Chapter 2 — The Alternatives

Introduction

This chapter presents five alternatives for the management of Port-Orford-cedar (POC) on the Coos Bay, Medford, and Roseburg Bureau of Land Management (BLM) Districts and the Siskiyou National Forest (NF). Selection of one of the Action Alternatives would amend the land and resource management plans of those four administrative units. The alternatives apply only to lands administered by those four units and to 5,400 acres belonging to the Coquille Indian Tribe that must, by law, be managed according to the standards and guidelines of the adjacent BLM lands. The alternatives would not amend any of the standards and guidelines for management of late-successional and old-growth-forest-related species adopted in 1994 as the Northwest Forest Plan.

Background/Existing Port-Orford-Cedar Standards and Guidelines

POC root disease was first identified near the northwest corner of the POC range near Coos Bay in 1952. POC in this part of the range are often well-distributed across the landscape, but typically make up only a small percentage (usually less than 5 percent) of the composition in any given stand of trees. Trees growing away from roads and streams are not as vulnerable, and those killed near roads and streams are often quickly replaced by other species. After 50 years of disease spread in the Coos Bay area, 70 to 80 percent of the trees are uninfected and the rate of disease spread has slowed.

In succeeding years, the disease moved south and east to the Siskiyou NF and Medford BLM District, and by the early 1980s had reached into the upper Smith River Watershed on the Six Rivers NF in Region 5. POC often makes up isolated remnants in unique habitats (ultramafic soils) or is scattered along the banks of streams and rivers in these areas. As the mortality of POC began to be of greater concern, several publications were issued describing the spread and effects of the disease, and offering strategies for control. These publications included "Port-Orford-Cedar Root Rot on the Siskiyou National Forest" (Harvey et al. 1985); "Siskiyou National Forest Tree Improvement Plan" (Tibbs et al. 1988); "Port-Orford Root Disease" (Roth et al. 1988), and "Ecology, Pathology, and Management of Port-Orford-Cedar (*Chamaecyparis lawsoniana*)" (Zobel et al. 1985). In May 1987, an interregional POC Coordinating Group was formed by the FS and BLM.

On June 29, 1988, in response to concerns about the loss of POC, the FS Regional Foresters of Regions 5 and 6 signed the "Region Five-Region Six Port-Orford-Cedar Root Disease Action Plan." This document was a formal commitment by both Regional Foresters for (1) Inventory and Monitoring, (2) Research, (3) Public Involvement and Education, and (4) Management Policy. This commitment was described in the 1989 "Siskiyou National Forest Land and Resource Management Plan" as providing the support necessary to insure the viability and continued presence of POC in the ecosystem throughout its native range on FS-administered lands.

When the "Siskiyou National Forest Land and Resource Management Plan" was completed in 1989, it referenced the 1988 Action Plan as its primary management strategy for controlling and mitigating the spread of the disease. During the next 6 years, POC and the root disease were extensively mapped, resistance breeding was begun, roads were closed either seasonally or permanently, sanitation treatments were begun along high-risk roads, a test was developed for determining the presence of the disease agent in water and soil, and many other treatments were pioneered and standardized.

Concerned about POC, BLM districts formalized a management approach similar to the FS by developing the "Port-Orford-Cedar Management Guidelines" in 1994 (see Appendix 1). These Guidelines were incorporated into the resource management plans for all three BLM Districts in 1995, without specifically addressing effects to POC in the final environmental impact statements (EISs) for those plans.

In 1995, the FS determined most of the items in its 1988 Action Plan were completed, and declared the Action Plan as ceasing to be operative. Continuing items such as monitoring and public involvement were identified to continue as routine activities, and an oversight and technical team were set up to ensure POC was maintained as

> . . . a viable component of healthy, sustainable ecosystems . . . .

with the BLM as partners.

In general, the current standards and guidelines for both Agencies place an emphasis on reducing the spread of *Phytophthora lateralis* (PL) and maintaining POC through various management practices applied at the project level following project-specific analysis. Although management practices may be locally effective, the disease continues to spread. In 1996 the disease was discovered to have spread to the disjunct population of POC in the Sacramento River drainage, over 150 road miles and in a different river drainage from the nearest known infection center.

The Northcoast Environmental Center, along with several other environmental organizations, filed an action in January 1995 claiming the FS and BLM had failed to comply with the requirements of the "National Environmental Policy Act" in developing their Action Plan and Guidelines, respectively. Plaintiffs sought an order enjoining the FS and the BLM

> . . . to prepare a comprehensive, inter-regional EIS on their management of the Port-Orford-cedar and its habitat . . . [and in the meantime] . . . to undertake all necessary actions to prevent the spread or introduction of *Phytophthora lateralis* and to maintain healthy diverse Port-Orford cedar stands and habitat . . .

which meant all road construction and maintenance, off-road vehicle use, timber harvest, mining, and commercial cedar bough and mushroom collection in the affected area, which encompasses southwestern Oregon and northwestern California. In August 1996, the U.S. District Court ruled that the plaintiffs cannot challenge under the "Administrative Procedures Act" government "programs" in general. The Court found that the alleged "Port-Orford-cedar Program" was a term loosely applied to all the actions that the government took regarding managing POC including public education efforts, research, sharing databases, etc. Such a general program was not a "final agency action" reviewable under the "Administrative Procedures Act." As to challenges to specific decisions such as the adoption of the "BLM

Port-Orford-cedar Management Guidelines" in the BLM's resource management plan decisions, the Court found that the Guidelines merely contained possible control strategies for root rot disease which managers may or may not select in subsequent site-specific NEPA decision processes. The Court concluded that since the Guidelines did not require district managers to take any action or make any specific proposal or commit any resources, that it was reasonable for the government to determine that the Guidelines did not constitute a major Federal action significantly affecting the quality of the human environment.

Plaintiffs appealed the decision to the Ninth Circuit. The Ninth Circuit in 1998 affirmed the District Court on the grounds that there was no final agency action and that the POC management documents do not constitute a major Federal action affecting the environment. The Court based its decision in part on an assumption that the government agencies would prepare an EIS when they propose to implement particular control strategies with environmental impacts.

The Sandy-Remote Lawsuit

The BLM proposed timber sales during 1996 within a portion of the Coos Bay BLM District known as the Sandy-Remote Analysis Area. The spread of POC root disease was among issues identified in the environmental analysis (EA), with treatments specified to follow the 1994 "Port-Orford-Cedar Management Guidelines." This decision became the subject of a lawsuit, Kern v. BLM, which followed up on the language in the Northcoast Environmental Center decision suggesting that a NEPA action would be ripe when the government took an action implementing a control strategy for managing the cedar root disease. In one of their counts of alleged NEPA violations, the litigants in Kern contended that both the EA and the overriding EIS for the 1995 "Coos Bay Resource Management Plan" contained insufficient analysis of the range-wide cumulative effects of proposed timber harvesting on the spread of the root disease. Although the District Court ruled that the site-specific EA adequately addressed the impacts to cedar within the watershed containing the proposed projects, the Ninth Circuit reversed on the grounds that the EIS to which the EA was tiered did not include an adequate analysis of effects of the adoption of control strategies on the species as a whole, and that the deficiencies of this tiered document were not addressed by the analysis in the EA of only the impacts on the affected watershed.

On February 12, 2003, under direction from the March 2002 decision by the U.S. Court of Appeals for the Ninth Circuit, the U.S. District Court for the District of Oregon ruled that

> . . . the EIS for the Coos Bay District is inadequate under NEPA because it does not include an analysis of reasonably foreseeable future timber sales and other actions on *Phytophthora lateralis* and Port Orford cedar. In the absence of an EIS analyzing the impact of reasonably foreseeable timber sales within the Coos Bay District under the proposed RMP, the Sandy-Remote Area EA is inadequate under NEPA because it lacks an analysis of the cumulative impacts of such sales within the Coos Bay District.

The court went on to enjoin timber sale activities and related road building and maintenance in the Sandy-Remote area that involve harvest of POC until

> . . . BLM completes adequate analysis of the direct, indirect and cumulative impacts on PL and POC.

This supplemental EIS is intended to fully rectify the deficiencies identified in the February 12, 2003 District Court decision and the March 2002 decision of the Ninth Circuit.

The Siskiyou NF has reviewed the Sandy-Remote Decision and, because of the similarity of their land management plan standards and guidelines and related analysis to the BLM plans, has determined similar deficiencies might exist in their plans. Further, because of a history of cooperation between the two Agencies regarding management of POC and the root disease, the Forest chose to participate in this analysis in the hope of adopting the same standards and guidelines as the BLM.

The Supplemental Environmental Impact Statement

The Council on Environmental Quality regulations implementing the "National Environmental Policy Act" (NEPA) direct that agencies supplement an EIS

> . . . 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, there are significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts. The Agencies need to amend previous land and resource management plan EISs to display the direct, indirect, and cumulative impacts of their current management on PL and POC. It follows that potential alternatives to the current direction need to be analyzed as well, in order to provide a context, or range of effects, within which the decision-maker can consider the required analysis an make an informed choice.

All alternatives would only affect a small portion of the land and resource management plan standards and guidelines, or their supporting EISs, for the affected administrative units. The proposed changes do not constitute an action separate and distinct from the existing land and resource management plans of the Agencies and do not warrant a new EIS. Therefore, it is appropriate to analyze the effects of the Proposed Action and alternatives in a supplemental EIS to the final EISs for the three BLM Districts and one NF affected.

Endangered Species Consultation

The BLM and FS will prepare a biological evaluation for the final SEIS, and consult with the U.S. Fish and Wildlife Service (USFWS) and/or the National Oceanic and Atmospheric Administration (NOAA)-Fisheries to the extent required by the "Endangered Species Act." A draft biological evaluation covering wildlife and botany is in Appendix 7. Listed anadromous fish are discussed in the Water and Fisheries section of Chapter 3&4.

The Planning Area

The planning area for this SEIS is the federally-administered land within the natural range of POC (Figure 1-1) within the Medford, Coos Bay, and Roseburg BLM Districts and the Siskiyou NF, all in southwest Oregon. The selected alternative would also apply to 5,400 acres managed by the Coquille Indian Tribe, because enacting legislation requires these lands to be managed under the same standards and guidelines as the adjacent BLM lands. No management direction is included here for other Federal lands, other American Indian trust lands, or state and private lands. However, cumulative impacts from expected management activities on these other lands, including NFs in California, were considered as part of the effects analysis in this SEIS. NFs in California within the range of POC contributed to the analysis in this SEIS as cooperators. There are no native POC on BLM-administered lands in California.

There will be two records of decision: The State Director for Oregon/Washington BLM will make the decision for the BLM Districts; and the Region 6 Forester will make the decision for the Siskiyou NF.

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 would remove the existing POC standards and guidelines in the land and resource management plans for three BLM and one FS administrative units (see direction described under the No-Action Alternative, Alternative 1) and replace it with the standards and guidelines of the selected alternative.

Bureau of Land Management

Adoption of the Proposed Action would be consistent with 43 CFR 1610.5-5 and would amend the resource management plans for the Medford, Coos Bay, and Roseburg Districts in Oregon. Because the action alternative 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 EIS, 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 EIS may be prepared to cover all amendments (43 CFR 1610.5-5).

Forest Service

Adoption of the Proposed Action would result in amendment of the "Siskiyou National Forest Land and Resource Management Plan" (forest plan) in Region 6.

If an amendment to a forest plan results in a significant change in the plan, the "National Forest Management Act" 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)). Significant change in the plan is determined by different criteria than those used in evaluating significance in the NEPA process. For the "National Forest Management Act" requirement, the Forest Service Manual (FSM 1922.51 and .52) provides specific direction as follows.

