, and identified mitigation that would change an outcome for each Survey and Manage species. | Alternative 1 | | Alternative 2 | | | | | Alternative 3 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Outcome | Survey & Manage Category | Outcome | BLM OR/ WA[1] | BLM CA | FS R-6 | FS R-5 | Outcome | Survey & Manage Category | BLM OR/ WA[1] | BLM CA | FS R-6 | FS R-5 |
| **LICHENS** | | | | | | | | | | | | | |
| *Nephroma bellum*, In Oregon: Klamath, Willamette Valley, Eastern Cascades; WA: Western Cascades (outside GPNF), Eastern Cascades, Olympic Peninsula Physiographic Provinces[2] | 1 | E | 1 | - | SS | SS-W | - | 1 | E | - | - | - | - |
| *Nephroma isidiosum* | 4 | E | 4 | - | - | - | - | 4 | E | - | - | - | - |
| *Nephroma occultum* | 1 | C | 3 | MK PPC | - | SS | - | 3 | | MK PPC | - | SS | - |
| *Niebla cephalota* | 3 | A | 3 | As | SS | SS | - | 3 | A | - | - | - | - |
| *Pannaria rubiginosa* | 1 | E | 1 | As | SS | SS | - | 1 | E | - | - | - | - |
| *Peltigera pacifica* | 1 | E | 2 | MK | - | SS | - | 1 | E | - | - | - | - |
| *Platismatia lacunosa*, Except OR Coast Range Physiographic Province[2] | 1 | E | 1 | - | - | SS-W | - | 1 | E | - | - | - | - |
| *Pseudocyphellaria perpetua* | 3 | A | 3 | - | - | - | - | 3 | A | - | - | - | - |
| *Pseudocyphellaria rainierensis* | 1 | A | 3 | MK PPC | - | SS | - | 3[4] | A | MK PPC | - | SS | - |
| *Stenocybe clavata* | 4 | E | 4 | - | - | - | - | 4 | E | - | - | - | - |
| *Teloschistes flavicans* | 3 | A | 3 | As | SS | SS-O | - | 3 | A | - | - | - | - |
| *Tholurna dissimilis*, south of Columbia River[2] | 4 | B | 4 | As | - | SS | - | 4 | B | - | - | - | - |
| *Usnea hesperina* | 3 | E | 3 | - | - | - | - | 3 | E | - | - | - | - |
| *Usnea longissima*, In California and in Curry, Josephine, and Jackson Counties, Oregon[2] | 1 | A | 1 | - | SS | SS | SS | 1 | A | - | - | - | - |
| *Usnea longissima*, In Oregon, except Curry, Josephine, and Jackson Counties and in Washington[2] | 1 | F | | | | | | 1 | - | - | - | SS | - |
| **BRYOPHYTES** | | | | | | | | | | | | | |
| *Brotherella roellii* | 4 | E | 4 | - | - | - | - | 4 | E | | | | |
| *Buxbaumia viridis*, In California[2] | 1 | E | 1 | - | SS | - | SS | 1 | E | - | - | - | - |
| *Diplophyllum plicatum* | 1 | B | 1 | As | - | - | - | 1 | B | - | - | - | - |
| *Herbertus aduncus* | 4 | E | 4 | As | - | - | - | 4 | E | - | - | - | - |
| *Iwatsukiella leucotricha* | 1 | B | 1 | As | - | SS | - | 1 | B | - | - | - | - |

## Table 2-15. Summary of Environmental Consequences for all 296 Survey and Manage Species and 4 Arthropod Functional Groups.

| This table summarizes, by alternative, the outcome, management, and identified mitigation that would change an outcome for each Survey and Manage species. | Alternative 1 | | Alternative 2 | | | | | Alternative 3 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Outcome | Survey & Manage Category | Outcome | BLM OR/ WA[1] | BLM CA | FS R-6 | FS R-5 | Outcome | Survey & Manage Category | BLM OR/ WA[1] | BLM CA | FS R-6 | FS R-5 |
| **BRYOPHYTES** | | | | | | | | | | | | | |
| *Kurzia makinoana* | 4 | B | 4 | As | - | - | - | 4 | B | - | - | - | - |
| *Marsupella emarginata* var. *aquatica* | 1 | B | 1 | As | - | - | - | 1 | B | - | - | - | - |
| *Orthodontium gracile* | 1 | B | 1 | As | SS | - | - | 1 | B | - | - | - | - |
| *Ptilidium californicum*, In California[2] | 1 | A | 1 | - | SS | - | SS | 1 | A | - | - | - | - |
| *Racomitrium aquaticum* | 4 | E | 4 | - | - | - | - | 4 | E | - | - | - | - |
| *Rhizomnium nudum*, Outside Washington[2] | 1 | B | 1 | As | - | SS-O | - | 1 | B | - | - | - | - |
| *Schistostega pennata* | 1 | A | 1 | As | - | SS | - | 1 | A | - | - | - | - |
| *Tetraphis geniculata* | 1 | A | 1 | As | SS | SS | - | 1 | A | - | - | - | - |
| *Tritomaria exsectiformis* | 4 | B | 4 | As | - | - | - | 4 | B | - | - | - | - |
| *Tritomaria quinquedentata* | 4 | B | 4 | As | - | - | - | 4 | B | - | - | - | - |
| **VERTEBRATES** | | | | | | | | | | | | | |
| Larch Mountain salamander *Plethodon larselli* | 1 | A | 1 | As | - | SS | - | 1 | A | - | - | - | - |
| Shasta salamander *Hydromantes shastae* | 1 | A | 1 | - | SS | - | SS | 1 | A | - | - | - | - |
| Siskiyou Mountains salamander *Plethodon stormi*, North Range[2] | 1 | D | 1[5] | SS | - | SS-O | SS | 1[5] | - | SS | - | SS-O | - |
| Siskiyou Mountains salamander *Plethodon stormi*, South Range[2] | 1 | A | | | | | | 1 | A | - | - | - | - |
| Van Dyke's salamander *Plethodon vandykei*, Cascade population only | 1 | A | 1 | - | - | SS-W | - | 1 | A | - | - | - | - |
| Great Gray Owl *Strix nebulosa* | 1 | A | 1 | - | - | SS-W | SS | 1 | A | - | - | - | - |
| Oregon Red Tree Vole *Arborimus longicaudus*, In xeric and northern mesic portion of its range[2] | 1 | C | 1[5] | SS[6] | - | SS[6] | - | 1[5] | - | SS[7] | - | SS[7] | - |
| **MOLLUSKS** | | | | | | | | | | | | | |
| *Cryptomastix devia* | 1 | A | 1 | SS | - | SS | - | 1 | A | - | - | - | - |
| *Cryptomastix hendersoni* | 1 | A | 1 | SS | - | SS | - | 1 | A | - | - | - | - |
| *Deroceras hesperium* | 1 | B | 1 | SS | - | SS | - | 1 | B | - | - | - | - |
| *Fluminicola* n. sp. 3 | 1 | A | 1 | SS | - | SS-O | - | 1 | A | - | - | - | - |
| *Fluminicola* n. sp. 11 | 1 | A | 1 | SS | - | - | - | 1 | A | - | - | - | - |
| *Fluminicola* n. sp. 14 | 1 | A | 3 | - | MK PPC | - | MK PPC | 1 | A | - | - | - | - |
| *Fluminicola* n. sp. 15 | 1 | A | 3 | - | - | - | MK PPC | 1 | A | - | - | - | - |
| *Fluminicola* n. sp. 16 | 1 | A | 3 | - | - | - | MK PPC | 1 | A | - | - | - | - |
| *Fluminicola* n. sp. 17 | 1 | A | 3 | - | - | - | MK PPC | 1 | A | - | - | - | - |
| *Fluminicola* n. sp. 18 | 1 | A | 3 | - | MK PPC | - | MK PPC | 1 | A | - | - | - | - |
| *Fluminicola* n. sp. 19 | 1 | A | 3 | - | MK PPC | - | MK PPC | 1 | A | - | - | - | - |

## Table 2-15. Summary of Environmental Consequences for all 296 Survey and Manage Species and 4 Arthropod Functional Groups.

| This table summarizes, by alternative, the outcome, management, and identified mitigation that would change an outcome for each Survey and Manage species. | Alternative 1 | | Alternative 2 | | | | | Alternative 3 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Outcome | Survey & Manage Category | Outcome | BLM OR/ WA[1] | BLM CA | FS R-6 | FS R-5 | Outcome | Survey & Manage Category | BLM OR/ WA[1] | BLM CA | FS R-6 | FS R-5 |
| **MOLLUSKS** | | | | | | | | | | | | | |
| *Fluminicola* n. sp. 20 | 1 | A | 3 | - | MK PPC | - | MK PPC | 1 | A | - | - | - | - |
| *Fluminicola seminalis* | 1 | A | 2 | - | MK PPC | SS-O | SS | 1 | A | - | - | - | - |
| *Helminthoglypta talmadgei* | 1 | D | 2 | - | SS | - | MK | 2 | - | - | SS | - | MK |
| *Hemphillia burringtoni* | 1 | E | 1 | SS | - | SS-W | - | 1 | E | - | - | - | - |
| *Hemphillia glandulosa*, In WA Western Cascades Physiographic Province[2] | 1 | E | 1 | - | - | SS-W | - | 1 | E | - | - | - | - |
| *Hemphillia malonei*, In Washington[2] | 1 | C | 1 | SS | - | SS-W | - | 1 | - | SS | - | SS-W | - |
| *Hemphillia pantherina* | 1 | B | 1 | - | - | SS-W | - | 4 | B[8] | - | - | - | - |
| *Juga (O)* n. sp. 2 | 1 | A | 1 | SS | - | SS-O | - | 1 | A | - | - | - | - |
| *Juga (O)* n. sp. 3 | 1 | A | 3 | - | - | - | MK PPC | 1 | A | - | - | - | - |
| *Lyogyrus* n. sp. 1 | 1 | A | 1 | SS | - | SS | - | 1 | A | - | - | - | - |
| *Lyogyrus* n. sp. 2 | 1 | A | 1 | SS | - | SS | - | 1 | A | - | - | - | - |
| *Lyogyrus* n. sp. 3 | 1 | A | 3 | - | MK PPC | - | MK PPC | 1 | A | - | - | - | - |
| *Monadenia chaceana* | 1 | B | 2 | SS | SS | SS-O | MK PPC | 1 | B | - | - | - | - |
| *Monadenia fidelis minor* | 1 | A | 1 | SS | - | SS | - | 1 | A | - | - | - | - |
| *Monadenia troglodytes troglodytes* | 1 | A | 1 | - | - | - | SS | 1 | A | - | - | - | - |
| *Monadenia troglodytes wintu* | 1 | A | 1 | - | - | - | SS | 1 | A | - | - | - | - |
| *Oreohelix* n. sp. | 1 | A | 1 | - | - | SS-W | - | 1 | A | - | - | - | - |
| *Pristiloma arcticum crateris* | 1 | A | 1 | SS | - | SS-O | - | 1 | A | - | - | - | - |
| *Prophysaon coeruleum*, In California and Washington[2] | 1 | A | 1 | - | - | SS-W | SS | 1 | A | - | - | - | - |
| *Trilobopsis roperi* | 1 | A | 1 | - | - | - | SS | 1 | A | - | - | - | - |
| *Trilobopsis tehamana* | 1 | A | 1 | - | SS | - | SS | 1 | A | - | - | - | - |
| *Vertigo* n. sp. | 1 | A | 1 | - | - | SS-W | - | 1 | A | - | - | - | - |
| *Vespericola pressleyi* | 1 | A | 1 | - | SS | - | SS | 1 | A | - | - | - | - |
| *Vespericola shasta* | 1 | A | 1 | - | - | - | SS | 1 | A | - | - | - | - |
| *Vorticifex* n. sp. 1 | 1 | E | 3 | - | MK | - | MK | 1 | E | - | - | - | - |

## Table 2-15. Summary of Environmental Consequences for all 296 Survey and Manage Species and 4 Arthropod Functional Groups.

| This table summarizes, by alternative, the outcome, management, and identified mitigation that would change an outcome for each Survey and Manage species. | Alternative 1 | | Alternative 2 | | | | | Alternative 3 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Outcome | Survey & Manage Category | Outcome | BLM OR/ WA[1] | BLM CA | FS R-6 | FS R-5 | Outcome | Survey & Manage Category | BLM OR/ WA[1] | BLM CA | FS R-6 | FS R-5 |
| **VASCULAR PLANTS** | | | | | | | | | | | | | |
| *Arceuthobium tsugense mertensianae*, In Washington[2] | 1 | F | 1 | - | - | - | - | 1 | - | - | - | - | - |
| *Bensoniella oregana*, In California[2] | 1 | A | 1 | SS | - | SS-O | SS | 1 | A | - | - | - | - |
| *Botrychium minganense*, In Oregon and California[2] | 1 | A | 1 | - | - | SS-O | SS | 1 | A | - | - | - | - |
| *Botrychium montanum* | 1 | A | 1 | As | - | SS-O | SS | 1 | A | - | - | - | - |
| *Coptis asplenifolia* | 1 | A | 1 | - | - | SS-W | - | 1 | A | - | - | - | - |
| *Coptis trifolia* | 1 | A | 1 | As | - | SS | - | 1 | A | - | - | - | - |
| *Corydalis aquae-gelidae* | 1 | A | 1 | SS | - | SS | - | 1 | A | - | - | - | - |
| *Cypripedium fasciculatum*, Entire Range except WA Eastern Cascades Physiographic Province[2] | 1 | C | 1 | A | SS | SS | SS | 1 | C | - | - | - | - |
| *Cypripedium montanum*, Entire range except WA Eastern Cascades Physiographic Province[2] | 1 | C | 2 | MK PPC | SS | MK-O PPC-O | SS | 2 | C | MK PPC | SS | MK-O PPC-O | SS |
| *Eucephalus vialis* | 1 | A | 1 | SS | - | SS-O | - | 1 | A | - | - | - | - |
| *Galium kamtschaticum*, Olympic Peninsula, WA Eastern Cascades, OR and WA Western Cascades Physiographic Provinces, south of Snoqualmie Pass [2] | 1 | A | 1 | - | - | SS | - | 1 | A | - | - | - | - |
| *Platanthera orbiculata* var. *orbiculata* | 1 | C | 1 | - | - | - | - | 1 | C | - | - | - | - |
| **ARTHROPODS** | | | | | | | | | | | | | |
| Canopy herbivores (south range)[2] | 4 | F | 4 | - | - | - | - | 4 | - | - | - | - | - |
| Coarse wood chewers (south range)[2] | 4 | F | 4 | - | - | - | - | 4 | - | - | - | - | - |
| Litter and soil dwelling species (south range)[2] | 4 | F | 4 | - | - | - | - | 4 | - | - | - | - | - |
| Understory and forest gap herbivores (south range)[2] | 4 | F | 4 | - | - | - | - | 4 | - | - | - | - | - |

[1]No lands are managed by the BLM in Washington under the Northwest Forest Plan; no Survey and Manage species would be added to the BLM's Special Status Species Program in Washington.
[2]Geographic limitations included with the species names applies to Survey and Manage only. Special Status Species Program placements apply to entire states.
[3]Mt. Hood National Forest only.
[4]Due to the species not being surveyed for in younger forests under Survey and Manage this species would have insufficient habitat. Mitigation for this species would be to manage the species under the Special Status Species Program for Region 6 instead of Survey and Manage and for BLM in Oregon to manage all known sites and conduct pre-project clearances in suitable habitat.
[5]While species have sufficient habitat range wide, they lack sufficient habitat in a small portion of their range under all alternatives.
[6]Species recommended for inclusion as SSSP in the northwestern Oregon coast area only (north of Highway 20, west of the Willamette Valley).
[7]Not surveying in stands that the have not yet reached late-successional and old-growth condition could cause inadvertent loss of sites and reduce the habitat necessary to support stable populations.
[8]There is insufficient information to determine if not doing equivalent effort surveys in non-late-successional and old-growth would reduce habitat to level that insufficient for the species. Mitigation would be to manage the species under the Special Status Species Programs.

Outcomes: 1 = Habitat sufficient to support stable populations in NWFP area; 2 = Habitat sufficient to support stable populations in NWFP area except in a portion the area; 3 = Habitat insufficient to support stable populations in NWFP area; or, 4 = Insufficient information to determine an outcome. For more detail see Chapter 3&4.
Survey and Manage Categories: A = Rare, pre-disturbance surveys practical, manage all known sites; B = Rare, pre-disturbance surveys not practical, manage all known sites; E = Rare, status undetermined, manage all known sites; C = Uncommon, pre-disturbance surveys practical, manage high priority sites; D = Uncommon, pre-disturbance surveys not practical or not required, manage high priority sites; or, F = Uncommon, status unknown. These categories are described in detail in Table 2-2 and Appendix 1 for Alternative 1 and Table 2-9 and Appendix 4 for Alternative 3.
Special Status Species Categories: SS=BLM Sensitive or FS Sensitive; As =BLM OR Assessment; -O= Oregon only; -W= Washington only. Hyphens (-) indicate not included. Fore more detail see Alternative 2 description in Chapter 2.
Mitigation: MK = Mitigation manage known sites; PPC = Mitigation pre-project clearances. For more detail see Potential Mitigation discussion under Alternative 2 and Alternative discussion in Chapter 2.

# Chapter 3&4

**Changes between Draft and Final**

Minor corrections, explanations, and edits are not included in this list.

- Clarified the key assumptions described in the Introduction section.
- Several comments expressed concern or confusion with the use of "High Risk of Extirpation" to describe the outcomes in the SEIS. As a result, the description of outcomes in the Final SEIS has been changed to be consistent with the 2000 Survey and Manage Final SEIS. See the Introduction to Chapter 3&4 for a complete description of outcomes.
- Updated the Comparison of Alternatives section to include a discussion of the possible outcomes and their basis and a discussion of the certainty of outcomes.
- Clarified the effects analysis (added detail) for species with sufficient habitat (including known sites) to support stable populations under Alternatives 1 that do not have sufficient habitat under Alternatives 2 or 3.
- Incorporated the results of the 2003 Annual Species Review.
- Updated the outcomes for 27 species that changed as a result of finding errors in logic, reconsideration based on additional detail, or assumed Special Status Species Program placements.
- Added a description of the differences between the alternatives for species that have insufficient habitat (including known sites) or for which there is insufficient information to determine an outcome under all alternatives. These differences are explained in the Introduction section and, where appropriate, in the environmental consequences for each species.
- Updated the Costs of Management section. Assumptions regarding Special Status Species Program costs were revised based on discussions with program managers. The costs for Alternative 1 were revised and now include overhead costs.
- Revised the Wildland and Prescribed Fire section to distinguish between types of fuel treatment: mechanical vs. prescribed fire. Revised calculations for Alternative 3 based on assumption regarding how many acres of hazardous fuels projects would take place in late-successional forest. Revised calculations for Alternative 2 based on cost discussions with Special Status Species Program managers.
- Expanded the Critical Elements of the Human Environment section and included items that had been inadvertently left out of the Draft SEIS.
- Revised the Aquatic Ecosystem section to describe the proposed language changes to the Aquatic Conservation Strategy.
- Updated the Great Gray Owl section with an analysis of the effects of not surveying in non late-successional stands under Alternative 3.
- Updated the Socioeconomics Section to include the net loss in personal income.

# Chapter 3&4 - Affected Environment and Environmental Consequences

## Introduction

Chapter 3 (Affected Environment) and Chapter 4 (Environmental Consequences) are combined in this document, as was done in the Northwest Forest Plan Final SEIS (USDA, USDI 1994a), to more clearly present information to the readers. The text is ordered by first describing a resource or environmental component, and then describing the environmental consequences to that resource or component.

This chapter describes aspects of the environment likely to be most directly affected by the proposed management. This chapter also describes the effects (direct, indirect, and cumulative) of management under the alternatives. Together, these descriptions form the scientific and analytic basis for the Comparison of Effects of the Alternatives section in Chapter 2. Additional information regarding the existing environment may be found in the 2000 Survey and Manage Final SEIS.

## Relationship of this SEIS to the Northwest Forest Plan Final SEIS and the 2000 Survey and Manage Final SEIS

The Final SEIS (1994) for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl (the Northwest Forest Plan) is referred to as the 1994 Final SEIS or the 1994 Northwest Forest Plan Final SEIS. The Final SEIS (2000) for Amendment to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines is referred to as the 2000 Final SEIS or the 2000 Survey and Manage Final SEIS.

This SEIS supplements the analysis contained in the 2000 Survey and Manage Final SEIS, and the 1994 Northwest Forest Plan Final SEIS. Whenever a broad environmental impact statement has been prepared and a subsequent environmental impact statement is then prepared on an action within the entire program, the subsequent environmental impact statement need only summarize the issues discussed in the broader environmental impact statement and incorporate by reference the discussions from the broader statement (40 CFR 1502.20). Appendix 8 contains a summary of the species analyses from the previous two Final SEISs.

Additional information is incorporated where appropriate from the Forest Ecosystem Management: An Ecological, Economic, and Social Assessment; Report of the Forest Ecosystem Management Assessment Team (FEMAT) 1993 and the 2001, 2002, and 2003 Annual Species Reviews of Survey and Manage species.

The analysis of environmental consequences of Alternative 1 in the 2000 Survey and Manage Final SEIS is the analytical equivalent of Alternative 1 (No-action alternative) in this SEIS. For the sake of brevity, the effects analysis for Alternative 1 in this SEIS only includes the outcomes from the 2000 Final SEIS. The complete analysis from the 2000 Final SEIS is incorporated by reference.

The analysis of environmental consequences for Alternative 2 is based on a consideration of the analysis from the 2000 Final SEIS, the 1994 Final SEIS, and FEMAT, as well as information from the 2001, 2002, and 2003 Annual Species Reviews of Survey and Manage species.

Alternative 3 combines elements of Alternative 1 with elements of Alternative 2. As a result, much of the analysis of Alternative 3 can be interpolated from the analysis of Alternatives 1 and 2.

The analysis of environmental consequences in this SEIS is limited to those consequences that would result from the actions described in the alternatives. The alternatives in this SEIS have already been thoroughly analyzed in FEMAT, the 1994 Final SEIS, and the 2000 Final SEIS. During the Annual Species Review process, new information is considered where available and changes to the Survey and Manage Program are made as appropriate. For the species that remain in Survey and Manage, there is no new information (unless specifically noted), that would substantially change the conclusions provided in these earlier documents, so the conclusions are still relevant.

The environmental consequences described in the 1994 Final SEIS relating to other aspects and elements of the Northwest Forest Plan, which are unchanged by the alternatives in this SEIS, are assumed to remain valid.

# Incomplete or Unavailable Information

The management of natural resources and the analysis in the Northwest Forest Plan Final SEIS have been surrounded by public and scientific controversy. The Northwest Forest Plan Final SEIS acknowledged this controversy. The public and scientific controversy concerning natural resource management in the Pacific Northwest has continued to the present time. Additionally, the amount of information available for description and analysis varies greatly by species and taxa managed under the Survey and Manage Standards and Guidelines.

One step in preparing an environmental impact statement is to evaluate whether information about effects of a proposed action is incomplete or unavailable and, if so, to disclose that fact and make certain findings about the relevance, importance, and/or costs of acquiring data that could help fill any such gaps. Much of the discussion concerning these issues in the Northwest Forest Plan Final SEIS (pp. 3&4-3 and 3&4-4) and the 2000 Final SEIS (pp. 180-182) remains relevant for purposes of the analysis in this SEIS and is specifically tiered to and incorporated by reference.

When encountering a gap in information, the question implicit in the Council on Environmental Quality (CEQ) regulations (40 CFR 1502.22(a)) on incomplete or unavailable information was posed: Is this information "essential to a reasoned choice among alternatives?" While additional information would often add precision to estimates, the basic data and central relationships are sufficiently well established that any new information would not likely reverse or nullify relationships. Though new information would be welcome, no missing information is essential to a reasoned choice among the alternatives.

As noted throughout the species analyses in this SEIS, there is much that remains unknown about many of the species subject to analysis. Despite more than 5 years and tens of millions of dollars spent on surveys, it is unknown how many sites are located in reserves because they have not been surveyed to the same degree as Matrix and Adaptive Management Area lands. In fact, for 112 species, no new sites have been found anywhere. Although some species are thought to be closely associated with late-successional and old-growth forests, for some species, the strength of this association is not well known. Connectivity and habitat needs, range, and other specific information for many species are unknown or uncertain. For many species, it is still unknown if the reserve system and other standards and guidelines provide for a reasonable assurance of persistence. Any discussion of risk based on rarity and likelihood of disturbance must recognize that, for many species, only a small percentage of potential habitat has

been surveyed. In situations where limited species-specific information is available, more reliance, by necessity, must be placed on information regarding the condition and management of the overall landscape in formulating conclusions regarding environmental consequences. The best available information was used to evaluate the alternatives.

# Assumptions and Information Common to All Alternatives

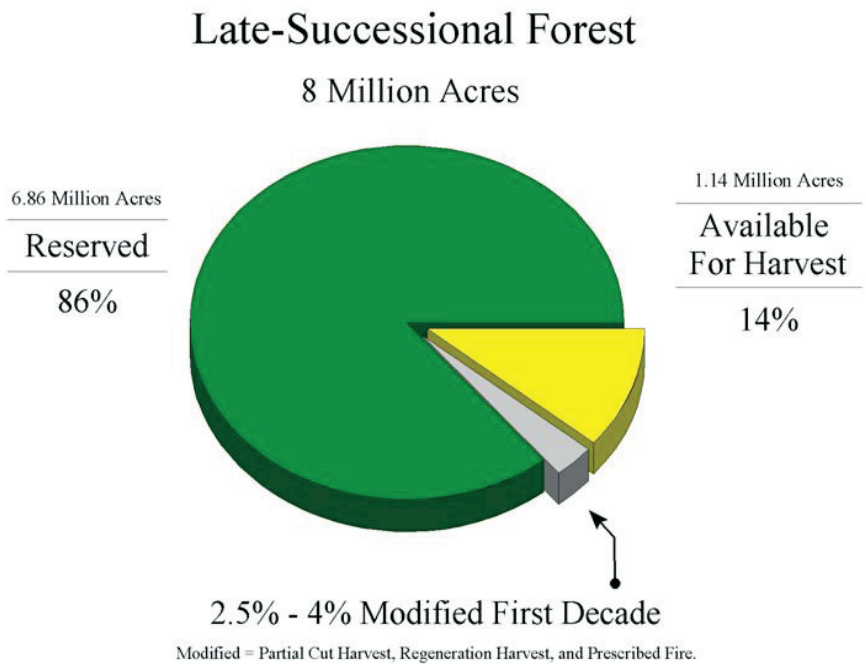
The land allocations and Northwest Forest Plan Standards and Guidelines provide direction for retention, protection, and development of late-successional forest.

- Reserves - Congressionally Reserved, Late-Successional Reserves, Administratively Withdrawn Areas, and Riparian Reserves encompass 86 percent (6.8 million acres) of the existing late-successional forest. The objectives of these reserves are to provide for protection and development of late-successional forest.
  - Late-Successional Reserves and Congressionally Reserved - Late-Successional Reserves were designed around the most ecologically significant existing late-successional forest. Late-Successional Reserves and Congressionally Reserved Areas designate 60 percent of federally managed lands in large block reserves. Forested portions of these reserves are being managed for the creation of large blocks of late-successional forest habitat. Late-Successional Reserves were also designated around known spotted owl activity centers and occupied marbled murrelet sites. These Late-Successional Reserves provide additional protection of the late-successional forest associated with these sites.
  - Administratively Withdrawn Areas - The current land and resource management plans have administratively withdrawn an additional 6 percent of federally managed lands which protect and preserve existing resource values. While the objectives of some of these areas (such as recreation facilities) are not to provide for protection and development of late-successional forest, most of these areas contain late-successional forest and incidentally protect them. Examples of administratively withdrawn areas include Research Natural Areas, Areas of Critical Environmental Concern, Scenic Areas, fragile sites not suitable for long-term timber production, unique habitat areas (caves, meadows, wetlands, etc.), recreation areas, and wildlife management areas (eagles, peregrine falcon, etc.).
  - Riparian Reserves - The Riparian Reserve network adopted under the Northwest Forest Plan was the most extensive among the alternatives considered. In 1994, the Riparian Reserves were estimated to encompass 11 percent of federally managed lands. Since 1994, revised estimates have indicated at least an additional 2 percent of federally managed lands are in Riparian Reserves. This reserve component spans the full range of forest conditions including late-successional forest and provides reserve lands intermingled throughout Matrix lands. Riparian Reserves are managed to develop and protect late-successional forest in riparian areas using watershed analysis.

- Matrix and Adaptive Management Areas - 1.1 million acres or 14 percent of the existing late-successional forest is assumed to be available for harvest within the Matrix and Adaptive Management Areas in support of the Probable Sale Quantity (PSQ) objectives of the Northwest Forest Plan.
  - Matrix management activities, including regeneration harvest, partial cut harvest, and prescribed fire, will modify 2.5-4 percent of the existing and late-successional forest over a decade (see Figure 3&4-1).[1]
  - Matrix Standards and Guidelines provide for retention of legacy elements of late-successional forest after harvest such as snags, large green trees, and down logs. There are also provisions for retaining old-growth fragments in watersheds where little remains.

[1] The Northwest Forest Plan Biological Opinion assumed that 2.5 percent of existing owl habitat will be removed as suitable habitat through timber harvest. Figure 3&4-1 differs from the Biological Opinion assumption in that it displays all late-successional forest not just owl habitat. The 2.5- 4 percent is "modified" not "removed" by activities such as prescribed fire, partial cuts, and forest health treatments as well as regeneration harvest.

**Figure 3&4-1**. Late-Successional Forest in the Northwest Forest Plan Area.



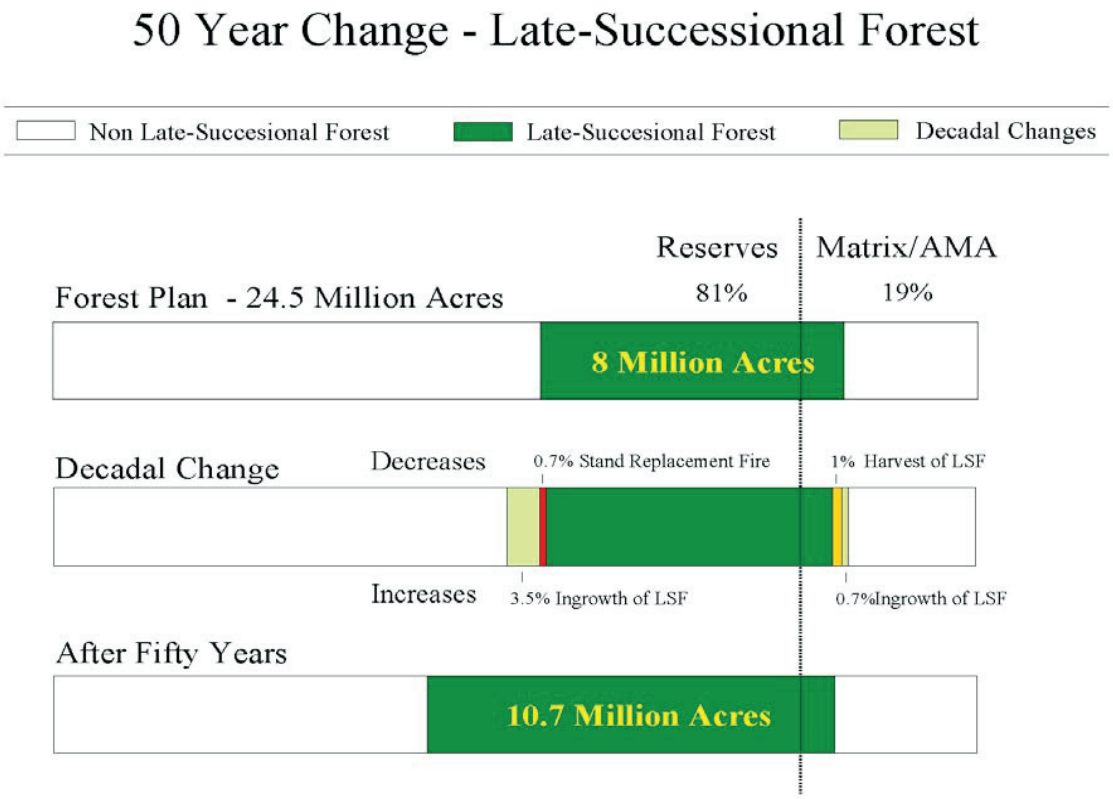

- The lands available for harvest in the Matrix contain all seral stages. The management of some of these lands, particularly in the southern half of the Northwest Forest Plan, is under longer rotations and partial cut regimes which will maintain some forest in older stages of stand development at all times.

Of the 24.5 million acres under the Northwest Forest Plan, 8 million acres are late-successional forest. The existing distribution and spatial patterns of this late-successional forest are the result of past land management activities, natural disturbances, and the land allocations designated prior to the Northwest Forest Plan.

Under the assumptions of the Northwest Forest Plan, the existing 1.1 million acres of late-successional forest in the Matrix and Adaptive Management Areas would be harvested over the next 40 to 50 years. During this same timeframe, with the Northwest Forest Plan assumptions for harvest and stand replacement fire, it is estimated the overall amount of late-successional forest will increase by 2.7 million acres due to the development of late-successional forest in reserves (see Figure 3&4 -2). Although the Biscuit Fire was large, with approximately 204,000 acres containing stands with high fire mortality (USDA Forest Service, 2003b), the Northwest Forest Plan SEIS (p. 3&4-84) acknowledged the potential for this type of disturbance. It said that "the risk of large-scale wildfire in northern spotted owl habitat is greatest within the dry provinces." Acknowledging the variability of fire events, that analysis assumed that 12.5 percent of the reserves would be subject to severe disturbance over 50 years (USDA, USDI 1994a, p. 3&4-42).

The development of forest over time occurs across the full spectrum of late-successional forests, including old growth. Late-successional forest is increasing at 2.5 times the rate of loss that occurs through stand replacement fire and harvest. The relative amounts in reserves and Matrix (as shown in Figure 3&4-2) have been adjusted to account for the assumed increase in reserves as a result of the 15 percent reduction in PSQ which has occurred since the beginning of the Northwest Forest Plan (see Timber Harvest Section).

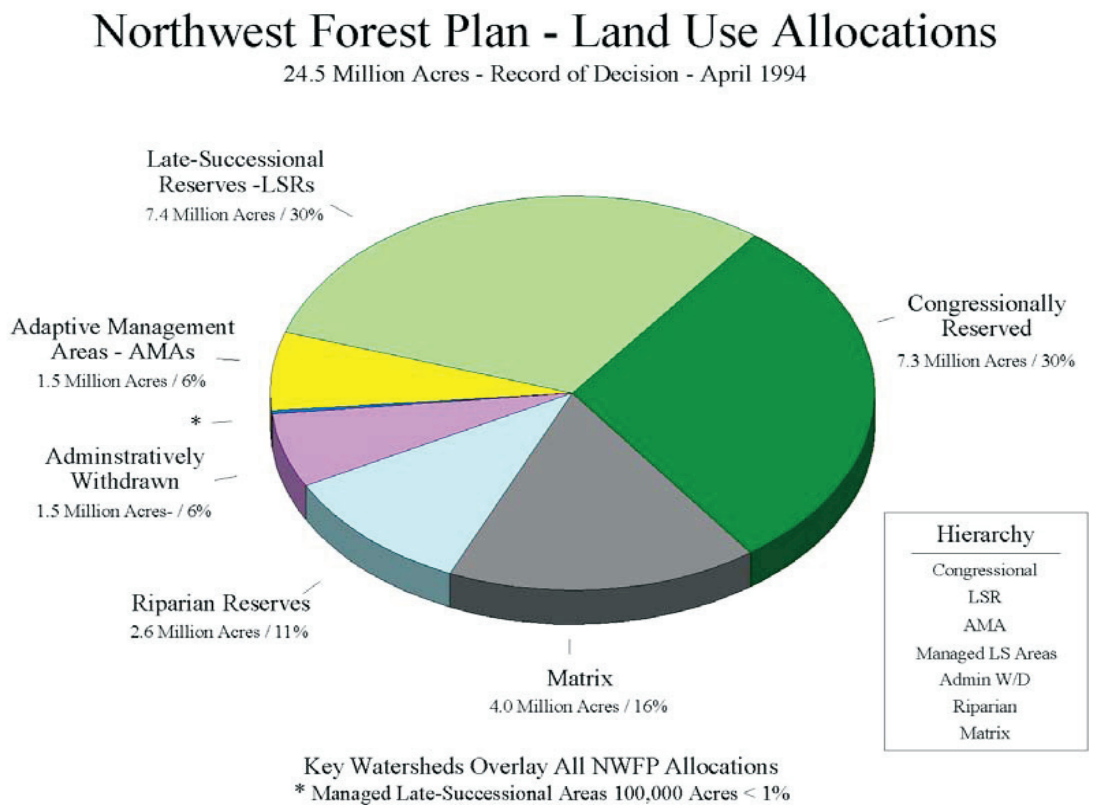
**Figure 3&4-2.** Development of Late-Successional Forest Over Time.




Conclusions regarding the environmental consequences of the alternatives are based on specific species information, information about the landscape, and assumptions regarding management actions. Information and assumptions regarding federally managed lands that are common to all alternatives include:

- The Northwest Forest Plan incorporates conservation principles of maintaining: (1) connectivity across the landscape; (2) landscape heterogeneity; (3) structural complexity; and, (4) the integrity of aquatic systems;
- Almost 80 percent of the Northwest Forest Plan area is reserved (see Figure 3&4-3);
- 86 percent of current late-successional forest is reserved (see Figure 3&4-1);
- Less than 4 percent of late-successional forest will be disturbed by management per decade;
- Development of late-successional forest is 2.5 times the rate of loss through stand replacement fire and harvest (see Figure 3&4-2);
- Under the Northwest Forest Plan, there is a 600,000-acre net increase in late-successional forest per decade and a 2.7 million-acre net increase in late-successional forest over 3-4 decades;
- On average, approximately 50 percent of any watershed in the Matrix is reserved by the application of Riparian Reserves.
- The 1994 Final SEIS and FEMAT concluded the Northwest Forest Plan would provide for maintenance and restoration of a functional and interconnected late-successional forest ecosystem.

**Figure 3&4-3.** Original Northwest Forest Plan Land Allocations and Late-Successional Forest.




## New Information

This subject was addressed in the 2000 Survey and Manage Final SEIS (pp. 183-187) which this SEIS supplements. This SEIS only addresses new information since the 2000 Final SEIS was prepared.

One of the primary events that has taken place since the 2000 Survey and Manage Final SEIS is the occurrence of wildfire. In the summer of 2002, wildfires burned many acres of federally managed lands within the Northwest Forest Plan area. Fires burned with varying degrees of intensity. Low-intensity, ground fires consumed light fuels while leaving much of the forest structure intact. Other forested areas were completely consumed in high-intensity, stand-replacing fires. Effects to Survey and Manage species probably varied with the intensity of the fires. Some species that depend on fire probably benefited while others that do not tolerate fire may have been killed or displaced. However, it is important to recognize that late-successional forests in the planning area are dynamic and have historically experienced varying levels of disturbance from fire, windstorms, insects, and disease. Survey and Manage species have evolved within this ecosystem.

A Draft Environmental Impact Statement (EIS) on the Biscuit Fire Recovery Project was completed in November 2003. The fire burned in a mosaic pattern; approximately 20 percent of the area burned lightly, with less than 25 percent of the vegetation killed. Approximately 50 percent of the area burned very hot, with more than 75 percent of the vegetation killed. The analysis in the Biscuit Fire Draft EIS refers to a fire history analysis

of the Klamath-Siskiyou Region of northwest California and southwest Oregon (Frost and Sweeney 2000) which stated "… initial analysis of 20th Century fire history suggests that forests of the Klamath-Siskiyou Region have experienced a reduction in both the total amount of area burned and the average fire size since the middle of the 1900's ..." It continued with the hypothesis that "… fire suppression has been somewhat effective at reducing area burned at low and moderate intensities - when fire sizes are likely to be small - but not at high intensities when extreme conditions typically exist and allow fires to grow to large size." And, "while high intensity fires may now comprise a larger proportion of total area burned than before 1950, this does not necessarily imply that the size or frequency of large fire events is outside the historic range." There is currently no information that indicates that the fires of 2002 are inconsistent with assumptions made in the Northwest Forest Plan Final SEIS (see Wildland and Prescribed Fire section) regarding the importance of hazardous fuels reduction or the predicted amount of disturbance due to fires.

Information has been gained from surveys and other sources and was used to update the Interagency Species Management System (ISMS) database. Federal known sites from the ISMS database were queried in March 2003 and are displayed in Table 3&4-8 at the end of this chapter. When effects writers had information about new federal known sites that affected the outcome for species, they were described in the effects analyses where relevant.

Under the Survey and Manage Standards and Guidelines, an annual species review is completed. A regional-level interagency group including taxa experts weighs new information against criteria to determine if additions or deletions of species from Survey and Manage or changes of species among categories are warranted. A complete summary for this process can be found in the 2000 Survey and Manage Final SEIS, Appendix F. The first annual species review as prescribed by the Survey and Manage Record of Decision (January 2001) was completed in June 2002. The second annual species review was completed in March 2003. The third annual species review was completed in December 2003. The following changes were made based on these reviews:

- 59 species were removed from Survey and Manage in all or part of their range;
- 40 species were placed in different categories for all or part of their range;
- 51 species had their ranges changed.

The species removed during the three annual species reviews are not analyzed in this SEIS because they are no longer included in the Survey and Manage Standards and Guidelines. The annual species reviews determined, in some instances, new information warranted a change in the category of a species but not its removal from the Survey and Manage Standards and Guidelines. The change in the category of a species under Survey and Manage is considered a refinement of management.

Monitoring of the Northwest Forest Plan has indicated the Agencies have a high degree of fidelity in implementing the standards and guidelines as written. The 2002 field season marked the seventh consecutive year of the Northwest Forest Plan implementation monitoring program. This program is designed to determine whether the Record of Decision and its corresponding standards and guidelines are consistently followed across the Northwest Forest Plan area. Overall, compliance in meeting the Northwest Forest Plan Standards and Guidelines was 98 percent for the 32 projects and watersheds monitored in 2002 (Baker 2003). The assumed level of timber sales under the Northwest Forest Plan has not been achieved for a variety of reasons including greater than anticipated effects from the Survey and Manage Standards and Guidelines and lawsuits.

It is important to understand the relationship of monitoring and information to mitigation. New information is always welcome and often facilitates decision-making

and adaptive management. Additional information may allow a more accurate management of risk. Monitoring is often an important source of new information. Although monitoring and gaining new or additional information are important, they are not mitigation measures that reduce the environmental consequences of management actions. For instance, monitoring or completing research on water temperature would not mitigate a management action that removed shade from streams. Gaining new information can aid the adaptive management process, but it does not predetermine what specific management decisions will be taken in response to that information. New information does not have a direct mitigating effect on the environmental consequences of management actions.

Both the Survey and Manage Standards and Guidelines and the Special Status Species Programs have mechanisms to obtain new information. The Survey and Manage Standards and Guidelines have a more intensive and uniform strategy to accomplish information gathering. In general, new information facilitates decision-making and adaptive management. It is not possible to attribute a reduction of specific environmental consequences from information gathering and the facilitation of adaptive management. Even though a direct link to environmental consequences is not attributable to information gathering and monitoring, these are the basis of adaptive management and informed decision making.

## Adaptive Management

The Northwest Forest Plan requires adaptive management. Adaptive management is a continuing process of action-based planning, monitoring, researching, evaluating, and adjusting with the objective of improving implementation and achieving the goals of the selected alternative. Under the concept of adaptive management, new information will be evaluated and a decision will be made whether to make adjustments. Each alternative provides for acquiring and utilizing additional information to improve management direction for species. Alternatives 1 and 3 prescribe strategic surveys to obtain new information and the annual species review process to evaluate new information relating to species currently included in the Survey and Manage Standards and Guidelines. One type of strategic survey is a random-grid survey. A region-wide, random-grid survey for Survey and Manage fungi (187 species), lichens (40 species), bryophytes (15 species), vascular plants (12 species), mollusks (19 species), and the red tree vole are nearing completion. These surveys were conducted on randomly selected Current Vegetation Survey (CVS)/Forest Inventory and Analysis (FIA) plots. The objectives of the surveys were to estimate species' abundances throughout the Northwest Forest Plan area and to determine if species are associated with late-successional/old-growth habitats and reserve land allocations. Field surveys and statistical analysis have been completed for lichens, bryophytes, and vascular plants. Field surveys for mollusks and fungi were completed in fall of 2003; statistical analysis is expected to be completed early in 2004. Red tree vole field surveys will be completed in early 2004 with statistical analysis expected to be completed by spring 2004. This information is expected to be available for the 2004 Annual Species Review. For all alternatives, the Agencies' Species Status Species Programs also provide for evaluation of new information regarding species. If the Survey and Manage Standards and Guidelines were eliminated as described under Alternative 2, it is expected that the results of the random-grid surveys would be used in guiding species management under the Agencies' Special Status Species Programs.

## Cumulative Impacts

Cumulative impacts to the environment are defined in the CEQ regulations as those that result from the incremental effects of a proposed action when added to other past, present, and reasonably foreseeable future actions, regardless of which agency or person undertakes them (40 CFR 1508.7). Given the programmatic nature and scale of this

SEIS, the environmental consequences represent a general projection of the accumulated effects of management actions that are reasonably assumed to occur given the current status of federally managed lands and the full complement of the Northwest Forest Plan Standards and Guidelines.

The cumulative effects analysis in Chapter 3&4 of the Northwest Forest Plan Final SEIS, including Appendix J2, and the 2000 Survey and Manage Final SEIS, addressed in detail the cumulative effects relating to species that are the subject of the analysis in this SEIS. The extensive cumulative effects analysis in these documents, as well as that contained in FEMAT, is incorporated by reference in this SEIS. The analysis and conclusions contained in the environmental consequences sections of this SEIS have considered new information as well as information contained in FEMAT and other Final SEISs. As in the previous efforts, the primary focus of the analysis in this SEIS is on federally managed lands, "The intent was and continues to be to make explicit the 'benefit expected to accrue to … species … from habitat provided on federally managed lands under each of the alternatives'" (USDA, USDI 1994a, Appendix J3).

Currently, the Agencies are considering modification of some of the language in the Aquatic Conservation Strategy (ACS). The ACS includes language that has been interpreted to mean that decision-makers must demonstrate that a proposed project will attain all of the ACS objectives. These objectives were never intended to be site-specific standards; rather, they were intended to be achieved at the fifth-field watershed scale and broader, over the long term. Confusion related to the existing language has hindered federal land managers' ability to plan and implement projects needed to achieve Northwest Forest Plan goals. The effects of this modification are disclosed in a separate Final SEIS completed in October 2003. The cumulative effects of this action are considered in the Aquatic Ecosystems section later in this Chapter.

Changes have been proposed for the Forest Service planning rule (36 CFR 219), changes have been made to the Forest Service appeal rule (36 CFR 215), and changes have been made for categorical exclusions for both Agencies. None of these changes affect the design of projects that comply with Northwest Forest Plan Standards and Guidelines and land allocations. These rule changes did not increase PSQ, but they are likely to contribute to agency success in meeting the PSQ.

Other broad-scale analyses currently underway include the Forest Service Invasive Plant EIS, the BLM and Forest Service Port-Orford-cedar EIS, and the BLM Vegetation Treatments Programmatic EIS. The Port-Orford-cedar EIS resulted from a need to address cumulative effects as directed by the Kern v. BLM decision of the Ninth Circuit Court of Appeals. The BLM Vegetation Management EIS is intended (among other things) to address problems created by court injunctions from the 1980's that continue to restrict BLM herbicide use.

In response to a lawsuit against the Secretary of Interior and the Director of the BLM regarding the validity of the 1994 Northwest Forest Plan or the 1995 Resource Management Plans of the BLM in western Oregon on Oregon and California railroad grant lands (Association of O&C Counties and Douglas County, Oregon v. Babbitt and Dombeck, C.A. No. 96-5333 (D.C. Cir.); Civ. No. 94-1044 (U.S.D.C.D.C.)), the Secretaries of Interior and Agriculture entered into a settlement agreement on August 1, 2003. The major issues of the lawsuit revolved around the alleged inappropriate application of reserves and wildlife viability standards to O&C lands. The O&C lands account for more than 2.5 million acres in western Oregon and northern California. Under this settlement agreement, federal agencies will attempt to achieve the PSQ associated with Alternative 9 of the Northwest Forest Plan (currently 805 million board feet), along with additional harvest from restoration silviculture within the reserves. The BLM will revise

its Resource Management Plans within the next several years. The settlement agreement requires the BLM to consider an alternative during plan revision that eliminates reserve allocations except as necessary to protect endangered species.

None of these efforts have changed the Northwest Forest Plan goals and objectives, land allocations, or standards and guidelines that are the basis for the effects analysis. None of these analyses, regulatory proposals, or settlement agreements currently alter the effects of the Northwest Forest Plan as analyzed in the 1994 Final SEIS. The resource management plan revision process outlined in the Association of O&C Counties settlement agreement will require NEPA analysis once alternatives are clearly identified. In the meantime, the BLM will continue to manage lands under its administration in accordance with existing resource management plans.

# Background for Effects Analysis

The information used to describe the affected environment and environmental consequences in Chapter 3&4 in this SEIS was, with consideration of new information, compiled or derived from FEMAT; the Northwest Forest Plan Final SEIS, including Chapter 3&4 and Appendix J2; the 2000 Survey and Manage Final SEIS; and the 2001, 2002, and 2003 Annual Species Reviews.

The analysis of environmental consequences in this SEIS must be understood in the context of the overall Northwest Forest Plan. The Northwest Forest Plan is an ecosystem approach to land management that focuses on habitat for late-successional and old-growth forest related species. Overall, environmental consequences cannot be attributed to a single set of standards and guidelines, such as Survey and Manage. The overall strategy in the Northwest Forest Plan is comprised of a combination of seven different land allocations and many different standards and guidelines.

The Survey and Manage Standards and Guidelines were a mitigation measure added to Alternative 9 in the Northwest Forest Plan Final SEIS and adopted in its Record of Decision. This mitigation measure was included to decrease the likelihood of extirpation of little known species that were thought to be rare.

A brief summary of the analyses provided in FEMAT, the Northwest Forest Plan Final SEIS (including Appendix J2), and the 2000 Survey and Manage Final SEIS is included here to help the reader understand the effects analysis in this SEIS.

## FEMAT

The Forest Ecosystem Management Assessment Team (FEMAT) was commissioned in 1993 to formulate and assess options for managing Forest Service and BLM administered lands within the range of the northern spotted owl. Of 64 options considered by FEMAT, 10 options encompassing various mixes of Late-Successional Reserves, Riparian Reserves, and prescriptions for management of forests both inside and outside of these reserves were selected for detailed consideration and analysis. In Late-Successional and Riparian Reserves, standards and guidelines were designed to restore and maintain late-successional forests and to maintain natural ecosystem processes. In the Matrix (areas outside of reserves), standards and guidelines were designed to provide connectivity between reserves and provide for important ecological functions such as dispersal of organisms, carryover of some species from one stand to the next, and maintenance of ecologically valuable structural components such as down logs, snags, and large trees. The Matrix was also expected to provide for ecologically diverse early-successional conditions and planned timber harvest.

For each of the 10 options, the team evaluated the likelihood of maintaining well-distributed habitat conditions on federally managed lands for threatened marbled murrelets and northern spotted owls. In addition, for sevem of the options, similar assessments were done for more than 1,000 plant and animal species thought to be closely associated with late-successional forests. In keeping with agency policies to prevent species from being listed under the Endangered Species Act (ESA) and with the regulations issued pursuant to the National Forest Management Act (NFMA), the team assessed the risk of "viability" to species.

Panels of experts were convened to make a determination of the likelihood of achieving four possible outcomes relating to habitat conditions on federally managed lands for each species. Panelists were asked to assign 100 "likelihood votes" (or points) across four outcomes. A panelist could express complete certainty in a single outcome for a species/option combination by allocating 100 points to a single outcome. The panelist could express uncertainty by spreading votes across the outcomes. Following are the four outcomes:

Outcome A: Habitat is of sufficient quality, distribution, and abundance to allow the species population to stabilize, well distributed across federal lands. (Note: the concept of well distributed was to be based on knowledge of the species distribution, range, and life history.)

Outcome B: Habitat is of sufficient quality, distribution, and abundance to allow the species population to stabilize, but with significant gaps in the historic species distribution on federal land. These gaps can cause some limitation in interactions among local populations. (Note: the significance of the gaps must be judged relative to the species distribution, range, and life history, and the concept of metapopulations.)

Outcome C: Habitat only allows continued species existence in refugia, with strong limitations on interactions among local populations.

Outcome D: Habitat is inadequate to maintain the species and would result in species extirpation from federal land within the range of the northern spotted owl.

While the use of a "point" system implies a certain precision, the ratings were compilations of subjective ratings by numerous scientists (FEMAT, p. 11-29). Although the overall evaluation may have been reasonable, the ratings are not precise and the ratings are conservative for many rare species. The following areas, which are relevant to the assessment of rare species, were subject to different interpretations by different panels.

1. Treatment for rare and locally endemic species. Many of these species had small and restricted ranges or existed in refugia even before habitat alteration by harvesting and other activities. Some panelists tended to rate these species in Outcome B or C under even the most protective options (USDA, USDI 1994a, p. 3&4-122).
2. Habitat versus population outcomes. Outcomes were defined in terms of habitat "quality, distribution, and abundance." Some panelists found it difficult to separate the habitat and population elements (USDA, USDI 1994a, p. 3&4-122).
3. Definition of "well distributed." Panelists were not uniformly clear about what "well distributed" meant for each taxon. This issue was particularly confusing between Outcome A and B (USDA, USDI 1994a, p. 3&4-123).
4. Historic versus current species distribution. Reference in the scale to "historic species distribution" in Outcome A was difficult for species groups for which information is limited to the current distribution. Taken literally, the reference to historic distribution held the ratings to a high standard of requiring habitat reestablishment throughout the historic range (USDA, USDI 1994a, p. 3&4-123).

5. It was difficult for panelists to project changes in biophysical conditions over the 100-year timeframe specified (FEMAT, pp. IV-42 through IV-43 and USDA, USDI 1994a, p. 3&4-123).

FEMAT compared outcomes of the options on species viability by assessing whether the scientists believed that under the alternative being evaluated, a vertebrate species had an 80 percent or greater likelihood of achieving Outcome A. In focusing on the 80 percent likelihood of achieving Outcome A, FEMAT did not suggest that only options attaining that likelihood satisfied the viability provision. FEMAT specifically noted that no single such level represents a viable population for all species and circumstances. The 80 percent level was chosen only as a point of comparison (FEMAT, p. IV-49).

The analysis by FEMAT was limited to assessing the sufficiency of habitat. It did not assess population viability per se. The team did note, for some species, continued persistence was in question regardless of federal land management. A system of Late-Successional Reserves was the central feature of all the options considered. The extent of the reserve system (i.e. total acreage) was the single most distinguishing feature across the array of options.

Late in the Northwest Forest Plan Final SEIS process, eight mitigation measures were added to Alternative 9. The panels and assessments were not repeated to determine if the additional protections would have caused a different outcome.

## Northwest Forest Plan Final SEIS including Appendix J2 (Results of Additional Species Analysis)

Using the FEMAT report, the Northwest Forest Plan interdisciplinary team prepared a Supplemental EIS using FEMAT's 10 options as alternatives. The 1994 Record of Decision selected Alternative 9 as the alternative that best met the dual needs: the need for forest habitat and the need for forest products.

Additional species analysis was completed between the Northwest Forest Plan Draft and Final SEIS. Species were screened for the necessity of further analysis if, for vertebrates, there was a likelihood of Outcome A of less than 80 percent or any percent likelihood of Outcome D. For all other taxa, the screen was a combined likelihood of Outcome C and D of 20 percent or more, or any percent likelihood of Outcome D. The screening levels were not intended to represent a judgment of what is required by either the NFMA or the ESA (USDA, USDI 1994, Appendix J2, p. J2-2). The additional species analysis is described in detail in Appendix J2 of the Northwest Forest Plan Final SEIS.

The additional species analysis process in the Northwest Forest Plan Final SEIS considered 23 additional mitigation measures, including Survey and Manage, which might improve the ratings for the species that did not pass the screen. Eight of the 23 mitigation measures were incorporated into Alternative 9 and were adopted in the Northwest Forest Plan Record of Decision including Survey and Manage and Riparian Reserve Scenario 1 (one site-potential tree height width reserve on either side of intermittent streams) which greatly increased the amount of forest protected in riparian areas within the Matrix. Since these mitigation measures were added late in the process, the ratings for species were never changed to reflect the added mitigation. Chapter 3&4 of the 1994 Final SEIS contained only general statements that the additional standards and guidelines resulting from the added mitigation provided increased habitat protection for some species. The overall assessment of maintenance of a functional and interconnected late-successional forest ecosystem in the Final SEIS was not revised to reflect the additional mitigations because the Agencies anticipated that the changes to the outcomes would be relatively minor.

After a species was screened for additional analysis in the Northwest Forest Plan Final SEIS, the thresholds by which it was screened for additional analysis (see explanation above) were used in evaluating the benefits of proposed mitigation (USDA, USDI 1994a, p. J2-57). Although the screening levels did not represent a judgment as to what is required by either the NFMA or the ESA (USDA, USDI 1994a, Appendix J2, p. J2-2), it is easy to confuse the screen thresholds with targets that must be met. The 1994 Final SEIS did not adopt any specific level of likelihood of Outcomes A, B, C, or D from the additional species analysis as representing a threshold of reasonable certainty to support a conclusion regarding environmental consequences.

## 2000 Survey and Manage Final SEIS

In 1998, the Secretaries of Agriculture and Interior determined the Survey and Manage mitigation measures added to Alternative 9 as a result of the additional species review needed to be revised. The revision was intended to: (1) better identify the management needed; (2) clarify language; (3) eliminate inconsistent and redundant direction; and, (4) establish a process that better responded to new information.

To accomplish this revision, three action alternatives were considered in a Supplemental EIS. The conclusions in the 2000 Survey and Manage Final SEIS were complex. For any given species, the process in that SEIS allowed for: 30 different descriptions of range and distribution, 5 different descriptions of populations, 24 different descriptions of habitat associations, 9 different descriptions of known sites, and 10 different standard conclusions for the outcome (USDA, USDI 2000a, Appendix J).

Potential outcomes based on population stability and distribution patterns were:

Outcome 1: Habitat (including known sites) is of sufficient quality, abundance, and distribution to allow species to stabilize in a pattern similar to reference distribution.

Outcome 2: Habitat (including known sites) is of sufficient quality, abundance, and distribution to allow species to stabilize in a pattern altered from reference distribution with some limitations on biological functions and species interactions.

Outcome 3: Habitat (including known sites) is insufficient to support stable populations of the species.

Outcome 4: Information is insufficient to determine an outcome.

The results of the analysis were stated with varying degrees of uncertainty: low, moderate, or high.

Alternative 1 from the 2000 Final SEIS was adopted in the subsequent Record of Decision. Alternative 1 in the 2000 Final SEIS is the approximate analytical equivalent to Alternative 1, the No-Action Alternative, in this SEIS.

## Comparison of Alternatives for this SEIS

The Agencies' Special Status Species Programs are described in Chapter 2 and Appendix 2 of this SEIS. An analytical assumption of the environmental consequences is the inclusion of 152 Survey and Manage species in the Special Status Species Programs as shown in Table 2-5.

The environmental consequences analysis of Alternative 2 includes removing the Survey and Manage mitigation measure for all 296 species and 4 arthropod functional groups that are currently included under the Survey and Manage Standards and Guidelines. The

environmental consequences analysis of Alternative 3 includes removing the Survey and Manage mitigation measure for 24 uncommon species and 4 arthropod functional groups that are currently included under the Survey and Manage Standards and Guidelines in Categories C, D, and F and eliminating pre-project surveys in stands that have not developed late-successional and old-growth characteristics.

The Survey and Manage Standards and Guidelines and the Agencies' Special Status Species Programs have similar objectives; they both provide species-specific management for species of concern. They both contain strategies that provide for site management and determining if a project would affect a species. While little management discretion exists under the Survey and Manage Standards and Guidelines, on-the-ground management discretion exists for the Special Status Species Programs. Line officers have discretion in survey methodology and in implementing protection measures in site-specific situations. This discretion in the Special Status Species Programs is constrained by policy objectives that include not contributing to the need to list species under the Endangered Species Act and for the Forest Service maintaining viable populations in habitats distributed throughout the species range. The BLM uses environmental analysis (in the form of an EA or EIS) and the Forest Service requires a biological evaluation to identify whether effects on populations, habitat, and viability as a whole would occur. Coordination with concerned units and agencies may be necessary to gather information about the species. If adverse effects are expected to individuals of the species, the analysis also determines whether it would result in a trend toward federal listing. In addition, the Forest Service biological evaluation identifies whether the project is part of a trend towards loss of viability. A broad assumption of this SEIS is that the expected future conservation status of species included under the Agencies' Special Status Species Programs is basically similar to the expected conservation status for species included under the Survey and Manage mitigation measure. Timeframes for projections of outcomes are the same as described in the Northwest Forest Plan, "Our approach involves complex projections regarding the likely fate of species over the next 50 to 100 years, or more" (USDA, USDI 1994b, p. 44).

As noted throughout the effects analyses in this SEIS, there is much that remains unknown about many of the species subject to analysis. Despite more than 5 years and tens of millions of dollars spent on surveys, it is unknown how many sites are located in reserves because they have not been surveyed to the same degree as the Matrix and Adaptive Management Area lands. In fact, for 112 species no new sites have been found anywhere. Although some species are thought to be closely associated with late-successional and old-growth forests, for some species, the strength of this association is not well known. Connectivity and habitat needs, range, and other specific information for many species are unknown or uncertain. For many species, it is still unknown if the reserve system and other standards and guidelines provide for a reasonable assurance of persistence. Any discussion of risk based on rarity and likelihood of disturbance must recognize that, for many species, only a small percentage of potential habitat has been surveyed. In situations where limited species-specific information is available, more reliance, by necessity, must be placed on information regarding the condition and management of the overall landscape in formulating conclusions regarding environmental consequences.

The environmental consequences analysis in this SEIS supplements the previous analyses in the Northwest Forest Plan Final SEIS and 2000 Final SEIS. The analysis in this SEIS determines one of the following outcomes for each species:

1. Habitat (including known sites) is sufficient to support stable populations in the Northwest Forest Plan area
2. Habitat (including known sites) is sufficient to support stable populations range-wide in the Northwest Forest Plan area, although there is insufficient habitat to support stable populations in a portion of the Northwest Forest Plan area.

3. Habitat (including known sites) is insufficient to support stable populations in the Northwest Forest Plan area.
4. There is insufficient information to determine an outcome.

These outcomes correlate to those found in the 2000 Survey and Manage Final SEIS with the following exceptions:

> Outcome 1 in this Final SEIS is a combination of Outcomes 1 and 2 from the 2000 Survey and Manage Final SEIS. In the 2000 Final SEIS, Outcome 1 described species as stabilizing "in a pattern similar to reference distribution" while Outcome 2 described species as stabilizing "in a pattern altered from reference distribution, with some limitations on biological functions and species interactions."
>
> Outcome 2 is new. It allows for an outcome of habitat that supports stable populations in most of the planning area while acknowledging that there are certain portions of the species range where habitat does not provide for stable populations. Populations may or may not be described by distinct population segments or evolutionarily significant units. The viability provision and the Survey and Manage persistence objectives define a viable population as "continued existence is well distributed in the planning area" (36 CFR 219.19). The 2000 Survey and Manage Final SEIS described well-distributed as "distributed sufficiently to permit normal biological function and species interactions ..." (USDA, USDI 2000a, p. 189). Insufficient habitat to support stable populations in a portion of a species range could result in some restriction on normal biological function and species interactions. This would imply that the species is no longer well distributed in at least a part of the planning area which could result in a downward trend in distribution. So, while a species may be well distributed and have stable populations in most of the Northwest Forest Plan area, it is important to describe and disclose in the analysis of environmental consequences that a species may not have stable populations in a portion of its range.

The determination of an outcome is based on numerous factors including (1) the extent of the reserve system; (2) Matrix and Adaptive Management Area Standards and Guidelines; (3) provisions for species management under the Survey and Manage or Special Status Species Programs; (4) species range, distribution, and populations; (5) species life history and habitat needs; and, (6) the number and location of known sites. Information from FEMAT; the Northwest Forest Plan Final SEIS; the 2000 Survey and Manage Final SEIS; the Annual Species Reviews; and ISMS database, along with the professional knowledge of biologists and botanists was used to make the determination. Since each species has different life histories, ranges, distributions, and habitat needs, it is nearly impossible to devise precise thresholds for determining outcomes. Determinations are based on the evaluation of experts and tend to be more qualitative than quantitative in nature. This is consistent with the approach used throughout the Northwest Forest Plan. Even FEMAT, with its 100-point rating system, described their evaluations as "qualitative expert opinion assessments" (FEMAT, p. II-101).

When analyzing species, particularly rare species, it is nearly impossible to have complete information. When a species has very low known population numbers, a narrow range, poor distribution, and the proposed action is likely to eliminate the few remaining populations, the determination that habitat is insufficient to provide for stable populations is highly certain. When a species has very high numbers, a large range, good distributions, and the proposed action is not likely to eliminate a significant number of populations, the determination that the proposed action would result in habitat sufficient to support stable populations is highly certain. Between these two situations are a range of conditions and outcomes that are not as certain. The effects writers were asked to evaluate known information and determine an outcome that was reasonably certain based on their professional interpretation and evaluation. The determinations are based on information sufficient to support predictions of reasonably foreseeable outcomes in

order to provide the Responsible Officials with an indication of the risk to species across the alternatives.

## Key Assumptions for Pre-Project Surveys/Clearances and Known Site Management

### Alternative 1

Implement current Survey and Manage Standards and Guidelines for pre-disturbance surveys and managing known sites.

### Alternative 2

Special Status Species policies have an objective that the effects of a proposed action do not result in a trend toward the listing of a Special Status Species under the Endangered Species Act. For the Forest Service, policy requires that the effects of a proposed action would not result in a trend towards loss of viability for sensitive species. The analysis of the effects of the project on Special Status Species is in the NEPA documentation for the project for the BLM and the biological evaluation for the Forest Service.

Pre-project clearances are activities conducted to learn whether a species is present or potentially present in a project area. Pre-project clearances may include, but are not limited to,

- clearance surveys;
- field clearances;
- field reconnaissance;
- inventories;
- habitat examinations;
- habitat evaluation;
- evaluation of species-habitat associations and presence of suitable or potential habitat;
- review of existing survey records, inventories, and spatial data;
- utilization of professional research, literature, and other technology transfer sources; or
- use of expertise, both internal and external, that is based on documented, substantiated professional rationale.

Pre-project clearances are completed prior to habitat-disturbing activities to determine the presence of a species or its habitat and the effect of management actions on the species. The following assumptions are made regarding the most likely methods for completing pre-project clearances under the Special Status Species Programs.

If pre-disturbance surveys are practical under the Survey and Manage Standards and Guidelines, then clearance surveys, field clearances, field reconnaissance, inventories, and/or habitat examinations are most likely to be used under the Special Status Species Programs.

If pre-disturbance surveys are not practical under the Survey and Manage Standards and Guidelines (most Category B and D species) or a species status is undetermined (Categories E and F species), then field surveys are not likely to occur under the Species Status Species Programs either. Instead, the other components of pre-project clearances such as habitat examinations; habitat evaluation; evaluation of species-habitat associations and presence of suitable or potential habitat; review of existing survey records, inventories, and spatial data; or utilization of professional research, literature, and other technology transfer sources are most likely to be used.

