U.S. Department of Agriculture
Forest Service, Rogue River-Siskiyou National Forest
333 W 8th Street, P.O. Box 520
Medford, OR 97501-0902

March 2004

Record of Decision and Land and Resource Management Plan Amendment for

MANAGEMENT OF PORT-ORFORD-CEDAR IN SOUTHWEST OREGON, SISKIYOU NATIONAL FOREST

Coos, Curry, and Josephine Counties in Oregon; Del Norte County in California

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Coos, Curry, and Josephine Counties in Oregon; Del Norte County in California

Co-lead Agency: Bureau of Land Management; Coos Bay, Medford, and Roseburg Districts

Cooperator: U.S. Forest Service, Region 5; Klamath, Shasta-Trinity, and Six Rivers National Forests

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Record of Decision

1. Introduction

Summary

This Record of Decision amends the Land and Resource Management Plan of the Siskiyou National Forest (NF) by replacing existing direction for the management of Port-Orford-cedar (POC) with the direction of Alternative 2 in the January 2004 "Final Supplemental Environmental Impact Statement (FSEIS) for Management of Port-Orford-cedar in Southwest Oregon" (USDA-FS and USDI-BLM 2004, [hereafter referred to as FSEIS]). This decision, as shown in the analysis in the FSEIS, provides for disease-control procedures and planning processes that will ensure POC continues to be an ecologically and economically significant species on National Forest System (NFS) lands in southwest Oregon for the foreseeable future.

This decision does not apply to NFS lands outside the natural range of POC, to non-NFS lands, and does not change existing permits, rights, or agreements.

This decision, and the analysis upon which it is based, assumes the Bureau of Land Management (BLM) has or will sign a similar decision and remain as a partner with the Siskiyou National Forest in the management of POC and its root disease. It also assumes NFs in Region 5, California, will continue to manage POC at least as protectively as in their current direction.

Background/Purpose and Need

When the "Siskiyou National Forest Land and Resource Management Plan" was completed in 1989, it referenced a then-current "Port-Orford-cedar Action Plan" at its primary strategy for controlling and mitigating POC root disease spread (FSEIS, pp. 2-13–14). Portions of the Action Plan were duplicated in the Plan for reference. Under the Plan, the Forest along with BLM units began resistance breeding, closing roads either seasonally or permanently, began sanitation treatments along high-risk roads, developed a test for determining the presence of the disease agent in water and soil, and pioneered and standardized other treatments.

In 1995, the three BLM Districts within the POC range in Oregon adopted roughly similar direction. In February 2003, the U.S. District Court for the District of Oregon ruled the EIS for the "Coos Bay District Resource Management Plan" did not contain an adequate analysis of the effects of timber sales on the direct, indirect, and cumulative impacts on POC and its root disease. In order to correct this analysis deficiency and to ensure maintenance of POC as an ecologically and economically significant species on Federal lands, the BLM decided to prepare a supplemental EIS with the missing information, and to consider additional management alternatives. To potentially improve its existing direction and to ensure the two Agencies would continue to work together on a unified strategy, the FS joined the BLM in preparing the January 2004 FSEIS, with six alternatives and accompanying analysis, upon which this decision is based (USDA-FS and USDI-BLM 2004).

2. The Decision

This decision selects Alternative 2 as described in the FSEIS, along with referenced appendices, glossary terms, and other sections from the FSEIS; and with changes, clarifications, emphases, and adopted mitigation as described below. For clarity and ease of implementation, these Standards and Guidelines from Chapter 2 and other relevant referenced FSEIS sections, slightly edited to conform to this decision and changed to reflect the clarifications, changes, and adopted mitigation described below, are attached to this decision under the heading Land and Resource Management Plan Amendment and made a part of this Record of Decision. More specifically the decision includes:

- The Standards and Guidelines for Alternative 2 (FSEIS, pp. 2-14–2-23);
- the 7th field watershed description and table from Alternative 6 (FSEIS, pp. 2-28–2-29) and appurtenant map;
- the list of 7th field watersheds from Appendix 12;
- the monitoring plan from Appendix 5;
- the specifications for a washing station from Appendix 1;
- the equipment cleaning checklist from Appendix 13;
- applicable terms from the Glossary; and
- the clarifications, emphasis, and mitigation measures described immediately below.

Four other FSEIS sections are attached to this Record of Decision for reference only. These are a description of the plant associations where POC is dominant, the Pathology discussion of disease spread and effectiveness of management techniques, the Clorox label information, and the Phythophthora lateralis (PL) 100-year spread predictions for the selected alternative. Implementation decisions will also consider other applicable portions of the FSEIS analysis, particularly when it helps clarify intent or indicate potential priorities.

Existing Land and Resource Management Plan direction for POC (described in Alternative 1 in the FSEIS) is hereby removed and replaced with the direction described in, and attached to, this Record of Decision.

This is a programmatic decision amending one land and resource management plan. It does not itself authorize any projects or activities. As described in the FSEIS, this is a nonsignificant Forest plan amendment and is therefore within the authority of the Forest Supervisor to approve (FSEIS, pp. 2-8–2-9).

Changes, Clarifications, Emphases, and Adopted Mitigation

In addition to the provisions of Alternative 2 as described in the FSEIS and listed above, this decision includes the following changes, clarifications, emphases, and adopted mitigation:

Emphasis. Analysis in the FSEIS indicates a potential substantial long-term (approximately 50 years) cost savings from an accelerated program (described in Alternative 4) to locate, test, and breed disease-resistant stock from the 16 breeding zones when compared to continuing existing practices. However, lack of specific information about where seed is needed, along with significant POC acreage differences between the breeding zones (FSEIS, p. 3&4-111, Table 3&4-21), precludes supporting a decision to proceed with an accelerated program

at this time. Therefore, the Forest will cooperate with the BLM in an evaluation of the individual breeding zones to determine whether or not such a program is warranted and, if so, in which zones. The evaluation would be based on the following:

- More detailed quantification of (1) the potential long-term savings of an accelerated program, and (2) the fixed costs that will end once resistant stock is developed for all target zones.

- Identification of the breeding zones where, because of amount and location of POC, significant mortality-related adverse environmental effects are anticipated, and determination of the costs of accelerating only these breeding zones. (I note, for example, that five of the breeding zones have fewer than 250 acres of POC and I wonder whether there is a significant need for resistant seed for these zones.)

- The increase in annual budget required between now and 2010 to run the accelerated program for the breeding zones identified above.

If the evaluation indicates that there is a substantial opportunity for long-term savings, then the Agencies would actively seek the necessary funding and technical support to implement the program. In addition, it is anticipated that the program could be utilized to provide disease resistant stock for state, local, industrial, and small woodland owners to contribute to meeting overall POC management goals.

Change. In addition to monitoring range-wide disease spread through continued inventory and mapping, the Monitoring Plan for Alternatives 3 and 6 called for road, aerial, or photo surveys of the uninfested watersheds to identify new infestations at least once every 2 years, so that eradication treatments could be considered before any new disease pockets have spread. This decision adopts such a provision for the uninfested 7th field watersheds, but with such surveys to take place at least every 5 years to correspond with the Agency(s) usual aerial photo cycles.

Clarification. To meet botany, wildlife, and fisheries mitigation measures of planting resistant stock in affected areas and to remain consistent with assumptions in the analysis, the planting site priorities described in Appendix 6, Planting Assumptions, are adopted, focusing on replacing POC where its ecological function is most critical, such as along streams on ultramafic soils and to replace stands lost to wildfire.

Change. The Standards and Guidelines of the selected alternative define uninfested 7th field watersheds as those containing more than 100 acres of POC at this time. Since POC presence maps and acreage used in the FSEIS are post-Biscuit Fire (2002), and severely burned acres were removed from the acres and maps (FSEIS, p. 3&4-31), the actual acres of POC within the Biscuit Fire area, especially following reforestation, will likely increase. Therefore, uninfested watersheds expected by the Agency(s) to have significant POC stocking on more than 100 acres within 10 years as a result of natural or artificial regeneration of burned POC stands will be considered uninfested 7th field watersheds.

Clarification. To further clarify that use of the risk key does not preclude future NEPA and other appropriate site-specific considerations at the project scale, I have edited the second sentence introducing the risk key to read, “This approach precludes the need for additional

project-specific analysis of mid- and large-geographic and temporal-scale effects because the risk key describes conditions where risk reduction management practices are assumed (expected) to be applied."

Clarification. I have added a definition for "activity area" to the Glossary to further clarify the area to be considered under the risk key.

Adopted Mitigation. To reduce the likelihood of Clorox-related fish kills, this decision adopts the mitigation measure of adding Clorox to fire trucks and road watering equipment only after they leave the stream area where filled (FSEIS, p. 2-48, Table 2-6).

3. Alternatives, Including the Proposed Action

Overview

Six alternatives were analyzed in detail. These covered a relatively wide range from passive management to restricting access and other management within currently uninfested watersheds. Since the Need identified in the SEIS was the maintenance of POC as an economically and ecologically significant species, the analysis examined both the likely progression of the root disease over time under the various alternatives, and the implications of the disease spread (and resultant POC mortality) on the ecologic function and value of POC. Alternatives were designed to explore what functions and values would be lost with no active protection, and what costs (economic and lost opportunities) would be incurred with high levels of protection.

Additional alternatives were considered, but eliminated from detailed study. These included no harvest of POC, protection of all old-growth POC, more road closures, eradication of the disease, eliminating timber harvest in POC areas, increasing protections, and other measures. These were eliminated generally because they duplicated elements of alternatives considered, or did not meet the Need.

Alternative 1 — Continue Existing Direction (the No-Action Alternative)

This alternative would have continued the current direction in the Land and Resource Management Plan. In general, this direction placed an emphasis on reducing the spread of PL and maintaining POC using all available means as appropriate. Under this and similar direction for the BLM, the Agencies have employed a combination of ongoing research to find additional tools and evaluate their effectiveness, monitoring of disease spread, public and within-Agency education, interagency and interregional cooperation and coordination, development of resistant stock, and application of a wide range of disease-controlling management practices applied at the project level following project-specific analysis. As a result, POC root disease control has been considered, and control techniques are applied, at all levels of project planning and execution, including wildland fire fighting. In addition to the relevant Standards and Guidelines shown on FSEIS pages 2-13–2-14, a summary of specific disease-control efforts implemented by the Agencies in Fiscal Years 2001 and 2002 is included in FSEIS Appendix 2, and served as the assumed approximate level of management activity that would have contin-

ued to occur under this alternative.

Alternative 2 — Proposed Action

This alternative continues all of the research, monitoring, education, cooperation, resistance breeding, and disease-controlling management practices of Alternative 1 to reduce the spread of PL and maintain POC. For this alternative, however, the Standards and Guidelines specifically describe all currently available disease-control 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 risk key also requires management to reduce appreciable additional risk to 162 currently uninfested 7th field watersheds (see Alternative 6 below for more detailed description of watersheds). The principal differences, when compared to Alternative 1, were a more detailed and updated description of the array of available disease-control treatments, more consistent implementation of those treatments based on the risk key, and an emphasis placed on keeping PL out of currently uninfested 7th field watersheds.

Alternative 3

This alternative contained all of the management elements of Alternative 2, except for the risk key linkage to 7th field watersheds, and sought to slow the spread of PL even more by adding additional protection for 31 currently uninfested 6th field watersheds having at least 100 acres of stands containing POC. Specific protection measures were prescribed for the POC stands within these watersheds (POC core areas), and somewhat different protection was prescribed for the remainder of these watersheds (POC buffers) to lessen the possibility of infection within POC cores.

Alternative 4

This alternative would have removed current site-specific measures used to control the root disease spread, but would have accelerated 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 have been emphasized.

Alternative 5

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

Alternative 6

This alternative contained all of the management elements of Alternative 2, and sought to slow the spread of PL even more by adding additional protection for 162 currently uninfested 7th field watersheds having at least 100 acres of stands containing POC. Specific protection measures were prescribed for the POC stands within these watersheds (POC core areas), and somewhat different protection was prescribed for the remainder of these watersheds (POC buffers) to lessen the possibility of infection within the POC core.

The Environmentally Preferable Alternatives

The Council on Environmental Quality (CEQ) regulations require that the Record of Decision specify ". . . the alternative or alternatives which were considered to be environmentally preferable . . . " (40 CFR 1505.2(b)). CEQ's "Forty Most Asked Questions" document, Federal Register 46[55]:18026-18038 on March 23, 1981, clarifies that "The environmentally preferable alternative is the alternative that will promote the national environmental policy as expressed in NEPA's Section 101. Ordinarily, this means the alternative that causes the least damage to the biological and physical environment; it also means the alternative that best protects, preserves, and enhances historic, cultural, and natural resources." NEPA's Section 101 calls for Federal agencies to make decisions to achieve ". . . conditions under which man and nature can exist in productive harmony and fulfill the social, economic, and other requirements of present and future generations of Americans." It also calls for Federal agencies to "3. attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences; . . . 5. achieve a balance between population and resource use which will permit high standards of living and a wide sharing of life's amenities; and 6. enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources."

I am identifying both Alternatives 6 and 2 as the Environmentally Preferable Alternatives. As described in the following Management Considerations section, Alternative 6 restricts certain fuel treatments and access. However, based on projected reduction in root disease spread and anticipated secondary benefits to watersheds, wildlife, and other resources from limiting access to uninfested watersheds, Alternative 6 meets the CEQ definition. Alternative 2 similarly has both detrimental and beneficial effects. Predicted disease spread and associated negative environmental effects is predicted to be faster than with Alternative 6, but this alternative better provides for restoration and protection management actions. It better meets the full range of Section 101 objectives including achievement of ". . . a balance between population and resource use . . . ", and attaining ". . . the widest range of beneficial uses . . . without [to the extent practicable] degradation . . ."

Alternative 2 is the selected Alternative. Reasons for not selecting Alternative 6 are detailed in the following Management Considerations section.