> FSM 1922.51 – Changes to the Forest Plan that Are Not Significant.
>
> 1. Actions that do not significantly alter the multiple-use goals and objectives for the long-term land and resource management.
>
> 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.
>
> 3. Minor changes in standards and guidelines.
>
> 4. Opportunities for additional management practices that will contribute to achievement of the management prescription.
>
> FSM 1922.52 – Changes to the Forest Plan That Are Significant.
>
> 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)).
>
> 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.

None of the alternatives would result in a significant change to the Siskiyou forest plan. The alternatives would not significantly alter the multiple-use goals and objectives for the long-term land and resource management. Changes in management prescriptions would not result in significant changes (in part because the additional protection areas of Alternative 3 are mostly located in reserves), and changes to the standards and guidelines would be minor, better contributing to achievement of the forest plan objectives. The alternatives would not significantly alter the long-term relationship between levels of goods and services originally projected, and would not have an important effect on the entire forest plan or affect resources

throughout a large portion of the planning area.

The Alternatives

Overview

There are five alternatives introduced here and described in detail in following sections. These alternatives apply to the Medford, Coos Bay, and Roseburg BLM Districts and the Siskiyou NF. If one of the Action Alternatives is adopted, the standards and guidelines of that alternative would replace the existing standards and guidelines for management of POC. Management direction for the Klamath, Six Rivers, Shasta-Trinity, and Suislaw NFs is not being considered for change at this time—their current direction is used in the effects discussions in later sections of this SEIS.

Alternative 1 — Continue Existing Direction (the No-Action Alternative): This alternative continues the current direction in the land and resource management plans of the BLM Districts and the Siskiyou NF. In general, these standards and guidelines place an emphasis on reducing the spread of PL and maintaining POC through various management practices applied at the project level following project-specific analysis. As a result, POC root disease control is considered, and control techniques are applied, at all levels of project planning and execution, including firefighting. A summary of specific control or mitigation efforts implemented by the Agencies in Fiscal Years 2001 and 2002 is included in Appendix 2, and serves as the assumed approximate level of management activity that would continue to occur under this alternative.

Alternative 2 — Proposed Action: This alternative specifically describes all currently available control and mitigation practices, dividing them between those that should be applied generally (such as community outreach and restoration) and those that may, depending upon site conditions, be applied to specific management activities (such as timber sales). For the latter group, a risk key is included to clarify the environmental conditions that require implementation of one or more of the listed disease-controlling management practices. The difference, when compared to Alternative 1, is implementation of a slightly broader, potentially more effective array of control or mitigation treatments, and more consistent implementation of those treatments based on the risk key.

Alternative 3: This alternative contains the management elements of Alternative 2, and seeks to slow the spread of PL even more by adding additional protection for 32 currently uninfested 6th field watersheds having at least 100 acres of stands containing POC. Specific protection measures are prescribed for the POC stands within these watersheds (POC core areas), and somewhat different protection is prescribed for the remainder of these watersheds (POC buffers) to lessen the possibility of infection within the POC core.

Alternative 4: This alternative would remove current site-specific measures used to control the root disease spread, but would accelerate the resistance breeding program. The resistance breeding program is designed to supply seedlings to replace (at the same site or elsewhere) POC killed by the disease. Quickly replacing dead POC in natural stands with resistant POC seedlings, and planting microsites at less risk of exposure to PL, would be emphasized.

Alternative 5: This alternative would remove current site-specific measures used to control the root disease spread and discontinue the resistance breeding program. All current management activities described in Alternative 1 would be discontinued except for the operational POC seed production orchards. Seedlings from existing resistant seed orchard trees would continue to be used to reforest areas of mortality occurring in the same breeding zone, but resistant seed for other breeding zones would not be developed.

Standards and Guidelines for Each Alternative

Alternative 1 — Continue Existing Direction

The alternative meets the Council on Environmental Quality requirements for a No Action Alternative described at CFR 1502.14(d).

This alternative continues the current direction in the land and resource management plans of the BLM Districts and the Siskiyou NF. In general, these standards and guidelines place an emphasis on reducing the spread of PL and maintaining POC through various management practices applied at the project level following project-specific analysis. As a result, POC root disease control is considered, and control techniques are applied, at all levels of project planning and execution, including firefighting. A summary of specific control or mitigation efforts implemented by the Agencies in Fiscal Years 2001 and 2002 is included in Appendix 2, and serves as the assumed approximate level of management activity that would continue to occur under this alternative.

The objectives of this alternative are to:

- Reduce the spread of root disease;
- BLM - Retain POC as a species, identify resistant individuals, and incorporate them into a tree improvement program.
- FS - Insure the viability and continued presence of POC in the ecosystem throughout its native range on Forest Service-managed lands.

General Direction

The standards and guidelines for the administrative units in Oregon are displayed as follows. The standards and guidelines for the Cooperating NFs in Region 5 are displayed in Appendix 3, and summarized under Cumulative Impacts near the beginning of Chapter 3&4. Summaries of management practices for other lands, including those administered by the states or by the National Park Service, are also included in the Cumulative Impacts and Background sections in Chapter 3&4.

Existing Direction — Roseburg, Medford, and Coos Bay BLM Districts

Page 60 of the “Roseburg District Record of Decision and Resource Management Plan” (1995) states:

> Conform all management activities within the range of Port-Orford-cedar to the guidelines described in the BLM Port-Orford-cedar Management Policies to mitigate damage caused by *Phytophthora lateralis*. Site specific analyses for projects within the range of Port-Orford cedar will consider possible effects on the species.

Similar language appears on page 75 of the "Medford District Record of Decision and Resource Management Plan" (1995) and page 52 of the "Coos Bay District Record of Decision and Resource Management Plan" (1995).

The "Port-Orford-Cedar Management Guidelines" (1994) document is displayed in its entirety in Appendix 1. It includes the following sections:

I. Introduction
II. *Phytophthora lateralis* and Port-Orford-Cedar
III. *Phytophthora lateralis* and Pacific Yew
IV. Management Objectives for Port-Orford-Cedar
V. Implementation Strategy to Achieve Port-Orford-Cedar Management Objectives
    A. Proactive management: limit the spread of *Phytophthora lateralis* and reduce the number of infested areas
    B. Retain Port-Orford-Cedar as a species, identify resistant individuals, and incorporate them into a tree improvement program
    C. Incorporate *Phytophthora lateralis* control strategies as management objectives in Riparian Reserves, Late-Successional Reserves, and in the Matrix
        1. Riparian Reserves
        2. Late-Successional Reserves
        3. Matrix
    D. Provide Port-Orford-Cedar as a primary forest product
    E. Public Involvement
    F. Develop a budget and implementation schedule for the Port-Orford-Cedar Program
VI. Mitigation Measures for Timber Sale and Service Contracts

APPENDICES
    Appendix 1: Synopsis of Region 5 and 6 Port-Orford-Cedar Coordinating Group Action Plan
    Appendix 2: General Specifications for a Washing Station
    Appendix 3: Equipment Cleaning Checklist
    Appendix 4: Project Analysis and Implementation
ACKNOWLEDGEMENTS
PEER REVIEWERS
REFERENCES

Existing Direction — Siskiyou National Forest

The following is from page IV-63 of the "Siskiyou National Forest Land and Resource Management Plan" (1989).

> Forest-wide Standards and Guidelines
>
> 12-8: Strategies for POC shall be integrated into environmental analyses and project planning for all areas that support POC. An example is to interplant existing plantations that are scheduled for planting or have been planted. POC should be managed as a major component of the appropriate plant association in areas of low to moderate risk of infection. Representative areas within plant associations containing POC will be identified and protected.

Appropriate practices identified from experience and research should be applied on a site- or drainage-specific basis to prevent or reduce the spread and severity of POC root disease. Additional information and suggested practices can be found in "Port-Orford-Cedar Root Rot on the Siskiyou National Forest" (Harvey et al. 1985); "Siskiyou National Forest Tree Improvement Plan" (Tibbs et al. 1988); "Port-Orford Root Disease" (Roth et al. 1988), and "Ecology, Pathology, and Management of POC (*Chamaecyparis lawsoniana*)" (Zobel et al. 1985).

Of special significance to the support of management of POC was the "Region Five-Region Six Port-Orford-Cedar Root Diseases Action Plan" dated June 29, 1988. This is a formal commitment by both Regional Foresters for (1) Inventory and Monitoring, (2) Research, (3) Public Involvement and Education, and (4) Management Policy. In short, this commitment provides the support to insure the viability and continue presence of POC in the ecosystem throughout its native range on Forest Service-managed lands.

To emphasize the importance of achieving success in this effort, specific examples of requirements are listed below:

1. Silvicultural prescriptions for sites having potential for growing POC will provide for the establishment of the species through natural or artificial regeneration and maintenance as a viable stand component through the current and future rotations. Prescription analysis will also consider distribution of POC so that spacing will inhibit spread of the disease, particularly in susceptible habitats.

2. Road construction and use that can potentially affect POC will be evaluated and appropriate control measures used that limit the spread of the disease. Road closures or controlled access can be used as part of the overall management scheme to reduce the risk of contamination of individual areas (such measures should be documented in the road management objectives).

3. Logging systems used in infested POC stands should minimize disturbance and redistribution of soil. In a given case, this might exclude use of ground-yarding equipment such as tractors or rubber-tired skidders. In other situations, it might require full suspension of logs during yarding operations with skyline systems or helicopters. It might also be necessary to operate during the drier time of the year to reduce soil movement.

The accomplishments of the 1988 "Region Five-Region Six Port-Orford-Cedar Root Disease Action Plan" were reviewed in 1995, with the decision that the majority of the items of the Action Plan had been completed. Specific completed tasks included giving general inventory directions to the affected NFs, establishing local maps, issuing directions for field monitoring, and preparing a report on the effects of mitigation measures. Continuing Action Plan items include active POC/PL forest monitoring programs and collaborating with the BLM, National Park Service, and private landowners.

Alternative 2 — General Direction Plus Risk Key (Proposed Action)

This alternative specifically describes all currently available control and mitigation practices, dividing them between those that should be applied generally (such as community outreach and restoration) and those that may, depending upon site conditions, be applied to specific management activities (such as timber sales). For the latter group, a risk key is included to clarify the environmental conditions that require implementation of one or more of the listed disease-controlling management practices. The difference, when compared to Alternative 1, is implementation of a slightly broader, potentially more effective array of control or mitigation treatments, and more consistent implementation of those treatments based on the risk key.

The objectives of this alternative are to:

- Maintain POC on sites where the risk for infection is low;
- reduce the spread of root disease;
- attempt to reestablish POC in plant communities where it has been significantly reduced in numbers by root disease.

General Direction

Integrated Management Approach. Implement an integrated approach to dealing with PL which includes prevention, restoration, detection, evaluation, suppression, and monitoring. Management goals are directed toward maintaining POC and reducing root disease losses. Elements of the management strategy include management of bough cutting, community outreach, genetics, interagency coordination, planning, wildfire suppression, snag retention, project-specific direction, risk key, management practices, and monitoring.

In portions of the natural range, POC is abundant and widespread across the landscape. In these areas, POC conservation should emphasize management on sites naturally at low risk for infection. In many forest types, management of POC can focus on sites where conditions make it likely to escape infection by PL, even if the pathogen has already been established nearby. POC on such sites often has escaped infection because the sites have characteristics that are unfavorable for the spread of the pathogen. These sites are above and away from roads, uphill from creeks, on ridgetops, and on well-drained soils.

In the majority of the natural range, POC is widespread but not abundant. POC populations are localized on moist microsites (such as along streams) or sites favorable for establishment of the species (such as along roads). In these areas, opportunities for managing for POC on sites unfavorable to the pathogen are limited or do not exist at all. Prevention of new infestations treatments should be emphasized in this portion of the range, and there is a potential for eradication treatments in certain circumstances.