The assumption for managing known sites under the Special Status Species Programs is that those sites needed to prevent a listing under Endangered Species Act would be managed. For species currently included in Survey and Manage Categories A, B, and E (which require management of all known sites), it is anticipated that only in rare cases would a site not be needed to prevent a listing. For species currently included in Survey and Manage Categories C and D (which require management of only high-priority sites), it is anticipated that loss of some sites would not contribute to a need to list.

For the Bureau Assessment category, the Agencies assumed in this SEIS that those sites needed to avoid a trend toward federal listing for species would be managed. BLM policy states that pre-project clearances are completed subject to limitations in funding or positions. Funding for pre-project clearances comes out of field-level project dollars. Given the realities of limited funding and heavy staff workloads at the field level, costly field surveys are unlikely to occur. For species in the Bureau Assessment category, it is assumed that methods other than field surveys would be used for these clearances. The agency must still determine the effect of a planned management action on a species and provide appropriate management.

Species in the BLM OR/WA tracking category are not considered a special status species for management purposes. The assumption for this SEIS is that pre-project clearances would not be completed and known sites would not be managed.

### Alternative 3

Exceptions for known site management and pre-disturbance surveys in emergency situations would be made by the line officer above the official responsible for the proposal instead of the Survey and Manage Intermediate Managers Group. The same criteria used under Alternative 1 (Survey and Manage Standards and Guidelines) would be used under Alternative 3 to make these determinations.

Pre-disturbance surveys would not be completed in stands that have not become late-successional and/or old-growth forest. Since it is a requirement that species included in Survey and Manage have a close association with late-successional or old-growth forest, the Agencies assumed that such species would not likely be present in non-late-successional and non-old-growth stands. Existing Northwest Forest Plan Standards and Guidelines provide for retention of late-successional or old-growth legacy components in Matrix. Therefore, even if they were present, the components of the stand which support their use would likely be retained anyway.

All other Survey and Manage Standards and Guidelines remain the same. Uncommon species that are assumed to be included in the Special Status Species Programs would follow the assumptions listed under Alternative 2. For uncommon species removed from the Survey and Manage mitigation measure, known sites would be released from management constraints unless the species were included in the Agencies' Special Status Species Programs.

## Key Assumptions for Riparian Reserves and Late-Successional Reserves

### Riparian Reserves

Management of Riparian Reserves will be as written in the 1994 Record of Decision and Northwest Forest Plan Standards and Guidelines. This is the same assumption used in the 2000 Survey and Manage Final SEIS. Riparian Reserves are one of the components of the Aquatic Conservation Strategy along with Key Watersheds, Watershed Analysis, and Watershed Restoration. These components are designed to operate together to maintain

and restore the productivity and resiliency of riparian and aquatic ecosystems. There are nine objectives included in the Aquatic Conservation Strategy which are intended to benefit aquatic and riparian-dependent species. These objectives are intended to be achieved at the fifth-field watershed scale and broader, over the long term (USDA, USDI 2003i). The Aquatic Conservation Strategy provides for a high degree of protection for aquatic and riparian associated species that may be locally rare, but have a wide distribution. Species that occur only in a few locales would be at a slightly increased risk compared to widely-distributed aquatic or riparian species from habitat-disturbing activities under the Aquatic Conservation Strategy. Even though there could be short-term effects at the site scale, application of the Aquatic Conservation Strategy would yield functioning riparian and aquatic ecosystems at the landscape level in the long term. All alternatives include the same protective measures to reduce the risk to aquatic-dependent flora and fauna at the site scale, such as riparian buffers and associated standards and guidelines.

### Late-Successional Reserves

Management of the Late-Successional Reserves will be as written in the 1994 Record of Decision and Northwest Forest Plan Standards and Guidelines. This is the same assumption used in the 2000 Survey and Manage Final SEIS. Activities are allowed in Late-Successional Reserves but only within the context of Late-Successional Reserve objectives. The objectives are described on Page C-11 of the 1994 Standards and Guidelines:

> *Late-Successional Reserves are to 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. These reserves are designed to maintain a functional, interacting, late-successional and old-growth forest ecosystem.*

Approximately 30 percent of all federally managed lands in the Northwest Forest Plan area are contained in Late-Successional Reserves. Approximately 86 percent (or 6.8 million acres) of late-successional forest on federally managed lands in the Northwest Forest Plan area is reserved. Based on Late-Successional Reserve objectives and the large amount of late-successional forest in reserves, it is assumed that all alternatives include the same protective measures to reduce the risk to late-successional or old-growth forest associated species.

## Summary of Environmental Consequences for Species

### Habitat (including known sites) is insufficient to support stable populations in the Northwest Forest Plan area under all alternatives

There are 142 species (127 fungi and 15 lichens) with an outcome of "habitat (including known sites) is insufficient to support stable populations in the Northwest Forest Plan area" under all alternatives (see Table 3&4-9). This outcome is not due to federal actions, but other factors such as: (1) limited potential habitat and few populations on federally managed lands; (2) potential for stochastic events; (3) low number of individuals; (4) limited distribution; and, (5) narrow ecological amplitude (USDA, USDI 1994a and USDA, USDI 2000a).

### Insufficient information to determine an outcome under all alternatives

There are 24 species (6 bryophytes, 7 fungi, and 11 lichens) and 4 arthropod functional groups for which there is insufficient information to determine an outcome under all alternatives (see Table 3&4-9). This is due to limited information about abundance,

distribution, and ecology of these species. In addition, for some of these species, there is uncertainty regarding effects of management practices and environmental conditions including global change.

Under Alternative 1, when the analyses shows that there is "insufficient information to determine an outcome" or "there is insufficient habitat (including known sites) to support stable populations" for a species, this outcome is the same for Alternatives 2 and 3 as well. Although the Survey and Manage Standards and Guidelines under Alternative 1 generally provide benefits to species, they do not substantively change the outcome or have as yet not resolved the insufficient information. However, many of these are species with few known sites or populations. For species with insufficient habitat under all alternatives that receive management under Alternative 1, but are not included in the Agencies' Special Status Species Programs under Alternatives 2 or 3, the lack of species management will increase the risk to these species. For species where there is "insufficient information to determine an outcome" that receive management under Alternative 1, but are not included in the Agencies' Special Status Species Programs under Alternatives 2 o 3, it is unknown if the lack of species management will increase the risk to these species.

#### Habitat (including known sites) is sufficient to support stable populations in the Northwest Forest Plan area under all alternatives

There are 79 species with an outcome of "habitat (including known sites) is sufficient to support stable populations in the Northwest Forest Plan area" under all alternatives (see Table 3&4-9).

#### Habitat (including known sites) is insufficient to support stable populations in the Northwest Forest Plan area under Alternatives 2 and 3

There are 51 and 8 species for which "habitat (including known sites) is sufficient to support stable populations in the Northwest Forest Plan area under Alternative 1, but habitat (including known sites) is insufficient to support stable populations in the Northwest Forest Plan area under Alternatives 2 and 3, respectively (see Table 3&4-9).

#### Habitat is insufficient to support stable populations in a portion of the Northwest Forest Plan area" under Alternative 2 and 3

There are 6 and 2 species for which "habitat (including known sites) is sufficient to support stable populations in the Northwest Forest Plan area under Alternative 1, but "habitat is insufficient to support stable populations in a portion of the Northwest Forest Plan area" under Alternatives 2 and 3, respectively (see Table 3&4-9).

# Aquatic Ecosystem

## Affected Environment

The Northwest Forest Plan provides for a high level of protection for all streams, lakes, and wetlands on Forest Service and BLM managed lands within the Northwest Forest Plan area. The Aquatic Conservation Strategy is a habitat-based approach for restoring and maintaining ecological health of watersheds and the aquatic ecosystems contained within them on these federally managed lands (USDA, USDI 1994a and USDA, USDI 1994b). The key assumption of the Aquatic Conservation Strategy in the Northwest Forest Plan was that species-specific strategies would be insufficient to maintain and

recover the populations of aquatic-dependent species. The Northwest Forest Plan Record of Decision emphasized this concept by stating:

> "*Any species-specific strategy aimed at defining explicit standards for habitat elements would be insufficient for protecting even the targeted species. The Aquatic Conservation Strategy must strive to maintain and restore ecosystem health at watershed and landscape scales to protect habitat for fish and other riparian-dependent species and resources and restore currently degraded habitats*." (USDA, USDI 1994b, p. B-9.)

The four major components of the Aquatic Conservation Strategy (Riparian Reserves, Key Watersheds, Watershed Analysis, and Watershed Restoration) provide the basis for protection of aquatic-dependent and full- and part-time riparian-dependent flora and fauna. Some of these species are currently included under the Survey and Manage Standards and Guidelines. Species that spend their entire life histories in water receive the highest degree of protection on federally managed lands, because they are all contained within Riparian Reserves. Managing Riparian Reserves under the specific standards and guidelines, combined with the other components of the Aquatic Conservation Strategy, should meet the habitat/life history needs of the water-dependent flora and fauna throughout the Northwest Forest Plan area. Riparian Reserves also benefit species that spend considerable portions of their life histories within the water or within riparian areas.

Alternative 9 in the Northwest Forest Plan Final SEIS incorporated Riparian Reserve Scenario 1, which increased the width recommended by the FEMAT from one-half site potential tree height or 50 feet, to one-site potential tree height or 100 feet, whichever is greatest, on each side of intermittent streams. This change was a result of the additional species analysis and response to public and internal comments in the Northwest Forest Plan Final SEIS. The analysis in the Northwest Forest Plan Final SEIS underestimated the potential landscape level of protection provided by the Aquatic Conservation Strategy. The quantity of Riparian Reserve acres is higher than originally analyzed, and the amount of land within all reserves has increased from a 6:1 ratio of reserve to non-reserve lands in the Northwest Forest Plan Final SEIS to a 7:1 ratio. This higher acreage has resulted in a 15 percent decrease in PSQ when compared to that anticipated in the Northwest Forest Plan Final SEIS. The absolute increase in reserves is in addition to the increase in prescribed Riparian Reserve widths identified in the Northwest Forest Plan Record of Decision. The Agencies assume that the conclusions regarding the level of protection provided by the Aquatic Conservation Strategy contained in the Northwest Forest Plan Final SEIS remain valid.

Several species of fish occurring in the Northwest Forest Plan area have been listed under the Endangered Species Act since the Northwest Forest Plan Record of Decision was signed (see Appendix 5, Table 5-1 for the complete list of threatened and endangered fish). These listings do not reflect the integrity of the Aquatic Conservation Strategy. The Northwest Forest Plan anticipated the potential of these listings and adopted a strategy to assist in the long-term recovery of these species. Factors other than habitat and land uses contributed to the need to list these species. Anadromous fish spend the majority of their life histories in areas outside of the federally managed lands covered by the Northwest Forest Plan. Other mortality factors (commercial and recreational fish harvest, ocean conditions, etc.) contributed to the listing of these fish. The relative contribution of each mortality factor was not identified in the listing announcements. The Northwest Forest Plan Final SEIS states:

> "*…the [Aquatic Conservation] strategy can succeed at maintaining and restoring the aquatic and riparian habitats regardless of what happens on nonfederal lands, but that would not ensure population viability of many of the fish stocks evaluated in this SEIS. For*

> *these reasons, it is not possible to determine whether any of the alternatives in this SEIS would preclude listing of fish species under the Endangered Species Act*." (USDA, USDI 1994a, p. 3&4-202.)

The Aquatic Conservation Strategy has been in place for approximately 10 years, a time period too short to demonstrate a measurable improvement in habitat conditions for fish populations to respond to the improved conditions. This, too, is consistent with the analysis contained in the Northwest Forest Plan Final SEIS and FEMAT Report. The authors of the Aquatic Conservation Strategy (USDA et al. 1993) stated:

> "*We emphasize, however, that it will require time for this strategy to work. Because it is based on natural disturbance processes, it may take decades to over a century to accomplish all of its objectives*."

Implementing the Aquatic Conservation Strategy over the last 10 years has not affected the listings of water quality-impaired stream segments under section 303(d) of the Clean Water Act. Although the number of stream miles added to the 303(d) list in Oregon increased from approximately 12,000 miles during 1994-1996, to approximately 13,700 miles in 1998 (Oregon Department of Environmental Quality 1999), not all of these streams occur within the Northwest Forest Plan area. The increase in stream miles is due primarily to more information being available and a greater emphasis on water quality in recent years. For example, the State of Oregon initiated a statewide effort aimed at recovering declining fish stocks. The State's effort involved identifying water quality-impaired water bodies and developing Water Quality Recovery Plans to address factors that contribute to the listing of the water body under section 303(d). The Northwest Forest Plan recognized these water quality concerns prior to their listing under 303(d). These listings are not new information for the Northwest Forest Plan.

## Environmental Consequences

The Aquatic Conservation Strategy emphasizes restoring watersheds, ecosystem functions, and aquatic systems, which results in a high degree of protection for aquatic-dependent flora and fauna regardless of the alternative selected. The Riparian Reserve network is designed to protect and restore functions and processes of an interconnected network of aquatic systems (USDA, USDI 1994b). The Northwest Forest Plan Record of Decision requires Riparian Reserve widths that maintain the functions and processes that support the particular aquatic community and associated riparian area. Watershed analyses address the factors that affect the protection and restoration of the habitat type affected (such as a lake or wetland). They also recommend Riparian Reserve management designed to protect and restore the functions and processes necessary to support the habitat type. The Riparian Reserve widths applied through project-level NEPA decision documents are based on these watershed analyses.

Regardless of the understanding of the ecological needs of aquatic-dependent flora and fauna or their existing distribution, the Aquatic Conservation Strategy provides a high degree of protection of their habitat. The risk to the persistence of a particular species depends on its distribution and life history characteristics. Species that have very limited distribution throughout their known range and/or occur in rare or isolated habitats (wetlands, lakes, geothermal springs, isolated seeps, etc.) are generally at higher risk than more widely distributed species and/or species that utilize a broader range of habitat conditions.

The degree of dependence on water is also a risk factor. Species that spend their entire lives within water generally have a lower risk of long-term negative effects due to habitat-disturbing activities. Species that spend greater proportions of their life histories out of water and within Riparian Reserves have a somewhat higher risk to their

persistence than purely aquatic species, but they have a relatively lower risk to their persistence than species that commonly use areas outside of Riparian Reserves. The other components of the Northwest Forest Plan, such as Late-Successional Reserves and Administratively Withdrawn Areas, provide other levels of protection for those species that spend more time outside Riparian Reserves.

The Agencies have completed a Final SEIS that proposes wording changes in the Record of Decision for the Northwest Forest Plan that relate to the Aquatic Conservation Strategy. The Northwest Forest Plan Record of Decision includes language that has resulted in interpretations that run counter to the original intent of the Aquatic Conservation Strategy. These interpretations are making it difficult to meet the restoration and timber harvest objectives identified in the Northwest Forest Plan. The proposed action in the Aquatic Conservation Strategy Final SEIS is to amend language in the Record of Decision to more clearly express how the Aquatic Conservation Strategy is to be applied in the Northwest Forest Plan area. The Aquatic Conservation Strategy has been interpreted to mean that every project must achieve all its objectives at all spatial and temporal scales (site or project, watershed, province, region). This interpretation suggests land managers must demonstrate that a project will maintain existing conditions (or lead to improved conditions) at every spatial and temporal scale. Any project that may result in site-level disturbance to aquatic or riparian habitat, no matter how localized or short term, could be precluded under this interpretation. This interpretation establishes a nearly impossible expectation for demonstrating that projects follow the Aquatic Conservation Strategy. The proposed wording changes clarify that the nine Aquatic Conservation Strategy objectives would not apply at the project or site level, but rather at a watershed or larger scale. All site-level projects would continue to meet the protective measures in the standards and guidelines such as riparian buffer widths. Although Aquatic Conservation Strategy objectives would not be applied at the site level, the Agencies would continue to seek attainment of Aquatic Conservation Strategy objectives at the watershed and landscape scales. The proposed language changes are for clarification only and do not change any of the components of the Aquatic Conservation Strategy. Therefore, they do not alter the conclusions reached in the Northwest Forest Plan Final SEIS regarding the aquatic ecosystem. The Record of Decision for the Aquatic Conservation Strategy Final SEIS is expected to be soon and is common to all alternatives in this SEIS.

All alternatives include the same protective measures to reduce the risk to aquatic-dependent flora and fauna at the site scale such as riparian buffers and associated standards and guidelines. Aquatic-dependent flora and fauna will benefit from the restoration of aquatic ecosystem functions and processes which is required to meet the Aquatic Conservation Strategy objectives. Even though there could be short-term effects at the site scale, application of the Aquatic Conservation Strategy would yield functioning riparian and aquatic ecosystems at the landscape level in the long term.

The effects of the alternatives to aquatic species do not change the outcomes described in the Northwest Forest Plan Final SEIS. This is due to the fact the Aquatic Conservation Strategy provides a high level of protection to aquatic habitats and associated species regardless of the presence of known sites for Survey and Manage or Special Status species. The managed area for Survey and Manage or Special Status species that contributes to additional protection for wetlands less than 1-acre would provide additional protection to other species that inhabit the affected wetland. These protections would accrue primarily at the site scale versus the scale of the Northwest Forest Plan and would not alter the conclusions reached in the Northwest Forest Plan Final SEIS.

None of the alternatives change the assessment of achieving the Aquatic Conservation Strategy goals described in the Northwest Forest Plan Final SEIS. The effectiveness of the Aquatic Conservation Strategy in achieving its goals is independent of whether managed sites are added in the future or currently managed sites are removed from

the Survey and Manage category. The goal of the Aquatic Conservation Strategy is to restore the functions and processes to maintain the ecological health of watersheds and aquatic ecosystems. The four components (Riparian Reserves, Key Watersheds, Watershed Analysis, and Watershed Restoration) were determined to effectively achieve the overall goal independent of the Survey and Manage mitigation measure. The Aquatic Conservation Strategy applied through the Northwest Forest Plan Record of Decision resulted in an 80 percent or higher likelihood of providing sufficient aquatic habitat to support stable, well-distributed populations of the seven races/species and groups of salmonids. Similarly, the Aquatic Conservation Strategy provides a high probability for aquatic species persistence.

# Late-Successional Forest Ecosystem

## Affected Environment

The Northwest Forest Plan is an ecosystem approach to land management that focuses on habitat for late-successional and old-growth forest related species within the range of the northern spotted owl. The Northwest Forest Plan features a functional, interconnected, late-successional forest ecosystem that is extensive and well distributed and provides dispersal and movement between populations of species. The Northwest Forest Plan comprises a network of reserves, which protect large blocks of late-successional forest and aquatic resources, and Matrix where most timber harvest occurs. In general, the reserve system is designed to be comprehensive, adequate, representative, and replicated. The proportion of the landscape in reserves varies among physiographic provinces; the reserves always predominate, ranging from 59 percent to 99 percent at the province level (USDA et al. 1993, pp. IV-64 and IV-65 and USDA, USDI 1994a, Appendix G, p. G-35).

The Northwest Forest Plan anticipated and planned for increases in late-successional acres in the long term, as well as short-term harvest of late-successional stands in Matrix and Adaptive Management Areas. Standards and guidelines for Late-Successional Reserves are designed to maintain late-successional forest ecosystems and protect them from catastrophic loss to large-scale fire, insect and disease epidemics, and major human impacts. Nevertheless, the Northwest Forest Plan acknowledged the role of natural disturbance in the development of late-successional forests and anticipated continued disturbances, even large-scale fire, in the reserves (USDA, USDI 1994a, pp. 3&4-46 through 49 and 3&4-89 through 91, and USDA, USDI 1994b, pp. B-3 through B-4). The reserves are designed to maintain frequent, low-intensity natural ecosystem processes such as gap dynamics, natural regeneration, pathogenic fungal activity, insect herbivore, and low-intensity fire (USDA, USDI 1994b, pp. B-8 through B-9 and C-13 through C-14).

The Matrix is an integral part of the conservation strategy. Land allocations and standards and guidelines important to maintaining ecological processes include: (1) Riparian Reserves; (2) 100-acre owl activity centers; (3) Connectivity Diversity Blocks (BLM managed lands north of Grants Pass); (4) green tree and snag retention within cutting units; (5) provisions for downed woody debris; and, (6) protection of all remaining late-successional stands within fifth-field watersheds currently comprised of 15 percent or less late-successional forests on federally managed lands. Estimates from FEMAT on the percent of the land base within Riparian Reserves commonly ranged from 45 to 70 percent (Johnson et al. 1993). Estimation done on individual administrative units has found that these initial estimates were conservative and, in most cases, Riparian Reserves were more extensive than originally estimated. Approximately 81,000 acres or 1 percent of the late-successional forest were projected to be managed for the protection of Survey and Manage species (USDA, USDI 2000a, p. 436).

The Northwest Forest Plan and this SEIS assume a continuation of succession and disturbance processes that interrupt succession. Assumptions used in this SEIS also include the natural variability in successional process rates and directions. The late-successional forest ecosystems in the Northwest Forest Plan area are dynamic and have historically experienced varying levels of disturbance, generally from frequent, low-intensity fires in the dry, southern provinces to infrequent, severe fires in the northern provinces (USDA, USDI 1994a, pp. 3&4-17 through 24, 3&4-88 through 91, and B-44 through 46; and USDA, USDI 2000a, p. 208). Although disturbance regimes (high rates of change) are often described precisely in terms of frequency, intensity, duration, and extent, such regimes are also highly variable. For example, the average fire return interval in the temperate forests of Oregon vary from less than 10 years between fires at low elevation, drier habitats to more than 100 years between fires in the high elevation, moister habitats. Variability throughout the overall region is greater yet. These frequencies seem precise, but the standard deviations (variability associated with the average) are often greater than the average. This means that average conditions and average rates of change can only be approximated. Because natural variability is wide, chaotic, and takes at least several decades to establish patterns and trends, it is premature to effectively evaluate human-caused effects and trends since the establishment of the Northwest Forest Plan 10 years ago.

## Environmental Consequences

In assessing the environmental consequences of the alternatives to the 296 Survey and Manage species and four arthropod functional groups, specific information about the species is used whenever available. Information about the exact habitat requirements of many organisms does not exist, nor is it possible to accurately predict the exact consequences of each potential land management activity for all species (USDA, USDI 1994a, p. 3&4-122). When specific species information is insufficient to base a conclusion of reasonable certainty regarding the security of habitat, reliance must be made on information regarding the overall design and effectiveness of the Northwest Forest Plan (land allocations, standards and guidelines, and other assumptions) and the understanding of the overall ecology of the late-successional forest ecosystem within the Northwest Forest Plan area.

PSQ has been adjusted downward by approximately 15 percent primarily to more accurately reflect the extent of Riparian Reserves. This has resulted in a corresponding increase in protection of late-successional forest. Under Alternatives 1, 2, and 3, between 2.5 to 4 percent of existing late-successional forest on federally managed lands would be modified per decade by management actions such as partial cut harvests, regeneration harvests, and prescribed fire. In relation to long-term and regional ecological objectives, the environmental consequences associated with the rates of management disturbance per decade are small in comparison to the large extent of reserves and the large range of natural variability. Because the rate of disturbance through management activities is so small, there would be no meaningful difference in environmental consequences to the late-successional forest ecosystem, as a whole, between the alternatives.

Under all alternatives, late-successional and old-growth forest is anticipated to be replaced due to aging of existing stands across the Northwest Forest Plan area in the long term at a rate 2.5 times greater than the rate of current anticipated harvest. In the long term, large blocks of late-successional and old-growth forest would be limited to the reserves and administratively withdrawn land allocations (USDA, USDI 1994a, pp. 3&4-42 through 46). The Matrix would include smaller patches of late-successional forest (such as within connectivity/diversity blocks) and late-successional structural elements within younger or multi-aged stands (such as older trees, snags, and coarse woody debris) (USDA, USDI 1994b, pp. C-40 through C-43).

FEMAT and the Northwest Forest Plan assessed the likelihood of maintaining a functional and interconnected, late-successional forest ecosystem. The ecosystem assessments were based upon diversity, function, dynamics, and spatial patterns of the late-successional forest ecosystem. Three attributes were assessed: abundance and ecological diversity, processes and function, and connectivity. Because the amount of forest habitat that is managed for known sites under the Survey and Manage Standards and Guidelines is so small when compared to the 20 million acres of reserves, the rating of the likelihood of maintaining a functional and interconnected, late-successional forest ecosystem would not substantively vary among the three alternatives. Moreover, variation associated with implementation of the alternatives is likely to be insignificant when compared to the effects of successional disturbance processes and because of the high natural variability of the forest ecosystems.

The most substantial effect of Alternatives 1 and 3 would be when the species-specific direction of the Survey and Manage Standards and Guidelines conflict with the Northwest Forest Plan strategy of maintaining functioning, late-successional forest ecosystems. An example of this conflict is the use of prescribed fire to restore ecological functions to fire-associated forests in southern or eastside provinces when the known site of a Survey and Manage species consists of habitat resulting from the exclusion of fire from the ecosystem. Management aimed at dampening extreme ecological variations caused by fire tends to lead to extreme magnification of the effects associated with disturbance (USDA et al. 1993, pp. IV-35 through IV-36 and IV-71 through IV-76; USDA, USDI 1994b, p. B-4; and USDA, USDI 2000a, p. 205).

Given that approximately 80 percent of the Northwest Forest Plan area (and 86 percent of currently existing late-successional forests) is reserved, most late-successional and old-growth forest related species are likely to be adequately protected by the reserve system. There may be greater uncertainty about some late-successional and old-growth forest related species, such as those that have limited distribution and that are highly intolerant of disturbance. However, the design of the reserve system, which generally provides the most reserves in those physiographic provinces that had the most late-successional forest historically and the least natural disturbance, provides some additional assurance that late-successional and old-growth forest related species adapted to more static systems are adequately protected by the reserve system.

Within the late-successional forest ecosystems in the Northwest Forest Plan area, in order for species to persist, they would likely need some tolerance for disturbance at least at the population level. Tolerance for disturbance by species at the population level is needed because the forest ecosystems are dynamic and have historically experienced levels of disturbance as described above.

Physiographic provinces with the least reserves and most Matrix are the Willamette Valley, California Cascades, and the Oregon Klamath Provinces. In the Willamette Valley Province, 66 percent of all federally managed forest and 59 percent of late-successional forest is in Reserves. In the California Cascade Province, 57 percent of all federally managed forest and 68 percent of late-successional forest is in Reserves. In the Oregon Klamath Province, 68 percent of all federally managed forest and 74 percent of late-successional forest is in reserves. These provinces have had historically high fire frequencies, have had the least late-successional forests, and have had forests that were naturally highly fragmented (USDA, USDI 1994a, pp. 3&4-21 through 3&4-24, 3&4-37; and USDA, USDI 2001b). Species that might be limited predominately to the Matrix in these areas would most likely have evolved in an ecosystem characterized by the least late-successional forest, the least connectivity of late-successional habitat, and the most frequent disturbance. Therefore, in general and in the absence of specific information to the contrary, if there are late-successional and old-growth forest related species that are restricted to provinces that have disproportionately more Matrix, such as the Willamette Valley, California Cascades, and Oregon Klamath provinces, then they are more likely to

be at less risk of limited or fragmented late-successional habitat, and are more likely to be relatively tolerant of disturbance.

Physiographic provinces with the most infrequent fire have the most reserves and least Matrix. The Olympic Peninsula and high elevations of Western Washington Cascades have "... the lowest fire frequencies of Pacific Northwest forest ecosystems" (USDA, USDI 1994a, pp. 3&4-17 through 18). In the Olympic Peninsula Province, 92 percent of all federally managed forest and 99 percent of late-successional forest is in reserves. In the Western Washington Cascade Province, 88 percent of all federally managed forest and 92 percent of late-successional forest is in reserves (USDA, USDI 1994a, pp. 2-39 and G-35). Therefore, if there are species that are restricted to these provinces, they may be highly intolerant of disturbance (in contrast to species that might be restricted to the drier provinces described above). However, if there are species restricted to these provinces that are highly intolerant of disturbance, they are likely to be adequately protected by the reserve system, because these provinces have disproportionately more reserves.

# Global Climate

The conclusion of the Northwest Forest Plan Final SEIS was that the Northwest Forest Plan would cause a change in global atmospheric carbon dioxide of less than 0.01 percent of the total (USDA, USDI 1994a, pp. 3&4-46, and 3&4-50 through 51). The 2000 Survey and Manage Final SEIS concluded that this increase would be even less because of the lower harvest levels than originally anticipated (USDA, USDI 2000a, p. 203). There is no new information that would alter these conclusions.

# Air Quality

## Affected Environment

The federal Clean Air Act, as amended in 1990, is designed to reduce air pollution, protect human health, and preserve the Nation's air resources. To protect air quality, the Clean Air Act requires federal agencies to comply with all federal, state, and local air pollution requirements (Section 118). Several federal air quality programs under the Clean Air Act regulate prescribed burning and other activities. Prescribed fire can be used as a tool for treating logging residue and for restoring ecosystem processes. Wildland fire for resource benefits is the term used for managing natural fire ignitions to meet resource objectives

While prescribed fire and wildland fire for resource benefits can create large quantities of particulate matter (PM10) and other pollutants, this burning usually takes place in relatively remote areas with intensities that vent smoke high into the atmosphere where it is widely dispersed (USDA, USDI 1994a, p. 3&4-91). The Northwest Forest Plan Final SEIS estimated PM10 levels under Alternative 9, aggregated across climatic groups (moist, dry, or intermediate), to be 35-40 percent of historic PM10 levels (1985-1992) (USDA, USDI 1994b, p. 3&4-96).

## Environmental Consequences

Under all alternatives, less than 160,000 annual acres of hazardous fuel treatment are projected (for further discussion see the Wildland and Prescribed Fire section later in this chapter). The 113,500 acres of estimated annual wildfire is the same under all alternatives. The 72,500 acres planned for wildland fire for resource benefits are the same under all alternatives. The acres burned for prescribed fire, wildland fire for resource benefits, and wildfire for each alternative would be less than the 476,000 annual acres that

were projected under Alternative 9 of the Northwest Forest Plan. None of the alternative would exceed the level of impacts analyzed in the Northwest Forest Plan.

# Water Quality

## Affected Environment

Water flowing from forested areas administered by the Agencies has a number of beneficial uses. The Clean Water Act directs federal agencies to comply with state water quality requirements to restore and maintain water quality necessary to protect beneficial uses. The Agencies are the designated management agencies within the range of the northern spotted owl, charged with implementing and enforcing natural resource management programs for the protection of water quality on lands they administer. The four major components of the Northwest Forest Plan's Aquatic Conservation Strategy are Riparian Reserves, Key Watersheds, Watershed Analysis, and Watershed Restoration. These provide for maintaining and improving water quality.

## Environmental Consequences

None of the alternatives change the provisions of the Northwest Forest Plan that provide for restoring and maintaining water quality on federally managed lands in the Northwest Forest Plan area. None of the alternatives change the analysis or outcomes for water quality described in the Northwest Forest Plan Final SEIS.

# Soil Productivity

## Affected Environment

The combined influences of time, parent material, climate, living organisms, and the topography of a site interact to form soils with unique sets of physical and chemical properties that determine the productivity of each soil type. Soil productivity is a soil's ability to produce vegetation. Long-term forest soil productivity is the capacity or suitability of a soil to establish and grow a plant species and community over time, primarily through nutrient availability and available soil moisture. Ecosystem structures and functions ultimately depend on productive soils.

## Environmental Consequences

Forest management practices have the potential to reduce natural productivity if certain operating guidelines are not followed. Under all alternatives, implementation of soil management prescriptions and best management practices would prevent unacceptable degradation of the soil resource and related productivity (USDA, USDI 1994, p. 3&4-111). None of the alternatives change the provisions of the Northwest Forest Plan that provide for maintaining soil productivity. Therefore, none of the alternatives change the analysis or outcomes for soil productivity described in the Northwest Forest Plan Final SEIS.

# Wildland and Prescribed Fire

## Affected Environment

### Wildfire and the Ecosystem

The late-successional forest ecosystems in the Northwest Forest Plan area are dynamic and have historically experienced varying levels of disturbance. Historical fire regimes have generally ranged from frequent, low-intensity fires in the dry, southern provinces to infrequent, high-intensity fires in the northern provinces (USDA, USDI, 1994, pp. 3&4-17 through 24, 3&4-88 through 91, and B-44 through B-46; and USDA, USDI 2000a, p. 208). Fire has shaped the Northwest Forest Plan landscape and influenced the species that live here.

Fire suppression throughout the western U.S. has often interrupted natural fire regimes. Where fire once created a mosaic of patches, large areas have built up high fuel levels, leading to increased risk of high-intensity, stand-replacing fire where it historically occurs infrequently. Interruption of natural fire regimes due to fire suppression has an effect on ecosystem species composition and sometimes on species persistence (USDA, USDI 1994a, p. 3&4-83).

Wildland fires burned more than 600,000 acres in the Northwest Forest Plan area during the 2002 fire season. Post-fire data on burn severity has been collected for several of the large fires in southwest Oregon. Table 3&4-1 shows the percent of acres burned by fire intensity.

The Umpqua National Forest lies largely within the Oregon Western Cascades Physiographic Province. This province includes a wide variety of climates and forest types. In 2002, approximately 89,000 acres of fire burned on the Umpqua National Forest. Preliminary analysis indicates some areas burned within the range of natural variation and some areas burned more intensely (www.fs.fed.us/r6/umpqua/fire/fire_recovery/index.php).

The nearly 500,000-acre Biscuit Fire burned largely in the Oregon Klamath Physiographic Province. This province is characterized by high-frequency fire, both historically as well as at present. Approximately 77 percent of the area burned experienced a moderate- to high-intensity burn (equal to or greater than 26 percent tree mortality). A high-frequency fire regime normally experiences small, low-severity fires.

A recent study in the Klamath Mountains demonstrated that fire return intervals at the watershed and burn level were historically more frequent than previously documented (Taylor and Skinner 2002). Fire suppression has altered the fire regimes in the study area

**Table 3&4-1. Percent of acres burned and fire intensity for the 2002 wildfires on the Umpqua and Siskiyou National Forests.**

| Fire | % of Acres Burned | Fire Intensity | % of Tree Mortality |
|---|---|---|---|
| Multiple Fires (Umpqua National Forest ) | 82 | Low | <25 |
| | 11 | Moderate | 25-90 |
| | 7 | High | >90 |
| Biscuit (Siskiyou National Forest) | 77 | Moderate-High | >26 |

from a historic fire return interval of 20 years to a current fire return interval of 238 years (Taylor and Skinner 2002).

The analysis in the Biscuit Fire Draft EIS refers to a fire history analysis of the Klamath-Siskiyou Region of northwest California and southwest Oregon (Frost and Sweeney 2000) which stated "… initial analysis of 20th Century fire history suggests that forests of the Klamath-Siskiyou Region have experienced a reduction in both the total amount of area burned and the average fire size since the middle of the 1900's ..." It continued with the hypothesis that "… fire suppression has been somewhat effective at reducing area burned at low and moderate intensities - when fire sizes are likely to be small - but not at high intensities when extreme conditions typically exist and allow fires to grow to large size" (USDA Forest Service 2003b).

Intensive fire suppression efforts in the last 70 years have resulted in significant fuel accumulations in some areas, and shifts in tree species composition and forest stand structure. These changes may have made forests more susceptible to large, high-severity fires (USDA, USDI 1994a, p. 3&4-22). The initial analyses of burn severity classes in recent fires along with results of the Klamath Mountains study appear to validate these conclusions from the Northwest Forest Plan.

## Fire Risk Management in the Northwest Forest Plan Area

The FEMAT report (p. III-35) states:

> "*Large-scale disturbances are natural events, such as fire, that can eliminate owl habitat on hundreds or thousands of acres. Certain risk management activities, if properly planned and implemented, may reduce the probability of these major stand-replacing events. There is considerable risk of such events in Late-Successional Forest Reserves in the eastern Oregon Cascades, eastern Washington Cascades, and California Cascades provinces and a lesser risk in the Oregon Klamath and California Klamath provinces. Elevated risk levels are attributed to changes in the characteristics and distribution of the mixed-conifer forests resulting from past fire protection*."

Risk management activities include wildland fire for resource benefits and silvicultural practices. Wildland fire for resource benefits is the use of naturally-ignited wildfires. Silvicultural practices include activities such as thinning tree stands, creating fuel breaks, controlling bark beetle infestations, and hazardous fuel treatments. Hazardous fuel treatments include such things as mechanized vegetation removal and prescribed fire (human induced underburning of forest stands to reduce fuel loading).

Recent studies have displayed the benefit of fuel treatment to post-wildland fire survival in coniferous trees (Omi and Martinson 2002). The studies demonstrated that thinning tree stands and conducting prescribed burns in those stands contributed to post-wildland fire tree survival. In the Lassen National Forest in northern California, the 2002 Cone Fire showed that thinned and prescribed burned forests survived an intense wildland fire, while adjacent untreated stands resulted in high-burn severity (Skinner 2002, pers. comm.).

## National Fire Plan

Small communities and other developed private lands bordered by federally managed lands can be directly affected by fuels conditions on federally managed lands. Threats posed by fuel accumulations were realized in summer 1999 (wildfires in northern California), in summer 2000 (in other western states), and again with the large wildfires in southern Oregon during summer 2002 and the large wildfires in southern California during summer 2003.

As a consequence of the more than 8 million acres burned nationally in 2000, the President created the National Fire Plan (USDA, USDI 2000b). Activities such as firefighting, rehabilitation and restoration, hazardous fuels reduction, community assistance, and research are included in the plan. The National Fire Plan proposes aggressive hazardous fuels abatement activities around communities and at-risk landscapes. Specific direction for implementation and accountability was received from Congress in the Fiscal Year 2001 Interior and Related Agencies Appropriations Act.

## Environmental Consequences

As noted in the 2000 Survey and Manage Final SEIS, the historic natural wildfire level of 476,000 acres burned annually is used as the goal for annual fuel treatment acres.

Wildfire and wildland fire for resource benefits are expected to burn 113,500 acres and 72,500 acres per year, respectively. This leaves 290,000 acres potentially available for hazard fuels reduction treatments. These acres are in need of hazardous fuel treatments and the goal is to achieve this level in the future. Due to current budgets, personnel limitations, air quality concerns, and other constraints, the "potentially available" acres were reduced to 190,000 acres. This is consistent with the figures used in the 2000 Final SEIS. After subtracting acres treated for regeneration timber sales (which varies by alternative), 164,400 acres are potentially available for fuel treatment annually under Alternative 1; for Alternative 2, the amount is 161,800 acres; for Alternative 3, the amount is 162,200 acres. It is assumed that the acres treated for regeneration timber sales will not need treatments to reduce hazardous fuels because slash (i.e. hazardous fuels)would be treated as part of the regeneration harvest project.

### Wildland Fire for Resource Benefits

Annually, 72,500 acres are planned for wildland fire for resource benefits. Allowing naturally-ignited fires to burn within prescribed parameters can generate a benefit to resources across the landscape. The benefits gained from allowing a naturally-ignited fire to burn under prescribed conditions typical of frequent, historic, low-to-moderate burns would far outweigh the values lost in these same stands if a high-intensity wildfire were to occur.

Under Alternative 1, pre-disturbance surveys are not required for wildland fire for resource benefits in any land allocation (subject to conditions as described in Appendix 1, Standards and Guidelines for Survey and Manage). Wildland fire burning within prescription is one tool to meet ecosystem goals. The types of prescriptions that meet these goals typically result in longer-term habitat maintenance, and reduce risk of a larger-scale, more-intense fire. Due to the timing, wildland fires can be used to mimic historic disturbance patterns, sizes, and intensities (USDA, USDI 2003g).

Under Alternative 2, the Agencies' Special Status Species Programs allow management decisions related to species sites to be made at the local level. It is assumed that identical prescriptions will be used under Alternative 2 and the same logic (described above) used to exempt these projects from pre-disturbance surveys under Alternative 1 would be used to exempt them from pre-project clearances under Alternative 2.

Under Alternative 3, pre-disturbance surveys are not required for wildland fire for resource benefits in any land allocation (the same as Alternative 1). For species managed under the Agencies' Special Status Species Programs, it is assumed that identical prescriptions will be used and the same logic used to exempt these projects from pre-disturbance surveys under Alternative 1 would be used to exempt them from pre-project clearances under Alternative 3.

Under all alternatives, prescriptions for wildland fire for resource benefit would be identical and pre-disturbance surveys or pre-project clearances would not be completed. None of the alternatives would change the acres available for burning through wildland fire for resource benefits.

## Hazardous Fuel Treatments

In response to the National Fire Plan, Management Recommendation amendments were developed with the intent of allowing greater flexibility in Survey and Manage species management around identified "Communities at risk." The amendments were designed to allow for fuel reduction activities in known sites of those species occurring within shorter fire return interval areas. Some risk to individual site occupancy was considered acceptable, if this risk would not impair species persistence objectives. These Management Recommendation amendments were released to the field within the past year, so the full extent of their benefits or shortcomings have not been realized. However, for some species, the amendments allow for prescribed fire and other hazardous fuels treatments to be used in and on known sites of Survey and Manage species. For other species, the Management Recommendations allow for very little risk to the site, and prohibit many fuel reduction activities in or on the site.

Much of the conflict between Survey and Manage and National Fire Plan projects appears to occur in the California Klamath and California Cascades Physiographic Provinces. Survey costs, including tree climbing for red tree vole to determine species and activity status of arboreal nests, appear to be the major impediment. Because of the costs of conducting the tree-climbing portion of surveys, field units often conclude that the arboreal nests are active red tree vole nests and manage them as such. In taking this approach, while saving money by not climbing the trees, the field units manage more nests as red tree vole sites than necessary. As such, management of these arboreal nests in accordance with the Management Recommendations often reduces flexibility in fuels treatments, and, in extreme cases, may cause the field unit to abandon the project.

Field units have identified several other species that are either found with some frequency within these shorter fire return interval areas, or are species with less flexible Management Recommendations that tend to prohibit effective fuels reduction treatments. Species mentioned by the field units include the Siskiyou Mountain salamander and various terrestrial mollusk species. Siskiyou Mountain salamander has specific habitat requirements, so survey cost is generally not an issue, but some on-site fuels management is an issue. For terrestrial mollusks, in many cases habitat descriptions are quite broad, necessitating surveys of entire project areas. (For instance, a large-scale prescribed burn of 1,000 acres would likely require all 1,000 acres to be surveyed.) These costs are borne by the project and can limit the amount of acres treated.

Under Alternative 1, before the Survey and Manage mitigation measure is applied, 164,400 acres would be available annually for fuel treatments. The actual acres available for treatment would be reduced by the need to manage known sites for Survey and Manage species. On average 62 percent of initial hazardous fuel treatments use mechanical methods and the other 38 percent use prescribed fire (Perkins 2003, pers. comm.).

For hazardous fuel treatments using mechanical methods, it is estimated that 5,045 acres would be managed annually for known sites. This is based on the amount of late-successional forest across the landscape and the projected percentage of this area in known sites (as analyzed in the Timber Harvest section).

For hazardous fuel treatments that employ prescribed fire, burning conditions around some known sites would necessitate additional buffering to keep fire entirely off the slope where the known sites occur. On average, this additional buffering would prohibit

burning on 3 times more acres than would actually be contained in known sites. For hazardous fuel treatments using prescribed fire, it is estimated that 9,276 acres would be managed annually for known sites. This is based on the amount of late-successional forest across the landscape, the projected percentage of this area in known sites (as analyzed in the Timber Harvest section), and the additional buffering.

Under Alternative 1, an estimated 14,321 (5,045 + 9,276) total acres would be managed for known sites leaving approximately 150,100 acres available each year for fuel treatments (see Table 3&4-2).

Under Alternative 2, before Special Status Species management is applied, 161,800 acres would be available annually for fuel treatments. The actual acres available for treatment would be reduced by the need to manage known sites for Special Status Species. Under Alternative 2, local managers could identify some known sites as not needed to prevent listing under the Endangered Species Act and not needed to meet the Forest Service viability and diversity requirements. On average 62 percent of initial hazardous fuel treatments use mechanical methods and the other 38 percent use prescribed fire (Perkins 2003, pers. comm.).

For hazardous fuel treatments using mechanical methods, it is estimated that 1,655 acres would be managed annually for known sites. This is based on the amount of late-successional forest across the landscape and the projected percentage of this area in known sites (as analyzed in the Timber Harvest section).

For hazardous fuel treatments that employ prescribed fire, burning conditions around some known sites would necessitate additional buffering to keep fire entirely off the slope where the known sites occur. Additional buffering would be less under Alternative 2 than under Alternative 1 due to flexibility in local management decisions. On average, this additional buffering would prohibit burning on 1.5 times more acres than would actually be contained in known sites. For hazardous fuel treatments using prescribed fire, it is estimated that 1,523 acres would be managed annually for known sites. This is based on the amount of late-successional forest across the landscape, the projected percentage of this area in known sites (as analyzed in the Timber Harvest section), and the additional buffering.

Under Alternative 2, an estimated 3,178 (1,655 + 1,523) total acres would be managed for known sites leaving 158,600 acres available each year for fuel treatments (see Table 3&4-2).

Under Alternative 3, before the Survey and Manage mitigation measure or Special Status Species Programs is applied, 162,200 acres would be available annually for fuel treatments. The actual acres available for treatment would be reduced by the need to manage known sites for Survey and Manage and Special Status Species. For Special Status species under Alternative 3, local managers could identify some known sites as not needed to prevent listing under the Endangered Species Act and not needed to meet the Forest Service viability and diversity requirements. On average 62 percent of initial hazardous fuel treatments use mechanical methods and the other 38 percent use prescribed fire (Perkins 2003, pers. comm.).

For hazardous fuel treatments using mechanical methods, it is estimated that 2,323 acres would be managed annually for known sites. This is based on the amount of late-successional forest across the landscape and the projected percentage of this area in known sites (as analyzed in the Timber Harvest section).

For hazardous fuel treatments that employ prescribed fire, burning conditions around some known sites would necessitate additional buffering to keep fire entirely off the slope where the known sites occur. For Special Status Species under Alternative 3, local

managers could identify some known sites as not needed for persistence according to the management direction contained in the Survey and Manage Standards and Guidelines. On average, this additional buffering would prohibit burning on 2 times more acres than would actually be contained in known sites. For hazardous fuel treatments using prescribed fire, it is estimated that 2,848 acres would be managed annually for known sites. This is based on the amount of late-successional forest across the landscape, the projected percentage of this area in known sites (as analyzed in the Timber Harvest section), and the additional buffering.

Under Alternative 3, an estimated 5,171 (2,323 + 2,848) total acres would be managed for known sites leaving 157,000 acres available each year for fuel treatments (see Table 3&4-2).

Under Alternative 1, pre-disturbance survey costs would be $69.86 per acre (see Cost of Management section). Because portions of projects are abandoned or deferred during the planning process, the Agencies survey about 10 percent more acres than what is proposed for treatment. With annual surveys covering 180,840 acres (164,400 acres + 10 percent), total pre-disturbance survey costs for hazardous fuel treatments under Alternative 1 would be $12.6 million annually. When the total survey cost is divided by the actual treatment acres, a cost of $84.18 per acre results (see Table 3&4-3).

Under Alternative 2, pre-project clearance survey costs would be $30.39 per acre (see Cost of Management section). Because portions of projects are abandoned or deferred during the planning process, the Agencies survey about 10 percent more acres than what is proposed for treatment. With annual surveys covering 177,980 acres (161,800 acres + 10 percent), total pre-project clearance survey costs for hazardous fuel treatments under Alternative 2 would be approximately $5.4 million annually. When the total survey cost is divided by the actual treatment acres, a cost of $34.10 per acre results (see Table 3&4-3).

### Table 3&4-2. Acres of Hazardous Fuel Treatments

| | Alternative 1 | Alternative 2 (Un-Mitigated) | Alternative 3 (Un-Mitigated) |
|---|---|---|---|
| Potentially Available | 190,000 | 190,000 | 190,000 |
| Regeneration Harvest (no separate fuel treatment) | -25,600 | -28,200 | -27,800 |
| Available for Treatment | =164,400 | =161,800 | =162,200 |
| Known Site Management | -14,321 | -3,178 | -5,171 |
| Actual Treatment* | =150,100 | =158,600 | =157,000 |

*Totals are not exact due to rounding

### Table 3&4-3. Cost of Hazardous Fuel Treatments

| | Alternative 1 | Alternative 2 (Un-Mitigated) | Alternative 3 (Un-mitigated) |
|---|---|---|---|
| Survey cost/acre | $69.86 | $30.39 | $63.43 |
| Total acres surveyed | x 180,840 | x 177,980 | x 59,473 |
| Total cost | = $12,633,482 | = $5,408,812 | = $3,772,372 |
| Actual treatment (Acres) | / 150,100 | / 158,600 | / 157,000 |
| Survey cost/actual treatment acre | = $84.18 | = $34.10 | = $24.02 |

Under Alternative 3, pre-disturbance survey costs would be $63.43 per acre (see Cost of Management section). Management activities in non-late-successional stands would be exempt from pre-disturbance surveys. It is assumed that fuel projects are distributed evenly across the landscape. With 33 percent of the 24.5 million acres of federally managed lands in late-successional stands, it is estimated that 33 percent of the potential fuel treatment acres would need surveys. Because portions of projects are abandoned or deferred during the planning process, the Agencies survey about 10 percent more acres than what is proposed for treatment. With annual surveys covering 59,473 acres (54,066 acres + 10 percent), total pre-disturbance survey costs for hazardous fuel treatments under Alternative 2 would be approximately $3.8 million annually. When the total survey cost is divided by the actual treatment acres, a cost of $23.78 per acre results (see Table 3&4-3).

Under all alternatives, treatment costs per acre vary from $50 to $150 for prescribed fire and from $400 to $600 for mechanical treatments. Treatment costs are generally higher around known sites for Survey and Manage and Special Status species because treatment methods are limited and prescribed fire is more likely to be prohibited. Treatment costs would be increased $550 per acre for known sites where prescribed fire is used. Under Alternative 1, based on the amount of late-successional forest and projected known sites (in the acres actually treated annually with prescribed fire), it is estimated that each year 2,823 acres would have these increased costs. This would result in a total increased cost of approximately $1.6 million annually. Averaged across all the acres treated, this would result in an increased cost of $10.35 per acre ($1,552,650/150,100 acres). Under Alternative 2, based on the amount of late-successional forest and projected known sites (in the acres actually treated annually with prescribed fire), it is estimated that each year 995 acres would have these increased costs. This would result in a total increased cost of approximately $0.5 million annually. Averaged across all the acres treated, this would result in an increased cost of $3.45 per acre ($547,250/158,600 acres). Under Alternative 3, based on the amount of late-successional forest and projected known sites (in the acres actually treated annually with prescribed fire), it is estimated that each year 1,378 acres would have these increased costs. This would result in a total increased cost of approximately $0.8 million annually. Averaged across all the acres treated, this would result in an increased cost of $4.83 per acre ($757,900/157,000 acres).

Mitigation for 57 species under Alternative 2 would result in 200 fewer acres available for annual fuel treatments and an increase in $3 per acre to protect species compared to Alternative 2 without mitigation.

Mitigation for 10 species under Alternative 3 would result in 300 fewer acres available for annual fuel treatments and an increase of less than $1.00 per acre to protect species compared to Alternative 3 without mitigation.

## Table 3&4-4. Summary Comparison of Fuel Treatment Acres and Costs

| | Alternative 1 | Alternative 2 | Alternative 3 |
|---|---|---|---|
| Hazardous fuel treatment (annual acres) | 150,100 | 158,600 | 157,000 |
| Hazardous fuel treatment (annual acres) with mitigation | - | 158,400 | 156,700 |
| Survey cost (per acre) | $84 | $34 | $24 |
| Additional treatment costs to manage sites (per acre) | $10 | $3 | $5 |
| Total costs to manage Survey and Manage or Special Status species | $94 | $37 | $29 |
| Total costs to manage Survey and Manage or Special Status species with mitigation | - | $40 | $29 |

In summary, under Alternatives 2 and 3 there would be more acres available for hazard fuel reduction treatments at lower costs (see Table 3&4-4). This would result in an increased ability to implement projects designed to improve forest health and would also assist in better implementation of the National Fire Plan.

# Bryophytes

## Affected Environment

Bryophytes are a distinct group of spore-bearing, nonvascular plants that include mosses, hornworts, and liverworts. They reproduce by producing spores, which are usually wind dispersed, or through specialized asexual structures. Although they are especially vulnerable to disturbance they have managed to colonize a wide variety of habitats throughout the world.

Bryophytes are important components in the forest canopy and understory habitats of late-successional and old-growth forests. They contribute to the species diversity, primary productivity, and biomass of these stands. Old-growth forests may be essential to the continued existence of some bryophytes (USDA et al. 1993, p. IV-101).

Habitat components important to some 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. Snags, shaded rock outcrops, rotten logs, and stumps also provide suitable substrate for numerous bryophyte species.

Since 1994, new information has been acquired on the occurrence and distribution of bryophyte species from strategic and pre-disturbance surveys, herbaria, literature, field units, and taxonomic experts. This knowledge has been used during the annual species review process to move species between categories and to remove some species from the Survey and Manage mitigation measure.

## Environmental Consequences

Under Alternative 1, 15 bryophytes would be included under the Survey and Manage Standards and Guidelines (Categories A, B, or E). Alternative 1 includes management of all known sites and strategic surveys for all 15 species. Alternative 1 includes pre-disturbance surveys for the three species included in Category A (see Table 2-3).

Under Alternative 2, 13 species are assumed to be included in the Agencies' Special Status Species Programs (see Table 2-5).

Under Alternative 3, 15 bryophytes would be included under the Survey and Manage Standards and Guidelines (Categories A, B, or E). Management activities in non-late-successional and non-old-growth forest stands would be exempt from pre-disturbance surveys for the three species included in Category A (*Ptilidium californicum*, *Schistostega pennata*, and *Tetraphis geniculata*).

Under all alternatives, bryophytes receive protection under the network of reserves. The Northwest Forest Plan Final SEIS concluded that several of the alternatives analyzed, including Alternative 9, were most favorable to bryophytes because they provide the set of allocations and management practices that best produces habitat components for bryophytes (USDA, USDI 1994a, p. 3&4-133).

***Brotherella roellii***

This Pacific Northwest endemic species is known from the lower mainland area of British Columbia and five historical sites in Washington. It is currently unknown if *Brotherella roellii* is still extant at these five sites.

Under Alternatives 1 and 3, this species would be included in Category E which requires strategic surveys and management of all known sites. Given the uncertainty regarding the status of this species in the Northwest Forest Plan area, there is insufficient information to determine how these alternatives would affect distribution and stability of this species (USDA, USDI 2000a, p. 223). There is insufficient information to determine an outcome under Alternatives 1 and 3.

Under Alternative 2, this species is assumed not to be included in any of the Agencies' Special Status Species Programs. Known sites would no longer be managed and strategic surveys would not occur. Given the uncertainty regarding the status of this species in the Northwest Forest Plan area, there is insufficient information to determine how the alternative would affect distribution and stability of this species. There is insufficient information to determine an outcome under Alternative 2.

***Buxbaumia viridis* (California only)**

*Buxbaumia viridis* is well distributed in Oregon and Washington (USDA, USDI 2002). In California, this species is known from four sites in northern California, three of which occur on National Forest System lands. These three sites occur outside of reserves. Given the low number of sites, loss of any site could affect populations to the point of leading to insufficient habitat in northern California. Although this species has a broad global distribution (USDA, USDI 2000a, p. 235), it is widely scattered elsewhere and it is listed as vulnerable on the European Red List (Hallinback 1998).

Under Alternatives 1 and 3, this species would be included in Category E which requires strategic surveys and management of all known sites. *Buxbaumia viridis* would stabilize in a pattern similar to its reference distribution (USDA, USDI 2000a, p. 237). Due to protection of known sites, habitat (including known sites) is sufficient to provide for stable populations for this species under Alternatives 1 and 3.

Under Alternative 2, this species is assumed to be included in the Special Status Species Programs for the Forest Service and BLM in California. Due to inclusion in the Agencies' Special Status Species Programs where known sites would be managed, habitat (including known sites) is sufficient to provide for stable populations under Alternative 2.

***Diplophyllum plicatum***

As a result of new information from pre-disturbance and proposive surveys, there are approximately 80 known sites for this species. These sites are primarily restricted to two cluster populations on Coos Bay BLM and the Olympic Peninsula. While most of the sites on Coos Bay BLM are in reserve allocations, not all of the sites on the Olympic Peninsula are in reserves. There are scattered occurrences in between these two clusters. This species is not currently known from California.

Under Alternatives 1 and 3, this species would be included in Category B which requires management of all known sites and strategic surveys. With a high level of uncertainty due to low numbers and spotty distribution, *Diplophyllum plicatum* would stabilize in a pattern similar to its reference distribution (USDA, USDI 2000a, p. 227). Due to management of known sites, habitat (including known sites) is sufficient to provide for stable populations for this species under Alternatives 1 and 3.

Under Alternative 2, this species is assumed to be included as Bureau Assessment on BLM managed lands in Oregon where known sites would be managed. This species is assumed not to be included as Forest Service sensitive in Washington and Oregon. In locations where the species is not included under the Special Status Species Programs and is not protected by reserves, loss of habitat and populations would limit the gene flow and dispersal capability for this species especially between the two larger cluster populations. However, due to protection of existing known sites in reserves and assumed inclusion in the BLM Special Status Species Program in Oregon where known sites would be managed, habitat (including known sites) is sufficient to provide for stable populations for this species under Alternative 2.

***Herbertus aduncus***

This species extends from Alaska to Oregon where it reaches the southern edge of its range in western North America. Recent proposive surveys have located several additional populations in the Columbia Gorge and on the Mt. Baker-Snoqualmie National Forest. Current information indicates that this species is rare and limited in distribution (USDA, USDI 2000a, p. 230).

Under Alternatives 1 and 3, this species would be included in Category E which requires management of all known sites and strategic surveys. Due to low number of sites, there is insufficient information to determine how any alternative would affect distribution and stability of this species (USDA, USDI 2000a, p. 230). There is insufficient information to determine an outcome under Alternatives 1 and 3.

Under Alternative 2, this species is assumed to be Bureau Assessment on BLM managed lands in Oregon where known sites would be managed. It is assumed not to be included as Forest Service sensitive in Washington and Oregon. Known sites would no longer be managed and strategic surveys would not occur. There is insufficient information to determine an outcome under Alternative 2.

***Iwatsukiella leucotricha***

Prior to 2002, there were only two known sites of this species in the continental U.S. Both sites were on nonfederal land in Oregon. Recent proposive surveys in Washington on the Olympic National Forest and Washington State Department of Natural Resources lands have located six new sites which brings the total number of known sites in the continental U.S. to eight. Five of these new sites are located within Late-Successional Reserves. Because this species is known from few sites and current information indicates that it is rare and limited in distribution (USDA/USDI 2000, p. 230), any loss of sites would limit the dispersal potential and lead to the decline in the number of sites in the U.S.

Under Alternatives 1 and 3, this species would be included in Category B which requires management of all known sites and strategic surveys. Due to protection of sites in reserves and management of known sites, habitat (including known sites) is sufficient to support stable populations in the Northwest Forest Plan area under Alternatives 1 and 3.

Under Alternative 2, this species is assumed to be included as Bureau Assessment on BLM managed lands in Oregon and as sensitive on Forest Service managed lands in Washington and Oregon. Since the five new locations on the Olympic National Forest are located in Late-Successional Reserves, protection would be provided for these sites. Due to inclusion in the Special Status Species Programs in Oregon and Washington where known sites would be managed, including the five sites in reserves, habitat (including known sites) is sufficient to provide for stable populations for this species under Alternative 2.

***Kurzia makinoana***

This species has been reported from Washington, Oregon, and California. Currently there are four known sites. Nomenclature of this taxon is in question, so it is difficult to fully understand the range and distribution of this species within the Northwest Forest Plan area.

Under Alternatives 1 and 3, this species would be included in Category B which requires management of all known sites and strategic surveys. There is insufficient information to determine how these alternatives would affect distribution and stability of this species. There is insufficient information to determine an outcome under Alternative 1 or 3.

Under Alternative 2, this species is assumed to be included as a Bureau Assessment species on Oregon BLM managed lands where known sites would be managed. It is assumed not to be included as Forest Service sensitive in Washington, Oregon, or California, or in the BLM Special Status Species Program in California. With the exception of sites on BLM managed lands in Oregon, known sites would no longer be managed. Strategic surveys would no longer be required. Due to lack of information for this species, there is insufficient information to determine an outcome under Alternative 2.

***Marsupella emarginata* var. *aquatica***

This aquatic species grows attached to rocks in streams. Until recently, the only known site for this species was on the Willamette National Forest. Recent proposive surveys located one additional site on the Mt. Baker-Snoqualmie National Forest. There has been taxonomic confusion over the acceptance of this taxon as a valid variety (USDA, USDI 2000a, p. 225).

Under Alternatives 1 and 3, this species would be included in Category B which requires management of all known sites and strategic surveys. Since this variety is restricted to aquatic habitats, Riparian Reserves may provide protection of habitat for this species. Habitat (including known sites) is sufficient to provide for stable populations for this species under Alternatives 1 and 3.

Under Alternative 2, this species is assumed to be included as a Bureau Assessment species on Oregon BLM managed lands. It is assumed not to be included as Forest Service sensitive in Washington, Oregon, or California, or in the BLM Special Status Species Program in California. Since this variety is restricted to aquatic habitats, Riparian Reserves would provide protection of habitat for this species. Habitat (including known sites) is sufficient to provide for stable populations for this species under Alternative 2.

***Orthodontium gracile***

This species occurs in southern Oregon and northern California. Current information indicates this species occurs predominately in coastal redwood forests, most of which are located in reserves, state parks, or National Parks.

Under Alternatives 1 and 3, this species would be included in Category B which requires management of all known sites and strategic surveys. Due to current information that this species is limited to coastal redwood forests, most of which are protected, habitat (including known sites) is sufficient to provide for stable populations for this species under Alternatives 1 and 3.

Under Alternative 2, this species is assumed to be included as sensitive on California BLM managed lands. The species is assumed to not be included as Forest Service

sensitive in California. Due to current information that this species is limited to coastal redwood forests, most of which are protected, habitat (including known sites) is sufficient to provide for stable populations for this species under Alternative 2.

***Ptilidium californicum* (California only)**

This species has a North Pacific distribution (USDA, USDI 2000a, p. 219). It reaches the southern extent of its range in northern California. Previously known only from the literature in California, there are now 228 known sites. Although it appears that there are a large number of sites, the majority of these records are the result of recent proposive surveys completed on the Klamath and Six Rivers National Forests. Roughly an equal percentage of the sites are in reserve and non-reserve allocations (USDA, USDI 2002). Because the majority of the known sites are on the above forests, it is not known if this species is well distributed in the state.

Under Alternatives 1 and 3, this species would be included in Category A in California which requires pre-disturbance surveys, management of all known sites, and strategic surveys. Under Alternative 3, management activities in non-late-successional and non-old-growth forest stands would be exempt from pre-disturbance surveys. Due to management of known sites and protection of known sites by reserve land allocations, habitat (including known sites) is sufficient to provide for stable populations for this species under Alternatives 1 and 3.

Under Alternative 2, this species is assumed to be included as sensitive for the California BLM and as sensitive by the Forest Service in California. Due to inclusion in the Special Status Species Programs where known sites would be managed and protection of known sites by reserves, habitat (including known sites) is sufficient to support stable populations in the Northwest Forest Plan area under Alternative 2.

***Racomitrium aquaticum***

Most of the western North American material of this species has been proposed for a name change to *Racomitrium ryszardii*. It is a recent proposal that has not had time to be evaluated by the North American bryological community (USDA, USDI 2002b). This genus is difficult to work with, in general, and it is often misidentified or overlooked when collections are made. Contrary to this species' name (*aquaticum*), it is not an aquatic species (Harpel 2003, pers. comm.).

Under Alternatives 1 and 3, this species would be included in Category E which requires management of all known sites and strategic surveys. Due to low number of sites and difficulties in identification, there is insufficient information to determine how these alternatives would affect distribution and stability of this species under Alternative 1 (USDA, USDI 2000a, p. 230) or Alternative 3. There is insufficient information to determine an outcome under Alternatives 1 and 3.

Under Alternative 2, this species is assumed not to be included in the Special Status Species Programs. Known sites would no longer be managed and strategic surveys would not occur. Due to low number of sites and difficulties in identification, there is insufficient information to determine how the alternative would affect distribution and stability of this species. There is insufficient information to determine an outcome under Alternative 2.

***Rhizomnium nudum***

Although Koponen (1973) maps the distribution of this species as ending in Washington, new information has extended the range of this species into the Oregon Cascades as far south as the Umpqua National Forest. In Oregon, 3 of the 16 ISMS sites are in Late-

Successional Reserves on National Forest System lands. Currently, this species is not known from California.

Under Alternatives 1 and 3, this species would be included in Category B outside of Washington State. This requires management of all known sites and strategic surveys. Because known site management will contribute to providing for stable populations of this species, *Rhizomnium nudum* would stabilize in a pattern similar to its reference distribution (USDA, USDI 2000a, p. 227). Habitat (including known sites) is sufficient to provide for stable populations for this species under Alternatives 1 and 3.

Under Alternative 2, this species is assumed to be included as Bureau Assessment for the BLM in Oregon and Forest Service sensitive in Oregon. Due to inclusion in the Agencies' Special Status Species Programs where known sites would be managed, habitat (including known sites) is sufficient to provide for stable populations for this species under Alternative 2.

***Schistostega pennata***

This species occurs in Washington and Oregon with most of the sites found on the Olympic Peninsula, and in the Gifford Pinchot, Mt. Baker-Snoqualmie, and Mt. Hood National Forests. It is known as far south as the Umpqua National Forest in Oregon. New information indicates this species is found in a variety of habitats and is not restricted to riparian areas (Harpel 2003, pers. comm.).

Under Alternatives 1 and 3, this species would be included in Category A which requires pre-disturbance surveys, management of all known sites, and strategic surveys. Under Alternative 3, management activities in non-late-successional and non-old-growth forest stands would be exempt from pre-disturbance surveys. Due to management of known sites habitat (including known sites) is sufficient to provide for stable populations for this species under Alternatives 1 and 3.

Under Alternative 2, this species is assumed to be included as Forest Service sensitive in Oregon and Washington. It is assumed to be Bureau Assessment on BLM managed lands in Oregon. Due to management of known sites, habitat (including known sites) is sufficient to provide for stable populations for this species under Alternative 2.

***Tetraphis geniculata***

This species occurs in Oregon and Washington and is suspected to be found in coastal California. Most of the known sites for this species occur in Washington on the Gifford Pinchot National Forest and the Olympic Peninsula. A substantial number of these sites occur outside of reserves. Only three locations are known to occur in Oregon. Because this species in the Pacific Northwest is dependent on decaying coarse woody debris, it is important to maintain these components within non-late-successional and non-old-growth forest stands.

Under Alternatives 1 and 3, this species would be included in Category A which requires pre-disturbance surveys, management of all known sites, and strategic surveys. Under Alternative 3, management activities in non-late-successional and non-old-growth forest stands would be exempt from pre-disturbance surveys. Due to management of known sites and surveys, habitat (including known sites) is sufficient to provide for stable populations for this species under Alternatives 1 and 3.

Under Alternative 2, this species is assumed to be included as sensitive on BLM managed lands in California and as Bureau Assessment on BLM managed lands in Oregon. It is also assumed to be included as Forest Service sensitive in Oregon and Washington. Due to inclusion in the Agencies' Special Status Species Programs where known sites would

be managed and pre-project clearances would be completed, habitat (including known sites) is sufficient to provide for stable populations for this species under Alternative 2.