4. Management Considerations

Reasons for the Decision

To meet the Need for maintenance of POC as an ecologically and economically significant species on BLM and NFS lands, the two Agencies have sought a management strategy that would slow the spread of the root disease enough to maintain POC's significant ecological and economic functions, without the cost of the management strategy exceeding its effect on the value of these functions (FSEIS, p. 1-5). Hence, the analysis in the FSEIS on the one hand identifies the ecological and economic significance of POC in the landscape and how POC mortality affects those values (FSEIS, p. 1-6, Issue Question 1). On the other hand, the analysis examines what measures can reduce the root disease spread and by how much, and what are the costs and benefits to other resources and uses of implementing those measures (FSEIS, p. 1-6–7, Issue Question 2). I am selecting Alternative 2 because it best responds to the Issues, balances the overall positive and negative effects, and meets applicable statutory requirements for NFS lands.

Alternative 2 borrows the management techniques currently used by the Agencies (Alternative 1), and then improves that direction by adding the risk key and emphasis on 162 uninfested 7th field watersheds. Emphasis on small watersheds was added after analysis of the draft and public responses pointed out their value for water quality and fish. The risk key recognizes POC plays different ecological roles in different parts of its range, and directs the application of disease-controlling management practices only where they are needed (see FSEIS, pp. 2-42–2-43, Differences in Risk Regions).

Alternative 2 emphasizes protection, but includes continued research, monitoring, and resistance breeding. The spatial and temporal limits on the benefits of resistant stock are recognized. Direct annual costs for Alternative 2 are similar to costs for Alternative 1, No Action. Alternative 2 provides direction for developing stronger partnerships with non-Federal landowners and managers to achieve overall POC objectives.

I am not selecting Alternative 4 or 5. Although the analysis in the FSEIS indicates POC would not be extirpated from large areas and no significant genetic resources would be lost, impacts to riparian areas—particularly within ultramafic soils—would be unacceptable. Further, these alternatives would not meet Agency and administrative goals and policies to minimize the spread of invasive species and maintain fully functional ecosystems.

I am not selecting Alternatives 3 or 6 because the additional reduction in the predicted 100-year disease spread (when compared to Alternative 2) and the resultant environmental benefits, would be small when compared with the additional costs and constraints on the Agency's ability to treat fuels, produce timber volume, and otherwise access and manage resources. Also, the emphasis on uninfested watersheds that was added to Alternative 2 in the FSEIS will achieve many of the benefits of Alternatives 3 or 6. The road and timber harvest prohibitions in Alternatives 3 and 6 would have secondary benefits of reducing roads, limiting noxious weed spread, decreasing off-highway vehicle damage to unique plants, and so forth; but these benefits are generally available other ways, and are particularly considered during unit-wide road management planning or during proposals to build roads in unroaded areas.

A discussion of how the selected alternative applies to each issue question/consideration follows:

Introduction — Disease Spread

POC root disease is primarily water-borne or is transported by humans and other vectors in mud from wet area to wet area. Running or standing water is needed for successful introductions. For this reason, the analysis identifies levels of risk at high or low. High-risk areas are low-lying wet areas that are located downslope from already infested areas or below likely sites for future introductions, especially roads. Low-risk areas are not influenced by wet conditions or periodic water flow. Although elk, hikers, and other vectors will continue to cause some infections across low risk areas, in-growth and reseeding will replace much of the mortality and there will be little net acreage loss. Most future infection and spread is predicted to occur in high-risk areas, where POC—at least large POC—will be eliminated unless replaced by resistant stock over time. Thus, disease-related POC mortality will have the most effect on riparian or water-dependent resources, and the least effect on resources spread more equally across the landscape.

The FSEIS analysis includes a 100-year mortality prediction for both the high-risk areas, and for the whole landscape. For the high-risk areas, mortality at 100 years would range from 50 to 90 percent (from 38 percent today) across the range of alternatives, with the selected alternative at 58 percent (FSEIS, p. 2-42, Table 2-4). For the population as a whole, projected mortality ranges from 16 to 30 percent (from 13 percent today) for the range of alternatives, with the selected alternative at 19 percent. There are no models available for making these predictions; they are best professional estimates of experienced Agency and non-Agency pathologists based on the available information and inventory. The scientific bases for these estimates—all relevant studies—are displayed in the FSEIS. Relative values for different spread vectors, environmental conditions, risk activities, and other factors are displayed and discussed. All of this information was the best available for analysis and subsequent review and comment. Additional information was added between DSEIS and FSEIS as a result of public comment. Actual disease spread will continue to be monitored to determine if a significant departure from these predictions might indicate a need to reexamine this strategy.

Issue Question 1. What is the ecological and economic significance of Port-Orford-cedar in the landscape and how is this affected by various levels of Port-Orford-cedar mortality? (FSEIS, p. 1–6)

Stream function and fish habitat: The analysis indicates a potential rise in stream temperature to be one of the most important effects of future POC mortality, particularly within ultramafic soils where POC typically makes up a larger and more irreplaceable percentage of the existing stream shading. This potential, and the related effects to fish, especially federally-listed fish, is examined and discussed in detail in the FSEIS. POC mortality under Alternatives 4 and 5, those providing the least protection for POC, would have a significant adverse effect on listed coho salmon. The analysis shows the mortality predicted for Alternative 2 would have an adverse effect on salmon and steelhead slightly above that for the most protective alternative, though not significant. POC provides durable logs for stream structure and helps stabilize soils. Mortality would cause a pulse in stream structure logs, and upslope and resistant logs would continue to provide for stream structure in the mid to long term, although

at somewhat lower than natural rates.

Terrestrial habitats for listed, rare, or unique plants: While the analysis found listed, rare, or unique plants in association with POC, no specific dependency with POC was identified. POC often helps shade some unique species, or acts as a physical barrier against disturbance, and the loss of such POC may adversely affect the nearby plants. On the other hand, POC mortality has been shown to improve the vigor of some unique plant communities. There are no federally- or state-listed threatened or endangered plants that occur in the riparian zone. The more protective alternatives, including the selected alternative, do benefit unique plants through road closures and equipment washing (which reduces noxious weed spread), and other direct effects not related to POC mortality.

Terrestrial habitats for listed, rare, or unique animals: As with plants, no animal species were found that were unique to POC. In fact, POC, because of its strong odor and disease-resistant wood, is used less frequently by most animal species than other species, with the only exceptions being species that use down logs for cover (such as deer). Loss of POC to disease, as well as loss of large tree structure during eradication and sanitation treatments, will affect late-successional forest associated species, but not significantly under any alternative.

Contemporary Tribal uses: Tribal use levels are so low that POC under all alternatives will persist sufficiently to meet demand, and all alternatives will maintain opportunities for limited collection.

Boughs and specialty woods: Since boughs can be collected from relatively small, upslope trees, mortality under any alternatives is not expected to significantly alter supply. However, bough collection on Federal lands is already severely limited under the current direction (Alternative 1) because bough collection is directly implicated in many new PL infections. Alternative 2, by describing circumstances where bough collection would be appropriate, could supply several tons of boughs annually, a slight increase from current levels (FSEIS, p. 3&4-146). For comparison, Alternatives 4 and 5 with no restrictions on bough harvesting could provide 100 to 200 tons of boughs annually, producing six (potentially minority) jobs (FSEIS, p. 2-45). Alternative 2 also restricts firewood, Christmas tree, and other product collection from some areas, reducing overall collections slightly.

POC wood is used for arrow shafts, soaking tubs, cabinet work, export, and other uses. Most of these needs can be met harvesting POC from non-riparian sites, although salvage within riparian areas also occurs. The selected alternative provides for long-term maintenance of POC at levels that will continue to permit its harvest and salvage. The decision also maintains harvest opportunities by avoiding area-specific prohibitions on POC harvest, deferring instead to site-specific analysis of risk. The demand for POC products can continue to be met if such harvest does not add appreciable additional risk to POC measurably contributing to meeting resource management plan objectives.

Maintaining and improving soils: Increased POC mortality may increase mass movement (slide) potential where lost root strength is not quickly replaced by other species. Evidence of POC contributing to soil fertility is inconclusive or lacking.

Are significant genetic resources at risk of loss: None of the alternatives are predicted to have a significant effect on the retention of genetic resources, in part because high-risk

areas are virtually always surrounded by nearby upslope low risk POC sharing the same genes, and because most genetic variability is within stands as compared to the variability between stands. Significant genotypes are unlikely to be extirpated under any alternative. Species extinction or even extirpation over significant areas is not a risk.

Ecosystem function and the maintenance of significant plant associations: While the questions above attempt to capture specific ecosystem functions, this section of the FSEIS examined forest diversity as a whole. POC is unique in its ability to tolerate various ecological conditions such as ultramafic soils and saturated soils. This tolerance makes it a component in a wide range of vegetation associations. The analysis indicates it is unlikely POC will be eliminated from any identified plant association, but large trees could possibly be eliminated from one or more plant associations that are uncommon and not well distributed within the POC range. The FSEIS analysis revealed little evidence that POC mortality in any given plant association will cause the demise of other plants in that association, or the loss of any plant association-related genetic resources. Nevertheless, the possible loss of larger POC from any identified plant association is a concern because of the potential for as yet unidentified effects. Alternative 2 helps maintain vegetation diversity when compared with the current direction (Alternative 1) or passive project management (Alternatives 4 and 5). Known unique plant associations would usually be considered in the risk key.

Issue Question 2. What factors affect the spread of the disease, what management techniques can minimize those factors, and what are the costs and benefits of implementing an appropriate mix of disease-reducing management techniques in terms of (a) direct financial costs, (b) maintaining the ecological and economic value of POC itself, and (c) the positive and negative effects to other (non-POC) resource values or uses?

Identification of the current management practices and other factors that may spread the root disease, and their relative importance: The Pathology section of the FSEIS (pp. 3&4-34–3&4-52) provides a detailed discussion of the vectors and pathways of disease spread, borrowing from all available research, administrative studies, observations, experience, and collective discussions with pathologists both in and out of Federal service in both California and Oregon. Clearly, roads are the primary pathway for the disease to jump from drainage to drainage, stream courses and overland flow move the disease down hill, and human and other vectors also move the disease within watersheds. Root-to-root spread occurs in some cases, but is thought to be much less significant than spore spread in soil or water (FSEIS, pp. 3&4-35–3&4-36). Most disease movement comes during the wet seasons or is associated with spores in mud. The relative importance of season, vectors, and other spread factors is ranked in the Pathology section of the FSEIS (FSEIS, pp. 3&4-35–3&4-43). This discussion is appended to this decision as a reference tool for users evaluating projects and selecting disease control practices (Reference 2). The agents of disease spread and their relative importance lead directly to the design of the General Direction and the Management Practices in Alternatives 2, 3, and 6.

Various effects sections of the FSEIS (such as those for timber harvest, grazing, special forest product collection, and mining) provide a description of the relative levels of activities both to provide a basis for the disease spread predictions in the Pathology section, and to provide a basis for understanding the effects of Standards and Guidelines in limiting activities in those areas.

Following issuance of the FSEIS in January, 2004, a "protest" filed against the BLM proposed Resource Management Plan Amendment questioned whether the analysis in the FSEIS accurately depicted mining activity levels and processes. The protest noted, with some merit, that the FSEIS statement ". . . claimants and other prospectors generally submit a written or verbal notice of intent to operate each year. . ." is misleading (FSEIS, p. 3&4-155). As noted in the following paragraph, however, the FSEIS recognizes that notices of intent received by the Forest are ". . . 30 to 50 per year . . ." and the number of actual operations ". . . is believed to be under 100 per year." Since casual mining within the State's summer season generally receives no more than a District Ranger's verbal go-ahead, many persons involved with casual mining often do not file notices of intent. They do, however, routinely secure a state dredging permit. Further, their possession of such a permit and their adherence to staying within the dry season and following rules against significant site disturbance (including cutting vegetation or opening new travel ways) are routinely checked by agency and state law enforcement officers. While I recognize such mining could spread PL, the risk appears reasonable in the context of the value and appropriateness of this activity on public lands. The FSEIS notes such use is far exceeded by annual recreation traffic in these same areas (FSEIS, p. 3&4-155), and this level of mining activity was considered in the development of the 100-year PL spread predictions.

Identification of management practices that can reduce disease spread, and their relative effectiveness: The management practices discussed in Alternatives 1, 2, 3, and 6 are generally ones with which the Agencies are well experienced. Disease indicators have been at least minimally studied for nearly every practice, sufficient to make professional judgments regarding their likely effectiveness (FSEIS, p. 3&4-3). The risk key, common to Alternatives 2, 3, and 6, clarifies the conditions that require implementation of one or more of the available management practices. This, together with the listed definitions and examples (FSEIS, p. 2-19), discussion of implementation scenarios (FSEIS, p. 2-42–2-43; FSEIS, p. 3&4-87; and elsewhere), and description of past implementation (FSEIS, Appendix 2), provides a management scenario for Alternative 2 sufficient to predict 100-year disease spread and effects on other activities and resources, and is therefore sufficient to determine that Alternative 2 will provide the most reasonable, cost-effective means of disease control. The additional access and activity restrictions provided by Alternatives 3 and 6 for uninfested watersheds would not provide enough additional control to warrant the cost, foreclosure of other public use opportunities (through road closures and off highway vehicle use restrictions, for example), and restrictions on fuels reduction and habitat improvement treatments.

It is understood that the various disease-controlling management practices do not "prevent" disease spread, but can reduce the risk of such spread. Some risk is practical to mitigate; some risk is not. For this reason, the Agencies will often apply control measures to their own or contractor activities that may not apply to others. Examples are: unwashed private vehicles will drive past washing stations; hunters will walk on roads closed to contract use or permittees; and administrative traffic adherence to various practices will vary depending upon the nature of the work and individual familiarity with localized conditions. These differences will be a result of various applications of the risk key, control over the conduct of a particular activity, and cost-benefit considerations. The objective is to provide cost-effective mitigation for controllable activities creating appreciable additional risk to important uninfested POC, not to reduce all risk to all trees at all cost.