Restoration of Port-Orford-Cedar. Restore POC to sites within its natural range where the species is essential for meeting land and resource management plan objectives for both aquatic and terrestrial ecosystems, Tribal, or product uses or function. This would be accomplished using resistant and nonresistant stock for reforestation and other elements of the integrated management approach.

Adaptive Management. Adaptive management is a continuing process of action-based planning, monitoring, researching, evaluating, and adjusting with the objectives of improving the implementation and achieving the goals of the selected alternative. Under the concept of adaptive management, new information would be evaluated and a decision would be made whether to make adjustments. The Agencies would continue to develop and evaluate techniques to protect POC, and prevent disease intensification and spread within and around areas where PL infestations already occur.

Bough Cutting. To reduce or eliminate the spread of PL by POC bough cutters, limit POC bough cutting to roadside sanitation, commercial thinning, and precommercial thinning units.

POC bough collection shall be by permit only, and require:

- Dry season operations;
- designation of access and egress routes;
- designation of parking areas;
- unit scheduling (collect all uninfested areas prior to infested areas);
- washing of boots and equipment;
- daily inspections;
- stopping operations during and after rains; and
- easily identifiable areas where boughs are to be collected.

Community Outreach. Increase public awareness of the root disease and the need to control it by using periodic press releases; distributing posters and pamphlets; coordinating with Tribal groups; creating and maintaining POC websites; conducting public symposiums; preparing and installing informational signs on or at trailheads, gates, and other closures; holding coordination meetings with industrial and small woodland landowners; and other measures.

Eradication. In watersheds or other geographic areas where PL infestations are localized or infrequent in comparison to the amount of POC, POC eradication may be tried as a management technique to prevent/reduce spread of the disease and reduce the need for other management practices in the long term. When experience demonstrates techniques and conditions where this treatment can be effective, its use will be increased. Prescribed fire may be considered as a part of eradication treatments. PL has been shown to be adversely affected by heat in laboratory studies (Ostrofsky et al. 1977; Hansen and Hamm 1996) and burning may reduce PL in the soil.

Genetics. Develop resistant stock and make it available for all POC reforestation and restoration projects.

The existing interagency resistance breeding program would be continued at current levels (per available funding) as described in a POC interagency agreement between the FS and BLM. The objectives of this agreement are to (1) select and evaluate families for resistance and develop durable resistance to PL while maintaining broad genetic diversity within the species, and (2) produce seed genetically resistant to PL for deployment throughout the range of where PL is present. The POC resistance breeding program would continue as follows:

- Develop resistant seed for **breeding zones** (breeding blocks plus elevation zones) based upon management needs within the range of POC;

- the three BLM Districts and the Siskiyou NF will develop a POC strategic deployment strategy for the planting of resistant POC stock, and include consideration for state and private lands (see Appendix 6);

- continue efforts to inform the public about the availability and use of resistant seed;

- find ways to provide resistant seed to non-Federal landowners; and

- monitor the operational performance of resistant plantings.

Collect and maintain between 50,000 and 100,000 resistant seeds (about 0.5 pound) for each

POC breeding zone in organized conservation seedbanks. This seed would be reserved exclusively for reforesting areas after the occurrence of stand replacement events such as large-scale wildfires. Where possible, resistant POC seedlings would be planted in such locales, with the goal to reintroduce POC to all pre-fire locations.

Interagency Coordination. The Agencies would continue to coordinate management practices including research, genetic resistance breeding, and public education.

Planning. Consideration of POC management objectives would be addressed, as applicable, in new NEPA documents, watershed analyses, Late-Successional Reserve assessments, wild and scenic river management plans, transportation planning (roads analysis process or transportation management objectives), fire management plans, recreation planning, and other activities or strategies in all watersheds with POC.

Wildfire Suppression. POC issues are secondary priority during wildfire suppression. While management objectives for POC are a concern, safety of firefighters and the public, and protection of property is always a higher priority. Existing or "in-place" disease-controlling management practices such as road closures may be compromised. When practicable, management strategies to prevent/reduce spread of PL shall be incorporated into firefighting activities. Such practices may include treating firefighting water with Clorox, washing vehicles, and washing tools and clothing.

Road closures and other compromised POC-disease controlling measures will be reinstalled following suppression and emergency rehabilitation. Fire rehabilitation efforts will include POC and PL considerations.

Snag Retention. Emphasize the retention of POC snags in Riparian Reserves because they are resistant to decay and the resultant down logs can provide durable structural components for both aquatic and terrestrial ecosystems. Retention numbers should consider that few additional large POC snags are likely to become available in the near future in infested areas because of the current mortality and presence of PL. This direction is particularly applicable to plant associations on utramafic soils and other locations where POC can be some of the largest and most abundant trees.

The stabilizing effects and habitat contributions of large POC woody material and its root mass in stream channels has often been described as the primary geomorphic control for soil movement in certain stream systems. Dead POC can provide in-channel structure, a source of nutrients, and a substrate for wood-associated aquatic insects. This allows for maintenance of the stream channel over time and retains anadromous and resident fish habitat.

Avoid Disease Export. Before travelling to or working in relatively less infested areas, such as in uninfested watersheds or different administrative units, heavy equipment, including road maintenance equipment that has left surfaced roads, should be washed upon leaving infested project areas to minimize transport of infested soil to uninfested areas. Washing areas would be located as described under Management Practice 13 (Washing Project Equipment) in the following Management Practices section.

Project-Specific Direction

One or more of the management practices listed under the following Management Practices subheading would be applied to site-specific management activities when a need is indicated by the POC Risk Key, Table 2-1. This approach precludes the need for additional project-specific analysis of risk because the risk key describes conditions where additional protection or mitigation management practices are assumed (expected) to be applied. When a project-specific application of the risk key shows the risk is low, no additional Management Practices are needed.

For the application of this risk key, the definition of "project" should be viewed broadly. Road maintenance, recreation management, non-POC special forest products including personal use firewood, and other general uses likely to introduce significant risk to essential POC should be considered for mitigation treatments when indicated by application of the key.

The objective of the risk key is to identify project areas/situations where new infections should be avoided, and guide the application of one or more of the management practices until the risk is acceptably mitigated. The risk key describes an expectation that appropriate mitigation measures would be applied where needed.

Management practices are designed to:

- Reduce the import of disease into uninfested areas (offsite spores picked-up and carried into an uninfested project area);
- prevent/reduce the export of disease to uninfested areas (onsite spores moved to offsite, uninfested area); and

Table 2-1.—*Port-Orford-Cedar Risk Key: Site-specific analysis to help determine where risk reduction or mitigation treatments would be applied*

1a. Are there uninfected POC within, near, or downstream of the analysis area whose ecological, Tribal, or product use or function is so essential that their mortality would preclude meeting land and resource management plan objectives?	
1b. Are there uninfected POC within, near, or downstream of the analysis area that, were they to become infected, would likely spread infections to trees whose ecological, Tribal, or product use or function is so essential that their mortality would preclude meeting land and resource management plan objectives?	*If the answer to both questions 1a and 1b is no, then risk is low and no POC management practices are required.*
If the answer to either question is yes, continue.	
2. Will the proposed project introduce significant risk of infection to these uninfected POC?	*If no, then risk is low and no POC management practices are required.*
If yes, apply management practices from the list below for reduction or mitigation of risk, until the answer to one of the above questions is no, or until the project analysis indicates no other treatment is effective, no other treatment is practicable, or disease control objectives can be met by other means.	

[1] In questions 1a and 1b, "near" generally means within 25 to 50 feet downslope or 25 feet upslope from management activity areas, access roads, or haul routes; farther for drainage features; considerably farther in streams.

- minimize increases in the level of inoculum or minimize the rate of spread in areas where the disease is localized or infection is intermittent.

Management Practices

Management practices from the list below would be selected and implemented when there is a management need indicated by the POC Risk Key. No priority is assumed by the order listed below. When indicated by the risk key, one or more specific practices best fitting the nature of the risk and the site-specific conditions would be applied.

1) Project Scheduling: Schedule projects during the dry season or incorporate unit scheduling (Management Practice 3) and vehicle and equipment washing (Management Practice 13) as part of project design.

2) Utilize Uninfested Water: Use uninfested water sources for planned activities such as road watering and other water distribution needs, or treat water with Clorox to prevent/reduce the spread of PL (see Appendix 4 for label and instructions for use).

3) Unit Scheduling: Conduct work in all timber sale and other activity units or areas where PL is not present before working in units infested with PL.

4) Access: Designate access and egress routes to minimize exposure to PL.

5) Public Information: Increase public awareness of the root disease and the need to control it by using informational signs on or at trailheads, gates, and other closures, and holding coordination meetings with adjacent industrial and small woodland landowners.

6) Prescribed Fire: Clean boots, vehicles, and incorporate other management practices to avoid moving infested soil out of treatment areas. Incorporate unit scheduling and vehicle and equipment washing as described in Management Practice 1 as part of project design. Select water sources as described in Management Practice 2. Specify travel routes as shown in Management Practice 4.

7) Incorporate POC Objectives into Prescribed Fire Plans: Incorporate POC objectives (sanitation, etc.) into prescribed fire treatment plans. These include using uninfested or treated water sources and, potentially, aiding with eradication treatments.

8) Routing Recreation Use: Route new trails (off-highway vehicle, motorcycle, mountain bike, horse, and foot) away from areas with POC or PL. Trailheads should be relocated and/or established trails should be rerouted in the same manner where trails present significant risk to POC.

9) Road Management Measures: Implement proactive disease prevention measures including seasonal or permanent road closures, road maintenance, and sanitation removal of roadside POC to help reduce the likelihood of spreading the disease—especially to high risk areas. Identify prevention measures at a site-specific or drainage-specific level. Road design features include pavement over other surfacing, surfacing over no surfacing,

removal of low water crossings, drainage structures to divert water to areas unfavorable to the pathogen, and priority retention during thinning or other silvicultural treatments.

10) Resistant POC Planting: Plant resistant POC 25 feet apart or in approximately 10 tree clusters at 100 to 150-foot spacing to lessen the potential for root grafting (a source of PL spread). Silvicultural prescriptions for sites having potential for growing POC would provide for the establishment of the species through natural or artificial regeneration and maintenance as a viable stand component through the current and future rotations.

11) Washing Project Equipment: Wash project equipment prior to beginning work in uninfested project areas, when leaving infested areas to work in uninfested areas, and when leaving the project area to minimize the transportation of infested soil to uninfested areas. Equipment includes maintenance and harvest equipment coming in contact with soils, and project vehicles, including trucks and crew vehicles, leaving surfaced roads or traveling on other roads deemed at risk for spreading disease. Project areas should be compartmentalized by road system in areas with mixed ownership (Federal and private). A road system with infested areas and noninfested areas would be considered infested. Washing areas should be placed at optimum locations for minimizing spread, such as at entry/exit points of the road system with Federal control. Washing should take place as close as possible to infested sites. Ideally, equipment should not travel for any substantial distance prior to being washed unless being transported on paved roads. Equipment moving into uninfested areas may be washed miles away as long as they do not travel through infested areas to reach their destination. Effectiveness testing indicates large reductions in inoculum by washing. Additional information about washing, and suggested parameters for washing stations, can be found in Appendix 2 and 3 of the BLM "Port-Orford-Cedar Management Guidelines," which can be found in Appendix 1 of this SEIS.

12) Logging Systems: Use non-ground-based logging systems (full suspension or helicopter).

13) Spacing Objectives for Port-Orford-Cedar Thinning: POC spacing objectives during thinning projects (commercial or precommercial) should be to create discontinuous POC populations across the management unit.