***Tritomaria exsectiformis***

Previously this species was thought to occur only on the eastside of the Cascade Mountains. New information from proposive surveys expanded the known range of the species on the eastside and to the Olympic National Forest on the westside of the Cascades. Currently, all known sites occur on National Forest System lands.

Under Alternatives 1 and 3, this species would be in Category B which requires management of all known sites and strategic surveys. Due to few known sites and lack of information, there is insufficient information to determine how any alternative would affect the distribution and stability of *Tritomaria exsectiformis* (USDA, USDI 2000a, p. 227). There is insufficient information to determine an outcome under Alternatives 1 and 3.

Under Alternative 2, this species is assumed to be included as Bureau Assessment by the BLM in Oregon where known sites would be managed. It is assumed not to be included in the Forest Service Sensitive Species Programs or in the BLM Special Status Species Program in California. Known sites would no longer be managed on National Forest System lands or on BLM managed lands in California. Strategic surveys would not occur. Although loss of sites could occur where not included in the Agencies' Special Status Species Programs, there is insufficient information to determine how the alternative would affect distribution and stability of this species. There is insufficient information to determine an outcome under Alternative 2.

***Tritomaria quinquedentata***

This species is known from few sites and current information indicates it is rare and limited in distribution (USDA, USDI 2000a, p. 230). There are 11 known sites for this species in Washington and 1 known site in Oregon. Eleven of 12 sites occur on federally managed lands. Several recent collections on the eastside of the Cascade Mountains have expanded the range from the Mt. Baker-Snoqualmie National Forest to the Okanogan National Forest in Washington. The association of this species with late-successional or old-growth forests is uncertain (USDA, USDI Species Review Panel 1999).

Under Alternatives 1 and 3, this species would be included in Category B which requires management of all known sites and strategic surveys. Because there are so few sites, there is insufficient information to determine how these alternatives would affect the distribution and stability of this species (USDA, USDI 2000a, p. 230). There is insufficient information to determine an outcome under Alternatives 1 and 3.

Under Alternative 2, this species is assumed to be included as a Bureau Assessment species by the Oregon BLM. It is assumed not to be included in the Forest Service Sensitive Species Program or the BLM Special Status Species Program in California. Known sites would no longer be managed on National Forest System lands or on BLM managed lands in California. Strategic surveys would not occur. Because it is unknown how well the current information reflects species' distribution and there are so few sites, there is insufficient information to determine an outcome under Alternative 2.

## Summary

Under all alternatives, habitat (including known sites) is sufficient to provide for stable populations for nine species.

Under all alternatives, there is insufficient information to draw a conclusion for six species.

# Fungi

## Affected Environment

Under Alternative 1, there are 187 fungi species currently included in the Survey and Manage Standards and Guidelines (see Table 2-3). Under Alternative 2, there would be 70 fungi species included in the Agencies' Special Status Species Programs (see Table 2-5). Under Alternative 3, there would be 172 species included in the Survey and Manage Standards and Guidelines (Categories A, B, and E) and 4 species would be included in the Agencies' Special Status Species Program (see Table 2-10).

Fungi are neither plants nor animals but are recognized as a separate kingdom of organisms, both in structure and function. Estimates indicate there are at least six species of fungi for every vascular plant species in a given temperate ecosystem (Hawksworth 1991). The fungal flora of the Pacific Northwest is extremely diverse. Of the 527 species of fungi that were evaluated as closely associated with late-successional and old-growth forests, 109 are known to be endemic to the Pacific Northwest.

Most macrofungi (mushrooms, truffles, and allies) produce fruiting structures or sporocarps that are short-lived and ephemeral, seasonal in occurrence, and annually variable. Richardson (1970) estimated that sampling every 2 weeks would fail to detect about 50 percent of macrofungal species fruiting in a season. On the average, less than 10 percent of species were detected in each of 2 consecutive years at any one of eight sites (O'Dell et al. 1999). The reasons for annual and seasonal variation are not fully understood, and predicting when, or under what conditions, a species would fruit is not possible at present.

Another poorly understood facet of fungi is their population biology. Dispersal, reproduction, and connectivity are not well understood for any of the fungi considered in this SEIS.

## Environmental Consequences

Habitat components important to fungi include dead, down wood; standing dead trees; and live, old-growth trees; as well as a diversity of host species (including trees and underbrush) 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. The analyses of environmental consequences of Option 9 in FEMAT and Alternative 9 in the Northwest Forest Plan Final SEIS concluded that alternatives, such as Alternative 9, which provide for more extensive and interconnected late-successional and old-growth forest conditions, would minimize the risks to these species (USDA, USDI 1994a, p. 3&4-136).

For most fungi species there is scant information regarding geographic range, habitat, or habitat range. Few systematic surveys for fungi have been performed, even within the Northwest Forest Plan area. Lack of detection does not necessarily indicate lack of presence. Therefore, there is incomplete knowledge regarding the true geographic range of Survey and Manage fungi species. Many fungi species are widespread but locally rare (large geographic range, but small, isolated populations). This may be due to broad macrohabitat (forests), yet restricted and specialized microhabitat requirements (specific hosts, local conditions). There currently are no methods to predict where specialized habitat occurs for most Survey and Manage fungi. Existing habitat information is confined to generalities and hypothesis, based on more common species. This makes it difficult to evaluate habitat for Survey and Manage fungi species.

The 2000 Survey and Manage Final SEIS acknowledged this high degree of uncertainty regarding the biological distribution of fungi. This uncertainty has been reduced for some species as a result of a variety of efforts including strategic surveys implemented under the Survey and Manage Standards and Guidelines. Consequently, the environmental consequences analysis in this SEIS was able to reach conclusions for some species that previously lacked sufficient information to determine how any alternative would affect distribution and stability. For other species, conclusions were modified from the 2000 Final SEIS as a result of additional information. A primary source of information regarding the distribution and number of known sites used in the analysis of these species was the ISMS database.

Species are grouped for the purpose of comparing environmental consequences. The groupings are not intended to imply that this certain aspect of the analysis is the only criteria by which the alternatives would be judged. Previous analyses, either incorporated by reference or supplemented by this SEIS, contain relevant information regarding the alternatives.

Although historic locations delineate potential species ranges, the following 44 species have not been recorded since institution of the Survey and Manage fungi lab in 1996. Under all alternatives, for the following 44 species, habitat (including known sites) is insufficient to support stable populations in the Northwest Forest Plan area. The reasons for this outcome include the fact that many of these species have not been observed in the Northwest Forest Plan area in more than 30 years, many may already be extirpated from the Northwest Forest Plan area, and all alternatives would provide insufficient habitat to maintain these species (USDA, USDI 2000a). This outcome is not due to federal action.

*Albatrellus avellaneus* (B)
*Arcangeliella crassa* (B)
*Asterophora parasitica* (B)
*Baeospora myriadophylla* (B)
*Balsamia nigrens* (B)
*Boletus haematinus* (B)
*Cordyceps ophioglossoides* (B)
*Cortinarius speciosissimus* (B)
*Cortinarius umidicola* (B)
*Cortinarius variipes* (B)
*Cortinarius wiebeae* (B)
*Cyphellostereum laeve* (B)
*Destuntzia fusca* (B)
*Destuntzia rubra* (B)
*Dichostereum boreale* (B)
*Elaphomyces anthracinus* (B)
*Endogone acrogena* (B)
*Endogone oregonensis* (B)
*Fayodia bisphaerigera* (B)
*Fevansia aurantiaca* (B)
*Gastroboletus imbellus* (B)
*Gastrosuillus umbrinus* (B)
*Gautieria magnicellaris* (B)
*Gautieria otthii* (B)
*Glomus radiatum* (B)
*Gymnomyces nondistincta* (B)
*Hebeloma olympianum* (B)
*Hydnotrya subnix* (B)
*Hygrophorus vernalis* (B)
*Macowanites lymanensis* (B)
*Macowanites mollis* (B)
*Martellia fragrans* (B)
*Mythicomyces corneipes* (B)
*Neolentinus adhaerens* (B)
*Octavianina macrospora* (B)
*Octavianina papyracea* (B)
*Ramaria hilaris* var. *olympiana* (B)
*Rhizopogon abietis* (B)
*Rhizopogon brunneiniger* (B)
*Rhizopogon ellipsosporus* (B)
*Rhizopogon inquinatus* (B)
*Sedecula pulvinata* (B)
*Stagnicola perplexa* (B)
*Thaxterogaster pavelekii* (B).

Under Alternatives 1 and 3, all 44 species would be included in Category B (as indicated by the B in parens following the species name) which requires management of known sites and strategic surveys.

Under Alternative 2, 33 of these 44 species are assumed not to be included in any of the Agencies' Special Status Species Programs or would be included as Bureau Tracking by Oregon BLM which is not considered special status for management purposes.

Sites would no longer be managed and strategic surveys would no longer be required. The remaining 11 species are assumed to be included in one or more of the Agencies' Special Status Species Programs. *Albatrellus avellaneus* is assumed to be included as a sensitive species by the Forest Service in Oregon and Washington and the BLM in Oregon. Pre-project clearances would be conducted and sites of *Albatrellus avellaneus* would be managed if loss of the site would contribute to a trend toward listing. General inventories may be conducted. *Boletus haematinus* and *Cordyceps ophioglossoides* are assumed to be included as Bureau Sensitive on California BLM managed lands. On California BLM managed lands, pre-project clearances would be conducted and sites would be managed if site loss would contribute to the need to list. General inventories may be conducted. *Destuntzia rubra*, *Gastroboletus imbellus*, *Gymnomyces nondistincta*, *Macowanites mollis*, *Martellia fragrans*, *Octavianina macrospora*, *Ramaria hilaris* var. *olympiana*, *Rhizopogon ellipsosporus*, and *Thaxterogaster pavelekii* are assumed to be included as sensitive on BLM managed lands in Oregon. Pre-project clearances would be conducted and sites would be managed if site loss would contribute to the need to list. General inventories may be conducted.

Under all alternatives, the following 83 species would not maintain stable populations largely due to the very low number of occurrences (most have had only 1 to 10 sites discovered since 1996). For all alternatives, habitat (including known sites) is insufficient to support stable populations in the Northwest Forest Plan area (USDA, USDI 2000a, pp. 244-245). This outcome is not due to federal action. For some species with a somewhat higher number of known sites, this outcome is also due to habitat requirements or life history. For example, *Bridgeoporus nobilissimus* has 60 known sites and while pre-disturbance surveys are conducted and known sites are managed, there is still a high probability that populations will not remain stable. The only host for this species is *Abies* (usually *Abies procera*). Known site survey data indicates that the majority of sites are located in second growth stands, with the most common substrate being *Abies* stumps or snags. In many of these stands, *Abies* is either not present, or negligibly present in the regeneration. Therefore, host populations may not be adequate to provide for continuity of *Bridgeoporus nobilissimus* over time, leading to unstable populations.

*Acanthophysium farlowii* (B)
*Albatrellus caeruleoporus* (B)
*Alpova alexsmithii* (B)
*Alpova olivaceotinctus* (B)
*Arcangeliella camphorata* (B)
*Arcangeliella lactarioides* (B)
*Asterophora lycoperdoides* (B)
*Boletus pulcherrimus* (B)
*Bridgeoporus nobilissimus* (A)
*Catathelasma ventricosa* (B)
*Chamonixia caespitosa* (B)
*Choiromyces alveolatus* (B)
*Choiromyces venosus* (B)
*Chroogomphus loculatus* (B)
*Chrysomphalina grossula* (B)
*Clavariadelphus subfastigiatus* (B)
*Clavulina castanopes* var. *lignicola* (B)
*Clitocybe senilis* (B)
*Clitocybe subditopoda* (B)
*Collybia racemosa* (B)
*Cortinarius boulderensis* (B)
*Cortinarius cyanites* (B)
*Cortinarius depauperatus* (B)
*Cortinarius magnivelatus* (B)
*Cortinarius olympianus* (B)
*Cortinarius valgus* (B)
*Cortinarius verrucisporus* (B)
*Dermocybe humboldtensis* (B)
*Elaphomyces subviscidus* (B)
*Entoloma nitidum* (B)
*Galerina cerina* (B)
*Gastroboletus ruber* (B)
*Gastroboletus turbinatus* (B)
*Gastroboletus vividus* (B)
*Gelatinodiscus flavidus* (B)
*Gymnomyces abietis* (B)
*Helvella crassitunicata* (B)
*Hydnotrya inordinata* (B)
*Hydropus marginellus* (B)
*Hygrophorus caeruleus* (B)
*Hygrophorus karstenii* (B)
*Hypomyces luteovirens* (B)
*Leucogaster microsporus* (B)
*Macowanites chlorinosmus* (B)
*Marasmius applanatipes* (B)
*Martellia idahoensis* (B)
*Mycena hudsoniana* (B)
*Mycena quinaultensis* (B)
*Mycena tenax* (B)
*Neolentinus kauffmanii* (B)

*Octavianina cyanescens* (B)
*Otidea smithii* (B)
*Phaeocollybia gregaria* (B)
*Phellodon atratus* (B)
*Pholiota albivelata* (B)
*Podostroma alutaceum* (B)
*Pseudaleuria quinaultiana* (B)
*Ramaria abietina* (B)
*Ramaria botrytis* var. *aurantiiramosa* (B)
*Ramaria claviramulata* (B)
*Ramaria concolor f. tsugina* (B)
*Ramaria conjunctipes* var. *sparsiramosa* (B)
*Ramaria coulterae* (B)
*Ramaria gracilis* (B)
*Ramaria maculatipes* (B)
*Ramaria rainierensis* (B)
*Ramaria rubella* var. *blanda* (B)
*Ramaria rubribrunnescens* (B)
*Ramaria spinulosa* var. *diminutiva* (B)
*Ramaria suecica* (B)
*Ramaria thiersii* (B)
*Ramaria verlotensis* (B)
*Rhizopogon atroviolaceus* (B)
*Rhizopogon chamaleontinus* (B)
*Rhizopogon evadens* var. *subalpinus* (B)
*Rhizopogon exiguus* (B)
*Rhizopogon flavofibrillosus* (B)
*Rhodocybe speciosa* (B)
*Rickenella swartzii* (B)
*Tricholomopsis fulvescens* (B)
*Tuber asa* (B)
*Tuber pacificum* (B)
*Tylopilus porphyrosporus* (D).

Under Alternative 1, all but two of these species would be included in Category B (as indicated by the B in parens) which requires management of known sites and strategic surveys. *Bridgeoporus nobilissimus* would be included in Category A which requires management of known sites, pre-disturbance surveys, and strategic surveys. *Tylopilus porphyrosporus* would be included in Category D which requires management of high-priority sites and strategic surveys.

Under Alternative 3, all but one of these species would be included in the Survey and Manage mitigation measure in Category A or B (as indicated by the letter in parens following the species name). Management under Alternative 3 is similar to Alternative 1, except pre-disturbance surveys would no longer be required for *Bridgeoporus nobilissimus* in non-late-successional and non-old-growth stands. Elimination of pre-disturbance surveys in non-late-successional and non-old-growth stands would further increase the habitat risk for *Bridgeoporus nobilissimus* by greatly reducing the probability of discovering and protecting new sites, since the majority of known sites are currently located in non-late-successional and non-old-growth stands (with large stumps and snags). *Tylopilus porphyrosporus* is assumed not be included in the Agencies' Special Status Species Programs. Sites of *Tylopilus porphyrosporus* would no longer be managed and strategic surveys would no longer be required; habitat (including known sites) is insufficient to support stable populations due to a low number (8) of likely extant sites in the Northwest Forest Plan area.

Under Alternative 2, 61 of these 83 species are assumed not to be included in any of the Agencies' Special Status Species Programs or would be included as Bureau Tracking by Oregon BLM which is not considered special status for management purposes. Sites would no longer be managed and strategic surveys would no longer be required. The remaining 22 species are assumed to be included in one or more of the Agencies' Special Status Species Programs. *Albatrellus caeruleoporus*, *Choiromyces venosus*, *Clavulina castanopes* var. *lignicola*, *Clitocybe subditopoda*, *Entoloma nitidum*, *Hydropus marginellus*, and *Mycena quinaultensis* are assumed to be included as sensitive on California BLM managed lands. Pre-project clearances would be conducted and sites would be managed if site loss would contribute to need to list. General inventories may be conducted. *Collybia racemosa* is assumed to be included as a sensitive species by BLM California and Region 5 of the Forest Service. Pre-project clearances would be conducted and sites would be managed if loss of the site would contribute to a trend toward listing. General inventories may be conducted. *Dermocybe humboldtensis* is assumed to be included as a sensitive species by BLM California and BLM Oregon. Pre-project clearances would be conducted and sites would be managed if site loss would contribute to need to list. General inventories may be conducted. *Alpova alexsmithii*,

*Arcangeliella camphorata*, *Chroogomphus loculatus*, *Gastroboletus vividus*, *Martellia idahoensis*, *Phaeocollybia gregaria*, *Ramaria spinulosa* var. *diminutiva*, *Rhizopogon chamaleontinus*, and *Rhizopogon exiguus* are assumed to be included as sensitive on BLM managed lands in Oregon. Pre-project clearances would be conducted and sites would be managed if site loss would contribute to need to list. General inventories may be conducted. *Boletus pulcherrimus* and *Bridgeoporus nobilissimus* are assumed to be included as a sensitive species by the Forest Service in Regions 5 and 6 and BLM in Oregon. Pre-project clearances would be conducted and sites would be managed if loss of the site would contribute to a trend toward listing. General inventories may be conducted. *Otidea smithii* is assumed to be included as a sensitive species by the Forest Service in Regions 5 and 6. Pre-project clearances would be conducted and sites would be managed if loss of the site would contribute to a trend toward listing. General inventories may be conducted. *Tricholomopsis fulvescens* is assumed to be included as a sensitive species by the Forest Service in Region 5. Pre-project clearances would be conducted and sites would be managed if loss of the site would contribute to a trend toward listing. General inventories may be conducted.

For the following seven species, there is insufficient information to determine how the alternatives would affect distribution and stability or to determine an outcome (USDA, USDI 2000a, p. 247). Under Alternatives 1 and 3, all seven of these species are included in Categories B or E which both require management of known sites and strategic surveys. Category designations are indicated by the letter in parens. Under Alternative 2, none of these species are assumed to be included in the Agencies' Special Status Species Programs. Sites would no longer be managed and strategic surveys would no longer be required.

*Cortinarius tabularis* (B)
*Galerina sphagnicola* (E)
*Gastrosuillus amaranthii* (E)
*Ramaria concolor f. marrii* (B)
*Ramaria lorithamnus* (B)
*Russula mustelina* (B)
*Tricholoma venenatum* (B).

Under Alternative 1, the following 14 species would be included in Categories B, D, E, or F as indicated by the letter in parens. All four categories require strategic surveys. In addition, Categories B and E require managing all known sites, while Category D requires managing high-priority sites. Under Alternative 1, the following 14 species would stabilize in a pattern similar to or different from their reference distribution. Habitat (including known sites) is sufficient to support stable populations in the Northwest Forest Plan area. This is due to management under the Survey and Manage Standards and Guidelines and because a substantial number of known sites are located in reserves (USDA, USDI 2000a, p. 243 and ISMS database). Under Alternative 2, these 14 species would stabilize in a pattern similar to or different from their reference distribution. Habitat (including known sites) would be sufficient to support stable populations in the Northwest Forest Plan area. This is because a substantial number of known sites are located in reserves (ISMS database) or managed under the Agencies' Special Status Species Programs. Under Alternative 3, these 14 species would stabilize in a pattern similar to or different from their reference distribution. Habitat (including known sites) would be sufficient to support stable populations in the Northwest Forest Plan area. This is because known sites would be protected through the Survey and Manage Standards and Guidelines or a substantial number of their known sites are located in reserves.

*Bondarzewia mesenterica* (B)
*Cantharellus subalbidus* (D)
*Chalciporus piperatus* (D)
*Clavariadelphus truncatus* (D)
*Collybia bakerensis* (F)
*Gastroboletus subalpinus* (B)
*Gomphus clavatus* (F)
*Helvella elastica* (B)
*Mycena overholtsii* (D)
*Nivatogastrium nubigenum* (B)
*Otidea leporina* (D)
*Phaeocollybia kauffmanii* (D)
*Phaeocollybia olivacea* (E and F)
*Phaeocollybia oregonensis* (B).

The following 17 species are not endemic to the Northwest Forest Plan area. Under Alternative 1, these 17 species would be included in Categories B, D, or E. All three categories require strategic surveys. Categories B and E also require management of known sites. Category D also requires management of high-priority sites. For these species, management under the Survey and Manage Standards and Guidelines in Alternative 1 would allow these species to stabilize in a pattern similar to their reference distribution. Habitat (including known sites) is sufficient to support stable populations in the Northwest Forest Plan area. However, within the Northwest Forest Plan area, due to overall low numbers of sites and low numbers of sites located in reserves, these species have limited potential for connectivity or gene flow between sites or clusters of sites.

*Albatrellus ellisii* (B)
*Albatrellus flettii* (B)
*Clavariadelphus ligula* (B)
*Clavariadelphus occidentalis* (B)
*Clavariadelphus sachalinensis* (B)
*Cortinarius barlowensis* (B)
*Galerina heterocystis* (E)
*Gomphus bonarii* (B)
*Phaeocollybia scatesiae* (B)
*Polyozellus multiplex* (B)
*Ramaria cyaneigranosa* (B)
*Ramaria rubrievanescens* (B)
*Rhizopogon truncatus* (D)
*Sowerbyella rhenana* (B)
*Sparassis crispa* (D)
*Spathularia flavida* (B)
*Tremiscus helvelloides* (D).

Under Alternative 2, these species would receive limited or no management of known sites through the Special Status Species Programs. Because the known sites of these species are not otherwise substantially protected by reserves, habitat (including known sites) would be insufficient to support stable populations in the Northwest Forest Plan area. This is due to soil disturbance and/or significant loss of host species (USDA, USDI 2000a, p. 243, and ISMS database). Although Matrix Standards and Guidelines provide for minimizing soil and litter disturbance, there is a lack of knowledge about how much disturbance can be tolerated by these species. Loss of even a few known sites could adversely impact persistence within the Northwest Forest Plan area.

Alternative 3 would require management of known sites for 14 of these 17 species. Under Alternative 3, these 14 species would stabilize in a pattern similar to their reference distribution. Habitat (including known sites) would be sufficient to support stable populations in the Northwest Forest Plan area. Under Alternative 3, management of known sites is not required through either Survey and Manage or the Special Status Species Programs for 3 of the 17 species (*Rhizopogon truncatus*, *Sparassis crispa*, and *Tremiscus helvelloides*). Because the known sites of these three species are not otherwise substantially protected by reserves, habitat (including known sites) would be insufficient to support stable populations in the Northwest Forest Plan area due to soil disturbance and/or significant loss of host species (USDA, USDI 2000a, p. 243 and ISMS database). Although Matrix Standards and Guidelines provide for minimizing soil and litter disturbance, there is a lack of knowledge about how much disturbance can be tolerated by these species. Loss of even a few known sites could adversely impact persistence within the Northwest Forest Plan area.

The following 22 species are endemic to the Northwest Forest Plan area or the Pacific Northwest. Under Alternative 1 these species would be included in Categories B, D, or E, as indicated by the letter in parens following the species name. Categories B and E require management of known sites and strategic surveys. Category D requires management of high-priority sites and strategic surveys. These species would stabilize in a pattern similar to their reference distribution. Habitat (including known sites) is sufficient to support stable populations in the Northwest Forest Plan area. However, due to overall low numbers of sites and low numbers of sites located in reserves, these species have limited potential for connectivity or gene flow between sites or clusters of sites.

*Cudonia monticola* (B)
*Gomphus kauffmanii* (E)
*Gymnopilus punctifolius* (B)
*Gyromitra californica* (B)
*Leucogaster citrinus* (B)
*Phaeocollybia attenuata* (D)
*Phaeocollybia californica* (B)
*Phaeocollybia dissiliens* (B)
*Phaeocollybia fallax* (D)
*Phaeocollybia piceae* (B)
*Phaeocollybia pseudofestiva* (B)
*Phaeocollybia sipei* (B)
*Phaeocollybia spadicea* (B)
*Ramaria amyloidea* (B)
*Ramaria araiospora* (B)
*Ramaria aurantiisiccescens* (B)
*Ramaria celerivirescens* (B)
*Ramaria gelatiniaurantia* (B)
*Ramaria largentii* (B)
*Ramaria rubripermanens* (B and D)
*Ramaria stuntzii* (B)
*Sarcodon fuscoindicus* (B).

Under Alternative 2, these species would receive limited or no management of known sites on federally managed lands through the Special Status Species Programs and/or there are a low number of sites located in reserves. Because the known sites of these species are not otherwise substantially protected by reserves, habitat (including known sites) would be insufficient to support stable populations in the Northwest Forest Plan area. This is due to soil disturbance and/or significant loss of host species (USDA, USDI 2000a, p. 243 and ISMS database). Although Matrix Standards and Guidelines provide for minimizing soil and litter disturbance, there is a lack of knowledge about how much disturbance can be tolerated by these species. Loss of even a few known sites could adversely impact persistence within the Northwest Forest Plan area.

Alternative 3 requires management of known sites for 19 of these 22 species. Under Alternative 3, these 19 species would stabilize in a pattern similar to their reference distribution. Habitat (including known sites) would be sufficient to support stable populations in the Northwest Forest Plan area. Under Alternative 3, management of known sites would not occur through either Survey and Manage or the Special Status Species Programs for 3 (*Phaeocollybia attenuata*, *Phaeocollybia fallax*, and *Ramaria rubripermanens*) of the 22 species in either all or a significant portion of their range. Because known sites of these three species are not otherwise substantially protected by reserves, habitat (including known sites) would be insufficient to support stable populations in the Northwest Forest Plan area. This is due to soil disturbance and/or significant loss of host species (USDA, USDI 2000a, p. 243 and ISMS database). Although Matrix Standards and Guidelines provide for minimizing soil and litter disturbance, there is a lack of knowledge about how much disturbance can be tolerated by these species. Loss of even a few known sites could adversely impact persistence within the Northwest Forest Plan area.

## Summary and Mitigation

Under Alternatives 1, 2, and 3, there is insufficient information to determine an outcome for 7 of the 187 species.

Under all alternatives, for 127 of the 187 fungi species, habitat (including known sites) is insufficient to support stable populations in the Northwest Forest Plan area. This is due to factors other than federal action.

Under Alternative 1, the remaining 53 (of the 187) species would stabilize in a pattern similar to their reference distribution. Habitat (including known sites) is sufficient to support stable populations in the Northwest Forest Plan area.

Under Alternative 2, for 14 of the remaining 53 species, habitat (including known sites) would be sufficient to support stable populations in the Northwest Forest Plan area. For the other 39 species, habitat (including known sites) would be insufficient to support stable populations in the Northwest Forest Plan area. Mitigation that consists

of managing known sites would eliminate the adverse effects to these 39 species under Alternative 2. See Chapter 2 for a detailed description of mitigation.

Under Alternative 3, 47 of the remaining 53 species would stabilize in a pattern similar to their reference distribution. Habitat (including known sites) would be sufficient to support stable populations in the Northwest Forest Plan area. For the other six species, habitat (including known sites) would be insufficient to support stable populations in the Northwest Forest Plan area because they are not included in the Survey and Manage or Special Status Species Programs. Mitigation that consists of managing known sites would eliminate the adverse effects within the Northwest Forest Plan area for these six species under Alternative 3. See Chapter 2 for a detailed description of mitigation.

# Lichens

## Affected Environment

Lichens are symbiotic organisms made of members of at least two, and sometimes three, biological kingdoms. All lichens consist of a photosynthetic component (either a green algae or a cyanobacterium, and occasionally both) and a fungal component (usually an ascomycete).

The distribution of many lichens is dispersal limited (USDA et al. 1993). Overall, lichens disperse and grow more slowly than vascular plants. Many of the lichens in the Survey and Manage Standards and Guidelines have narrow ecological amplitude. Many of the forest species are epiphytic, growing directly on trees and shrubs, but some grow on downed wood or soil, or are aquatic and are partially submerged at least part of the year. Lichens often occupy late-successional and old-growth components that provide continuity in younger stands, such as legacy trees, wolf trees, well-developed hardwood gaps, and dynamic riparian areas with an old alder component. Some of the Northwest Forest Plan Standards and Guidelines, such as green tree retention and riparian buffers, can be effective for lichens, if clumps of colonized trees are retained to act as "seed" sources when habitat conditions become suitable again. FEMAT states that riparian buffers on all orders of streams are important for riparian and aquatic lichens (USDA et al. 1993, p. IV-97).

At the time of the Northwest Forest Plan Final SEIS (1994), there was little information about the distribution, number of sites, and habitat requirements for most of the lichens. New information has contributed substantially to the understanding of many species' frequency and distribution throughout the Northwest Forest Plan area. Most of this information is a direct result of pre-disturbance and strategic surveys, statistical analyses of data from Oregon National Forests in the Northwest Forest Plan area and the Gifford Pinchot National Forest in Washington (Edwards et al. 2002), and the Coastal Lichen Study (Glavich et al. 2002). The historic distribution of these species is unknown and can only be inferred.

Additional information regarding the affected environment for lichens is found in the 2000 Final SEIS, the Northwest Forest Plan Final SEIS, and FEMAT.

### Lichen Functional Groups

In the Option 9 and Alternative 9 analyses, lichens were grouped into 12 functional groups based on ecological relationships. Some of these groups were subdivided by their degree of rarity (USDA et al. 1993, p. IV-92). Additional information since these analyses has further refined membership within functional groups, and has also indicated that some functional affinities might not be as strong as once suspected. Although lichens

are not analyzed by functional groups here, a brief description of the modified functional groups is presented below. This is not intended as a formal definition of functional groups, a task that is beyond the scope of this analysis. Each species is analyzed individually.

## Coastal Lichens

The coastal lichen group includes *Bryoria pseudocapillaris, Bryoria subcana, Bryoria spiralifera, Buellia oidalea, Heterodermia sitchensis, Hypotrachyna revoluta, Niebla cephalota, Pannaria rubiginosa, Teloschistes flavicans,* and *Usnea hesperina*.

New information from the Coastal Lichen Study (Glavich et al. 2002) and ISMS confirm all of the coastal lichens are still considered rare and have narrow ecological amplitudes in limited habitat. None of these species are well represented in the reserves.

## Riparian Lichens

The riparian lichen group includes *Cetrelia cetrarioides* and *Collema nigrescens*.

New information indicates some riparian enhancement projects, especially hardwood removal to promote conifer development, may disturb habitat for riparian lichens (USDA, USDI 2003c, in review). Riparian hardwoods can be an important substrate for these species.

### Ambiguous Riparian Association Lichens

This group includes lichens whose riparian association is in question. The ambiguous riparian association lichens include *Leptogium cyanescens, Leptogium teretiusculum, Platismatia lacunosa,* and *Usnea longissima*.

## Aquatic Lichens

The aquatic lichen group includes *Dermatocarpon luridum* and *Leptogium rivale*.

Aquatic lichens are truly aquatic and are submerged at least part of the year. The Aquatic Conservation Strategy was designed to address all elements of the aquatic and riparian ecosystem. FEMAT states that riparian buffers on all orders of streams are important for the riparian and aquatic lichens (USDA et al. 1993, p. IV-97). New information indicates some riparian enhancement projects may disturb habitat for aquatic lichens (Derr 1998).

## Rare and Uncommon Nitrogen-Fixing Lichens

This group includes *Dendriscocaulon intricatulum, Lobaria linita, Lobaria oregana, Nephroma bellum, Nephroma isidiosum, Nephroma occultum, Peltigera pacifica, Pseudocyphellaria perpetua,* and *Pseudocyphellaria rainierensis*.

These cyanolichens fix atmospheric nitrogen and make it usable to other components of the ecosystem.

## Pin Lichens

The pin lichen group includes *Calicium abietinum, Calicium adspersum, Chaenotheca chrysocephala, Chaenotheca ferruginea, Chaenotheca subroscida, Chaenothecopsis pusilla, Microcalicium arenarium,* and *Stenocybe clavata*.

This is a group of small, easily overlooked species. Strategic surveys have yielded new information on the rarity, distribution, and habitat association for many of these species.

### Other Lichens

Three species did not fit into any of the other groupings. They are *Hypogymnia duplicata, Hypogymnia vittata,* and *Tholurna dissimilis*.

### Lichens of Taxonomic Concern

Two lichens, *Fuscopannaria* (*Pannaria*) *saubinetii* (a coastal lichen) and *Leptogium burnetiae* var. *hirsutum*, are lichens with taxonomic concerns.

## Environmental Consequences

Under Alternative 1, there are 40 lichen species that remain in the Survey and Manage Standards and Guidelines (see Table 2-3).

Under Alternative 2, there are 27 lichen species assumed to be included in the Agencies' Special Status Species Programs (see Table 2-5).

Under Alternative 3, 37 lichen species would be included in the Survey and Manage Standards and Guidelines (Categories A, B, or E). The other three species are assumed to be included in the Agencies' Special Status Species Programs (see Table 2-10). Management activities in non-late-successional and non-old-growth forest stands would be exempt from pre-disturbance surveys for 11 species in Survey and Manage Category A. Late-successional and/or old-growth legacy components in these stands provide important refugia and propagule sources to re-colonize these stands. While surveys for these 11 species would not be completed in non-late successional and non-old-growth stands, existing Northwest Forest Plan Standards and Guidelines for Matrix management (USDA, USDI 1994b, pp. C-39 through C-48) provide for retention of these legacy components.

Under all alternatives, some of the lichen species would receive protection under the network of reserves provided by the Northwest Forest Plan. The level of protection varies by species, depending on how many sites and what proportions of the known sites are in reserves. Few statistical analyses have been done on the association between reserve allocations and lichens. Seven lichens (*Buellia oidalea*, *Lobaria oregana*, *Nephroma isidiosum*, *Nephroma occultum*, *Peltigera pacifica*, *Pseudocyphellaria rainierensis*, and *Stenocybe clavata*) are Pacific Northwest endemics. FEMAT stated that "extirpation of these species in the region would equate to the extinction of the species" (USDA, USDI 1993, p. IV-90). Two lichen species, *Hypogymnia vittata* and *Nephroma isidiosum*, are suspected but not documented in the Northwest Forest Plan area. The first record of *Heterodermia sitchensis* in the Northwest Forest Plan area was recently detected in coastal Oregon (McHenry and Tønsberg 2002).

The Northwest Forest Plan Final SEIS concluded that several alternatives including Alternative 9 were most favorable to lichens because they provided the set of allocations and management practices that best produce habitat components for lichens (USDA, USDI 1994a, p. 3&4-145). In the Matrix, management that could provide suitable habitat for lichens includes clumping leave trees within managed stands and retaining old-growth fragments where little exists (USDA et al. 1993, p. IV-97). Colonized forest fragments act as refugia for lichens that become future propagule sources as suitable habitat conditions develop in the surrounding managed stand. Several of the late-successional and old-growth forest related lichens, including *Hypogymnia duplicata*, *Nephroma occultum*, and *Pseudocyphellaria rainierensis* are dispersal limited.

***Bryoria pseudocapillaris***

*Bryoria pseudocapillaris* is rare with five known sites on federally managed lands in Oregon and northern California. Only one of these sites is in a reserve land allocation. There is one known site on nonfederal land in Washington.

Under Alternatives 1 and 3, *Bryoria pseudocapillaris* would be included in Category A which requires pre-disturbance surveys, management of known sites, and strategic surveys. Under Alternative 3, management activities in non-late-successional and non-old-growth forest stands would be exempt from pre-disturbance surveys. This species would not maintain stable populations and/or distributions (USDA, USDI 2000a, p. 293). Due to limited potential habitat, few populations on federally managed lands, and the potential for stochastic events, habitat (including known sites) is insufficient to provide for stable populations under Alternatives 1 and 3. This outcome is not due to federal action.

Under Alternative 2, *Bryoria pseudocapillaris* is assumed to be included in the Agencies' Special Status Species Programs as Bureau Sensitive on BLM managed lands in Oregon and California and sensitive on Forest Service managed lands in Oregon and Washington. Known sites would be managed. Pre-project clearances would be conducted on BLM managed lands in Oregon and California and Forest Service managed lands in Oregon and Washington. General inventories may be conducted. The species is assumed not to be included as sensitive for the Forest Service in California where there is suitable habitat at only one location. This species would not maintain stable populations and/or distributions under Alternative 2 due to limited potential habitat, few populations on federally managed lands, and the potential for stochastic events. Habitat (including known sites) is insufficient to provide for stable populations under Alternative 2. This outcome is not due to federal action.

***Bryoria spiralifera***

*Bryoria spiralifera* is rare and occurs in Oregon and northern California. No sites have been found in reserve land allocations. Current information still indicates this lichen is rare in the Northwest Forest Plan area, with low number of known sites, low numbers of individuals, limited distribution, and narrow ecological amplitude (USDA, USDI 2000a, p. 290).

Under Alternatives 1 and 3, *Bryoria spiralifera* would be included in Category A which requires management of known sites, pre-disturbance surveys, and strategic surveys. Under Alternative 3, management activities in non-late-successional and non-old-growth forest stands would be exempt from pre-disturbance surveys. This species would not maintain stable populations and/or distributions (USDA, USDI 2000a, p. 293). Due to limited potential habitat and few populations on federally managed lands and the potential for stochastic events, habitat (including known sites) is insufficient to provide for stable populations under Alternatives 1 and 3. This outcome is not due to federal action.

Under Alternative 2, *Bryoria spiralifera* is assumed to be included in the Agencies' Special Status Species Programs as Bureau Sensitive on BLM managed lands in Oregon and California, and sensitive on Forest Service managed lands in Oregon. Known sites would be managed. Pre-project clearances would be conducted on BLM managed lands in Oregon and California and Forest Service managed lands in Oregon. General inventories may be conducted. This species would not maintain stable populations and/or distributions under Alternative 2 due to limited potential habitat, few populations on federally managed lands, and the potential for stochastic events. Habitat (including known sites) is insufficient to provide for stable populations under Alternative 2. This outcome is not due to federal action.

***Bryoria subcana***

*Bryoria subcana*, which was previously thought to be strictly coastal (USDA, USDI 1994a), is now also known to occur at a few sites in the Western Cascades (Glavich et al. 2002). This species is still considered to be rare with only one site in a reserve.

Under Alternatives 1 and 3, *Bryoria subcana* would be included in Category B which requires management of known sites and strategic surveys. This species would not maintain stable populations and/or distributions (USDA, USDI 2000a, p. 293). Due to limited potential habitat, few populations on federally managed lands, and the potential for stochastic events, habitat (including known sites) is insufficient to provide for stable populations under Alternatives 1 and 3. This outcome is not due to federal action.

Under Alternative 2, *Bryoria subcana* is assumed to be included as Bureau Assessment on BLM managed lands in Oregon. Known sites would be managed. Pre-project clearances would be conducted subject to limitations in funding or positions. This species would not maintain stable populations and/or distributions under Alternative 2 due to limited potential habitat, few populations on federally managed lands, and the potential for stochastic events. Habitat (including known sites) is insufficient to provide for stable populations under Alternative 2. This outcome is not due to federal action.

***Buellia oidalea***

*Buellia oidalea* is very rare in the Northwest Forest Plan area. There is high concern for this species due to low numbers of known sites, low number of individuals, limited distribution, and narrow ecological amplitudes (USDA et al. 1993; USDA, USDI 1994b, Appendix J2; USDA, USDI 2000a; and USDA, USDI Species Review Panel 1999). This species was not detected during the Coastal Lichen Study (Glavich et al. 2002).

Under Alternatives 1 and 3, *Buellia oidalea* would be included in Category E which requires management of known sites and strategic surveys. This species would not maintain stable populations and/or distributions (USDA, USDI 2000a, p. 307). Due to low numbers of known sites, low number of individuals, limited distribution, and narrow ecological amplitude, habitat (including known sites) is insufficient to provide for stable populations under Alternatives 1 and 3. This outcome is not due to federal action.

Under Alternative 2, *Buellia oidalea* is assumed not to be included in the Agencies' Special Status Species Programs. Known sites would not be managed and general inventories would not be required. This species would not maintain stable populations and/or distributions under Alternative 2 due to low numbers of known sites, low number of individuals, limited distribution, and narrow ecological amplitude. Habitat (including known sites) is insufficient to provide for stable populations under Alternative 2. This outcome is not due to federal action.

***Calicium abietinum***

*Calicium abietinum* occurs in all three states. Information is still limited on the distribution, ecology, and abundance of this species in the Northwest Forest Plan area (USDA, USDI Species Review Panel 1999 and 2000).

Under Alternatives 1 and 3, *Calicium abietinum* would be included in Category B which requires management of known sites and strategic surveys. There is insufficient information to determine how distribution and stability of this species would be affected (USDA, USDI 2000a, p. 290). Due to limited information on the distribution, ecology, and abundance of this species in the Northwest Forest Plan area, there is insufficient information to determine an outcome under Alternatives 1 and 3.

Under Alternative 2, *Calicium abietinum* is assumed not to be included in the Agencies' Special Status Species Programs. Known sites would not be managed and general inventories would not be required. There is insufficient information to determine how the alternative would affect distribution and stability of this species due to limited information on its distribution, ecology, and abundance in the Northwest Forest Plan area. There is insufficient information to determine an outcome under Alternative 2.

***Calicium adspersum***

*Calicium adspersum* is still poorly known in the Northwest Forest Plan area (USDA, USDI 2000a, p. 301). Although there are sites on non-federal lands, there are no known sites on federally managed land.

Under Alternatives 1 and 3, *Calicium adspersum* would be included in Category E which requires management of known sites and strategic surveys. There is insufficient information about this species to determine how distribution and stability would be affected (USDA, USDI 2000a, p. 303). There is insufficient information to determine an outcome under Alternative 1 or 3.

Under Alternative 2, *Calicium adspersum* is assumed to be included in the Agencies' Special Status Species Programs as Bureau Assessment for the BLM in Oregon and as sensitive for the Forest Service in California. Known sites would be managed on BLM managed lands in Oregon and Forest Service managed lands in California. Pre-project clearances would be conducted and general inventories may be completed on Forest Service managed lands in California. General inventories may be conducted. There is insufficient information about this species to determine how the alternative would affect distribution and stability. There is insufficient information to determine an outcome under Alternative 2.

***Cetrelia cetrarioides***

*Cetrelia cetrarioides* is a riparian lichen that frequently occurs on large, old riparian hardwoods. It is considered rare and is found in Washington and Oregon. It is assumed to be protected by Riparian Reserves; however, riparian enhancement projects that remove large, old hardwoods may disturb habitat for this lichen.

Under Alternatives 1 and 3, *Cetrelia cetrarioides* would be included in Category E which requires management of known sites and strategic surveys. This species would maintain stable populations and/or distributions (USDA, USDI 2000a, p. 305). Due to management of known sites, pre-project clearances, and protection by reserves, habitat (including known sites) is sufficient to provide for stable populations under Alternatives 1 and 3.

Under Alternative 2, *Cetrelia cetrarioides* is assumed to be included in the Special Status Species Program for the Forest Service in Washington. This species would maintain stable populations and/or distributions under Alternative 2 due to management of known sites, pre-project clearances, and protection by reserves. Habitat (including known sites) is sufficient to provide for stable populations under Alternative 2.

***Chaenotheca chrysocephala***

*Chaenotheca chrysocephala* is rare and is reported from Washington and California. There is still limited information on the distribution, ecology, and abundance of this species in the Northwest Forest Plan area (USDA, USDI Species Review Panel 1999 and 2000).

Under Alternatives 1 and 3, *Chaenotheca chrysocephala* would be included in Category B which requires management of known sites and strategic surveys. There is insufficient

information for this species to determine how distribution and stability would be affected (USDA, USDI 2000a, p. 290). There is insufficient information to determine an outcome under Alternative 1 or 3.

Under Alternative 2, *Chaenotheca chrysocephala* is assumed not to be included in the Agencies' Special Status Species Programs. Known sites would not be managed and general inventories would not be required. There is insufficient information for this species to determine how the alternative would affect distribution and stability. There is insufficient information to determine an outcome under Alternative 2.

***Chaenotheca ferruginea***

*Chaenotheca ferruginea* is rare and occurs in all three states. There is still limited information on the distribution, ecology, and abundance of this species in the Northwest Forest Plan area (USDA, USDI Species Review Panel 1999 and 2000), and uncertainty regarding its association with late-successional or old-growth forests.

Under Alternatives 1 and 3, *Chaenotheca ferruginea* would be included in Category B which requires management of known sites and strategic surveys. There is insufficient information about this species to determine how distribution and stability would be affected (USDA, USDI 2000a, p. 290). There is insufficient information to determine an outcome under Alternative 1 or 3.

Under Alternative 2, *Chaenotheca ferruginea* is assumed not to be included in the Agencies' Special Status Species Programs. Known sites would not be managed and general inventories would not be required. There is insufficient information about this species to determine how the alternative would affect distribution and stability. There is insufficient information to determine an outcome under Alternative 2.

***Chaenotheca subroscida***

Formerly, *Chaenotheca subroscida* was poorly known in the Northwest Forest Plan area and it was unknown if the species was even present (USDA, USDI 2000a, p. 301). This species has now been confirmed in the Northwest Forest Plan area. There are four known sites in ISMS. New information suggests that this species has extremely low numbers, limited distributions and populations, few populations on federally managed lands, or limited suitable habitat on federally managed lands.

Under Alternatives 1 and 3, *Chaenotheca subroscida* would be included in Category E which requires management of known sites and strategic surveys. This species would not maintain stable populations and/or distributions (USDA, USDI 2000a, p. 303). Due to extremely low numbers, limited distributions and populations, few populations on federally managed lands, or limited suitable habitat on federally managed lands, habitat (including known sites) is insufficient to provide for stable populations under Alternatives 1 and 3. This outcome is not due to federal action.

Under Alternative 2, *Chaenotheca subroscida* is assumed to be included as sensitive on Forest Service managed lands in Oregon and Washington. Known sites would be managed and pre-project clearances would be conducted. General inventories may be conducted. This species would not maintain stable populations and/or distributions under Alternative 2 due to extremely low numbers, limited distributions and populations, few populations on federally managed lands, or limited suitable habitat on federally managed lands. Habitat (including known sites) is insufficient to provide for stable populations under Alternative 2. This outcome is not due to federal action.

***Chaenothecopsis pusilla***

Formerly, *Chaenothecopsis pusilla* was poorly known in the Northwest Forest Plan area and it was unknown if these species were even present (USDA, USDI 2000a, p. 301). This species has now been confirmed in the Northwest Forest Plan area. There are only three sites in ISMS for *Chaenothecopsis pusilla*. New information indicates this species has extremely low numbers, limited distributions and populations, few populations on federally managed lands, or limited suitable habitat on federally managed lands.

Under Alternatives 1 and 3, *Chaenothecopsis pusilla* would be included in Category E which requires management of known sites and strategic surveys. This species would not maintain stable populations and/or distributions (USDA, USDI 2000a, p. 303). Due to extremely low numbers, limited distributions and populations, few populations on federally managed lands, or limited suitable habitat on federally managed lands, habitat (including known sites) is insufficient to provide for stable populations under Alternatives 1 and 3. This outcome is not due to federal action.

Under Alternative 2, *Chaenothecopsis pusilla* is assumed not to be included in the Agencies' Special Status Species Programs. Known sites would not be managed and general inventories are not required. This species would not maintain stable populations and/or distributions under Alternative 2 due to extremely low numbers, limited distributions and populations, few populations on federally managed lands, or limited suitable habitat on federally managed lands. Habitat (including known sites) is insufficient to provide for stable populations under Alternative 2. This outcome is not due to federal action.

***Collema nigrescens***

*Collema nigrescens* is a riparian lichen. It occurs primarily on deciduous trees and shrubs and occasionally mossy rock, mainly west of the Cascades (McCune and Geiser 1997 and USDA, USDI Species Review Panel 1999). It is included in the Survey and Manage Standards and Guidelines only for Washington and Oregon, except for the Oregon Klamath Physiographic Province where there are relatively few documented sites (USDA, USDI 2000a, p. 269). Elsewhere (Oregon and California Klamath Provinces and California Coast Range Province) the number of known sites has increased and many sites are in reserve allocations (USDA, USDI 2000a, p. 269). In this part of its range where it is more common, there is a reasonable assurance of persistence as indicated by its widespread distribution, abundance, and by the number of known sites and availability of potential habitat in reserve land allocations (USDA, USDI, Species Review Panel 1999).

Under Alternative 1, *Collema nigrescens* would be included in Category F which requires strategic surveys. In Washington and Oregon (except for the Oregon Klamath Province) there is insufficient information to determine how this alternative affects distribution and stability (USDA, USDI 2000a, p. 271). Due to abundance elsewhere in the Northwest Forest Plan area, this species would maintain stable populations and/or distributions under Alternative 1. Habitat (including known sites) is sufficient to support stable populations in the Northwest Forest Plan area under Alternative 1.

Under Alternatives 2 and 3, *Collema nigrescens* is assumed to be sensitive on Forest Service managed lands in Washington. In Washington and Oregon (except for the Oregon Klamath Province) there is insufficient information to determine how these alternatives affect distribution and stability. Due to abundance elsewhere in the Northwest Forest Plan area, this species would maintain stable populations and/or distributions under Alternatives 2 and 3. Habitat (including known sites) is sufficient to support stable populations in the Northwest Forest Plan area under Alternatives 2 and 3.

***Dendriscocaulon intricatulum***

*Dendriscocaulon intricatulum* occurs from southeast Alaska to northern California. It is rare in most of its range (except in southern Oregon, where it occupies a different habitat). Its range is centered in southern Oregon (Coos, Curry, Douglas, Jackson, and Josephine Counties), where it is common and may not be old-growth associated. This species has been removed from the Survey and Manage mitigation measure in southern Oregon where it is common. This analysis only pertains to the few populations in Washington, northern Oregon, and northern California, where it is rare. In Washington, most sites are on federally managed lands and few sites are in reserve allocations (USDA, USDI 2000a, p. 294).

Under Alternatives 1 and 3, *Dendriscocaulon intricatulum* would be included in Category A in Washington and Oregon except in Oregon's Coos, Curry, Douglas, Jackson, and Josephine Counties. This species would receive management of known sites, pre-disturbance surveys, and strategic surveys in Washington and in Oregon (outside of Coos, Curry, Douglas, Jackson, and Josephine Counties). In the California portion of its range, this species would be included in Category E which requires management of known sites and strategic surveys. Under Alternative 3, management activities in non-late-successional and non-old-growth forest stands would be exempt from pre-disturbance surveys. Late-successional, old-growth legacy components in non-late-successional stands provide important refugia and propagule sources to re-colonize these stands. While surveys in these important legacy components would not be completed in non-late-successional and non-old-growth stands for this species, existing Northwest Forest Plan Standards and Guidelines for Matrix management provide for retention of these legacy components. This species would maintain stable populations and/or distributions (USDA, USDI 2000a, p. 295). Due to management of known sites, pre-disturbance surveys, strategic surveys, and species abundance in southern Oregon, habitat (including known sites) is sufficient to provide for stable populations under Alternatives 1 and 3.

Under Alternative 2, *Dendriscocaulon intricatulum* is assumed to be included in the Special Status Species Program for the Forest Service in Washington and the BLM in California. Outside of southern Oregon (Coos, Curry, Douglas, Jackson, and Josephine Counties), there is a high risk of loss of known sites on Forest Service managed lands in Oregon and California and BLM managed lands in Oregon where not protected by reserves. In this portion of its range, *Dendriscocaulon intricatulum* most frequently occurs on the lower branches and dead twigs of suppressed, understory western Hemlock and Pacific silver fir, which can be quite old. Thinning prescriptions could remove suitable habitat and eliminate populations. Given the low number of sites outside southern Oregon, this loss of sites would reduce stability and distribution of populations there. Due to management of known sites, pre-project clearances, and species abundance in southern Oregon, habitat (including known sites) is sufficient to support stable populations range-wide in the Northwest Forest Plan area under Alternative 2, although there is insufficient habitat to support stable populations in a portion of the Northwest Forest Plan area.

***Dermatocarpon luridum***

*Dermatocarpon luridum* occurs in all three states and is known from less than 20 sites in the Northwest Forest Plan area. It is an aquatic lichen with a broad global distribution (USDA, USDI 2000a). Although some enhancement projects within Riparian Reserves can disturb habitat for this species (culvert removal, in-stream structure placement), it is assumed that the Aquatic Conservation Strategy would lower the risk of loss of sites (USDA, USDI 2000a, p. 297).

Under Alternatives 1 and 3, *Dermatocarpon luridum* would be included in Category E which requires management of known sites and strategic surveys. This species would

maintain stable populations and/or distributions (USDA, USDI 2000a, p. 297). Due to management of known sites, strategic surveys, and protection by the Riparian Reserve network, habitat (including known sites) is sufficient to provide for stable populations under Alternatives 1 and 3.

Under Alternative 2, *Dermatocarpon luridum* is assumed to be sensitive on Forest Service managed lands in Oregon and Washington. This species would maintain stable populations and/or distributions under Alternative 2 due to management of known sites, pre-project clearances, and protection by the Riparian Reserve network. Habitat (including known sites) is sufficient to provide for stable populations under Alternative 2.

***Fuscopannaria (Pannaria) saubinetii***

*Fuscopannaria* (*Pannaria*) *saubinetii* was formerly thought to be a common, widespread species. North American lichens in the family Pannariaceae have recently been revised, including lichens in the genus *Pannaria* (Jorgensen 2000). Some material formerly called *Pannaria saubinetii* has been moved to the genus *Fuscopannaria* (Jorgensen 2000). *Fuscopannaria saubinetii* is a rare species and only a few correctly identified specimens have been located to date (Jorgensen 2000). Although once believed to be a coastal species, examination of this material may prove otherwise. Until the taxonomic ambiguities can be resolved for *Fuscopannaria* (*Pannaria*) *saubinetii*, sites with vouchers being worked on are managed as known sites.

Under Alternatives 1 and 3, this species would be included in Category E which requires management of known sites and strategic surveys. Although it was thought that this species would maintain stable populations and/or distributions due to species abundance (USDA, USDI 2000a, p. 309), new information indicates this is a rare species. Due to low numbers, habitat (including known sites) is insufficient to provide for stable populations under Alternatives 1 and 3. This outcome is not due to federal action.

Under Alternative 2, this species is assumed not to be included in the Agencies' Special Status Species Programs. Known sites would not be managed and general inventories are not required. This species would not maintain stable populations and/or distributions under Alternative 2 due to low numbers. Habitat (including known sites) is insufficient to provide for stable populations under Alternative 2. This outcome is not due to federal action.

***Heterodermia sitchensis***

The first record of *Heterodermia sitchensis* has recently been detected in the Northwest Forest Plan area (McHenry and Tønsberg 2002). This species could occur at other sites along the immediate coast. Until recently, it was uncertain if this species is closely associated with late-successional or old-growth forests (USDA, USDI 2000a, p. 299). However, new information shows that this species is associated with old growth at Cape Lookout, where it was found on fallen branches beneath enormous Sitka spruce and western hemlock (McHenry and Tønsberg 2002). *Heterodermia sitchensis* was not encountered on the Coastal Lichen Study plots (Glavich et al. 2002).

Under Alternatives 1 and 3, *Heterodermia sitchensis* would be included in Category E which requires management of known sites and strategic surveys. There is insufficient information about this species to determine how distribution and stability would be affected (USDA, USDI 2000a, p. 301). There is insufficient information to determine an outcome under Alternative 1 or 3.

Under Alternative 2, *Heterodermia sitchensis* is assumed to be included in the BLM Special Status Species Program as Bureau Assessment in Oregon. Known sites would be managed on BLM managed lands in Oregon. Pre-project clearances would be conducted

subject to limitations in funding or positions. General inventories may be conducted. There is insufficient information about this species to determine how the alternative would affect distribution and stability. There is insufficient information to determine an outcome under Alternative 2.

***Hypogymnia duplicata***

*Hypogymnia duplicata* is a Pacific Northwest endemic. It occurs from Alaska to northwestern Oregon. There are relatively high numbers of sites on the Mt. Baker-Snoqualmie National Forest. Concerns for this species have decreased in northern Washington because of the increase in number of known sites, although it is still restricted to specific habitat conditions and considered to be poorly distributed and rare (USDA, USDI 2000a). Most sites in Washington are protected (ISMS database). These populations are clustered and not well distributed across the landscape (Lesher 2002, pers. comm.). It is rare in the rest of its range.

Under Alternative 1, *Hypogymnia duplicata* would be included in Category C which requires management of high-priority sites, pre-disturbance surveys, and strategic surveys. This species would maintain stable populations and/or distributions (USDA, USDI 2000a, p. 282). Due to management of high-priority sites, pre-disturbance surveys, strategic surveys, and locations in reserve land allocations, habitat (including known sites) is sufficient to provide for stable populations under Alternative 1.

Under Alternatives 2 and 3, *Hypogymnia duplicata* is assumed to be sensitive on Forest Service managed lands in Oregon. There are several sites on BLM managed lands in Oregon. These sites fall within Areas of Critical Environmental Concern where management activity is limited. This species would maintain stable populations and/or distributions under Alternatives 2 and 3 due to management of known sites, pre-project clearances, and protection by reserve land allocations and Areas of Critical Environmental Concern. Habitat (including known sites) is sufficient to provide for stable populations under Alternatives 2 and 3.

***Hypogymnia vittata***

*Hypogymnia vittata* occurs in southern British Columbia and in forested habitat in southeast Alaska (Geiser et al. 1998) that is similar to habitat in the Northwest Forest Plan area. It is suspected to occur in the North Cascades, and could be present in other parts of the Northwest Forest Plan area. Because it is not yet known here, little is known of this species in the Northwest Forest Plan area and its status is undetermined. In addition, it is uncertain if this species is closely associated with late-successional or old-growth forests (USDA, USDI 2000a, p. 299).

Under Alternatives 1 and 3, *Hypogymnia vittata* would be included in Category E which requires management of known sites and strategic surveys. There is insufficient information about this species to determine how distribution and stability would be affected (USDA, USDI 2000a, p. 301). There is insufficient information to determine an outcome under Alternatives 1 and 3.

Under Alternative 2, *Hypogymnia vittata* is assumed not to be included in the Agencies' Special Status Species Programs. Known sites would not be managed and general inventories are not required. There is insufficient information about this species to determine how the alternative would affect distribution and stability. There is insufficient information to determine an outcome under Alternative 2.

***Hypotrachyna revoluta***

*Hypotrachyna revoluta* was not rated by the FEMAT lichen panel because there was insufficient information at that time (USDA et al. 1993 and USDA, USDI 2000a, p. 299). This species was included in the Survey and Manage Standards and Guidelines because

of persistence concerns since it was thought to be rare (USDA, USDI 1994b, Appendix J2). Since then, new information from more than 160 surveys in suitable habitat has only detected 2 additional known sites of *Hypotrachyna revoluta* (Glavich et al. 2002). This new information suggests that this species has extremely low numbers, limited distributions and populations, few populations on federally managed lands, or limited suitable habitat on federally managed lands.

Under Alternatives 1 and 3, *Hypotrachyna revoluta* would be included in Category E which requires management of known sites and strategic surveys. This species would not maintain stable populations and/or distributions (USDA, USDI 2000a, p. 301). Due to extremely low numbers, limited distributions and populations, few populations on federally managed lands, or limited suitable habitat on federally managed lands, habitat (including known sites) is insufficient to provide for stable populations under Alternatives 1 and 3. This outcome is not due to federal action.

Under Alternative 2, *Hypotrachyna revoluta* is assumed to be included as sensitive for the Forest Service in Oregon and Washington and as Bureau Assessment by the BLM in Oregon. Known sites would be managed. Pre-project clearances would be conducted; on BLM managed lands in Oregon, pre-project clearances are subject to limitations in funding or positions. General inventories may be conducted. This species would not maintain stable populations and/or distributions under Alternative 2 due to extremely low numbers, limited distributions and populations, few populations on federally managed lands, or limited suitable habitat on federally managed lands. Habitat (including known sites) is insufficient to provide for stable populations under Alternative 2. This outcome is not due to federal action.

***Leptogium burnetiae* var. *hirsutum***

For *Leptogium burnetiae* var. *hirsutum*, pre-disturbance surveys have yielded vouchers that are taxonomically indistinct, based on current keys and species descriptions. This species is known from few sites on federally managed land (USDA, USDI 2000a, p. 283).

Under Alternatives 1 and 3, *Leptogium burnetiae* var. *hirsutum* would be included in Category E which requires management of known sites and strategic surveys. There is insufficient information about this species to determine how distribution and stability would be affected (USDA, USDI 2000a, p. 305). There is insufficient information to determine an outcome under Alternative 1 or 3.

Under Alternative 2, *Leptogium burnetiae* var. *hirsutum* is assumed to be included as sensitive for the Forest Service in Washington and Oregon. Known sites would be managed and pre-project clearances would be conducted. General inventories may be conducted. There is insufficient information about this species to determine how the alternative would affect distribution and stability. There is insufficient information to determine an outcome under Alternative 2.

***Leptogium cyanescens***

*Leptogium cyanescens* is rare and occurs in all three states. Because it is known from few sites on federally managed land, there is a high concern for this species (USDA, USDI 2000a, p. 283). New information has only increased the number of known sites from 1 (Appendix J2, p. J2-239) to 10 (ISMS database).

Under Alternatives 1 and 3, *Leptogium cyanescen*s would be included in Category A which requires management of known sites, pre-disturbance surveys, and strategic surveys. Under Alternative 3, management activities in non-late-successional and non-old-growth forest stands would be exempt from pre-disturbance surveys. This species would not maintain stable populations and/or distributions (USDA, USDI 2000a, p. 284). Due to extremely low numbers, habitat (including known sites) is insufficient to provide for stable populations under Alternatives 1 and 3. This outcome is not due to federal action.

Under Alternative 2, *Leptogium cyanescens* is assumed to be included as sensitive on Forest Service managed lands in Washington and Oregon. Known sites would be managed and pre-project clearances would be conducted. General inventories may be conducted. This species would not maintain stable populations and/or distributions under Alternative 2 due to extremely low numbers. Habitat (including known sites) is insufficient to provide for stable populations under Alternative 2. This outcome is not due to federal action.

***Leptogium rivale***

*Leptogium rivale* occurs in all three states. It is an aquatic lichen endemic to western North America and most known sites are on federally managed lands within Riparian Reserves (USDA, USDI 2000a, p. 296). Although some enhancement projects within Riparian Reserves can disturb habitat for this species (culvert removal, in-stream structure placement), the Aquatic Conservation Strategy would lower the risk of loss of sites (USDA, USDI 2000a, p. 297).

Under Alternatives 1 and 3, *Leptogium rivale* would be included in Category E which requires management of known sites and strategic surveys. This species would maintain stable populations and/or distributions (USDA, USDI 2000a, p. 297). Due to management efforts under Survey and Manage and protection by Riparian Reserves, habitat (including known sites) is sufficient to provide for stable populations under Alternatives 1 and 3.

Under Alternative 2, *Leptogium rivale* is assumed not to be included in the Agencies' Special Status Species Programs. This species would maintain stable populations and/or distributions under Alternative 2 due to protection by Riparian Reserves. Habitat (including known sites) is sufficient to provide for stable populations under Alternative 2.

***Leptogium teretiusculum***

*Leptogium teretiusculum* is rare and occurs in Oregon and California only. It is poorly known in the Northwest Forest Plan area (USDA, USDI 2000a, p. 303). It is uncertain if it is closely associated with late-successional or old-growth forests (USDA, USDI 2000a, p. 303). New information based on broad regional surveys has only increased the number of known sites from one (Appendix J2, p. J2-240) to eight (ISMS database). This new information suggests that this species is rare with limited distribution and populations, few populations on federally managed lands, or limited suitable habitat on federally managed lands.

Under Alternatives 1 and 3, *Leptogium teretiusculum* would be included in Category E which requires management of known sites and strategic surveys. This species would not maintain stable populations and/or distribution (USDA, USDI 2000a, p. 305). Due to rarity, limited distribution and populations, few populations on federally managed lands, and limited suitable habitat on federally managed lands, habitat (including known sites) is insufficient to provide for stable populations under Alternatives 1 and 3. This outcome is not due to federal action.

Under Alternative 2, *Leptogium teretiusculum* is assumed not to be included in the Agencies' Special Status Species Programs. Known sites would not be managed and general inventories would not be required. This species would not maintain stable populations and/or distributions under Alternative 2 due to rarity, limited distribution and populations, few populations on federally managed lands, and limited suitable habitat on federally managed lands. Habitat (including known sites) is insufficient to provide for stable populations under Alternative 2. This outcome is not due to federal action.

***Lobaria linita***

*Lobaria linita* occurs sporadically in northern Europe and Asia, and is known to occur in North America from Alaska to Oregon (USDA, USDI 2000a, p. 280). The majority of known sites in the Northwest Forest Plan area are in northwest Washington (USDA, USDI 2000a, p. 280). There are currently 175 known sites (ISMS database), most of which are on the Mt. Baker-Snoqualmie National Forest. These populations reflect the results of several years of field tests of a predictive model. Populations are clustered and not well distributed across the landscape. The numbers of individuals at most sites is low (Lesher 2002, pers. comm.). *Lobaria linita* is uncommon in Washington north of Snoqualmie Pass where most sites are in reserves on the Mt. Baker-Snoqualmie National Forest. It is rare south of the pass and its presence in reserve allocation in this part of its range is unknown.

Under Alternatives 1 and 3, *Lobaria linita* is included in Category A for all of its range except for the Olympic Peninsula and the western Cascades north of Snoqualmie Pass in Washington. It would receive management of known sites, pre-disturbance surveys, and strategic surveys. Under Alternative 3, management activities in non-late-successional and non-old-growth forest stands would be exempt from pre-disturbance surveys. This species would maintain stable populations and/or distributions (USDA, USDI 2000a, p. 282). Due to management of known sites, pre-disturbance surveys, strategic surveys, and protection by reserves, habitat (including known sites) is sufficient to provide for stable populations under Alternatives 1 and 3.

Under Alternative 2, *Lobaria linita* is assumed to be included as sensitive by the Forest Service in Oregon and as Bureau Assessment on BLM managed lands in Oregon. This species would maintain stable populations and/or distributions under Alternative 2 due to protection by reserves, management of known sites, and pre-project clearances. Habitat (including known sites) is sufficient to provide for stable populations under Alternative 2.

***Lobaria oregana***

*Lobaria oregana* is endemic to western North America (Goward et al. 1994 and McCune and Geiser 1997). It is currently included in the Survey and Manage mitigation measure in California where it is rare and reaches the southern extent of its range. There is a high concern for this species in California because it is restricted in distribution and known from few sites (USDA, USDI 2000a, p. 273).

Under Alternatives 1 and 3, *Lobaria oregana* would be included in Category A in California which requires management of known sites, pre-disturbance surveys, and strategic surveys. Under Alternative 3, management activities in non-late-successional and non-old-growth forest stands would be exempt from pre-disturbance surveys. This species would not maintain stable populations and/or distributions (USDA, USDI 2000a, p. 274). Due to restricted distribution and extremely low numbers, habitat (including known sites) is insufficient to support stable populations in the Northwest Forest Plan area of northern California under Alternatives 1 and 3. This outcome is not due to federal action.

Under Alternative 2, *Lobaria oregana* is assumed to be included in the BLM Special Status Species Program in California. Known sites would be managed and pre-project clearances would be conducted on BLM managed lands in California. This species is not included in the Forest Service Sensitive Species Program in California, where it is rare and known sites occur on National Forest System lands. Known sites on Forest Service managed lands in California would not be managed and general inventories would not be required. This species would not maintain stable populations and/or distributions under Alternative 2 due to restricted distribution and extremely low numbers. Habitat (including known sites) is insufficient to support stable populations in the Northwest

Forest Plan area of northern California under Alternative 2. This outcome is not due to federal action.