Identification of forest uses or management needs that will be constrained by implementation of various management practices, either because of cost or because of reduced access: The analysis in the FSEIS indicates that a variety of forest uses and other vectors are potentially responsible for the spread of POC root disease spores. These include timber harvest, road construction and maintenance, special forest products collection, grazing, mining, fire suppression and fuels reduction, recreation including camping, hiking, horseback riding and off-road vehicle operation, as well as non-human vectors such as elk. To the extent the Agencies control these uses either through permitting, contracting, site construction and maintenance, gating, or other agency conduct or decision-making, use of the risk key during the planning/decision process will help determine if disease-controlling measures should be applied to the activity. Any of these activities have the potential to have various disease-reducing Management Practices applied, including case-specific application of area or seasonal exclusions. Alternative 2 achieves a reasonable level of disease control generally without absolute prohibitions on these activities, although some areas will undoubtedly be closed to access or certain uses, and costs for the conduct of some activities (timber harvest, for example) will increase. The more restrictive Alternatives 3 and 6 would have reduced probable sale quantity by 0.65 or 0.9 million board feet annually.

The risk key emphasis on the uninfested 7th field watersheds may eliminate or severely constrain some activities in these watersheds, but in general those activities will be directed to other areas. Examples are firewood and Christmas tree collection, and off-highway vehicle use.

Alternatives 3 or 6 were not selected because the complete elimination of specified activities was too great of a cost, both economically and environmentally, for the additional protection over Alternative 2. Required road closures would have reduced access to fire trucks and other emergency equipment, as well as to harvest equipment. The prohibitions on timber sales in POC stands would have reduced the Agencies ability to manage fuels and habitat in Late-Successional Reserves, and to treat hazardous fuels elsewhere, including 2,700 to 3,200 acres within the wildland/urban interface so important to the protection of communities. Probable sale quantity would also have been reduced 650,000 to 900,000 board feet annually, reducing supply and resulting in a loss of 7 to 10 timber jobs. Finally, road closures and other measures would have reduced access to these watersheds for various existing public recreation and other uses. Such a closure is not justified by the current risk.

Alternatives 3 and 6 were also not selected because of the additional cost of implementing sanitation treatments along roads in and near the uninfested watersheds. This additional expenditure is not cost-effective.

Forest Resources (other than POC) that will also benefit from implementation of various disease-reducing management practices: In addition to the effects discussed above, the FSEIS analysis identifies environmental effects expected from implementation of disease-controlling Standards and Guidelines (FSEIS, p. 3&4-6, item #4), and the effects of the various alternatives offsite, including within the POC range in California. Beneficial effects attributable to Alternative 2 include road closures benefiting water, fisheries, and plants, and vehicle washing reducing the spread of noxious weeds. Adverse effects include loss of wildlife habitat and reduction in visual quality from eradication and roadside sanitation treatments. These effects have been considered and are acceptable.

Alternatives 3 and 6 would have increased visual quality losses and habitat losses from roadside sanitation, but would have closed more roads, generally benefiting wildlife and watershed management. It is in part to capture this water quality gain that an emphasis on the uninfested 7th field watersheds was added to Alternative 2 in the FSEIS.

POC resource values in the California portion of the range are a consideration for this decision as well. The three NFs in California with POC have land and resource management plan provisions to minimize the spread of the root disease. The disease does not occur on the Klamath NF, and is very limited on the Shasta-Trinity NF where efforts are under way to eradicate it. Alternatives 4 or 5 are not selected in part because the Agencies wish to reduce the likelihood of disease spread to California. The "disease export" Standard and Guideline common to Alternatives 2, 3, and 6 is designed specifically to reduce the likelihood of moving the disease to other, sometimes distant, locations. Alternative 2 adequately reduces the long-distance risk, and is the alternative most similar to the POC direction on the Six Rivers NF. In fact, the risk key has it origin in a similar "cumulative effects key" from that forest (see FSEIS, p. A-36). Alternatives 3 or 6 would provide little additional protection from long distance spread.

Findings

A. This decision is consistent with the plant diversity requirements of the "National Forest Management Act" (NFMA) of 1976 (16 U.S.C. § 1604(g)(3)(B)). Because FSEIS projections show 81 percent of POC acreage will be retained disease-free at 100 years, no significant genes are expected to be lost, and POC will not be extirpated from any significant area.

B. This decision is consistent with NEPA. NEPA's requirement to prepare an environmental impact statement is designed to serve two major functions: (1) to provide decision makers with a detailed accounting of the likely environmental effects of a proposed action prior to its adoption; and (2) to inform the public of, and allow it to comment on, such effects. The process leading up to this decision has fulfilled both functions. First, the analysis identifies six specific kinds of effects (FSEIS, pp. 3&4-5–3&4-7), and references or provides the analysis in Chapter 3&4. The analysis sought at length to identify and discuss the ecological role of POC, identify the nature and level of activities responsible for transmission of POC root disease, and identify the effects, both to POC and to other environmental values, direct, indirect, and cumulative, of management activities conducted to control the disease. The analysis provides a complete benefit/cost analysis (though not necessarily in economic terms) for each alternative, consistent with the requirements and objectives of NEPA. Incomplete or unavailable information is discussed in the FSEIS (FSEIS, pp. 3&5-2–3&4-5). No missing information was identified that prevents identification of reasonably foreseeable significant adverse effects or prevents the making of a reasoned choice from among the alternatives. Second, as discussed in the Public Involvement section below, a small but intensely interested and well informed public has been involved with the SEIS throughout the process. Scoping and comment letters were received from all known interested parties as well as pathologists, both within and outside the Federal government, who have studied POC and its root disease. The FSEIS was responsive to all substantive comments.

C. This decision is consistent with the FS 1982 Planning Regulations under which the FSEIS was prepared (FSEIS, p. 2-8). For changes to Forest plans that are not significant, the regulations require public notification and completion of NEPA procedures [16 USC 1604

(f)(4) and 36 CFR 219.10(f)]. Scoping, news releases, and circulation of the DSEIS for 90 days met public notification requirements. The plan amendment adopted by this decision is not "significant" in the NFMA context, as described in the FSEIS at page 2-9.

D. This decision is consistent with the "Oregon and California Lands (O&C) Act." The O&C Act requires management of O&C lands (some of which are on the Siskiyou NF) to be managed for permanent forest production on sustained yield principles. Further, the Act requires that management protect watersheds, regulate steamflow, provide for recreational facilities, and contribute to economic stability of local communities and industries. All of these factors are consistent with, and in fact help define, the Need for this decision. The selected alternative provides for the maintenance of POC as an ecologically and economically significant species on NFS lands. The decision provides for POC products, maintenance of POC along streams where it provides shade and other benefits, retains a part of the visual resource at recreation sites, and so forth. Further, the elements of this decision are designed to protect POC while facilitating the continuance of timber harvest, recreation, and other activities.

E. This decision is consistent with the "Endangered Species Act." Consultation was conducted with the U.S. Fish and Wildlife Service in accordance with section 7 of the Act (Biological Opinion Reference Number 1-15-04-F-0114). The biological opinion of the U.S. Fish and Wildlife Service determined that proposed programmatic actions are not likely to jeopardize the continued existence of the bald eagle, northern spotted owl, and marblec murrelet. In addition, these proposed actions are not likely to destroy or adversely modify spotted owl or murrelet critical habitat. Subsequent project consultations which tier to the programmatic consultation will address project-specific effects when more information concerning the location, timing, and duration of proposed actions is available.

Consultation and conferencing was conducted with the National Oceanic and Atmospheric Administration - Fisheries for Southern Oregon/Northern California Coho and the Central Oregon Coast Coho, respectively. The biological opinion determined that proposed programmatic actions are not likely to jeopardize the continued existence of either population, nor adversely modify critical habitat. Subsequent project consultations will tier to the programmatic consultation as described above.

No terms, conditions, or mitigation measures were suggested in the Fish and Wildlife Service Biological Opinion. Four Conservation Recommendations in the NOAA Fisheries Biological Opinion for minimizing stream temperature effects and monitoring will be followed.

F. Between the DSEIS and FSEIS, the Agencies did not make ". . . substantial changes in the proposed actions that are relevant to environmental concerns . . ." nor are there ". . . significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or it impacts . . ." (40 CFR 1502.9(c)). The agencies did strengthen the proposed action in response to public comment and the Agencies' own analysis, but those changes were within the range of actions discussed in other alternatives. An additional alternative was also added to the FSEIS that was arguably slightly outside the range of those included in the DSEIS. However, the alternative was nearly identical to Alternative 3 in the DSEIS, with the primary difference being the size of watersheds considered "uninfested", thereby increasing POC cores acres and decreasing POC buffer acres when compared to Alternative 3. The change was not so substantial as to change the nature or significantly change the magnitude of environmental effects from those described in the DSEIS. Regard-

ing new information or changed circumstance, most of the improvement between DSEIS and FSEIS was clarification in nature; therefore, no supplement to the DSEIS was required. Mining and Grazing sections were added to Chapter 3&4, but these uses had already been considered in the calculations of disease spread.

G. This decision is consistent with other elements of the "Siskiyou National Forest Land and Resource Management Plan" (USDA-FS 1989) including amendments made April 13, 1994 known collectively as the Northwest Forest Plan (USDA-FS and USDI-BLM 1994b). This amendment does not change any Standards and Guidelines of the Northwest Forest Plan, nor does it ". . . significantly reduce protection for late-successional or old-growth forest related species, or reduce protection for aquatic ecosystems . . ." (USDA-FS and USDI-BLM 1994b, p. C-29), so no review by the Regional Ecosystem Office is required. I recognize that two changes to the Northwest Forest Plan have been recently adopted, one to clarify application of the Aquatic Conservation Strategy and one to remove Survey and Manage, but these two changes have negligible effect to POC and the FSEIS assumption that the Northwest Forest Plan will be implemented as written.

H. This decision is consistent with Executive Order 13112, Invasive Species, which requires that each Federal Agency ". . . shall, to the extent practicable and permitted by law . . . (3) not authorize, fund, or carry out actions that it believes are likely to cause or promote the introduction or spread of invasive species . . .unless . . . the agency has determined and made public its determination that the benefits of such actions clearly outweigh the potential harm caused by invasive species; and that all feasible and prudent measures to minimize risk of harm will be taken in conjunctions with the actions." The FSEIS at page 3&4-165 discusses this Executive order, pointing out that reducing PL is part of the Purpose of the FSEIS. I have determined the provisions of Alternative 2, with its risk key and emphasis on uninfested watersheds, meets this Executive order. The balancing of benefits versus potential harm was the purpose of the analysis in the FSEIS, and the selection of Alternative 2 correctly considers that balancing as described earlier in this section of this Record of Decision. The selected alternative will result in implementation of all practicable disease-controlling measures.

I. This decision is consistent with the "Clean Water Act," specifically section 303(d) as regards to water temperature in Oregon Department of Environmental Quality-listed stream segments. The FSEIS at page 3&4-83 describes listed streams as accounting for 8 percent of streams within the range of POC, but notes that there are numerous variables affecting stream temperatures for each segment and suggests deferring individual considerations to the site-specific scale. This is appropriate for this programmatic decision. However, I am sensitive to the role POC places in stream shading, and acknowledge that the selection I make today can influence, but is not the major determinant of, the cost and success of future stream restoration and protection measures. The Alternative 2 provisions adopted by this decision facilitate site-specific consideration and protection of 303(d) streams with respect to POC. For example, where uninfested POC significantly contributes to shading such streams, it would be deemed "measurably contributing to Land and Resource Management Plan objectives" during application of the risk key. This decision also clarifies the FSEIS planting assumption that resistant stock planting priorities will ". . . focus[ing] on replacing POC where its ecological function is most critical, such as along streams on ultramafic soils . . ."

I note that at the rangewide scale (for Oregon), PL infestations are predicted in 58 percent of high-risk areas (generally riparian areas) in 100 years, from 38 percent today. This is 6

percent lower (better) than would be expected under the current direction, but 8 percent higher than the 50 percent predicted for the most protective of the FSEIS alternatives (FSEIS, Table 3&4-10, p. 3&4-53). Analysis in the FSEIS shows that although temperatures might rise up to 3 degrees C per mile if POC was the dominant vegetation and became infested (FSEIS, p. 3&4-83), analysis of stocking levels and plant association information reveals such conditions are scattered and discontinuous. Further, on non-ultramafic and some ultramafic soils, other species will replace POC as stream shade. The analysis showed 25 percent of a subset of 303(d) listed streams (those containing steelhead) were on ultramafic soils where replacement would be slower or not at all. Finally I note that the difference between the selected alternative and the most conservative alternative in the FSEIS, Alternative 6, is primarily an increased level of protection for uninfested 7th field watersheds. Such watersheds tend to be at higher elevations in the POC range where, according to the FSEIS analysis, their contribution to summer stream temperatures in lower elevation stream segments (where 303(d) listed streams are more likely to be) is less than other watersheds (FSEIS, pp. 3&4-84–86). I conclude from the combination of these points that temperature effects to 303(d)-listed streams possible from the loss of POC are not significantly different between the selected alternative and the most conservative alternative in the FSEIS. I also conclude that the selected alternative provides tools and standards that will help the Forest meet "Clean Water Act" obligations.

J. The decision is consistent with other potentially relevant laws and Executive orders as described under Critical Elements of the Human Environment in the FSEIS (p. 3&4-165), including those for air quality, floodplains, and wetlands.