14) Non-Port-Orford-Cedar Special Forest Products*:* No special forest products permits, including firewood permits, would be issued in the wet season where POC is present, unless administration shown above for POC boughs can be implemented. Educate the public on the risks associated with collecting in areas with POC.

Monitoring

The monitoring plan for this alternative is in Appendix 5.

Alternative 3 — Port-Orford-Cedar Cores and Buffers

This alternative contains the management elements of Alternative 2, and seeks to slow the spread of PL even more by adding additional protection for 32 currently uninfested 6th field

watersheds having at least 100 acres of stands containing POC. Specific protection measures are prescribed for the POC stands within these watersheds (POC core areas), and somewhat different protection is prescribed for the remainder of these watersheds (POC buffers) to lessen the possibility of infection within the POC core.

The objectives of this alternative are to:

- Maintain POC on sites where the risk for infection is low;
- reduce the spread of root disease;
- attempt to reestablish POC in plant communities where it has been significantly reduced in numbers by root disease;
- prevent root disease from becoming established in disease-free subwatersheds.

General Direction

Except for the specific requirements for the POC cores and buffers described below, and minor differences in the monitoring plan shown in Appendix 5, all direction for Alternative 2 applies to this alternative.

Management of Port-Orford-Cedar Cores

Analysis of Federal lands with greater than 100 acres in stands that include POC shows that there are currently 32 6th field watersheds in Oregon uninfested with PL (see Map 1). These stands occur in Matrix as well as various reserve land allocations. Uninfested POC stands within these watersheds (about 34,400 acres) would be referred to as POC cores (see Table 2-2). POC cores are not necessarily contiguous acres. POC cores are represented in red on Map 1 using existing geographic information system stand mapping. Actual POC core boundaries would depend on where POC occurs on the ground. Stands with any level of POC are included. Watersheds no longer qualify for POC cores and buffers if 5 percent or more of the POC core area becomes infested with PL.

The following measures apply to POC cores:

1) Minimize Entry: Administratively controllable entry into POC cores would be minimized. For example, product collection or other special use permits would not be issued in these areas.

2) Transportation Analysis: A transportation analysis would be conducted to determine road needs for the POC cores. Management objectives should minimize the road system within the POC core, which could result in decommissioning parts of the existing road system. New (discretionary) road construction would not be permitted.

3) No Vehicles: To the extent road access is controlled by the Agencies, all vehicular traffic would be excluded, with the exception of administrative access. Off-highway vehicle use would not be permitted.

4) No Timber Harvest: Timber harvest, including salvage, would be prohibited, unless a stand-replacing event results in the area no longer qualifying as a POC core area. Stand treatments not involving timber harvest would be permitted.

Table 2-2.—*Port-Orford-cedar disease-free 6th field watersheds* [1]

Subwatershed [6th field] number	Subwatershed name	Administrative unit [2]	Core Matrix/ Riparian Reserve/ Adaptive Management Area acres	Core reserve acres [3, 4]	Port-Orford-cedar buffer acres	Total sub-watershed acres [5]	% Federal ownership
171003100103	Taylor Creek	M	106	305	15,484	17,649	90
171003100105	Rogue River/Lower Hellgate	M	0	285	10,954	12,847	87
171003100401	Rogue River/Whiskey Creek	M	0	779	13,266	15,090	93
171003100406	Rogue River/Missouri Creek	M	6	2,000	11,485	14,850	91
171003110101	Upper East Fork Illinois River	S	0	1,775	8,537	10,312	100
171003110404	Rough and Ready Creek	S	34	2,013	21,260	23,852	98
171003110501	Upper Deer Creek	M	6	1,902	9,319	14,347	88
171003110602	Josephine Creek	S	236	4,627	22,867	27,773	100
171003110602	Sixmile Creek	S	136	577	13,326	14,319	98
171003110604	Baker Creek	S	0	440	20,388	21,302	98
171003110702	Lower Briggs Creek	S	178	1,773	15,276	19,104	90
171003110801	Florence Creek	S	0	144	11,739	11,883	100
171003110802	Klondike Creek	S	0	537	9,491	10,028	100
171003110804	Middle Illinois River	S	0	416	21,857	22,273	100
171003110901	Upper Silver Creek	S	676	395	26,294	27,484	100
171003111003	North Fork Indigo Creek	S	0	361	18,905	19,287	100
171003120103	Box Canyon Creek	S	0	146	9,406	9,552	100
171003120104	Tin Cup Creek	S	0	1,062	16,690	17,752	100
171003120105	Chetco River/Sluice Creek	S	0	488	13,991	14,479	100
171003120106	Boulder Creek	S	0	987	12,987	13,974	100
171003120108	South Fork Chetco River	S	1	147	27,743	28,811	97
180101010101	Chrome Creek [Upper North Fork Smith River]	S	0	2,861	21,650	24,511	100
180101101102	Baldface Creek	S	0	3,355	16,441	19,796	100
171003021002	Willis Vandine	R	287	0	2,384	28,321	9
171003021201	Mt. Shep/Thompson	R	137	0	8,038	18,586	44
171003021204	Shields	R	5	105	6,773	25,561	27
171003090604	Slate Creek	M	917	0	15,322	28,409	57
171003100101	Rogue River/Upper Hellgate	M	359	45	17,742	32,936	55
171003110405	Lower West Fork Illinois River	M	354	137	3,285	12,161	30
171003110502	Middle Deer Creek	M	0	106	7,799	18,390	43
171003110504	Lower Deer Creek	M	479	94	10,529	23,224	48
171003110601	Illinois River/Kerby	M	429	101	7,611	18,279	45
171003110701	Upper Briggs Creek	S	1,488	647	22,044	24,626	98
Total Roseburg		R	429	105	17,195	72,468	24
Total Medford		M	2,656	5,754	122,796	208,182	63
Total Siskiyou		S	2,749	22,750	330,897	361,121	99
Grand total			5,833	28,609	470,886	641,770	79

[1] Watersheds serve as the basis for POC core and buffer areas under Alterntiave 3; acres reflect stands assumed lost in Biscuit Fire [see Map 2].
[2] Predominant administrative unit: M=Medford BLM District; R=Roseburg BLM District; S=Siskiyou National Forest.
[3] Data is approximate, based on current Agency mapping analyzed with GIS systems. Actual size of core and buffer areas may vary based on actual field conditions.
[4] Reserves include Late-Successional Reserves, Congressional Reserves, and Administratively Withdrawn.
[5] Includes private acres.

5) Water Sources: To the extent consistent with firefighter safety and water availability, wildfire suppression within the POC cores would utilize water from within the uninfested watershed. Water sources would be mapped.

6) Trails: New trails would not be built in POC cores. Whenever practicable, move existing trails so they do not pass through POC cores.

7) Roadside Sanitation: Remove or kill all POC less than 10 inches dbh (diameter at breast height) along both sides of the road. Recommended minimum width is 25 feet above the road or to the top of the cutbank, and 25 to 50 feet below the road. Roads that are open year-round generally pose the highest risk and would benefit most from sanitation treatment. Maintenance would be essential to retain benefits. POC should be re-treated as soon as possible after they reach a height of 6 inches above ground level.

8) Eradication: All areas within the POC cores that become infested with PL in the future should be considered for eradication treatments. Where practicable, the objective is to reduce and eventually eliminate PL from POC cores. Eradication treatments could be a source of commodities.

Management of Port-Orford-Cedar Buffers

To reduce the likelihood of introducing root disease within POC cores, the remainder of the 6th field watershed containing POC cores would be managed as a POC buffer. This includes all land allocations. Management within the POC buffers would include actions that reduce the possibility of introducing PL into the POC cores, as described below. There are 32 POC buffers in the analysis area, ranging from 2,384 acres to 27,743 acres. On the enclosed map (see Map 1), Federal lands within the buffers are shown in four colors depending on their land use allocation.

The following measures apply to POC buffers:

1) Transportation Analysis: A transportation analysis would determine road needs for the POC buffers. Management objectives should minimize the road system available for public use, particularly for vehicle traffic, both within and entering the 6th field watershed. This may include, but does not necessarily mandate, reduction in the total number of road miles. Emphasis would be on limiting public road use to the dry season with seasonal closures of selected roads.

2) Water Sources: Planned management actions (outside of wildfire suppression) would use water from within the POC core or buffer, or from sources known to be uninfested. To the extent consistent with firefighter safety and water availability, wildfire suppression within the POC buffer would utilize water from uninfested sources when possible.

Monitoring

The monitoring plan for this alternative is in Appendix 5.

Alternative 4 — Passive Project Management with Accelerated Resistance Breeding

This alternative would remove current site-specific measures used to control the root disease spread, but would accelerate the resistance breeding program. The resistance breeding program is designed to supply seedlings to replace (at the same site or elsewhere) POC killed by the disease. Quickly replacing dead POC in natural stands with resistant POC seedlings, and planting microsites at less risk of exposure to PO, would be emphasized.

The objectives of this alternative are to:

- Maintain POC on sites where the risk for infection is low;
- permit the disease to run its course in high risk areas;
- attempt to quickly reestablish POC in plant communities where it has been significantly reduced in numbers by root disease.

General Direction

Except when coincident with other management activities or programs, or when there is potential to spread the root disease from infested federally-administered lands to adjacent uninfested private lands, active Federal forest efforts to limit the spread of the pathogen would be discontinued. An example of when compatible treatments would continue would be when washing vehicles for the control of noxious weeds.

Genetics. The ongoing interagency breeding program at the FS Dorena Genetic Resource Center located at Cottage Grove, Oregon, would be intensified. Operational containerized seed orchards, organized into previously identified **breeding zones**, would be developed at a faster pace and maintained to produce resistant seed. Screening and breeding activities to increase the level and diversity of resistance available would accelerate for those zones of concern. Any forms of partial resistance are likely to need several cycles of selection and breeding to be of most benefit—with POC, this can be accomplished much faster than with most other forest tree species. Further research would be done to uncover more information on the array and number of resistance mechanisms available, and their underlying basis. For testing and reforestation purposes and for orchard development, an adequate production flow of rooted cuttings would also be assured.

Resistant stock would be developed and made available for all POC reforestation and restoration projects. About 50 to 75 percent of resistant seedlings have survived during 10 years of exposure to the pathogen, compared to 0 to 5 percent for nonresistant stock (field trials are under way).

The existing interagency resistance breeding program would be continued as described in a POC interagency agreement between the FS and BLM. The objectives of this agreement are to (1) select and evaluate families for resistance and develop durable resistance to PL while maintaining broad genetic diversity within the species, and (2) produce seed genetically resistant to PL for deployment throughout the range of POC where PL is present. The POC resistance breeding program would continue as follows:

- Develop resistant seed for breeding zones (breeding blocks plus elevation zones) based upon management needs within the range of POC;

- the three BLM Districts and the Siskiyou NF will develop a POC strategic deployment strategy for the planting of resistant POC stock, and include consideration for state and private lands (see Appendix 6);

- continue efforts to inform the public about the availability and use of resistant seed;

- find ways to provide resistant seed to non-Federal landowners; and

- monitor the operational performance of resistant plantings.

Collect and maintain between 50,000 and 100,000 resistant seeds (about 0.5 pound) for each POC breeding zone in organized conservation seedbanks. This seed would be reserved exclusively for reforesting areas after the occurrence of stand-replacement events such as large-scale wildfires. Where possible, resistant POC seedlings would be planted in such locales, with the goal to reintroduce POC to all pre-fire locations.

Snag Retention. Emphasize the retention of POC snags in Riparian Reserves because they are resistant to decay and the resultant down logs can provide durable structural components for both aquatic and terrestrial ecosystems. Retention numbers should consider that few additional large POC snags are likely to become available in the near future in infested areas because of the current mortality and presence of PL. This direction is particularly applicable to plant associations on utramafic soils and other locations where POC can be some of the largest and most abundant trees.