***Microcalicium arenarium***

*Microcalicium arenarium* is known from one site in Washington that is not on federally managed lands. There is still limited information on the distribution, ecology, and abundance of most pin lichens in the Northwest Forest Plan area (USDA, USDI Species Review Panel 1999 and 2000). There is uncertainty regarding its association with late-successional or old-growth forests.

Under Alternatives 1 and 3, *Microcalicium arenarium* would be included in Category B which requires management of known sites and strategic surveys. There is insufficient information about this species to determine how distribution and stability would be affected (USDA, USDI 2000a, p. 290). There is insufficient information to determine an outcome under Alternatives 1 and 3.

Under Alternative 2, *Microcalicium arenarium* is assumed to be included as a Bureau Assessment species for the BLM in Oregon. Known sites would be managed. Pre-project clearances would be conducted subject to limitations in funding or positions. General inventories may be conducted. There is insufficient information about this species to determine how the alternative would affect distribution and stability. There is insufficient information to determine an outcome under Alternative 2.

***Nephroma bellum***

*Nephroma bellum* has a broad, global distribution and is well distributed west of the Cascade crest (USDA, USDI Species Review Panel 1999). Current information indicates that it may be common in the Northwest Forest Plan area, although it is rare in the parts of its range included in Survey and Manage (OR Klamath, OR Willamette Valley, OR Eastern Cascades, WA Eastern Cascades, WA Western Cascades (outside of the Gifford Pinchot National Forest), and WA Olympic Peninsula provinces). Many of the known sites in Oregon and Washington are protected by reserves (ISMS database). One site has been reported but has not been verified for California; this site does not occur on federally managed lands.

Under Alternatives 1 and 3, *Nephroma bellum* would be included in Category E which requires management of known sites and strategic surveys. This species would maintain stable populations and/or distributions (USDA, USDI 2000a, p. 309). Due to management of known sites, strategic surveys, protection by reserves, and species abundance in some Northwest Forest Plan areas, habitat (including known sites) is sufficient to provide for stable populations under Alternatives 1 and 3.

Under Alternative 2, *Nephroma bellum* is assumed to be included in the Agencies' Special Status Species Program for the Forest Service in Washington and the BLM in California. This species would maintain stable populations and/or distributions under Alternative 2 due to management of known sites, pre-project clearances, protection by reserves, and species abundance in some Northwest Forest Plan areas. Habitat (including known sites) is sufficient to provide for stable populations under Alternative 2.

***Nephroma isidiosum***

*Nephroma isidiosum* occurs in southern British Columbia and in forested sites in Alaska, and is suspected to occur in the North Cascades. Because it is not yet known from the Northwest Forest Plan area, nothing is known of this species here and its status is undetermined. In addition, it is uncertain if this species is closely associated with late-successional or old-growth forests (USDA, USDI 2000a, p. 299).

Under Alternatives 1 and 3, *Nephroma isidiosum* would be included in Category E which requires management of known sites and strategic surveys. There is insufficient information about this species to determine how distribution and stability would be affected (USDA, USDI 2000a, p. 301). There is insufficient information to determine an outcome under Alternatives 1 and 3.

Under Alternative 2, *Nephroma isidiosum* is assumed not to be included in the Agencies' Special Status Species Programs. Known sites would not be managed and general inventories are not required. There is insufficient information about this species to determine how the alternative would affect distribution and stability. There is insufficient information to determine an outcome under Alternative 2.

***Nephroma occultum***

*Nephroma occultum* is a western North American endemic occurring from British Columbia to southern Oregon (USDA, USDI 2000a). Almost all sites are on federally managed land; about 30 percent occur in reserve land allocations (USDA, USDI Species Review Panel 2000). It occurs on large, old, lateral limbs of conifers (USDA, USDI 2000a, p. 293). Although there are a moderate number of known sites, persistence concerns are based on the species' dispersal limitations, the low number of individuals at known sites, and the patchy distribution in the Northwest Forest Plan area. *Nephroma occultum* is known to be dispersal limited (Rosso et al. 2000, Sillett et al. 2000, and Sillett and Goward 1998), is closely associated with very old, old-growth habitat (Sillett and Goward 1998), and is not well distributed across the landscape (instead it occurs in isolated patches).

Under Alternative 1, *Nephroma occultum* would be included in Category C which requires management of known sites, pre-disturbance surveys, and strategic surveys. Habitat (including known sites) is sufficient to provide for stable populations under Alternative 1 since known sites would be protected and pre-disturbance surveys would be completed.

Under Alternatives 2 and 3, *Nephroma occultum* is assumed to be included as sensitive for the Forest Service in Washington and Oregon. There is a high risk of loss of sites on BLM managed lands in Oregon where it is not protected by reserves. Although some legacy components are retained based on Matrix Standards and Guidelines, these standards and guidelines may not be sufficient for this species because not all legacy components are immediately apparent. For example, some suppressed understory conifers can be very old, and are known to provide propagules of *Nephroma occultum* and other old-growth lichens. In many cases, these suppressed understory trees are not protected because they do not appear to be old-growth components (USDA, USDI 2003c, in review). The removal of these components greatly reduces the likelihood that refugial populations of *Nephroma occultum* will remain across the landscape. The single most important action promoting the accumulation of old-growth associated epiphytic lichens is the retention of propagule sources, and maintaining an adequate local source of propagules is critical to the resilience of dispersal limited species in a managed forested landscape (Sillett et al. 2000). Most of the known global sites occur in Oregon and this is also where the species reaches the southern extent of its range. A combination of factors, including the potential loss of innoculum sources in younger stands across its entire range in the Northwest Forest Plan area and the lack of protection of sites on BLM managed lands in Oregon results in habitat (including known sites) insufficient to support stable populations in the Northwest Forest Plan area under Alternatives 2 and 3.

***Niebla cephalota***

*Niebla cephalota* occurs from Baja California to Washington in coastal fog belt areas (McCune et al. 1997). This lichen is still considered rare in the Northwest Forest Plan area, and has a low number of known sites, low number of individuals at each site, limited distribution, and narrow ecological amplitude (USDA, USDI 2000a, p. 285).

Under Alternatives 1 and 3, *Niebla cephalota* would be included in Category A which requires management of known sites, pre-disturbance surveys, and strategic surveys. Under Alternative 3, management activities in non-late-successional and non-old-growth forest stands would be exempt from pre-disturbance surveys. This species would not maintain stable populations and/or distributions (USDA, USDI 2000a, p. 286). Due to low number of known sites, low number of individuals at each site, limited distribution, and narrow ecological amplitude, habitat (including known sites) is insufficient to provide for stable populations under Alternatives 1 and 3. This outcome is not due to federal action.

Under Alternative 2, *Niebla cephalota* is assumed to be included in the Agencies' Special Status Species Programs as Bureau Assessment on BLM managed lands in Oregon, as sensitive on BLM managed lands in California, and sensitive on Forest Service managed lands in Oregon and Washington. Known sites would be managed and pre-project clearances would be conducted. General inventories may be conducted. This species would not maintain stable populations and/or distributions under Alternative 2 due to low number of known sites, low number of individuals at each site, limited distribution, and narrow ecological amplitude. Habitat (including known sites) is insufficient to provide for stable populations under Alternative 2. This outcome is not due to federal action.

***Pannaria rubiginosa***

*Pannaria rubiginosa* has a broad, global distribution, but is considered rare in the Northwest Forest Plan area. This is a coastal lichen. There is high concern for this species due to low numbers of known sites, low number of individuals, limited distribution, and narrow ecological amplitudes (USDA et al. 1993; USDA, USDI 1994b, Appendix J2; USDA, USDI 2000a; and USDA, USDI Species Review Panel 1999).

Under Alternatives 1 and 3, *Pannaria rubiginosa* would be included in Category E which requires management of known sites and strategic surveys. With a high degree of uncertainty, due to low numbers of known sites, low number of individuals, limited distribution, and narrow ecological amplitudes, this species would maintain stable populations and/or distributions (USDA, USDI 2000a, p. 307). Due to management of known sites and strategic surveys, habitat (including known sites) is sufficient to provide for stable populations under Alternatives 1 and 3.

Under Alternative 2, *Pannaria rubiginosa* is assumed to be included in the Agencies' Special Status Species Programs except for the Forest Service in California. There is little suitable habitat on National Forest System lands in California. Due to management of known sites and pre-project clearances, this species would maintain stable populations and/or distribution. Habitat (including known sites) is sufficient to provide for stable populations under Alternative 2.

***Peltigera pacifica***

*Peltigera pacifica* occurs in Washington and Oregon and is a Pacific Northwest endemic. It occurs primarily in riparian forests and hardwood stands, but also in moist forests at low to mid-elevation (McCune and Geiser 1997) and in a range of stand ages (USDA, USDI Species Review Panel 1999). This species is widespread in the Northwest Forest Plan area west of the Cascade crest (McCune and Geiser 1997 and USDA, USDI Species Review Panel 1999 and 2000). A portion of its population may be provided for by the reserve land allocation, particularly the riparian buffers under the Aquatic Conservation Strategy. The contribution of the Riparian Reserves and other reserve allocations to provide for stable populations of this species is unknown (USDA, USDI 2000a, p. 304).

Under Alternatives 1 and 3, *Peltigera pacifica* would be included in Category E which requires management of known sites and strategic surveys. This species would maintain stable populations and/or distributions (USDA, USDI 2000a, p. 305). Due to protection by reserves, management of known sites, and strategic surveys, habitat (including known sites) is sufficient to provide for stable populations under Alternatives 1 and 3.

Under Alternative 2, *Peltigera pacifica* is assumed to be included as sensitive by the Forest Service in Oregon and Washington. It is assumed not to be included in the Special Status Species Programs for the BLM. There is a high risk of loss of sites on BLM managed lands in Oregon where not protected by reserves. This species occurs on old, moist, well-decayed logs on the forest floor, and needs constant access to wood in an advanced stage of decay. Although the Matrix Standards and Guidelines provide for the retention of existing course woody debris, they do not specify the decay class, which should be decay class three or higher to meet the substrate requirement for this species. Loss of these sites could result in insufficient habitat in this portion of its range. Due to protection by reserves, management of known sites, and pre-project clearances, this species would maintain overall stable populations and/or distributions under Alternative 2. Habitat (including known sites) is sufficient to support stable populations range-wide in the Northwest Forest Plan area, although there is insufficient habitat to support stable populations in a portion of the Northwest Forest Plan area.

***Platismatia lacunosa***

*Platismatia lacunosa* occurs in Washington and Oregon. It is common in the Oregon Coast Range and rare in the rest of its range. A high proportion of known sites, most of which are in the Oregon Coast Range, are protected by reserve land allocations (ISMS database). It is sometimes, but not necessarily, associated with riparian areas where it often grows on alders. This species occurs primarily at lower elevations and it is unknown at this time how much potential habitat exists on federally managed lands (USDA, USDI 2000a, p. 299). Although riparian enhancement projects that remove hardwoods within Riparian Reserves can disturb habitat for this species, the Aquatic Conservation Strategy would lower the risk of loss of sites. Other reserve allocations may also provide some protection of known sites (USDA, USDI 2000a, p. 299).

Under Alternatives 1 and 3, *Platismatia lacunosa* would be included in Category E except in the Oregon Coast Range. Known sites would be managed and strategic surveys would be completed. This species would maintain stable populations and/or distributions (USDA, USDI 2000a, p. 299). Due to management of known sites, strategic surveys, protection of sites by reserves, and species abundance in the Oregon Coast Range, habitat (including known sites) is sufficient to provide for stable populations under Alternatives 1 and 3.

Under Alternative 2, *Platismatia lacunosa* is assumed to be included as sensitive on Forest Service managed lands in Washington. Due to species abundance in the Oregon Coast Range, protection of sites by reserves, management of known sites, and pre-project clearances under the Forest Service Sensitive Species Program in Washington, this species would maintain stable populations and/or distributions under Alternative 2. Habitat (including known sites) is sufficient to provide for stable populations under Alternative 2.

***Pseudocyphellaria perpetua***

*Pseudocyphellaria perpetua* is known from less than 10 sites in the Northwest Forest Plan area; most known sites are in Oregon. A new site was recently detected on the Olympic National Forest bringing the number of known sites on National Forest System lands to two (the other is on the Willamette National Forest (McCune 2003, pers. comm.)). There are five sites on BLM managed lands (Rodenkirk 2003, pers. comm.). All sites on federally managed lands are located in old-growth stands. *Pseudocyphellaria perpetua*

is the new name for this species (Miadlikowska et al. 2002). FEMAT (1993) and the Northwest Forest Plan Final SEIS (1994) erroneously applied the name *Pseudocyphellaria mougeotiana*. Because of the erroneous name, the Survey and Manage Final SEIS (2000) and Lichen Management Recommendations (USDA, USDI 2000c) identified this entity as *Pseudocyphellaria* sp. 1 while acknowledging the taxonomic work that was underway. The taxonomic uncertainty was resolved when the new name was published in 2002. In the 2000 Survey and Manage FEIS (p. 293) there was insufficient information about this taxonomic entity to determine effects. Since that time, there is sufficient new information to clarify the taxonomic uncertainty, habitat association, and rarity within the Northwest Forest Plan area (Miadlikowska et al. 2002).

Under Alternatives 1 and 3, *Pseudocyphellaria perpetua* would be included in Category A which requires management of known sites, pre-disturbance surveys, and strategic surveys. Due to its rarity, habitat (including known sites) is insufficient to support stable populations in the Northwest Forest Plan area under Alternatives 1 and 3. This outcome is not due to federal action.

Under Alternative 2, *Pseudocyphellaria perpetua* is assumed not to be included in the Agencies' Special Status Species Programs. There are currently seven known sites on Forest Service and BLM managed lands in Oregon. All these sites on federally managed lands would be at risk under Alternative 2, because known sites would no longer be managed. General inventories would not be required. Due to its rarity and the lack of management of known sites, habitat (including known sites) is insufficient to provide for stable populations under Alternative 2. This outcome is not a result of federal action.

***Pseudocyphellaria rainierensis***

*Pseudocyphellaria rainierensis* is a Pacific Northwest endemic. It is known to occur from southeastern Alaska to southern Oregon, west of the Cascade Crest (USDA, USDI Species Review Panel 2000). It is rare in Washington and throughout most of the rest of its range, although several large, scattered populations exist in large tracts of suitable habitat on the Willamette National Forest in Oregon. Although there are a moderate number of known sites, persistence concerns are based on the species' dispersal limitations, the low number of individuals at known sites, and the patchy distribution of this species in the Northwest Forest Plan area. This species occurs primarily in the oldest stands on the landscape and is rarely found in stands less than 400 years old (USDA, USDI 2000a and Mt. Baker-Snoqualmie NF Ecology Program data files).

Under Alternatives 1 and 3, *Pseudocyphellaria rainierensis* would be included in Category A which requires management of known sites, pre-disturbance surveys, and strategic surveys. Habitat (including known sites) is sufficient to provide for stable populations under Alternative 1 since known sites would be protected and pre-disturbance surveys would be completed.

Under Alternative 3, management activities in non-late-successional and non-old-growth forest stands would be exempt from pre-disturbance surveys. Late-successional, old-growth legacy components in younger stands provide important refugia and propagule sources to re-colonize younger stands. *Pseudocyphellaria rainierensis* is a dispersal limited species (Rosso et al. 2000, Sillett et al. 2000, and Sillett and Goward 1998) and the loss of populations in legacy components surrounded by younger stands could further restrict the establishment, distribution, and persistence of this poorly distributed species. Although some legacy components are retained based on Matrix Standards and Guidelines, these standards and guidelines may not be sufficient for this species because not all legacy components are immediately apparent. For example, some suppressed understory conifers can be very old, and can provide propagules of *Pseudocyphellaria rainierensis* and other old-growth lichens. In many cases, these suppressed understory trees are not protected because they do not appear to be old-growth components (USDA,

USDI 2003c, in review). The removal of these components greatly reduces the likelihood that refugial populations of *Pseudocyphellaria rainierensis* will remain across the landscape. The single most important action promoting the accumulation of old-growth associated epiphytic lichens is the retention of propagule sources, and maintaining an adequate local source of propagules is critical to the resilience of dispersal limited species in a managed forested landscape (Sillett et al. 2000). The removal of refugial populations in isolated legacy components of younger stands would lead to habitat (including known sites) insufficient to support stable populations in the Northwest Forest Plan area under Alternative 3.

Under Alternative 2, *Pseudocyphellaria rainierensis* is assumed to be included in the Forest Service Sensitive Species Program in Oregon and Washington. In areas of its range not included in the Agencies' Special Status Species Programs, there is a high risk of loss of sites where not protected by reserves. *Pseudocyphellaria rainierensis* is a dispersal limited species (Rosso et al. 2000, Sillett et al. 2000, and Sillett and Goward 1998) and loss of these sites could affect stability and distribution of populations and result in insufficient habitat. Although some legacy components are retained based on Matrix Standards and Guidelines, these standards and guidelines may not be sufficient for this species because not all legacy components are immediately apparent. For example, some suppressed understory conifers can be very old, and are known to provide propagules of *Pseudocyphellaria rainierensis* and other old-growth lichens. In many cases, these suppressed understory trees are not protected because they do not appear to be old-growth components (USDA, USDI 2003c, in review). Removing these components greatly reduces the likelihood that refugial populations of *Pseudocyphellaria rainierensis* will remain across the landscape. The single most important action promoting the accumulation of old-growth associated epiphytic lichens is the retention of propagule sources. Maintaining an adequate local source of propagules is critical to the resilience of dispersal limited species in a managed forested landscape (Sillett et al. 2000). A combination of factors, including the potential loss of innoculum sources in younger stands across its entire range in the Northwest Forest Plan area and the lack of protection of known sites outside of Forest Service managed lands in Oregon and Washington would lead to habitat (including known sites) insufficient to support stable populations in the Northwest Forest Plan area under Alternative 2.

***Stenocybe clavata***

*Stenocybe clavata* is a Pacific Northwest endemic where its distribution is unknown. It is still poorly known in the Northwest Forest Plan area (USDA, USDI 2000a, p. 301). Habitat data is limited and it is uncertain if it is closely associated with late-successional or old-growth forests (USDA, USDI 2000a, p. 301).

Under Alternatives 1 and 3, *Stenocybe clavata* would be included in Category E which requires management of known sites and strategic surveys. There is insufficient information about this species to determine how distribution and stability would be affected (USDA, USDI 2000a, p. 303). There is insufficient information to determine an outcome under Alternative 1 or 3.

Under Alternative 2, *Stenocybe clavata* is assumed not to be included in the Agencies' Special Status Species Programs. Known sites would not be managed and general inventories would not be required. There is insufficient information about this species to determine how the alternative would affect distribution and stability. There is insufficient information to determine an outcome under Alternative 2.

***Teloschistes flavicans***

*Teloschistes flavicans* is still considered rare in the Northwest Forest Plan area where there are a low number of known sites, low number of individuals, limited distribution, and narrow ecological amplitude (USDA, USDI 2000a, p. 285).

Under Alternatives 1 and 3, *Teloschistes flavicans* would be included in Category A which requires management of known sites, pre-disturbance surveys, and strategic surveys. Under Alternative 3, management activities in non-late-successional and non-old-growth forest stands would be exempt from pre-disturbance surveys. This species would not maintain stable populations and/or distributions (USDA, USDI 2000a, p. 286). Due to low number of known sites, low number of individuals, limited distribution, and narrow ecological amplitude, habitat (including known sites) is insufficient to provide for stable populations under Alternatives 1 and 3. This outcome is not due to federal action.

Under Alternative 2, *Teloschistes flavicans* is assumed to be included in the Agencies' Special Status Species Programs as Bureau Assessment on BLM managed lands in Oregon, as sensitive on BLM managed lands in California, and as sensitive on Forest Service managed lands in Oregon. Known sites would be managed and pre-project clearances would be conducted. Pre-project clearances on BLM managed lands in Oregon are subject to limitations in funding and positions. General inventories may be conducted. This species would not maintain stable populations and/or distributions under Alternative 2 due to low number of known sites, low number of individuals, limited distribution, and narrow ecological amplitude. Habitat (including known sites) is insufficient to provide for stable populations under Alternative 2. This outcome is not due to federal action.

***Tholurna dissimilis***

*Tholurna dissimilis* is rare in Oregon where there are few known sites. It occurs on sub-alpine and alpine conifers. Potential habitat is limited in extent in this part of its range (USDA, USDI 2000a, p. 276).

Under Alternatives 1 and 3, *Tholurna dissimilis* would be included in Category B which requires management of known sites and strategic surveys. There is insufficient information about this species to determine if distribution and stability would be affected (USDA, USDI 2000a, p. 276). There is insufficient information to determine an outcome under Alternatives 1 and 3.

Under Alternative 2, *Tholurna dissimilis* is assumed to be included as Bureau Assessment on BLM managed lands in Oregon and as Forest Service sensitive in Washington and Oregon. Known sites would be managed and pre-project clearances would be conducted. Pre-project clearances on BLM managed lands are subject to limitations in funding and positions. General inventories may be conducted. There is insufficient information about this species to determine how the alternative would affect distribution and stability. There is insufficient information to determine an outcome under Alternative 2.

***Usnea hesperina***

For *Usnea hesperina*, current information indicates this lichen is still rare in the Northwest Forest Plan area, with low number of known sites, low numbers of individuals, limited distribution, and narrow ecological amplitude (USDA, USDI 2000a, p. 290).

Under Alternatives 1 and 3, *Usnea hesperina* would be included in Category E which requires management of known sites and strategic surveys. This species would not maintain stable populations and/or distributions (USDA, USDI 2000a, p. 293). Due to low numbers of known sites, low number of individuals, limited distribution, and

narrow ecological amplitude, habitat (including known sites) is insufficient to provide for stable populations under Alternatives 1 and 3. This outcome is not due to federal action.

Under Alternative 2, *Usnea hesperina* is assumed not to be included in the Agencies' Special Status Species Programs. Known sites would not be managed and general inventories are not required. This species would not maintain stable populations and/or distributions under Alternative 2 due to low numbers of known sites, low number of individuals, limited distribution, and narrow ecological amplitudes. Habitat (including known sites) is insufficient to provide for stable populations under Alternative 2. This outcome is not due to federal action.

***Usnea longissima***

*Usnea longissima* in Oregon (except in Curry, Josephine, and Jackson Counties and in Washington) is uncommon. It can be locally abundant in all of its range. Although this species was once thought to be riparian, it is now known to occur on ridge tops (Keon and Muir 2002) and at other non-riparian sites. In California and in Oregon's Curry, Josephine, and Jackson Counties, this species is rare and is apparently associated with old growth.

Under Alternative 1, *Usnea longissima* would be included in Category A in California and in Oregon's Curry, Josephine, and Jackson Counties which requires pre-disturbance surveys, management of known sites, and strategic surveys. This species would be included in Category F in Oregon outside of Curry, Josephine, and Jackson Counties which requires strategic surveys. This species would maintain stable populations and/or distributions under Alternative 1 (USDA, USDI 2000a, p. 278). Due to pre-disturbance surveys, management of known sites, and strategic surveys, habitat (including known sites) is sufficient to provide for stable populations under Alternative 1.

Under Alternative 2, *Usnea longissima* is assumed to be included in the Agencies' Special Status Species Programs throughout its range except for the BLM in Oregon. Due to management of known sites and pre-project clearances, this species would maintain stable populations and/or distributions under Alternative 2. Habitat (including known sites) is sufficient to provide for stable populations under Alternative 2.

Under Alternative 3, this species would be included in Category A in California and in Oregon's Curry, Josephine, and Jackson Counties which requires pre-disturbance surveys, management of known sites, and strategic surveys. Management activities in non-late-successional and non-old-growth forest stands would be exempt from pre-disturbance surveys. Outside of California and Oregon's Curry, Josephine, and Jackson Counties, this species would be included in the Agencies' Special Status Species Programs except for the BLM in Oregon. Due to pre-disturbance surveys, pre-project clearances, management of known sites, and strategic surveys, this species would maintain stable populations and/or distributions under Alternative 3. Habitat (including known sites) is sufficient to provide for stable populations under Alternative 3.

## Summary and Mitigation

Under all alternatives, for 15 of 40 lichen species, habitat (including known sites) is insufficient to support stable populations in the Northwest Forest Plan area. This outcome is not a result of federal actions.

Under all alternatives, for 12 of 40 lichen species, habitat (including known sites) is sufficient to support stable populations in the Northwest Forest Plan area. For two of these 12 species (*Dendriscocaulon intricatulum* and *Peltigera pacifica)* under Alternative 2, while habitat (including known sites) is sufficient to support stable populations range-

wide in the Northwest Forest Plan area, there is insufficient habitat to support stable populations in a portion of the Northwest Forest Plan area. Mitigation could include management of known sites not protected by reserves or the Agencies' Special Status Species Programs. In addition, for *Dendriscocaulon intricatulum* mitigation could also include pre-project clearances. These mitigations would eliminate the adverse effects of Alternative 2 for these species in portions of their ranges. See Chapter 2 for a detailed description of mitigation.

Under all alternatives, 11 of 40 lichen species have insufficient information to determine an outcome.

Under Alternative 1, two lichen species (*Nephroma occultum* and *Pseudocyphellaria rainierensis*) would have habitat (including known sites) sufficient to support stable populations, but under Alternatives 2 and 3, habitat (including known sites) is insufficient to support stable populations in the Northwest Forest Plan area. For *Nephroma occultum,* mitigation of these effects under Alternatives 2 and 3 could include management of known sites not protected by reserves or the Agencies' Special Status Species Programs, and pre-project clearances. For *Pseudocyphellaria rainierensis*, under Alternative 2, mitigation of these effects could include management of known sites and pre-project surveys where not protected by reserves or the Agencies' Special Status Species Programs. For *Pseudocyphellaria rainierensis* under Alternative 3, for the Forest Service in Oregon and Washington, mitigation for this species could be to manage it under the Special Status Species Program instead of Survey and Manage. For BLM Oregon, mitigation for this species would be to manage known sites and conduct pre-project clearances in suitable habitat. These mitigations would eliminate the adverse effects of Alternatives 2 and 3 for these two species. See Chapter 2 for a detailed description of mitigation.

# Vascular Plants

## Affected Environment

Vascular plants create the structure of the forest and function as the primary producers, capturing sunlight through photosynthesis and converting their energy to foods consumed by animals and fungi. They include seed-bearing plants (flowering plants and conifers) and spore-bearing forms such as ferns, horsetails, and club mosses. Ranging from dominant conifers to the delicate fern, vascular plants are defined as those that contain conducting or vascular tissue (USDA et al. 1993, p. IV-111).

In general, vascular plants provide substrate and habitat for other organisms, influence microclimate, and provide forage, hiding, and thermal cover for vertebrate and invertebrate species. They produce litter fall that contributes to organic matter and soil development (USDA et al. 1993, p. IV-111).

The habitat components important to vascular plants are those that generally increase amounts of late-successional, riparian, and old-growth habitat. The Northwest Forest Plan Final SEIS concluded that several alternatives, including Alternative 9, provided an intermediate level of the habitat conditions important to vascular plants (USDA, USDI 1994a, p. 3&4-155).

Elements of the Northwest Forest Plan that are important to vascular plants include the system of reserves, introduction of prescribed fire, and retention of late-successional, old-growth, and riparian habitat components in the Matrix (retaining coarse woody debris, green trees, snags, and old-growth remnants where little remains) (USDA, USDI 1994a).

Field surveys, research, and monitoring have provided additional information on the abundance, distribution, and range for most of these species (USDA, USDI Species Review Panel 1999).

## Environmental Consequences

Under Alternative 1, there would be 12 vascular plants included under the Survey and Manage Standards and Guidelines (see Table 2-3).

Under Alternative 2, 10 species are assumed to be included in the Agencies' Special Status Species Programs (see Table 2-5).

Under Alternative 3, there would be eight species included under the Survey and Manage Standards and Guidelines in Category A. Management activities in non-late-successional and non-old-growth forest stands would be exempt from pre-disturbance surveys for these eight species. Late-successional and old-growth legacy components in younger stands provide important refugia and propagule sources to re-colonize younger stands. While surveys in these legacy components in younger stands would not be completed for these eight species, existing Northwest Forest Plan Standards and Guidelines for Matrix (USDA, USDI 1994b, pp. C-39 through C-48) provide for retention of legacy components. Under Alternative 3, two species would also be included in the Agencies' Special Status Species Programs (see Table 2-10).

Under all alternatives, vascular plants would receive protection under the network of reserves.

***Arceuthobium tsugense ssp. Mertensianae***

A majority of sites occur in reserve land allocations (USDA, USDI 2000a, p. 318). Additionally, retention of old-growth fragments in the Matrix where little exists provides benefit to this species (USDA, USDI 1994a, p. 3&4-156).

Under Alternative 1, this species would be included in Category F in Washington which requires strategic surveys. Since a majority of known sites would be protected under reserve land allocations, Alternative 1 would provide sufficient habitat to allow the species to stabilize in a pattern similar to its reference distribution (USDA, USDI 2000a, p. 318). Habitat (including known sites) is sufficient to provide for stable populations of this species under Alternative 1.

Under Alternatives 2 and 3, this species is assumed not to be included in the Agencies' Special Status Species Programs. Since a majority of known sites would be protected under reserve land allocations, habitat (including known sites) is sufficient to provide for stable populations of this species under Alternatives 2 and 3.

***Bensoniella oregana***

This species has a restricted range and small populations in California. It is more common in Oregon. It does not occur in Washington. Cumulative effects of actions on nonfederal lands are impacting this species. Harvest, grazing, fire suppression, and road construction have impacted sites. This species has potential habitat in reserve land allocations (USDA, USDI 2000a, p. 317).

Under Alternatives 1 and 3, this species would be included in Category A in the California portion of its range. In this portion of its range, management of known sites, pre-disturbance surveys, and strategic surveys would be required. Under Alternative 3, management activities in non-late-successional and non-old-growth forest stands would

be exempt from pre-disturbance surveys. The management efforts identified for this species would provide sufficient habitat (including known sites) to allow it to stabilize in a pattern similar to its reference distribution (USDA, USDI 2000a, p. 317). Due to management of known sites, pre-disturbance surveys, strategic surveys, and potential habitat in reserve land allocations, habitat (including known sites) is sufficient to provide for stable populations of this species under Alternatives 1 and 3.

Under Alternative 2, this species is assumed to be included in the Special Status Species Programs for the Forest Service in Oregon and California and for the BLM in Oregon. Since habitat is known to occur in reserve land allocations and this species is included in the Agencies' Special Status Species Programs where known sites are managed and pre-project clearances are completed, habitat (including known sites) is sufficient to provide for stable populations of this species under Alternative 2.

***Botrychium minganense* and *Botrychium montanum***

*Botrychium minganense* is one of the most widespread moonworts in North America. In the Northwest Forest Plan area, it is known from Washington, Oregon, and California. *Botrychium minganense* is less common in Oregon and California where it is known from less than 20 sites. *Botrychium minganense* no longer meets the basic criteria for Survey and Manage in Washington because of the number of sites found in reserve land allocations (USDA, USDI 1998 and USDA, USDI Species Review Panel 1999). *Botrychium montanum* is found in western North America. Most of the known occurrences have been reported from Oregon, Montana, and Washington.

Under Alternatives 1 and 3, these species would be included in Category A which requires management of known sites, pre-disturbance surveys, and strategic surveys. Under Alternative 3, management activities in non-late-successional and non-old-growth forest stands would be exempt from pre-disturbance surveys; however, potential habitat is known to occur in reserve land allocations that would not be typically subject to pre-disturbance surveys (USDA, USDI 2000a, p. 317). Management efforts would provide sufficient habitat to allow these species to stabilize in a pattern similar to reference distribution (USDA, USDI 2000a, p. 317). Habitat (including known sites) is sufficient to provide for stable populations of these species under Alternatives 1 and 3.

Under Alternative 2, *Botrychium minganense* would be included in the Sensitive Species Program for the Forest Service in Oregon and California. *Botrychium montanum* would be included in the Special Status Species Programs for the Forest Service in Oregon and California and the BLM in Oregon. Since habitat is known to occur in reserve land allocations and these species are included in the Agencies' Special Status Species Programs where they receive management of known sites and pre-project clearances, habitat (including known sites) is sufficient to provide for stable populations of these species under Alternative 2.

***Coptis asplenifolia* and *Coptis trifolia***

*Coptis asplenifolia* reaches the southern extent of its range in northern Washington west of the Cascades. *Coptis trifolia* occurs from Greenland across North America to Alaska. It also occurs in northeast Asia to northern Japan. There are two disjunct populations in the western United States, in Washington and Oregon.

Under Alternatives 1 and 3, these species would be included in Category A which requires management of known sites, pre-disturbance surveys, and strategic surveys. Under Alternative 3, management activities in non-late-successional and non-old-growth forest stands would be exempt from pre-disturbance surveys; however, these species are known to have potential habitat in reserve land allocations that would not typically be subject to pre-disturbance surveys (USDA, USDI 1998 and USDA, USDI Species Review

Panel 1999). Management of known sites, pre-disturbance surveys, strategic surveys, and reserves would provide sufficient habitat to allow these species to stabilize in a pattern similar to reference distribution under Alternative 1 (USDA, USDI 2000a, p. 317). Habitat (including known sites) is sufficient to provide for stable populations of these species under Alternatives 1 and 3.

Under Alternative 2, *Coptis asplenifolia* would be included in the Sensitive Species Program for the Forest Service in Washington. *Coptis trifolia* would be included in the Special Status Species Programs for the Forest Service in Washington and the BLM in Oregon. Since habitat is known to occur in reserve land allocations and these species are included in the Agencies' Special Status Species Programs where they receive management of known sites and pre-project clearances, habitat (including known sites) is sufficient to provide for stable populations of these species under Alternative 2.

***Corydalis aquae-gelidae***

This species is restricted to the western Cascades of Skamania and Clark Counties in, Washington and Clackamas, Lane, Linn, Marion, and Multnomah Counties in Oregon. Almost all known occurrences are on National Forest System lands and within riparian buffers.

Under Alternatives 1 and 3, this species would be included in Category A which requires management of known sites, pre-disturbance surveys, and strategic surveys. Under Alternative 3, management activities in non-late-successional and non-old-growth forest stands would be exempt from pre-disturbance surveys. Due to management of known sites, pre-disturbance surveys, strategic surveys, and the location of most known sites in Riparian Reserves, Alternatives 1 and 3 would provide sufficient habitat to allow this species to stabilize in a pattern similar to its reference distribution (USDA, USDI 2000a, p. 318). Habitat (including known sites) is sufficient to provide for stable populations of this species under Alternatives 1 and 3.

Under Alternative 2, this species would be included in the Special Status Species Programs for the Forest Service and BLM in Oregon. Since habitat is known to occur in Riparian Reserve allocations and this species is included in the Agencies' Special Status Species Programs where it receives management of known sites and pre-project clearances, habitat (including known sites) is sufficient to provide for stable populations of this species under Alternative 2.

***Cypripedium fasciculatum***

This species is known from Washington, Oregon, and California. This species has small and scattered populations that are declining. Effects of habitat fragmentation, trampling, collection for horticultural purposes, and lack of fire have reduced populations and habitat (USDA, USDI 1994a, p. J2-275). In the eastside of the Cascades in Washington, the species is not associated with old-growth forest (USDA, USDI 2003a).

Under Alternative 1, this species would be included in Category C which requires management of high-priority sites, pre-disturbance surveys, and strategic surveys except in the Washington Eastern Cascades. Originally, this species was included in all of its Northwest Forest Plan area range; however, due to a large number of known sites, *Cypripedium fasciculatum* was removed in the Washington Eastern Cascades province. Habitat (including known sites) is sufficient to provide for stable populations of this species under Alternative 1.

Under Alternatives 2 and 3, *Cypripedium fasciculatum* is assumed to be included in the Special Status Species Programs for the BLM and Forest Service in Washington, Oregon, and California. Since this species is included in the Agencies' Special Status Species

Programs where it receives management of known sites and pre-project clearances, habitat (including known sites) is sufficient to support stable populations in the Northwest Forest Plan area under Alternatives 2 and 3.

***Cypripedium montanum***

This species is known from Washington, Oregon, and California. It has small and scattered populations that are declining. Effects of logging, collection for horticultural use, loss of habitat on private land, and lack of fire have reduced populations and habitat (USDA, USDI 1994a, p. J2-281).

Under Alternative 1, this species would be included in Category C which requires management of high-priority sites, pre-disturbance surveys, and strategic surveys except in the Washington Eastern Cascades. Applying the Survey and Manage Standards and Guidelines to the entire range of *Cypripedium montanum* within the Northwest Forest Plan area would improve the chance for it to stabilize in a pattern similar to its reference distribution (USDA, USDI 2000a, p. 319). Habitat (including known sites) is sufficient to provide for stable populations of this species under Alternative 1.

Under Alternatives 2 and 3, *Cypripedium montanum* is assumed to be included in the Special Status Species Programs for the BLM and the Forest Service in California. It is assumed not to be included in the Special Status Species Programs for the BLM or Forest Service in Washington and Oregon. This could lead to loss of populations on federally managed lands in Washington and Oregon. This species is more common in Washington, so the loss of populations is most important in Oregon. The majority of occurrences (75 percent) for *Cypripedium montanum* are in Oregon and Washington. The more fragmentation within the range of a species, the more likely it is to be adversely affected. Alternatives 2 and 3 would remove Oregon and Washington from any type of pre-disturbance inventory or site protection. Seventy-eight percent of *Cypripedium montanum* sites occur in Matrix in areas with 60 percent or more canopy (USDA, USDI 1998) in Oregon. Matrix Standards and Guidelines, such as 15 percent green tree retention, would not provide 60 percent or greater canopy cover in areas where habitat-disturbing activities occur. There could be negative impacts to these small populations from loss of canopy cover and changes in interior habitat conditions and microclimate (USDA, USDI 1998). Habitat (including known sites) is insufficient to support stable populations for *Cypripedium montanum* on Forest Service and BLM managed lands in Oregon where known sites are not protected by reserves. Under Alternatives 2 and 3, since this species is included in the Agencies' Special Status Species Programs in California where it receives management of known sites and pre-project clearances and is more common in Washington, habitat (including known sites) is sufficient to support stable populations range-wide in the Northwest Forest Plan area, although there is insufficient habitat to support stable populations in a portion of the Northwest Forest Plan area.

***Eucephalus vialis***

This species is known from Oregon and California. There is currently a single known site in California which is protected on National Forest System lands. This species has potential habitat in reserve land allocations (USDA, USDI 2000a, p. 317).

Under Alternatives 1 and 3, this species would be included in Category A which requires management of known sites, pre-disturbance surveys, and strategic surveys. Under Alternative 3, management activities in non-late-successional and non-old-growth forest stands would be exempt from pre-disturbance surveys. Management identified would allow *Eucephalus vialis* to stabilize. Due to management of known sites, pre-disturbance surveys, strategic surveys, and potential habitat in reserve land allocations, habitat (including known sites) is sufficient to provide for stable populations of this species under Alternatives 1 and 3.

Under Alternative 2, *Eucephalus vialis* is assumed to be included in the Special Status Species Programs for the BLM and the Forest Service in Oregon. Management efforts under Alternative 2 would allow *Eucephalus vialis* to stabilize in a pattern different from its reference distribution. Due to management of known sites, pre-project clearances, and potential habitat in reserve land allocations, habitat (including known sites) is sufficient to provide for stable populations of this species under Alternative 2.

***Galium kamtschaticum***

The current known range of this species within the Northwest Forest Plan area is limited to the Olympic and Cascades Mountains north of Snoqualmie Pass in the State of Washington (USDA, USDI 2000a, p. 317). It is not a concern in the WA Western Cascades Physiographic Province of the Mt. Baker-Snoqualmie National Forest because a high number of healthy populations occur in reserves spanning an array of geographic locations and habitats (USDA, USDI 1998 and USDA, USDI Species Review Panel 1999).

Under Alternatives 1 and 3, this species would be included in Category A which requires management of known sites, pre-disturbance surveys, and strategic surveys. Under Alternative 3, management activities in non-late-successional and non-old-growth forest stands would be exempt from pre-disturbance surveys. Management efforts would provide sufficient habitat to allow this species to stabilize in a pattern similar to its reference distribution (USDA, USDI 2000a, p. 317). Due to Survey and Manage mitigation and potential habitat in reserve land allocations, habitat (including known sites) is sufficient to provide for stable populations of this species under Alternatives 1 and 3.

Under Alternative 2, this species would be included in the Sensitive Species Program for the Forest Service in Washington. Due to management of known sites, pre-project clearances, and potential habitat in reserve land allocations, habitat (including known sites) is sufficient to provide for stable populations of this species under Alternative 2.

***Platanthera orbiculata* var. *orbiculata***

This species occurs throughout Canada, south to South Carolina and Tennessee in the east and Oregon to Wyoming in the west. There is a moderate to high likelihood of sites occurring in reserves (USDA, USDI 1998 and USDA, USDI Species Review Panel 1999). Additionally, retention of old-growth fragments in the Matrix where little exists provides benefit to this species (USDA, USDI 1994a, p. 3&4-156).

Under Alternative 1, this species would be included in Category C which requires management of high-priority sites, pre-disturbance surveys, and strategic surveys. Alternative 1 would provide sufficient habitat to allow this species to stabilize in a pattern similar to its reference distribution (USDA, USDI 2000a, p. 318). Habitat (including known sites) is sufficient to provide for stable populations of this species under Alternative 1.

Under Alternatives 2 and 3, *Platanthera orbiculata* var. *orbiculata* would not be included in the Agencies' Special Status Species Programs. Since habitat is known to occur in reserve land allocations, habitat (including known sites) is sufficient to provide for stable populations of this species under Alternatives 2 and 3.

## Summary and Mitigation

Under all alternatives, habitat (including known sites) is sufficient to provide for stable populations for 12 species.

However, for one species (*Cypripedium montanum*), habitat (including known sites) is sufficient to support stable populations range-wide in the Northwest Forest Plan area, but there is insufficient habitat to support stable populations in a portion of the Northwest Forest Plan area under Alternatives 2 and 3. Mitigation could include management of known sites not protected by reserves or the Agencies' Special Status Species Programs. In addition mitigation could include pre-project clearances. These mitigations would eliminate the adverse effects of Alternatives 2 and 3 for this species in a portion of its range. See Chapter 2 for a detailed description of mitigation.

# Arthropods

## Affected Environment

Arthropods, invertebrates with jointed legs, a segmented body, and an exoskeleton, constitute more than 85 percent of the biodiversity in late-successional forests (Asquith et al. 1990) and play a vital role in ecosystem processes (Wilson 1987). They include insects, mites, crustaceans, spiders, and myriapods. Four functional groups of arthropods (out of 15 functional groups) were included in the Survey and Manage Standards and Guidelines because there was not sufficient information to determine necessary levels of protection for them. They are: (1) litter and soil dwellers; (2) coarse woody debris chewers; (3) understory and forest gap herbivores; and, (4) canopy herbivores. Some species of arthropods are included in the Agencies' Special Status Species Programs. For example, the Mardon Skipper Butterfly is listed as Sensitive by the Forest Service in Region 6.

Arthropods inhabit virtually every part of the coniferous forest ecosystem, including coarse woody debris, litter and soil layers, understory vegetation, canopy foliage, tree trunks, snags, and the aquatic system. The litter and soil of the forest floor is the site of some of the greatest biological diversity found anywhere (USDA et al. 1993, p. IV-137). The structure and function of temperate forest soils are largely determined by the feeding habits of soil arthropods. They are the basic consumers of the forest floor where they ingest and process massive quantities of organic litter and debris, from large logs to bits of moss (Lattin and Moldenke 1992). While the richness of arthropod species in late-successional and old-growth forests suggests a great number of different processes and functions, relatively little is known about how arthropods interact, survive, and contribute to ecosystem function (USDA et al. 1993, p. IV-137). It has been estimated that there are between 20,000 and 25,000 described species of arthropods within the Northwest Forest Plan area, and as many or more not yet described (USDA, USDI 2000a).

For the FEMAT analysis, arthropod species were aggregated into functional groups because it is not possible to monitor all arthropods as individual species. For Alternative 9 of the Northwest Forest Plan Final SEIS, ratings for the four arthropod functional groups showed an 80 percent or greater likelihood of achieving outcomes A and/or B: providing habitat of sufficient quality, distribution, and abundance to support stable populations either well distributed when measured against their historic range or distributed with gaps in their historic distribution on federally managed lands. Risk of extirpation varied between 2 and 6 percent for the four functional groups (USDA, USDI 1994a, p. 3&4-161). The four groups were divided into northern and southern ranges. Only the southern portions of their ranges were subject to additional analysis for inclusion in Survey and Manage (USDA, USDI 199a, pp. 3&4-160). While there is a low risk that an entire functional group, encompassing thousands of species, would face extirpation, individual species are at greater risk.

There is concern regarding the persistence of arthropods for several reasons. First, many of the species are flightless, so their dispersal capabilities are limited. Second, their flightless condition is believed to reflect habitat stability and permanence; therefore, they

are sensitive to habitat disturbance. Third, many of the old-growth forest associated species have disjunct distributions and are endemic to undisturbed conifer forests of the Pacific Northwest. Fourth, arthropods are key to ecosystem function and may serve as indicators of ecosystem health. Last, many of the species native to this region have not been described or named and the number of known species probably represents fewer than half the species estimated to exist (Lattin and Moldenke 1992). In a recent survey, 10 percent of the beetle species found were new to science (O'Keefe and Rappaport, unpublished).

New research has shown that fire can reduce soil arthropod biodiversity (particularly the forest floor arthropods: soil/litter dwellers) more than expected (Rappaport et al. in press and Camann et al. in press). In these two studies in the southern Cascade Range, soil arthropod species richness and diversity continued to decline for 2 years following fire, but late-successional stand characteristics mitigated the negative effects of fire. Even 2 years after the fire, there was no consistent sign of recovery of soil arthropods. This new information raises questions about the persistence of soil arthropods when subjected to fire, particularly high-intensity wildfire. Management that reduces fuel loads to minimize high-intensity wildfires will likely increase the probability of persistence of soil arthropods.

### Environmental Consequences

Under Alternative 1, the four arthropod functional groups would be included in the Survey and Manage Standards and Guidelines in Category F which requires strategic surveys.

Under Alternatives 2 and 3, the four arthropod functional groups are assumed not to be included in the Agencies' Special Status Species Programs; however, individual arthropods, like species in any other taxonomic grouping, might qualify for the Special Status Species Programs. Under Alternatives 2 and 3, strategic surveys for arthropods would no longer be conducted.

New information gathered since 1994 does not substantially alter the basic assumptions or conclusions of the Northwest Forest Plan Final SEIS that expressed a concern that their ecological functions may not persist in the south range. However, there continues to be insufficient information upon which to determine an outcome for these four functional groups (USDA, USDI 2000a, p. 321).

In summary, new information gathered since 1994 increases concern about the effect of fire on two arthropod functional groups (soil/litter dwellers). However, there is insufficient information to determine an outcome in the Northwest Forest Plan area for the four arthropod functional groups under Alternatives 1, 2, and 3.

The determination of whether habitat (including known sites) is sufficient to support stable populations which was made for other taxa in this analysis, is not applicable here because it is not practical to make those determinations for entire functional groups which consist of thousands of individual species.

## Mollusks

### Affected Environment

Mollusk species that inhabit Northwest forests include land snails, slugs, aquatic snails, and bivalves. Many mollusks have restricted geographic ranges and narrow ecological requirements. All 36 of the mollusk species below are either endemic to the Northwest

Forest Plan area or have ranges that lie mostly within the Northwest Forest Plan area.

Several different factors contribute to rarity and concerns for persistence in these animals. Some of the species are confined to very narrow ranges in which subpopulations appear relatively well-connected demographically and genetically. However, habitat sufficiency is a serious concern due to habitat alteration or catastrophic events. Other species are found widely scattered over a large range, so range-wide habitat concerns are low, but likelihood of loss of some populations, connectivity among populations, and normal biological function is high.

Several factors make prediction of occupation rates of suitable habitat difficult. While the understanding of suitable habitat has improved since 1994, habitat definitions remain general. Habitat suitability for many species appears to depend on microsite conditions that are difficult or impossible to map. Because of the extremely limited dispersal ability of these animals and their sensitivity to environmental conditions like temperature and humidity, recolonization of unoccupied habitat is extremely slow, and historical factors leave their signature in current distributions. Suitable habitat may remain unoccupied for indefinite periods of time. As a result, the analysis of occupation of different land allocations, association with habitat types, and extent or pattern of distribution relies on data from known sites more than on predictive approaches.

Under Alternative 1, there are 36 mollusk species included in the Survey and Manage Standards and Guidelines (see Table 2-3). Under Alternative 2, there are 26 mollusk species included in the Agencies' Special Status Species Programs (see Table 2-5). Under Alternative 3, there are 34 species included in the Survey and Manage Standards and Guidelines (Categories A, B, and E) and two uncommon species included in the Agencies' Special Status Species Programs (see Table 2-10).

Additional information regarding the affected environment for mollusks is found in the 2000 Final SEIS, the Northwest Forest Plan Final SEIS, and the FEMAT Report.

## Environmental Consequences

Under Alternative 1, the outcome for these 36 mollusk species was habitat sufficient to allow the species to stabilize in a pattern either similar to reference distribution or altered from reference distribution with some limitations on biological function and species interactions (USDA, USDI 2000a, pp. 173 and 191, and USDA, USDI 2001, p. 14). Table 2-3 (in Chapter 2) displays the category assignments for each of the 36 mollusk species analyzed here.

Analyses relevant to Alternative 2 include the FEMAT report which judged Option 9 and the Northwest Forest Plan Final SEIS which judged Alternative 9 among the alternatives that were generally the most favorable to mollusks (USDA, USDI 1994a, p. 3&4-165). However, the options in FEMAT and alternatives in the Northwest Forest Plan Final SEIS were less effective in providing for mollusks than any of the other species groups (USDA et al. 1993, p. IV-132). Of 102 species assessed, 97 species were rated low enough that they failed to pass the screen in the Northwest Forest Plan Final SEIS (USDA, USDI 1994a, and Appendix J2) and required additional analysis. All 36 species analyzed in this SEIS had combined likelihood scores in Outcomes C and D greater than 20. All but one species had at least some likelihood of Outcome D (USDA, USDI 1994a, and Appendix J2). Rarity, localized distribution, habitat specialization, and lack of information played an important role in the FEMAT rating for most of these species. Those species currently confined to refugia because of habitat history and species life history were judged unlikely to expand their range and were rated accordingly. "Therefore, in even the most favorable situations such species were judged unlikely to be well distributed" (USDA et al. 1993, p. IV-135).

In the Northwest Forest Plan Final SEIS, most of the mollusk species analyzed here were judged to be strongly or partly associated with riparian areas, or to have all or most sites in Late-Successional Reserves, Administratively Withdrawn Areas, or Congressionally Reserved Areas (USDA, USDI 1994a, and Appendix J2). Data collected since the Northwest Forest Plan Final SEIS provides substantial new information on the association of these species with riparian areas and other reserves. All but one species (*Fluminicola* n. sp. 11, known from two sites) currently have a majority of their known sites outside of Late-Successional Reserves, Administratively Withdrawn Areas, or Congressionally Reserved Areas (ISMS database August 2002). However, these known site records do not represent a statistical sample of all land allocations. Of the 20 terrestrial species, 7 (*Cryptomastix hendersoni, Deroceras hesperium, Monadenia fidelis minor, Pristiloma arcticum crateris, Vertigo* n. sp. 1, *Vespericola pressleyi,* and *Vespericola shasta*) are currently believed to be associated with riparian areas in at least part of their range (USDA, USDI 2003b). The other terrestrial species are not considered to be associated with riparian areas. The remaining 16 species are aquatic snails. The analysis completed in 2000 and the 2001 Annual Species Review considered the protection provided by the reserve network, including the Aquatic Conservation Strategy, to all of these species. These reviews determined that for 34 species "The reserve system and other Standards and Guidelines of the Northwest Forest Plan do not appear to provide for a reasonable assurance of species persistence." For two species (*Hemphillia burringtoni* and *Hemphillia glandulosa* in WA Western Cascades), information was considered insufficient to determine this criterion (USDA, USDI 2000a, pp. 332 and 334; USDA, USDI 2001b, p. 3; and USDA, USDI 2002b).

Under Alternative 3, pre-disturbance or equivalent-effort surveys for the 31 species requiring them would no longer be required in non-late-successional and non-old-growth forest stands. All 31 species are believed to be closely associated with late-successional and old-growth forest as defined in USDA, USDI 2001 (pp. 55-56). In many cases, these species appear more closely associated with old-growth forest components, such as down wood, than with forest stands of a particular age, although the forest stand may provide critical microhabitat conditions (USDA, USDI 2003b). Species may often be found in younger stands that contain some of these components, and sites in these areas may provide important connectivity corridors among populations in fragmented old-growth stands that were once part of more contiguous habitat in the species' reference distribution. Lack of surveys could result in inadvertent loss of undiscovered sites in these stands. The potential environmental consequences to these mollusk species are discussed in more detail below.

Species are grouped for the purpose of comparing environmental consequences. The groupings are not intended to imply that this aspect of the analysis is the only criterion by which the alternatives would be judged. Previous analyses, either incorporated by reference or supplemented by this SEIS, contain relevant information regarding the alternatives.

***Cryptomastix devia, Cryptomastix hendersoni, Hemphillia burringtoni, Hemphillia glandulosa* (WA Western Cascades), *Hemphillia malonei* (in Washington), *Lyogyrus* n. sp. 1, *Monadenia fidelis minor*, *Oreohelix* n. sp. 1, *Pristiloma arcticum crateris*, *Prophysaon coeruleum* (in Washington and California), *Trilobopsis roperi,* and *Vespericola shasta***

This group of 12 species contains 7 terrestrial snails, 4 slugs, and 1 aquatic snail. These species range from somewhat rare to uncommon. Six of these species (*Cryptomastix hendersoni*, *Lyogyrus* n. sp. 1, *Monadenia fidelis minor*, *Oreohelix* n. sp. 1, *Trilobopsis roperi*, and *Vespericola shasta*) have moderate numbers of known sites confined to narrow ranges. The other six species are known from moderate numbers of known sites spread across broader ranges. Three of the slug species (*Hemphillia glandulosa*, *Hemphillia malonei*, and *Prophysaon coeruleum*) were removed from the Survey and Manage list in portions of their

ranges because of reduced concern for persistence in those portions (USDA, USDI 2001, p. 10). For *Prophysaon coeruleum*, although the California and Washington portions of its range each represent less than 10 percent of the total range area, they may represent genetically or ecologically distinct populations or undescribed species (USDA, USDI 2000a, pp. 336-339). Under Alternative 1, nine of these species (not including *Hemphillia burringtoni*, *Hemphillia glandulosa*, and *Hemphillia malonei*) are included in Category A which requires management of known sites, pre-disturbance surveys, and strategic surveys. *Hemphillia burringtoni* and *Hemphillia glandulosa* are included in Category E which requires management of known sites and strategic surveys. *Hemphillia malonei* in Washington is included in Category C which requires management of high-priority sites, pre-disturbance surveys, and strategic surveys.

Under Alternative 1, *Cryptomastix devia, Cryptomastix hendersoni, Hemphillia burringtoni, Hemphillia glandulosa, Hemphillia malonei, Lyogyrus* n. sp. 1, *Monadenia fidelis minor*, *Prophysaon coeruleum*, *Trilobopsis roperi,* and *Vespericola shasta* were predicted to have habitat sufficient to "stabilize in a pattern altered from reference distribution with some limitations on biological functions and species interactions" with moderate uncertainty (USDA, USDI 2000a, pp. 173 and 191). *Pristiloma arcticum crateris*, and *Oreohelix* n. sp. 1 were predicted to have habitat sufficient to "stabilize in a pattern similar to reference distribution" with low and moderate uncertainty, respectively (USDA, USDI 2000a, pp. 173 and 191). Under Alternative 1, habitat (including known sites) is sufficient to support stable populations in the Northwest Forest Plan area.

Under Alternative 2, these 12 species would be included in the Agencies' Special Status Species Programs (see Table 2-5). This includes both BLM and Forest Service listings for seven species in most or all of their range: *Cryptomastix devia, Cryptomastix hendersoni, Hemphillia burringtoni, Hemphillia malonei* in Washington, *Lyogyrus* n. sp. 1, *Monadenia fidelis minor*, and *Pristiloma arcticum crateris*. The other five species would be listed as Sensitive only by the Forest Service: *Hemphillia glandulosa* in WA Western Cascades Province, *Oreohelix* n. sp. 1, *Prophysaon coeruleum* in Washington and California, *Trilobopsis roperi*, and *Vespericola shasta*. Known sites and suitable habitat on federally managed lands for all of these species (in the Survey and Manage portion of their ranges) occur almost exclusively on National Forest System lands (ISMS database April 2003). For these 12 species, some known sites may be lost as site management requirements and management strategies are evaluated at a local scale. Site losses allowed under the Special Status Species Programs are constrained by policy objectives that include maintaining viable populations in habitats throughout their geographic range on National Forest System lands and ensuring that actions do not contribute to the need to list under the Endangered Species Act. Under Alternative 2, habitat (including known sites) is sufficient to support stable populations in the Northwest Forest Plan area

Under Alternative 3, all of these species except *Hemphillia malonei* would be included in the Survey and Manage Standards and Guidelines similar to Alternative 1. Removal of the pre-disturbance survey requirement in non-late-successional and non-old-growth forest stands for nine of the species (all except the *Hemphillia* species) could result in loss of some sites. This could result in some minor loss of population connectivity and interaction. Under Alternative 3, *Hemphillia malonei* would be managed as a Sensitive Species and site losses would be constrained as described under Alternative 2 above. For these 12 species, habitat (including known sites) is sufficient to support stable populations in the Northwest Forest Plan area under Alternative 3.

***Deroceras hesperium*, *Fluminicola* n. spp. 3 and 11, *Hemphillia pantherina*, *Juga* (*O.*) n. sp. 2, *Lyogyrus* n. sp. 2, *Monadenia troglodytes troglodytes*, *Monadenia troglodytes wintu*, *Trilobopsis tehamana*, *Vertigo* n. sp., and *Vespericola pressleyi***

This group of 11 species includes 5 terrestrial snails, 2 slugs, and 4 aquatic snails. These species are very rare, known from only a few sites scattered across a relatively broad

range (*Deroceras hesperium* and *Trilobopsis tehamana*) or from one to a moderate number of sites confined to a narrow range (the remaining species). Since 1994, the understanding of the range of *Deroceras hesperium* has changed; the species is now known from four sites in southern Oregon, although it was previously considered to occur across northwestern Oregon and western Washington (USDA, USDI 1994a, Appendix J2). For most of these species, the known range and number of sites have not changed substantially since 1994, despite pre-disturbance or equivalent-effort survey requirements, so the likelihood of significant undiscovered populations appears low (USDA, USDI 1994a, Appendix J2 and ISMS database April 2003). *Fluminicola* n. sp. 3 is known from one cluster of sites in southern Oregon (USDA, USDI 1994a, Appendix J2). Although two sites have been recorded for this species in California, these records are most likely the result of confusion from inconsistent numbering schemes for undescribed species in this genus. The single known site for *Vertigo* n. sp. 1 lies on non-federal land adjacent to the Olympic National Forest, in an area subject to substantial timber harvest. Adjacent federally managed land is split between Late-Successional Reserve and Adaptive Management Area land allocations. *Hemphillia pantherina* is known from only one historic site in a riparian zone, although it is unknown if this population is still extant. The historic site and the species' presumed historic range lie entirely on National Forest System lands in the Northwest Forest Plan area in Washington. If *Hemphillia pantherina* is extinct, comparison of alternatives is moot. The comparison of alternatives below assumes that the species survives, either at the historic location and/or at other locations in the vicinity.

Under Alternative 1, *Fluminicola* n. sp. 11, *Hemphillia pantherina* (with the additional mitigation of equivalent-effort surveys), *Juga* (*O.*) n. sp. 2, *Lyogyrus* n. sp. 2, *Monadenia troglodytes troglodytes*, *Monadenia troglodytes wintu*, and *Vespericola pressleyi* were predicted to have habitat sufficient to "stabilize in a pattern altered from reference distribution with some limitations on biological functions and species interactions" with moderate uncertainty (USDA, USDI 2000a, pp. 173-174 and 191 and USDA, USDI 2001, p. 14). *Deroceras hesperium*, with the additional mitigation of equivalent-effort surveys, was predicted to have the same outcome with high uncertainty (USDA, USDI 2000a, pp. 173 and 191 and USDA, USDI 2001, p. 14). *Fluminicola* n. sp. 3, *Trilobopsis tehamana*, and *Vertigo* n. sp. 1 were predicted to have habitat sufficient to "stabilize in a pattern similar to reference distribution" with moderate, high, and low uncertainty, respectively (USDA, USDI 2000a, pp. 173-174 and 191). Under Alternative 1, for these 11 species, habitat (including known sites) is sufficient to support stable populations in the Northwest Forest Plan area.

Under Alternative 2, these 11 species would be included in the Agencies' Special Status Species Programs (see Table 2-5). This includes both BLM and Forest Service listings for six species: *Deroceras hesperium*, *Fluminicola* n. sp. 3, *Juga* (*O.*) n. sp. 2, *Lyogyrus* n. sp. 2, *Trilobopsis tehamana*, and *Vespericola pressleyi*. Four species would be listed as Sensitive only by the Forest Service: *Hemphillia pantherina*, *Monadenia troglodytes troglodytes*, *Monadenia troglodytes wintu*, and *Vertigo* n. sp. 1. Known sites and suitable habitat on federally managed lands for all of these species occur almost exclusively on National Forest System lands (ISMS database April 2003). For these 10 species, some known sites may be lost as site management requirements and management strategies are evaluated at a local scale. Site losses allowed under the Special Status Species Programs are constrained by policy objectives that include maintaining viable populations in habitats throughout their geographic range on National Forest System lands and ensuring that actions do not contribute to the need to list under the Endangered Species Act. *Fluminicola* n. sp. 11 would be listed as Bureau Sensitive in Oregon, covering the two known sites and most of the range for this species. Both sites would be managed to avoid contributing to the need for listing under the Endangered Species Act. Under Alternative 2, for these 11 species, habitat (including known sites) is sufficient to support stable populations in the Northwest Forest Plan area.

Under Alternative 3, all of these species would be included in the Survey and Manage Standards and Guidelines similar to Alternative 1. Removal of the pre-disturbance survey requirement in non-late-successional and non-old-growth forest stands could result in loss of some sites. This could result in some minor loss of population connectivity and interaction for 10 of the species (all except *Hemphillia pantherina*). For these 10 species, habitat (including known sites) is sufficient to support stable populations in the Northwest Forest Plan area under Alternative 3.

Under Alternative 3, equivalent-effort surveys for *Hemphillia pantherina* would no longer be required in non-late-successional and non-old-growth forest stands. This species is known from only a single site. Other sympatric Survey and Manage species in this genus (*H. burringtoni* and *H. glandulosa*) have been found associated with old-growth components in non-late-successional and non-old-growth stands, habitats which would not require equivalent-effort surveys for this species. It is not known whether this species occurs in younger stands, and the mechanisms that have allowed the sympatric species to persist in younger stands in the presence of various disturbances in the past are unknown. There is insufficient information to determine an outcome under Alternative 3.

***Helminthoglypta talmadgei and Monadenia chaceana***

This group includes two terrestrial snails that are somewhat rare to uncommon and are known from sites scattered widely across their ranges. Although *Helminthoglypta talmadgei* is more abundant in number of known sites than *Monadenia chaceana*, there is evidence of genetically and ecologically distinct populations within this species (Roth 2002), each of which occupy relatively small ranges. Several habitat components with which these species are associated may not be adequately provided by the Matrix Standards and Guidelines. Both of these species depend to some extent on woody debris of various decay classes (USDA, USDI 2003b). Northwest Forest Plan Standards and Guidelines require existing woody debris to be maintained. Carey et al. (1999) found that coarse woody debris amounts declined significantly as a result of variable density thinning, especially the higher decay classes, despite the intent of the treatment to leave all existing debris in place. While canopy shading may recover relatively quickly following harvest, large down wood takes much longer if sufficient levels were not maintained through disturbance (Harmon and Hua 1991). In the drier regions of California and southern Oregon where these species are found, canopy and understory reduction may alter the necessary microclimate conditions that allow populations to persist (USDA, USDI 2000d). Thinning and other management also shifts ground-level biomass from more shade-tolerant taxa, such as fungi or lichens, to primary producers like vascular plants (Carey 2000), altering the habitat and the food supply for these two species. In addition, prescribed burning usually takes place in the spring or fall, when these species are more likely to be active on the surface, compared to late summer wildfires to which these species are adapted, when individuals are typically aestivating (similar to hibernating) (USDA, USDI 2003b).

Under Alternative 1, *Helminthoglypta talmadgei* is included in Category D which requires management of high-priority sites and strategic surveys. *Monadenia chaceana* is included in Category B which requires management of known sites and strategic surveys. Equivalent-effort surveys are also required for *Monadenia chaceana*. Under Alternative 1, *Monadenia chaceana*, with the additional mitigation of equivalent-effort surveys, is expected to have habitat sufficient to "stabilize in a pattern similar to reference distribution" with moderate uncertainty (USDA, USDI 2000a, p. 191, as amended by USDA, USDI 2001a, p. 13). *Helminthoglypta talmadgei* is expected to have habitat sufficient to "stabilize in a pattern altered from reference distribution with some limitations on biological functions and species interactions" with moderate uncertainty (USDA, USDI 2000a, p. 191). Under Alternative 1, for these species, habitat (including known sites) is sufficient to support stable populations in the Northwest Forest Plan area.

Under Alternative 2, *Helminthoglypta talmadgei* (known only from California) would be listed as Bureau Sensitive throughout its ranges but would not be listed under the Forest Service Sensitive Species Program (see Table 2-5). Nearly all known sites for these species are located on National Forest System lands where the species would not be listed as Sensitive under Alternative 2. Management as Bureau Sensitive would apply to only two known sites for *Helminthoglypta talmadgei*. Therefore, as described above, existing provisions of the Northwest Forest Plan and the addition of listing as Bureau Sensitive on BLM managed lands would not prevent or compensate for loss of known sites or population areas. Because of the widely scattered pattern of populations for this species, loss of sites or population areas would reduce population interaction, connectivity, and normal biological function, and could result in habitat (including known sites) insufficient to support stable populations in significant portions of its range (i.e. insufficient habitat in 20 percent or more of the area of the species range, and/or loss of genetically or ecologically distinct populations). However, because of the number of known sites and extent of the range of this species, habitat (including known sites) is sufficient to support stable populations range-wide in the Northwest Forest Plan area although there is insufficient habitat to support stable populations in a portion of the Northwest Forest Plan area under Alternative 2.

Under Alternative 2, *Monadenia chaceana*, known from southwestern Oregon and northwestern California, would be listed as Sensitive by the BLM throughout its range and by the Forest Service only in Oregon. In the Oregon portion of this species' range, some known sites may be lost as site management requirements and management strategies are evaluated at a local scale. Site losses allowed under the Special Status Species Programs are constrained by policy objectives that include maintaining viable populations in habitats throughout their geographic range on National Forest System lands and ensuring that actions do not contribute to the need to list under the Endangered Species Act. In the California portion of the species' range (roughly one third of the total range), only 12 percent of the known sites are found on BLM managed land. Therefore, as described above, existing provisions of the Northwest Forest Plan and the addition of listing as Bureau Sensitive on BLM managed lands would not prevent or compensate for loss of known sites or population areas. Because of the widely scattered pattern of populations for this species, loss of sites or population areas would reduce population interaction, connectivity, and normal biological function, and could result in habitat (including known sites) insufficient to support stable populations in significant portions of the species' range in California although habitat (including known sites) is sufficient to support stable populations range-wide in the Northwest Forest Plan area under Alternative 2.