5. Monitoring

Project and other general resource management plan compliance monitoring will continue under processes and practices already in place and/or described in the existing plans. The Land and Resource Management Plan Amendment (attached) also includes monitoring provisions specific to POC and the Standards and Guidelines being adopted today (FSEIS, pp. A-44–A-45, Appendix 5). According to those provisions:

- District and resistance breeding program summaries will continue to be prepared;
- sample resistant seedlings will be tracked over time to determine the durability (long-term effectiveness) of resistance;
- the USDA-FS Southwest Oregon Forest Insect and Disease Service Center, which has responsibilities for disease control assistance on NFS lands, will continue working with field units to develop and evaluate the effectiveness of various disease control measures;
- uninfested 7th field watersheds will be systematically examined every 5 years in an effort to catch any new infestations while they are still small enough to consider whether eradication treatments should be attempted; and
- ongoing inventory remeasurements will be evaluated to determine infestation spread, and this information will be compared with spread predictions made in the FSEIS to

check for substantial departures. Substantial departures will be evaluated as to whether they indicate a need to adjust the strategy or its implementation.

6. Mitigation

As noted in the FSEIS, the implementing regulations of NEPA, at CFR 1502.14(f) and 1502.16(h), require identification of measures to mitigate adverse environmental impacts (FSEIS, p. 2-46). 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 currently known measures to mitigate the spread of PL are included in some form in one or more of the alternatives. 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.

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.

The FSEIS includes a summary of all potential and likely adverse environmental effects identified in the FSEIS along with a list of possible mitigation measures for each. The mitigation option of selecting a different alternative is not included (FSEIS, pp. 2-48–2-49, Table 2-5). Selected mitigation measures are either listed under the Decision section of this Record of Decision (above), or are already part of the Standards and Guidelines in the following Land and Resource Management Plan Amendment. All practical means to avoid or minimize environmental harm have been adopted.

NEPA's implementing regulations at CFR 1502.2 require each Record of Decision to state ". . . whether all practical means to avoid or minimize environmental harm from the alternative selected have been adopted, and if not, why they were not." Mitigation measures listed in the FSEIS that are not adopted, and the reasons for not adopting them, are:

> Increase public education in offsite areas regarding the risk of receiving disease from unfamiliar equipment. This is not adopted because other provisions provide nearly the same protection, but more practically. The selected alternative includes community outreach direction that includes ". . . continue to improve public awareness . . ." and ". . . consider focusing . . . efforts on user groups most likely to engage in activities at more risk . . ." and " . . . coordinate with state, local, industrial, and small woodland owners to help meet overall POC management objectives." The Decision section above also includes direction to work with non-Federal owners toward finding support for additional resistance breeding.

Encourage the State to enact POC root disease measures on non-Federal lands. Other than coordinating with the State as described above and assisting private landowners interested or willing to participate, it is generally outside of the NF System mission to lobby State governments to apply controls on private timberlands.

Improve risk mapping of POC to improve efficiency and effectiveness of disease-reduction measures. This is discussed in the FSEIS in the alternatives eliminated from detailed study (FSEIS, p. 2-38). This may be possible in the future as POC and plant association mapping continues to be improved, and such maps could help management of the overall disease-control strategy. However, the current strategy coupled with project-specific consideration of risk on a site-specific basis through use of the risk key will adequately and more cheaply meet disease control objectives.

Apply the uninfested watershed provisions of Alternative 3 or 6 to specific (temperature-sensitive) watersheds. The analysis indicates that the inclusion of uninfested 7th field watersheds as emphasis areas in the selected alternative will lead to adequate protection of these watersheds without having to add the carte blanche prohibitions on certain activities as described for Alternatives 3 and 6.

Attempt to limit water drops on streams by educating suppression crews of the risk so they can direct drops accordingly. While this could reduce the risk of getting Clorox into streams, adding this expense and complication to fire suppression activities (especially requiring additional coordination between helicopters and ground crews) to reduce a risk that has not been demonstrated to deliver significant quantities of Clorox to streams would be premature. There have been no demonstrated adverse environmental effects from Clorox in helicopter water drops. This decision suggests, but does not require, that simple testing be conducted. For example, a sample helicopter water drop could be released at varying heights over an array of sampling containers, and then tested in a lab to get an estimate of the amount and distribution of chlorine reaching the ground. Comparing the amount and pattern against sample stream widths and related likely flows would quickly confirm or rebut FSEIS estimates that harmful levels are dissipated within "yards or tens of yards" (FSEIS, p. A-42, Appendix 4).

Fly farther to get uninfested waters. This approach is discussed in the Fire and Fuels section of the analysis (FSEIS, pp. 3&4-127–3&4-128), with the conclusion that expenses would rise and fire suppression efficiency would suffer. In the absence of significant evidence of environmental risk from adding Clorox to water drops, this measure is not adopted.

Neutralize Clorox in water by adding aeration or treating with chemical neutralizer such as ammonium salts (which may have their own risk). As above, the additional cost and time for such treatments, where mixing is often done in portable water tanks in remote locations, is unjustified in the absence of confirmed risk. This treatment is done where treated waters are subsequently mixed with ammonium-based fire retardants because of the risk of creating gases toxic to mixing personnel.

Drop from higher-up to increase spread (limiting amount in stream) and increase volatilization (evaporation) of the chlorine. Fire suppression effectiveness would be reduced, safety of nearby ground crews could be compromised, and drop accuracy would

be reduced, potentially increasing the likelihood some material would reach the stream. Dropping from different heights is suggested as an element of the sample drops suggested above.

Remove POC disease control measures for fire-fighting, especially in dry weather and conditions where introduction risk is low. The potential savings in additional burned acres (an arguably natural process) is not worth the additional risk of spreading the root disease. Fire suppression activities involve people and equipment traversing all sites spread over large areas often with no opportunity to distinguish between infested and uninfested areas. They are also often working with and around water, and therefore mud. Although infestations specifically attributable to fire suppression activities are lacking, the kinds of activities conducted are those known to move the disease. This decision suggests, but does not require, that water bucket dips from major streams (such as in river pools) during low summer flows be examined for the presence of PL, and Clorox use be reduced if such examination proves negative.

Improve fuel treatment flexibility by reducing spotted owl or other resource seasonal or area restrictions. This is outside the scope of this decision.

All practical identified mitigation measures applicable to Alternative 2 have been adopted. The effects described in the FSEIS and summarized above under Reasons for the Decision will remain following implementation of adopted mitigation measures.

7. Implementation

This is a programmatic decision amending Standards and Guidelines in the "Siskiyou National Forest Land and Resource Management Plan." These Standards and Guidelines are applicable to future project planning for projects and activities potentially spreading POC root disease.

This decision applies to future projects whose decision documents and permits, etc., will be signed after the effective date of today's decision, and may be applied to other projects, initiated or not, at the discretion of the official responsible for the project. It applies to permitted activities as permits are issued or reissued, and new assessment documents or when such documents are substantially updated. It applies to annual plans, such as road maintenance plans, that will be implemented next fiscal or calendar year, the time period depending upon how such plans are normally prepared. It may be applied sooner in any of these cases, at the discretion of the responsible official. The FSEIS analysis is considered valid as of the FSEIS publication date. It is understood, and confirmed with the pathologists and other effects writers preparing the FSEIS, that signed, sold, or otherwise implemented projects were part of the existing conditions for purposes of the effects in the FSEIS including 100-year disease spread predictions. There is no requirement to revise any existing contract or permitted project to achieve the effects described for this alternative.

Remapping POC in the Biscuit Fire area is under way and will continue. These maps will assist implementation of these Standards and Guidelines and the final designation of uninfested watersheds (see section E. Attachments).

8. Public Involvement

Background

Agency management of POC root disease has been somewhat controversial for at least a decade. Various letters, appeals, and protests to management projects involving POC, and related meetings with environmental groups and publics, gave the Agencies an understanding of many of the issues before scoping for the SEIS began. The Agencies had been working on a rangewide assessment of POC and were well familiar with the current science. Authors variously suggested changes to the current management strategy. The District Court decision on BLM's Sandy-Remote analysis also identified cumulative effects as an issue for the analysis. These all provided analysis issues relating to the then-current management direction, and indicated a SEIS was appropriate to examine those issues.

Scoping (February–March 2003)

A Notice of Intent to write a SEIS was published in the Federal Register February 10, 2003, simultaneously or soon thereafter posted on the project's website, mailed to about 600 persons identified from Agency mailing lists as potentially interested, and was the subject of a news release mailed to 68 radio stations and newspapers within the POC range. The Agencies received 77 letters or e-mail messages asking to be on the mailing list; 63 of those also contained other scoping-related comments.

Public Review and Comment on the Draft SEIS (June–September 2003)

The Notice of Availability for the Draft SEIS appeared in the Federal Register June 13, 2003, beginning a 90-day public review and comment period that ran through September 12, 2003. Draft documents were supplied either in hard copy or on the project website, as people had specified a preference, to the 77 persons responding to scoping as well as to persons known to have a strong interest, public agencies, elected officials, libraries, and BLM and FS offices within the POC range. Forty-eight comment letters were received. These were studied in their entirety by members of the interdisciplinary core team who identified about 600 substantive comments. These comments were coded by topic and forwarded to SEIS team member/authors responsible for the subject area discussed. Appropriate changes were made to the analysis, and all substantive comments (after combining like comments) received written responses. Written comments and responses are displayed in the FSEIS, Appendix 10 (pp. A-81–A-176).

Changes to the Final SEIS Resulting from Public Comments to the Draft SEIS

The comment letters were generally well thought out and indicated considerable dedication and review on the part of the commentors. New information was presented, confusing analysis was identified, and new alternatives were suggested. As a result of public comment, new effects sections were added for mining and grazing, a new alternative was added focus-

ing on the uninfested 7th field watersheds, Alternative 2 was strengthened, management practices were added, and various other portions of the analysis were expanded, particularly the Pathology discussion. For Alternative 2, emphasis on the uninfested 7th field watersheds was added, language in the risk key was clarified, and the importance of protection over reliance on resistance breeding was clarified.

Public Comments on the Final SEIS/Proposed Resource Management Plan Amendment

Although there was no described "public comment" period after issuance of the Final SEIS on January 23, 2004, three comment letters were received by the BLM State Office. One of these was also submitted as a BLM protest, and questioned portions of the Pathology section of the SEIS. Specifically, the letter said the multi-year sanitation trials should have had a "control" to be meaningful, that long-distance spread probabilities and rates were underestimated and no analytical model was used, the designation of low-risk sites was not justified, and the risk key is flawed because it had no requirement to cancel a project if the risk was too high.

I have considered these four issues as follows, and do not consider them reason to adjust the selected alternative. Regarding the "control," the study does in fact have two "control" stands. Regarding long-distance spread, there is no analytical model available, nor is there likely to be soon as the number of variables is significant. The basis for all estimates is well documented, however, and the commentor neither offers a model nor presents information sufficient to bring key disease spread assumptions into question. Regarding low-risk sites, the role of low-risk sites on the overall spread of the disease is, I believe, considered in the disease spread predictions. The low risk designation is used more to describe the significance of disease impacts to certain sites, and disease spread on these sites is estimated at 0.1 percent per year, ". . . much of which is offset by regeneration and growth . . ." (FSEIS, p. 2-42, footnote 1). Finally, there is a requirement to cancel the project if the risk it too high unless ". . . analysis supports a finding that the value or need for the proposed activity outweighs the additional risk to POC created by the project." This is not a project option that is likely to be chosen often if at all, but must remain an option to allow for as yet unforeseen high-priority needs and circumstances. A conflict between land management plan standards and guidelines and the need to do a safety-related realignment of a state highway is an example that came up recently on the Willamette NF.

The second letter suggests that maximum ecological protection is the first priority and requests selection of Alternative 3 or 6 to provide maximum protection of POC and to help maintain Wilderness options in Roadless Areas.

The final letter suggests Alternative 4 is not adequate, because research and access restrictions will be the most effective solution. I recognize Alternative 3 and 6 would provide more protection for POC, and have chosen against selecting these and in favor of selecting Alternative 2 for the reasons stated above. I agree that Alternative 4 is not adequate.

Governor's 60-Day Review

A 60-day period for Governor review of BLM FSEISs is required prior to a Record of Deci-

sion being signed (43 CFR 1610.3-2(e)). The review period provides the state with an opportunity to review the proposal for consistency with state and local plans, programs, and policies. A copy of the FSEIS was forwarded to Oregon Governor, the Honorable Ted Kulongoski, on December 10, 2003, along with a transmittal letter asking for concurrence and also stating that if no word were received within the 60 days following December 10, the BLM would presume the proposal to be consistent with state and local plans, programs, and policies. No correspondence has been received from the Governor.

BLM Protests

The FSEIS identified Alternative 2 as the Proposed Resource Management Plan Amendment for the three BLM administrative units. Issuance of the FSEIS on January 23 began a 30 day BLM "Protest Period," during which persons who participated in the planning process and who had an interest which may have been adversely affected may have protested the planned decision. To be timely, any such protests needed to be postmarked by February 23, 2004, and addressed to the Director, BLM, c/o the protest coordinator in Washington D.C. (refer to the FSEIS "Dear Interested Party" letter).

Five protests were received that included approximately 71 different issues or comments. I have reviewed those comments, making some changes to this decision where appropriate, but determining in large part that the FSEIS analysis adequately considered the issues raised and no additional changes in the selected alternative are needed.

9. Additional Applicable Protest or Appeal Periods

This decision is subject to appeal pursuant to 36 CFR 217. To appeal this decision, a person or organization must file a written notice of appeal with the Regional Forester, ATTN: 1570 Appeals, P.O. Box 3623, Portland, OR 97208-3623. Appeals should meet the content requirements outlined in Section 217.9 and include narrative evidence and argument to show why the decision should be changed or reversed. Appeals should be postmarked within 45 days of the date notice of this decision appears in the Medford Mail Tribune.

The Agency appeal processes also apply to many individual project decisions made pursuant to this land and resource management plan amendment.

10. Decision Signature

/s/ Scott D. Conroy — 3/29/04

SCOTT D. CONROY — Date
Forest Supervisor,
Rogue River-Siskiyou National Forest

11. Literature Cited

USDA-FS; USDI-BLM. 2004. Final Supplemental Environmental Impact Statement [for] Management of Port-Orford-Cedar in Southwest Oregon. Portland, OR.