The stabilizing effects and habitat contributions of large POC woody material and its root mass in stream channels has often been described as the primary geomorphic control for soil movement in certain stream systems. Dead POC can provide in-channel structure, a source of nutrients, and a substrate for wood-associated aquatic insects. This allows for maintenance of the stream channel over time and retains anadromous and resident fish habitat.

Monitoring

The monitoring plan for this alternative is in Appendix 5.

Alternative 5 — Passive Project Management with Reduced Resistance Breeding

This alternative would remove current site-specific measures used to control the root disease spread and discontinue the resistance breeding program. All current management activities described in Alternative 1 would be discontinued except for the operational POC seed production orchards. Seedlings from existing resistant seed orchard trees would continue to be used to reforest areas of mortality occurring in the same breeding zone, but resistant seed for other breeding zones would not be developed.

The objectives of this alternative are to:

- Maintain POC on sites where the risk for infection is low;
- permit the disease to run its course in high risk areas.

General Direction

Except when coincident with other management activities or programs, or when there is potential to spread the root disease from infested federally-administered lands to adjacent uninfested private lands, active Federal forest efforts to limit the spread of the pathogen would be discontinued. An example of when compatible treatments would continue would be when washing vehicles for the control of noxious weeds.

Snag Retention. Emphasize the retention of POC snags in Riparian Reserves because they are resistant to decay and the resultant down logs can provide durable structural components for both aquatic and terrestrial ecosystems. Retention numbers should consider that few additional large POC snags are likely to become available in the near future in infested areas because of the current mortality and presence of PL. This direction is particularly applicable to plant associations on utramafic soils and other locations where POC can be some of the largest and most abundant trees.

The stabilizing effects and habitat contributions of large POC woody material and its root mass in stream channels has often been described as the primary geomorphic control for soil movement in certain stream systems. Dead POC can provide in-channel structure, a source of nutrients, and a substrate for wood-associated aquatic insects. This allows for maintenance of the stream channel over time and retains anadromous and resident fish habitat.

Monitoring

The monitoring plan for this alternative is in Appendix 5.

Alternatives Considered But Eliminated From Detailed Study

An EIS 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 alternatives.

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 Need, as described in Chapter 1, is

> . . . the need for maintenance of POC as an ecologically and economically significant species on BLM and NF lands. POC plays a key role in the forest ecosystem because it serves as a component of many habitats and plant communities, provides culturally significant products for Tribes, and provides unique forest products.

This includes purposes to reduce disease introductions, slow the spread of the disease where present, and/or mitigate the occurrence of the disease on POC, to the degree such treatments are needed and cost-effective. The Agencies also must continue to meet their multiple-use mandates including providing access to products, public use, and fire suppression. Since the progression of the root disease over time is not predicted to vary widely between "no specific management" and "intensive POC management," the interdisciplinary team chose to include a relatively wide range of alternatives for consideration in detail to ensure a reasonable range of resource effects relative to each issue. Alternatives were more likely to be eliminated from detailed study because they were too much like other alternatives, not because they did not meet the Purpose and Need.

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 belief the disease would run its course and a combination of natural resistance and tree placement would preclude loss of all POC. Alternatives 4 and 5 best respond to these types of comments. Some proposals suggested prevention of new infections by prohibiting road access, harvest, and other management activities. These proposals are addressed by Alternative 3. Many proposals suggested that application of various control measures the Agencies were already implementing, along with careful monitoring and development of additional strategies, would allow for forest use, products, and POC protection. These comments are addressed by Alternatives 1 and 2. The interdisciplinary team appreciated the number of knowledgeable comments received during scoping. Many of the issues addressed in Chapter 3&4, as well as elements of the alternatives, came directly from scoping.

More Proactively Harvest Within Port-Orford-Cedar Stands

This alternative would reduce the spread of the disease by more actively thinning POC stands to reduce root contact between trees, cutting trees rooted into infested streams, and removing trees immediately upslope from riparian areas where POC serves a key function. This alternative would also actively salvage dead cedar in all land allocations where quantities exceed those required to meet to other management objectives.

This alternative was not analyzed in detail for two reasons. First, it is a variation on the No-Action Alternative that encourages or permits such treatments where site-specific analysis indicates it would benefit aquatic resources. Salvaging dead cedar is permitted in all alternatives, and can already be accelerated under existing guidelines. Second, an across-the-board increase in POC thinning and streamside sanitation would not meet the need for maintenance of POC as an ecologically significant species, because it would remove trees in important riparian and stream habitats regardless of risk.

Retain Most Disease Control Techniques, Particularly in High Public Use Areas, But Don't Close Roads

This alternative would manage the spread of root disease by application of the full range of management techniques except closing roads. Roads would remain open for recreation, extraction, and other forest use. This is essentially a variation on other alternatives. Alternatives 1 and 2, and to a large extent Alternative 3, provide a menu of treatments to be applied based on site-specific conditions and disease-control needs. Managers can choose to close

roads or apply other measures. The discussions of effects in Chapter 3&4, particularly the effects in the pathology section, address the specific standards and guidelines, land use, and management practices that most affect POC root disease spread. Managers can make that balance to the extent other techniques adequately control root disease spread and as public use favors keeping roads open.

Retain All Port-Orford-Cedar Old-Growth Stands and Large Trees

This alternative would prohibit harvest of large POC and old-growth stands of POC. It would help address the concerns that: Larger trees are killed at higher percentage and take longer to replace; ecosystem function and persistence in the ecosystem continues after POC die; and because of the root disease, old-growth POC would likely not become well distributed on the entire 80 percent of the Federal forests managed as reserves. However, this alternative is very similar to Alternatives 1, 2, and 3, in that (1) about 80 percent of the landscape is in reserves that preclude old-growth harvest, and (2) the percent of POC acreage in reserves may exceed 90 percent because POC is a riparian species over much of the eastern part of its range. This alternative is also similar to other alternatives in that the amount of old-growth or large POC tree harvest taking place is extremely limited. However, the exclusion of all harvest would not meet the Need of supplying wood for specialty products, and the retention of additional trees outside of riparian and other reserves would be of limited value because POC is used by terrestrial wildlife at a lower rate than other tree species.

Close Roads and Prohibit Management Activities in Uninfested Watersheds and Small Subwatersheds

This alternative would seek to limit new infection areas by stopping disease spread associated with roads and harvest equipment. Road use and timber harvest have been shown to be significant avenues of disease spread. Roads are the primary avenue for disease spread between watersheds. Such a strategy would reduce, but likely not eliminate, the incidence of new infections in these watersheds. The alternative would not preclude the movement of infections by hunters, hikers, bough cutters, elk, and other vectors. This alternative is a variation of Alternative 3, but protects more watershed areas. It would not meet the Purpose and Need of avoiding unnecessary restrictions on public access, access to products, forest treatments, and fire-suppression activities.

Restore Old-Growth to its Historic Range

This alternative would prohibit harvest of any large trees and attempt to restore old-growth to presettlement levels. Resistant stock could be used. This alternative is not feasible because of uncontrollable aspects of the root disease, and the responsibility of the Agencies to provide for multiple-use. While devoting sufficient land, time, protection, seed, and seedlings to this single objective could provide substantial esthetic and ecological benefits, costs would be exorbitant and other multiple-use objectives would not be met. Such an alternative would require eradication of the disease at a large scale, which has not yet shown to be effective.

Provide For Restoration of Port-Orford-Cedar on Sites Impacted by *Phytophthora lateralis*

This alternative would examine different strategies for introducing resistant stock, include evaluation and success criteria, and describe changes in other management practices if resistant stock is not successful. This alternative is a variation of elements of several of the alternatives considered in detail. The resistance breeding program common to four of the alternatives as well as the seedling deployment strategy common to at least three alternatives includes monitoring and adaptive management. Overall monitoring requirements call for tracking disease spread and reconsidering the management direction as appropriate. Alternative 4 and 5 are identical, except for emphasis on resistance breeding; the expectations from that program are well described and contrasted with the effects of discontinuing the current breeding program. Alternatives 1, 2, and 3 rely on a mix of management strategies that would ensure minimizing root disease spread even if resistant stock does not meet expectations. No alternative, except Alternative 4, places full reliance on the resistance breeding program. Although the other alternatives assume that the long-term effects of the resistance breeding program will mitigate the loss of existing POC to disease, these benefits would not be realized in the near future. Hence, there are no specific provisions for relaxing management practices in favor of using resistant stock in those alternatives.

Plant Port-Orford-Cedar In Other Suitable Habitats

The alternative would vigorously plant POC in wet, but upslope, aspen, and other low-risk areas suitable for its survival and growth. This alternative would help provide POC products for the future and potentially help maintain POC in some habitats. This alternative is generally a variation on other alternatives, particularly Alternative 2 which notes that

> . . . conservation should emphasize management on sites naturally at low risk for infection. In many forest types, management of POC can focus on sites where conditions make it likely to escape infection by PL, even if the pathogen has already been established nearby.

Use of this technique exclusively, however, would not meet the Purpose and Need since POC is an important component of streamside habitats and should be maintained.

Design Different Management Strategies for Different Parts of the Range to Address Different Conditions

This alternative recognizes there are significant differences in the location and ecological function of POC between the northwest part of the range (where POC grows away from streams, across the landscape) and the rest of the range (where POC is more of a riparian species). In the northwest part of the range, up to 80 percent of the POC grows away from streams and roads, and is therefore not at risk from these two primary infection sources. In other parts of the range, particularly on the ultramafic soils, POC can be primarily limited to Riparian Reserves, and therefore can be put at risk by activities that put the pathogen in the streams. This alternative would prescribe different measures for these different parts of the range. This alternative is essentially a variation of Alternative 2, because the application of the risk key in Alternative 2 would result already in the variable treatments suggested by this alternative.

Intensively Evaluate Individual Plant Association Group (PAG) Sites and Implement PAG-Specific Management Criteria

This alternative would identify representative samples for each of the 90 PAGs that are distributed across the range of POC in which POC is prominent. Close examinations of POC ecological functions and subpopulation characteristics would be performed, including determining genotypic differences using allozyme studies, DNA marker techniques, and common-garden study plots. Based upon PAG-specific data, specific management regimes would be conceived and desired treatments implemented. Individual management criteria would be applied to each site, including collecting and retaining seed from representative PAG sites in every breeding block. This alternative is not considered in detail because analysis has determined that PL will not completely eliminate POC from any given PAG, nor will it eliminate significant genetic variation, so such intensive scrutiny and management are not warranted. Such an alternative is not necessary to meet the Need and therefore would not meet the cost-effectiveness test in the Purpose.

Increase Port-Orford-Cedar by Encouraging Planting On Private Lands

This alternative would continue development of resistant POC in quantities sufficient to meet private land needs. This alternative would have the benefit of providing POC products and potentially meeting certain ecosystem and habitat needs. This alternative is a variation of Alternatives 1, 2, 3, and 4 that specifically identify a goal of supplying resistant seedlings to private and state lands. It is particularly similar to Alternative 4, which emphasizes the resistance breeding program to the exclusion of other proactive forms of POC management.

Impose Stronger Protections

This alternative would impose stronger protections for POC throughout their entire natural range by:

1) Withdrawing all uninfested areas from mineral entry;
2) banning new road building and road reconstruction;
3) closing Level 1 and 2 roads and trails in, or leading into, uninfested watersheds;
4) prioritizing road closure over the practice of “sanitation” logging;
5) prohibiting motorized vehicles in all inventoried roadless areas;
6) prohibiting motorized vehicles in landscapes affected by the Biscuit Fire, including the watersheds of Rough & Ready, Rancherie, Baldface, and Fall and Baker Creeks; and
7) evaluating the benefits of wilderness protection for roadless areas to prevent/reduce the spread of PL.