Under Alternative 3, *Monadenia chaceana* would continue to be managed under the Survey and Manage Standards and Guidelines with modifications. Removal of the pre-disturbance survey requirement in non-late-successional and non-old-growth stands for this species could result in inadvertent loss of some sites. Because of the widely scattered distribution of this species, this could result in some loss of population connectivity and interaction. *Helminthoglypta talmadgei* would not be managed under the Survey and Manage mitigation measure, but would be listed as Bureau Sensitive as described under Alternative 2. Because only two of the known sites for this species are found on BLM managed lands and would receive protection (ISMS database August 2002), loss of sites or population areas under Alternative 3 would reduce population interaction, connectivity, and normal biological function, and could result in habitat insufficient to support stable populations in significant portions of the species' range (including loss of genetically and ecologically distinct populations) although habitat (including known sites) is sufficient to support stable populations range-wide in the Northwest Forest Plan area.

***Fluminicola seminalis***

This aquatic snail is characterized by a low number of known sites widely scattered over a somewhat limited range. New sites for *Fluminicola seminalis* discovered on National Forest System lands in southern Oregon have expanded the known range of this species, although few sites have been discovered since 1994, despite pre-disturbance and strategic survey requirements. The Northwest Forest Plan Final SEIS (Appendix J2) noted *Fluminicola seminalis* is "now about 95 percent extirpated from its former range in the Sacramento River." As an aquatic snail, this species receives protection from the Aquatic Conservation Strategy. However, concerns for persistence remained (USDA, USDI 1994, Appendix J2, and USDA, USDI 2000a). These concerns included factors that could directly or indirectly affect local populations while still meeting overall Aquatic Conservation Strategy goals, such as livestock grazing or activities outside the riparian buffer zone, particularly around small wetlands or springs where the riparian buffer covers only the extent of riparian vegetation. Local extirpation and species extinction of ecologically similar species in this family (Hydrobiidae) have been documented as a result of water diversion, livestock grazing, and groundwater withdrawal outside the riparian zone (Hershler and Sada 1987, USDI 1993, and Hershler and Frest 1996).

Under Alternative 1, this species is included in Category A which requires management of known sites, pre-disturbance surveys, and strategic surveys. *Fluminicola seminalis* was predicted to have habitat sufficient to "stabilize in a pattern altered from reference distribution with some limitations on biological functions and species interactions" with moderate uncertainty (USDA, USDI 2000a, p. 191). Under Alternative 1, habitat (including known sites) is sufficient to support stable populations in the Northwest Forest Plan area.

Under Alternative 2, *Fluminicola seminalis* would be listed as Forest Service Sensitive in California and Oregon (see Table 2-5) and Bureau Tracking in Oregon. One of the known sites and areas of suitable habitat are on BLM managed lands in California, which would not be protected under the Special Status Species Programs. Bureau Tracking status in Oregon does not provide any management direction for sites that may be discovered on BLM managed lands (BLM Manual 6840), although the distribution of the species in Oregon appears to cover mostly National Forest System lands. In the Oregon portion of the range, some known sites may be lost as site management requirements and management strategies are evaluated at a local scale. Site losses allowed under the Special Status Species Programs are constrained by policy objectives that include maintaining viable populations in habitats throughout their geographic range on National Forest System lands. In the California portion of the range, listing as Sensitive by the Forest Service would provide protection for some of the species' populations, but populations on BLM managed lands would not be managed. Because of the widely scattered distribution of this species, loss of any known sites would have a substantial effect on population interactions and the distribution of the species as a whole. This would lead to habitat insufficient to support stable populations from significant portions of the range in California (i.e. insufficient habitat in over 20 percent of the area of the species range, and/or loss of genetically or ecologically distinct populations) although habitat (including known sites) is sufficient to support stable populations range-wide in the Northwest Forest Plan area.

Under Alternative 3, this species would continue to be managed under the Survey and Manage mitigation measure with modifications. Because this species is an aquatic snail, much of the habitat for this species may no longer require pre-disturbance surveys. The association of this species with late-successional and old-growth forest typically depends on stand conditions at a larger scale, which may not be considered in assessment of survey requirements. This may result in inadvertent loss of undiscovered sites or populations, although it is unlikely that significant undiscovered populations are extant. Because of the protection afforded by site management in Survey and Manage under

Alternative 3, habitat (including known sites) is sufficient to support stable populations in the Northwest Forest Plan area.

***Fluminicola n. spp. 14, 15, 16, 17, 18, 19, and 20; Juga (O.) n. sp. 3; Lyogyrus n. sp. 3; and Vorticifex n. sp. 1***

All 10 species in this group are aquatic snails known from a small number of sites in a narrow range. Number of known sites ranges from 1 (*Fluminicola* n. sp. 19 and *Lyogyrus* n. sp. 3) or 2 (*Fluminicola* n. spp. 17 and 20 and *Vorticifex* n. sp. 1) to 17 (*Fluminicola* n. sp. 16). There is no new information since 1994 that would alter the evaluation in the Northwest Forest Plan Final SEIS (USDA, USDI 1994a). Nine of these species have all of their known sites outside of Late-Successional Reserves, Administratively Withdrawn Areas, and Congressionally Reserved Areas. The exception is *Fluminicola* n. sp. 14, with 1 of 12 known sites in a Late-Successional Reserve. The known ranges of all of these species have not substantially changed since 1994, despite pre-disturbance and strategic survey requirements. The likelihood of significant undiscovered populations appears low (USDA, USDI 1994a, Appendix J2 and ISMS database August 2002). As aquatic snails, these species receive protection from the Aquatic Conservation Strategy (USDA, USDI 1994a). However, concerns for persistence remained (USDA, USDI 1994, Appendix J2, and USDA, USDI 2000a). These concerns included factors that could directly or indirectly affect local populations while still meeting overall Aquatic Conservation Strategy goals, such as livestock grazing or activities outside the riparian buffer zone, particularly around small wetlands or springs where the riparian buffer covers only the extent of riparian vegetation. Local extirpation and species extinction of ecologically similar species in this family (Hydrobiidae) have been documented as a result of water diversion, livestock grazing, and groundwater withdrawal outside the riparian zone (Hershler and Sada 1987, USDI 1993, and Hershler and Frest 1996). These species are rare and have narrow ranges. Six of these species have been found or are likely to be found on both BLM and Forest Service managed lands, while the other four (*Fluminicola* n. spp. 15, 16, and 17, and *Juga* (*O.*) n. sp. 3) are likely to be found only on Forest Service managed lands.

Under Alternative 1, nine of these species would be included in Category A which requires management of known sites, pre-disturbance surveys, and strategic surveys. The remaining species, *Vorticifex* n. sp. 1, is included in Category E which requires management of known sites and strategic surveys. Under Alternative 1, two of these species are expected to have sufficient habitat to "stabilize in a pattern similar to reference distribution" with moderate uncertainty (*Fluminicola* n. sp. 14 and *Vorticifex* n. sp. 1). The remaining seven species are expected to "stabilize in a pattern altered from reference distribution," all with moderate uncertainty (USDA, USDI 2000a, p. 191, as amended by USDA, USDI 2001a, p. 13). Under Alternative 1, for these 10 species, habitat (including known sites) is sufficient to support stable populations in the Northwest Forest Plan area.

Under Alternative 2, these 10 species would not be included in the Agencies' Special Status Species Programs (see Table 2-5). Known sites would not be managed and pre-disturbance and strategic surveys would not be completed. The loss of even a single site could result in habitat insufficient to support stable populations because of the rarity and narrow ranges of these species. Due to lack of management under Alternative 2, habitat (including known sites) is insufficient to support stable populations in the Northwest Forest Plan area.

Under Alternative 3, these species would continue to be managed under the Survey and Manage mitigation measure with modifications. Because these species are aquatic snails, much of the habitat for these species may no longer require pre-disturbance surveys. The association of these species with late-successional and old-growth forest typically depends on stand conditions at a larger scale, which may not be considered in assessment

of survey requirements. This may result in inadvertent loss of undiscovered sites or populations, although it is unlikely that significant undiscovered populations are extant. Because of the protection afforded by the management under the Survey and Manage mitigation measure under Alternative 3, habitat (including known sites) is sufficient to support stable populations in the Northwest Forest Plan area.

## Summary and Mitigation

Twenty-two of the 36 species (*Cryptomastix devia, Cryptomastix hendersoni, Deroceras hesperium*, *Fluminicola* n. spp. 3 and 11, *Hemphillia burringtoni, Hemphillia glandulosa* in WA Western Cascades, *Hemphillia malonei* in Washington, *Juga* (*O.*) n. sp. 2, *Lyogyrus* n. spp. 1 and 2, *Monadenia fidelis minor*, *Monadenia troglodytes troglodytes, Monadenia troglodytes wintu, Oreohelix* n. sp. 1, *Pristiloma arcticum crateris*, *Prophysaon coeruleum* in Washington and California, *Trilobopsis roperi, Trilobopsis tehamana*, *Vertigo* n. sp. 1, *Vespericola pressleyi*, and *Vespericola shasta*) would have habitat (including known sites) sufficient to support stable populations in the Northwest Forest Plan area under all alternatives.

One of the 36 species (*Hemphillia pantherina*) would have habitat (including known sites) sufficient to support stable populations in the Northwest Forest Plan area under Alternatives 1 or 2. Under Alternative 3, there is insufficient information to determine an outcome for this species. Since it is unknown if there are adverse effects under Alternative 3, no mitigation is proposed.

Three of the 36 species (*Fluminicola seminalis*, *Helminthoglypta talmadgei, and Monadenia chaceana*) would have habitat (including known sites) sufficient to support stable populations range-wide in the Northwest Forest Plan area under all alternatives. However, these species tend to have widely scattered known sites or populations and would not be included in the Special Status Species Programs throughout some or all of their range under Alternative 2. Loss of sites or population areas would reduce population interaction, connectivity, and normal biological function, and could result in habitat (including known sites) insufficient to support stable populations in the Northwest Forest Plan area from significant portions of the species range. Mitigation under Alternative 2 could include management of known sites not protected by reserves. Mitigation for all but *Helminthoglypta talmadgei* could also include pre-project clearances. Under Alternative 3, outcomes for two of these species are expected to be similar to Alternative 1, while the outcome for *Helminthoglypta talmadgei* is expected to be similar to Alternative 2. Mitigation under Alternative 3 could include management of known sites not protected by reserves. Mitigation would apply to National Forest System lands in California for two of the species (*Helminthoglypta talmadgei* and *Monadenia chaceana*), and to BLM managed lands in California for *Fluminicola seminalis*. Mitigation would eliminate the adverse effects of Alternatives 2 and 3. See Chapter 2 for a detailed description of mitigation.

Ten of the 36 species (*Fluminicola* n. spp. 14, 15, 16, 17, 18, 19, and 20; *Juga* (*O.*) n. sp. 3, *Lyogyrus* n. sp. 3, and *Vorticifex* n. sp. 1) would have habitat (including known sites) sufficient to support stable populations in the Northwest Forest Plan area under Alternatives 1 and 3. Under Alternative 2, because of the rarity and narrow ranges of these species and lack of inclusion in the Special Status Species Programs, these species would have habitat (including known sites) insufficient to support stable populations in the Northwest Forest Plan area. Mitigation of these effects under Alternative 2 could include management of known sites not protected by reserves. Additionally, mitigation could include pre-project clearances for all but *Vorticifex* n. sp. 1. Mitigation would apply to National Forest System lands in California for all 10 of these species, and to BLM managed lands in California for 6 of these species (*Fluminicola* n. spp. 14, 18, 19, and 20; *Lyogyrus* n. sp. 3; and *Vorticifex* n. sp. 1). Mitigation would eliminate the adverse effects of Alternative 2. See Chapter 2 for a detailed description of mitigation.

# Amphibians

## Affected Environment

Under Alternative 1, four salamanders are included in the Survey and Manage Standards and Guidelines: Larch Mountain, Shasta, Siskiyou Mountains, and Van Dyke's in the Cascade Range. Under Alternative 2, these four salamanders are included in the Agencies' Special Status Species Programs (see Table 2-5), and three of four species are included across their full range on federally managed lands. The Larch Mountain salamander is Bureau Assessment in the Oregon/Washington BLM and is Sensitive in Forest Service Region 6. The Shasta salamander is Bureau Sensitive in the California BLM and is included as Forest Service Sensitive in Region 5. The Siskiyou Mountains salamander is Bureau Sensitive in BLM Oregon and Sensitive in Oregon in Forest Service Region 6 and Sensitiv in Forest Service Region 5. The Van Dyke's salamander is Sensitive in Washington in Forest Service Region 6. Under Alternative 3, these four salamanders would be retained under the Survey and Manage Standards and Guidelines similar to Alternative 1 with the exception that the northern population of Siskiyou Mountains salamander, which includes sites north of the Siskiyou Mountains crest, would not be retained under the Survey and Manage mitigation measure. Instead, under Alternative 3, this population would be included in the Agencies' Special Status Species Programs similar to Alternative 2. The Survey and Manage Standards and Guidelines and the Agencies' Special Status Species Programs have similar strategies; they both provide for management of sites and surveys.

These four salamanders are found in terrestrial environments without an aquatic life history stage. Populations of interacting individuals may be comprised of numerous sites. Knowledge regarding the known sites and range of these species has increased since 1994. During this time, the known range of these species has increased 51 percent for the Shasta salamander, 5 percent for the Van Dyke's salamander, 155 percent for the Larch Mountain salamander, and 91 percent for the Siskiyou Mountains salamander.

Although these four salamanders have met criteria for late-successional and old-growth forest associations, such association does not preclude their occurrence in younger stands. Terrestrial salamander habitat associations are often a mix of microhabitat to landscape-scale parameters, which may include an array of environmental variables in addition to late-successional and old-growth forests. They may have greater abundances in late-successional and old-growth forest and/or be associated with elements of late-successional and old-growth forest that may be retained in legacy conditions in younger stands. Furthermore, they may occur in non-late-successional and non-old-growth forest stands if other site conditions are lessening the deleterious effects of past disturbances (e.g., cooler surface microclimates of north facing slopes and deep rocky substrates, or wetter conditions of local surface hydrology).

The knowledge gained about the Shasta, Van Dyke's, Larch Mountain, and Siskiyou Mountains salamanders' biology, distributions, and habitats from pre-disturbance and strategic surveys, and various research efforts, has been used in adaptive management. This has resulted in improved survey protocols with greater likelihood of detecting animals which has reduced inadvertent loss of sites. Improved knowledge of species' distributions and habitat associations has resulted in a perceived risk reduction for some salamanders. For example: (1) the Del Norte salamander was removed from the Survey and Manage Standards and Guidelines in 2002; (2) the Siskiyou Mountains salamander was moved to a different Survey and Manage category; and, (3) rarity of the Larch Mountain, Van Dyke's, and Shasta salamanders has been confirmed.

**Shasta Salamander *(Hydromantes shastae)***

Shasta salamander occurs only in California near Shasta Lake. There are 54 known sites on federally managed lands. The current range extends over 250,000 acres. Federally managed lands are primarily National Forest System lands and comprise 68 percent of the range. Less than 1 percent of the range occurs on BLM managed lands. Habitat includes limestone outcrops, other rock sources, and nonrock habitats (USDA, USDI 2000d; Lewendal 1995; Lindstrand 2000; Nauman and Olson 2002; and North State Resources, Inc. 2002). Potential habitat has not been well surveyed (USDA, USDI 2000e). Divergent genetic lineages have been detected in this species such that it is considered a species-complex with multiple discrete populations.

**Van Dyke's Salamander *(Plethodon vandykei)***

This species occurs in the Olympic Peninsula, in southwestern Washington, and in the Cascade Range. Only the populations in the Cascade Range are included in the Survey and Manage Standards and Guidelines. There are 29 known sites on federally managed lands in the Cascades and relatively few new sites have been found since 1994. The distribution of the species is not well known. Although habitat is broad, including caves, talus, streams, and lakes, this species appears to have a strong association with riparian environments, occurring in association with streams and seeps, and including apparent affinities for high gradient and headwater areas. Sites are known up to an elevation of 5,200 feet.

**Larch Mountain Salamander *(Plethodon larselli)***

Although originally thought to be restricted to the Columbia River Gorge, the range of the Larch Mountain salamander now extends 135 miles in length, north and south along the Cascade Range, and 40 miles wide, east to west. Since 1980, the total area encompassed by known sites has increased almost 10-fold (Nauman and Olson 1999). There are 87 known sites on federally managed lands. The fact that relatively few sites have been identified since 1993 despite survey efforts (i.e., 461 negative surveys, ISMS database) supports the rarity of this animal (USDA, USDI Species Review Panel 2001). This animal occurs in a variety of habitat types including talus and rocky slopes within a dense conifer overstory (Herrington and Larsen 1985). The majority of known sites for this species reflect narrow habitat and microclimate requirements. Known sites occur to an elevation of 4,100 feet. Divergent genetic lineages representing discrete populations have been identified within this species.

**Siskiyou Mountains Salamander *(Plethodon stormi)***

The known range of the Siskiyou Mountains salamander is limited to a small area near the Oregon-California border, and has increased substantially from 1993. There are 173 known sites including the 126 sites found since 1993. Habitat is forested, rocky substrates under a closed canopy that provides cool, moist microclimates (Ollivier et al. 2001). The species can occur in all seral stages but the majority of sites are in older forests (mature and old growth) and abundances are higher in older forests (USDA, USDI Species Review Panel 2000 and Nussbaum 1974).

The ecology and biological diversity of this animal appears to differ north and south of the Siskiyou Mountain crest near the Oregon-California border. The range for this species has been split at the Siskiyou crest for management considerations. North of the crest there are 143 sites and south of the Siskiyou crest there are 30 sites. In the south, genetically distinct populations have been identified (Mahoney 2003 and Mead et al. 2003). At the southernmost extent of the species range, genetic analyses of animals from

three sites have a revealed a distinct population that is a completely separate lineage (Scott Bar group, *Plethodon asupaki*; Mead et al. 2003). This population is under taxonomic review and its distribution is under study.

## Environmental Consequences

***Shasta Salamander***

The Shasta salamander was given a FEMAT rating of 0-40-40-20 (see Background for Effects Analysis section). The rating reflected an extremely localized distribution and risk of extirpation due to small population sizes (USDA, USDI 1994a, Appendix J2, p. J2-426). The rating was not primarily a result of alternative design or federal management (USDA, USDI 1994a, p. 3&4-175). No standards and guidelines could be devised that would fully eliminate the risks of extirpation from federally managed lands (USDA, USDI 1994a, p. 3&4-176). The Shasta salamander did not meet the Northwest Forest Plan persistence criterion to maintain stable, well-distributed populations (USDA, USDI 2001a, Attachment 1, p. 3) from implementation of other elements of the Northwest Forest Plan (e.g., land allocations, down wood). Most of the federal range of the Shasta salamander occurs on National Forest System lands (more than 99 percent) and about 66 percent occurs in Matrix with 33 percent occurring in Administratively Withdrawn Areas (Nauman and Olson 1999). These Administratively Withdrawn Areas are the Shasta Lake National Recreation Area, where vegetation-altering activities such as timber harvest do not generally occur, although fuels reduction activities such as prescribed burning for wildlife habitat do occur.

Under Alternatives 1 and 3, this species would be included in Category A which requires pre-disturbance surveys, strategic surveys, and management of all known sites. Alternatives 1 and 3 likely would provide sufficient habitat (including known sites) to allow the Shasta salamander to stabilize in a pattern similar to reference distribution on federally managed lands in the Northwest Forest Plan area (USDA, USDI 2000a, pp. 340-357). This result is analogous to Outcome A from FEMAT; thus, if a similar rating process were conducted now, this amphibian species would have a preponderance of points in Outcome A. Under Alternative 3, pre-disturbance surveys would not be conducted in non-late-successional and non-old-growth forest. Lack of pre-disturbance surveys in non-late-successional and non-old-growth forest stands increases the risk of inadvertent loss of such sites. Losses of highly-localized populations or subpopulations are possible. There is uncertainty regarding the extent that this would affect stable, well-distributed populations. The spatial pattern of identified sites, and possibly populations, that are then managed may be reduced under Alternative 3; some gaps in the species distribution may result. Habitat (including known sites) is sufficient to support stable populations in the Northwest Forest Plan area under Alternative 1. Under Alternative 3, habitat (including known sites) is sufficient to support stable populations range-wide, but with potential gaps, in the Northwest Forest Plan area.

Under Alternative 2, the Shasta salamander is assumed to be included in the Agencies' Special Status Species Programs as Bureau Sensitive and Forest Service Sensitive in California (see Table 2-5). Discretion in survey methodology and in the management of known sites under the Special Status Species Programs results in uncertainty whether all sites would be detected and managed. This, in turn, creates some uncertainty in the analysis of environmental consequences because the inadvertent loss of undetected sites, and possibly localized populations, may reduce the overall spatial pattern of managed sites and populations and may affect the maintenance of stable, well-distributed populations. Some gaps in the species distribution may result. The management discretion in the Special Status Species Programs is constrained by policy objectives that include maintaining viable populations in habitats throughout their geographic range on National Forest System lands and ensuring that actions do not contribute to the need to

list under the Endangered Species Act. Alternative 2 does not have a specified process (i.e. strategic surveys) to improve knowledge of the species that would facilitate adaptive management.

In addition to the Forest Service Sensitive Species listing for the Shasta salamander, a "Comprehensive Species Management Plan" is maintained by the Shasta-Trinity National Forest (Bogener and Brouha 1979). The Comprehensive Species Management Plan includes maintaining known sites and populations. Although the comprehensive plan includes an adaptive management provision, it does not include a specified process to fill information gaps (e.g., discrete population boundaries, species range, habitat associations), and it has not been periodically revised as originally envisioned. The outdated habitat definition and survey procedures included in the comprehensive plan create some uncertainty in predicting environmental consequences.

Alternative 2 would maintain stable, well-distributed Shasta salamander populations that are currently known and identified in the future through new surveys. Alternative 2 has some limits that may result in inadvertent loss of undetected sites and populations, and gaps in distribution. The Shasta salamander would have habitat (including known sites) sufficient to support stable populations range-wide, with potential gaps, in the Northwest Forest Plan area under Alternative 2.

**Van Dyke's Salamander**

The Van Dyke's salamander (Cascades populations) was given a FEMAT rating of 0-20-58-23 (see Background for Effects Analysis section). The rating reflected the species' naturally patchy distribution and it was thought that additional habitat protection would not increase its score (USDA, USDI 1994a, Appendix J2, p. J2-420). The Van Dyke's salamander did not meet the persistence criterion to maintain stable, well-distributed populations (USDA, USDI 2001a, Attachment 1, p. 3). Due to the few known sites of this animal, loss of sites may pose a risk to maintaining the species' reference distribution pattern, with potentially cascading effects on maintenance of stable, well-distributed populations throughout the species range. Current information indicates that Riparian Reserves under the Northwest Forest Plan provide mitigation for this species in areas where it occurs along streambanks.

Under Alternatives 1 and 3, this species would be included in Category A which requires pre-disturbance surveys, strategic surveys, and management of all known sites. Alternatives 1 and 3 likely would provide sufficient habitat (including known sites) to allow the Van Dyke's salamander to stabilize in a pattern similar to reference distribution on federally managed lands in the Northwest Forest Plan area (USDA, USDI 2000a, pp. 340-357). This result is analogous to Outcome A from FEMAT; thus, if a similar rating process were conducted now, this amphibian species would have a preponderance of points in Outcome A. Under Alternative 3, pre-disturbance surveys would not be conducted in non-late-successional and non-old-growth forest stands which may lead to inadvertent loss of some sites. Losses of highly-localized populations or subpopulations are possible. This, in turn, creates some uncertainty in the analysis of environmental consequences because inadvertent loss of undetected sites or localized populations may affect stable, well-distributed populations. Some gaps in the species distribution may result. Habitat (including known sites) is sufficient to support stable populations in the Northwest Forest Plan area under Alternative 1. Under Alternative 3, habitat (including known sites) is sufficient to support stable populations range-wide, but with potential gaps, in the Northwest Forest Plan area.

Under Alternative 2, Van Dyke's salamander is assumed to be included in the Special Status Species Program as Forest Service Sensitive in Washington. Under Alternative 2, discretion in survey methodology and in the management of known sites under the Special Status Species Programs results in uncertainty whether all sites would be detected

and managed. This, in turn, creates some uncertainty in the analysis of environmental consequences because the inadvertent loss of undetected sites may affect the maintenance of stable, well-distributed populations. Some gaps in the species distribution may result. The management discretion in the Special Status Species Programs is constrained by policy objectives that include maintaining viable populations in habitats throughout their geographic range on National Forest System lands and ensuring that actions do not contribute to the need to list under the Endangered Species Act. Alternative 2 does not have a specified process to improve knowledge of the species that would facilitate adaptive management. Due to inclusion in the Sensitive Species Program and benefits provided by the Riparian Reserves, the Van Dyke's salamander would have habitat (including known sites) sufficient to support stable populations range-wide, with potential gaps, in the Northwest Forest Plan area under Alternative 2.

**Larch Mountain Salamander**

The Larch Mountain salamander was given a FEMAT rating of 75-20-5-0 (see Background for Effects Analysis section). The rating was based on the fact that under Option 9 in FEMAT the species: (1) was provided protection buffers; (2) was rare and locally endemic; (3) might be a relict species susceptible to extirpation through catastrophic events; and, (4) distribution was very poorly known (USDA, USDI 1994a, Appendix J2, p. J2-423). There are 87 federally managed sites occurring across 4 million acres. Away from the Columbia River Gorge, there are 55 federal sites. The Larch Mountain salamander did not meet the Survey and Manage persistence criterion to maintain stable, well-distributed populations from implementation of other elements of the Northwest Forest Plan (e.g., land allocations, down wood) (USDA, USDI 2001a, Attachment 1, p. 3). However, the number of federally managed sites and extent of the potential range in reserve land allocations (north of the Columbia River Gorge, 34 of 55 federal sites are in reserves) is expected to be beneficial for this animal, although some of these reserved lands are not suitable habitat and forest management activities in reserves may pose risks to site-level persistence (USDA, USDI 2000d). Due to the few known sites of this animal, and their patchy distribution away from the Columbia River Gorge, loss of sites may pose a risk to maintaining the species' reference distribution, with potentially cascading effects on maintenance of stable, well-distributed populations throughout the species range.

Under Alternatives 1 and 3, this species would be included in Category A which requires pre-disturbance surveys, strategic surveys, and management of all known sites. Alternatives 1 and 3 likely would provide sufficient habitat (including known sites) to allow the Larch Mountain salamander to stabilize in a pattern similar to reference distribution on federally managed lands in the Northwest Forest Plan area (USDA, USDI 2000a, pp. 340-357). This result is analogous to Outcome A from FEMAT; thus, if a similar rating process were conducted now, this species would have a preponderance of points in Outcome A. Under Alternative 3, pre-disturbance surveys would not be conducted in non-late-successional and non-old-growth forest stands which may lead to inadvertent loss of some sites and populations. Losses of highly-localized populations or subpopulations are possible. There is uncertainty regarding the extent that this would affect persistence; there is a risk that this would affect the maintenance of stable, well-distributed populations in the patchy part of the species' range, north of the Columbia River Gorge. Some gaps in the species distribution may result. Habitat (including known sites) is sufficient to support stable populations in the Northwest Forest Plan area under Alternative 1. Under Alternative 3, habitat (including known sites) is sufficient to support stable populations range-wide, but with potential gaps, in the Northwest Forest Plan area.

Under Alternative 2, Larch Mountain salamander is assumed to be included in the Special Status Species Programs as Forest Service Sensitive in Region 6 and Bureau Assessment in Oregon (see Table 2-5). Discretion in survey methodology and in the

management of known sites under the Special Status Species Programs results in uncertainty whether all sites, and potentially localized populations, would be detected and managed. This, in turn, creates some uncertainty in the analysis of environmental consequences because the inadvertent loss of undetected sites may affect the maintenance of stable, well-distributed populations. Some gaps in the species distribution may result. The management discretion in the Special Status Species Programs is constrained by policy objectives that include maintaining viable populations in habitats throughout their geographic range on National Forest System lands and ensuring that actions do not contribute to the need to list under the Endangered Species Act. Alternative 2 does not have a specified process to improve knowledge of the species that would facilitate adaptive management. Due to inclusion in the Special Status Species Programs and the extent of federally managed sites and potential range in reserve land allocations, the Larch Mountain salamander would have habitat (including known sites) sufficient to support range-wide stable populations, with potential gaps, in the Northwest Forest Plan area under Alternative 2.

**Siskiyou Mountains Salamander**

The Siskiyou Mountains salamander was given a rating of 50-30-15-5 (see Background for Effects Analysis section). The rating reflected its naturally patchy distribution and was not primarily a result of alternative design or federal management (USDA, USDI 1994a, Appendix J2, p. J2-426). The species has an extremely small range. Because of its small population size, there was expected to be some risk of extirpation regardless of protective measures undertaken (USDA, USDI 1994a, p. 3&4-177, and Appendix J2, p. J2-427). Of the 173 federally managed sites, 143 occur north and 30 occur south of the Siskiyou crest, a boundary which delineates distinct management units based on ecology and genetics. Three sites south of the crest are known to represent a distinct genetic lineage that is under taxonomic review. The Siskiyou Mountains salamander did not meet the Survey and Manage persistence criterion to maintain stable, well-distributed populations from implementation of other elements of the Northwest Forest Plan (e.g., land allocations, down wood) (USDA, USDI 2001a, Attachment 1, p. 3 and USDA, USDI 2002a). In the north, most of the federal range occurs within an Adaptive Management Area, where programmed timber harvest activities can occur. Less than 10 percent of the high quality habitat is in reserves and much of this range is suitable habitat for the species (Clayton et al. 2002). In the south, the animal is patchier in distribution, with fewer sites. Also, a new genetic population has been identified (from three sites, Scott Bar group) (Mead et al. 2002), so maintenance of distinct populations is important.

Under Alternatives 1 and 3, this species would be included in Category A in the south range, which requires pre-disturbance surveys, strategic surveys, and management of all known sites. Under Alternative 1, it would be included in Category D in the north range which requires strategic surveys and management of high-priority sites. Under Alternative 3 in the north range, this species would not be included under Survey and Manage; however, it would be included in the Special Status Species Programs as described under Alternative 2.

Alternative 1 (and Alternative 3 for the southern population) likely would provide sufficient habitat (including known sites) to allow the Siskiyou Mountains salamander to stabilize in a pattern similar to reference distribution on federally managed lands in the Northwest Forest Plan area (USDA, USDI 2000a, pp. 340-357). This result is analogous to Outcome A from FEMAT; thus, if a similar rating process were conducted now, this species would have a preponderance of points in Outcome A. Under Alternative 3, pre-disturbance surveys would not be conducted in non-late-successional and non-old-growth forest stands which may lead to inadvertent loss of some sites. Losses of highly-localized populations or subpopulations are possible. There is uncertainty regarding the extent that this would affect stable, well-distributed populations. Some gaps in the species distribution may result. Habitat (including known sites) is sufficient to support

stable populations in the Northwest Forest Plan area under Alternative 1, for both the northern and southern populations. Under Alternative 3 for the southern population, habitat (including known sites) is sufficient to support stable populations range-wide, but with potential gaps, in the Northwest Forest Plan area. However, in the south, where the Scott Bar population of the Siskiyou Mountains salamander is known from only three sites, habitat (including known sites) is insufficient to support stable populations in the Northwest Forest Plan area under Alternatives 1 and 3 due to stochastic events.

Under Alternative 2 (and Alternative 3 for the northern population), the Siskiyou Mountains salamander is assumed to be included in the Special Status Species Program as Forest Service Sensitive in Oregon and Region 5, and Bureau Sensitive in Oregon. Discretion in survey methodology and in the management of known sites under the Special Status Species Programs results in uncertainty whether all sites would be detected and managed. Lack of detection and subsequent losses of highly-localized populations or subpopulations are possible, especially in the southern portion of the species range where multiple genetic lineages have been detected. This, in turn, creates some uncertainty in the analysis of environmental consequences because the inadvertent loss of undetected sites may affect the maintenance of stable, well-distributed populations, particularly in the southern range. Some gaps in the species distribution may result. The management discretion in the Special Status Species Programs is constrained by policy objectives that include maintaining viable populations in habitats throughout their geographic range on National Forest System lands and ensuring that actions do not contribute to the need to list under the Endangered Species Act. The Special Status Species Programs do not have a specified process to improve knowledge of the species that would facilitate adaptive management.

The Agencies' Special Status Species Programs would help provide a reasonable assurance of maintaining stable, well-distributed populations if all occupied sites were managed for site persistence. (In the north, under Alternative 1, identification of high-priority sites for management can achieve this same objective, and the process to identify such sites has been initiated.) Northern and southern groups of the Siskiyou Mountains salamander would have habitat (including known sites) sufficient to support stable populations range-wide, with potential gaps, in the Northwest Forest Plan area under Alternative 2 (and Alternative 3 for the northern population); however, in the south, where the Scott Bar population is known from only three sites, habitat (including known sites) is insufficient to support stable populations in the Northwest Forest Plan area due to stochastic events.

## Summary and Mitigation

For the Shasta, Van Dyke's, Larch Mountain, and the southern population of the Siskiyou Mountains salamander, Alternatives 1 and 3 would achieve stable, well-distributed populations, and would provide specified mechanisms to improve knowledge of the species that would facilitate adaptive management. Some site losses and possibly gaps in distributions of these species are expected under Alternative 3; however, the extent that this would affect stable, well-distributed populations is uncertain. Similarly, Alternative 2 for all four species and Alternative 3 for the northern population of the Siskiyou Mountains salamanders would achieve stable, well-distributed populations; however, there is some uncertainty regarding inadvertent site losses or localized population losses created by discretionary procedures and lack of a specified mechanism to improve knowledge. Under Alternative 1, all of the four salamander species would have habitat (including known sites) sufficient to support stable populations in the Northwest Forest Plan area. Under Alternatives 2 and 3, all four salamander species would have habitat (including known sites) sufficient to support stable populations range-wide, with potential gaps, in the Northwest Forest Plan area. However, under all alternatives, the Scott Bar population of the Siskiyou Mountains salamander would have habitat

(including known sites) insufficient to support stable populations in the Northwest Forest Plan area due to stochastic events.

Mitigation is not proposed for the Scott Bar population of the Siskiyou salamander because the risk to the three known sites is due to stochastic events. Improved knowledge of this population (e.g., distribution, abundance, and habitat) through strategic surveys, under Alternatives 1 and 3 may alter the perception of its risk.

# Late-Successional Birds

## Affected Environment

The Northwest Forest Plan Final SEIS and its supporting documents addressed the habitat needs of 36 bird species which were identified as closely associated with late-successional and old-growth forests (USDA, USDI 1994a). Additional discussion of affected environment is contained in FEMAT and the 2000 Survey and Manage Final SEIS.

## Environmental Consequences

Analyses and conclusions relevant to all alternatives in this SEIS include the Northwest Forest Plan Final SEIS finding that Alternative 9 adequately provides for the majority of these species (USDA, USDI 1994a, Table 3&4-29, p. 3&4-179). These positive assessments for late-successional bird species were due to the provision of Congressionally Reserved Areas, Late-Successional Reserves, Riparian Reserves, watershed analysis, and the retention of green trees, snags, and coarse woody debris in areas of timber harvest in Matrix and Adaptive Management Area land allocations. None of these 36 bird species were included as Survey and Manage species. The conclusion of FEMAT regarding Option 9 and the Northwest Forest Plan Final SEIS regarding Alternative 9 was that these late-successional birds would be stable and well distributed on federally managed lands throughout the Northwest Forest Plan area. There has been no new information or changed circumstances that would alter these conclusions for any of the alternatives.

# Great Gray Owl

## Affected Environment

Under Alternatives 1 and 3, the great gray owl is included in the Survey and Manage Standards and Guidelines. Under Alternative 2, the great gray owl is assumed to be Forest Service Sensitive in Washington and California. The Survey and Manage Standards and Guidelines and the Agencies' Special Status Species Programs have similar strategies that include both pre-disturbance surveys or pre-project clearances and management of known sites.

There has been an increase in the known range of the great gray owl since the Northwest Forest Plan Final SEIS. At the time of the Northwest Forest Plan Final SEIS, the great gray owl was documented as nesting in an area along the central Cascade Mountains of Oregon and in a small area southwest of Medford, Oregon. Published data (Hayward and Verner 1994) and the results of surveys indicate that the range is likely much greater. Great gray owls have been documented over much of the Cascade Range in Oregon and Washington, although nesting has not been confirmed in some of these new areas. In addition to increasing the geographic area of known and expected great gray owl nesting,

recent information indicates that the great gray owl uses elevations below 3000 feet, the level described in protocols (Huff et al. 1996 and USDA, USDI Species Review Panel 1999).

Originally great gray owl locations were classified as either an "Activity Center" or a "Nest Site." An activity center is the point that best describes the focal area of use by territorial owls. It spans from active nest to diurnal location of pair/single to nocturnal location of pair/single. A nest site is the known nest tree and the immediate area surrounding it.

In the 2002 Annual Species Review and in the proposed protocol only an active nest site is considered a great gray owl site. The working definition of a great gray owl site is:

1. A male and female are heard and/or observed in proximity (less than 1/4 mile apart) to each other on the same outing during daylight hours.
2. A male and female are heard and/or observed in proximity (less than 1/4 mile apart) to each other on two separate outings at night within a 2-year timeframe.
3. A male takes prey to a female.
4. A female is seen on a nest.
5. One or both adults are observed with young.
6. Young are observed and can be determined as the correct species by the presence of an adult great gray owl or other means that is defensible.

According to this definition, there are currently 114 great gray owl sites (ISMS database). The great gray owl has a spotty distribution throughout the Northwest Forest Plan area and the current population is considered low.

## Environmental Consequences

Many raptors are protected under the Migratory Bird Treaty Act. Implementation of the Migratory Bird Treaty Act is handled differently by each agency. Generally, the Migratory Bird Treaty Act provides little additional protection for the great gray owl. Raptors, in general, are handled differently by each administrative unit. Protection measures vary from simple buffers of active nest sites to consideration as a Management Indicator Species which requires some analysis of impacts and associated mitigation measures. These management activities will not change under any alternative.

Under Alternatives 1 and 3, this species would be included in Category A which requires management of known sites, pre-disturbance surveys, and strategic surveys. Under Alternative 3 pre-disturbance surveys will be limited to activities in "late-successional habitat." The initial protocol for great gray owls identified key habitat features as mature and old-growth conifer forests, or forest with remnant, older trees or snags. The triggers for protocol were "proposed activities within mature stands (80 years plus) with greater than 60 percent canopy cover (USDA et al. 1993). A review of the protocol in 1996 (Huff et al.), found that great gray owls were using stands younger than 80 years; however, the panel failed to recommend a change in the protocol. Currently, pre-disturbance survey requirements do not differ between Alternatives 1 and 3. Alternative 3 would limit the expansion of pre-disturbance survey requirements that may be proposed in future updates to the protocol. Alternatives 1 and 3 provide sufficient habitat (including known sites) to allow the species to stabilize in a pattern similar to its reference distribution (USDA, USDI 2000a, p. 367).

FEMAT rated the great gray owl as having an 83 percent likelihood of Outcome A (habitat sufficient to be stable, well distributed across federally managed lands), a 17 percent likelihood of habitat sufficient to be stable with significant gaps in its historic distribution on federally managed lands, and a 0 percent likelihood of continued existence only in refugia or extirpation from federally managed lands (USDA et al. 1993,

p. IV-166). Management specific to the great gray owl included protection of nest sites and foraging habitat and pre-disturbance surveys (similar to the Survey and Manage mitigation measure). The ratings for Alternative 9 reflect these mitigation measures. Some alternatives considered in the Northwest Forest Plan Final SEIS did not include Protect and Buffer provisions for the great gray owl, provided for less reserve, and generally provided less favorable habitat conditions (USDA, USDI 1994a, pp. 2-56 through 2-59 and 3&4-178). Even these less protective alternatives had a 100 percent likelihood of providing habitat of sufficient quality, distribution, and abundance to allow the great gray owl populations to stabilize, but with significant gaps in the historic distribution across federally managed lands (USDA, USDI 1994a, p. 3&4-181). Under Alternative 2, the Forest Service' Sensitive Species Program which provides for pre-project clearances and the management of known sites could only provide added benefit for this species.

In summary, management under Alternatives 1, 2, and 3 (Survey and Manage mitigation measure or Sensitive Species Program) adds protection and may help stabilize or improve the distribution and populations of the great gray owl. Under all alternatives, habitat (including known sites) is sufficient to support stable populations in the Northwest Forest Plan area.

# Late-Successional Mammals

## Affected Environment

Additional discussion of affected environment is contained in FEMAT, the Northwest Forest Plan Final SEIS, and the 2000 Survey and Manage Final SEIS.

The Northwest Forest Plan Final SEIS listed 14 mammal species associated with late-successional forests. Important habitat components for these species were dead standing wood, dead down wood, live old-growth trees, and riparian zones (USDA, USDI 1994a, pp. 3&4-182 through 185).

Management of Riparian Reserves, Congressionally Reserved Areas, and Late-Successional Reserves has occurred as anticipated in the Northwest Forest Plan Final SEIS (USDA et al. 2002). The most common activities in Late-Successional Reserves are silvicultural thinning of young stands (not currently of appropriate age and structural characteristics to be classified as late-successional forest) to accelerate the development of late-successional forest structural and functional conditions, and fuels reduction through prescribed fire in drier forest types. Thinning similar to that in the Late-Successional Reserves has occurred in Riparian Reserves where consistent with Aquatic Conservation Strategy objectives.

Although new information is constantly being gained and old information is being refined, there has been no new information or changed circumstances that would alter the basic scientific understanding of these species or that would alter, for these species, the conclusions of the Northwest Forest Plan Final SEIS.

## Environmental Consequences

In addition to the Survey and Manage mitigation measure, the assessments of Option 9 in FEMAT and Alternative 9 in the Northwest Forest Plan Final SEIS did not include seven other mitigations that were added late in the Northwest Forest Plan Final SEIS process including an increase in Riparian Reserves. The increase in the size of Riparian Reserves has implications for improving connectivity for the red tree vole (USDA, USDI 1994a, Appendix J2, p. J2-475).

A conclusion relevant to all alternatives is that Alternative 9 of the Northwest Forest Plan Final SEIS was judged to be among the alternatives most favorable to mammals because it provides the set of allocations and management practices that best produce habitat components for mammals (USDA, USDI 1994a, p. 3&4-183).

The acreage of protected known sites for Survey and Manage species under Alternatives 1 and 3 occurs as scattered, small patches that provide little overall contribution to the maintenance of late-successional forest associated mammal species when compared to the contribution of Congressionally Reserved Areas, Late-Successional Reserves, and Riparian Reserves. If the protection of the known sites was permanent, they could play a role in providing refugia for certain species; however, the protection of these sites varies as new information refines management prescriptions for Survey and Manage species.

The conclusion of the Northwest Forest Plan Final SEIS was that 13 of the 14 species of mammals that were associated with late-successional forest would be stable, well-distributed on federally managed lands throughout the Northwest Forest Plan area without any anticipated contribution from the Survey and Manage Standards and Guidelines. The exception was the Oregon red tree vole. There is no new information or changed circumstances to alter these conclusions for any of the alternatives.

The relatively small difference in habitat acreage between the alternatives resulting from managed known sites is inconsequential to the maintenance of these species compared to the millions of acres of late-successional forest habitat contained in the reserves under all alternatives. Because the differences in habitat between the alternatives are inconsequential, they do not represent "gains" or "losses" of habitat essential to Northwest Forest Plan Final SEIS conclusions (USDA, USDI 2000a, p. 371).

# Oregon Red Tree Vole (*Arborimus longicaudus*)

## Affected Environment

Additional discussion of affected environment is contained in FEMAT, the Northwest Forest Plan Final SEIS (including Appendix J2), and the 2000 Survey and Manage Final SEIS.

The Oregon red tree vole (referred to herein as the red tree vole) is the only mammal included in the Survey and Manage Standards and Guidelines. It is included in Category C under Alternative 1 only in the xeric and northern mesic portion of its biological range (see Figure 3&4-4). Under Alternatives 2 and 3, the red tree vole is assumed to be included in the Agencies' Special Status Species Programs in the northern Coast Range of Oregon. The red tree vole is the most arboreal mammal in the Pacific Northwest (Carey 1996) and is endemic to moist coniferous forests of western Oregon and extreme northwestern California. Its distribution is limited within the Northwest Forest Plan area and is limited throughout its range to coniferous forests. Since the implementation of the Northwest Forest Plan (1994), the known and suspected range of the species has been expanded by approximately 3 million acres in southern Oregon and northern California (USDA, USDI 2000a, p. 375). The red tree vole's geographic range includes approximately 16.3 million acres across all land ownerships. Federally managed lands provide important habitat. More than 70 percent of known sites and 47 percent of the known and suspected range is on federally managed lands (USDA, USDI Species Review Panel 2000). Red tree voles are believed to have limited dispersal capability (USDA, USDI 2000a, p. 377), even there dispersal capabilities are virtually unknown, and there is no data on their ability to disperse through forests of different age classes. The role of young forests in the population dynamics of red tree voles is not well understood (USDA, USDI 2000a, p. 378).

**Figure 3&4-4**. Red Tree Vole Biological Zones.

In xeric (dry) forests of the Klamath National Forest in northern California and the dry conifer forest surrounding the Rogue and Illinois Valleys in southern Oregon, there is a poor understanding of red tree vole distribution and habitat relationships. Red tree vole habitat becomes more isolated with progressively less connectivity towards the edges of this zone where it intergrades with oak woodlands (USDA, USDI 2000a, p. 384).

A subspecies of the red tree vole (*Arborimus longicaudus silvicolus)* was believed to occur in the northern Coast Range of Oregon, primarily on nonfederal lands (USDA, USDI, 1994a, p. 3&4-185). A recent genetic study (Bellinger et al. in prep.) found no clear difference between *Arborimus longicaudus silvicolus* and *Arborimus longicaudus longicaudus*, which brings into question the validity of *Arborimus longicaudus silvicolus* as a subspecies. However, the Oregon Natural Heritage Information Center ranked *Arborimus longicaudus silvicolus* as a subspecies and indicated there are significant threats and low population numbers. Since the Agencies' Special Status Species Programs use Heritage rankings, in part, to determine species additions to their lists, under Alternatives 2 and 3, the northern Coast Range portion of the red tree vole's range would be added to the Special Status Species Programs as previously mentioned.

That portion of the red tree vole's range located in the Oregon Coast Range north of Highway 20 running between Newport and Corvallis and west of the non-forested Willamette Valley contains limited federally managed land. Federally managed lands in this area are fragmented and geographically isolated, and include portions of the western half of the Salem District BLM and all of the Hebo Ranger District of the Siuslaw National Forest. There are approximately 25 known sites in this portion of the species range, many of them located on private or state lands. Although the northern Coast Range is primarily nonfederal land, some historic red tree vole populations are known from scattered locations on federally managed lands. Over 93 percent of federally managed lands in the northern Coast Range are Late-Successional Reserve or Late-Successional Reserve-like in their management (USDA, USDI, 2000a, p. 391).

## Environmental Consequences

Under Alternative 1, the red tree vole is included in Category C in the xeric and northern mesic portion of its range which requires management of high-priority sites, pre-disturbance surveys, and strategic surveys. Previously, the red tree vole had also been included as a Category D species in the central portion of its range. The red tree vole, in most of the central portion of its range, was removed from Survey and Manage during the 2003 Annual Species Review. The central portion of the red tree vole's range included the contiguous core detection area: Siuslaw National Forest (Mapleton Ranger District); Roseburg District BLM; Umpqua National Forest (North Umpqua Ranger District); Eugene District BLM (Coast Range Resource Area); Medford District BLM (Glendale Resource Area) within Douglas County; Coos Bay District BLM within Coos and Douglas County.

In the portion of the red tree vole's range located on the Klamath National Forest in northern California and the dry conifer forest surrounding the Rogue and Illinois Valleys in southern Oregon, there is insufficient information to determine how any alternative would affect distribution and stability (USDA, USDI 2000a, p. 391).

The red tree vole received a rating for Outcomes A, B, C, and D of 73-25-2-0 by the FEMAT assessment panel (a detailed explanation of these ratings is included early in this chapter). As a result of this rating, the red tree vole failed to pass the screen for additional species analysis in the Northwest Forest Plan Final SEIS (less than 80 percent Outcome A, the likelihood of stable, well distributed across federally managed lands). However, the panel judged that there was a 0 percent likelihood that this species would be extirpated from federally managed lands, a 2 percent likelihood that the habitat would

only allow continued species existence in refugia, and a 73 percent likelihood that the population of this species would be stable, well distributed across federally managed lands in the Northwest Forest Plan area (USDA, USDI 1994a, Appendix J2).

The red tree vole failed to pass the screens because of its apparent association with old-growth forest, its limited dispersal capabilities, and general concern about the extent to which information is lacking on its distribution, habitat requirements, and population status. The species rating reflected the concern whether provisions of Alternative 9 in the Northwest Forest Plan Final SEIS would adequately provide for connectivity among late-successional patches for dispersal and gene flow. Although evidence cited in the Survey and Manage Final SEIS (USDA, USDI 2000a, p. 386) clearly indicates that red tree voles are most abundant in older forests or in forests with remnant old trees, there is still uncertainty about the role of young forests in the population ecology of red tree voles (USDA, USDI 2000a, p. 378). Red tree voles begin to reinvade young stands when the trees become big enough to support arboreal nests; however, there is considerable uncertainty regarding the ability of tree voles to persist in landscapes dominated by young forests. Wildlife biologists have found many red tree voles and their nests in young stands, including many nests occupied by breeding females (Howell 1926, Clifton 1960, Maser 1965, and ISMS database). It is unclear whether red tree voles in these situations can persist over long periods of time or are ephemeral populations that contribute little to overall population persistence (USDA, USDI 2000a, p. 378). Some (e.g. Aubry et al. 1991) have suggested that young forests do not provide suitable habitat for tree voles. Repeated clear-cutting or thinning at short intervals will isolate and eventually eliminate tree vole populations (Maser et al. 1981 and Carey 1991).

Mitigation identified in the Northwest Forest Plan Final SEIS Appendix J2 and adopted in its Record of Decision was judged to raise the rating under Outcome A, stable, well-distributed across federally managed lands, above 80 percent (USDA, USDI 1994a, Appendix J2, p. J2-55). This mitigation included the Survey and Manage Standards and Guidelines and the application of Riparian Reserve Scenario 1. There would be a 0 percent likelihood of extirpation from federally managed lands (USDA, USDI 1994a, pp. 3&4-183 and J2-473 through 475). Alternative 1 would allow the species to stabilize in a pattern similar to its reference distribution except in the northern Coast Range (USDA, USDI 2000a, pp. 390-391).

Conclusions in the Northwest Forest Plan Final SEIS relevant to Alternatives 2 and 3, include "... the Late-Successional Reserves will support large populations, and connectivity between reserves will be provided by Riparian Reserves, and the additional late-successional patches in the matrix" (USDA, USDI 1994a, Appendix J2, pp. J2-474 through 475). Implementation of Riparian Reserve Scenario 1, which was added to Alternative 9 in the Northwest Forest Plan Record of Decision, was identified as "a key standard and guideline addition for ... red tree vole" (USDA, USDI 1994a, p. 3&4-183). Under Alternative 9 (before the addition of the Survey and Manage mitigation measure) the FEMAT panel judged that there would be a 0 percent likelihood of extirpation from federally managed lands, a 2 percent likelihood that the species would be restricted to refugia, a 25 percent likelihood of it being locally restricted, and a 73 percent likelihood that the population of this species would be stable, well-distributed across federally managed land in the Northwest Forest Plan area (USDA, USDI 1994a, Table 3&4-30, p. 3&4-184; and Appendix J2, pp. J2-473 through 475). Under Alternatives 2 and 3, the red tree vole would be included in the Agencies' Special Status Species Programs in the northern Coast Range of Oregon.

Cumulative effects assessment in the Northwest Forest Plan Final SEIS disclosed that federally managed lands would likely provide for large, well-distributed populations of the species, except possibly in the northern Coast Range of Oregon (USDA, USDI, 1994a, Appendix J2, p. J2-474). Red tree voles may be eliminated from significant portions of their historic range, particularly in the northern Oregon Coast Range and foothills

of the Willamette Valley, where there is little federally managed land. Few nests have been located on federally managed lands in the northern Coast Range in recent years, but the presence of tree vole skulls in pellets of spotted owls indicates that tree voles are still present on some federally managed lands in this region (Forsman, unpublished data). Although 93 percent of federally managed lands in the northern Coast Range are in Late-Successional Reserves or Late-Successional Reserve-like in their management, land management practices on nonfederal lands reduces the potential connectivity between these blocks of federally managed lands (USDA, USDI, 2000a, p. 391). Riparian Reserves and Matrix Standards and Guidelines provide additional levels of protection for red tree voles on federally managed lands, but do not eliminate the high risk that there is insufficient habitat in this particular area. Since there is so little federally managed land and so few animals here, every site is critical for persistence. In this portion of its range under Alternative 1, the red tree vole would be included in Survey and Manage as Category C which requires pre-disturbance surveys, management of high-priority sites and strategic surveys. In this portion of its range under Alternatives 2 and 3, it would be included in the Agencies' Special Status Species Programs.

There are few known sites, little federally managed land, and limited connectivity in this area. This would result in habitat (including known sites) insufficient to support stable populations in this portion of its range under all alternatives.

## Summary and Mitigation

In that portion of the red tree vole's range located on the Klamath National Forest in northern California and the dry conifer forest surrounding the Rogue and Illinois Valleys in southern Oregon, there is insufficient information to determine how any alternative would affect distribution and stability (USDA, USDI 2000a, p. 391).

Under Alternative 1, the Survey and Manage Standards and Guidelines and Riparian Reserve Scenario 1 would raise the red tree vole rating to above 80 percent likelihood of sufficient habitat to provide for stable, well-distributed populations across federally managed land and a 0 percent likelihood of extirpation (USDA, USDI 1994a, Appendix J2, p. J2-475). Alternative 1 would allow the species to stabilize in a pattern similar to its reference distribution except in the northern Coast Range of Oregon (USDA, USDI 2000a, pp. 390-391). Habitat (including known sites) is sufficient to support stable populations range-wide in the Northwest Forest Plan area, although there is insufficient habitat to support stable populations in the northern Coast Range of Oregon.

Under Alternatives 2 and 3, with the inclusion of Riparian Reserve Scenario 1, the rating for the red tree vole was improved by an undetermined amount above 73 percent likelihood of sufficient habitat to provide for stable, well-distributed populations across federally managed lands and a 0 percent likelihood of extirpation in the Northwest Forest Plan area. In addition, the red tree vole is included in the Agencies' Special Status Species Programs in the northern Coast Range of Oregon. Habitat (including known sites) is sufficient to support stable populations range-wide in the Northwest Forest Plan area, although there is insufficient habitat to support stable populations in the northern Coast Range of Oregon.

Mitigation is not proposed in the northern Coast Range of Oregon because the red tree vole is included in the Survey and Manage mitigation measure under Alternative 1 and would be included in the Agencies' Special Status Species Programs under Alternatives 2 and 3.

# Species Associated with Early-Successional Forest

## Affected Environment

The Northwest Forest Plan was developed to address federal land management related to late-successional forest associated species. Despite this emphasis, the Northwest Forest Plan Final SEIS, the 2000 Survey and Manage Final SEIS, and this SEIS examined the expected effects of the alternatives on early-successional forest associated species. Early-successional forest associated species, as a group, are generally widespread and occur throughout the Northwest Forest Plan area. Individual species may be distributed in a small geographic range, and occur in a more limited area within that general geographic range. These species are adapted to a variety of early-successional habitats. These species are assumed stable within the planning area (USDA, USDI 2000a, p. 396).

The assumed availability on a landscape scale of early-successional habitat is unlikely to substantially differ from that occurring under historic natural disturbance processes. The Northwest Forest Plan was found acceptable for sustaining adequate populations of species dependent upon young-forest habitat (USDA, USDI 2000a, p. 396).

## Environmental Consequences

The primary sources of early-successional habitat are timber harvest and natural disturbance processes. The Northwest Forest Plan anticipated an annual harvest level of 958 million board feet (MMBF) of timber. Actual harvest levels have been less (see Timber Harvest section). Under Alternatives 2 and 3, known sites for some Survey and Manage species would continue to be managed through the Special Status Species Programs.

Relevant to Alternatives 1 and 3, the 2000 Final SEIS concluded that Survey and Manage Standards and Guidelines would not result in significant changes to the abundance and distribution of species associated with early-successional habitat that were anticipated in the Northwest Forest Plan SEIS. This is due to the large extent of early-successional habitat currently available, and the reasonable expectation that federally managed and nonfederal lands will continue to be harvested and natural disturbances will continue throughout the Northwest Forest Plan area (USDA, USDI 2000a, p. 397). Because these assumptions apply to all alternatives, under all alternatives, early-successional species are expected to remain stable and distributed in a pattern similar to their historic distribution within the Northwest Forest Plan area.

# Threatened and Endangered Species

This section discusses the expected effects to terrestrial and inland aquatic species listed as threatened, endangered, or proposed for listing under the Endangered Species Act of 1973, as amended. See the Aquatic Ecosystem section for a discussion of fish species in the Northwest Forest Plan area listed as threatened or endangered. Refer to Appendix 5 for the Forest Service' Biological Evaluation which includes effects to species currently included in the Sensitive Species Programs in Regions 5 (California) and 6 (Washington and Oregon), as well as a discussion of BLM Special Status Species. The Biological Evaluation also includes an in-depth analysis of effects to federally listed species.

Effects to listed species associated with late-successional and old-growth forests in the Northwest Forest Plan area (i.e. the action area) are discussed in detail.

# Northern Spotted Owl (*Strix occidentalis caurina*)

## Affected Environment

Management of the northern spotted owl and its habitat on federally managed lands was an important consideration in the design of the Northwest Forest Plan. This species received extensive attention in the Northwest Forest Plan Final SEIS and its supporting documents. The Biological Opinion for the Draft of the Northwest Forest Plan concluded:

> "*…the adoption of Alternative 9, as modified, is not likely to jeopardize the continued existence of any listed species, or result in the destruction or adverse modification of any designated critical habitat for those species. The late-successional and riparian reserve features of Alternative 9 are particularly important contributions to the conservation of the spotted owl and marbled murrelet*" (USDA, USDI 1994a, p. 3, Appendix G).

The Survey and Manage mitigation measure was not a component of the Northwest Forest Plan Draft SEIS. The addition of the Survey and Manage mitigation measure would have an insignificant effect on the maintenance of spotted owl populations (USDA, USDI 2000a, p. 398). This was due to the small scale and isolated nature of the resultant late-successional and old-growth forest areas outside of reserves.

The Northwest Forest Plan concluded that the anticipated rate of timber harvest in Matrix and Adaptive Management Areas would occur in a manner that would allow the habitat to recover and spotted owl populations to stabilize in the Late-Successional Reserves and Congressionally Reserved Areas.

The 2000 Final SEIS concluded that neither the original basis for the assessment nor the conclusion of the effects to the northern spotted owl as presented in the Northwest Forest Plan would be affected by the Survey and Manage Standards and Guidelines.

## Environmental Consequences

Reserves protect about 80 percent of the federally managed lands within the Northwest Forest Plan area. Eighty-six percent of the remaining late-successional and old-growth forests are in these reserves. The remaining 14 percent is available for regularly scheduled timber harvest. The Northwest Forest Plan projected that less than 2.5 percent of the late-successional forest would be harvested per decade. Actual harvest has been well below that rate. The reduced rate of harvest is due primarily to greater than expected riparian reserve coverage, the effects of the Survey and Manage mitigation measure, and legal challenges. Harvest of late-successional forest under any alternative would not exceed the rate anticipated in the Northwest Forest Plan Final SEIS.

Neither the No-Action Alternative nor either of the two action alternatives will affect the original basis for the assessment or the conclusions of the effects to spotted owls as presented in the Northwest Forest Plan Final SEIS. Congressionally Reserved Areas and Late-Successional Reserves will continue to be managed for late-successional habitat in the Northwest Forest Plan area and provide for spotted owl breeding clusters. Because Congressionally Reserved Areas, Late-Successional Reserves, and the Riparian Reserve system are intertwined or in close proximity, adequate dispersal habitat for spotted owls will continue to be provided. The potential difference between alternatives has no effect on the spotted owl habitat management strategy because it results in only negligible and minor losses in the amount of habitat. The Northwest Forest Plan Final SEIS assumptions and conclusions relative to a spotted owl 4(d) rule and critical habitat remain valid as described above. Removal of the Survey and Manage Standards and Guidelines would result in the return of Survey and Manage known site management areas to the underlying management allocations. Most of the Survey and Manage species

known sites consist of areas generally 1/2 to 2 acres in size. These size areas (given their scattered distribution across the Northwest Forest Plan area) do not generally provide any benefit to spotted owls. However, one species, the red tree vole, requires site management of 10 acres or more. The return of red tree vole known sites to the underlying management allocations may effect spotted owl, as the size of these areas may provide some negligible beneficial effect to foraging owls, and provide for structural diversity during adjacent stand development. Due to the small size and dispersed array of these areas, Alternative 2 and 3 would result in a *may effect, not likely to adversely effect* for northern spotted owl and its critical habitat.

## Marbled Murrelet (*Brachyramphus marmorata*)

### Affected Environment

Management of the marbled murrelet and its habitat on federally managed lands was an important consideration in the design of the Northwest Forest Plan. This species received extensive attention in the Northwest Forest Plan Final SEIS and its supporting documents. The Biological Opinion for the Draft of the Northwest Forest Plan concluded:

> "*…the adoption of Alternative 9, as modified, is not likely to jeopardize the continued existence of any listed species, or result in the destruction or adverse modification of any designated critical habitat for those species. The late-successional and riparian reserve features of Alternative 9 are particularly important contributions to the conservation of the spotted owl and marbled murrelet*" (USDA, USDI 1994a, p. 3, Appendix G).

The management strategy for marbled murrelets in the Northwest Forest Plan includes two primary components: (1) protection and development of marbled murrelet nesting habitat inside the large reserves near the coast, and (2) retention of all current and future known marbled murrelet nest sites in all land allocations.

### Environmental Consequences

Under Alternative 1, the level of protection for currently occupied marbled murrelet habitat would not be changed; all known and future nest sites would be protected.

The primary difference between the two action alternatives would be the number of species removed from the Survey and Manage Program and the subsequent acres removed from managed known site direction, much of which is outside the range of the marbled murrelet. In addition, much of the range of this species is protected by large block Late-Successional Reserves. Despite eliminating protection for Survey and Manage sites in the future, the level of protection for habitat currently occupied by marbled murrelet would not be reduced, since marbled murrelet surveys and habitat protection measures would remain in place regardless of Survey and Manage species locations. All nest sites located would be protected under existing Northwest Forest Plan Standards and Guidelines for the murrelet. The determination for all alternatives is *no effect* for marbled murrelet and its critical habitat.

## Bald Eagle (*Halieatus leucocephalus*)

### Affected Environment

The Agencies survey extensively for bald eagles. Management of the bald eagle includes preparation of site-specific management plans and providing protection zones and management areas, as needed, to the species and its habitat.

### Environmental Consequences

All alternatives in this SEIS would have similar effects on bald eagle habitat management. Removal of species from Survey and Manage will not change the environmental baseline for the bald eagle or result in changes to impacts to this species that were not anticipated in the original analysis of the Northwest Forest Plan and subsequent analyses. The current requirements to conduct specific surveys and develop site management plans for bald eagles greatly reduces any potential effect from changes in the Survey and Manage Standards and Guidelines. None of the alternatives in this SEIS will affect the original basis for the assessment of the effects to bald eagles and conclusions in the Northwest Forest Plan Final SEIS. Therefore, for the three alternatives, the determination is *no effect* for bald eagles. No critical habitat has been designated for bald eagles.

## Canada Lynx (*Lynx canadensis*)

### Affected Environment

The Canada lynx was listed by the U.S. Fish and Wildlife Service as a threatened species within the conterminous United States, effective April 24, 2000. Concurrent with the listing process, a national interagency Lynx Conservation Assessment and Strategy was developed to provide a consistent and effective approach to conservation of Canada lynx on federally managed land in the conterminous United States. This conservation agreement was entered into by the Forest Service, BLM, and the U.S. Fish and Wildlife Service. The Forest Service and BLM agreed to consider conservation measures in the Lynx Conservation Assessment and Strategy when designing and implementing activities that might affect lynx.

### Environmental Consequences

Removal of species from Survey and Manage will not change the environmental baseline for the lynx or result in changes to impacts to this species that were not anticipated in the analysis of the Northwest Forest Plan and subsequent analyses. Future activities including, but not limited to, timber harvest, road construction, or application of prescribed fire, might be proposed on these "returned" sites, but would be evaluated for their direct and indirect effects to lynx under the auspices of the Endangered Species Act. All alternatives are expected to have *no effect* on the Canada lynx. No critical habitat has been designated for lynx.

## Gray Wolf (*Canis lupus*)

### Affected Environment

The range of the gray wolf includes portions of the Northwest Forest Plan area, including the northern Cascade Range in Washington. Gray wolves are not closely associated with late-successional forest, but use a variety of open and forested habitat that support deer, elk, and other species that are their primary prey, as well as areas supporting small mammal populations.

### Environmental Consequences

All alternatives would have nearly identical effects on gray wolf habitat. Because gray wolves are not dependent on late-successional forest, loss of the small, isolated patches of late-successional forest that would be managed under the Survey and Manage Standards and Guidelines would have no effect on habitat for this species. None of the alternatives

would affect the original basis for the assessment of the effects and conclusions in the Northwest Forest Plan Final SEIS. All alternatives are expected to have *no effect* on the gray wolf.

## Grizzly Bear (*Ursus arctos*)

### Affected Environment

The range of the threatened grizzly bear includes portions of the Northwest Forest Plan area, including the National Forests of the Cascade Range in Washington. While grizzly bears are not closely associated with late-successional forests, they use a variety of habitat, including forested areas for hiding and cover.

### Environmental Consequences

All alternatives would have nearly identical effects on grizzly bear habitat. Because grizzly bears are not dependent on late-successional forest, the small, isolated patches of late-successional forest that would be managed under the Survey and Manage Standards and Guidelines would have no effect on habitat for this species. None of the alternatives would affect the original basis for the assessment of the effects and conclusions in the Northwest Forest Plan Final SEIS. All alternatives are expected to have *no effect* on the grizzly bear.

## Listed or Proposed Plant Species Associated with Late-Successional Forests

There are no species in the Northwest Forest Plan area that fit into this category.

## Other Species

The following terrestrial or inland-aquatic listed species occur within the Northwest Forest Plan area, but are not associated with late-successional and old-growth forests. The Survey and Manage Standards and Guidelines were developed to address concerns for species associated with late-successional forest. Any habitat protected by the Survey and Manage Standards and Guidelines is likely to be late-successional conifer forest. Therefore, any changes to the Survey and Manage Standards and Guidelines are not expected to affect these species or the conclusions of the Northwest Forest Plan Final SEIS.