USDA-FS. 1989. Siskiyou National Forest Land and Resource Management Plan. Siskiyou National Forest, Grants Pass, OR.

USDA-FS. 1993. Region 6 Interim Old Growth Definition for Douglas-Fir Series, Grand Fir Series, Interior Douglas Fir Series, Lodgepole Pine Series, Pacific Silver Fir Series, Ponderosa Pine Series, Port-Orford-Cedar and Tanoak (Redwood) Series, Subalpine Fir Series, Western Hemlock Series. U.S. Forest Service, Region 6, Portland, OR.

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Land and Resource Management Plan Amendment

Existing Standards and Guidelines are Replaced

The Standard and Guidelines (management direction) relating to Port-Orford-cedar (POC) root disease control in the existing Land and Resource Management Plan for the Siskiyou NF are removed and replaced entirely with the Standards and Guidelines below. The Standards and Guidelines replaced are described as Alternative 1, the No Action Alternative, in the January 2004 "Final Supplemental Environmental Impact Statement (FSEIS) for Management of Port-Orford-Cedar in Southwest Oregon" (USDA-FS and USDI-BLM 2004 [hereafter referred to as FSEIS], pp. 2-13–2-14).

A. Introduction

These Standards and Guidelines build upon previous research, monitoring, education, cooperation, resistance breeding, and experience with disease-controlling management practices used to reduce the spread of Phytophthora lateralis (PL) and maintain POC. They describe all currently known disease-control practices, dividing them between those that would 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 fuel management projects, special use permits, road maintenance, mining plans of operations, and 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 risk key also highlights 162 currently uninfested 7th field watersheds (described and listed in Attachment 1), requiring management practices to reduce appreciable additional risk posed by proposed activities.

The objectives of these Standards and Guidelines are to:

- Maintain POC on sites where the risk for infection is low;
- reduce the spread and severity of root disease in high-risk areas to retain its ecological function to the extent practicable;
- reestablish POC in plant communities where its numbers or ecosystem function have been significantly reduced; and
- reduce the likelihood of root disease becoming established in disease-free 7th field watersheds.

B. General Direction

Integrated Management Approach. An integrated approach will be implemented to deal 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 POC bough cutting, community outreach, genetics, interagency coordination, planning, wildland fire operations, snag retention, project-specific direction, risk key, management practices, and monitoring.

In portions of the natural range, POC is widespread across the landscape. In these areas, POC conservation will 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 localized on moist microsites (such as along streams) or sites favorable for establishment of the species. In these areas, opportunities for managing for POC on sites unfavorable to the pathogen are more limited. Treatments to prevent new infestations will 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 measurably contributes to meeting Land and Resource Management Plan objectives for both aquatic and terrestrial ecosystems, Tribal, or product uses or function. This will be accomplished using resistant and nonresistant (generally on low-risk sites or away from potential infection sources) 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 will be evaluated and a decision made whether to make adjustments. The Agencies will 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 (or stewardship contracts with specific provisions to protect and enhance POC).

POC bough collection will 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. Continue to improve public awareness of the root disease and the need to control it by using methods such as 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; and/or other measures. Consider focusing these efforts on user groups most likely to engage in activities at more risk for spreading PL. Coordinate with state, local, industrial, and small woodland owners to help meet overall POC management objectives.

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. If experience demonstrates techniques and conditions where this treatment can be effective, its use can be increased. Additional tools for eradicating PL in the soil will be sought, developed, and implemented as evidence warrants.

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

The existing interagency resistance breeding program will be continued as needed, contingent on available funding. The objectives 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 will continue as follows:

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

In addition, collect and maintain about 0.5 pound of resistant seeds for each POC breeding zone in organized conservation seedbanks. This seed will be reserved exclusively for reforesting areas after the occurrence of stand-replacement events such as large-scale wildfires. Where possible, resistant POC seedlings will be planted in such locales, with the goal to reintroduce POC to all pre-event locations.

Finally, as described in the Record of Decision, the Agency(s) will prepare a benefit analysis by seed zone and elevation of an accelerated resistance breeding program, and then, if still warranted by a substantial long-term cost savings and environmental benefits, to pursue potential sources for the necessary increased funding.

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

Planning. Consideration of how to achieve the POC management objectives will 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.

Wildland Fire Operations. Management strategies to prevent/reduce spread of PL will be a part of wildland fire preparedness planning. When practicable, these measures will be incorporated into firefighting activities. Such practices may include treating firefighting water with Clorox bleach or other registered material to kill waterborne PL spores, washing vehicles, and washing tools and clothing. However, POC issues may become a secondary priority during wildland fire operations. 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.

Road closures and other compromised POC disease-controlling measures will be reinstalled following suppression and emergency rehabilitation unless changed circumstances indicate otherwise. Fire rehabilitation efforts would 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.

Disease Export. Where the agencies have reason to believe heavy equipment working in infested stands will next travel through or to substantially uninfested private or public POC areas, such as in uninfested watersheds or different administrative units, heavy equipment, including road maintenance equipment that has left surfaced (rocked or paved) roads in infested POC areas, will be washed upon leaving infested project areas to minimize transport of infested soil to uninfested areas. Washing areas will be located as described under Management Practice 11 (Washing Project Equipment) in the following Management Practices section.

C. Project-Specific Direction and Port-Orford-Cedar Risk Key

One or more of the management practices listed under the following Management Practices subheading will be applied to site-specific management activities when a need is indicated by the POC Risk Key. This approach precludes the need for additional project-specific analysis of mid- and large-geographic and temporal-scale effects because the risk key describes

Port-Orford-Cedar Risk Key: Site-specific analysis to help determine where risk reduction management practices would be applied

1a. Are there uninfected POC within, near [1], or downstream of the activity area whose ecological, Tribal, or product use or function measurably contributes to meeting land and resource management plan objectives?	
1b. Are there uninfected POC within, near [1], or downstream of the activity area that, were they to become infected, would likely spread infections to trees whose ecological, Tribal, or product use or function measurably contributes to meeting land and resource management plan objectives?	
1c. Is the activity area within an uninfested 7th field watershed [2] as defined in Attachment 1?	If the answer to all three questions, 1a, 1b, and 1c, is no, then risk is low and no POC management practices are required.
If the answer to any of the three questions is yes, continue.	
2. Will the proposed project introduce appreciable additional risk [3] 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 to reduce the risk to the point it is no longer appreciable, or meet the disease control objectives by other means, such as redesigning the project so that uninfected POC are no longer near or downstream of the activity area. If the risk cannot be reduced to the point it is no longer appreciable through practicable and cost-effective treatments or design changes, the project may proceed if the analysis supports a finding that the value or need for the proposed activity outweighs the additional risk to POC created by the project.	

[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; 100 to 200 feet in streams.
[2] Uninfested 7th field watersheds are defined and listed in Attachment 1, and are those with at least 100 acres of POC stands, are at least 50% federal ownership, and are free of PL except within the lowermost 2 acres of the drainage.
[3] Appreciable additional risk does not not mean "any risk." It means that a reasonable person would recognize risk, additional to existing uncontrollable risk, to believe mitigation is warranted and would make a cost-effective or important difference (see Risk Key Definitions and Examples for further discussion.

conditions where risk reduction 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. Project-specific NEPA analysis will appropriately document the application of the risk key and the consideration of the available management practices. Application of the risk key and application of resultant management practices (if any) will make the project consistent with the mid- and large-geographic and temporal-scale effects described by the SEIS analysis, and will permit the project analysis to tier to the discussion of those effects.

For the application of this risk key, the definition of project would not be limited to any one type of management activity. For example, projects such as road maintenance projects, livestock grazing permits, recreation management projects and permits, fuelwood permits, non-POC special forest products permits, and other uses subject to permitting or other specific Agency authorization action, likely to introduce significant risk to essential POC require implementation of applicable management practices at the time of planning or reissuance of permits 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 circumstances under which the various risk reducing management practices will be applied where needed.

Port-Orford-Cedar Risk Key Definitions and Examples

Additional risk ~ The intent is to mitigate or avoid the potential risk for infection that is appreciably above background or existing risk levels, commensurate with the value of the potentially affected resource and the cost of the mitigation or avoidance. Where background or existing potential risk of infection levels are low, an apparently minor activity such as a permitted one-time event or trail maintenance, might create appreciable additional risk. In checkerboard ownerships near private timberlands, near roads that have reciprocal rights-of-way agreements not addressing POC, or near major public use areas, such activities would likely not create appreciable "additional" risk since the risk already exists. In other words, mitigation (application of management practices or other options identified in the risk key) is only required by the key when, in the context of the risk coming from already existing activities essentially beyond the practical control of the Agencies, it can make a cost-effective and important difference.

Measurably contributes to meeting land and resource management plan objectives ~ The uninfected POC in question is so located, or covers such a geographic area such, that it measurably contributes to meeting land and resource management plan objectives and/or all applicable laws and regulations. The effects discussions in the FSEIS provide much of the basis for this determination; if no adverse effect is identified for POC mortality, then the likelihood of various mortality having an adverse effect on Land and Resource Management Plan objectives is low.

Land and Resource Management Plan objectives ~ Includes, but is not limited to, maintaining forested landscapes, species diversity, soil stability, stream temperatures (including State 303(d) requirements), buffering seasonal stream flow fluctuations, supplying large wood from streams and wildlife, visual quality, habitat for rare or unique plants, habitat for threatened, endangered, sensitive/special status, or other Agency-emphasis species, product collection and harvest, designated wilderness values, research opportunities, and genetic diversity.

Measurably contributes to ~ Means the POC at risk from the proposed activity makes a meaningful and unique contribution to the plan objective in question. Where POC is a small percentage of the stand or does not provide unique stand attributes (not providing the largest trees in the stand, for instance), its loss is probably not meaningful when measured against management objectives. Similarly, where stream shading, bank stability, and other riparian functions are readily performed by other species onsite, POC mortality is probably not meaningful. Where POC mortality could affect rare or unique plants, but mortality has been demonstrated to benefit such plants, POC mortality is probably not meaningful.

On the other hand, where POC is a significant portion of the riparian vegetation and its loss would likely lead to creating or exacerbating stream temperature, bank stability, turbidity, or other problems, POC is making a meaningful contribution to Land and Resource Management Plan objectives. Significant geographic areas in designated wilderness are making a meaningful contribution. POC as a large percentage of the stand in recreation or visually sensitive areas are probably making a meaningful contribution. Where POC is part of the reason for the designation of a research natural area or area of critical environmental concern, it is

making a meaningful contribution. POC protecting rare plants, or serving as nest structures for listed species, are probably making a meaningful contribution if substitutes are not readily available. It is more likely that POC is making a meaningful contribution to Land and Resource Management Plan objectives if the site is within the 90,900 acres in Oregon where POC is prominent in the overstory (see Reference 1).

Management Practices

Management practices are designed to:

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

One or more of the management practices from the list below will 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; the one or combination of specific practices best fitting the nature of the risk and the site-specific conditions will be applied when indicated by the risk key. Practices can be modified or partially implemented if such changes still meet risk reduction objectives and/or better fit site conditions. As noted in the Pathology section of the FSEIS (see Reference 2), combinations of practices can be more effective than single practices, depending on site-specific circumstances.

1) Project Scheduling: Schedule projects during the dry season or incorporate unit scheduling (Management Practice 3) and vehicle and equipment washing (Management Practice 11) as part of project design.

2) Utilize Uninfested Water: Use uninfested water sources for planned activities such as equipment washing, road watering, and other water-distribution needs, or treat water with Clorox bleach to prevent/reduce the spread of PL (see Reference 3 for Clorox bleach label and instructions for use). To reduce the likelihood of getting Clorox in streams, add Clorox to fire trucks and road watering equipment only after they have left the stream area where they were just filled.

3) Unit Scheduling: Conduct work in all timber sale and other activity units or areas where PL is not present before working in units or areas 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) Fuels Management: 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 (such as sanitation) 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, or provide other mitigation such as seasonal closures. Trailheads will be relocated and/or established trails will be rerouted in the same manner where trails present significant risk to POC, or provide other mitigation such as site hardening.

9) Road Management Measures: Implement proactive disease-prevention measures including not building roads, not using existing roads, seasonal or permanent road closures, road maintenance, and/or sanitation removal of roadside POC to help reduce the likelihood of spreading the disease—especially to high-risk areas and/or 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 waste disposal.

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 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. Highest priority for reforestation is replacing POC where its ecological function is most critical, such as along streams on ultramafic soils and replacing stands lost to wildfire.

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 (generally project area secondary roads around diseased POC). 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 will 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. Wash water will be from uninfested water sources or treated with Clorox bleach. Wash water should not drain into watercourses or into areas with uninfected POC. Ideally, equipment should not travel for any substantial distance prior to being washed unless being transported on surfaced 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 field washing stations from the BLM "Port-Orford-Cedar Management Guidelines," but with an updated equipment cleaning checklist, is in Attachment 2. A Clorox bleach label and updated mixing instructions are in Reference 3.

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

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

14) Non-POC Special Forest Products: No special forest products permits, including firewood permits, will be issued in the wet season where POC is present, unless administration previously mentioned for Bough Cutting under General Direction can be implemented. Educate the public on the risks associated with collecting in areas with POC.

15) Summer Rain Events: Apply permit or contract clause or otherwise require cessation of operations when indicators such as puddles in the roadway, water running in roadside ditches, or increases in soil moisture (as measured by moisture meter or equivalent) indicate an unacceptable increase in the likelihood of spreading PL.

16) Roadside Sanitation: Remove or kill POC 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 will benefit most from sanitation treatment. Maintenance will 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. Sanitation treatments could be incorporated as part of routine road maintenance.