Aspects of this alternative are included in other alternatives. Closing roads in uninfested watersheds to the extent allowed under current permits and laws is included in Alternative 3. Most motor vehicle use is already prohibited in inventoried roadless areas. Other elements of this alternative would not meet the Purpose and Need of providing access to the forest for public use and extraction of products. This is particularly acute within the Biscuit Fire area, where salvage harvest and restoration treatments are being analyzed. Closing all Level 1 and 2 roads, and withdrawing additional lands from mineral entry, would also not meet the Need to provide public access and use, and access products.

Focus on Prevention Rather Than Mitigation or Control

This alternative would try to eliminate all new infections by eliminating management activities and most other access into uninfested areas of any size. This alternative would not meet the Need of providing POC products, or of allowing the Agencies to continue to meet their multiple-use mandates for public use and access, fire suppression, and so forth.

Limit Risky Activities Such as Bough Harvest to the Matrix

This alternative would restrict bough cutting to the Matrix to prevent bough-cutting related infections from about 80 percent of the Federal lands. This alternative is a variation of a standard and guideline in Alternatives 2 and 3 which severely restricts all bough cutting. Further, such a limitation would probably not meet the Purpose and Need because illegal bough cutting and accidental cutting in reserves would be difficult to enforce if bough cutting were allowed nearby in the Matrix. This cutting in the Matrix would continue to contribute significantly to the spread of disease.

Broaden Risk Analysis to Include Road Maintenance, Road Use, Recreation Use, and Other Broad-Scale Activities Not Necessarily Subject to Project-Level or NEPA Analysis

This alternative would require routine forest use and management activities to be examined for the effect on root disease spread, and mitigation or control measures applied as appropriate. This alternative is a variation on other alternatives considered in detail. Alternatives 1, 2, and 3 already have such requirements. For Alternative 1, as described in Appendix 2, road maintenance techniques and road-side sanitation are examples of activities triggered by road use and location, not by specific projects. Water sources are mapped, roads are closed, trails are moved, the public is informed about how to avoid spreading the disease, roads crossing streams are removed, road maintenance and other crew regularly clean vehicles and are aware of the location of infested areas, and integrated planning takes place. For Alternative 2 and 3, there is a specific requirement to apply the risk key to such activities.

Eliminate Timber Harvest in Port-Orford-Cedar Areas

This alternative would prohibit timber harvest in POC stands thereby reducing the likelihood of carrying the pathogen into uninfested stands, or out of infested stands. This approach is applied to POC stands in currently uninfested watersheds in Alternative 3. Application of this approach to the entire range would not meet the Need for making POC products available, or meet the Purpose of allowing the Agencies to continue to meet other multiple-use mandates including the extraction of a wide range of products. On lands managed for regularly scheduled timber harvest, POC typically makes up no more than 5 to 10 percent of the stands. Even if the Agencies harvested no POC, the prohibition against harvesting in these stands would have a substantial effect on other harvest objectives. This alternative also would not meet the Need for the maintenance of POC. While such an emphasis would undoubtedly reduce the spread rate, disease spread would continue via other human vectors. Other human vectors besides logging, for example, are implicated in all but one of the five or six longest distance spreads.

Prohibit Logging During the Wet Season When the Likelihood of Disease Spread is Highest

This alternative would limit the likelihood of spreading POC root disease by limiting timber harvest to dry periods when the likelihood of moving infested soil is lowest. This treatment is already included as a management practice available under Alternative 2, reading in part

> . . . schedule projects during the dry season or . . .

Second, such scheduling is already practiced to the extent possible in order to protect soils, roads, and streams, particularly for ground-based skidding. To place further restrictions than these two, when coupled with existing seasonal restrictions for nesting wildlife and other purposes, would not meet the Need for continuing to provide products. It would also not meet the Purpose that control measures be cost-effective. Limiting harvest while other uses continue during the wet season could reduce, but not nearly eliminate, disease spread.

Reverse *Phytophthora lateralis* Infestations and Eliminate it from the Landscape

This alternative would eliminate the root disease from the range of POC by temporarily (up to 10 years) removing all POC in, around, and for up to 200 meters downstream of infested areas and keep them free of POC for up to 7 years for the pathogen to die out of the soil. This alternative is not feasible or practical for several reasons. First, the pathogen currently infests an estimated 22,000 to 32,000 acres in Oregon, an acreage (plus surrounding buffers) that would be prohibitively expensive if not impossible to treat. Second, the impact of killing these trees all at once, particularly downstream from the infestations, could have a worse effect than the gradual advance of the disease. Third, while eradication success is promising enough to try in isolated cases such as in POC cores (Alternative 3), limited Agency experience with eradication treatments has shown that treatments are not always successful. The pathogen can persist in the soil for many years. In very limited trials so far, even prescribed fire has, to date, not been uniformly demonstrated to kill the pathogen. Fourth, even if eradication were typically more successful, some infestations would escape the treatment. For example, although research shows infections to be typically located within 200 yards of an upstream infection source, anecdotal evidence indicates the disease can travel much farther. Finally, the disease would not be removed from private lands, so there would continue to be an infection source.

Treatments suggested by this alternative are already included in Alternatives 2 and 3 to some extent. Eradication treatment is one of the management options, and will be used where limited infections exist. An eradication treatment for a small, isolated infestation is being done on the Shasta-Trinity NF, for example. These alternatives call for an increase in eradication once this technique proves successful.

Manage According to Stand-Specific Risk Assessment Methods

This alternative would employ methodologies for identifying elements of risk (value, hazard, exposure, and susceptibility), and a resulting range of possible management objectives and strategies to deploy on a landscape scale (Jimerson et al., *unpublished*; Atzet and Rose, *in press*). This alternative is essentially a variation of Alternatives 2 and 3, because these alternatives acknowledge inherent POC values and then, embedded as an integral component

of the risk key, identify relative hazard based upon exposure and susceptibility on a project basis.

Close Roads and Eliminate Mining in Wilderness to Exclude *Phytophthora lateralis*

This alternative would administratively, or by purchase, eliminate existing mining claims in the Kalmiopsis (and any other) Wilderness Area and restore access roads. The alternative would not meet the element of the Purpose to continue to meet multiple-use needs by providing access to products. Mining is an important and legitimate use of public lands, providing raw materials for a variety of industrial uses. Congress considered these uses so important that the 1964 "Wilderness Act" had a grace period for filing and beginning operations on mining claims in wilderness, and such claims remain valid as long as they are maintained. Closing such claims could constitute a "taking," and would require purchase by the Federal government. Also, such a restriction may not have the desired effect, because the sources of infestations near mining activity are simply not well known.

Finally, there are other measures that can be taken under the standards and guidelines of Alternatives 1, 2, and 3. On NFs, operations of any size, and even most prospecting, requires a plan of operation to be filed with the local administrative unit if the proposed activity would likely cause significant disturbance of surface resources. Applications typically trigger an EA or other NEPA analysis. Depending upon the risk, the Agency is required to provide reasonable terms and conditions for the operation. In this case, requirements to follow the same POC management practices used on other Agency activities would be binding on the claimant. Infection risk from mine operations are currently reduced because the Kalmiopsis claim owner has been using helicopters to bring in equipment, and travels the road via horseback.

The BLM rules are similar to those described above.

Include Disease Control Provisions for Sudden Oak Death

This alternative would provide standards and guidelines for the prevention and eradication of Sudden Oak Death. At this time, scientists and land managers have no way of predicting the movement of Sudden Oak Death, *Phytophthora ramorum*, across the range of POC in southwestern Oregon or northern California. In California, the pathogen is present and causes disease in many plant species in coastal areas, with the disease being most abundant and severe in forest types with a significant component of tanoak. Since the disease was discovered and identified in 2000, it has increased dramatically in California and now extends to within 125 miles of the Oregon border. Presently, the disease is not known to occur in Del Norte County or northern Humboldt County, California. In Oregon, the disease has been found at 22 locations within a 9 square-mile area near Brookings, now regulated by Oregon Department of Agriculture. Infesting not more than 55 acres, all of these areas have been cut and burned in an effort to eradicate all populations of the pathogen. There has also been recent discoveries of Sudden Oak Death in nursery stock near Gresham, Oregon (eradication is under way). None of the Oregon locations are within the natural range of POC.

Research is underway in California to describe factors that affect spread of the disease across the landscape, but at present these are poorly understood. Therefore, spread of the disease

cannot be predicted. Sudden Oak Death has not been analyzed as part of POC-SEIS because too little is known about the disease spread mechanisms and pathology to design control measures. *P. ramorum* has only been clearly known and studied for a few years. Too little is known about the disease for development of an impacts analysis and disease management evaluation.

PL is a root disease, but *P. ramorum* attacks plant stem and leaf tissues. While the major host species for *P. ramorum* and PL, tanoak and POC respectively, are both located in southwestern Oregon and northern California, there are obvious host differences in the species range, habitats occupied, and life history that suggest a different disease mechanism is operating. POC is generally restricted to sites near groundwater; moisture regime strongly influences community development and plant associations within the range of POC. Tanoak is not strongly dependent on a consistent supply of soil moisture and is usually found on sites that are much drier than those for POC. The range of tanoak extends much further south into the hotter, drier climates of the central California coast range (and even into the Sierras) than does POC. In California, there is a correlation between the spread of *P. ramorum* into tanoak and its association with high population levels of California laurel (*Unbellularia californica*). There is no known connection between high population levels of California laurel tree, sometimes called Oregon myrtle, and POC. Additionally, *P. ramorum* has been found to kill or injure a wide variety of host species, while PL is only known in two host species (Sudden Oak Death Symposium, Monterey, California [February 2003]).

The differences between *P. ramorum* and PL and their host species are enough to suggest that the difference in environmental affects resulting from each disease and the difference in disease management practices would be substantial.

Close More Roads within Federal Lands

This alternative would close roads in uninfested Federal lands, especially those also going through nearby infested private lands. This alternative was not considered in detail because there are provisions within other alternatives to consider closing roads where needed and appropriate. But in particular, a substantial increase in road closures is not possible in many cases, at least not without purchasing existing private interests to those roads.

Bureau of Land Management-administered lands. The BLM entered into hundreds of Reciprocal Right-of-Way Agreements in western Oregon to gain access for forest management activities on the "checkerboard" lands that the BLM is responsible for managing under the "O&C Act" of August 28, 1937. In the early 1950s, BLM published the O&C Logging Road Right-of-Way regulations, now codified as 43 CFR 2812, initiating the development of Reciprocal Right-of-Way Agreements with most of the private timberland owners within the O&C area of western Oregon. A Reciprocal Rights-of-Way Agreement is a legal exchange of rights between the BLM and a private landowner, called a "permittee." The major benefit and objective of these agreements is the joint use and development of a single, forest road system that serves the needs of the BLM and the intermingled private timberland owner. This arrangement eliminates a potentially duplicative road system and provides guaranteed access for prospective bidders of BLM timber sales. BLM and a permittee share costs in the construction and maintenance of the road network.

To gain access to their respective lands, BLM and the other party have Reciprocal Right-of-

Way Agreements to use existing roads and construct new roads across each other's lands. Typically, these agreements are granted in perpetuity to assure long-term access for both parties. The lands that each party can cross are specifically identified in the agreement by legal description and are recorded in the counties where the lands are located. The terms of the agreement are specific and apply to both parties equally. Each party has little discretion in not approving a new road location requested on that party's lands by the other party. In most of the agreements, the only reasons why a proposed road location can be rejected is: (1) the new road location does not constitute the most reasonable direct route; (2) the new road will substantially interfere with existing facilities; (3) the proposed road will cause excessive erosion; or (4) there is already an existing road suitable for the transportation of timber to market. Mitigation measures can be required for new construction, but only if they are to mitigate one of the reasons for rejecting a construction plat in the permit. Because of the reciprocal nature of these agreements, the terms and conditions generally cannot be amended or changed without the approval of both parties.