**Vascular Plants**

| | |
|---|---|
| Sonoma alopecurus | *Alopecurus aequalis* var. *sonomensis* |
| MacDonald's rockcress | *Arabis macdonaldiana* |
| Marsh sandwort | *Arenaria paludicola* |
| Applegate's milkvetch | *Astragalus applegatei* |
| Clara Hunt's milkvetch | *Astragalus clarianus* |
| Tiburon paintbrush | *Castilleja affinis* ssp. *neglecta* |
| Golden Indian paintbrush | *Castilleja levisecta* |
| Howell's spineflower | *Chorizanthe howellii* |
| Sonoma spineflower | *Chorizanthe valida* |
| Baker's larkspur | *Delphinium bakeri* |
| Yellow larkspur | *Delphinium luteum* |
| Willamette daisy | *Erigeron decumbens* var. *decumbens* |
| Menzies' wallflower | *Erysimum menziesii* |
| Gentner's mission-bells | *Fritillaria gentneri* |

| | |
|---|---|
| Marin dwarf-flax | *Hesperolinon congestum* |
| Showy stickweed | *Horkelia venusta* |
| Water howellia | *Howellia aquatilis* |
| Burke's goldfields | *Lasthenia burkei* |
| Contra costa goldfields | *Lasthenia cojugens* |
| Beach layia | *Layia carnosa* |
| Western lily | *Lilium ocidentale* |
| Large-flowered wooly meadowfoam | *Limnanthes floccose* spp. *grandiflora* |
| Bradshaw's lomatium | *Lomatium bradshawii* |
| Agate desert-parsley | *Lomatium cookii* |
| Kincaid's lupine | *Lupinus sulphereus* var. *kincaidii* |
| Pt. Reyes clover lupine | *Lupinus tidestromii* var. *layneae* |
| Tidestrom's clover lupine | *Lupinus tidestromii* var. *tidestromii* |
| Many-flowered navarretia | *Navarretia leucocephala* ssp. *plieantha* |
| Slender Orcutt grass | *Orcuttia tenuis* |
| Yreka phlox | *Phlox hirsuta* |
| Hairy (rough) popcorn flower | *Plagiobothrys hirtus* |
| Calistoga allocarya | *Plagiobothrys strictus* |
| Napa bluegrass | *Poa napensis* |
| Nelson's checkermallow | *Sidalcea nelsoniana* |
| Wenatchee Mountain checkermallow | *Sidalcea oregana* var. *calva* |
| Kenwood Marsh checkermallow | *Sidalcea oregana* var. *valida* |
| Ladies'-tresses | *Spiranthes diluvialus* |
| Kneeland Prairie penny-cress | *Thlaspi californicum* (*montanum* var. *californicum*) |
| Showy Indian clover | *Trifolium amoenum* |

**Invertebrates**

| | |
|---|---|
| Conservancy fairy shrimp | *Branchinecta conservatio* |
| Vernal pool fairy shrimp | *Branchinecta lynchi* |
| Valley elderberry longhorn beetle | *Desmocerus californicus dimorphus* |
| Mission blue butterfly | *Icaricia icarioides missionensis* |
| Fender's blue butterfly | *Icaricia icarioides fenderi* |
| San Bruno elfin butterfly | *Incisalia mossii bayensis* |
| Vernal pool tadpole shrimp | *Lepidurus packardi* |
| Lotis blue butterfly | *Lycaeides argyrognomon lotis* |
| Shasta (placid) crayfish | *Pacifastacus fortis* |
| Callippe silverspot butterfly | *Speyeria callippe callippe* |
| Behren's silverspot butterfly | *Speyeria zerene behrensii* |
| Oregon silverspot butterfly | *Speyeria zerene hippolyta* |
| Myrtle's silverspot butterfly | *Speyeria zerene myrtleae* |
| California freshwater shrimp | *Syncaris pacifica* |

**Fish**

| | |
|---|---|
| Tidewater goby | *Eucyclogobius newberryi* |
| Delta smelt | *Hypomesus transpacificus* |
| Oregon chub | *Oregonichthys* (*Hybopsis*) *crameri* |

**Birds**

| | |
|---|---|
| Western snowy plover (coastal populations) | *Charadrius alexandrinus nivosus* |
| Brown pelican | *Pelcanus occidentalis* |
| California clapper rail | *Rallus longirostris obsoletus* |

**Mammals**

| | |
|---|---|
| Point Arena mountain beaver | *Aplodontia rufa nigra* |
| Steller's (northern) sea lion | *Eumetopias jubatus* |
| Columbian white-tailed deer | *Odocoileus virginianus leucurus* |
| Salt marsh harvest mouse | *Reithrodontomys raviventris* |

The Agencies survey for listed and proposed species in the vicinity of proposed projects. These surveys are designed to have a high likelihood of locating populations of such species irrespective of whether surveys are also done for Survey and Manage species. Since surveys for listed or proposed species will discover and subsequently protect these species with or without the Survey and Manage mitigation measure, there would be no difference between the alternatives.

All projects proposed on BLM or Forest Service administered lands must meet the Aquatic Conservation Strategy objectives of the Northwest Forest Plan. As proposed projects are designed and analyzed for effects to listed fish, needs of the fish species and habitat elements required to meet Aquatic Conservation Strategy objectives will be identified. Alternatives 2 and 3 would not alter this assessment process; therefore, there would be no change in effect as a result of the removal or modification of the Survey and Manage Standards and Guidelines when compared to Alternative 1.

## California red-legged frog (*Rana aurora draytonii*)

### Affected Environment

The most important habitat for California red-legged frog is aquatic and riparian. This species is known to sometimes move through moist forest habitat during dispersal. Within the Northwest Forest Plan area, the listed range of the species may include some portions of the Mendocino and Shasta-Trinity National Forests and the BLM Redding Resource Area. This area has poor quality potential habitat (lack of narrow, incised channels and pools, dry chaparral/knobcone pine habitat, etc.). Few historical sightings for this species have been recorded in its limited potential range in the Northwest Forest Plan area. The Recovery Plan for the California red-legged frog was released on May 28, 2002. The Recovery Plan identified reasons for decline and threats to survival. It established Core Areas for recovery of the species, none of which are within the Northwest Forest Plan area.

### Environmental Consequences

Under all alternatives, the Agencies would survey for listed species in the vicinity of proposed projects. These surveys are designed to have a high likelihood of locating populations of California red-legged frogs irrespective of whether surveys are also done for Survey and Manage species. In addition, the species habitat will be provided a high level of protection through implementation of Aquatic Conservation Strategy objectives and the reserve land allocations. None of the areas identified for recovery of the species are within the Northwest Forest Plan area. Implementation of any alternative will have *no effect* on the California red-legged frog or its critical habitat.

# Costs of Management

In the 2000 Survey and Manage Final SEIS (p. 417), the Agencies estimated that the Survey and Manage Program would cost approximately $28.6 million per year based on implementation of the Northwest Forest Plan. This total includes $9.8 million for strategic surveys and other regional-level tasks such as the maintenance of databases and the development of management recommendations. The total also includes $18.8 million for pre-disturbance surveys that would occur prior to activities such as timber sales ($8.2 million) and prescribed burning ($10.3 million). These estimates were based on predicted levels of timber sales, prescribed burning projects, and other habitat-disturbing activities.

Since 2000, the actual levels of habitat-disturbing activities have fallen short of that anticipated. As a result, the actual amount spent in Fiscal Year 2002 for the Survey and Manage Program was $16 million.

## Comparison of Alternatives

These cost estimates are presented for comparative purposes only. Actual implementation costs will vary. Costs are based on implementing the Northwest Forest Plan.

It is assumed for all alternatives that eligible species would be added to the Agencies' Special Status Species Programs. These programs cover entire states, so species would be added outside the Northwest Forest Plan area. The costs outside the Northwest Forest Plan area were not calculated; however, they would be the same under all alternatives.

### Alternative 1

Alternative 1 would cost approximately $25.9 million per year to implement. This cost is less than predicted in 2000 because actual program management and strategic survey costs from Fiscal Year 2003 were used. These costs have had a downward trend over the past 3 years. This estimated cost also reflects a savings accomplished by the removal of some species from Survey and Manage and elimination of requirements to conduct pre-disturbance surveys for some species through the Annual Species Reviews. There were increased costs in pre-disturbance surveys compared to the 2000 Survey and Manage Final SEIS because acres thinned through the timber program are no longer considered complete fuel reduction projects adding 50,000 acres per year to the fuel treatment program. The total cost of Alternative 1 includes $5.8 million for pre-disturbance surveys for timber; $12.6 million for pre-disturbance surveys for fuel treatment; $0.3 million for pre-disturbance surveys for other activities; and $7.1 million for Strategic Surveys, program management, training, data management, and other costs. Totals are not exact due to rounding. Pre-disturbance surveys costs are estimated at $69.86 per acre.

The Survey and Manage Final SEIS (USDA, USDI 2000a, p. 419) estimated that long-term (6-10 years) costs would decline by approximately 41 percent as strategic surveys are completed and recommendations are made for management of high-priority sites. It is assumed that this trend would apply to Alternative 1.

### Alternative 2

Alternative 2 would cost approximately $10 million per year to implement. The total cost of Alternative 2 includes $2.6 million for pre-project surveys for timber; $5.4 million for pre-project surveys for fuel treatments; $0.1 million for pre-project surveys for other activities; and $1.9 million for general surveys, program management, conservation strategies, training, data management, and other costs. Pre-project surveys would cost approximately $30.39 per acre. As with Alternative 1, costs may decline over time as information is gained on the species in the Special Status Species Programs. It is estimated that 5 percent savings would accrue over time as knowledge is gained about species.

Alternative 2 differs from Alternative 1 in several key ways that affect cost.

- Reduced pre-project surveys
  - Eleven species that would have pre-disturbance surveys with Alternative 1 are assumed not to be included in the Agencies' Special Status Species Programs under Alternative 2. This includes one lichen, one vascular plant, and nine mollusks. There would be little or no cost saving because these taxa groups would have other species included in the Agencies' Species Status Species Programs that would still receive surveys. The red tree vole is included in the Agencies' Special Status Species Programs under Alternative 2 in a small part of its range (the northern Coast Range of Oregon). Elsewhere, the red tree vole would not be included in the Special Status Species Programs. This would result in cost savings since surveys would no longer

be completed outside the area where it is included in the Special Status Species Programs. Unlike the other species noted above, the red tree vole receives its own survey.

- Many other species would only be surveyed in a portion of their range under Alternative 2. For example, a species may be added to the Special Status Species list for BLM managed lands in California, but not for nearby National Forest System lands.
- For Sensitive Species that are currently in Survey and Manage Category A or C, pre-project clearances can include various tools besides surveys (see description of Alternative 2 in Chapter 2). Pre-project clearances will likely include surveys for non-fungal botanical species due to the lack of large-scale analysis tools for many of these species. In addition, many of the botanical taxa are relatively easy to survey for, so surveys are a useful and efficient tool for assessing potential project impacts. However, some of these species are more common, so there would likely be some use of tools other than surveys for more common species. It is assumed surveys would be completed for non-fungal botanical species 85 percent of the time. Pre-project clearances for fungi would normally use other tools (than surveys) due to the infeasibility of surveys. Most of the fungi are unpredictable fruiters, and may not be discovered even after 5 years of survey effort. In addition, the time period in which surveys may be effective can be limited. Larger-scale analysis tools are a more efficient and effective means of assessing project impacts. It is assumed there would be no survey cost for fungi species, except for one fungus. This fungus can be identified during surveys and the cost of surveys for this species is included with other botanical surveys. For wildlife species, pre-project clearances will likely include tools other than surveys most of the time due to the complexity of survey methodology. Where the species has specific habitat parameters, habitat avoidance during project design is an effective way of eliminating survey need. Habitat avoidance will likely occur for many of the amphibians and some of the mollusks, where more refined definitions of habitat are known. Where a species has more general habitat characteristics, larger-scale tools, coupled with some surveys, may be used. In other cases, unsurveyed habitat may be assumed to be occupied by the species, and the impacts of the project upon that habitat assessed, by looking at overall impact to habitat. It is assumed surveys would be completed for wildlife species 25 percent of the time.
- For the Bureau Assessment category, pre-project clearances are completed subject to limitations in funding or positions. It is likely that methods other than field surveys would be used for these clearances due to funding and staffing limitations.

- Increased pre-project surveys
  - There are 98 species that would be added to the Special Status Species Programs under Alternative 2 that do not currently require pre-disturbance surveys (because they are in Categories B, D, E, or F). With Alternative 2, local land managers would decide what level of survey, if any, to apply to these species. It is assumed, for the purpose of cost analysis, that there would be no increases in pre-project surveys because the same logic used with Alternative 1 to determine that pre-disturbance surveys were not needed, would be used by local managers. Similarly, where species have split ranges under Alternative 1 that limit surveys to only portions of their range, it is assumed that the same logic would apply to Alternative 2.

- Reduced strategic surveys
  - With Alternative 2, there would be general surveys where needed to determine species distribution and to identify trends, but the cost of these general surveys would be far less than strategic surveys under Alternative 1.
  - With Alternative 2, arthropod studies would be eliminated because these functional groups are not included in the Special Status Species Programs.

- Miscellaneous costs and overhead
  - It is assumed that other program management costs such as maintaining databases (similar to ISMS), updating survey protocols and field guides, developing conservation strategies, and overhead would occur with Alternative 2, but at a reduced level when compared to Alternative 1. This reduction would be a result of elimination of the large overhead in place to administer the Survey and Manage Program, while existing overhead for the Special Status Species Programs would suffice with some additions to accommodate increased workload. Some costs might shift from regional to local levels. For example, at local units, environmental assessments and biological evaluations would require additional documentation to incorporate the species added to Special Status Species Programs.

Measures could be used to mitigate the adverse environmental impacts for species under Alternative 2. Mitigation of these effects under Alternative 2 could include management of known sites not protected by reserves or the Agencies' Special Status Species Programs. In addition, mitigation for some of these species could include pre-project clearances. The cost of possible mitigation under Alternative 2 for species would be $0.6 million.

## Alternative 3

Alternative 3 would cost approximately $11.8 million per year to implement. The total cost of Alternative 3 includes $1.9 million for pre-disturbance surveys for timber; $3.8 million for pre-disturbance surveys for fuel treatments; $0.2 million for pre-disturbance surveys for other activities; $5.9 million for general surveys, program management, training, data management, and other costs. Pre-disturbance surveys would cost approximately $63.43 per acre.

Alternative 3 differs from Alternative 1 in several key ways that affect cost.

- Reduced pre-disturbance surveys
  - Pre-disturbance surveys would not be conducted in non-late-successional and non-old-growth stands. For timber projects, this amounts to an estimated reduction of 50,000 acres of surveys per year (these are the acres involved in thinning projects). For fuel treatment projects, it is estimated that two-thirds of all projects would not need pre-disturbance surveys.
  - Seven Category C species would be eliminated from the Survey and Manage mitigation measure; six of these species would continue to be surveyed under the Agencies' Special Status Species Programs. The primary cost savings would be from eliminating surveys for red tree voles except in the small portion of its range (northern Coast Range of Oregon) where it is included in the Agencies' Special Status Species Programs.

- Reduced strategic survey costs
  - The elimination of Categories C, D, and F species would result in a savings of $1.2 million per year compared to Alternative 1. Under Alternative 1, this amount would be spent on surveys and other studies to help define high-priority sites, rewrite Management Recommendations, and to answer questions about the species role in ecosystems.
  - As with Alternative 1, most strategic surveys would eventually be completed. In the long term, costs for strategic surveys under Alternative 3 would decline to approximately one-tenth the current level.

Measures could be used to mitigate the adverse environmental impacts for species under Alternative 3. Mitigation of these effects under Alternative 3 could include management

of known sites not protected by reserves or the Agencies' Special Status Species Programs. In addition, mitigation for some of these species could include pre-project clearances.

The cost of possible mitigation under Alternative 3 is negligible.

# Timber Harvest

## Affected Environment

Each alternative would directly affect the level of timber available for harvest from lands administered by the Forest Service and BLM within the Northwest Forest Plan area. The purpose of this section is to display the effects of the alternatives on the Probable Sale Quantity (PSQ) at the Northwest Forest Plan scale (24.5 million acres) to provide a relative comparison between the alternatives. Effects at the administrative unit would vary from this regional-level analysis. This analysis is not intended to have the precision necessary for re-declaring the PSQ for the National Forests and BLM Districts. Further, the alternatives in this SEIS do not authorize timber sales or other habitat-disturbing activities. The decision to harvest timber is made in site-specific, project-level decisions that implement land and resource management plans of administrative units.

### Changes in PSQ from 1994 to Present

As noted in the 1994 Northwest Forest Plan Final SEIS, the PSQ is based only on those lands considered suitable for programmed, long-term, sustainable timber harvest. These lands are only in the Matrix and Adaptive Management Area land allocations. Riparian, Late-Successional, and other reserve allocations do not contribute to PSQ.

The Northwest Forest Plan Final SEIS estimated the PSQ at 958 million board feet (MMBF), plus an additional 10 percent volume estimated in "other wood" (cull, submerchantable, firewood, and other products) for a total of 1.1 billion board feet (USDA, USDI, 1994a, pp. 3&4-266 and 268).

**Table 3&4-5. Annual Cost (In millions of dollars).**

| Cost Element (includes overhead) | Alternative 1 | Alternative 2 | Alternative 3 |
|---|---|---|---|
| Pre-disturbance surveys for Timber | 5.8 | 2.6 | 1.9 |
| Pre-disturbance surveys for Fuel Treatments | 12.6 | 5.4 | 3.8 |
| Pre-disturbance surveys for Other | 0.3 | 0.1 | 0.2 |
| Pre-disturbance surveys total | 18.7 | 8.1 | 5.9 |
| | | | |
| Strategic Surveys / General Surveys / Program Management / Training / Data Management / Other Costs | 7.1 | 1.9 | 5.9 |
| Total Annual Cost (short term) | 25.9 | 10.0 | 11.8 |
| Total Annual Cost with Mitigation (short term) | - | 10.6 | 11.8 |
| Long-term Annual Cost (10 years) | 16.8 | 9.5 | 10.3 |
| Long-term Annual Cost with mitigation (10 years) | - | 10.1 | 10.3 |

Totals are not exact due to rounding.

The 2000 Survey and Manage Final SEIS describes the changes in PSQ from 958 MMBF at the onset of the plan to the year 2000 level of 811 MMBF. In 2001, the Oregon Washington BLM State Director re-declared the Coos Bay and Eugene Districts PSQ (6 MMBF reduction) in response to the transfer of lands to the Coquille Tribe and additional protection for late-successional forest as required by the Northwest Forest Plan. The current combined PSQ for the BLM and Forest Service is 805 MMBF (current baseline PSQ for the Northwest Forest Plan). Management of known sites for Survey and Manage species identified since the beginning of the Northwest Forest Plan has not been incorporated into the PSQ.

## Relationship of PSQ and Late-Successional Forest

Of the 24.5 million acres in the Northwest Forest Plan area, approximately 8 million acres are late-successional forest. Of the 8 million acres of existing late-successional forest 86 percent is in the reserve land allocations: Congressionally Reserved, Late-Successional Reserves, Riparian Reserves, and/or Administratively Withdrawn Areas. Fourteen percent of the existing late-successional forest, 1.1 million acres, is within the Matrix and Adaptive Management Area land allocations. These 1.1 million acres of late-successional forest are the primary source for harvest in support of the PSQ.

On most administrative units, the PSQ is heavily dependent on harvesting late-successional forest for 3 to 5 more decades until early-successional stands begin to mature and become available for harvest. Because of this dependence, harvest schedules indicate about 90 percent (709 MMBF annually) of PSQ over the next decade is dependent on harvest of late-successional forest. This situation was reflected in modeling PSQ for the Northwest Forest Plan as:

> *"Most of the harvest in Option 9 [the selected alternative] ... over the next decade will come from late-successional (over 80 years old) ... While Option 9 may reserve sizeable amount of late-successional forest on federal land, it does not escape the historic dependence on late-successional forest and old growth as the source of harvest volume ..."* (Johnson et al. 1993, p. 22).

Since a majority of sites are assumed to be in late-successional forests, managing species sites within the Matrix and Adaptive Management Areas has the effect of reducing the amount of late-successional forest that is available for harvest. This reduction in the amount of late-successional forest available for harvest has a direct and calculable effect on PSQ.

Reductions to the 1.1 million acres of late-successional forest available for harvest through management of known sites are assumed to have a direct, proportional effect to the 709 MMBF annual portion of the PSQ dependent on late-successional forests. For purposes of this analysis, the remaining 96 MMBF from early-successional forests is assumed to be unaffected by the management of known sites, and is held constant across all alternatives.

Although known sites affect harvest of early-successional forest for some species, the ISMS database used for this analysis does not distinguish between early and late-successional forest at this time. Since Survey and Manage species are, by definition, closely associated with late-successional and old-growth forest, the calculated acreage effects are all assumed to occur on late-successional forest in this PSQ analysis.

The 2000 Final SEIS provided a detailed explanation on the shift in late-successional forest between the Reserves and Matrix/Adaptive Management Areas as a result of the reductions in the PSQ since the beginning of the Northwest Forest Plan. The assumptions for late-successional forest acreage available for harvest are the same as in the 2000 Final SEIS. The 6 MMBF reduction in PSQ since 2000 has not been incorporated

into the assumptions for lands available for harvest because of the relatively minor nature of the change.

## Differences in Data since the 2000 Final SEIS

For purposes of this analysis, the ISMS data is assumed to reflect survey results up though calendar year 2001.

In the 2000 Survey and Manage Final SEIS, Geographic Information System (GIS) data was not available for the red tree vole or great gray owl and estimations were made without GIS analysis. GIS data is now available for these two species and was used in this analysis.

## Methodology Used in Analysis of PSQ

Estimating the effects to PSQ is dependent on determining the number of acres of late-successional forest that will ultimately be managed as known sites for Survey and Manage species. The Agencies have now had 4 years experience conducting pre-disturbance surveys for most of the species requiring such surveys. The last 4 years of survey data which has been entered into the ISMS database is the basis for estimating the current acreage of known sites and species detection rates.

In the 2000 Final SEIS and this analysis, it is assumed that it will take 25 years to survey the 1.1 million acres of late-successional forest in the Matrix and Adaptive Management Areas based on input from the field units. For most species, predicting the eventual number of sites that might affect PSQ involves projecting the current known sites detection rate ahead for 25 years. Since the alternatives provide for removing species from Survey and Manage and/or Special Status Species Programs, some of the more numerous species were projected for a shorter period of time. Although the alternatives provide for adding species to Survey and Manage and Special Status Species Programs no estimation of effects was attempted for adding new species.

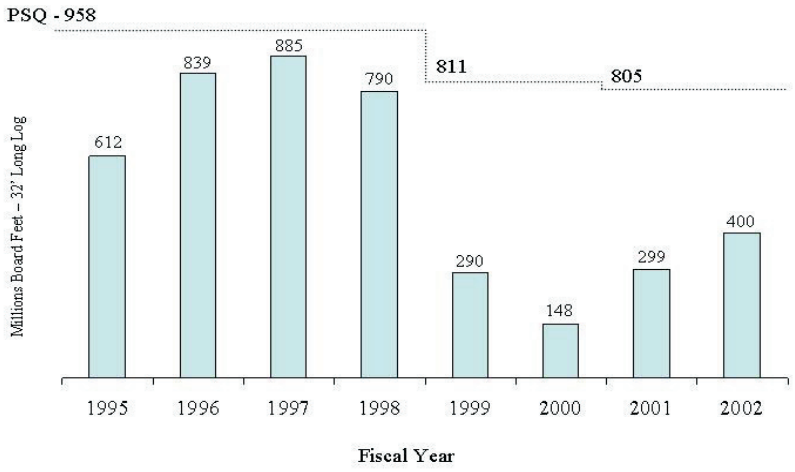
The average number of acres managed at each site varies by taxa group and by species within the taxa groups, according to habitat requirements described in Management Recommendations for each species or taxa group. The same average number of acres managed at each site, for particular species, was held as a constant for the alternatives. GIS was used to apply buffers to each of the species sites which have been identified within the Matrix and Adaptive Management Areas to calculate the total acreage of current known sites. Additional adjustments were made to account for acreage which would become inoperable for harvest, sites within Riparian Reserves, and additional sites expected to be found with strategic surveys (Alternatives 1 and 3).

## Timber Sale Offerings

The Agencies' annual timber sale offerings are shown in Figure 3&4-5. The Agencies' harvest targets were 60 and 80 percent of PSQ during the start-up years of 1995 and 1996, respectively. Shortfalls in sales offered since 1998 are related to the implementation of the Survey and Manage Standards and Guidelines and biological opinions related to certain harvests in watersheds with threatened or endangered anadromous fish (consultation issues associated with the Pacific Coast Federation of Fishermen's Associations et al. v. National Marine Fisheries Service lawsuits (commonly referred to as the PCFFA ruling)), and protests/appeals on individual timber sales.

Since the beginning of the Northwest Forest Plan, the Agencies have offered timber sales at 60 percent of the PSQ on average. Prior to the litigation on the Survey and Manage Standards and Guidelines and the PCFFA ruling (fiscal years 1995-1998), the Agencies had offered 82 percent of the PSQ. Considering the start-up period anticipated by the

**Figure 3&4-5.** Annual Timber Sale Offerings in Relation to PSQ.




Northwest Forest Plan, the Agencies were close to meeting the timber sale objectives during that timeframe. Since 1999, the Agencies offerings have been reduced to 35 percent of the PSQ.

## Environmental Consequences

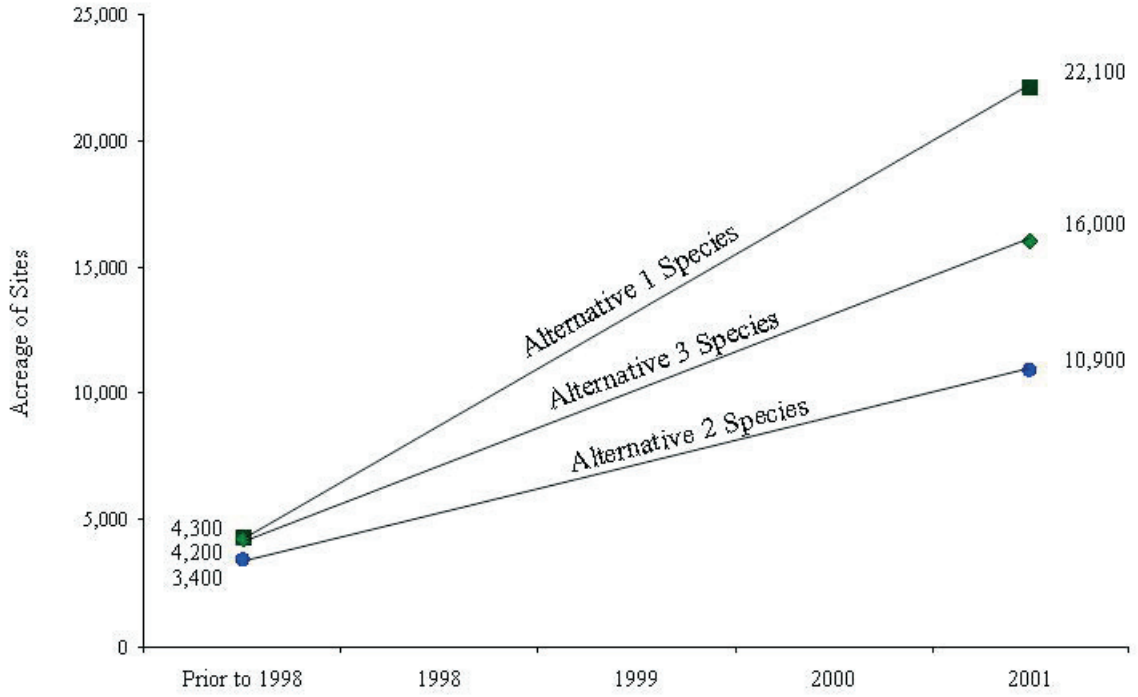
The effect on PSQ is a direct result of the number of acres managed within the Matrix and Adaptive Management Areas for the species considered in the alternatives. These areas are not reserves; however, they are unavailable for harvest for several decades. Figure 3&4-6 reflects the estimated acreage associated with the species under the alternatives which have been identified in the ISMS database, within the Matrix and Adaptive Management Area allocation, up to the present time. The data in ISMS prior to 1998 reflects the number of sites identified prior to the implementation of pre-disturbance surveys. The acreage of sites identified after 1998 reflect sites identified with pre-disturbance surveys being conducted. This illustrates the relative acreage of sites in ISMS associated with the species under the alternatives, as well as the rates of detection used in the projections of effects.

### Additional Constraints on Timber Sale Offerings and Estimating Effects on PSQ

The data within ISMS and existing acreage of sites illustrated in Figure 3&4-6 does not convey the full constraints on the implementation of timber sales for the management of known sites within the Matrix and Adaptive Management Areas.

In recent years, the PCFFA ruling has constrained timber sales in areas with Endangered Species Act-listed anadromous fish species to those which do not require formal consultation. As a result, there has been additional emphasis on thinning of younger stands while some road construction, regeneration harvest, and density management silvicultural practices have been precluded.

**Figure 3&4-6.** Acreage of Species Sites identified through 2001 under the alternatives.




With the implementation of the Survey and Manage Standards and Guidelines, the PCFFA ruling, and protests and appeals, the Oregon BLM regeneration harvest timber sales sold during fiscal years 1999-2001 were reduced by 89 percent when compared to the fiscal year 1995-1998 timeframe. Regeneration harvest sales of stands 200 years and older was reduced by 88 percent during this timeframe. The 1995-1998 timber sales were 22 percent less than the harvest assumptions under the Northwest Forest Plan (BLM Annual Program Summaries).

The environmental consequences need to be based in the context of fully implementing the baseline PSQ (805 MMBF/year) identified in the Northwest Forest Plan. With the recent years of reduced levels of timber sale offerings (35 percent of PSQ) and limits on regeneration harvest of older forest and more emphasis on thinning of younger forest, the ISMS database does not reflect the number of species/sites that would be identified under the full PSQ. With more implementation experience since the 2000 Survey and Manage Final SEIS, two additional effects have been identified that are not reflected in the ISMS-based calculation of acres for existing sites or in the 2000 Survey and Manage Final SEIS timber harvest projections.

- Avoidance - When initial sale reconnaissance indicates the presence of numerous Survey and Manage species sites, sale areas are abandoned and no specific sites may be recorded in ISMS. The Agencies have sought to offer timber sales (thinning, avoidance of older forest) where it is less likely Survey and Manage species will encumber the sale.

- Abandonment - Red tree vole surveys provide an example of the trade-offs managers face in use of staff time and dollars for preparing timber sales. Pre-disturbance surveys indicate nest structures within the sale area but only those nest structures associated with red tree vole activity require protection. Each site associated with activity commonly receives a 10-acre management area. When managers are faced with numerous nest structures in the sale area, they must weigh the additional staff work for reconfiguring the sale, and the cost of climbing the trees versus abandonment of the sale area. This situation extends beyond red tree vole when identified sites are so numerous that it results in an infeasible sale.

Sale areas that are avoided or abandoned are not fully reflected in the ISMS database and the estimation of existing acreage of managed sites.

## Projection of Acres of Managed Sites

The ISMS database was used to establish the current number of acres associated with the management of Survey and Manage species within the Matrix and Adaptive Management Areas. The ISMS data for sites identified since 1998 is assumed to represent 4 years of surveys. It is assumed that it will take 25 years to survey the 1.1 million acres of late-successional forest within the Matrix and Adaptive Management Areas. Projecting sites into the future is based upon taking the existing sites, identified over 4 years, and expanding that to what would continue to be found over the next 21 years.

Additional factors were incorporated into the projection of effects to account for the factors which are not reflected in the ISMS data:

- The last 4 years of sale offerings (35 percent of PSQ) do not reflect full implementation of PSQ.
- These sales have placed an emphasis on thinning and partial cut harvest with less regeneration harvest.
- There has been avoidance of harvest in older forest conditions.
- There has been avoidance of areas where Survey and Manage species would likely encumber sales.
- The Survey and Manage mitigation measure has resulted in abandonment of portions and/or entire sale areas.

The projected acreage was increased by 100 percent for Alternative 1 to account for the factors listed above and to reflect the amount of sites what would be managed under full implementation of the PSQ under the Northwest Forest Plan. Given that there are fewer numbers of species under Alternatives 2 and 3, it is assumed that the degree of avoidance and abandonment would be less, so the projected acreage was increased by 50 percent for these alternatives.

Those species with more than 100 acres in known sites within the Matrix and Adaptive Management Areas had projection caps applied in the 2000 Final SEIS to simulate the adaptive management process. These same assumptions were applied to the projections for the alternatives in this SEIS.

The existing sites under Survey and Manage which are assumed to have been implemented with timber sales but under Alternatives 2 and 3 are now “released” have an effect on the PSQ. Acreage of existing sites established in timber sales in which regenerations harvest has occurred are unavailable for harvest for several decades and has a long-term effect on PSQ. Those existing sites implemented in thinning or partial cut harvest are available for harvest with the next entry which has less of a long-term effect. To account for this PSQ effect, 50 percent of acreage of the existing sites which are “released” from future site management under Alternatives 2 and 3 are assumed to reduce the 1.1 million acres of late-successional forest available for harvest.

A summary of the acres of late-successional forest in the Matrix and Adaptive Management Areas that are projected to be managed as known sites under each alternative is shown on Figure 3&4-7.

As previously described, the percent of late-successional forest projected for management of known sites has a corresponding effect on the 1.1 million acres of late-successional forest in the Matrix and Adaptive Management Areas which supports the PSQ. For example, the projection of sites under Alternative 1 identified 15 percent of the 1.1 million acres of existing late-successional forest would be managed for known sites. The 15 percent of the 709 MMBF of PSQ associated with late-successional forests equates to the projected PSQ reduction of 105 MMBF (rounded to nearest 5 MMBF). The projected PSQ reduction from the current 805 MMBF PSQ baseline for each alternative is shown in Figure 3&4-8. Note: these projections provide the relative magnitude effect on the PSQ for purposes of comparing alternatives. This analysis is not intended to have the precision necessary for re-declaring the PSQ for the National Forests and BLM Districts. The current 805 MMBF PSQ baseline does not include the added 10 percent volume for "other wood" that was used in the Northwest Forest Plan Final SEIS estimate of timber harvest.

## Comparison of Effects of the Alternatives

The primary factor affecting the PSQ between the alternatives is the number of species and resulting acreage of known sites affecting the 1.1 million acres of late-successional forest within the Matrix and Adaptive Management Areas.

**Figure 3&4-7**. Projected Acres of Survey and Manage Sites Affecting PSQ. The projected acreage of known sites affecting the 1.1 million acres of late-successional forest within the Matrix and Adaptive Manage Areas for each alternative.

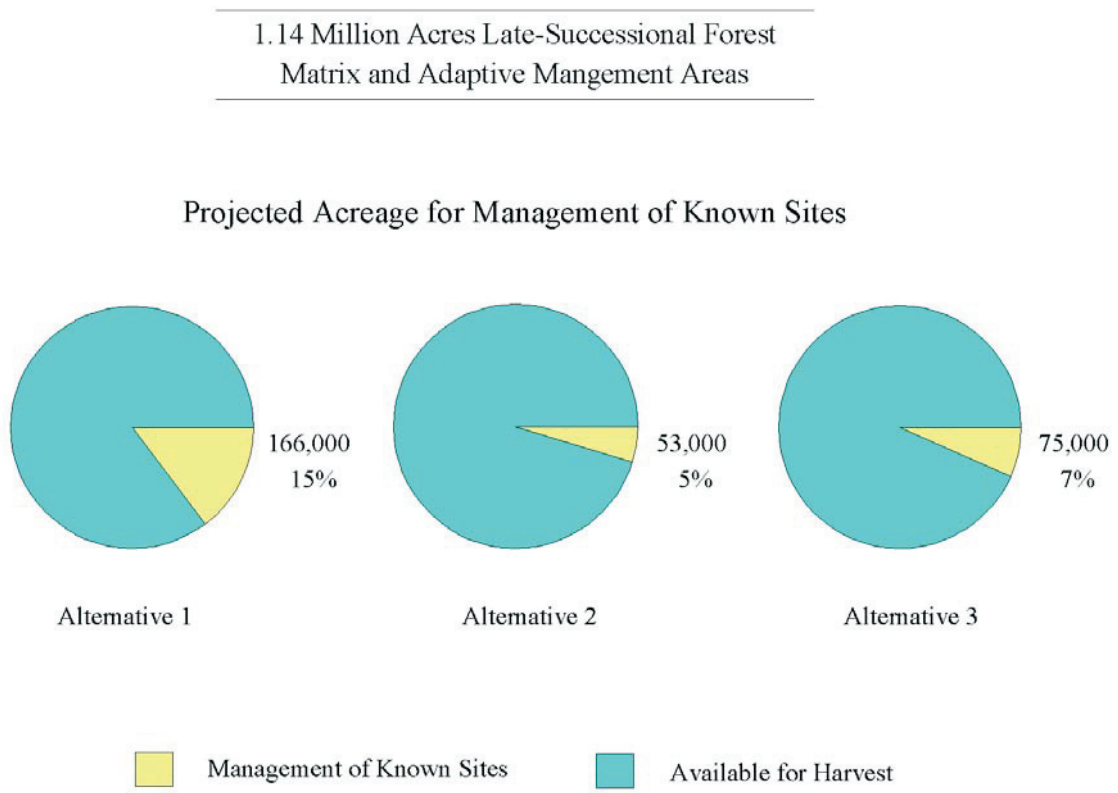
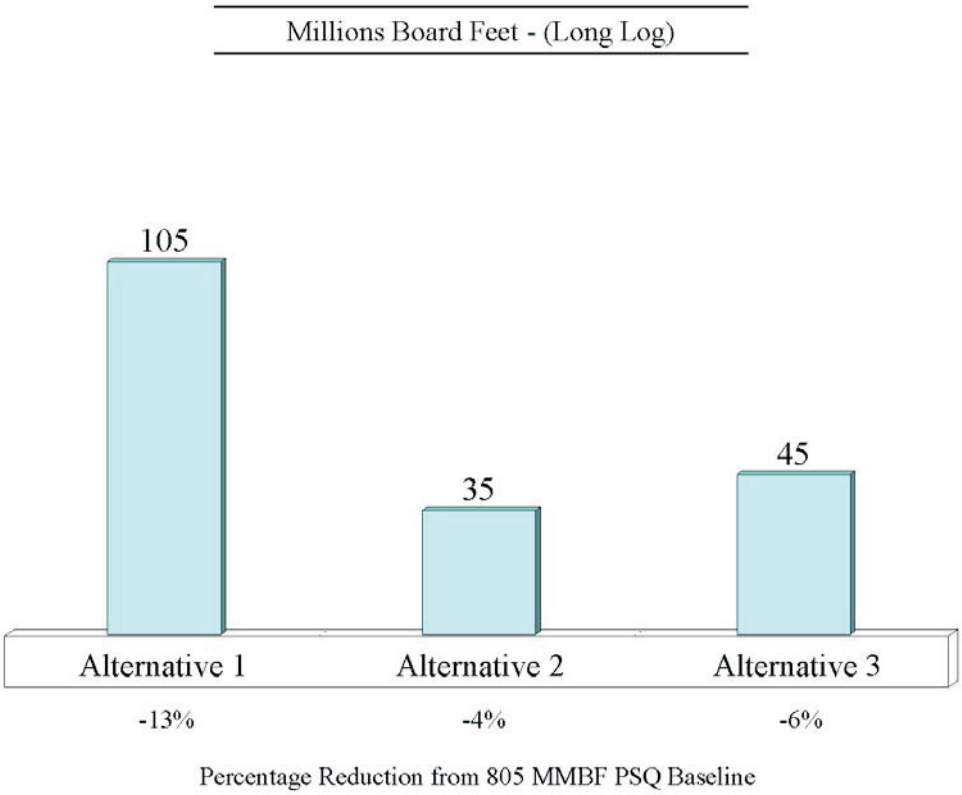


**Figure 3&4-8**. Projected PSQ Reductions in Million Board Feet from the current 805 MMBF Baseline.




The effect on PSQ of mitigating for adverse effects to species due to management under Alternatives 2 and 3 is included in Table 3&4-6. For the 142 species that would have habitat (including known sites) insufficient to support stable populations in the Northwest Forest Plan area under all alternatives and the 24 species and 4 arthropod functional groups for which there is insufficient information to determine an outcome under all alternatives, there are less than 200 acres of known sites. The effect on PSQ is below the threshold of measuring any substantial effects; therefore, the effect is not shown in Table 3&4-6.

## Alternative 1

Under Alternative 1, there would be a 105 MMBF reduction in PSQ due to management of known sites.

Of the 300 species and arthropod functional groups included in the Survey and Manage mitigation measure, there are 14 species with projected acres of more than 1,000 each that account for approximately 41 percent of the projected acres and resulting effect on PSQ.

## Alternative 2

Under Alternative 2 without mitigation, there would be a 35 MMBF reduction in PSQ due to management of known sites. This is a 70 MMBF increase in PSQ compared to Alternative 1.

**Table 3&4-6. Comparison of Timber Harvest Effects.**

| | Alternative 1 | Alternative 2 | Alternative 3 |
|---|---|---|---|
| Number of Species/Functional Groups Included | 300 | 152 | 284 |
| Number of Species identified in Matrix / Adaptive Management Areas through Pre-Disturbance Surveys Since 1998 | 138 | 68 | 125 |
| Existing Acreage of Sites in the Matrix and Adaptive Management Areas | 22,100 | 10,900 | 16,000 |
| Projected Acreage of Sites in the Matrix and Adaptive Management Areas + Existing | 166,000 | 53,000 | 75,000 |
| Projected Acreage of Sites as a percentage of the 1.1 million acres of late-successional forest in the Matrix and Adaptive Management Areas | 15% | 5% | 7% |
| Projected PSQ Reduction in MMBF (rounded to nearest 5 MMBF) | 105 | 35 | 45 |
| Projected PSQ Percentage Reduction from 805 MMBF baseline (w/out mitigation) | 13% | 4% | 6% |
| Reduction in MMBF for Mitigation | - | 2 | 4 |
| Projected PSQ Reduction with Mitigation in MMBF (rounded to nearest 5 MMBF) | - | 35 | 50 |
| Projected PSQ Percentage Reduction from 805 MMBF baseline (with mitigation) | 13% | 4% | 6% |

Of the 152 species assumed to be included in the Special Status Species Programs, there are 8 species with projected acres of more than 1,000 each that account for approximately 30 percent of the total projected acres and resulting effect on PSQ.

Mitigation for the 57 species (see Table 2-6) that would have habitat insufficient to support stable populations in all or a portion of their range under Alternative 2, but would have habitat sufficient to support stable populations under Alternative 1, would require 2 MMBF for management of known sites.

Under Alternative 2 with mitigation, the total PSQ reduction is 35 MMBF (rounded to the nearest 5 MMBF). This is an increase of 70 MMBF compared to Alternative 1. Note: the addition of the mitigation fell within the rounding unit of 5 MMBF in which the PSQ effects are expressed.

### Alternative 3

Under Alternative 3 without mitigation, there would be a 45 MMBF reduction in PSQ due to management of known sites. This would be a 60 MMBF increase in PSQ over Alternative 1.

Of the 284 species assumed to be included in Survey and Manage or the Agencies' Special Status Species Programs in this alternative, there are 8 species with more than 1,000 projected acres each that account for approximately 33 percent of the total projected acres and resulting effect on PSQ.

Mitigation for the 10 species (see Table 2-11) that would have habitat insufficient to support stable populations in all or a portion of their range under Alternative 3, but would have habitat sufficient to support stable populations under Alternative 1, would require 4 MMBF for management of known sites.

Under Alternative 3 with mitigation, the total reduction in PSQ is 50 MMBF (rounded to the nearest 5 MMBF). This would be a 55 MMBF increase in PSQ over Alternative 1.

## Northwest PSQ - Context and Cumulative Effects

The 1994 Northwest Forest Plan Final SEIS included a 6 MMBF reduction in the PSQ for the management of existing known sites under Survey and Manage. Since little was known about these species in 1994, the Agencies assumed that the effects on the PSQ would be minor since these species were thought to be relatively rare. Based on the analysis of effects in the 2000 Final SEIS and this SEIS, it has been demonstrated that the Survey and Manage mitigation measure within the Matrix and Adaptive Management Areas, under any of these alternatives, has affected PSQ to a greater extent than was anticipated in 1994.

The Northwest Forest Plan PSQ is the combined result of the harvest levels as stated in the individual National Forest and BLM District land and resource management plans. Harvest levels are established based on a set of forest management assumptions including the intensity of harvest, the acreage available for harvest, and the types of forest available. All of these harvest-level assumptions are based in the long-term context of decades of implementation and forest growth.

The projections of effects for alternatives to the current Survey and Manage Program can be quantified at the regional level to provide the relative effect on the PSQ in the long term. These effects are largely based on the reduction in land available for harvest as a result of managing species sites within Matrix and Adaptive Management Areas.

In recent years, timber sale offerings have also been constrained because of biological opinions related to harvests in watersheds with threatened or endangered anadromous fish. The Aquatic Conservation Strategy SEIS along with other administrative actions are seeking to clarify and resolve issues caused by these constraints. These actions are ongoing and have not resulted in a decision to alter the long-term direction for harvest under the Northwest Forest Plan.

## Scale and Precision

This analysis of PSQ has been done at the planning area scale and does not consider the exact effects of the changes in the lands available for harvest at smaller scales. Effects at the individual National Forests and BLM Districts would vary from this regional-level analysis. This analysis is not intended to have the precision necessary for re-declaring the PSQ for the affected National Forests and BLM Districts. Actual PSQ will be affected by the number of sites that are found and future adaptive management decisions. Modifications to National Forest and BLM District level PSQ need to be based on the accumulation of specific, unit-level effects during individual land and resource management plan revisions. At the Northwest Forest Plan area-wide scale, the PSQ effects calculated here are reasonable estimates of both the magnitude of effects and of the differences between the alternatives.

Additional information about methodology and assumptions in this analysis is included in the administrative record and is available upon request.

# Socioeconomic Effects

## Affected Environment

The Northwest Forest Plan Final SEIS addressed socioeconomic effects. The 2000 Survey and Manage Final SEIS examined alternative ways to change only one aspect, the Survey and Manage Standards and Guidelines of the Northwest Forest Plan. This SEIS also examines an alternative way to change only one aspect of the Northwest Forest Plan. Since it supplements the previous analyses, this SEIS does not repeat the analysis and conclusions in those documents that are unaffected by the proposals in this SEIS. The following analysis presents effects that would be different than those identified in the 2000 Final SEIS. In many cases, effects are the same type previously identified, but vary in scope or extent as a result of alternatives analyzed in this SEIS. In these instances, the same assumptions used in the 2000 Final SEIS are used in this SEIS.

## Environmental Consequences

### Mineral Resources, Recreation Resources, and Special Forest Products

Impacts on these programs are correlated to the species requiring pre-disturbance surveys and projected known site management (USDA, USDI 2000a, pp. 420-422). The potential conflicts with these programs would be less under Alternative 2 compared to Alternatives 1 and 3 because 152 species would be managed under the Special Status Species Programs under Alternative 2 compared to 300 and 284 species/groups managed under Alternatives 1 and 3, respectively. Pre-disturbance surveys would not be required for red tree voles under Alternatives 2 and 3 except in a small portion of its range. Under Alternative 1, the projected acreage of known sites is 166,000. Under Alternative 2, the projected acreage of known sites is 53,000. Under Alternative 3, the projected acreage of known sites is 75,000.

### Range/Grazing Resources

As discussed in the 2000 Final SEIS (USDA, USDI 2000a, p. 421), impacts to grazing are not discernibly different among the alternatives. Pre-disturbance surveys, management of known sites, and strategic surveys are not anticipated to change the conclusions of the Northwest Forest Plan Final SEIS regarding impacts to grazing. That document concluded, "... consequences to the industry would be small based on the relatively minor amount of range production on federally managed lands within the planning area. These modifications would likely have consequences, however, for individual permittees" (USDA, USDI 1994a p. 3&4-276).

### Commercial and Subsistence Fisheries Resources

None of the alternatives are anticipated to directly impact commercial or subsistence fisheries (USDA, USDI 2000a).

### Lumber and Wood Products Employment

Actual timber harvest, a primary driver of economic, community, and social effects, has lagged behind levels projected in the Northwest Forest Plan Final SEIS for a variety of reasons as stated in the 2000 Final SEIS (USDA, USDI 2000a, p. 422). The Northwest Forest Plan Final SEIS estimated employment affected per million board feet of timber processed by subregion. A region-wide average was also estimated. Since no new information is available to revise these statistics, they continue to be used for analytical purposes within the Northwest Forest Plan area. An estimated 9.08 jobs are generated within the region per million board feet harvested and processed.

The current (2000 annual average) employment in the lumber and wood products industry is approximately 56,900 people in Oregon, 48,927 people in Washington, and 10,120 people in northern California counties. The employment figures for Oregon and Washington include the paper industry (Stevenson 2002, pers. comm.; State of California, Employment Development Department 2002; and Washington State Employment Security Department 2000).

Lumber and Wood Products employment changes have been close to the impacts projected in the Northwest Forest Plan Final SEIS (USDA, USDI 1994a). Actual employment declines between 1990, the baseline used by the Northwest Forest Plan Final SEIS, and the 2000 Survey and Manage Final SEIS have been about 8,460 jobs in Washington, 16,300 jobs in Oregon, and 3,780 jobs in northern California. Projected changes under the alternative selected in the Northwest Forest Plan Record of Decision (Alternative 9) were: 9,500 in western Washington, 16,700 in western Oregon, and 2,800 in northern California.

All alternatives have an adverse effect on PSQ that was not anticipated in the Northwest Forest Plan Final SEIS (see Survey and Manage Final SEIS 2000, p. 429). A comparison of annual employment and personal earnings associated with the alternatives is shown in Table 3&4-7. The full harvest level under the Northwest Forest Plan is currently 805 MMBF which would support 7,309 jobs.

## Survey-Related Employment

The Costs of Management section earlier in this chapter examines the estimated costs of implementing each alternative. The assumptions used to build those estimates include direct survey costs (such as labor, vehicles, equipment, and lab fees) and overhead. Labor costs were assumed to represent 46.8 percent of total costs. This represents 60 percent costs after deduction of overhead. The potential mitigation of Alternative 3 would not materially add to the costs of that alternative.

The methodology and assumptions used in the Survey and Manage Final SEIS (USDA, USDI 2000a, p. 424) are used for this analysis.

As in the 2000 Final SEIS the same three titles: (1) Biological, Agricultural, and Food Technicians; (2) Forest and Conservation Workers; and, (3) Surveying and Mapping Technicians are used. The weighted average median wage for these occupations was $10.91 per hour (Oregon Employment Department 2002). For comparison, the weighted average median wage for the 22 major occupational titles in the Lumber and Wood Products industry was $15.61 per hour (Oregon Employment Department 2002 and Stevenson 2000, pers. comm.).

The Northwest Forest Plan Final SEIS did not specifically anticipate employment associated with species surveys. Table 3&4-7 displays estimated annual survey-related employment and personal earnings by alternative.

The effect of mitigating for adverse effects to species due to management actions under Alternatives 2 and 3 is based on the effect on PSQ from the Timber Harvest section and the increased costs shown in Table 3&4-5 from the Cost of Management section.

## Government Revenues

As stated in the 2000 Final SEIS, the analysis of impacts to government revenues in the Northwest Forest Plan Final SEIS did not include legislation that has provided an ongoing "special payment amount," also known as safety net payments. Current legislation, passed October 30, 2000, provides for annual payments based on the average of the highest 3 years of payments between 1986 and 1999. It applies to the BLM "50-

**Table 3&4-7. Comparison of Annual Employment and Net Loss in Personal Earnings.**

| | |
|---|---|
| **Alternative 1:** | |
| 953 Lumber/Wood-related jobs lost @ $15.61/hr[2] | $30,942,957 |
| 534 Survey-related jobs gained @ $10.91/hr | $12,118,062 |
| Net loss in personal earnings | -$18,824,895 |
| **Alternative 2:** | |
| 318 Lumber/Wood-related jobs lost @ $15.61/hr[2] | $10,325,078 |
| 206 Survey-related jobs gained @ $10.91/hr | $4,674,717 |
| Net loss in personal earnings | -$5,650,361 |
| **Alternative 2 Mitigated:** | |
| 336 Lumber/Wood-related jobs lost @ $15.61/hr[2] | $10,909,584 |
| 219 Survey-related jobs gained @ $10.91/hr | $4,969,767 |
| Net loss in personal earnings | -$5,939,817 |
| **Alternative 3:** | |
| 409 Lumber/Wood-related jobs lost @ $15.61/hr[2] | $13,279,821 |
| 243 Survey-related jobs gained @ $10.91/hr | $5,514,399 |
| Net loss in personal earnings | -$7,765,422 |
| **Alternative 3 Mitigated:** | |
| 445 Lumber/Wood-related jobs lost @ $15.61/hr[2] | $14,448,705 |
| 243 Survey-related jobs gained @ $10.91/hr | $5,514,399 |
| Net loss in personal earnings | -$8,934,306 |

[1]Some jobs may be seasonal in nature, data has been annualized and figures are based on a 2,080-hour work year.
[2]Loss in jobs and earnings are in comparison to full Northwest Forest Plan harvest level (805 MMBF).

percent payments" and to the Forest Service "25-percent payments" through fiscal year 2006, and also allows for annual increases based on the Consumer Price Index.

To the extent that the alternatives reduce federal timber harvest below levels anticipated in the Northwest Forest Plan Final SEIS, federal revenue sharing would also be reduced beginning in 2006. Reductions would be greatest under Alternative 1 followed by Alternative 3 and Alternative 2 (see Timber Harvest section). Effects of reduced payments to the counties would be the same type as those identified in the Northwest Forest Plan Final SEIS, but to a greater extent (USDA, USDI 2000a, p. 426).

## Community Capacity

Community capacity involves the ability of residents, community institutions, organizations, and leadership (formal and informal) to meet local needs and expectations. None of the alternatives would change the capacity ratings assigned by the Northwest Forest Plan Final SEIS (USDA, USDI 2000a, p. 426).

## People Coping with Change

Four factors of social and cultural disruption were noted in the Northwest Forest Plan Final SEIS (USDA, USDI 1994a, p. 3&4-307). Alternatives 1 and 3 include the Survey and Manage mitigation measure and would influence the first three of the following four factors.

- a shift from decentralized participatory forest land management that is oriented toward communities and workers to a centralized command and control for forests both public and private,

- the perception that the federal government has reneged on its commitment to maintain non-declining, even flow of timber from federal forests,
- a social structure that is less likely to adapt to a permanent loss of employment, and
- the potential for conflict among different people in which the timber industry and workers, as well as other interested groups, are negatively stereotyped and stigmatized.

No change is anticipated in the level of controversy associated with public land management generally, and late-successional or old-growth forests specifically, because this SEIS also addresses only one of many issues associated with federal land management (USDA, USDI 2000a, p. 426).

As stated in the Northwest Forest Plan Final SEIS "these factors can impose a significant emotional impact, and all can undermine individual and community efforts to successfully adapt to changes" (USDA, USDI 1994a p. 3&4-307).

## Environmental Justice

Executive Order 12898 (Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, February 11, 1994) requires that all federal agencies "make achieving Environmental Justice part of [their] mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations."

Thirty-three of the 51 counties covered by the Northwest Forest Plan have poverty rates above the rate for the state in which they are located. Nine of the 51 counties covered by the Northwest Forest Plan have African American populations above the rate for the state in which they are located. Nine of the 51 counties under the Northwest Forest Plan have Asian populations above the rate for the state in which they are located. Thirty-four of the 51 counties under the Northwest Forest Plan have Pacific Islander populations above the rate for the state in which they are located. Five of the 51 counties covered by the Northwest Forest Plan have Hispanic (any race) populations above the rate for the state in which they are located. Twenty-nine of the 51 counties covered by the Northwest Forest Plan have Native American populations above the rate for the state in which they are located (USDA Economic Research Institute 2002 and Bureau of Census 2000). There are 25 federally recognized tribes in California and 36 in Oregon and Washington (USDA, USDI 1994a, p. 3&4-314).

Under all alternatives, Native American subsistence uses (such as bark and root collecting) may be suspended or restricted until surveys can be completed for activities that are deemed habitat disturbing by the Agencies.

Suspending or restricting subsistence uses may affect treaty-reserved rights and the Agencies' ability to execute its trust responsibilities. The protection of tribal treaty rights and trust resources is addressed starting on page 54 of the Northwest Forest Plan ROD. Through the scoping and public involvement process on this SEIS there has been no specific identification of Survey and Manage species that are a particular concern of or used by Tribes.

There is high participation by minority and low-income populations in collecting special forest products. Permits for collecting wild plants, some mosses, bark, roots, and boughs could be restricted until surveys can be completed where such collections are deemed habitat disturbing by the Agencies.

The potential impacts to environmental justice described above would be less under Alternative 2 because there would be 152 species compared to 300 species/groups

under Alternative 1 and 284 species under Alternative 3 that require surveys and/or management of sites.

## Species Values

As stated in the 2000 Final SEIS, the Survey and Manage species examined in this SEIS have no known consumptive use value to people. They are not collected for food, shelter, or decoration. However, they have a variety of non-consumptive use values which include ongoing and new scientific research, recreational observation, and photography (USDA, USDI 2000a, p. 428).

## Critical Elements of the Human Environment

Air Quality is addressed in the Air Quality section.

American Indian Religious Concerns: Projects that would occur as a result of this proposed action would receive site-specific analysis and clearances to ensure they would not restrict access to or ceremonial use of sacred sites by American Indian religious practitioners or adversely affect the physical integrity of such sacred sites per Executive Order 13007.

Areas of Critical Environmental Concern and Research Natural Areas: These areas are managed for the maintenance, protection, or restoration of important resource values or for the purpose of scientific study, research, and education. Projects that would occur as a result of this proposed action would receive site-specific analysis to ensure management activities were compatible with objectives for these areas as identified in land and resource management plans.

Cultural Resources: Projects that would occur as a result of this proposed action would receive site-specific analysis and clearances to ensure cultural resources were not adversely affected.

Energy: Executive Order 13212 requires an analysis of direct or indirect adverse affects on energy development, production, supply, and/or distribution. New energy development projects such as pipelines and power corridors that are proposed in the Northwest Forest Plan area could be directly affected by the proposed action. For some Survey and Manage or Special Status species, surveys would be needed and/or known sites would be managed. This could delay a project or cause rerouting. It is also possible, although unlikely, that a project could be abandoned. There are fewer species included in the Special Status Species Programs or Survey and Manage Program under Alternatives 2 and 3 when compared to Alternative 1. The adverse effects on energy development projects would be less under the action alternatives than under the No-action alternative.

Environmental Justice is addressed in the Environmental Justice Section.

Prime Farmlands or Unique Land Characteristics: Prime farmlands and other unique federal land characteristics are required to be identified and restored as part of the Surface Mining and Reclamation Act of 1977. No federally managed land under the Northwest Forest Plan is currently designated as Prime Farmland. If any such lands were to be designated in the future, surface mining projects within the area of the Northwest Forest Plan would utilize the appropriate standards and guidelines from land and resource management plans to meet the requirements of this Act.

Floodplains: Executive Order 11988, as amended, requires agencies to determine if a proposed action will occur in a floodplain and if the action will significantly affect the

quality of the human environment. The objective of the law is to avoid adverse impacts associated with occupancy and modification of floodplains and to avoid floodplain development.

Projects resulting from the proposed action could occur in floodplains. These projects are not expected to adversely affect the quality of the human environment since they must adhere to the Aquatic Conservation Strategy. Projects should generally improve floodplains since they are targeted to maintaining functioning riparian areas or restoring degraded riparian areas. A thorough discussion can be found in the Aquatic Ecosystem section.

Noxious Weeds and Invasive Nonnative Species: Projects would follow individual land and resource management plan provisions for preventing the introduction or spread of noxious and invasive nonnative species. It is possible that unintentional spread of noxious or invasive non-native species could occur with any project. The projected harvest of late-successional forest under Alternative 1 would be 974,000 acres. The projected harvest of late-successional forest under Alternatives 2 and 3 would be 1,087,000 and 1,065,000 acres, respectively. Adverse impacts would be less under the No-Action Alternative than either of the action alternatives. However, under all three alternatives, the total acreage harvested would still be less than that projected in the Northwest Forest Plan Final SEIS.

Threatened, Endangered, and Agency Sensitive Species are addressed in the Threatened and Endangered Species Section and in the Biological Evaluation (Appendix 5).

Solid or Hazardous Waste: The Resource Conservation and Recovery Act of 1976 and the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 are laws that regulate hazardous waste that endangers public health or the environment. No adverse affects relating to solid or hazardous waste are expected. Projects resulting from the proposed action will follow land and resource management plan provisions for identifying, investigating, or removing hazardous waste.

Water Quality (Ground and Surface): The Water Quality section addresses water quality and conformance with state water quality standards.

Wetlands and Riparian Zones: Executive Order 11990 requires federal agencies to avoid destruction or modifications of wetlands and to avoid undertaking or providing assistance for new construction located in wetlands. Projects resulting from the proposed action are not expected to destroy or modify wetlands or undertake/assist new construction located in wetlands. If projects near a wetland or in a riparian zone do occur, they would be completed in accordance with Aquatic Conservation Strategy objectives as well as follow individual land and resource management plan provisions for protecting wetlands and riparian zones. Projects should generally improve wetlands and riparian zones since they are targeted to maintaining functioning riparian areas or restoring degraded riparian areas. A thorough discussion can be found in the Aquatic Ecosystem section.

Wild and Scenic Rivers and Wilderness: Management of Wild and Scenic Rivers and Wilderness is guided by specific management plans or standards and guidelines. These are developed at the local level to maintain the wild character of these areas. The proposed action will not alter these specific plans or standards and guidelines. There are no expected adverse impacts to Wild and Scenic Rivers or Wilderness as a result of the proposed action.

# Other Environmental Consequences

It is important to bear in mind the context of this SEIS when considering the overall environmental impacts of this proposal. This SEIS supplements previous impact statements which included 28 Final Environmental Impact Statements for Forest Service and BLM land and resource management plans. These plans were amended by the Northwest Forest Plan Final SEIS (USDA, USDI 1994a). The Northwest Forest Plan Final SEIS addressed issues and environmental impacts dealing with a wide range of multiple uses on federally managed lands and led to sweeping decisions regarding timber management and resource conservation. The 2000 Final SEIS was narrowly focused on issues concerning implementation of the Survey and Manage Standards and Guidelines. This SEIS is also narrowly focused on the Survey and Manage Standards and Guidelines. The 2000 Final SEIS and this SEIS only address changes to the Survey and Manage Standards and Guidelines and do not change the fundamental decisions or substantially change environmental impacts disclosed in the previous environmental impact statements.

The Council on Environmental Quality (CEQ) regulations require that the discussion of environmental consequences include "... any adverse environmental effects which cannot be avoided should the proposal be implemented, the relationship between short-term uses of man's environment and the maintenance and enhancement of long-term productivity, and any irreversible or irretrievable commitments of resources which would be involved in the proposal should it be implemented" (40 CFR 1502.16).

## Adverse Environmental Effects Which Cannot Be Avoided

An agency does not have to avoid adverse effects, but must identify and disclose any adverse environmental, social, and economic effects in the impact statement. This SEIS incorporates by reference the Northwest Forest Plan SEIS and the 2000 Survey and Manage Final SEIS. Both of those Final SEISs included extensive discussions of effects, both beneficial and adverse. This SEIS supplements those Final SEISs and need not restate impacts disclosed in the previous impact statements. This SEIS addresses only those adverse effects caused by the alternatives herein. Adverse effects which cannot be avoided include habitat (including known sites) insufficient to support stable populations in the Northwest Forest Plan area for 142 species under all alternatives. No mitigation could be proposed that could change this outcome.

## Relationship Between Short-term Uses of the Human Environment and Maintenance of Long-term Productivity

The Agencies' land and resource management plans, as amended by the Northwest Forest Plan, committed National Forest System and BLM administered lands to multiple use, including commercial timber commodity production. The environmental analyses supporting those plans determined that the loss in long-term productivity of forest soils and other components necessary for a healthy forest environment would be minimal. All alternatives explored in this SEIS are projected to impact fewer acres than analyzed for the land and resource management plans and, as such, will have less impact on productivity than previously disclosed.

## Irreversible or Irretrievable Impacts

Irreversible refers to a loss of non-renewable resources, such as mineral extraction, heritage (cultural) resources, or to those factors, which are renewable over long time

spans such as soil productivity. Irretrievable commitment applies to losses that are temporary, such as loss of forage production in an area being used as a ski run or use of renewable natural resources.

Old-growth forests would be harvested in the Matrix and Adaptive Management Areas under all alternatives. The Northwest Forest Plan considered the loss of old growth to be irretrievable (USDA, USDI 1994a, p. 3&4-321). The projected harvest of late-successional forest under Alternative 1 would be 974,000 acres. The projected harvest of late-successional forest under Alternatives 2 and 3 would be 1,087,000 and 1,065,000 acres, respectively. However, the total acreage harvested would still be less than that projected in the Northwest Forest Plan Final SEIS.

Elimination of habitat for species could be an irreversible or irretrievable impact depending on circumstances. In some cases, species may re-colonize an area following disturbance.

# Conflicts with Other Plans

The CEQ regulations (40 CFR 1502.16) require a discussion of "possible conflicts between the proposed action and the objectives of Federal, regional, State, and local (and in the case of a reservation, Indian tribe) land use plans, policies and controls for the area concerned." This SEIS incorporates by reference the discussion in the Northwest Forest Plan Final SEIS concerning conflicts with other plans (USDA, USDI 1994a, pp. 3&4-319 and 320, and Appendix D). Removing the Survey and Manage Standards and Guidelines as proposed in Alternative 2 would not alter the conclusion of the Northwest Forest Plan Final SEIS regarding the possible conflicts with other plans. Modifying the Survey and Manage Standards and Guidelines as proposed in Alternative 3 also would not alter the conclusion of the Northwest Forest Plan Final SEIS regarding conflicts with other plans.

The management direction in this SEIS applies only to federally managed lands where state and local land use plans, policies, and controls have little application. Similarly, none of the alternative in this SEIS apply to tribal and Indian-owned lands, with one exception. The Coquille Indian Tribe currently manages approximately 5,400 acres of forest lands (Coquille Forest) under the same standards and guidelines as the adjacent federal land management agency (Coos Bay District BLM). This places them in a unique position as the only tribe in the Northwest Forest Plan area that must comply with the Northwest Forest Plan Standards and Guidelines, including Survey and Manage.

In recent years, western states have raised concerns about the occurrence of catastrophic wildfires. This sentiment led to formation of the National Fire Plan, a national multi-agency policy designed to prevent catastrophic wildfires through broad-scale fuel treatment and improved suppression efforts. The National Fire Plan proposes aggressive hazardous fuel abatement activities around communities and at-risk landscapes. The 2002 fire season was particularly problematic for the Northwest Forest Plan area. Complex management recommendations in the Survey and Manage Standards and Guidelines impeded the Agencies' ability to meet National Fire Plan objectives. Conflicts between these policies and the Survey and Manage Standards and Guidelines led, in part, to the proposed action.

Alternatives 2 and 3 result in more acres available for hazardous fuel treatments at a lower cost than under Alternative 1. Under Alternative 1, fuel treatment is precluded by species protection on about 14,000 acres per year. Under Alternative 2, about 3,000 acres would be precluded from treatment. Under Alternative 3, about 5,000 acres would be precluded from treatment. Costs are similarly affected. Fuel treatment cost

under Alternative 1 is approximately $94 per acre. Cost under Alternative 2 would be approximately $37 per acre. Cost under Alternative 3 would be approximately $29 per acre.