17) Site-Specific POC Management: Where possible, emphasize management of POC on sites where conditions make it likely that they will escape infection by PL, even if the pathogen has already been established nearby or may be introduced in the future. POC above roads, uphill from creeks, on ridgetops, and on well-drained sites are less likely to become infected. Emphasis may include priority retention during thinning or other silvicultural treatments, and planting to increase the presence of POC in areas unfavorable to the pathogen.

D. Monitoring

Introduction

To maintain POC as an ecologically and economically significant species on BLM- and FS-administered lands, management strategies (both actions and inactions) will be evaluated.

Implementation Monitoring

Questions

1) Have resistance breeding and genetic conservation requirements been met?

2) Are General Direction requirements for maintaining and reducing the risk of PL infections being implemented?

3) Are project-specific management actions applied as required?

Requirements

1) The Agencies will address current accomplishments including levels of established conservation seedbanks in annual updates for the resistance breeding program.

2) District annual program summaries will include the general activities accomplished for maintaining and reducing the risk of PL infections.

3) Administrative units will incorporate POC management actions into their existing project-specific implementation monitoring programs.

Effectiveness and Validation Monitoring

Questions

1) Is the genetic resistance program producing POC seedlings that survive long term under field conditions?

2) Are disease-controlling mitigation measures, such as road use restrictions and closures, sanitation, and washing, effective as predicted, and is the risk associated with projects such as fire suppression at presumed or predicted levels?

3) Has the spread or non-spread of the disease significantly departed from the predictions made in the FSEIS that were used to select this management strategy (see Reference 4)?

4) Is the disease being kept out of the uninfested watersheds and if not, have appropriate eradication treatments been tried and are they successful?

Requirements

1) The Agencies will annually report survival results of validation studies that determine effectiveness of the genetic resistance program.

2) The USDA-FS Southwest Oregon Forest Insect and Disease Service Center will continue working with field units to evaluate and coordinate existing management techniques to reduce the occurrence of PL and retain healthy POC. Emphasis will be directed towards ongoing projects and monitoring their results. Actual monitoring will be split

between the Service Center and the administrative units where management occurs. Additional (new) monitoring efforts will be a function of available budget and workforce. (An example is whether prescribed fire heats the soil enough to be effective as an eradication treatment.) In some cases, university research will be the appropriate vehicle to accomplish evaluations of management techniques.

3) As new inventory data (continuous vegetation survey and forest inventory and analysis) and local mapping becomes available, it will be evaluated for current levels (acres and/or number of trees) of infected and uninfected POC and corresponding trends. Inventory plots are typically reinventoried on a 3- to 10-year cycle, depending upon location.

4) Road, aerial, or photo surveys of the uninfested watersheds will be done to identify new infestations at least once every 5 years.

E. Attachments

Attachment 1: Description of Uninfested 7th Field Watersheds, Table of Watersheds, and Map

Description of Uninfested 7th Field Watersheds

"Uninfested 7th field watersheds" are watersheds with greater than 50 percent Federal ownership and with greater than 100 Federal acres in stands that include POC (not including plantations where POC did not previously occur), where at least the Federal lands are uninfested or essentially uninfested (see the following table) with PL. These stands occur in Matrix as well as various Reserve land allocations. Uninfested POC stands within these watersheds (about 49,000 acres) are referred to as POC cores. POC cores are not necessarily contiguous acres. Analysis done for the FSEIS using existing GIS stand mapping indicates there are 162 currently uninfested 7th field watersheds in Oregon (BLM and FS). Actual watersheds included, and POC core boundaries, depend on the absence of PL at the time the Record of Decision is signed, and where POC occurs on the ground. Stands with any level of POC are included. Uninfested watersheds expected to have over 100 acres of POC within 10 years of this Record of Decision as a result of natural or artificial regeneration of POC

Summary of 7th field watershed cores and buffers [1]

	Federal acres					
District or Forest	Number of watersheds	Core Matrix/ Riparian Reserve/ Adaptive Management Area acres	Core reserve acres	Buffer acres	Federal and private acres in watershed	% Federal ownership
Coos Bay	0	0	0	0	0	0
Medford	18	8	7,137	22,201	33,414	88
Roseburg	0	0	0	0	0	0
Siskiyou	144	6,343	35,881	193,799	244,867	96
Total	162	6,351	43,018	216,000	278,281	95

[1] Includes watersheds with up to 2 acres PL; excludes watersheds with less than 50% Federal administration.

stands burned in the Biscuit Fire will be considered uninfested 7th field watersheds. Watersheds no longer qualify for POC cores if 5 percent or more of the POC core area becomes infested with PL. Because these watersheds sometimes empty into a larger stream that is infested, infestations within the lowest 2 acres of the watershed (and lowest 200 feet of stream) do not count against the current uninfested status or the 5 percent.

The existing mapping protocols used for determining the 7th field watersheds shown on the Map are not necessarily consistent between administrative units or with standard 6th field mapping. If 7th field watershed maps are revised to a regional standard in the future, it does not change the designation of POC cores. POC core areas identified with the existing protocol would be considered permanent unless 5 percent or more become infested, or they are changed through a future NEPA decision.

Table of Uninfested 7th Field Watersheds

The following 7th field watersheds are those that Agency GIS databases indicate meet the description of uninfested watersheds above. Text above also explains that actual field conditions are the final determinant as to whether a watershed is ultimately considered uninfested for the purpose of these Standards and Guidelines. These watersheds are referenced in question 1c in the risk key.

Map of Uninfested 7th Field Watersheds

Map of uninfested 7th field watersheds, showing POC locations and Northwest Forest Plan land allocations (enclosed).

Port-Orford-cedar disease-free 7th field watersheds [1]

Subwatershed number	Core Matrix/ Riparian Reserve/ Adaptive Manage-ment Area acres	Core reserve acres [2, 3]	Non-Port-Orford-cedar Federal acres	Total sub-water-shed acres [4]	% Federal owner-ship
Roseburg and Coos Bay	0	0	0	0	0
Total [0 watersheds]	0	0	0	0	0
Medford					
17100310010536	0	227	951	1,178	100
17100310010539	0	950	504	1,454	100
17100310010545	0	546	836	1,382	100
17100309050103	2	514	621	1,251	91
17100309050218	0	188	3,139	5,152	65
17100310010603	0	115	450	781	72
17100310040103	0	174	2,065	2,929	76
17100310040106	0	605	2,038	2,643	100
17100310040212	0	239	747	986	100
17100310040215	0	324	2,781	3,105	100
17100310040612	0	113	1,201	1,314	100
17100310040618	6	1,076	2,670	3,752	100
17100310040630	0	797	620	1,417	100
17100310040727	0	109	248	357	100
17100311050106	0	217	690	941	96
17100311050115	0	460	847	1,615	81
17100311050121	0	377	1,241	1,986	81
17100311050203	0	106	552	1,170	56
Total [18 watersheds]	8	7,137	22,201	33,414	88
Siskiyou					
03B01F	0	103	2,836	2,939	100
03B02F	0	286	1,304	1,590	100
03B04W	0	219	1,877	2,096	100
03B08W	0	136	1,688	1,824	100
03L01W	0	196	1,557	1,753	100
03L02F	0	122	1,567	1,689	100
03M05W	0	212	1,347	1,559	100
03T01W	0	557	1,438	1,995	100
03T05F	0	168	2,888	3,056	100
03T07F	0	140	2,308	2,448	100
03U11W	0	416	695	1,111	100
03U12W	0	127	1,360	1,487	100
03U15W	0	310	1,060	1,370	100
04H02F	118	22	2,378	2,518	100
04M01F	0	119	1,444	1,570	99
04M04W	0	297	1,018	1,315	100
04M05W	1	146	1,191	1,338	100
05E06W	0	746	1,726	2,472	100
07L04W	0	205	207	412	100
07L05W	0	184	574	758	100
07L08W	136	89	368	593	100

Watershed number	Core Matrix/ Riparian Reserve/ Adaptive Manage-ment Area acres	Core reserve acres [2, 3]	Non-Port-Orford-cedar Federal acres	Total sub-water-shed acres [4]	% Federal owner-ship
07L13W	0	119	417	536	100
07L14W	0	323	1,123	1,446	100
07M06F	0	140	1,506	1,646	100
08N01F	0	160	2,520	2,680	100
09U14W	89	79	958	1,126	100
09U16W	259	70	1,307	1,636	100
10C02F	0	105	2,194	2,299	100
10C03W	44	362	2,170	2,576	100
10C07W	2	170	879	1,051	100
10C09W	0	173	1,399	1,572	100
10C10W	40	682	960	1,682	100
10K01W	0	290	3,601	3,891	100
10K03W	0	168	3,022	3,190	100
10L01F	0	151	2,478	2,629	100
11B02W	7	170	1,536	1,802	94
11B03F	0	273	1,889	2,162	100
11B05W	0	113	889	1,002	100
11B06F	0	101	1,276	1,377	100
11B08W	25	232	1,552	1,809	100
11O05F	63	240	1,936	2,241	99
11S01F	0	370	1,434	1,804	100
11S03W	0	149	859	1,198	84
11S04W	43	251	1,945	2,508	89
11U01F	32	180	1,492	1,704	100
11U02W	71	35	474	580	100
11U03F	191	7	2,067	2,265	100
11U07W	149	1	1,213	1,363	100
11U11F	191	0	786	980	99
11U12W	112	36	804	952	100
11U13W	155	1	854	1,010	100
12J02W	0	154	2,295	2,450	99
12J03F	29	127	1,530	1,686	100
12J05W	0	218	1,668	1,886	100
12J07F	0	202	1,147	1,349	100
12J09W	0	645	2,013	2,658	100
12J10W	4	149	1,355	1,508	100
12J12W	0	128	635	763	100
12J13W	19	204	1,169	1,392	100
12J14F	83	58	2,074	2,235	99
12J15F	76	817	1,578	2,488	99
12J16W	0	769	1,323	2,092	100
12J17W	0	1,051	1,103	2,155	99
12L11W	0	171	1,073	1,244	100
12U09F	0	163	2,329	2,650	94
13D06W	227	8	724	1,021	94
13D10W	6	719	959	2,212	76
14E08W	37	132	1,484	2,272	73
14E10W	0	216	612	1,578	52
14M04W	165	0	1,102	1,296	98

Watershed number	Core Matrix/ Riparian Reserve/ Adaptive Manage-ment Area acres	Core reserve acres [2, 3]	Non-Port-Orford-cedar Federal acres	Total sub-water-shed acres [4]	% Federal owner-ship
14M06W	0	250	293	565	96
14M07W	8	1,056	548	1,612	100
14R01F	18	154	2,111	2,561	89
14R04F	0	256	1,200	1,457	99
14R06F	0	165	1,995	2,160	100
14R08W	0	397	1,544	1,941	100
14R09F	0	104	1,388	1,492	100
14R13W	0	351	1,965	2,316	100
14R14F	0	289	2,071	2,360	100
14W02W	43	358	1,394	2,453	73
14W03W	0	750	413	1,163	100
14W05W	0	674	469	1,616	71
15D01F	36	139	1,818	2,134	93
15D04W	1	447	626	1,074	100
15D05W	80	55	846	981	100
15D09W	70	77	1,315	1,462	100
15U01W	0	143	269	412	100
15U02F	0	187	2,242	2,429	100
15U03W	0	525	844	1,369	100
15U04F	0	165	1,975	2,140	100
15U05W	0	438	705	1,143	100
15U06W	0	313	2,314	2,627	100
16A08W	273	7	419	699	100
16A09F	658	318	1,061	2,037	100
16A10W	146	312	1,770	2,228	100
16A11F	664	50	822	1,536	100
17C03F	0	200	1,719	1,919	100
17G04W	0	142	1,187	2,028	66
17G07W	164	10	544	718	100
17G13W	12	335	621	968	100
17L03W	9	98	1,850	1,986	98
17S16F	0	110	1,460	1,570	100
18S02W	109	0	1,240	1,520	89
18S04W	179	0	993	1,172	100
18S06F	180	0	1,976	3,207	67
18S07W	113	0	876	989	100
18S09W	157	0	1,412	1,636	96
20N02W	217	120	1,169	1,506	100
20N07F	7	421	649	1,077	100
20S08W	0	226	1,822	2,702	76
22M01F	0	108	2,647	3,040	91
22M09W	0	1,212	951	2,235	97
23L03W	38	123	876	1,099	94
23L06W	1	347	1,017	1,377	99
26F08W	84	45	1,215	1,344	100
26F11W	136	0	1,457	1,674	95
26G06W	160	10	796	966	100
26G10W	0	230	617	847	100
26T10W	28	115	1,289	1,432	100

Watershed number		Core Matrix/ Riparian Reserve/ Adaptive Manage-ment Area acres	Core reserve acres [2, 3]	Non-Port-Orford-cedar Federal acres	Total sub-water-shed acres [4]	% Federal owner-ship
30M05W		0	215	439	852	77
30S07W		0	103	612	715	100
31A04W		0	193	448	807	79
31B01W		4	235	1,440	1,699	99
31C01W		0	106	1,726	1,832	100
31C04W		0	243	71	314	100
31C08W		0	108	1,013	1,121	100
83E07W		314	0	1,292	2,091	77
90B01F		0	269	2,603	2,872	100
90B02W		0	263	1,569	1,832	100
90B03F		0	447	2,893	3,340	100
90B04W		0	130	2,491	2,621	100
90B05W		0	321	1,165	1,486	100
90B06W		0	231	538	769	100
90B08W		0	894	572	1,466	100
90B09W		0	423	1,973	2,396	100
90B10W		0	297	1,805	2,102	100
90C01F		0	208	2,027	2,235	100
90C03W		0	338	952	1,290	100
90C06W		0	282	1,285	1,567	100
90L02F		60	1,228	468	2,231	79
90L05W		0	748	105	853	100
90L06F		0	105	939	1,044	100
90L07F		0	617	165	782	100
90N09W		0	163	1,864	2,027	100
Total	[144 watersheds]	6,343	35,881	193,799	244,867	96
Grand total	[162 watersheds]	6,351	43,018	216,000	278,281	95

[1] 7th field watersheds with at least 50 percent Federal ownership, at least 100 acres of POC, and either uninfested or infestation limited to the lowermost 2 acres of the watershed. Acres reflect stands assumed lost in Biscuit Fire.
[2] 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.
[3] Reserves include Late-Successional Reserves, Congressional Reserves, and Administratively Withdrawn.
[4] Includes private acres.