Reciprocal Rights-of-Way Agreements are considered as legally binding interests on the lands identified in the agreement. Responsibility of the parties for compliance with the environmental laws, including the "Endangered Species Act," have been tested in court and it has been affirmed that the BLM has limited discretion when roads are planned for construction on public lands by a permittee.

Reciprocal Rights-of-Way Agreements continue to operate as the primary means of obtaining access to intermingled BLM and private timberlands in western Oregon. It is estimated that nearly 80 percent of the public lands in western Oregon are encumbered by one or more agreements.

Although BLM roads are available for use by the public, they are not "public roads" as defined by State Statute ORS 386.010(2). BLM roads are considered "private government roads" and the Agency retains the authority to control activities on these roads including use by the general public.

In addition to Reciprocal Right-of-Way Agreements for roads, the Bureau has issued right-of-way reservations to the Bonneville Power Administration for utility corridors, pipeline rights-of-way, and numerous rights-of-way grants to private parties for utilities or to access home sites, as well as to numerous users of communication sites located on BLM-managed lands.

Forest Service-administered lands. The FS has the same or similar obligations. Several factors affect the level of discretion held by the FS relative to road use and control. Private road use rights are often held on NF System roads and the degree of control the agency may exercise is dictated by the terms of the document creating the private right. Some private use rights were retained by landowners who conveyed some of their lands to the FS but needed continued road access across the lands to reach other parcels they still owned. Other rights have been granted to private landowners under such authorities as the "Federal Land Policy and Management Act" and the "National Forest Roads and Trails Act." The FS shares ownership in entire road systems where cooperative road construction and use ("cost share") agreements have been entered into with large industrial timberland owners. Other authorities have authorized access, such as laws relating to mining on Federal lands. The FS has a statutory requirement to grant reasonable access across NF System lands to landowners within NF boundaries and many different types of access grants have been issued to comply

with this mandate.

In general, rights possessed by non-FS entities on NF System roads allow for ingress and egress to private lands subject to traffic regulations, such as speed and weight limits, as well as responsibility for road maintenance commensurate with the use. There are many private use roads, such as private driveways, on which the FS exercises little discretion as to road standards or type of use since they are not open to the public.

Reservations, outstanding rights, and easement grants all constitute some form of non-Federal interest in the NF road and each road must be individually assessed to determine the extent of private and Federal rights of use and control.

Comparison of the Effects of the Alternatives

Disease Spread: Table 2-3 summarizes the disease infestation predictions for 100 years by "risk region" within the POC range. The risk regions differ in the way POC is distributed on the landscape relative to the primary disease spread avenues of water and roads. Put another way, the risk regions differ in the percentage of POC acres potentially affected by root disease in the future. Regardless of risk region, however, it is important to note that POC is not at risk of extirpation. Under the "no management" alternative, Alternative 5, disease infestation is predicted to cover 29 percent of all POC acres in 100 years, with no risk region exceeding 50 percent.

In the North Coast Risk Region (Coos Bay BLM District and Powers Ranger District on the Siskiyou NF), POC is well distributed across the landscape because of favorable moisture conditions. POC at high risk to infection because of proximity to streams and roads is approximately 20 percent of the total POC acreage. Because PL has been in this area more than 50 years, much of that time without active Agency disease-control measures, the disease has reached approximately 75 percent of these high risk sites, or 15 percent of the total POC acreage. Because spread is limited almost exclusively to high risk sites, this area is approaching disease saturation and the annual new infestation rate has substantially declined from previous decades.

In the Siskiyou risk region (Siskiyou NF and California) and Inland Siskiyou risk region (Roseburg and Medford BLM Districts), POC is more concentrated in riparian areas, raising the percent of POC acres in proximity to water and therefore at high risk to infestation. Higher road density and more checkerboard ownership pattern in the Inland Siskiyou risk region further increases the area at high risk, so the area of POC at high risk to infestation in these two risk regions is 40 and 60 percent, respectively. The root disease has not been in these areas as long, and the potential for rapid expansion of the disease acres is still high.

The standards and guidelines of each alternative affect the percentage of high risk sites that will become infested within the next 100 years. The predictions consider not only the provisions of the alternatives, but the location and context of federal lands within the larger POC landscape. In addition to the 272,000 acres of POC stands and 32,000 acres of infestation on federal lands in Oregon, there are over 50,000 acres of private lands with POC, and over 8,500 acres of infestation, often checkerboarded with Agency lands and being actively managed for timber production at all times of the year.

Table 2-3.—*100-year infestation prediction for Oregon by alternative*

Alternative	% of risk region high risk	Currently infested high-risk area [as % of risk region] [1]	Uninfected high-risk area [as % of risk region]	% of uninfested high-risk areas predicted to become infested [new] in 100 years [2]	Uninfested high-risk areas predicted to become infested [as % of risk region] [3]	Total [new and current] area to be infested in 100 years [as % of risk region]	Total [new and current] area to be infested in 100 years [in acres] [4]	Total [new and current] area to be infested in 100 years [as % of high-risk areas only]
North Coast Risk Region *[126,248 acres]*								
1	20	15	5	40	2	17	21,460	85
2	20	15	5	35	2	17	21,150	85
3	20	15	5	20	1	16	20,200	80
4 & 5	20	15	5	80	4	19	23,990	95
Siskiyou Risk Region *[116,374 acres]*								
1	40	9	31	40	12	21	24,900	52
2	40	9	31	35	11	20	23,100	50
3	40	9	31	20	6	15	17,690	37
4 & 5	40	9	31	80	25	34	39,330	85
Inland Siskiyou Risk Region *[29,341 acres]*								
1	60	9	51	40	20	29	8,630	48
2	60	9	51	35	18	27	7,880	45
3	60	9	51	20	10	19	5,630	32
4 & 5	60	9	51	80	41	50	14,670	83
Totals *[271,963 acres]*								
1				40		20	54,990	61
2				35		19	52,120	58
3				20		16	43,520	49
4 & 5				80		29	77,930	87

[1] All infestation is assumed to be within the high-risk areas.
[2] From Table 3&4-6.
[3] Previous two columns multiplied together.
[4] Mortality in infested areas is expected to be about 90%; table does not include replacement with resistant stock.

According to predictions detailed in the Pathology section of Chapter 3&4, the percentage of currently uninfested high risk areas that will become infested within the next 100 years is predicted to be 40, 35, 20, 80, and 80 percent for Alternatives 1, 2, 3, 4, and 5, respectively. Combining each of these predictions with the existing infestation level, and the portion of the area at high risk, results in the 100-year infestation percentage and acreage calculations shown in Table 2-3.

As shown in Table 2-3, the total area predicted to be infested at 100 years varies between 16 and 29 percent (from 12 percent today) depending upon alternative. The percent of "high risk" areas predicted to be infested in 100 years is also displayed because some effects, such as water temperature, are dependent more on the percent of PL infestation near streams, not

the percent infestation on the entire landscape. The percent of high-risk riparian areas predicted to be infested in 100 years varies between 49 and 87 percent (from 36 percent today), depending upon the alternative. In both cases, the 100 year infestation percentage varies by risk region.

Differences in Risk Regions: In the North Coast risk region, most (75 percent) of the high risk areas are already infested. Since the alternatives primarily affect the percentage of high risk areas to become infested in the future, there is little difference in 100-year infestation percentage between the alternatives in this area (16 to 19 percent of the total area, 80 to 95 percent of high risk riparian areas). The similarities in this region between Alternatives 2, 3, 4, and 5 become more apparent upon examining the way they would be applied. The risk key in Alternative 2 and 3 requires project-specific management actions be applied when there is significant risk to uninfested POC in the area that, were they to become infested, would preclude the area from meeting land and resource management plan objectives. If there are few uninfested areas near by, or if those uninfested areas make no significant or unique contribution to ecological, tribal, or product use or function (use or function that is not equally met elsewhere or by other species), the key will not lead to the application of any project-specific management practices. This situation will likely occur more often than not in this risk region because most high risk areas are already infested, and because the terrestrial distribution of POC places 80 percent of its acres on low risk sites. The various effects sections in this SEIS (see Summary and Comparison of Effects, Table 2-4) support this generalization that few important functions will be at risk; they do not identify any significant adverse ecological effect from any of the alternatives in this region.

In the Siskiyou and Inland Siskiyou risk regions, the differences between alternatives are more pronounced. The 100-year infestation prediction varies from 15 to 34 percent in the Siskiyou risk region, and 19 to 50 percent in the Inland Siskiyou risk region, between the most and least protective alternatives. The alternatives also vary in the percent of high risk riparian areas infested, from 37 to 85 percent in the Siskiyou risk region and 32 to 83 percent in the Inland Siskiyou risk region, between the most and least protective alternatives. These percentages become particularly meaningful on ultramafic soils where POC is a prominent and often largest species present. On such soils, mortality can decrease stream shading, reduce fish survival, and have other measurable and predictable adverse effects.

Environmental Effects: The degree to which these POC mortality-related, or indirect, effects vary by alternative are summarized in Table 2-4 and described in detail in Chapter 3&4. It is important to note that these indirect effects, those resulting from POC mortality, do not all occur at once but are predicted to occur over the next 100 years as the disease advances into new areas.

There are also negative direct effects from the standards and guidelines themselves. The exclusion of timber harvest in the Core areas in Alterative 3, for example, would reduce scheduled harvest levels and reduce opportunities to treat fuels build-ups and diversify habitats. These direct effects for each alternative are also displayed in Table 2-4. In general across the range of alternatives, as the negative direct effects increase, the negative indirect effects decrease, and vice versa.

The various combinations of risk region, ultramafic soils, riparian areas, and POC prominence leads to a complex combination of affected environments and effects that generally

Table 2-4.—*Summary and comparison of the environmental consequences (effects) of the alternatives*