## Table 3&4-8. Number of Known Sites for Species Included in Survey and Manage Standards and Guidelines, November 2000 Final SEIS and Present (March 2003).

| TAXA GROUP *Species* | Note: Where taxon has more than one name indicated, first name is current accepted name, second one (in parentheses) is name used in Northwest Forest Plan (Table C-3). | Cate-gory | Known Sites in Final SEIS 2000* | | Known Sites Present** | |
|---|---|---|---|---|---|---|
| | | | Federal Land Only | Total | Federal Land only | Total |
| **FUNGI** | | | | | | |
| *Acanthophysium farlowii (Aleurodiscus farlowii)* | | B | 1 | 1 | 1 | 2 |
| *Albatrellus avellaneus* | | B | 1 | 3 | 1 | 3 |
| *Albatrellus caeruleoporus* | | B | 4 | 9 | 4 | 9 |
| *Albatrellus ellisii* | | B | 12 | 13-15 | 39 | 41 |
| *Albatrellus flettii*, In Washington and California | | B | 24 | 28 | 39 | 43 |
| *Alpova alexsmithii* | | B | 6 | 6 | 6 | 6 |
| *Alpova olivaceotinctus* | | B | 1 | 1 | 1 | 1 |
| *Arcangeliella camphorata* (*Arcangeliella* sp. nov. #Trappe 12382; *Arcangeliella* sp. nov. #Trappe 12359) | | B | 6 | 9 | 8 | 11 |
| *Arcangeliella crassa* | | B | 2 | 2 | 2 | 2 |
| *Arcangeliella lactarioides* | | B | 3 | 3 | 3 | 3 |
| *Asterophora lycoperdoides* | | B | 1 | 4 | 1 | 5 |
| *Asterophora parasitica* | | B | 1 | 5 | 1 | 5 |
| *Baeospora myriadophylla* | | B | 9 | 17 | 9 | 17 |
| *Balsamia nigrens (Balsamia nigra)* | | B | 1 | 4 | 1 | 4 |
| *Boletus haematinus* | | B | 1 | 1 | 1 | 1 |
| *Boletus pulcherrimus* | | B | 2 | 8 | 6 | 12 |
| *Bondarzewia mesenterica (Bondarzewia montana)*, In WA and California | | B | 18 | 19 | 22 | 23 |
| *Bridgeoporus nobilissimus (Oxyporus nobilissimus)* | | A | 10 | 13 | 48 | 60 |
| *Cantharellus subalbidus*, In Washington and California | | D | 29 | 36 | 53 | 68 |
| *Catathelasma ventricosa* | | B | 6 | 14 | 6 | 15 |
| *Chalciporus piperatus* (*Boletus piperatus*) | | D | 42 | 71 | 43 | 76 |
| *Chamonixia caespitosa* (*Chamonixia pacifica* sp. nov. #Trappe #12768) | | B | 3 | 5 | 3 | 5 |
| *Choiromyces alveolatus* | | B | 7 | 8 | 7 | 8 |
| *Choiromyces venosus* | | B | 1 | 1 | 2 | 2 |
| *Chroogomphus loculatus* | | B | 3 | 3 | 4 | 4 |
| *Chrysomphalina grossula* | | B | 9 | 13 | 9 | 14 |
| *Clavariadelphus ligula* | | B | 24 | 28 | 41 | 47 |
| *Clavariadelphus occidentalis* (*Clavariadelphus pistillaris*) | | B | 31 | 43 | 57 | 70 |
| *Clavariadelphus sachalinensis* | | B | 5 | 7 | 29 | 34 |
| *Clavariadelphus subfastigiatus* | | B | 1 | 1 | 5 | 5 |
| *Clavariadelphus truncatus* (syn. *Clavariadelphus borealis*) | | D | 34 | 39 | 106 | 118 |
| *Clavulina castanopes* v. *lignicola* (*Clavulina ornatipes*) | | B | 4 | 10 | 4 | 11 |
| *Clitocybe senilis* | | B | 1 | 1 | 5 | 5 |
| *Clitocybe subditopoda* | | B | 2 | 2 | 2 | 4 |
| *Collybia bakerensis* | | F | 12 | 12 | 124 | 129 |
| *Collybia racemosa* | | B | 15 | 30 | 17 | 34 |
| *Cordyceps ophioglossoides* | | B | 9 | 12 | 9 | 12 |
| *Cortinarius barlowensis* (syn. *Cortinarius azureus*) | | B | 0 | 0 | 0 | 0 |
| *Cortinarius boulderensis* | | B | 8 | 8 | 8 | 9 |
| *Cortinarius cyanites* | | B | 0 | 0 | 1 | 1 |
| *Cortinarius depauperatus* (*Cortinarius spilomeus*) | | B | 1 | 1 | 1 | 1 |
| *Cortinarius magnivelatus* | | B | 2 | 2 | 8 | 8 |
| *Cortinarius olympianus* | | B | 26 | 27 | 41 | 42 |
| *Cortinarius speciosissimus (Cortinarius rainierensis)* | | B | 4 | 4 | 5 | 5 |
| *Cortinarius tabularis* | | B | 0 | 0 | 0 | 0 |
| *Cortinarius umidicola (Cortinarius canabarba)* | | B | 1 | 1 | 1 | 1 |

## Table 3&4-8. Number of Known Sites for Species Included in Survey and Manage Standards and Guidelines, November 2000 Final SEIS and Present (March 2003).

| TAXA GROUP *Species* | Note: Where taxon has more than one name indicated, first name is current accepted name, second one (in parentheses) is name used in Northwest Forest Plan (Table C-3). | Cate-gory | Known Sites in Final SEIS 2000* | | Known Sites Present** | |
|---|---|---|---|---|---|---|
| | | | Federal Land Only | Total | Federal Land only | Total |
| **FUNGI** | | | | | | |
| *Cortinarius valgus* | | B | 0 | 0 | 0 | 0 |
| *Cortinarius variipes* | | B | 3 | 3 | 4 | 5 |
| *Cortinarius verrucisporus* | | B | 0 | 0 | 7 | 8 |
| *Cortinarius wiebeae* | | B | 1 | 1 | 1 | 1 |
| *Cudonia monticola* | | B | 7 | 7 | 12 | 12 |
| *Cyphellostereum laeve* | | B | 3 | 3 | 3 | 3 |
| *Dermocybe humboldtensis* | | B | 1 | 1 | 1 | 3 |
| *Destuntzia fusca* | | B | 1 | 2 | 1 | 3 |
| *Destuntzia rubra* | | B | 0 | 2 | 0 | 4 |
| *Dichostereum boreale (Dichostereum granulosum)* | | B | 1 | 1 | 1 | 1 |
| *Elaphomyces anthracinus* | | B | 1 | 1 | 1 | 1 |
| *Elaphomyces subviscidus* | | B | 1 | 1 | 1 | 1 |
| *Endogone acrogena* | | B | 3 | 3 | 3 | 3 |
| *Endogone oregonensis* | | B | 3 | 7 | 3 | 7 |
| *Entoloma nitidum (Rhodocybe nitida)* | | B | 6 | 7 | 6 | 7 |
| *Fayodia bisphaerigera (Fayodia gracilipes)* | | B | 2 | 2 | 10 | 14 |
| *Fevansia aurantiaca (Alpova* sp. nov. # Trappe 1966) (*Alpova aurantiaca*) | | B | 2 | 2 | 2 | 2 |
| *Galerina cerina* | | B | 1 | 1 | 3 | 3 |
| *Galerina heterocystis* | | E | 0 | 0 | 3 | 7 |
| *Galerina sphagnicola* | | E | 0 | 0 | 0 | 0 |
| *Gastroboletus imbellus* | | B | 1 | 1 | 1 | 1 |
| *Gastroboletus ruber* | | B | 15 | 15 | 25 | 25 |
| *Gastroboletus subalpinus* | | B | 20 | 21 | 29 | 30 |
| *Gastroboletus turbinatus* | | B | 0 | 0 | 3 | 4 |
| *Gastroboletus vividus* (*Gastroboletus* sp. nov. #Trappe 2897; *Gastroboletus* sp. nov. #Trappe 7515) | | B | 3 | 3 | 3 | 3 |
| *Gastrosuillus amaranthii* (*Gastrosuillus* sp. nov. #Trappe 9608) | | E | 0 | 0 | 0 | 0 |
| *Gastrosuillus umbrinus* (*Gastroboletus* sp. nov. #Trappe 7516) | | B | 1 | 1 | 1 | 1 |
| *Gautieria magnicellaris* | | B | 2 | 2 | 2 | 2 |
| *Gautieria otthii* | | B | 1 | 2 | 1 | 2 |
| *Gelatinodiscus flavidus* | | B | 14 | 14 | 19 | 19 |
| *Glomus radiatum* | | B | 2 | 3 | 2 | 3 |
| *Gomphus bonarii* | | B | 14 | 15 | 77 | 80 |
| *Gomphus clavatus* | | F | 35 | 45 | 71 | 96 |
| *Gomphus kauffmanii* | | E | 31 | 42 | 43 | 54 |
| *Gymnomyces abietis* (*Gymnomyces* sp. nov. #Trappe 1690, 1706, 1710; *Gymnomyces* sp. nov. #Trappe 4703, 5576; *Gymnomyces* sp. nov. #Trappe 5052; *Gymnomyces* sp. nov. #Trappe 7545; *Martellia* sp. nov. #Trappe 1700; *Martellia* sp. nov. #Trappe 311; *Martellia* sp. nov. #Trappe 5903) | | B | 18 | 18 | 21 | 21 |
| *Gymnomyces nondistincta* (*Martellia* sp. nov. #Trappe 649) | | B | 1 | 1 | 1 | 1 |
| *Gymnopilus punctifolius*, In California | | B | 0 | 5 | 0 | 5 |
| *Gyromitra californica* | | B | 9 | 9 | 22 | 22 |
| *Hebeloma olympianum (Hebeloma olympiana)* | | B | 5 | 5 | 6 | 6 |
| *Helvella crassitunicata* | | B | 20 | 20 | 25 | 25 |
| *Helvella elastica* | | B | 25 | 25 | 33 | 36 |
| *Hydnotrya inordinata* (*Hydnotrya* sp. nov. #Trappe 787, 792) | | B | 3 | 3 | 3 | 3 |
| *Hydnotrya subnix (Hydnotrya subnix* sp. nov. #Trappe 1861) | | B | 1 | 1 | 1 | 1 |
| *Hydropus marginellus (Mycena marginella)* | | B | 9 | 13 | 9 | 14 |

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|---|---|---|---|---|---|---|
| | | | Federal Land Only | Total | Federal Land only | Total |
| **FUNGI** | | | | | | |
| *Hygrophorus caeruleus* | | B | 1 | 2 | 4 | 5 |
| *Hygrophorus karstenii* | | B | 0 | 0 | 0 | 0 |
| *Hygrophorus vernalis* | | B | 1 | 1 | 1 | 1 |
| *Hypomyces luteovirens* | | B | 7 | 9 | 7 | 11 |
| *Leucogaster citrinus* | | B | 7 | 7 | 8 | 21 |
| *Leucogaster microsporus* | | B | 7 | 7 | 7 | 7 |
| *Macowanites chlorinosmus* | | B | 2 | 11 | 2 | 11 |
| *Macowanites lymanensis* | | B | 1 | 1 | 1 | 1 |
| *Macowanites mollis* | | B | 2 | 2 | 3 | 3 |
| *Marasmius applanatipes* | | B | 2 | 2 | 2 | 2 |
| *Martellia fragrans* | | B | 3 | 3 | 3 | 3 |
| *Martellia idahoensis* | | B | 2 | 2 | 2 | 2 |
| *Mycena hudsoniana* | | B | 6 | 7 | 6 | 7 |
| *Mycena overholtsii* | | D | 15 | 17 | 130 | 136 |
| *Mycena quinaultensis* | | B | 3 | 5 | 3 | 9 |
| *Mycena tenax* | | B | 12 | 18 | 12 | 29 |
| *Mythicomyces corneipes* | | B | 8 | 9 | 8 | 9 |
| *Neolentinus adhaerens* | | B | 3 | 4 | 3 | 4 |
| *Neolentinus kauffmanii* | | B | 19 | 31 | 20 | 34 |
| *Nivatogastrium nubigenum*, In entire range except OR Eastern Cascades and CA Cascades Physiographic provinces | | B | 6 | 6 | 8 | 8 |
| *Octavianina cyanescens* (*Octavianina* sp. nov. #Trappe 7502) | | B | 1 | 1 | 1 | 1 |
| *Octavianina macrospora* | | B | 0 | 0 | 0 | 0 |
| *Octavianina papyracea* | | B | 0 | 1 | 0 | 1 |
| *Otidea leporina* | | D | 18 | 18 | 101 | 110 |
| *Otidea smithii* | | B | 4 | 5 | 11 | 12 |
| *Phaeocollybia attenuata* | | D | 30 | 57 | 78 | 106 |
| *Phaeocollybia californica* | | B | 26 | 31 | 39 | 44 |
| *Phaeocollybia dissiliens* | | B | 8 | 8 | 16 | 18 |
| *Phaeocollybia fallax* | | D | 23 | 48 | 61 | 88 |
| *Phaeocollybia gregaria* | | B | 2 | 2 | 4 | 4 |
| *Phaeocollybia kauffmanii* | | D | 39 | 57 | 78 | 97 |
| *Phaeocollybia olivacea*, In Oregon | | F | 0 | 0 | 0 | 0 |
| *Phaeocollybia olivacea* In Washington and California | | E | 5 | 14 | 6 | 18 |
| *Phaeocollybia oregonensis* (syn. *Phaeocollybia carmanahensis*) | | B | 3 | 3 | 31 | 36 |
| *Phaeocollybia piceae* | | B | 10 | 12 | 41 | 46 |
| *Phaeocollybia pseudofestiva* | | B | 10 | 15 | 21 | 31 |
| *Phaeocollybia scatesiae* | | B | 5 | 5 | 13 | 13 |
| *Phaeocollybia sipei* | | B | 2 | 2 | 38 | 42 |
| *Phaeocollybia spadicea* | | B | 15 | 27 | 41 | 56 |
| *Phellodon atratus (Phellodon atratum)* | | B | 8 | 28 | 8 | 29 |
| *Pholiota albivelata* | | B | 6 | 13 | 7 | 14 |
| *Podostroma alutaceum* | | B | 4 | 9 | 4 | 9 |
| *Polyozellus multiplex* | | B | 30 | 30 | 53 | 55 |
| *Pseudaleuria quinaultiana* | | B | 2 | 2 | 3 | 3 |
| *Ramaria abietina* | | B | 2 | 3 | 4 | 9 |
| *Ramaria amyloidea* | | B | 8 | 8 | 14 | 15 |
| *Ramaria araiospora* | | B | 14 | 15 | 80 | 89 |

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|---|---|---|---|---|---|---|
| | | | Federal Land Only | Total | Federal Land only | Total |
| **FUNGI** | | | | | | |
| *Ramaria aurantiisiccescens* | | B | 9 | 10 | 22 | 25 |
| *Ramaria botryis* var. *aurantiiramosa* | | B | 0 | 0 | 8 | 10 |
| *Ramaria celerivirescens* | | B | 14 | 15 | 62 | 65 |
| *Ramaria claviramulata* | | B | 0 | 0 | 1 | 1 |
| *Ramaria concolor f. marrii* | | B | 0 | 0 | 0 | 0 |
| *Ramaria concolor f. tsugina* | | B | 1 | 1 | 4 | 5 |
| *Ramaria conjunctipes* var. *sparsiramosa (Ramaria fasciculata* var. *sparsiramosa)* | | B | 0 | 0 | 4 | 4 |
| *Ramaria coulterae* | | B | 6 | 6 | 8 | 8 |
| *Ramaria cyaneigranosa* | | B | 7 | 9 | 21 | 27 |
| *Ramaria gelatiniaurantia* | | B | 6 | 9 | 13 | 22 |
| *Ramaria gracilis* | | B | 1 | 2 | 1 | 2 |
| *Ramaria hilaris* var. *olympiana* | | B | 0 | 0 | 0 | 0 |
| *Ramaria largentii* | | B | 4 | 4 | 8 | 10 |
| *Ramaria lorithamnus* | | B | 0 | 0 | 0 | 0 |
| *Ramaria maculatipes* | | B | 3 | 3 | 8 | 8 |
| *Ramaria rainierensis* | | B | 0 | 1 | 2 | 3 |
| *Ramaria rubella* var. *blanda* | | B | 0 | 0 | 0 | 0 |
| *Ramaria rubribrunnescens* | | B | 1 | 1 | 9 | 9 |
| *Ramaria rubrievanescens* | | B | 15 | 15 | 42 | 46 |
| *Ramaria rubripermanens* In Oregon | | D | 35 | 42 | 113 | 124 |
| *Ramaria rubripermanens* In Washington and California | | B | 9 | 9 | 10 | 11 |
| *Ramaria spinulosa* var. *diminutiva* (*Ramaria spinulosa*) | | B | 1 | 1 | 1 | 1 |
| *Ramaria stuntzii* | | B | 16 | 18 | 73 | 76 |
| *Ramaria suecica* | | B | 1 | 1 | 1 | 1 |
| *Ramaria thiersii* | | B | 3 | 3 | 4 | 4 |
| *Ramaria verlotensis* | | B | 0 | 1 | 0 | 3 |
| *Rhizopogon abietis* | | B | 0 | 0 | 0 | 0 |
| *Rhizopogon atroviolaceus* | | B | 1 | 1 | 1 | 1 |
| *Rhizopogon brunneiniger* | | B | 2 | 2 | 6 | 7 |
| *Rhizopogon chamaleontinus* (*Rhizopogon* sp. nov. #Trappe 9432) | | B | 1 | 1 | 1 | 1 |
| *Rhizopogon ellipsosporus* (*Alpova* sp. nov. # Trappe 9730) | | B | 1 | 1 | 1 | 1 |
| *Rhizopogon evadens* var. *subalpinus* | | B | 18 | 19 | 18 | 19 |
| *Rhizopogon exiguus* | | B | 2 | 3 | 2 | 3 |
| *Rhizopogon flavofibrillosus* | | B | 6 | 6 | 8 | 8 |
| *Rhizopogon inquinatus* | | B | 2 | 2 | 2 | 2 |
| *Rhizopogon truncatus* | | D | 2 | 3 | 31 | 55 |
| *Rhodocybe speciosa* | | B | 2 | 2 | 3 | 3 |
| *Rickenella swartzii (Rickenella setipes)* | | B | 3 | 6 | 3 | 8 |
| *Russula mustelina* | | B | 0 | 0 | 0 | 0 |
| *Sarcodon fuscoindicus* | | B | 25 | 37 | 27 | 40 |
| *Sedecula pulvinata* | | B | 0 | 0 | 0 | 0 |
| *Sowerbyella rhenana (Aleuria rhenana)* | | B | 12 | 16 | 58 | 68 |
| *Sparassis crispa* | | D | 27 | 27 | 59 | 60 |
| *Spathularia flavida* | | B | 11 | 24 | 24 | 38 |
| *Stagnicola perplexa* | | B | 7 | 7 | 7 | 7 |
| *Thaxterogaster pavelekii* (*Thaxterogaster* sp. nov. #Trappe 4867, 6242, 7427, 7962, 8520) | | B | 3 | 6 | 3 | 7 |
| *Tremiscus helvelloides* | | D | 32 | 40 | 81 | 107 |

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|---|---|---|---|---|---|---|
| | | | Federal Land Only | Total | Federal Land only | Total |
| **FUNGI** | | | | | | |
| *Tricholoma venenatum* | | B | 0 | 0 | 0 | 0 |
| *Tricholomopsis fulvescens* | | B | 2 | 2 | 2 | 2 |
| *Tuber asa* (*Tuber* sp. nov. #Trappe 2302) | | B | 1 | 1 | 3 | 3 |
| *Tuber pacificum* (*Tuber* sp. nov. #Trappe 12493) | | B | 2 | 2 | 2 | 3 |
| *Tylopilus porphyrosporus (Tylopilus pseudoscaber)* | | D | 18 | 31 | 21 | 34 |
| **LICHENS** | | | | | | |
| *Bryoria pseudocapillaris* | | A | 5 | 8 | 13 | 24 |
| *Bryoria spiralifera* | | A | 8 | 8 | 20 | 49 |
| *Bryoria subcana* | | B | 16 | 16 | 18 | 18 |
| *Buellia oidalea* | | E | 4 | 17 | 5 | 18 |
| *Calicium abietinum* | | B | 7 | 7 | 9 | 10 |
| *Calicium adspersum* | | E | 0 | 0 | 0 | 0 |
| *Cetrelia cetrarioides* | | E | 23 | 23 | 29 | 60 |
| *Chaenotheca chrysocephala* | | B | 7 | 7 | 21 | 21 |
| *Chaenotheca ferruginea* | | B | 9 | 9 | 12 | 12 |
| *Chaenotheca subroscida* | | E | 0 | 0 | 5 | 5 |
| *Chaenothecopsis pusilla* | | E | 0 | 0 | 4 | 4 |
| *Collema nigrescens,* In WA and OR, except in OR Klamath Physiographic province | | F | 18 | 21 | 18 | 28 |
| *Dendriscocaulon intricatulum,* In California | | E | | | | |
| *Dendriscocaulon intricatulum,* In all of Washington and Oregon except Coos, Douglas, Curry, Josephine, and Jackson Counties | | A | | | | 23[6] |
| *Dermatocarpon luridum* | | E | 11 | 12 | 12 | 16 |
| *Fuscopannaria saubinetii* (syn. *Pannaria saubinetii*) | | E | 126 | 126 | 180 | 190 |
| *Heterodermia sitchensis* | | E | 0 | 0 | 0 | 0 |
| *Hypogymnia duplicata* | | C | 70 | 70 | 200 | 211 |
| *Hypogymnia vittata* (misspelled in FEMAT as *Hygomnia vittiata*) | | E | 0 | 0 | 0 | 0 |
| *Hypotrachyna revoluta* | | E | 1 | 1 | 10 | 10 |
| *Leptogium burnetiae* var. *hirsutum* | | E | 1 | 2 | 1 | 4 |
| *Leptogium cyanescens* | | A | 3 | 3 | 8 | 10 |
| *Leptogium rivale* | | E | 30 | 30 | 67 | 71 |
| *Leptogium teretiusculum* | | E | 4 | 5 | 7 | 8 |
| *Lobaria linita,* Entire range except WA Western Cascades physiographic province north of Snoqualmie Pass and Olympic Peninsula physiographic province | | A | - | - | - | 29[6] |
| *Lobaria oregana,* In California | | A | 6 | 6 | 11 | 11 |
| *Microcalicium arenarium* | | B | 0 | 0 | 0 | 0 |
| *Nephroma bellum*, In OR; Klamath, Willamette Valley, Eastern Cascades; WA; Western Cascades (outside GPNF), Eastern Cascades, Olympic Peninsula physiographic provinces | | E | 12 | 12 | 20 | 20 |
| *Nephroma isidiosum* | | E | 0 | 0 | 0 | 0 |
| *Nephroma occultum* | | C | 95 | 95 | 168 | 168 |
| *Niebla cephalota* | | A | 4 | 11 | 4 | 15 |
| *Pannaria rubiginosa* | | E | 10 | 11 | 10 | 13 |
| *Peltigera pacifica* | | E | 36 | 36 | 72 | 80 |
| *Platismatia lacunosa,* Except in Oregon Coast Range physiographic province | | E | - | - | - | 37[6] |

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|---|---|---|---|---|---|---|
| | | | Federal Land Only | Total | Federal Land only | Total |
| **LICHENS** | | | | | | |
| *Pseudocyphellaria* perpetua (misapplied name - *P. mougiotiana in* FEMAT and NWFP, 1994. also called *Pseudocyphellaria sp*. 1 in Management Recommendations (Lesher et al. 2000)) | | A | 1 | 1 | 5 | 5 |
| *Pseudocyphellaria rainierensis* | | A | 107 | 107 | 167 | 167 |
| *Stenocybe clavata* | | E | 2 | 2 | 7 | 7 |
| *Teloschistes flavicans* | | A | 2 | 8 | 3 | 9 |
| *Tholurna dissimilis*, south of Columbia River | | B | 3 | 5 | 3 | 5 |
| *Usnea hesperina* | | E | 7 | 7 | 14 | 17 |
| *Usnea longissima*, In California and in Curry, Josephine, and Jackson Counties, Oregon | | A | 13 | 26 | 19 | 26 |
| *Usnea longissima*, In Oregon, except in Curry, Josephine, and Jackson Counties and in Washington | | F | 100 | 100 | 115 | 207 |
| **BRYOPHYTES** | | | | | | |
| *Brotherella roellii* | | E | 5 | 5 | 5 | 5 |
| *Buxbaumia viridis*, In California | | E | 1 | 1 | 4 | 5 |
| *Diplophyllum plicatum* | | B | 45 | 45 | 78 | 80 |
| *Herbertus aduncus* | | E | 4 | 5 | 8 | 9 |
| *Iwatsukiella leucotricha* | | B | 2 | 2 | 2 | 2 |
| *Kurzia makinoana* | | B | 3 | 4 | 3 | 4 |
| *Marsupella emarginata* var. *aquatica* | | B | 1 | 1 | 1 | 1 |
| *Orthodontium gracile* | | B | 1 | 27 | 2 | 29 |
| *Ptilidium californicum*, In California | | A | 30 | 30 | 228 | 228 |
| *Racomitrium aquaticum* | | E | 14 | 15 | 24 | 28 |
| *Rhizomnium nudum*, Outside Washington | | B | - | - | - | 26[6] |
| *Schistostega pennata* | | A | 26 | 26 | 59 | 59 |
| *Tetraphis geniculata* | | A | 30 | 30 | 57 | 57 |
| *Tritomaria exsectiformis* | | B | 10 | 10 | 15 | 15 |
| *Tritomaria quinquedentata* | | B | 3 | 4 | 11 | 12 |
| **VERTEBRATES** | | | | | | |
| Larch Mountain salamander *Plethodon larselli* | | A | 79 | 79 | 88 | 88 |
| Shasta salamander *Hydromantes shastae* | | A | 50 | 50 | 56 | 56 |
| Siskiyou Mountains salamander *Plethodon stormi*, North Range | | D[1] | 138 | 138 | 143 | 143 |
| Siskiyou Mountains salamander *Plethodon stormi*, South Range | | A | 22 | 22 | 30 | 30 |
| Van Dyke's salamander *Plethodon vandykei*, Cascade population only | | A | 23 | 26 | 23 | 29 |
| Great Gray Owl *Strix nebulosa* | | A | 69 | 69 | 103 | 114 |
| Oregon Red Tree Vole *Arborimus longicaudus*, Xeric, Northern Mesic | | C | 0[7] | 0[7] | 346 | 346 |
| **MOLLUSKS** | | | | | | |
| *Cryptomastix devia* | | A | 26 | 26 | 121 | 148 |
| *Cryptomastix hendersoni* | | A | 18 | 22 | 18 | 22 |
| *Deroceras hesperium* | | B[4] | 2 | 4 | 2 | 4 |
| *Fluminicola* n. sp. 3 | | A[2] | 2 | 4 | 3 | 5 |
| *Fluminicola* n. sp. 11 | | A[2] | 2 | 2 | 2 | 2 |
| *Fluminicola* n. sp. 14 | | A | 3 | 12 | 3 | 12 |
| *Fluminicola* n. sp. 15 | | A | 0 | 4 | 0 | 4 |
| *Fluminicola* n. sp. 16 | | A | 0 | 17 | 0 | 17 |
| *Fluminicola* n. sp. 17 | | A | 0 | 2 | 0 | 2 |
| *Fluminicola* n. sp. 18 | | A | 1 | 3 | 1 | 3 |
| *Fluminicola* n. sp. 19 | | A[2] | 0 | 1 | 0 | 1 |

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|---|---|---|---|---|---|---|
| | | | Federal Land Only | Total | Federal Land only | Total |
| **MOLLUSKS** | | | | | | |
| *Fluminicola* n. sp. 20 | | A[2] | 0 | 2 | 0 | 2 |
| *Fluminicola seminalis* | | A[2] | 5 | 15 | 5 | 15 |
| *Helminthoglypta talmadgei* | | D[1] | 93 | 93 | 761 | 761 |
| *Hemphillia burringtoni* | | E | 4 | 31 | 17 | 55 |
| *Hemphillia glandulosa*, In WA Western Cascades Physiographic Province | | E | 64 | 64 | 139 | 140 |
| *Hemphillia malonei*, Washington | | C | 94 | 94 | 341 | 352 |
| *Hemphillia pantherina* | | B[4] | 0 | 0 | 0 | 0 |
| *Juga (O)* n. sp. 2 | | A | 3 | 7 | 3 | 7 |
| *Juga (O)* n. sp. 3 | | A | 0 | 4 | 0 | 4 |
| *Lyogyrus* n. sp. 1 | | A | 28 | 28 | 49 | 61 |
| *Lyogyrus* n. sp. 2 | | A | 3 | 3 | 3 | 3 |
| *Lyogyrus* n. sp. 3 | | A | 0 | 1 | 0 | 1 |
| *Monadenia chaceana* | | B[4] | 48 | 48 | 110 | 125 |
| *Monadenia fidelis minor* | | A | 14 | 15 | 60 | 61 |
| *Monadenia troglodytes troglodytes* | | A | 8 | 9 | 8 | 9 |
| *Monadenia troglodytes wintu* | | A | 7 | 7 | 7 | 8 |
| *Oreohelix* n. sp. | | A | 25 | 36 | 43 | 54 |
| *Pristoloma arcticum crateris* | | A[2] | 13 | 13 | 90 | 90 |
| *Prophysaon coeruleum*, In California and Washington | | A | 31 | 31 | 112 | 112 |
| *Trilobopsis roperi* | | A | 51 | 55 | 140 | 146 |
| *Trilobopsis tehamana* | | A | 4 | 6 | 4 | 7 |
| *Vertigo* n. sp. | | A | 1 | 1 | 1 | 1 |
| *Vespericola pressleyi* | | A | 19 | 19 | 21 | 21 |
| *Vespericola shasta* | | A | 6 | 12 | 72 | 78 |
| *Vorticifex* n. sp. 1 | | E | 0 | 2 | 0 | 2 |
| **VASCULAR PLANTS** | | | | | | |
| *Arceuthobium tsugense mertensianae*, In Washington only | | F | 0 | 0 | 2 | 2 |
| *Bensoniella oregana*, In California only | | A | 3 | 10 | 3 | 25 |
| *Botrychium minganense*, In Oregon and California | | A | 7 | 7 | 13 | 16 |
| *Botrychium montanum* | | A | 53 | 53 | 68 | 68 |
| *Coptis asplenifolia* | | A | 14 | 14 | 21 | 21 |
| *Coptis trifolia* | | A | 2 | 3 | 2 | 3 |
| *Corydalis aquae-gelidae* | | A | 95 | 101 | 102 | 110 |
| *Cypripedium fasciculatum*, Entire Range except WA Eastern Cascades physiographic province | | C | - | - | - | 818[6] |
| *Cypripedium montanum*, Entire range except WA Eastern Cascades physiographic province | | C | 326 | 342 | 393 | 424 |
| *Eucephalus vialis (Aster vialis)* | | A | 31 | 53 | 65 | 89 |
| *Galium kamtschaticum*, Olympic Peninsula, WA Eastern Cascades, OR & WA Western Cascades physiographic provinces, south of Snoqualmie Pass | | A | 5-8 | 5-8 | 11-14 | 11-14 |
| *Platanthera orbiculata* var. *orbiculata* (*Habenaria orbiculata*) | | C | 82 | 82 | 146 | 146 |
| **ARTHROPODS** | | | | | | |
| Canopy herbivores (south range) | | F | - | - | - | - |
| Coarse wood chewers (south range) | | F | - | - | - | - |

## Table 3&4-8. Number of Known Sites for Species Included in Survey and Manage Standards and Guidelines, November 2000 Final SEIS and Present (March 2003).

| **TAXA GROUP** *Species* | *Note*: Where taxon has more than one name indicated, first name is current accepted name, second one (in parentheses) is name used in Northwest Forest Plan (Table C-3). | **Cate-gory** | **Known Sites in Final SEIS 2000*** | | **Known Sites Present**** | |
|---|---|---|---|---|---|---|
| | | | Federal Land Only | Total | Federal Land only | Total |
| **ARTHROPODS** | | | | | | |
| Litter and soil dwelling species (south range) | | F | - | - | - | - |
| Understory and forest gap herbivores (south range) | | F | - | - | - | - |

*These numbers were a result of a data call cutoff date of 11/99 and/or 3/2000. Most of the Final SEIS 2000 numbers do not reflect the numbers listed in Table F-1 and F-2 in the 2000 Final SEIS. Numbers in the 2000 Final SEIS likely included sites on non-Federal land, sites not within the Northwest Forest Plan area, and/or historic/non-extant sites. In addition, site definition (and proximity of individual sites) may have changed since the 11/99 data entry cutoff. Also, database clean-ups have also reduced some double counting/entries and some other database errors. Sites included above may still contain some of these errors, including the counting of historic sites, as many historic sites have not been revisited to determine if they are extant.

**For certain fungi, data entry deadline was 1/11/02; for great gray owl, amphibians and red tree vole, data entry deadline was 3/8/02; for vascular plants, bryophytes, and certain fungi data entry deadline was 6/7/02; and for mollusks and lichens, data entry deadline was 8/2/02.

[1]Although pre-disturbance surveys are deemed practical, continuing pre-disturbance surveys is not necessary to meet management objectives.

[2]Until Management Recommendations are written: Known and newly discovered sites will be protected from grazing by all practical steps to ensure that the local population of the species will not be impacted.

[3]Until Management Recommendations are written, the language known and newly discovered sites of these species will be protected from grazing by all practical steps to ensure that the local population of the species will not be impacted is the Management Recommendation. No other recommendations are imposed at this time.

[4]Equivalent-effort pre-disturbance surveys are required for these mollusk species.

[5]This mollusk species requires management of sites known as of 9/30/99.

[6]The range for this species was reduced as a result of the 2002 Annual Species Review (March 2003).

[7] Due to the timing of the 2003 Annual Species Review, known sites within the xeric and northern mesic zones were not available to the SEIS Team.

## Table 3&4-9. Species Outcomes

| TAXA GROUP *Species* | Sufficient Habitat Under All Alternative | Insufficient Information to Determine Outcome | Insufficient Habitat | | |
|---|---|---|---|---|---|
| | | | Not Caused by Federal Action | Caused by Management Under Alt. 2 | Caused by Management Under Alt. 3 |
| **FUNGI** | | | | | |
| *Acanthophysium farlowii* | | | ✓ | | |
| *Albatrellus avellaneus* | | | ✓ | | |
| *Albatrellus caeruleoporus* | | | ✓ | | |
| *Albatrellus ellisii* | | | | ✓ | |
| *Albatrellus flettii* | | | | ✓ | |
| *Alpova alexsmithii* | | | ✓ | | |
| *Alpova olivaceotinctus* | | | ✓ | | |
| *Arcangeliella camphorata* | | | ✓ | | |
| *Arcangeliella crassa* | | | ✓ | | |
| *Arcangeliella lactarioides* | | | ✓ | | |
| *Asterophora lycoperdoides* | | | ✓ | | |
| *Asterophora parasitica* | | | ✓ | | |
| *Baeospora myriadophylla* | | | ✓ | | |
| *Balsamia nigrens* | | | ✓ | | |
| *Boletus haematinus* | | | ✓ | | |
| *Boletus pulcherrimus* | | | ✓ | | |
| *Bondarzewia mesenterica* | ✓ | | | | |
| *Bridgeoporus nobilissimus* | | | ✓ | | |
| *Cantharellus subalbidus* | ✓ | | | | |
| *Catathelasma ventricosa* | | | ✓ | | |
| *Chalciporus piperatus* | ✓ | | | | |
| *Chamonixia caespitosa* | | | ✓ | | |
| *Choiromyces alveolatus* | | | ✓ | | |
| *Choiromyces venosus* | | | ✓ | | |
| *Chroogomphus loculatus* | | | ✓ | | |
| *Chrysomphalina grossula* | | | ✓ | | |
| *Clavariadelphus ligula* | | | | ✓ | |
| *Clavariadelphus occidentalis* | | | | ✓ | |
| *Clavariadelphus sachalinensis* | | | | ✓ | |
| *Clavariadelphus subfastigiatus* | | | ✓ | | |
| *Clavariadelphus truncatus* | ✓ | | | | |
| *Clavulina castanopes* v. *lignicola* | | | ✓ | | |
| *Clitocybe senilis* | | | ✓ | | |
| *Clitocybe subditopoda* | | | ✓ | | |
| *Collybia bakerensis* | ✓ | | | | |
| *Collybia racemosa* | | | ✓ | | |
| *Cordyceps ophioglossoides* | | | ✓ | | |
| *Cortinarius barlowensis* | | | | ✓ | |
| *Cortinarius boulderensis* | | | ✓ | | |
| *Cortinarius cyanites* | | | ✓ | | |
| *Cortinarius depauperatus* | | | ✓ | | |
| *Cortinarius magnivelatus* | | | ✓ | | |
| *Cortinarius olympianus* | | | ✓ | | |
| *Cortinarius speciosissimus* | | | ✓ | | |
| *Cortinarius tabularis* | | ✓ | | | |
| *Cortinarius umidicola* | | | ✓ | | |

## Table 3&4-9. Species Outcomes

| TAXA GROUP *Species* | Sufficient Habitat Under All Alternative | Insufficient Information to Determine Outcome | Insufficient Habitat | | |
|---|---|---|---|---|---|
| | | | Not Caused by Federal Action | Caused by Management Under Alt. 2 | Caused by Management Under Alt. 3 |
| **FUNGI** | | | | | |
| *Cortinarius valgus* | | | ✓ | | |
| *Cortinarius variipes* | | | ✓ | | |
| *Cortinarius verrucisporus* | | | ✓ | | |
| *Cortinarius wiebeae* | | | ✓ | | |
| *Cudonia monticola* | | | | ✓ | |
| *Cyphellostereum laeve* | | | ✓ | | |
| *Dermocybe humboldtensis* | | | ✓ | | |
| *Destuntzia fusca* | | | ✓ | | |
| *Destuntzia rubra* | | | ✓ | | |
| *Dichostereum boreale* | | | ✓ | | |
| *Elaphomyces anthracinus* | | | ✓ | | |
| *Elaphomyces subviscidus* | | | ✓ | | |
| *Endogone acrogena* | | | ✓ | | |
| *Endogone oregonensis* | | | ✓ | | |
| *Entoloma nitidum* | | | ✓ | | |
| *Fayodia bisphaerigera* | | | ✓ | | |
| *Fevansia aurantiaca* | | | ✓ | | |
| *Galerina cerina* | | | ✓ | | |
| *Galerina heterocystis* | | | | ✓ | |
| *Galerina sphagnicola* | | ✓ | | | |
| *Gastroboletus imbellus* | | | ✓ | | |
| *Gastroboletus ruber* | | | ✓ | | |
| *Gastroboletus subalpinus* | ✓ | | | | |
| *Gastroboletus turbinatus* | | | ✓ | | |
| *Gastroboletus vividus* | | | ✓ | | |
| *Gastrosuillus amaranthii* | | ✓ | | | |
| *Gastrosuillus umbrinus* | | | ✓ | | |
| *Gautieria magnicellaris* | | | ✓ | | |
| *Gautieria otthii* | | | ✓ | | |
| *Gelatinodiscus flavidus* | | | ✓ | | |
| *Glomus radiatum* | | | ✓ | | |
| *Gomphus bonarii* | | | | ✓ | |
| *Gomphus clavatus*[3] | ✓ | | | | |
| *Gomphus kauffmanii* | | | | ✓ | |
| *Gymnomyces abietis* | | | ✓ | | |
| *Gymnomyces nondistincta* | | | ✓ | | |
| *Gymnopilus punctifolius* | | | | ✓ | |
| *Gyromitra californica* | | | | ✓ | |
| *Hebeloma olympianum* | | | ✓ | | |
| *Helvella crassitunicata* | | | ✓ | | |
| *Helvella elastica* | ✓ | | | | |
| *Hydnotrya inordinata* | | | ✓ | | |
| *Hydnotrya subnix* | | | ✓ | | |
| *Hydropus marginellus* | | | ✓ | | |
| *Hygrophorus caeruleus* | | | ✓ | | |
| *Hygrophorus karstenii* | | | ✓ | | |

## Table 3&4-9. Species Outcomes

| TAXA GROUP *Species* | Sufficient Habitat Under All Alternative | Insufficient Information to Determine Outcome | Insufficient Habitat | | |
|---|---|---|---|---|---|
| | | | Not Caused by Federal Action | Caused by Management Under Alt. 2 | Caused by Management Under Alt. 3 |
| **FUNGI** | | | | | |
| *Hygrophorus vernalis* | | | ✓ | | |
| *Hypomyces luteovirens* | | | ✓ | | |
| *Leucogaster citrinus* | | | | ✓ | |
| *Leucogaster microsporus* | | | ✓ | | |
| *Macowanites chlorinosmus* | | | ✓ | | |
| *Macowanites lymanensis* | | | ✓ | | |
| *Macowanites mollis* | | | ✓ | | |
| *Marasmius applanatipes* | | | ✓ | | |
| *Martellia fragrans* | | | ✓ | | |
| *Martellia idahoensis* | | | ✓ | | |
| *Mycena hudsoniana* | | | ✓ | | |
| *Mycena overholtsii* | ✓ | | | | |
| *Mycena quinaultensis* | | | ✓ | | |
| *Mycena tenax* | | | ✓ | | |
| *Mythicomyces corneipes* | | | ✓ | | |
| *Neolentinus adhaerens* | | | ✓ | | |
| *Neolentinus kauffmanii* | | | ✓ | | |
| *Nivatogastrium nubigenum* | ✓ | | | | |
| *Octavianina cyanescens* | | | ✓ | | |
| *Octavianina macrospora* | | | ✓ | | |
| *Octavianina papyracea* | | | ✓ | | |
| *Otidea leporina* | ✓ | | | | |
| *Otidea smithii* | | | ✓ | | |
| *Phaeocollybia attenuata* | | | | ✓ | ✓ |
| *Phaeocollybia californica* | | | | ✓ | |
| *Phaeocollybia dissiliens* | | | | ✓ | |
| *Phaeocollybia fallax*[3] | | | | ✓ | ✓ |
| *Phaeocollybia gregaria* | | | ✓ | | |
| *Phaeocollybia kauffmanii* | ✓ | | | | |
| *Phaeocollybia olivacea*[3] | ✓ | | | | |
| *Phaeocollybia oregonensis*[3] | ✓ | | | | |
| *Phaeocollybia piceae* | | | | ✓ | |
| *Phaeocollybia pseudofestiva* | | | | ✓ | |
| *Phaeocollybia scatesiae* | | | | ✓ | |
| *Phaeocollybia sipei* | | | | ✓ | |
| *Phaeocollybia spadicea* | | | | ✓ | |
| *Phellodon atratus* | | | ✓ | | |
| *Pholiota albivelata* | | | ✓ | | |
| *Podostroma alutaceum* | | | ✓ | | |
| *Polyozellus multiplex* | | | | ✓ | |
| *Pseudaleuria quinaultiana* | | | ✓ | | |
| *Ramaria abietina* | | | ✓ | | |
| *Ramaria amyloidea* | | | | ✓ | |
| *Ramaria araiospora* | | | | ✓ | |
| *Ramaria aurantiisiccescens* | | | | ✓ | |
| *Ramaria botryis* var. *aurantiiramosa* | | | ✓ | | |

## Table 3&4-9. Species Outcomes

| TAXA GROUP *Species* | Sufficient Habitat Under All Alternative | Insufficient Information to Determine Outcome | Insufficient Habitat | | |
|---|---|---|---|---|---|
| | | | Not Caused by Federal Action | Caused by Management Under Alt. 2 | Caused by Management Under Alt. 3 |
| **FUNGI** | | | | | |
| *Ramaria celerivirescens* | | | | ✓ | |
| *Ramaria claviramulata* | | | ✓ | | |
| *Ramaria concolor f. marrii* | | ✓ | | | |
| *Ramaria concolor f. tsugina* | | | ✓ | | |
| *Ramaria conjunctipes* var. *sparsiramosa* | | | ✓ | | |
| *Ramaria coulterae* | | | ✓ | | |
| *Ramaria cyaneigranosa* | | | | ✓ | |
| *Ramaria gelatiniaurantia* | | | | ✓ | |
| *Ramaria gracilis* | | | ✓ | | |
| *Ramaria hilaris* var. *olympiana* | | | ✓ | | |
| *Ramaria largentii* | | | | ✓ | |
| *Ramaria lorithamnus* | | ✓ | | | |
| *Ramaria maculatipes* | | | ✓ | | |
| *Ramaria rainierensis* | | | ✓ | | |
| *Ramaria rubella* var. *blanda* | | | ✓ | | |
| *Ramaria rubribrunnescens* | | | ✓ | | |
| *Ramaria rubrievanescens* | | | | ✓ | |
| *Ramaria rubripermanens* | | | | ✓ | ✓ |
| *Ramaria spinulosa* var. *diminutiva* | | | ✓ | | |
| *Ramaria stuntzii* | | | | ✓ | |
| *Ramaria suecica* | | | ✓ | | |
| *Ramaria thiersii* | | | ✓ | | |
| *Ramaria verlotensis* | | | ✓ | | |
| *Rhizopogon abietis* | | | ✓ | | |
| *Rhizopogon atroviolaceus* | | | ✓ | | |
| *Rhizopogon brunneiniger* | | | ✓ | | |
| *Rhizopogon chamaleontinus* | | | ✓ | | |
| *Rhizopogon ellipsosporus* | | | ✓ | | |
| *Rhizopogon evadens* var. *subalpinus* | | | ✓ | | |
| *Rhizopogon exiguus* | | | ✓ | | |
| *Rhizopogon flavofibrillosus* | | | ✓ | | |
| *Rhizopogon inquinatus* | | | ✓ | | |
| *Rhizopogon truncatus* | | | | ✓ | ✓ |
| *Rhodocybe speciosa* | | | ✓ | | |
| *Rickenella swartzii* | | | ✓ | | |
| *Russula mustelina* | | ✓ | | | |
| *Sarcodon fuscoindicus* | | | | ✓ | |
| *Sedecula pulvinata* | | | ✓ | | |
| *Sowerbyella rhenana* | | | | ✓ | |
| *Sparassis crispa* | | | | ✓ | ✓ |
| *Spathularia flavida* | | | | ✓ | |
| *Stagnicola perplexa* | | | ✓ | | |
| *Thaxterogaster pavelekii* | | | ✓ | | |
| *Tremiscus helvelloides* | | | | ✓ | ✓ |
| *Tricholoma venenatum* | | ✓ | | | |
| *Tricholomopsis fulvescens* | | | ✓ | | |

## Table 3&4-9. Species Outcomes

| TAXA GROUP *Species* | Sufficient Habitat Under All Alternative | Insufficient Information to Determine Outcome | Insufficient Habitat | | |
|---|---|---|---|---|---|
| | | | Not Caused by Federal Action | Caused by Management Under Alt. 2 | Caused by Management Under Alt. 3 |
| **FUNGI** | | | | | |
| *Tuber asa* | | | ✓ | | |
| *Tuber pacificum* | | | ✓ | | |
| *Tylopilus porphyrosporus* | | | ✓ | | |
| **LICHENS** | | | | | |
| *Bryoria pseudocapillaris* | | | ✓ | | |
| *Bryoria spiralifera* | | | ✓ | | |
| *Bryoria subcana* | | | ✓ | | |
| *Buellia oidalea* | | | ✓ | | |
| *Calicium abietinum* | | ✓ | | | |
| *Calicium adspersum* | | ✓ | | | |
| *Cetrelia cetrarioides* | ✓ | | | | |
| *Chaenotheca chrysocephala* | | ✓ | | | |
| *Chaenotheca ferruginea* | | ✓ | | | |
| *Chaenotheca subroscida* | | | ✓ | | |
| *Chaenothecopsis pusilla* | | | ✓ | | |
| *Collema nigrescens* | ✓ | | | | |
| *Dendriscocaulon intricatulum* | ✓[1] | | | | |
| *Dermatocarpon luridum* | ✓ | | | | |
| *Fuscopannaria saubinetii* (syn. *Pannaria saubinetii*) | | | ✓ | | |
| *Heterodermia sitchensis* | | ✓ | | | |
| *Hypogymnia duplicata* | ✓ | | | | |
| *Hypogymnia vittata* | | ✓ | | | |
| *Hypotrachyna revoluta* | | | ✓ | | |
| *Leptogium burnetiae* var. *hirsutum* | | ✓ | | | |
| *Leptogium cyanescens* | | | ✓ | | |
| *Leptogium rivale* | ✓ | | | | |
| *Leptogium teretiusculum* | | | ✓ | | |
| *Lobaria linita* | ✓ | | | | |
| *Lobaria oregana* | | | ✓ | | |
| *Microcalicium arenarium* | | ✓ | | | |
| *Nephroma bellum* | ✓ | | | | |
| *Nephroma isidiosum* | | ✓ | | | |
| *Nephroma occultum*[3] | | | | ✓ | ✓ |
| *Niebla cephalota* | | | ✓ | | |
| *Pannaria rubiginosa* | ✓ | | | | |
| *Peltigera pacifica* | ✓[1] | | | | |
| *Platismatia lacunosa* | ✓ | | | | |
| *Pseudocyphellaria perpetua*[3] | | | ✓ | | |
| *Pseudocyphellaria rainierensis*[3] | | | | ✓ | ✓ |
| *Stenocybe clavata* | | ✓ | | | |
| *Teloschistes flavicans* | | | ✓ | | |
| *Tholurna dissimilis* | | ✓ | | | |
| *Usnea hesperina* | | | ✓ | | |
| *Usnea longissima* | ✓ | | | | |

## Table 3&4-9. Species Outcomes

| TAXA GROUP *Species* | Sufficient Habitat Under All Alternative | Insufficient Information to Determine Outcome | Insufficient Habitat | | |
|---|---|---|---|---|---|
| | | | Not Caused by Federal Action | Caused by Management Under Alt. 2 | Caused by Management Under Alt. 3 |
| **BRYOPHYTES** | | | | | |
| *Brotherella roellii* | | ✓ | | | |
| *Buxbaumia viridis*[3] | ✓ | | | | |
| *Diplophyllum plicatum* | ✓ | | | | |
| *Herbertus aduncus* | | ✓ | | | |
| *Iwatsukiella leucotricha* | ✓ | | | | |
| *Kurzia makinoana* | | ✓ | | | |
| *Marsupella emarginata v. aquatica* | ✓ | | | | |
| *Orthodontium gracile* | ✓ | | | | |
| *Ptilidium californicum* | ✓ | | | | |
| *Racomitrium aquaticum* | | ✓ | | | |
| *Rhizomnium nudum*[3] | ✓ | | | | |
| *Schistostega pennata* | ✓ | | | | |
| *Tetraphis geniculata*[3] | ✓ | | | | |
| *Tritomaria exsectiformis* | | ✓ | | | |
| *Tritomaria quinquedentata* | | ✓ | | | |
| **VERTEBRATES** | | | | | |
| Larch Mountain salamander *Plethodon larselli* | ✓ | | | | |
| Shasta salamander *Hydromantes shastae* | ✓ | | | | |
| Siskiyou Mountains salamander *Plethodon stormi* | ✓[1] | | | | |
| Van Dyke's salamander *Plethodon vandykei,* | ✓ | | | | |
| Great Gray Owl *Strix nebulosa* | ✓ | | | | |
| Oregon Red Tree Vole *Arborimus longicaudus* | ✓[1] | | | | |
| **MOLLUSKS** | | | | | |
| *Cryptomastix devia* | ✓ | | | | |
| *Cryptomastix hendersoni* | ✓ | | | | |
| *Deroceras hesperium*[3] | ✓ | | | | |
| *Fluminicola* n. sp. 3 | ✓ | | | | |
| *Fluminicola* n. sp. 11 | ✓ | | | | |
| *Fluminicola* n. sp. 14[3] | | | | ✓ | |
| *Fluminicola* n. sp. 15[3] | | | | ✓ | |
| *Fluminicola* n. sp. 16[3] | | | | ✓ | |
| *Fluminicola* n. sp. 17[3] | | | | ✓ | |
| *Fluminicola* n. sp. 18[3] | | | | ✓ | |
| *Fluminicola* n. sp. 19[3] | | | | ✓ | |
| *Fluminicola* n. sp. 20[3] | | | | ✓ | |
| *Fluminicola seminalis* | ✓[1] | | . | | |
| *Helminthoglypta talmadgei* | ✓[1] | | | | |
| *Hemphillia burringtoni* | ✓ | | | | |
| *Hemphillia glandulosa* | ✓ | | | | |
| *Hemphillia malonei* | ✓ | | | | |
| *Hemphillia pantherina*[3] | ✓ | ✓[2] | | | |
| *Juga (O)* n. sp. 2 | ✓ | | | | |
| *Juga (O)* n. sp. 3[3] | | | | ✓ | |

## Table 3&4-9. Species Outcomes

| TAXA GROUP *Species* | Sufficient Habitat Under All Alternative | Insufficient Information to Determine Outcome | Insufficient Habitat | | |
|---|---|---|---|---|---|
| | | | Not Caused by Federal Action | Caused by Management Under Alt. 2 | Caused by Management Under Alt. 3 |
| **MOLLUSKS** | | | | | |
| *Lyogyrus* n. sp. 1[3] | ✓ | | | | |
| *Lyogyrus* n. sp. 2 | ✓ | | | | |
| *Lyogyrus* n. sp. 3[3] | | | | ✓ | |
| *Monadenia chaceana* | ✓[1] | | | | |
| *Monadenia fidelis minor*[3] | ✓ | | | | |
| *Monadenia troglodytes troglodytes* | ✓ | | | | |
| *Monadenia troglodytes wintu* | ✓ | | | | |
| *Oreohelix* n. sp. | ✓ | | | | |
| *Pristoloma arcticum crateris*[3] | ✓ | | | | |
| *Prophysaon coeruleum*[3] | ✓ | | | | |
| *Trilobopsis roperi* | ✓ | | | | |
| *Trilobopsis tehamana* | ✓ | | | | |
| *Vertigo* n. sp.[3] | ✓ | | | | |
| *Vespericola pressleyi*[3] | ✓ | | | | |
| *Vespericola shasta* | ✓ | | | | |
| *Vorticifex* n. sp. 1[3] | | | | ✓ | |
| **VASCULAR PLANTS** | | | | | |
| *Arceuthobium tsugense mertensianae* | ✓ | | | | |
| *Bensoniella oregana* | ✓ | | | | |
| *Botrychium minganense* | ✓ | | | | |
| *Botrychium montanum* | ✓ | | | | |
| *Coptis asplenifolia* | ✓ | | | | |
| *Coptis trifolia* | ✓ | | | | |
| *Corydalis aquae-gelidae* | ✓ | | | | |
| *Cypripedium fasciculatum* | ✓ | | | | |
| *Cypripedium montanum* | ✓[1] | | | | |
| *Eucephalus vialis* | ✓ | | | | |
| *Galium kamtschaticum* | ✓ | | | | |
| *Platanthera orbiculata* var. *orbiculata* | ✓ | | | | |
| **ARTHROPODS** | | | | | |
| Canopy herbivores | | ✓ | | | |
| Coarse wood chewers | | ✓ | | | |
| Litter and soil dwelling species | | ✓ | | | |
| Understory and forest gap herbivores | | ✓ | | | |

[1]While having sufficient habitat range-wide in the Northwest Forest Plan area, the species has insufficient habitat in a portion of it range. Mitigation could be added to reduce this adverse effect (except for red tree vole and Siskiyou Mountains salamander).
[2]There is insufficient information to determine whether lack of pre-disturbance surveys in non-late-successional and non-old-growth stands under Alternative 3 results in sufficient habitat range-wide in the Northwest Forest Plan area because it is not known whether this species occurs in younger stands and the mechanisms that has allowed the sympatric species to persist in younger stands in the presence of various disturbances in the past are unknown.
[3]One of the 27 species for which the outcome changed between Draft and Final SEIS due to a discovery of error in logic, reconsideration of effects based on adding detail which gives a better description of the specifics of management that results in insufficient habitat, or changes in assumed Special Status Species placements.

# Glossary

**Acre** - A land area measurement based on horizontal plane; 43,560 square feet; 1/640th of a square mile; approximately 4/10ths of a hectare; if square, nearly 209 feet on a side.

**Adaptive management** - A continuing process of action-based planning, monitoring, researching, evaluating, and adjusting with the objective of improving implementation and achieving the goals of the standards and guidelines (USDA, USDI 1994a).

**Adaptive Management Areas** - Land allocation under the Northwest Forest Plan; areas designated for development and testing of technical and social approaches to achieving desired ecological, economic, and other social objectives.

**Administratively Withdrawn Areas** - Areas removed from the suitable timber base through agency direction and land and resource management plans.

**Alternative** - One of several policies, plans, or projects proposed for making decisions (USDA, USDI 1994a).

**Amphibians** - Cold-blooded vertebrates, including frogs, toads, salamanders, and newts, having four limbs and glandular skin, tied to moist or aquatic habitats for all or at least part of their life cycle.

**Arthropods** - Invertebrates belonging to the largest animal phylum (more than 800,000 species) including crustaceans, insects, centipedes, and arachnids. Characterized by a segmented body, jointed appendages, and an exoskeleton composed of chitin (USDA, USDI 1994a).

**Assessment species** - A Special Status Species Category established by Oregon/Washington BLM. Assessment species include plant and vertebrate species which are not presently eligible for official federal or state status but are of concern in Oregon or Washington and may, at a minimum, need protection or mitigation in BLM activities. These species will be considered as a level of special status species separate from Bureau sensitive.

**Bryophytes** - Plants of the phylum *Bryophyta*, including mosses, liverworts, and hornworts; characterized by the lack of true roots, stems, and leaves (USDA, USDI 1994a).

**Candidate Species** - Those plant and animal species that, in the opinion of the U.S. Fish and Wildlife Service (FWS) or NOAA Fisheries, may qualify for listing as endangered or threatened. The FWS recognizes two categories of candidates. Category 1 candidates are taxa for which the FWS has on file sufficient information to support proposals for listing. Category 2 candidates are taxa for which information available to the FWS indicates that proposing to list is possibly appropriate, but for which sufficient data are not currently available to support proposed rules.

**Category** - Groupings of species by relative rarity, practicality of pre-disturbance surveys, and information status. Management direction is generally the same for all species within a category and differs between categories.

**Clearance surveys** - see Surveys Prior to Habitat-Disturbing Activities.

**Coarse woody debris** - Portion of a tree that has fallen or been cut and left in the woods. Usually refers to pieces at least 20 inches in diameter (USDA, USDI 1994a).

**Congressionally Reserved Areas** - Areas that require Congressional enactment for their establishment, such as National Parks, Wild and Scenic Rivers, National Recreation Areas, National Monuments, and Wilderness. Also referred to as Congressional Reserves (USDA, USDI 1994a). Includes similar areas established by Executive Order such as National Monuments.

**Conservation Agreement** - A formal written document agreed to by federal agencies, tribes, state agencies, local governments, and/or the private sector to achieve the conservation of species through voluntary cooperation. It documents the specific actions and responsibilities for which each party agrees to be accountable. The objective of a Conservation Agreement is to reduce threats to a species and/or its habitat. An effective Conservation Agreement may lower listing priority or eliminate the need to list a species.

**Conservation Assessment** - A technical document that describes the current state of knowledge for the life history, habitat requirements, and management considerations for a species or group of species throughout its occupied range on the lands managed by the cooperating agencies. Habitat conservation assessments are often done as a forerunner to preparation of a conservation agreement.

**Conservation Strategy** - an interagency technical document based on the available scientific information for a species or group of species that discuss the biological and ecological factors of the species and determines if management actions are necessary for a species or group of species to persist over time. If actions are necessary, the strategy describes the actions land management agencies must take to maintain a species or group of species and usually include a monitoring plan. Conservation Strategies can also be known as Management Strategies.

**Decay Class** - Decaying logs are classified into five separate classes depending on their state of decay. The five classes are:

Class 1: Intact, recently downed trees. Bark is intact and not loose. No invading roots are present. Log is structurally sound.
Class 2: There is some loose bark, but most bark is difficult to pull from log. No invading roots are present. Structurally, the sapwood is somewhat decayed while the heartwood is mostly sound.
Class 3: Bark is easily pulled from the log or is absent. The stem is partly rotted. There are invading roots present only in the sapwood. The sapwood is decayed, but the heartwood is still mostly sound.
Class 4: The log is deeply decomposed with invading roots throughout. Bark has fallen off or is absent. Heartwood is rotten and branch stubs are easily pulled out.
Class 5: Hummocks of wood chunks and organic material. Bark has fallen off or is absent. Invading roots are present throughout wood chunks. There is no structural integrity.

**Ecological amplitude** - The breadth of the biological and environmental requirements of a species such as temperature, moisture, soil types, hosts, and stand ages.

**Ecosystem approach** - A strategy or plan to manage ecosystems to provide for all associated organisms, as opposed to a strategy or plan for managing individual species.

**Effects** - Effects, impacts, and consequences are synonymous. Effects may be direct, indirect, or cumulative and may fall in one of these categories: aesthetic, historic, cultural, economic, social, health, or ecological (such as effects on natural resources and on the components, structures, and functioning of affected ecosystems) (USDA USDI 1994a).

**Endemic or endemism** - Unique to a specific locality or the condition of being unique to a specific locality.

**Endangered Species** - A plant or animal identified and defined in accordance with the 1973 Endangered Species Act and published in the Federal Register (USDA, USDI 1994a)

**Endangered Species Act (ESA)** - A law passed in 1973 to conserve species of wildlife and plants determined by the Director of the Fish and Wildlife Service or the NOAA Fisheries to be endangered or threatened with extinction in all or a significant portion of its range. Among other measures, ESA requires all federal agencies to conserve these species and consult with the Fish and Wildlife Service or NOAA Fisheries on federal actions that may affect these species or their designated critical habitat.

**Environmental analysis** - An analysis of alternative actions and their predictable short-term and long-term environmental effects, incorporating physical, biological, economic, and social considerations (USDA, USDI 1994a).

**Environmental Impact Statement (EIS)** - A statement of the environmental effects of a proposed action and alternatives to it. It is required for major federal actions under Section 102 of the National Environmental Policy Act (NEPA), and released to the public and other agencies for comment and review. It is a formal document that must follow the requirements of NEPA, the CEQ guidelines, and directives of the agency responsible for the project proposal.

**Equivalent-effort surveys** - Pre-disturbance surveys for species whose characteristics, such as small size or irregular fruiting, prevent it from being consistently located during site-specific surveys.

**Extant** - Still present in a specific locality.

**Forest Ecosystem Management Assessment Team (FEMAT)** - An interagency, interdisciplinary team of scientists, economists, and sociologists led by Dr. Jack Ward Thomas and chartered to review proposals for management of federal forests within the range of the northern spotted owl. The team produced a report assessing ten options in detail, which were used as a basis for developing the Northwest Forest Plan.

**Fungi** - Saprophytic and parasitic spore-producing organisms usually classified as plants that lack chlorophyll and include molds, rusts, mildews, smuts, mushrooms, and yeasts.

**Habitat** - Place or environment where a plant or animal naturally or normally lives and grows. For surveys: habitat specific to the species being surveyed, generally described in Survey Protocols or Management Recommendations.

**Habitat Conservation Assessment** - A comprehensive, state-of-knowledge technical document that describes life history, habitat requirements, and management considerations for a species or group of species throughout its/their occupied range on the lands managed by the cooperating agencies.

**Habitat-disturbing activity** - Activities with disturbances likely to have a substantial negative impact on the species habitat, its life cycle, microclimate, or life support requirements. See additional detail in the standards and guidelines.

**Hazardous fuel treatments** - A management activity that is designed to reduce fuel levels and reduce burn intensity. Hazardous fuel treatments include, but are not limited to, thinning tree stands, creating fuel breaks, controlling bark beetle infestations, and prescribed fire.

**High-priority sites** - A site or group of sites deemed necessary for species persistence. High-priority sites may be identified as specific locations, sites meeting specific criteria, or as a distribution of populations or sites over a geographic area that may change over time. High-priority sites are designated through the Management Recommendations for the species. High-priority sites are generally a subset of known sites; however, in some cases, all known sites may be determined to be high-priority sites. Management of high-priority sites is necessary to ensure species persistence.

**Interagency Species Management System (ISMS)** - An interagency database system that contains information about Survey and Manage species in the Northwest Forest Plan area, including known sites, species locations, and habitats.

**Interdisciplinary team (ID team)** - A group of individuals with varying areas of specialty assembled to solve a problem or perform a task. The team is assembled out of recognition that no one scientific discipline is sufficiently broad enough to adequately analyze the problem and propose action.

**Issue** - A point, matter, or question of public discussion or interest to be addressed or decided through the planning process.

**Known site** - Historic and current location of a species reported by a credible source, available to field offices, and that does not require additional species verification or survey by the Agency to locate the species. Known sites include those known prior to the signing of the Northwest Forest Plan Record of Decision (USDA, USDI 1994b), as well as sites located in the future. Known sites can be based on any documented and credible source (such as herbaria/museum records, published documents, Agency records, species expert records, and documented public information). Historic locations where it can be demonstrated that the species and its habitat no longer occur do not have to be considered known sites. A credible source is a professional or amateur person who has academic training and/or demonstrated expertise in identification of the taxon of interest sufficient for the Agency to accept the identification as correct. These can include Agency staff and private individuals.

The known site identification should be precise enough to locate the species by geographic coordinates, maps, or descriptions sufficient to design specific management actions or to be located by other individuals. Also see "site" for description of size or components.

**Land management** - Intentional process of planning, organizing, programming, coordinating, directing, and controlling land use actions.

**Land allocation** - Commitment of a given area of land or a resource to one or more specific uses (such as campgrounds or Wilderness). In the Northwest Forest Plan, one of the seven allocations of Congressionally Withdrawn Areas, Late-Successional Reserves, Adaptive Management Areas, Managed Late-Successional Areas, Administratively Withdrawn Areas, Riparian Reserves, or Matrix.

**Landscape** - A heterogeneous land area with interacting ecosystems repeated in similar form throughout (USDA, USDI 1994a).

**Late-successional forests** - Forest stands consisting of trees, structural attributes, supporting biological communities, and processes associated with old-growth and/or mature forests (USDA, USDI 1994a). Forest seral stages that include mature and old-growth age classes (USDA, USDI 1994a). These stands exhibit increasing stand diversity, patchy multi-layered canopy, trees of several age classes, larger standing dead trees (snags), large woody debris, and species that represent the potential natural community (FEMAT 1993). Age is not a defining characteristic but has been used as a proxy or

indicator in the past. Minimum ages vary depending on the site quality, species, and rate of stand development.

**Late-Successional Reserve** - Land allocation under the Northwest Forest Plan with the objective to protect and enhance conditions of late-successional and old-growth forest ecosystems that serve as habitat for late-successional and old-growth forest related species, including the northern spotted owl. Limited stand management is permitted, subject to review by the Regional Ecosystem Office (USDA, USDI 1994b).

**Lichens** - Organisms consisting of a fungus and a photosynthetic partner (green algae, cyanobacteria, or both) growing together in a mutually beneficial relationship. The composite form is strongly altered in appearance, physiology, reproduction, and chemistry, compared to free living fungi, algae, or bacteria.

**Line officer** - In the BLM and Forest Service, the individual managers in the direct chain of command.

**Listed Species** - A plant or animal identified and defined in accordance with the 1973 Endangered Species Act as threatened or endangered.

**Manage (as in manage known sites)** - To maintain the habitat elements needed to provide for persistence of the species at the site. Manage may range from maintaining one or more habitat components such as down logs or canopy cover, up to complete exclusion from disturbance for many acres, and may permit loss of some individuals, area, or elements not affecting continued site occupancy.

**Managed Late-Successional Areas** - Land allocation under the Northwest Forest Plan; similar to Late-Successional Reserves, but identified for certain owl territories in the drier provinces where regular and frequent fire is a natural part of the ecosystem. Certain silvicultural treatments and fire hazard reduction treatments are allowed to help prevent large-scale disturbance such as fires of high intensity or severity, disease, and insect epidemics.