Attachment 2: General Specifications for a Washing Station and Equipment Cleaning Checklist

The following specifications are from the 1994 BLM "Port-Orford-cedar Management Guidelines," (FSEIS, Appendix 1). The Equipment Cleaning Checklist is from the POC FSEIS (FSEIS, Appendix 13).

General Specifications for a Field Washing Station

Purpose: The purpose of the washing station is to remove as much soil and organic matter from vehicles as possible to prevent/reduce the spread of PL. The intent is to reduce the spread of PL into uninfested areas. Washing can be accomplished with a mixture of chlorine bleach and water or by steam cleaning. The ration of chlorine bleach to water is 12 ounces of bleach per 1,000 gallons of wash water.

When locating and constructing a washing station to clean vehicles and equipment, we need to minimize the chance that a "clean" truck will be re-exposed to infested material near the washing site. There are two ways this can happen. One is if the truck travels through an area where "unclean" trucks are also traveling. This can be minimized by proper location of the washing station. If some common travel ways are used, efforts need to be made that will reduce the chance of picking up soil. This can be accomplished by rocking the common road surface or hardening it in some other fashion. Reducing the amount of water used for dust abatement will lessen the amount of mud which may also prove useful.

The second way a "clean" truck could become a carrier again is by traveling through wash water and mud at the washing station. Proper construction of the site will eliminate this risk. Runoff of the wash water needs to drain away from the wash site and away from the travel route to and from the site. Wash water must not be allowed to drain into stream channels. The actual washing site needs to be elevated so that the trucks are not sitting in mud and wash water. This could be accomplished by ramps or by building a sufficiently high rocked surface on which the trucks can travel. The length of the rocked surface wash area should be at least 1.5 times the length of the trucks that will be using it. This will allow the trucks to travel on a non-contaminated surface for a short distance after being washed and reduce the chances of picking up infested soil from the washing. The gravel used for rocking should be of sufficient size to allow good percolation of water and soil into the subsurface. Accumulations of water and soil on the surface should be avoided. This last point also affects the depth of the rocked road surface. The amount of washing and the number of trucks using the site will also influence the depth.

The type of equipment used for washing needs to be sufficient to remove all soil and organic matter that is clinging to the trucks. The actual water pressure required can best be determined on the site.

Equipment Cleaning Checklist

This checklist (for optional use) is referenced in the Washing Project Equipment management practice.

The purpose of this checklist is to provide guidance in the cleaning of equipment, as stipulated in contracts, to control or prevent the spread of noxious weeds and PL. The checklist directs attention to specific areas on equipment that are likely to accumulate soil and organic material. Questions to ask about overall equipment cleanliness are:

1) Does the equipment appear to have been cleaned?
2) Is the equipment clean of clumps of soil and organic matter?

Rubber-Tired Vehicles

- ☐ Tires
- ☐ Wheel rims (underside and outside)
- ☐ Axles
- ☐ Fenders/wheel wells/trim
- ☐ Bumpers

Track-Laying Vehicles

- ☐ Tracks
- ☐ Road wheels
- ☐ Drive gears
- ☐ Sprockets
- ☐ Roller frame
- ☐ Track rollers/idlers

All Vehicles

- ☐ Frame
- ☐ Belly pan (inside)
- ☐ Stabilizers (jack pads)
- ☐ Grapple and arms
- ☐ Dozer blade or bucket and arms
- ☐ Ripper
- ☐ Brush rake
- ☐ Winch
- ☐ Shear head
- ☐ Log loader
- ☐ Water tenders (empty or with treated water)
- ☐ Trailers (low-boys)
- ☐ Radiator/grill
- ☐ Air filter/pre-cleaner
- ☐ Struts/springs/shocks
- ☐ Body seams

Attachment 3: Definitions

The following terms have been reproduced from the FSEIS Glossary because they are used in the Record of Decision or Plan Amendment, or are readily applicable to implementation. No departure from the FSEIS Glossary definitions is intended; they are listed here for convenience, and the FSEIS Glossary may continue to be used for any terms that were not included below.

Activity area ~ Used in the risk key, the portion of the project area where potentially PL-disturbing activities will take place, including related transportation routes and parking areas. Usually not synonymous with the NEPA "analysis area", or fish consultation "action area".

Adaptive management ~ A continuing process of action-based planning, monitoring, researching, evaluating, and adjusting with the objective of improving implementation and achieving the goals of the standards and guidelines.

Breeding ~ The science or art of changing the genetic constitution of a population of plants or animals.

Breeding block ~ A breeding block designates the geographic area which envelops a number of breeding zones.

Breeding zone ~ A breeding zone designates a unit of land in which an improved population of a species is being developed. Progeny testing and/or breeding activity is conducted to obtain an "improved" population (for one or more traits of interest) over time. The boundaries of a breeding zone may or may not coincide with seed zones. In many instances, a breeding zone covers multiple seed zones.

Buffer ~ In Alternatives 3 and 6, all lands within the currently uninfested 6th or 7th field watersheds (respectively) except stands containing POC (see Chapter 2).

Core ~ In Alternative 3 and 6 (and 2), stands with POC within the currently uninfested 6th or 7th field watersheds (respectively) (see Chapter 2).

Disease ~ An abnormal, injurious physiological condition brought about by a continuous irritation. Plant disease usually involves a complex relationship between a susceptible host, a conducive environment, and a causal agent called a pathogen.

Dry season ~ From the Pathology section of the FSEIS, generally between June 1 and September 30, when conditions are dry and temperatures typically exceed 68 degrees F.

Eradication ~ Removal of live POC around a PL infestation to keep PL from spreading.

Fire management plan ~ A strategic plan that defines a program to manage wildland and prescribed fires and documents the Fire Management Program in the approved land or resource management plan.

Ground-based logging system ~ Tractor or cable partial suspension (as opposed to cable full suspension or helicopter).

Heavy equipment ~ Wheeled or tracked equipment other than highway vehicles, used for construction, road maintenance, logging, pipe-laying, and similar work; some examples are backhoes, Bobcats®, skidders, yarders, and graders.

High-risk site ~ Low-lying wet areas (infected or not) that are located downslope from already infected areas or below likely sites for future introductions, especially roads; they include streams, drainage ditches, gullies, swamps, seeps, ponds, lakes, and concave low-lying areas where water collects during rainy weather.

Infected ~ Refers to the attack of a living organism by a pathogen (the pathogen enters and establishes a pathogenic relationship with its host).

Infested ~ Refers to soil or other substratum that is occupied by a pathogen (used in the sense of "contaminated").

Inoculum ~ (1) The substance, generally a pathogen, used for inoculating; (2) to put a micro-organism or virus, or a substance containing one of the aforementioned, into an organism or substratum. Also, pathologists use these terms to apply both to inoculations conducted by humans and to inoculations that occur in nature.

Land Use Allocations (LUAs) or Land Allocations ~ Use in this SEIS is limited to the seven designations of management emphasis identified in land and resource management plans for each administrative unit as a result of the 1994 "Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl." The seven land allocations are Congressionally Reserve, Late-Successional Reserve, Adaptive Management Area, Managed Late-Successional Areas, Administratively Withdrawn, Riparian Reserve, and Matrix.

Late-successional forests ~ Forest stands consisting of trees, structural attributes, supporting biological communities, and processes associated with old-growth and/or mature forests. Forest seral stages that include mature and old-growth age classes. Age is not necessarily a defining characteristic but has been used as a proxy or indicator in some usages. Minimum ages are typically 80 to 130 years, depending on the site quality, species, rate of stand development, and other factors.

Late-Successional Reserve ~ Land allocation under the Northwest Forest Plan with the objective to protect and enhance conditions of late-successional and old-growth forest ecosystems that serve as habitat for late-successional and old-growth forest-related species, including the northern spotted owl. Limited stand management is permitted, subject to review by the Regional Ecosystem Office.

Low-risk site ~ A site with characteristics unfavorable for spread and infection by a particular pathogen.

Maintenance ~ The retention of POC.

Matrix ~ Federal lands outside of reserves, withdrawn areas, managed Late-Successional Areas, and Adaptive Management Areas.

Mitigation measures ~ Modifications of actions taken to: (1) avoid impacts by not taking a certain action or parts of an action; (2) minimize impacts by limiting the degree or magnitude of the action and its implementation; (3) rectify impacts by repairing, rehabilitating, or restoring the affected environment; (4) reduce or eliminate impacts over time by preservation and maintenance operations during the life of the action; or, (5) compensate for impacts by replacing or providing substitute resources or environments.

Monitoring ~ A process of collecting information to evaluate if objectives and anticipated or assumed results of a management plan are being realized or if implementation is proceeding as planned.

"National Environmental Policy Act" (NEPA) ~ An Act passed in 1969 to declare a national policy that encourages productive and enjoyable harmony between humankind and the environment, promotes efforts that prevent or eliminate damage to the environment and biosphere, stimulates the health and welfare of humanity, enriches the understanding of the ecological systems and natural resources important to the nation, and establishes a Council on Environmental Quality.

"National Forest Management Act" (NFMA) ~ A law passed in 1976 as an amendment to the "Forest and Rangeland Renewable Resources Planning Act," requiring preparation of forest plans and the preparation of regulations to guide that development.

Northwest Forest Plan ~ Coordinated ecosystem management direction incorporated into land and resource management plans for lands administered by the BLM and the FS within the range of the northern spotted owl. In April 1993, President Clinton directed his cabinet to craft a balanced, comprehensive, and long-term policy for management of over 24 million acres of public land within the range of the northern spotted owl. A Forest Ecosystem Management Assessment Team (FEMAT) was chartered to develop a series of options. These options were modified in response to public comment and additional analysis and then analyzed in a final SEIS. A record of decision was signed on April 13, 1994, by the Secretaries of the Department of Agriculture and the Department of Interior to adopt "Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl." The record of decision, including the "Standards and Guidelines for Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl" is referred to as the Northwest Forest Plan. The Northwest Forest Plan is not a plan in the agency planning regulations sense; the term instead refers collectively to the 1994 amendment to existing agency land and resource management plans or to the specific standards and guidelines for late-successional species incorporated into subsequent land and resource management plans.

Noxious weed ~ A plant species that is highly injurious or destructive and has a great potential for economic impact; a plant species that is listed as noxious by the State of Oregon.

Off-highway vehicle ~ Any motorized vehicle capable of, or designed for, travel on land, water, or natural terrain. The term will be used in place of off-road vehicle to comply with the purposes of Executive Orders 11644 and 11989 (although the definition for both terms is the same).

Old-growth forest ~ An ecosystem distinguished by old trees and related structural at-

tributes. Old growth encompasses the later stages of stand development that typically differ from earlier stages in a variety of characteristics which may include tree size, accumulations of large dead woody material, number of canopy layers, species, composition, and ecosystem function. More specific parameters applicable to various species are available in the 1993 "Interim Old Growth Definitions" (USDA-FS Region 6). The Northwest Forest Plan SEIS and FEMAT describe old-growth forest as a forest stand usually at least 180- to 220-years old with moderate-to-high canopy closure; a multi-layered, multi-species canopy dominated by large overstory trees; high incidence of large trees, some with broken tops and other indications of old and decaying wood (decadence); numerous large snags; and heavy accumulations of wood, including large logs on the ground.

Pathogen ~ A parasite able to cause disease in a particular host or range of hosts.

Plant association ~ A plant community type based on land management potential, successional patterns, and species composition.

Prescribed fire ~ Any fire ignited by management actions to meet specific objectives.

Prevent ~ As in prevent new infections: An objective, not a requirement.

Record of decision ~ A document separate from, but associated with, an environmental impact statement that: (1) states the management decision; (2) states the reason for that decision, (3) identifies all alternatives including the environmentally preferable and selected alternatives; and (4) states whether all practicable measures to avoid environmental harm from the selected alternative have been adopted, and if not, why not.

Reforestation ~ The natural or artificial restocking of an area with forest trees.

Resistant ~ Possessing qualities that hinder the development of a given pathogen.

Riparian ~ Pertaining to areas of land directly influence by water. Riparian areas usually have visible vegetative or physical characteristics reflecting this water influence. Streamsides, lake borders, or marshes are typical riparian areas. Vegetation bordering watercourses, lakes, or swamps; it requires a high water table. In the FSEIS, sometimes used as substitute for "high-risk sites," although the two are not synonymous (see text of respective FSEIS sections).

Riparian area ~ The shoreline zone including floodplains, along a stream or lake, affected by varying levels of subsurface water storage conditions; favoring water tolerant plants and forest vegetation. This linear geographic area is oftentimes extended upslope to include the direct influence of forest trees or to a transitional area between aquatic and terrestrial communities.

Riparian Reserves ~ Areas along live and intermittent streams, wetlands, ponds, lakes, and unstable and potentially unstable areas where riparian-dependent resources receive primary emphasis. Riparian Reserves are important to the terrestrial ecosystem as well, serving as dispersal habitat for certain terrestrial species.

Sanitation ~ Removal of POC from infested areas along roads, trails, or around uninfested

POC to prevent spores from being generated and reaching nearby uninfested stands, or roads where they could be picked-up by passing traffic. Also removal of POC from uninfested areas along roads, trails, or around infested areas to prevent spores falling off vehicles or originating from the nearby infested areas from reaching a host and thereby spreading the disease.

Seed zone ~ A seed zone is an area where seed can be moved from a source or seed collection location to a planting location. General adaptation over the long term is inferred within the movement or seed transfer within the respective zone. Most seed zones have a set geographic area where movement is restricted to specific elevation bands (300 meters).