Resource/topic	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Pathology	54,990 acres [20%] infested in 100 years, 61% of high-risk riparian.	52,120 acres [19%] infested in 100 years, 58% of high-risk riparian.	43,520 acres [16%] infested in 100 years, 49% of high-risk riparian.	77,930 acres [29%] infested in 100 years, 87% of high-risk riparian.	77,930 acres [29%] infested in 100 years, 87% of high-risk riparian.
Ecology	Losses in species diversity and ecological function in one or more of 64 identified plant associations where POC is a major component [prominent]; more of a concern in ultramafic soils where POC is a major component; effect by alternative is proportional to acres infested; no plant association is eliminated.				
Botany	There are probably benefits to some rare plants proportional to decreased infestation acres. Also Alternatives 1, 2, and 3 road closures reduce noxious weed introductions and trampling. However, some rare plants benefit when nearby cedars die. No negative effects to threatened and endangered plants are identified.				
Water and Fisheries	Increased temperature in ultramafic areas results in coho salmon [ESA listed] and steelhead loss, with some effect in all alternatives, increasing towards Alternatives 4 and 5. Less than 5% of coho spawn in ultramafic streams, but temperature increases affect other parts of the system. Alternatives 1, 2 and 3 possible isolated mortality of salmonids from Clorox in fire suppression water drops.				
Wildlife	There are no species dependent upon POC, and no adverse effect on threatened and endangered species. Because pure stands are the exception, effects are minimal. In Alternative 3, late-successional forest-related wildlife benefits from reduced timber harvest, but reduced Late-Successional Reserve thinning could slightly reduce future habitat for these same species. Alternatives 1, 2, and 3 possible isolated mortality of aquatic species from Clorox in fire suppression water drops.				
Genetics	POC survival in all alternatives is sufficient to avoid loss of common genes and prevent large-scale population divergence.				
Resistance	Good major gene resistance and early fruiting of POC, plus very limited genetic variability in the pathogen, predicts successful development of durable resistant stock for replanting infested areas				
	Stock available in all breeding zones within 45 years.			Stock available in all breeding zones in 10 years.	Stock limited to current level [26% of breeding zones].
Fire and Fuels	Increased suppression and fuel treatment costs about 2 percent [Alternative 3 slightly more]. Alternative 3 would reduce access to 60,000 acres and prohibit timber harvest on 2,300 acres of wildland-urban interface.			No costs associated with POC disease control [possible fuels increase associated with mortality is insignificant].	
Recreation, Visual, Wilderness, and Wild and Scenic Rivers	Negative effects to some users if roads and areas closed; greatest in Alternative 3. Positive effects to visuals, wilderness, and wild and scenic river values [esthetic] of reduced mortality.			No restrictions on access. Esthetic impacts increased.	No restrictions on access. Esthetic impacts increased.
	Resistance breeding mitigates esthetic impacts over time, fastest in Alternative 4; not all areas in Alternative 5.				
Cultural Products for Tribes	Insignificant difference between alternatives because of modest levels used and access on other lands.				
Special Forest Products	Current level [4% of bough market], plus firewood and other collections.	Current level of bough collection, and <5% reduction of firewood and other collections.	Current level of bough collection, and slightly more reduction in firewood and other collections than Alternative 2.	Increase of bough harvest by 100 to 200 tons, plus slight increase in firewood and other collections from current levels.	
Timber Harvest	Increase in cost to purchasers of about $0.80/thousand board feet.				
			Decrease in PSQ approximately 0.7 million board feet and no thinning in 2,300 Late-Successional Reserve acres.		
Direct Costs	$860,000	$846,000	$881,000	$477,000	$93,000
Environmental Justice	Current level	Slight job decrease	Job decrease includes 8 timber jobs	Job increase of 6 related to bough collection	
Note: The planning area includes 1.5 million acres of Federal lands and 272,000 acres with some level of POC stocking, 32,000 of which is infested with root disease.					

defies range-wide generalizations. In general, the effects (both positive and negative) listed on Table 2-4 are greatest in the Siskiyou and Inland Siskiyou where mortality differences between the alternatives are greatest, and lower in the North Coast risk region where differences between the alternatives are generally slight or nonexistant. The nature of each of the various effects, and the affected environment in which those effects occur, are described in more detail in Chapter 3&4.

Resistance Breeding: Alternatives 1, 2, 3, and 4 include some level of resistance breeding for all breeding zones, and Alternative 5 would only use resistance stock in the 26 percent of the breeding zones for which it has already been developed. There is an expectation that the resistance breeding program will mitigate at least some, and potentially many, of the adverse indirect effects in the long term, as POC killed by the disease are gradually replaced by planted resistant stock and their off-spring. Alternative 4, scheduled to have seed for all breeding zones within 10 years, will be able to begin this mitigation up to 35 years sooner in some zones than Alternatives 1, 2, and 3. Although there are long-term uncertainties in any resistance breeding program, the chance for durable resistance in POC is good because it appears to have major gene resistance, the disease itself has a very narrow genetic base indicating a low likelihood of it adapting to kill resistant trees, and POC begin to produce cones as early as age 5 which makes a rapid breeding program possible.

However, because uncertainties about Agency funding in Alternatives 1, 2, and 3 (which include language “per available funding”), and the long timeframes involved for planted POC to be large enough to substantially mitigate adverse effects of POC mortality, the expected benefits are generally not included in the effects summarized on Table 2-4. The level of benefit will depend on the success and application of the breeding program. Planting resistant stock can only reduce, not increase, negative effects displayed in the effects discussions. Fortunately, every dead tree need not be replaced by direct planting. POC begins fairly prolific seed production as early as age 5. Successful plantings of a few dozen resistant trees in an infested area should be sufficient to begin a cycle of natural regeneration of resistant or partially resistant stock with adequate genetic variability. In any event, however, significant reduction of the adverse indirect effects summarized in Table 2-4 will not begin to occur until resistant trees exceed 50 to 80 years of age, and will not occur at all in some breeding zones if the program is not funded.

Potential Mitigation Measures

The implementing regulations of NEPA, at CFR 1502.14(f) and CFR 1502.16(h), require identification of measures to mitigate adverse environmental impacts. It is important to note that the alternatives considered in this SEIS are themselves different levels of mitigation measures that apply to other forest management and use. All known measures to mitigate the spread of PL are included in one or more of the alternatives to the extent such measures would continue to meet the agencies multiple-use mandate. Even measures that have not been proven, such as eradication, are encouraged for trial and evaluation in one or more of the alternatives. The monitoring section specifies continued evaluation of various PL-reducing management techniques so management can best mitigate the spread of PL on future activities.

In Alternative 2, the definition of an “activity” with respect to the use of the risk key is

purposely broad in order to force consideration of the full range of potential PL-spreading activities.

The resistance breeding program is another mitigation program, and one that can be used to mitigate adverse effects in sensitive habitats. Where POC losses occur near sensitive or listed wildlife, botanical, or fish species, opportunities to plant resistant stock will be identified and implemented as appropriate.

Mitigation for direct effects to other programs are included in the alternatives as well. For example, a provision for some level of bough harvesting in Alternatives 2 and 3 helps reduce the job losses attributable to bough harvest restrictions. This will help mitigate adverse effects identified in the Environmental Justice and Civil Rights sections.

Measures that would be somewhat more effective than any of the alternatives at slowing the spread of PL include more road closures; indeed, large area closures. Given the analysis of the likely spread of the disease, and the need for other uses of our public lands, consideration of additional closures would not meet the Need. This topic is dealt with in the Alternatives Considered but Eliminated from Detailed Study section.

Potential and likely adverse effects identified in Chapter 3&4 are listed in Table 2-5, along with possible mitigation measures for each. The mitigation option of selecting a different alternative is also a choice, and is not included in the table.

Table 2-5.—*Identified adverse environmental effects and possible mitigation measures*

Resource Elements	Adverse Effect	Possible Mitigation
Pathology	Disease spread and related effects to private, other units, long-distance spread; mostly in Alternatives 4 and 5.	1] Clarify "reduced spread" objective of Alternatives 4 and 5, by adding "avoid disease export" provision from Alternative 2. 2] Increase public education in offsite areas regarding the risk of receiving disease from unfamiliar equipment. 3] Encourage State to enact POC root disease measures on non-Federal lands. 4] Develop disease resistant seedlings for use on private lands.
	Increase in POC infestations and mortality on Agency lands.	Function, not mortality, is the effect; mitigation for function loss discussed under other headings.
Ecology	POC mortality-caused reduction in plant diversity; greatest in Alternatives 4 and 5.	1] Improve risk-mapping of POC to improve efficiency and effectiveness of disease-reduction measures. 2] Plant disease-resistant stock or alternate species in affected areas.
Botany	Possible POC mortality-related negative effects to some rare species; greatest in Alternatives 4 and 5.	1] Plant disease-resistant stock or alternative species in affected areas. 2] Identify species and sites most affected by POC mortality, and protect or plant those sites specifically.
Water	Streams in ultramafic soils, POC mortality-related increase instream temperatures, particularly in Alternatives 4 and 5.	1] Plant disease-resistant stock or alternate species in affected areas. 2] Apply the uninfested watershed provisions of Alternative 3 to specific watersheds.
Fisheries	Streams in ultramafic soils, POC mortality-related negative effect on coho [ESA listed] in upper Illinois River Watershed, and on steelhead; greatest in Alternatives 4 and 5.	1] Plant disease-resistant stock or alternate species in affected areas. 2] Apply the uninfested watershed provisions of Alternative 3 to ultramafic subwatersheds in the upper Illinois River Watershed.
Wildlife	POC mortality-related slight general long-term effect on snag, down wood, and riparian-dependent species not detectable at the landscape scale; greatest with Alternatives 4 and 5.	1] Plant disease-resistant stock or alternate species in affected areas.
	Alternative 3 prohibition on commercial thinning in POC cores prevents silvicultural acceleration of late-successional habitat; slight effect.	1] Permit commercial thinning in POC cores in Late-Successional Reserves. 2] Thin and leave material on site, if consistent with fuels objectives.
Wildlife and Fish	Possible isolated Clorox-related mortality of fish and other aquatic species from fire-suppression water drops in Alternatives 1, 2, and 3.	1] Attempt to limit water drops on streams by educating suppression crews of the risk so they can direct drops accordingly. 2] Fly farther to get uninfested water. 3] Neutralize Clorox in water by adding aeration or treating with chemical neutralizer such as ammonium salts [which may have their own risks]. 4] Drop from higher-up to increase spread [limiting amount in stream] and increase volatilization [evaporation] of the active ingredient.
Fire	1 to 2% cost increase and potential increase in burned acres to implement disease-control measures in Alternatives 1, 2, and 3.	1] Remove POC disease control measures for fire-fighting, especially in dry weather and conditions where introduction risk is low.
Fuels	Slight reduction in acres of fuels treated in Alternatives 1 and 2, reduction in wildland/urban interface acres treated in Alternative 3.	1] Ease Alternative 3 POC core and buffer treatment restrictions for fuels treatment. 2] Improve fuel treatment flexibility by reducing seasonal or area restrictions for other resources.

Recreation	Some restrictions on OHV use and road access in Alternatives 1 and 2; greatest in Alternative 3; could displace some users and intensify use in other areas.	1] Identify more appropriate use areas and educate using public. 2] Apply seasonal, rather that complete, closures where possible.
	POC mortality-related loss of scenic quality, especially near water-related activities; greatest in Alternatives 4 and 5.	1] Plant disease-resistant stock or alternate species in affected areas. 2] Design developed sites to keep use away from POC.
Wilderness	Possible POC mortality-related reduction in wilderness values; greatest in Alternatives 4 and 5.	1] Plant disease-resistant stock or alternate species in affected areas consistent with management policies. 2] Try eradication treatments if permitted by management policies.
Areas of Critical Environmental Concern and Research Natural Areas	Areas devoted to botanical study or exceptional value adversely affected by POC mortality; greatest with Alternatives 4 and 5.	1] Specifically limit access. 2] Educate user to the risks and provide shoe-cleaning stations. 3] Add PL considerations into the management plan for each area.
Cultural Products for Tribes	Slightly reduced access to products from road and area closures and harvest restrictions in Alternatives 1 and 2, and more so in Alternative 3.	1] Make exceptions for Tribal collections. 2] Work with Tribes to identify collections areas.
	Slight but immeasurable POC mortality-related reduction in long-term collectable POC products; greatest in Alternatives 4 and 5.	1] Plant disease-resistant stock or alternate species in affected areas. 2] As large-tree mortality occurs, harvest and store logs for later use.
Special Forest Products	Nearly complete restriction on POC bough sales, and slight restrictions on firewood, mushrooms, and other products, in Alternatives 1 and 2, and more so in Alternative 3.	1] Educate collectors about risks and direct them to open collection areas. 2] Identify bough collection areas for long-term stewardship contracting. 3] Encourage development of private POC bough orchards.
Timber Harvest	At least $0.35/thousand board feet increase in harvest cost in Alternatives 1, 2, and 3, and 1.7% PSQ reduction [0.7 million board feet] in Alternative 3.	1] Do not apply Alternative 3 POC cores to Matrix lands. 2] Designate the POC cores and buffers as Late-Successional Reserves and remove Late-Successional Reserve designation from corresponding habitat elsewhere [a Northwest Forest Plan amendment].
Environmental Justice/Civil Rights	Loss of 8 timber jobs in Alternative 3, and loss of 6 POC bough collection jobs in Alternatives 1, 2, and 3.	See mitigation for Timber Harvest and Special Forest Products.