**Management Recommendation** - An interagency document that addresses how to manage known sites and that provides guidance to Agency efforts in conserving Survey and Manage species. They describe the habitat parameters that provide for maintaining the taxon at that site. They may also identify high-priority sites for uncommon species or provide other information to support management direction. (See additional detail in the standards and guidelines.)

**Management Strategy** - see Conservation Strategy.

**Matrix** - Federal lands outside of reserves, withdrawn areas, Managed Late-Successional Areas, and Adaptive Management Areas (USDA, USDI 1994a).

**Mature forest** - A subset of late-successional forests. Mature forests are characterized by the onset of slowed height growth, crown expansion, heavier limbs, gaps, some mortality in larger trees, and appearance of more shade-tolerant species or additional crown layers. (Adapted from USDA, USDI 1994b, pp. B-2 and B-3).

**Microclimate** - The suite of climatic conditions measured in localized areas near the earth's surface. Microclimate variables important to habitat may include temperature, light, wind speed, and moisture.

**Mitigation measures** - Modifications of actions taken to: (1) avoid impacts by not taking a certain action or parts of an action; (2) minimize impacts by limiting the degree or magnitude of the action and its implementation; (3) rectify impacts by repairing,

rehabilitating, or restoring the affected environment; (4) reduce or eliminate impacts over time by preservation and maintenance operations during the life of the action; or, (5) compensate for impacts by replacing or providing substitute resources or environments (USDA, USDI 1994a).

**Mollusks** - Invertebrate animals (such as slugs, snails, clams, or squids) that have a soft unsegmented body usually enclosed in a calcareous shell.

**Monitoring** - A process of collecting information to evaluate if objectives and anticipated or assumed results of a management plan are being realized or if implementation is proceeding as planned (USDA, USDI 1994a).

**National Environmental Policy Act (NEPA)** - An Act passed in 1969 to declare a National policy that encourages productive and enjoyable harmony between humankind and the environment, promotes efforts that prevent or eliminate damage to the environment and biosphere, stimulates the health and welfare of humanity, enriches the understanding of the ecological systems and natural resources important to the nation, and establishes a Council on Environmental Quality (USDA, USDI 1994a).

**National Forest Management Act (NFMA)** - A law passed in 1976 as an amendment to the Forest and Rangeland Renewable Resources Planning Act, requiring preparation of Forest Plans and the preparation of regulations to guide that development (USDA, USDI 1994a).

**Non-vertebrate species** - A species that does not have a backbone.

**Northwest Forest Plan** - Coordinated ecosystem management direction incorporated into land and resource management plans for lands administered by the BLM and the Forest Service within the range of the northern spotted owl. In April 1993, then President Clinton directed his cabinet to craft a balanced, comprehensive, and long-term policy for management of over 24 million acres of public land within the range of the northern spotted owl. A Forest Ecosystem Management Assessment Team (FEMAT) was chartered to develop a series of options. These options were modified in response to public comment and additional analysis and then analyzed in a Final Supplemental Environmental Impact Statement (USDA, USDI 1994a). A Record of Decision was signed on April 13, 1994, by the Secretaries of the Department of Agriculture and the Department of Interior to adopt Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl (USDA, USDI 1994b). The Record of Decision, including the Standards and Guidelines for Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl is referred to as the "Northwest Forest Plan." The Northwest Forest Plan is not a "plan" in the agency planning regulations sense; the term instead refers collectively to the 1994 amendment to existing agency land and resource management plans or to the specific standards and guidelines for late-successional species incorporated into subsequent land and resource management plans.

**Old-growth forest** - An ecosystem distinguished by old trees and related structural attributes. Old growth encompasses the later stages of stand development that typically differ from earlier stages in a variety of characteristics which may include tree size, accumulations of large dead woody material, number of canopy layers, species, composition, and ecosystem function. More specific parameters applicable to various species are available in the 1993 Interim Old Growth Definitions (USDA Forest Service Region 6). The Northwest Forest Plan SEIS and FEMAT describe old-growth forest as a forest stand usually at least 180 to 220 years old with moderate-to-high canopy closure; a multi-layered, multi-species canopy dominated by large overstory trees; high incidence

of large trees, some with broken tops and other indications of old and decaying wood (decadence); numerous large snags; and heavy accumulations of wood, including large logs on the ground (USDA, USDI 1994a).

**Outcome** - A reasoned determination of whether a particular species would be at high risk of extirpation. This determination was based on numerous factors including (1) the reserve system; (2) Matrix and Adaptive Management Area Standards and Guidelines; (3) provisions for species management under the Survey and Manage or Special Status Species Programs; (4) species range, distribution, and/or populations; (5) species life history and habitat needs; and, (6) number of known sites. Information from FEMAT; the Northwest Forest Plan Final SEIS; the 2000 Survey and Manage Final SEIS; the 2001, 2002, and 2003 Annual Species Review; and ISMS database, along with the professional knowledge of taxa experts was used to make the determination. Since each species has different life histories, ranges, distributions, and habitat needs, it is impossible to devise a single set of precise thresholds for determining what constitutes a high risk. Determinations are based on the professional evaluation of experts and tend to be qualitative. The four potential outcomes used to inform management decisions are:

1. Habitat (including known sites) is sufficient to support stable populations in the Northwest Forest Plan area
2. Habitat (including known sites) is sufficient to support stable populations range-wide in the Northwest Forest Plan area, although there is insufficient habitat to support stable populations in a portion of the Northwest Forest Plan area.
3. Habitat (including known sites) is insufficient to support stable populations in the Northwest Forest Plan area.
4. There is insufficient information to determine an outcome.

**The Oregon Natural Heritage Information Center** - ONHIC is part of the Oregon State University Institute for Natural Resources in the Research Office. Their mission is to identify the plant, animal, and ecological community resources of Oregon. As part of the Natural Heritage Network and NatureServe, the Oregon Natural Heritage Information Center contributes to an understanding of global biodiversity and provides tools for managers and the public to better protect vanishing species and communities.

**Oregon Natural Heritage Program** - The Oregon Natural Heritage Program is a cooperative, interagency effort to identify the animal and plant community resources of Oregon. The program is managed by the Oregon Natural Heritage Information Center, part of the Oregon State University's Institute for Natural Resources, under a cooperative agreement with the Oregon Division of State Lands. The Natural Heritage Program was established by the Oregon Natural Heritage Act, and is overseen by the Natural Heritage Advisory Council, a board appointed by the Governor.

**Persistence (as in persistence objective for a species)** - An abbreviated expression of the species management objectives for these standards and guidelines. Generally the persistence objective for vertebrates is based on the Forest Service viability provision in the regulations implementing NFMA. For non-vertebrates, it is a similar standard to the extent practicable. See "Species Persistence Objective" in the 2001 Survey and Manage Standards and Guidelines for more details. Use in standards and guidelines such as "sites not needed for persistence" includes an understood "reasonable assurance of" or "to the extent practicable."

**Persistence (as in persistence at a site)** - Continued occupancy by a species at a known site.

**Physiographic province** - A geographic area having a similar set of biophysical characteristics and processes due to effects of climate and geology that result in patterns of soils and broad-scale plant communities. Habitat patterns, wildlife distributions, and

historical land use patterns may differ significantly from those of adjacent provinces (USDA, USDI 1994a) (See Figure 1 in the 2001 standards and guidelines).

**Planning area** - All of the lands within a federal agency's management boundary addressed in land management plans (USDA, USDI 1994a).

**Practical surveys (relative to surveys prior to habitat-disturbing activities)** - Surveys are practical if characteristics of the species (such as size, regular fruiting) and identifying features result in being able to reliably locate the species, if the species is present, within one or two field seasons and with a reasonable level of effort. Characteristics determining practicality of surveys include: individual species must be of sufficient size to be detectable; the species must be readily distinguishable in the field or with no more than simple laboratory or office examination for verification of identification; the species is recognizable, annually or predictably producing identifying structures; and the surveys must not pose a health or safety risk. See additional detail in the standards and guidelines.

**Pre-disturbance surveys** - see Surveys Prior to Habitat-Disturbing Activities.

**Pre-project clearances** - activities conducted to learn whether a species is present or potentially present in a geographic area. Pre-project clearances may include, but are not limited to,

- clearance surveys;
- field clearances;
- field reconnaissance;
- inventories;
- habitat examinations;
- habitat evaluation;
- evaluation of species-habitat associations and presence of suitable or potential habitat;
- review of existing survey records, inventories, and spatial data;
- utilization of professional research, literature, and other technology transfer sources; or
- use of expertise, both internal and external, that is based on documented, substantiated professional rationale.

Pre-project clearances are completed prior to habitat-disturbing activities to determine the presence of a species or its habitat and the effect of management actions on the species.

**Prescribed fire** - Any fire ignited by management actions to meet specific objectives. A written, approved prescribed fire plan must exist, and NEPA requirements must be met, prior to ignition.

**Proposed species** - Any plant or animal species that is proposed by the Fish and Wildlife Service or NOAA Fisheries in a Federal Register notice to be listed as threatened or endangered.

**Proposive surveys** - One type of landscape-scale or strategic survey, proposive surveys are focused searches conducted where taxa experts anticipate finding the target species. They are used to find sites of the rarest species, i.e. those that may not be picked up in random plots. Also referred to as purposive surveys.

**Purposive surveys** - see Proposive surveys.

**Range of the Northern Spotted Owl** - Area generally comprised of lands in western portions of Washington, Oregon, and northern California (see Province Map, Figure 1) (USDA, USDI 1994a).

**Rare** - A species is considered to be rare when there are a low number of extant known sites with low numbers of individuals present at each site and populations are not well-distributed within its natural range. "Low" numbers and "not well distributed" are relative terms that must be considered in the context of other criteria such as distribution of habitat, fecundity, and so forth. See complete list of criteria under "Relative Rarity" in the standards and guidelines.

**Record (as applied in the ISMS database)** - A single database entry. There may be more than one record for a single location because the location was visited multiple times, the visit record was recorded more than once by multiple observers, or voucher specimens from the location were stored in several different locations.

**Record of Decision** - A document separate from, but associated with, an environmental impact statement that: (1) states the management decision; (2) states the reason for that decision; (3) identifies all alternatives including the environmentally preferable and selected alternatives; and (4) states whether all practicable measures to avoid environmental harm from the selected alternative have been adopted, and if not, why not (USDA, USDI 1994a).

**Reference distribution** - Historic or inferred biological distribution pattern of a species (limited by historic potential) that serves as a baseline to compare current and future distribution. For purposes of this analysis, the reference distribution is considered to be "well distributed."

**Regional Ecosystem Office (REO)** - The office that provides staff work and support to facilitate decision making of the Regional Interagency Executive Committee (RIEC) and to prompt interagency issue resolution in support of implementing the Northwest Forest Plan Standards and Guidelines. The REO is also responsible for evaluating major modifications arising from the adaptive management process and coordinating the formulation and implementation of data standards. This office reports to the RIEC and is responsible for developing, evaluating, and resolving consistency and implementation issues with respect to specific topics under the Northwest Forest Plan (USDA, USDI 1994b).

**Regional Interagency Executive Committee (RIEC)** - This group consists of the Pacific Northwest federal agency heads of the Forest Service, BLM, U.S. Fish and Wildlife Service, NOAA Fisheries, Bureau of Indian Affairs, Environmental Protection Agency, U.S. Army Corps of Engineers, U.S. Geological Survey (Biological Resource Division), Natural Resources Conservation Service, and the National Park Service. The RIEC serves as the senior regional entity to assure prompt, coordinated, and successful implementation of the Northwest Forest Plan Standards and Guidelines.

**Reserves** - Congressionally Reserved Areas (such as Wilderness) and land allocations that were designated under the Northwest Forest Plan, including Late-Successional Reserves, Riparian Reserves, and Managed Late-Successional Areas. Reserves help to protect and enhance conditions of late-successional and old-growth forest ecosystems. Stand management actions are either prohibited or limited within these allocations. The likelihood of maintaining a connected, viable late-successional ecosystem was found to be directly related to the amount of late-successional forest in reserve status.

**Responsible Official** - The agency employee who has the delegated authority to make and implement a decision on a proposed action.

**Riparian Reserves** - Areas along live and intermittent 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 as dispersal habitat for certain terrestrial species (USDA, USDI 1994b).

**Sensitive species** - Those species that: (1) have appeared in the Federal Register as proposed for classification and are under consideration for official listing as endangered or threatened species; (2) are on an official state list; or, (3) are recognized by the implementing agencies as needing special management to prevent their being placed on federal or state lists (USDA, USDI 1994a).

**Seral stages** - The series of relatively transitory plant communities that develop during ecological succession from bare ground to the climax stage (USDA, USDI 1994a).

**Site (as in occupied site)** - The location where a specimen or population of the target species (taxonomic entity) was located, observed, or presumed to exist (occasionally used as a local option to pre-disturbance surveys for certain vertebrates) based on indicators described in the Survey Protocol or Management Recommendation. Also, the polygon described by connecting nearby or functionally contiguous detections at the same location.

**Site (as used in manage known sites)** - The occupied site plus any buffer needed to maintain the habitat parameters described in the Management Recommendation.

**Site management** - managing an occupied site to maintain the habitat elements needed to provide for persistence of the species at the site. Management may range from maintaining one or more habitat components such as down logs or canopy cover, up to complete exclusion from disturbance for many acres. Site management may allow loss of some individuals, areas, or elements not affecting continue site occupancy.

**South range (for arthropods)** - The California Coast Range, the Oregon and California Klamath, and the California Cascades Physiographic Provinces (USDA, USDI 1994a, p. J-2 37).

**Species** - A class of individuals having some common characteristics or qualities. In these standards and guidelines, synonymous with taxon, which may include subspecies, groups, or guilds.

**Special Status Species** - As used in this SEIS, the term "Special Status Species" refers only to the following species categories that are included under agency species conservation policies:

> Oregon/Washington BLM: Bureau Tracking, Bureau Assessment, and Bureau Sensitive (BLM Manual 6840; Instruction Memorandum No. OR-2003-054; and Instruction Memorandum No. OR-91-57).
>
> California BLM: Bureau Sensitive (BLM Manual 6840 and Manual Supplement 6840.06, Plant Management).
>
> Forest Service Region 5: Sensitive (Forest Service Manual 2670).
>
> Forest Service Region 6: Sensitive (Forest Service Manual 2670).

**Stable** - A taxon that, over time, maintains population numbers, given inherent levels of population fluctuation and variability of habitats to which they are adapted. The species may become stable at a different population level than the current or (inferred) historical level.

**Stand (tree stand)** - An aggregation of trees occupying a specific area and sufficiently uniform in composition, age, arrangement, and condition to be distinguishable from the forest in adjoining areas (USDA, USDI 1994a).

**Standards and guidelines** - The rules and limits governing actions, as well as the principles specifying the environmental conditions or levels to be achieved and maintained (USDA, USDI 1994a).

**Strategic surveys** - Landscape-scale surveys designed to collect information about a species, including its presence and habitat.

**Substrate** - Any object or material on which an organism grows or is attached (USDA, USDI 1994a).

**Succession** - A series of dynamic changes by which one group of organisms succeeds another through stages leading to a potential natural community or climax. An example is development of a series of plant communities (called seral stages) following a major disturbance (USDA, USDI 1994a).

**Supplemental Environmental Impact Statement (SEIS)** - As defined by the NEPA, a supplement to an existing Environmental Impact Statement is prepared when: (1) the agency makes substantial changes to the proposed action that are relevant to environmental concerns; (2) there are significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts; or, (3) the agency determines that the purposes of NEPA would be furthered by doing so.

**Survey and Manage** - Mitigation measure adopted as a set of standards and guidelines within the Northwest Forest Plan Record of Decision and replaced with standards and guidelines in 2001 (Record of Decision) intended to mitigate impacts of land management efforts on those species that are closely associated with late-successional or old-growth forests whose long-term persistence is a concern. This mitigation measure applies to all land allocations and requires land managers to take certain actions relative to species of plants and animals, particularly some amphibians, bryophytes, lichens, mollusks, vascular plants, fungi, and arthropods, which are rare or about which little is known. These actions include: (1) manage known sites; (2) survey prior to habitat-disturbing activities; and, (3) conduct extensive and general regional (strategic) surveys.

**Survey Protocol** - Unless otherwise specified, Survey Protocols are for surveys prior to habitat-disturbing activities. These are interagency documents describing the survey techniques needed to have a reasonable chance of locating the species when it is present on the site, or needed to make an "equivalent-effort" of locating the species when it is present on the site. Survey Protocols also identify habitats needing surveys and may identify habitats or circumstances not needing surveys. Instructions for conducting strategic surveys may be prepared along with the Strategic Survey Implementation Guide and may be referred to as strategic survey protocols.

**Surveys Prior to Habitat-Disturbing Activities** - Surveys conducted to determine if the species is present at a site proposed for habitat-disturbing activities. Includes "practical surveys" and "equivalent-effort surveys." See additional detail in the standards and guidelines.

**Taxa Expert** - Taxa experts are scientists identified by interagency managers as the person responsible for taxonomic identification of specimens collected during field surveys, inventories, or incidental finds. The expert has advanced skills and/or education in the taxonomy, biology, ecology, and habitat needs as well as a strong knowledge and understanding of the research related to a species/taxa. Taxa experts provide scientific input in the preparation of management recommendations, surveys protocols, and during the annual species review.

**Taxon** - A category in the scientific classification system, such as a class, family, phylum, species, subspecies, or race.

**Taxonomic entity** - A unique species, subspecies, or variety.

**Threatened species** - Plant or animal species likely to become endangered throughout all or a significant portion of its range within the foreseeable future. A plant or animal identified and defined in accordance with the 1973 Endangered Species Act and published in the Federal Register (USDA, USDI 1994a).

**Tracking species** - A special status species category established by Oregon/Washington BLM. The purpose of tracking species is to enable an early warning for species which may become threatened or endangered in the future. BLM Districts in Oregon and Washington are encouraged to collect occurrence data on species for which more information is needed to determine status within the state or which no longer need active management. Until status of such species changes to federal or state listed, candidate or assessment species, tracking species will not be considered as special status species for management purposes.

**Uncommon (species)** - Species that do not meet the definition for rare, but where concerns for persistence remain. See criteria under "Relative Rarity" in the standards and guidelines.

**Understory** - The trees and other woody species growing under the canopies of larger adjacent trees and other woody growth (USDA, USDI 1994a).

**Vascular plants** - Plants that contain conducting or vascular tissue. They include seed-bearing plants (flowering plants and trees) and spore-bearing plants (ferns, horsetails, and clubmosses).

**Vertebrate species** - A species that has a backbone or spinal column (includes fish, amphibians, reptiles, birds, and mammals, all of which have a segmented bony or cartilaginous spinal column).

**Viability** - Ability of a wildlife or plant population to maintain sufficient size to persist over time in spite of normal fluctuations in numbers, usually expressed as a probability of maintaining a specific population for a specified period (USDA, USDI 1994a).

**Viability Provision** - A provision contained in the National Forest System Land and Resource Management Planning Regulation of 1982, pursuant to the National Forest Management Act. This provision is found in 36 CFR 219.19 and reads as follows: "Fish and wildlife habitat shall be managed to maintain viable populations of existing native and desired non-native vertebrate species in the planning area. For planning purposes, a viable population shall be regarded as one which has the estimated numbers and distribution of reproductive individuals to insure its continued existence is well distributed in the planning area. In order to insure that viable populations will be maintained, habitat must be provided to support, at least, a minimum number of reproductive individuals and that habitat must be well distributed so that those individuals can interact with others in the planning area."

**Viable population** - A wildlife or plant population that contains an adequate number of reproductive individuals appropriately distributed in the planning area to ensure the long-term existence of the species (USDA, USDI 1994a).

**Voucher** - a specimen of a plant or animal that is preserved and archived for long-term storage along with specific habitat, location, and, at times, identification information.

**Well distributed** - Distribution sufficient to permit normal biological function and species interactions, considering life history characteristics of the species and the habitats for which it is specifically adapted.

**Wilderness** - Areas designated by Congressional action under the 1964 Wilderness Act. Wilderness is defined as undeveloped federal land retaining its primeval character and influence without permanent improvements or human habitation. Wilderness areas are protected and managed to preserve their natural conditions, which generally appear to have been affected primarily by the forces of nature with the imprint of human activity substantially unnoticeable; have outstanding opportunities for solitude or for a primitive and confined type of recreation; include at least 5,000 acres or are of sufficient size to make practical their preservation, enjoyment, and use in an unimpaired condition; and may contain features of scientific, educational, scenic, or historical value as well as ecological and geologic interest (USDA, USDI 1994a).

**Wildland fire** - Any non-structure fire, other than prescribed fire, that occurs in the wildland.

**Wildland fire for resource benefits** - A fire that results from natural ignition (i.e. lightning strike) and is permitted to burn because it is resulting in resource benefits, is consistent with the land and resource management plan, is consistent with the fire management plan, and is burning within prescription.

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**Dick Prather** - *Team Leader*. Dick is a 1968 graduate of the Northern Arizona University School of Forestry in Flagstaff, Arizona. He was the team leader for the Final SEIS for Survey and Manage in 2001. He is a 31-year veteran of the BLM. For the last 18 years, he was Field Manager in the Salem District. He has previously worked in Coeur d'Alene, Idaho and Coos Bay, Oregon.

**Craig Snider** - *Planner/NEPA Specialist*. Craig holds a B.S. in Forestry from the University of California, Berkeley and a M.A in Spirituality from Holy Names College. Craig has 23 years experience with the Forest Service including work on the Idaho Panhandle, Targhee, Dixie, Siskiyou, and Siuslaw National Forests. In recent years, he has served on the Regional Implementation Monitoring Team for the Northwest Forest Plan and as the Regional Environmental Coordinator for Region 6, Forest Service. He is also a Certified Silviculturist and a graduate of the Forest Engineering Institute at Oregon State University. He has held field positions of forester, silviculturist, timber management assistant, forest planner, and program manager. He is currently the Regional Environmental Coordinator for Region 5, Forest Service, in Vallejo, California.

# Specialists

**Chris Cadwell** - *Forester/Resource Analyst*. Chris served on FEMAT in the estimation of Probable Sale Quantities. He has coordinated PSQ estimations and GIS analysis supporting development and implementation of the BLM resource management plans in western Oregon. He is co-author of the implementation guidance for the 15 percent standard and guideline. Chris served as co-lead in developing interagency vegetation standards and served on the team which developed interagency land allocation standards for the Northwest Forest Plan area. Chris has 22 years experience with the BLM in western Oregon and currently is employed by the BLM Oregon/Washington State Office. He holds a B.S. in Forest Management from Humboldt State University.

**Thomas DeMeo** - *Ecologist.* Tom has a B.S. in Forest Science from Penn State University, an M.S. in Forest Science from Oregon State University, and a Ph.D. in wildlife biology from West Virginia University. An ecologist with the Forest Service since 1987, he has experience in ecological classification, mapping, wetlands, old-growth, alternative silvicultural methods, conservation biology, landscape ecology, and wildlife habitat assessment. Current emphases include regional-scale restoration priorities, old-growth inventory, data management and standards, and administering the regional ecology program.

**Chiska Derr** - *Lichenologist*. Chiska holds a B.A. in Biology from Western Washington University and an M.S. in Ecology from Oregon State University, where her research focused on lichen ecology in southeast Alaska and western Oregon. She has worked as a Botanist on the Gifford Pinchot National Forest for 6 years. She has also worked as an Ecologist conducting air quality biomonitoring and lichen inventory studies on

the Chugach and Tongass National Forests for 4 years. Chiska has also worked as a Fishery Biologist for the State of Alaska. She is a co-author of the lichen Management Recommendations and lichen Survey Protocols, and has been part of the Survey and Manage lichen team since 1995.

**Tina Dreisbach** - *Mycologist*. Tina holds a B.S. in Plant Science and a M.S. in Plant Pathology from Pennsylvania State University and a Ph.D. in Botany and Plant Pathology from Oregon State University. Her professional experience includes the study of ecology, evolutionary relationships, and population biology of fungi. Since 1997, Tina has been employed by the Forest Service' Pacific Northwest Research Station studying habitat relationships of forest fungi. In collaboration with scientists in the Pacific Northwest, Tina develops landscape and microscale habitat models for fungi and other rare organisms.

**Eric Forsman** - *Research Wildlife Biologist*. Eric has a Ph.D. in Wildlife Management from Oregon State University. He is currently employed with the Forest Service at the Forestry Sciences Laboratory in Corvallis, Oregon. Eric has conducted research on spotted owls and their prey since 1970. The primary focus of his current research is population demography of northern spotted owls, and distribution, habitat, movements, and genetics of red tree voles.

**Nancy E. Gillette** - *Research Entomologist*. Nancy earned a B.A. and Ph.D. in Forest Entomology at the University of California, Berkeley. Previous positions Nancy has held are: liaison between the Forest Health Protection staff and the Environmental Protection Agency Biopesticide Division; researcher with the Chemical Ecology of Forest Insects research team in Berkeley, California; and postdoctoral researcher at the Institut National de la Recherche, in Olivet, France. She has more than 20 years experience in pesticide bioassay and residue analysis. Nancy has authored more than 50 scientific publications dealing with forest entomology. Currently, Nancy is the Principal Research Entomologist at the Forest Service' Pacific Southwest Research Station.

**Richard Hardt** - *Ecologist*. Richard has a B.A. in Natural Sciences from John Hopkins University, an M.L.A in Landscape Architecture from Harvard University, and a Ph.D. in Forest Resources from the University of Georgia. He has 9 years of experience working for the BLM and is currently employed at the Eugene District Office. Richard's expertise is in forest ecology, planning, and NEPA.

**Judith A. Harpel** - *Bryologist*. Judy has a B.S. and an M.S. in Botany from California Polytechnic University, Pomona, and a Ph.D. in Botany from the University of British Columbia. She has 25 years of professional experience working with bryophyte systematics, ecology, and biogeography throughout North America and in the Russian Far East. For the last 6 years she has worked as the Regional Interagency Bryologist for the Forest Service and BLM under the Northwest Forest Plan.

**Paul Hohenlohe** - *Malacologist*. Paul holds a B.A. in Biology from Williams College and a Ph.D. in Zoology from the University of Washington. His research has focused on systematics, life history, ecology, and evolution of gastropod mollusks. He has served in an interagency position as the Regional Malacologist for the Survey and Manage Program since 2001. Paul is currently employed as the Regional Interagency Malacologist at the Forest Service' Corvallis Forestry Sciences Laboratory.

**William F. Hudson** - *Fishery Biologist*. Bill has a B.S. in Wildlife Management and a M.S. in Biology (Fisheries) from Tennessee Technological University. He has worked for the BLM for 24 years in the Coos Bay District. Early in his career he worked as a resource area biologist covering fisheries and wildlife management. Currently, he is the Coos Bay District Fisheries Biologist and has spent the last 7 years working on various ESA consultations with NOAA Fisheries, including local project consultations and regional

consultations at the plan level for the Interior Columbia Basin and the Northwest Forest Plan.

**Christina C. McElroy** - *Economist*. Christina has a B.B.A. in Marketing with minors in both Economics and International Business from Boise State University. She has worked as a federal economist for 10 years for the Bureau of Labor Statistics and the U.S. Army Corps of Engineers. Christina currently works for the BLM as a Regional Economist for Oregon/Washington.

**Deanna H. Olson** - *Research Ecologist*. Dede has a B.A. in Biology from the University of California and a Ph.D. in Zoology from Oregon State University. She is currently a research ecologist with the Pacific Northwest Research Station in Corvallis, Oregon. She also serves as an expert for the amphibian subgroup under the Survey and Manage species of the Northwest Forest Plan; an associate editor for the *Herpetological Review*; and co-chair for the Pacific Northwest Working Group, Declining Amphibian Task Force, International Union for the Conservation of Nature, Species Survival Commission. Dede currently holds courtesy faculty appointments in the Departments of Zoology and Fisheries and Wildlife at Oregon State University. Her professional experience includes studying the ecology and behavior of every vertebrate class in a diverse array of habitats: desert, tropical rainforest, montane lakes, and coastal streams. She has 20 years experience working in biological research. For the last 12 years, Dede has worked for the Forest Service.

**James H. Perkins** - *Forester*. Jay holds a B.S. in Forest Management with post-graduate studies in Fire Management from Colorado State University. He started his permanent career in Montana in 1980. He is currently the Forest Fire Management Officer for the Klamath National Forest, Yreka, California. Jay has been on the Klamath National Forest for 18 years. Jay did the fire planning for the Klamath Land and Resource Management Plan as well as provided the technical fire assessment for the 2000 Survey and Manage SEIS.

**Jim Roden** - *Forester*. Jim has a B.S. in Forest Management from Northern Arizona University. He has worked for the Forest Service for 25 years in Wyoming, California, Idaho, and Oregon. He is a specialist in timber sale planning, geographic information systems, pomology, and economic analysis.

**Joan Seevers** - *Botanist*. Joan has a B.S. in Science/Math from Southern Oregon State College (now Southern Oregon University). She has worked as a botanist for the BLM for 25 years: 22 years as Medford District Botanist and 3 years as the Oregon State Office Botanist.

**David A. Sinclear** - *Fire Management Officer*. Dave holds a B.A. in Biology. He started his permanent career in timber management on the Stanislaus National Forest, leaving his position as Assistant District Silviculturist to become a District Wildlife Biologist at the Modoc National Forest. Dave moved on to be a Fire Management Officer 18 years ago holding positions as District Fire Management Officer and Assistant Forest Fire Management Officer at the Modoc National Forest. Dave left the Forest Service to be a Fire Management Officer for the USDI Fish and Wildlife Service at the Klamath Basin National Wildlife Refuge Complex. After 3 years with the Fish and Wildlife Service, he is now the Forest Fire Management Officer at Mendocino National Forest.

## Special Acknowledgments

***Thanks To:***

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**Ed Buursma** - Forestry Technician, Clackamas Ranger District, Mt. Hood National Forest. Thanks for coordinating and helping to analyze the hundreds of letters and e-mails received during the scoping process.

**Elizabeth I. Gayner** - Roseburg District BLM. Thanks for the artwork that graces the front cover of this EIS.

**The Species Status Species Program coordinators** for the BLM and Forest Service in Washington, Oregon, and California, who so quickly analyzed the Natural Heritage Rankings and other pertinent species information to determine what species should be included in the Agencies' Special Status Species Programs if an action alternative is selected.

# Distribution List and Document Availability on the Internet

This Final Supplemental Environmental Impact Statement (SEIS) is being sent to the following individuals, groups, and organizations. The list includes elected officials; federal agencies; state, local, and county governments; American Indian Tribes and Nations; businesses; other organizations; libraries; and individuals.

The Final SEIS will also be available on the internet at: http://www.or.blm.gov/nwfpnepa.

## Elected Officials

*California*
Senator Barbara Boxer
Senator Dianne Feinstein
Representative Sam Farr
Representative Wally Herger
Representative Barbara Lee
Representative Robert Matsui
Representative George Miller
Representative Doug Ose
Representative Nancy Pelosi
Representative Mike Thompson
Representative Lynn Woolsey

*Oregon*

Senator Gordon Smith
Senator Ron Wyden
Representative Earl Blumenauer
Representative Peter DeFazio
Representative Darlene Hooley
Representative Greg Walden
Representative David Wu

*Washington*

Senator Maria Cantwell
Senator Patty Murray
Representative Brian Baird
Representative Norman Dicks
Representative Jennifer Dunn
Representative Richard Hastings
Representative Jay Inslee
Representative Rick Larsen
Representative Jim McDermott
Representative George Nethercutt
Representative Adam Smith

## Intergovernmental Advisory Committee (to the Regional Ecosystem Office)

Dave Allen
U.S. Fish and Wildlife Service
Elaine Brong
Bureau of Land Management, OR/WA
Lance Clark
Office of the Governor, State of Oregon
Kent Connaughton
USDA Forest Service, Region 5
Merv George, Jr.
CA Indian Forest and Fire Management Council
Linda Goodman
USDA Forest Service, Region 6
Bob Graham
Natural Resources Conservation Service
David Herrera
Northwest Indian Fisheries Commission
Colonel Richard Hobernicht
U.S. Army Corps of Engineers
Jon Jarvis
National Park Service
Anne Kinsinger
U.S. Geological Survey
Robert Lohn
National Marine Fisheries Service
Albert McKee
Representative of Washington Counties
Rocky McVay
Association of O & C Counties
Mary Nichols
California Resources Agency
Robert Nichols
WA State Senior Executive Policy Assistant
Jennifer Orme-Zavaleta
Environmental Protection Agency
Michael Pool
Bureau of Land Management, CA

Dave Powers
- Environmental Protection Agency

Tom Quigley
- USDA Forest Service, PNW

George Smith
- Intertribal Timber Council

Joan Smith
Representative of California Counties
Stan M. Speaks
Bureau of Indian Affairs
Steve Thompson
U.S. Fish and Wildlife Service, CA/NV

# Federal Agencies

Advisory Council on Historic Preservation
Bonneville Power Administration
Environmental Protection Agency
- Office of Federal Activities
- Operations Office
- Region 9
- Region 10

Federal Aviation Administration
- NW Mountain Region
- Western Pacific Region

Federal Energy Regulatory Commission
Regional Ecosystem Office
U.S. Coast Guard
U.S. Department of Agriculture
- Animal and Plant Health Inspection Service
- Forest Service
  - Pacific Northwest Regional Office
  - Pacific Southwest Regional Office
  - Pacific Northwest Research Station
  - Pacific Southwest Research Station
  - *California*
  - Klamath National Forest
  - Lassen National Forest
  - Mendocino National Forest
  - Modoc National Forest
  - Shasta-Trinity National Forest
  - Six Rivers National Forest
  - *Oregon*
  - Deschutes National Forest
  - Mt. Hood National Forest
  - Rogue River National Forest
  - Siskiyou National Forest
  - Siuslaw National Forest
  - Umpqua National Forest
  - Willamette National Forest
  - Winema National Forest
  - *Washington*
  - Gifford Pinchot National Forest
  - Mt. Baker-Snoqualmie National Forest
  - Okanogan National Forest
  - Olympic National Forest
  - Wenatchee National Forest
- National Agriculture Library
- Natural Resources Conservation Service

U.S. Department of Commerce
- NOAA Fisheries (National Marine Fisheries Service)

U.S. Department of Defense
- Army Corp of Engineers
  - NW Distict
  - PE PF
  - Seattle District
  - S Pacific Division
  - Walla Walla District
- Naval Submarine Base Bangor
- Deputy Asst Secretary of Defense
- Air Force Deputy Asst Secretary

U.S. Department of Energy
U.S. Department of Interior
- Bureau of Indian Affairs
- Bureau of Land Management
  - *California*
  - Arcata Field Office
  - Redding Field Office
  - State Office
  - Ukiah Field Office
  - *Oregon*
  - Coos Bay District
  - Eugene District
  - Lakeview District
  - Medford District
  - Roseburg District
  - Salem District
- Burea of Reclamation
- National Park Service
  - Ft. Vancouver National Historic Site
  - Olympic National Park
  - Pacific Northwest Region
  - Pacific West Region
  - Redwood National Park
- Office of Environmental Policy & Compliance
- Office of the Regional Solicitor
- Regional Environmental Office
- U.S. Fish and Wildlife Service
- U.S. Geological Survey
  - Biological Resources Division
  - Pacific Northwest District

U.S. Department of Justice
U.S. Ecosystem Restoration Office
U.S. Housing and Urban Development
U.S. Small Business Administration
U.S. Department of Transportation
- Federal Highway Administration
  - Oregon Division
  - Western Division
- Western Federal Lands Highway Division

# State, County, and Local Governments

*California*

California Regional Water Quality
Caltrans
City of Yreka
Colusa County
County of Siskiyou
Del Norte County Board of County Supervisors
Department of Fish and Game
Department of Forestry
Department of Forestry & Fire Protection
Department of Water Resources
EEL - Russian River Commission
Glenn County
    Agriculture Department
    Board of Directors
    Board of Supervisors
    Cooperative Extension Office
Humboldt County Board of Supervisors
Lake County Board of Supervisors
Mendocino County
    Board of Supervisors
    Cooperative Extension
    Planning Department
    Water Agency
North California Water Association
Office of The Governor
Resources Agency
Shasta County Board of Supervisors
Siskiyou County
    Administrators
    Board of Supervisors
Sonoma County Conservation Action
State Clearinghouse
State Lands Commision
Tehama County
    Board of Supervisors
    Planning Department
Trinity County, Board of County Supervisors

*Colorado*

San Miguel County

*District of Columbia*

Rural Utilities Service

*Oregon*

City of Cottage Grove
City of Klamath Falls
Coos County Board of Commissioners
Curry County Board of Commissioners
Department of Agriculture, Noxious Weed Control Program
Department of Energy
Department of Environmental Quality
Department of Fish & Wildlife
Department of Forestry
Department of Geology and Mineral Industries
Department of Human Resources
Department of Revenue
Department of Transportation
Detroit City Hall
District 17 Watermaster
Douglas County
    Board of Commissioners
    Planning Department
Employment Department
Executive Department
Farm Bureau Federation
Hood River County
Jackson County Commissioners
Jefferson County Commissioners
Josephine County
    Courthouse
    Forestry Department
    Planning Department
Klamath Basin Water Resources Advisory Commit
Klamath County Commissioners
Klamath Irrigation District
Lane County Commissioner
Meadows Drainage District
Mohawk Watershed Planning Group
Northwest Power Planning Council
Office of The Governor
Oregon State Public Interest Research Group
Parks and Recreation Department
Portland Water Bureau
Rogue Institute of Economy and Ecology
Rogue Valley Council of Governments
Small Business Administration
Southeastern Oregon Advisory Council
State Historic Preservation Office
State Marine Board
State Police
Tillamook County Commissioner
Umpqua Regional Council of Governments
Water Resources Department

*Washington*

Chelan County Planning Department
City of Port Townsend
Clallam County Commisioner
Department of Ecology
Department of Fish and Wildlife
Department of Natural Resources
Department of Transportation

Governor's Special Asst
Jefferson County Commissioners
Lewis County Commissioners
Mason County Commissioners
Office of The Governor
Skagit County
Skamania County Planning Department

## American Indian Tribes and Nations

Big Valley Rancheria
Blue Lake Rancheria
Columbia River Inter-Tribal Fish Commission
Colville Confederated Tribes
Confederated Tribes of Coos, Lower Umpqua and Siuslaw Indians
Confederated Tribes of Grande Ronde Indians
Confederated Tribes of Siletz Indians
Confederated Tribes of The Warm Springs Reservation
Coquille Indian Tribe
Covelo Indian Community
Cow Creek Band of Umpqua Tribe of Indians
Cowlitz Indian Tribe
Coyote Valley Rancheria
Elk Valley Rancheria
Grindstone Rancheria
Hoh Tribe
Hoopa Tribal Fisheries Department
Hoopa Valley Tribal Council
Intertribal Timber Council
Jamestown S'kallam Tribe
Kalapooya Sacred Circle Alliance
Karuk Tribe of California
Klamath General Council
Klamath Indian Game Commission
Lower Elwha S'klallam Tribe
Lummi Indian Business Council
Lummi Tribe of The Lummi Reservation
Makah Tribe
Muckleshoot Indian Tribal Council
Native American Heritage Committee
Nisqually Indian Community Council
Nooksack Indian Tribal Council
Northwest Indian Fisheries Commission
Paskenta Band of The Nomlaki
Point-No-Point Treaty Council
Port Gamble Band of S'klallam Indians
Puyallup Tribal Council
Quinault Indian Nation
Reservation Ranch
Resighini Rancheria
Robinson Rancheria Pomo Indian Tribe
Rohnerville Rancheria
Samish Indian Tribe
Sauk Suiattle Indian Tribal Council
Shasta Nation
Shoalwater Bay Tribal Council
Siletz Tribal Council
Squaxin Island Tribal Council
Stillaguamish Board of Directors
Suquamish Tribal Council
Swinomish Indian Tribal Community
Table Bluff Reservation
The Klamath Tribes
Tolowa Nation
Tsnungwe Council
Tulalip Board of Directors
Twin Rocks Inholders
Upper Lake Rancheria
Yakama Indian Nation Tribal Council
Yurok Tribe

## Businesses

Adobe Rose
Alder Creek Lumber Co.
Alpha World International Corp.
American Forest and Paper Assn.
American Forest Resource Council
American Forestry Association
American Rivers, Inc.
Amerititle
Armco
Associated Oregon Industries
Associated Oregon Loggers, Inc.
B.S. Roads, Inc.
BAC Logging
Barnes & Associates, Inc.
Bennett Forest Industries
Berry Botanical Garden
Blue Lake Forest Products, Inc.
Boise Cascade Corporation
Brecher & Volker LLP
Brewley, Inc.
Burlington Northern, Inc.
Buse Timber & Sales, Inc.
C & D Lumber Co.
C.E. Exploration Co.
Cascade Timber Consulting
Cavenaugh Forest Industries
CH2M Hill Northwest
Clifford, Chance, Rogers and Wells Law Firm
Columbia Forest Products
Columbia Helicopters, Inc.
Conifer Pacific, Inc.
Crystal Mountain
David Evans and Associates, Inc.
Deer Creek Timber, Inc.
Deixis Consultant
Douglas County Lumber Co.

Douglas Timber Operators
Dreyer Lapidos Geyer & Van Horn, Inc.
DRJohnson Lumber Co.
Earthwise Excavation
East Fork Lumber Co., Inc.
Edaw, Inc.
Eel River Sawmills, Inc.
Ericson Air-Crane Co.
Forestry and Resource Consulting
Freres Lumber Co., Inc.
Freshwater Farms
Future Logging Co.
Galea Wildlife Consulting
Gary Cook & Associates
Georgia Pacific Corporation
Georgia Pacific West, Inc.
Giustina Land & Timber Co.
Glide Lumber Co.
Gold Smith Farm
Gustin Enterprises
Haglund, Kirtley, Kelley and Horngren
Hampton Tree Farms
Harder Productions
Harwood Products
Hendrix Enterprises
Herbert Lumber Co.
High Cascade, Inc.
Hillcrest Vineyard
Huffman &Wright Timber Corporation
Hull Oakes Lumber Co.
Hydro Energy Development Corporation
Independent Thinning
Indian Hill LLC
Indian Hill Timber Co.
Industrex Unlimited
J. Davidson & Sons Construction
Jeld Wen, Inc.
K D Logging
Keller Lumber Co.
Ken Sorenson Logging, Inc.
Keslick & Son Modern Arboriculture
Klamath Insurance Center
Klamath Potato Growers Association
Land & Water Consulting, Inc.
Laughing Horse Book Store
Law Office of Nancy Page
Leo Miller Contracting
Logging Engineering Int., Inc.
Lone Rock Timber Co.
Longview Fibre Corporation
Lusignan Forestry, Inc.
M&A Broken Limb
Madroak Logging
Marys River Lumber
Mason Bruce & Girard, Inc.
Mater Engineering Ltd.
Matesol
McFarland Cascade
McKenzie River Guides
Merlin Biological
Merrill & Ring
Mountain Title Company
Mt. Hood Meadows
Northwest Forestry Association
Northwest Forest Resources
Northwest Mining Association
Northwest Optometric Clinics, Inc.
Northwest Timber Review
Northwest Whitewater Excursions
NRM Corporation
Offices of Marin Psychological Services
Oregon Forest Industry Council
Oregon Zoo
Overland Express
Pacific Northwest Ski Areas Assn.
Pacific Power and Light
Pan Pacific Forestry
Perkins Coie LLP
Plum Creek Timber Co.
Portland General Electric
Public Timber Purchasers Group
Quafco
Rayonier, Inc.
Resource Recovery Group, Inc.
Resources Northwest Consultants
Richard L. Willis Logging
Roberts Cummings, Inc.
Rocking C Ranch
Rogue Forest Protective Assn.
Rosboro Lumber Co.
Roseburg Forest Products
Rough & Ready Lumber Co.
Salt Springs Logging
Saltman and Stevens PC
SDS Lumber Company
Seneca Jones Timber Co.
Seneca Sawmill Company
Sequoia Associates
Shiloh Forestry Co.
Sierra Pacific Industries
Silver Butte Timber
Simpson Door Co.
Simpson Investment Co.
Siskiyou Coop, Inc.
Snowy Butte Helicopters
South Umpqua State Bank
Southern Oregon Nature Excursions
Sparkling and Son, Inc.
Spider Webb Ent., Inc.
Starfire Lumber Co.
Stevens Pass
Superior Lumber Co., Inc.
Sustainable Northwest
Swanson Group

Swanson Superior Forest Product, Inc.
T.H. Ireland, Inc.
The Nicholoff Company
The Phoenix Zoo
The Timber Company
The Waldo Inn: Bed & Breakfast
Thinking, Inc.
Three Rivers Logging Co.
Timber Data Company
Timber Products Co.
Timberland Logging
Trinity River Lumber Co.
US Forest Industries, Inc.
US Timberlands Klamath Falls LLC
Wahington Contract Loggers Association
Wards Creek Logging
Washington Belt & Drive Systems
Washington Contract Loggers Association
Washington Forest Law Center
Westbrook Land and Timber
Western Forest Industries Assn.
Western Timber Co.
Western Wood Products Assn.
Westest Logging
Weyerhauser Co.
Wilkins, Kaiser & Olsen
Willamette Industries
Wolfe's Guide Service
Woody Contracting, Inc.
Woolley Enterprises, Inc.
WTD Industries, Inc.

# Other Organizations

1000 Friends of Oregon
1000 Friends of the Earth
Alameda Creek Alliance
Allegheny Defense Project
Alliance for the Wild Rockies
Alpine Lakes Protection Society
American Alpine Institute
American Fisheries Society
American Lands
American Lands Alliance
Ancient Forest Defense Fund
Applegate Partnership
Applegate River Watershed Council
Arc-En-Ciel
Aspen Wilderness Workshop
Association of Northwest Steelheaders
Association of O & C Counties
Association of Oregon Counties
Audubon Society
- Altacal
- Black Hills
- Columbia Gorge
- Corvallis
- Des Moines
- Golden Gate
- Grays Harbor
- Kalmiopsis
- Kitsap
- Kittitas
- Klamath Basin
- Lane County
- Leavenworth
- Pilchuck
- Portland
- Rainier
- Redwood Chapter
- Rogue Valley
- San Juan Islands
- Seattle
- Siskiyou
- Spokane
- Umpqua Valley
- Washington State Office

BARK
Baron Family Partnership
Basketweavers Project
Bike To Nature
Biodiversity Northwest
Blue Ribbon Coalition
Breitenbush Community
Breitenbush Hot Springs
Butte Falls Advocates
California Cattlemens Association
California Coalition for Alternatives to Pesticides
California Lichen Society
California Native Plant Society
California Trout
California Wilderness Coalition
Californians for Alternatives To Toxins
Cascadia Forest Alliance
Cascadia Wildlands Project
CATs
Central Cascades Alliance
Central Oregon Motorcycle and ATV Club
Central Valley WQCB
Cheetwoot Wilderness Alliance
Chehalis Business Council
Citizens for Better Forestry
Citizens Interested in Bull Run, Inc.
Clackamas-Marion Forest Protection Assn.
Claggett Creek Watershed Council
Coast Range Association
Columbia Basin Wildlife Association
Communities for a Great Oregon
Community Clean Water Institute
Concerned Friends of Ferry County
Cottage Grove Historical Society
Deer Creek Valley Natural Resource Conserve
Defenders of Wildlife

Ducks Unlimited-South Oregon
Earth Justice Legal Defense Fund
EF! Wolf Action Network
Endangered Species Coalition
Environmental Protection Information Center
Environmental Resources Center
Essex Junction Environmental Group
Forest Conservation Council
Forest Guardians
Forest Issues Group
Forest Landowners of California
Forest Service Employees for Environmental Ethics
Forest Unlimited
Forks Chamber of Commerce
Four Runners Four-Wheel Drive Club
Franciscan Sisters of The Poor
Friends of Clackamas River
Friends of Del Norte County
Friends of Hope Valley
Friends of the Greensprings
Friends of the River
Friends of Trees
Gifford Pinchot Task Force
Global Peoples Assembly Network
Grants Pass and Josephine County Chamber of Commerce
Great Lake United
Headwaters
Heartwood
High Country Citizens Alliance
High Desert Trail Riders
Hood Canal Coordinating Council
Humanity
In Harmony Services
Inland Empire Public Lands Council
Institute for Applied Ecology
Institute for Policy Research
Izaak Walton League of America
Keep Oregon Green
Kettle Range Conservation Group
Klamath Basin Snowdrifters Snowmobile Club
Klamath Forest Alliance
Klamath-Siskiyou Wildlands Center
Klamath Yacht Club
Kootenai Environmental Alliance
La Canada Flintridge Trails Council
Land and Water Fund of the Rockies
Lassen Forest Preservation Group
League of Wilderness Defenders
Little River Committee
Marion County Water Watch
Mattole Salmon Group
Mazamas
McKenzie Guardians
McKenzie River Trust
McKenzie Watershed Council
Mendocino Environmental Center
Moose School Productions
Mt. Mazama Mushroom Association
Mt. Adams Adopt-A-District
MUDD
National Association of Conservation
National Forest Protection Alliance
National Resources Conservation Service
National Wildlife Federation
Native Fish Society
Native Forest Council
Native Plant Conservation Campaign
Native Plant Society of Oregon
Siskiyou Chapter
Nature Conservancy - Washington State
Natures Helpers
NCASI West Coast Regional Center
North Coast Recreation Coalition
Northern CA Society of American Foresters
Northwest Coalition for Alternatives to Pesticides
Northwest Ecosystem Alliance
Northwest Environmental Defense Center
Northwest Old-Growth Campaign
Northwest Rafters Association
Nuview - Evaluation & Learning
Oak Ridge National Laboratory
Olympic Forest Coalition
Oregon Bicycling Advisory Committee
Oregon Cattlemans Association
Oregon Coast Mycological Society
Oregon Council Rock and Mineral Clubs
Oregon Forest Research and Education Group
Oregon High Desert Museum
Oregon Historical Society
Oregon Hunters Asociation
Oregon Independent Miners/BMOA
Oregon Lands Coalition
Oregon Mycological Society
Oregon Natural Desert Association
Oregon Natural Resources Council
Oregon Park Associates
Oregon Shares Conservation Coalition
Oregon Sheep Growers Association
Oregon Small Woodlands Association
Oregon Trail Coordinating Council
Oregon Trout
Oregon Waterfowl and Wetlands Association
Oregon Wildlife Federation
Oregonians For Action
Oregonians For Food and Shelter
Ouachita Watch League
Ozark Watch League
Pacific Biodiversity Institute
Pacific Coast Federation of Fisherman's Association
Pacific Crest Trail Association
Pacific Northwest 4 Wheel Drive
Pacific Rivers Council
Pacific Wildlife Research

PEER
People for the USA Happy Camp
Portland Chamber of Commerce
Predator Conservation Alliance
Public Lands Foundation
Reed College Forest Watch
Restoring Eden
River House Outdoor Program
Rocky Mountain Ecosystem Defense
Roseburg Resources
Rural Information Network
Safe
Sanctuary Forest
Save Our Klamath Jobs
Seattle Lichen Guild
Shenandoah Ecosystems Defense Group
Sierra Club
- Cascade Chapter
- Illinois Valley
- Many Rivers Group
- New York City Chapter
- Northern Plains Region
- Northwest
- Plant Society
- Rogue Group
- Tillamook Committee
- Yahi Group

Sierra Club Legal Defense Fund
Sierra Student Coalition
SINPU
Siskiyou Project
Siskiyou Regional Education Project
Smith River Alliance
SOCATS
Society for Range Management
Society of American Foresters
SOLV, Inc.
South Carolina Forest Watch
Southern Apalachian Biodiversity Project
Southern Oregon Alliance for Resources
Southern Oregon Timber Industry Assn.
Southern Willamette Earth First!
Steamboaters
Stillwater Sciences
Sublette Riders Association
Suburban Outreach
Sustainable Steps
Sutherlin Watershed Action Committee
Takilma Watershed Committee
Telav
The Carlisle
The Cascadians
The Ecology Center
The Heritage Institute
The John Muir Project
The Lands Council
The Mountaineers
The Nature Conservancy
The Pacific Forest Trust
The Ptarmigans
The Wilderness Society
The Wildlife Society
- Oregon Chapter

Town Hall Coalition
Trees of Mystery
Trout Unlimited
Umpqua Watersheds
United Anglers of California
University of Oregon, Survival Center
Vancouver Wildlife
Washington State Association of Counties
Washington State Hi-Lakers
Washington State Snowmobile Assn
Washington Trout
Washington Wilderness Coalition
Water For Life
WELC
West Montana Mycological
Western Environmental Law Center
Western Fire Ecology Center
Western Forestry and Conservation Association
Western Mining Council
White River Conservation Project
Wilderness Watch
Willits Environmental Center
World Wildlife Fund
Xerces Society

## Libraries, Schools, and Universities

Aberdeen Timberland Library
Albany City Library
Albina Library
Algona Pacific Library
Amanda Park Timberland Library
Applegate Branch Library
Arcata Branch Library
Ashland Public Library
Auburn Library
Bandon Public Library
Battleground Library
Bellevue Regional Library
Belmont Library
Bend Public Library
Black Diamond Library
Bleyhl Community Library
Blue Lake Branch Library
Bothell Regional Library
Boulevard Regional Library
Brownsville Public Library
Buena Library

Burien Library
Butte County Library
C. Giles Hunt Memorial Library
California State University, Chico
Camas Public Library
Canyonville Branch Library
Capitol Hill Library
Carnation Library
Carpenter Memorial Library
Cascade Foothills Library
Cascade Locks Library
Cascade Pacific Library Network
Cascade Park Library
Central Library
Central Washington University
Chemult Branch Library
Chetco Public Library
City of Eugene Library
City of Springfield Library
Clallam Bay Library
Clark College Cannell Library
Colorado State University Libraries
Columbia Gorge Community College Library
Coos Bay Public Library
Coquille Public Library
Corning City Library
Corvallis-Benton Public Library
Cottage Grove Public Library
Cottonwood Library
Covington Library
Curry County Public Library
Dallas Library
Del Norte County Library District
Des Moines Library
Douglas County Library System
Dufur Community Library
Dunsmuir Library
Duvall Library
Ellensburg Library
Entiat Public Library
Eugene Public Library
Everett Public Library
Evergreen State College
Fairview Columbia Library
Fairwood Library
Fall City Library
Fall River Library
Federal Way 320th Library
Federal Way Regional Library
Ferndale Branch Library
Flora M. Laird Memorial Library
Forks Library
Fortuna Branch Library
Foster Library
Ft. Bragg Library
Ft .Jones Branch Library
Ft .Vancouver Regional Library
Garberville Branch Library
Glendale Branch Library
Gold Beach Public Library
Goldendale Library
Granger Library
Grants Pass Library
Gregory Heights Library
Gresham Library
Happy Camp Library
Harrah Library
Hazel M. Lewis Library
Hillsdale Library
Holgate Library
Hollywood Library
Hood River County Library
Hoodsport Timberland Library
Hoopa Branch Library
Hoquiam Timberland Library
Humboldt County Library
Humboldt State University
Indiana University.
Issaquah Library
Jackson County Library System
Jacksonville Public Library
Jefferson County Library
Jefferson Public Library
Josephine County Library
Keizer Reading Connection Library
Kenmore Library
Kent Regional Library
Kingsgate Library
Kirkland Library
Klamath County Library
Klamath Union High School
Lacey Timberland Library
Lake Forest Park Library
Lake Hills Library
Lakeport Library
Lakeview County Library
Land-Air-Water Law Center
Lane Community College Library
LaPine Public Library
Lebanon Library
Lyons Public Library
Mabton Library
Maple Valley Library
Mazama High School
McCloud Branch Library
McKinleyville Branch
Medford Library
Mercer Island Library
Middletown Library
Midland Library
Mildred Whipple Library
Mill City Public Library
Modoc County Library
Montague Branch Library

Mosier Public Library
Moxee Library
Mt. Shasta Library
Muckleshoot Library
Myrtle Creek Branch Library
N. Bonneville Library
N. State Coop Library
Naches Library
Newport Way Library
Nile Library
North Bend Library
North Central Regional Library System
North Portland Library
Northwest Library
Oak Run Community Library
Oakland Branch Library
Oakridge City Library
Olympia Timberland Library
Oregon Institute of Technology
Oregon Natural Herigate Information Center
Oregon State University
Orland City Library
Parkdale Library
Peninsula College
Plumas County Library
Port Angeles Library
Port Townsend Library
Quinney Natural Resources Library
Red Bluff Library
Redbud Library
Redmond Public Library
Redmond Regional Library
Reedsport Branch Library
Richmond Beach Library
Riddle Branch Library
Ridgefield Library
Rio Dell Branch Library
Rockwood Library
Roseburg Library
Roslyn Library
Round Valley Public Library
Ruch Branch Library
Salem Public Library
Salem State College
Sammamish Library
SE Yakima Library
Seattle Public Library
Selah Library
Sellwood-Moreland Library
Sequiam Library
Shasta Bible College Library
Shasta College Library
Shasta County Library
Shasta Lake Gateway Library
Shelton Timberland Library
Shingletown Library
Shoreline Library
Simpon College & Graduage School
Siskiyou County Library
Sisters Public Library
Siuslaw Public Library District
Skykomish Library
Skyway Library
Snoualmie Library
Southern Oregon University
Springfield Public Library
St. Johns Library
State of Illinois University
Stayton Public Library
Stevenson Library
Summit View Library
Sunnyside Library
Sunriver Area Public Library
Susanville District Library
SW OR Community College Library
Sweet Home Public Library
Tehama County Library
Terrace Heights Library
The Dalles-Wasco County Library
Three Creeks Library
Tieton Library
Tillamook County Library
Toppenish Library
Trinidad Branch Library
Trinity County Library
Tukwila Library
Tulelake Library
Ukiah Library
Union Gap Library
University of California
University of Oregon
University of Tennessee
University of Washington
Upper Lake Library
Valley View Library
Vancouver Library
Vashon Library
Wapato Library
Washington Natural Heritage Program
Washington State University Library
Washougal Library
West Salem Library
White Center Library
White Salmon Valley Library
White Swan Library
Willits Library
Willow Creek Branch Library
Willows Public Library
Winston Branch Library
Woodinville Library
Woodland Library
Woodmont Library
Woodstock Library
World Botanical Association

Yakima Valley Regional Library
Yoncalla Branch Library
Yreka Library
Zillah Library

# Media

Ashland Daily Tidings
KMTX TV
News Review
The Associated Press
The Chronicle
The Columbian
Environmental Media Services

# Individuals

Zach Aaronson
Lenice Abbott
Nikki Abbott
Sylvia Abbott
Fran Abel
Neil Abelson
Darren Aboulafia
Diane Abrams
Sally Abrams
Jose Abreu
Edward Abril
Jennifer Abseyn, RN
Emily Acavdador
Stephere Acel
Cynthia Achten
Terry L. Ackart
Brannen Acor
Toni Acuna
Kim Adair
Bill Adams
Bo Adams
Chris Adams
David Adams
George Adams
Jamie Adams
Lani J. Adams
Laurie Adams
Lesley Adams
Michael Adams
Tudy Adams
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Liselotte Adler
Michael Adler
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Lorraine Agost
Rory Ahearn
Tim Ahrens
Takaka Aikara
Larry Aiken
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Ashley Akerberg
Stanley Alari
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J. F. Alberson
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Audrey Albrecht
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Cate Allen
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M. R. Ambrozewski
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Emma Amiad
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James Andelin
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Hannah Andersen
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Reta Anderson
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Hedy Andersson
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Roberta Andrade
April Andreas

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Ernest Andrews
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Imelda Ankrum
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Sean Anthony
Rick Antillon
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Vijayalakshmi Balasubramanian
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Scott Bates
Thomasina Bates
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Janis Beaudette
Bob Beaudry
Tom Beautait
Linde S. Beaver
Ashli Beavers
Anne Becher
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Larue Beckley
Azel Beckner
Kristan Beckwith
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Joseph Bednarik
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Erna Beerheide
Jody Beh
Fred Behm
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Joan Beldin
Carrie Belisle
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Gregg Bell
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Elke Betz-Schmidt
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Johnathan M. Bilenki

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Deborah Billington
Melinda Bilodeau
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Tami Binder
Marcus Bingham
Kimberly Binion
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Stonewall Bird
Michelle Birdseye
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Chris Bishop
Lynn Bishop
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Holly Blackie
Marilyn Blackwell
Sama Blackwell
Winston Blackwell
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Petra J. Blair
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Spencer Blatt
Eli Blavin
Bronwyn Bleakley
Efrain Bleiberg
Alex Blementhal
Karen Blessing
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Daniel Bloch-Jeyden
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L. Blodgett
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Gemariah Borough
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Valerie Boss
Linda Bost
Randy Bostic
Kristin Bott
Libby Bottero
Dan Bourdet
Hank Bourscheidt
Than Boves
Kathy Bowden
Obadiah Bowen
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Shayleen Bowling
Kenneth Bowman
Roxy Bowman
David Bowra
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Colleen Boyd
Kayla Boyd
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Marylou Boydston
Charles Boyer
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Tracy Boyer
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J. L. Boyle
Christina Boyles
Spencer Boyles
Virginia Boynton
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Susan Bradfield
Craig S. Bradford
Deborah Bradford
Joshua D. Bradley
Kellyanne C. Bradley
Matt Bradley
Joseph & Jill E. Bradwell
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Lori Brady
Susan Brady
Keith Bragdon
C. Bragg
David Brain
Teresa Brain
Sylvie Braitman
Gloria Bram
Ruth Bramall
Jenny Bramlette
Amber Branch
Holly Branch
Pamela & Thomas Branch
Erin Brand
Lindsey Brand
Rushton Brandis
Eugene R. Brandon
Leslie Brandon
Gladys Brandstoettner
Deborah R. Brandt
John Brandt

Roger Brandt
Marc Brashear
Dana G. Braswell
Kevin Braun
Peter A. Bray
Julia Brayshaw
Mary C. Breaden
Susan Bredau
Jay Bredbenner
Phyllis Breeden
Beverly Breeland
Bob Breen
Kelley Breen
Robert Breheny
Joan Breiding
Luke Breit
Maple H. Breitbach
Holley Brennan
Sean Brennan
Becca Brenner
Billie Bresnahan
Jerry Bresnahan
Chris Bretherton
Mariette Breton
Alisandra Brewer
Jeannine Brewer
Marvin Brewer
Rick Brewer
John Bridges
John Brinda
Thomas A. Brindley
Larry Brink
Kara L. Brinkman
Amber Brinson
Craig M. Briscoe
Bob Brister
Melissa Britton
Bonnie Brock
Richard Brock
Scott Broder
Joseph E. Brodrick
Deborah Brody-Chen
Jason Broehm
James Broemmelsiek
Eriks Brolis
Justin Bronk
Honey Bronson
Beau Brookans
Aslan Brooke
Gillian Brooks
Jane & Al Brooks
Daniel Brophy
Jeremy Brothers
Jodi Broughton
Adriane Brown
Alex P. Brown
Amber Brown
Beatrice Brown
Caleb Brown
Chris Brown
Donna M. Brown
Edwina Brown
Jackie Brown
Jeannine Brown
Jerry Brown
Jesse B. Brown
Jim Brown
Katrina L. Brown
Laura S. Brown
Lauren Brown
Monica Brown
Nicole Brown
Patrick Brown
Rebecca Brown
Sanford Brown
Sarah Brown
Shirley Brown
Steven Brown
William Brown
Bob Browne
Herbert Browne
John Browne, Jr.
Kathy Browning
John Broz
Aliaska Brozen
Susan J. Brubaker-Cole
Ben Bruce
Lawrence Bruguera
Francoise Brunette
David P. Brunner
James R. Brunner
Matt Brunner
Jeannie Brunnick
Laura Bruno
Lisa Bruno
Dustin Brunson
Elizabeth Brusin
Cory Brusseau
Marj & Val Brustad
Thomas Brustman
Alex Bryan
Frank Bryant
Noah Bryant
Clifford M. Bryden
Elizabeth Bryer
Corey Bryerman
Ben Brysacz
Amy Brzeczek
Gloria Buce
Nikki Buchanan
Gregory Buck
Janet S. Buck
M. & Lisa Buck
Dean Buckerfield
Jenifer Buckley
Mitch & Jennifer Buckley
Ona Budo
David Bueker
Greg & Catherine Bueker
Robert M. Bueker
Cierra Buer
Patricia Bugas-Schramm
Kevin & Colleen Bulatek
Nathan Bull
Clark Bullard
E. Bullard
Barbara Bullock
Adi Bunim
Al Buono
Jeanine Burandt
Karen Burchett
Kate Burge
Kathryn Burger
William Burger
Sylvia Burges
Eleanor Burian-Mohr
Joyce Burk
Colleen Burke
Erik Burke
Josephine Burke
Maureen Burke
Patricia Burke
Thomas Burke
William T. Burke
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Judy Burlison
Judith Burnaman
Lois Burns
Steve Burns
Tim Burns
Victor Burns
Charlene Burrell
Serena D. Burroughs
S. Burrows
Lonnie Burson
Gordon Burt
Kirsten Burt
Donald Burton
J. Burton
Leslie Burton
Harold Busby
Dan Busemeyer
Norman Bush
Deborah Bushnell
Barbara Busse
Carol H. Bussell
Jean Butler
Steve Butler
Judd Buzzard

Adrian Byers
Jennifer Byington
Douglas S. Byrd
Jennifer Byrd-Steiner
Patty Byrnes
Virginia Cabot
Susan Cabre
Russ Cabtrel
Raymond Cachial
Eric Cadora
Kim Cafin
Tim Cagney
Richard S. Cahall
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Nancy Cain
Deborah Caine
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Stephanie Calcavecchio
Christopher Caldwell
Diane Caldwell
Pearl Caldwell
Blair D. Calibaba
Claudia Calistro
Brian Call
Debbie Callaghan
Matthew Calverley
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Shelby Camerer
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Joni Cameron
Roni Cameron
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Orville Camp
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Catherine Campbell
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Steve Canning
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Sean Cannon
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M. Canter
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Linda R. Cantrell
Duke Cantrelle
Suzy Capano
Marina Cappas
Mrs. Caracci
Mylene Carberry
Sylvia Cardella
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Gregory D. Carey
Jim Carey
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Alex Caring-Lobe
Miles Carl
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Bob Carlson
Brad Carlson
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Don Carlton
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Diane Carney
Trish Carney
Hugh M. Carola
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Linda Carpenter
Theresa Carpenter
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Laurie Carr
Sherry Carr
Sandra Carrillo
Bryanna Carroll
Jen Carroll
Joanna Carroll
Jim Carsella
Rec E. Carson
Sandra J. Carson
Dorothy Carswell
Ron Carswell
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Brian Carter
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Holly Carter
Judith Carter
Sara Carter
Stephen C. Carter
Thomas Carter
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Kenya Casas
Lisa Cascade
Bruce Lee Casey
Echo Casey
Susan Casey
Tonnie Casey
David Cash
Douglas Casper
Judy Cassada
Gregg Cassarini
Doris Cassidy
Renee Cassidy
Steve Cassilly
Leigh Castellon
Sean J. Castor
Alfred Castro
Lexie Cataldo
Marilyn Cathers
Kasey & Josh Cathey
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Dorah Caulfield
John Caulkins
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Rebecca Chance
Bill Chandler
Lowana Chandler
Tommy Chang
Samuel Chaparro
James Chapman
Sonja Chapman
Phil Chappel
David Chappell
Karen Charters
Tia M. Chartier
Aaron Chase
Bonnie & Steve Chase
Clark Chase
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*Final Supplemental Environmental Impact Statement*

# To Remove or Modify the Survey and Manage Mitigation Measure Standards and Guidelines

***Volume I — Summary, Chapters 1-4***