7th field watershed ~ A delineated hydrologic unit depicting the location of a drainage area that is typically 1,000 to 10,000 acres in size; the 7th division level of the Nation's drainages; represented by extending the hydrologic unit code to 14 digits (Source: http://www.reo.gov/gis/projects/watersheds/Data_Standards2.htm).

6th field watershed ~ A delineated hydrologic unit depicting the location of a drainage area that is typically 10,000 to 40,000 acres in size (it can be as small as 3,000 acres); the 6th division level of the Nation's drainages; represented by extending the 10-digit hydrologic unit code to 12 digits (Source: http://wwwga.usgs.gov/gis/iag.html and http://www.reo.gov/gis/projects/watersheds/Data_Standards2.htm).

Snag ~ A standing dead tree.

Species ~ A class of individuals having some common characteristics or qualities. In these Standards and Guidelines, synonymous with taxon, which may include subspecies, groups, or guilds.

Spore ~ A general term for a reproductive structure in fungi, bacteria, oomycetes, and cryptogams (analogous to the seed of a green plant).

Stand (tree stand) ~ An aggregation of trees occupying a specific area and sufficiently uniform in composition, age, arrangement, and condition to be distinguishable from the forest in adjoining areas.

Standards and guidelines ~ The rules and limits governing actions, as well as the principles specifying the environmental conditions or levels to be achieved and maintained; synonymous with measures and management direction.

Supplemental environmental impact statement (SEIS) ~ As defined by NEPA, a supplement to an existing EIS is prepared when: (1) the agency makes substantial changes to the proposed action that are relevant to environmental concerns; (2) there are significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts; or, (3) the agency determines that the purposes of NEPA would be furthered by doing so.

Surfaced roads ~ Rocked or paved roads.

Ultramafic ~ Igneous rocks composed chiefly of mafic minerals such as augite or olivine. A

general name for plutonic rocks with color index M greater than or equal to 90, including, among others, dunite, peridotite, and pyroxenite.

Understory ~ The trees and other woody species growing under the canopies of larger adjacent trees and other woody growth.

Upland ~ Out of (above) the riparian zone.

Watershed ~ That land area that is separated from other land areas by a divide, contributing water or snowmelt, organic material, sediments and nutrients to a stream; synonymous with catchment.

Wetlands ~ Areas that are inundated by surface or ground water with a frequency sufficient to support a prevalence of vegetative or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction. Wetlands generally include swamps, marshes, bogs, wet meadows, river overflows, mud flats, and natural ponds.

Wilderness ~ Areas designated by congressional action under the 1964 "Wilderness Act." Wilderness is defined as undeveloped Federal land retaining its primeval character and influence without permanent improvements or human habitation. Wilderness areas are protected and managed to preserve their natural conditions, which generally appear to have been affected primarily by the forces of nature with the imprint of human activity substantially unnoticeable; have outstanding opportunities for solitude or for a primitive and confined type of recreation; include at least 5,000 acres, or are of sufficient size to make practical their preservation, enjoyment, and use in an unimpaired condition; and may contain features of scientific, educational, scenic, or historical value as well as ecological and geologic interest.

Wildland fire ~ Any non-structure fire, other than prescribed fire, that occurs in the wildland.

Wildland fire suppression ~ An appropriate management response to wildland fire that results in curtailment of fire spread and eliminates all identified threats from the particular fire.

Reference Material Reprinted From the Final SEIS

Reference 1: Plant Associations Where Port-Orford-Cedar is Prominent in the Overstory

Within the POC range in Oregon and California, there are 64 plant associations where POC is prominent in the overstory. This includes all 59 POC plant associations with POC in their name, as well as 5 others where POC is common (not occurring in the plant association name, but occurring in the overstory data for a plant association at least 20 percent of the time). The area covered by these plant associations is approximately 104,200 acres, or about 34 percent of the total mapped POC acres. The number of such associations by geographic area and plant association group, as well as the average abundance of POC as indicated by percent cover, is shown in the following two tables (FSEIS, p. 3&4-55 and Tables 3&4-11 and 3&4-13).

Table R-1.—Number of plant associations containing Port-Orford-cedar by geographic area and plant association group

	Geographic Areas						
Plant association group	Northern Coast	Mid-Coast	Mid-Range Oregon	North Inland (OR/CA)	Mid-Range California	Southern Range	East Disjunct California
Upland	10	4		16	2	2	1
Ultramafic upland	1	5	17	9	19	11	
Riparian [1]				1	7	1	6
Ultramafic riparian			1	1	11	6	3

[1] Riparian zones were not specifically sampled to develop the plant association classification in Oregon; hence, the paucity of riparian associations for Oregon.

Table R-2.—Average abundance [as indicated by percent cover] of Port-Orford-ceder in plant association groups where Port-Orford-cedar is prominent in the overstory

Plant association group	% POC overstory cover	% total overstory cover	POC as % of total overstory cover	% POC understory cover	% total understory cover	POC as % of understory cover
Upland	27	78	35	15	27	56
Ultramafic upland	30	80	38	3	16	19
Riparian	37	87	43	4	14	29
Ultramafic riparian	37	74	50	6	15	40

Reference 2: Final SEIS Pathology Discussion of Disease Spread and Effectiveness of Management Techniques to Prevent Spread

The following portion of the Pathology discussion in the FSEIS (pp. 3&4-35–3&4-43) is presented here to aid project managers in their assessment of risk and the selection and evaluation of appropriate Management Practices to reduce the risk. It is presented here as a reference tool only. The information will not apply equally to all situations, and relative values will change as new information and experience is gathered over time.

How the Pathogen Spreads

PL spreads in several ways (Hansen et al. 2000; Zobel et al. 1985):

1) Over long distances via resting spores transported in infested plant material or soil;
2) locally via waterborne spores moving in ditches, streams, or overland flow; or
3) via mycelia growing across root contacts and grafts between infected and uninfected POC.

Initiation of infestation into new areas involves 1, above, and is most commonly associated with deposition of infested soil along a road or trail. Vehicles, equipment, animals, or humans on foot transport inoculum from previously infested areas (Hansen et al. 2000; Jules et al. 2002; Kliejunas 1994; Ritts 2003; Roth et al. 1972). A susceptible POC fairly close to the actual site where inoculum is deposited is needed—this is usually a POC growing close to the road (within 10 feet) or a cedar with its roots in the water close to the road-crossing in a case where the introduction involves deposition of inoculum directly in water. Jules et al. (2002) found indications that spores from an introduction into water at a road-crossing can spread to a tree as far downstream as 160 meters, but probability of any single introduction reaching such a distant tree is low. Probability decreases with distance from the point of introduction into the water. In addition to POC, Pacific yew is infected by PL on infrequent occasions (Kliejunas 1994). Observations and laboratory trials show that Pacific yew is much less susceptible than POC. Where it has been found infected, Pacific yew was growing in close association with many previously infected POC (Murray and Hansen 1997).

Once PL is successfully established, subsequent spread mostly involves number 2 listed previously. Under proper environmental conditions for the pathogen, spores produced on the initially infected POC are released and move downslope in overland water flow or streams, infecting additional trees whose roots are within the sphere of influence of the infested water (Hansen et al. 2000; Jules et al. 2002).

Root-to-root spread, number 3 listed previously, occurs in some cases (Gordon and Roth 1976), but is thought to be of much less significance in the epidemiology of the pathogen than spore spread in soil or water. It occurs in heavily-stocked stands with substantial POC components (many POC quite close together).

Infection by PL is greatly favored by cool conditions and requires the presence of water around POC roots for at least several hours (Zobel et al. 1985). Optimal temperatures for

infection are between 50 degrees and 68 degrees F (Trione 1974). Most POC are infected by the pathogen in the cool, wet parts of the year. Very little infection occurs in the dry, warm summer months.

Certain kinds of sites and microsites foster conditions especially favorable for spread and infection by PL (Goheen et al. 2000a; Hansen et al. 2000; Roth et al. 1987). These high-risk sites are low-lying wet areas (infested or not) that are located downslope from already infested areas or below likely sites for future introductions, especially roads. They include streams, drainage ditches, gullies, swamps, seeps, ponds, lakes, and concave low-lying areas where water collects during rainy weather. Areas not influenced by the wet conditions or periodic water flow that occurs in high-risk sites are low-risk sites. Cedars near streams or bodies of water whose roots do not extend below the high watermark for flooding are at low risk of infection. Riparian Reserve widths along a stream (as defined in the Northwest Forest Plan by site tree heights) often extend well beyond the high-risk widths for POC.

Probability of Long-Distance Spread and Establishment of P. lateralis in New, Previously Uninfested Areas

As already mentioned, long-distance spread of PL involves movement of resting spores. These spores can survive in infected POC roots and root fragments in the soil for at least 7 years after the host POC's death under ideal conditions (Hansen and Hamm 1996). Movement of spores with transport of nursery stock in infested soil was probably how PL was originally introduced into the natural range of POC (Roth et al. 1957). Long-distance spread in the forest today primarily involves movement of resting spores in soil adhering to vehicles or clinging to the feet of humans or animals.

When evaluating the likelihood of long-distance spread to and establishment of PL into a new area, consideration needs to be given to the probabilities that: (1) viable inoculum will be picked up at an infested source; (2) the inoculum will be carried to a particular uninfested area; (3) the inoculum will remain viable during transit; (4) the inoculum will be deposited in the new site; and (5) the inoculum deposited will infect a POC and disease establishment will result. A number of factors influence inoculum accession, spread, and establishment of PL, especially:

- Character of site of origin;
- type of carrier;
- time of year of transport event;
- distance traveled and associated time elapsed;
- effectiveness of management techniques applied to slow or prevent spread or prevent establishment of PL in new areas;
- character of site and stand conditions where the potential introduction occurs; and
- number of potential transport and introduction events.

Exact figures for determining the influence of each factor on the probability of long-distance spread and establishment are available in very few cases. However, relative probabilities between 1 (very low) and 10 (very high) have been determined for each factor. Based on the literature, and the professional judgments of forest pathologists with substantial amounts of experience evaluating PL in the laboratory and the field, it is suggested that probabilities of an event having the result under consideration are as follows.

1 = 0 to 2 percent	6 = 10.1 to 20 percent
2 = 2.1 to 4 percent	7 = 20.1 to 30 percent
3 = 4.1 to 6 percent	8 = 30.1 to 40 percent
4 = 6.1 to 8 percent	9 = 40.1 to 50 percent
5 = 8.1 to 10 percent	10 = 50.1 to 100 percent

The following is a discussion of each of the factors.

Character of site of origin. Potential carriers of PL entering a possible inoculum source area are more likely to pick up soil that contains viable inoculum in some kinds of sites than others. Inoculum clearly will not be available on a site with no infection while areas with obvious infection of POC where certain kinds of wet conditions prevail are the most likely places for inoculum to be acquired. Suggested probability figures for the likelihood of potential carriers picking up viable inoculum on different kinds of sites are:

Site with no evidence of root disease within the local drainage = 1;

site with no evidence of root disease in the area entered by the potential carrier, but evidence of root disease nearby (within 300 feet) in the same drainage = 2;

site with local evidence of root disease where the potential carrier does not enter water = 5;

site with local evidence of root disease where the potential carrier enters flowing water = 7; and

site with local evidence of root disease where the potential carrier enters a swamp, seep, or any-sized body of standing water = 10.

Type of carrier. Vehicles (both motorized and nonmotorized), equipment, humans on foot, and animals (especially cows, horses, and elk) have been implicated in carrying PL. Probability of successful spread is greater with the larger carriers, those that transport greater amounts of soil, those most likely to access infested areas, and those that can rapidly travel to new sites. Suggested figures for the probabilities that different kinds of carriers could pick up and transport infested soil are:

Earth moving equipment = 10;
large transport equipment = 9;
all-terrain vehicles = 8;
passenger vehicles = 7;
humans on foot or using nonmotorized vehicles = 5; and
large animals = 5.

Time of year of transport event. Likelihood of acquiring inoculum, successfully transporting it, and establishing disease at a new site are greatly favored by cool temperatures, and probability of infection is much greater during wet periods than dry ones. Also, inoculum is most likely to be picked up from an infested site during a wet period when infested soil is muddy and prone to adhere to the carrier. Probability of spread and establishment of new infections is greater with soil movement in late fall, winter, and early spring than summer, and

is greater in rainy rather than dry weather. Suggested probability figures are:

Movement between October 1 and May 31 during wet weather = 10;

movement between June 1 and September 30 during dry weather = 1;

movement between October 1 and May 31 during a dry period that lasts at least a week before and continues during the time of the movement = 3; and

movement between June 1 and September 30 during a rainy period of sufficient intensity to form puddles on a road or cause roadside ditches to flow = 6.

Distance traveled by carrier. Probability of successful delivery of viable inoculum from one site to another decreases with distance traveled and associated time elapsed since inoculum was picked up. Suggested probability figures are:

For vehicles

less than 0.5 mile = 10;
0.5 to 1 mile = 9;
1 to 5 miles = 8;
5 to 10 miles = 5;
10 to 20 miles = 3;
20 to 50 miles = 2;
greater than 50 miles = 1.

For animals and human foot traffic

less than 0.5 mile = 4;
0.5 to 1 mile = 2;
greater than 1 mile = 1.

Effectiveness of management techniques applied to prevent spread or prevent establishment of P. lateralis in new areas. A number of management techniques are recommended for preventing spread of PL or protecting uninfested areas (Betlejewski 1994; Goheen et al. 1997; Goheen et al. 2000a; Hadfield et al. 1986; Hansen et al. 2000; Hansen and Lewis 1997; Kliejunas 1994; Roth et al. 1987). Techniques considered for use in the EIS for managing POC root disease include:

a) Limiting activities to the dry season;
b) ceasing operations during significant rain events that happen during the dry season;
c) planning activities so that uninfested sites are accessed before infested sites;
d) using uninfested or treated water;
e) road management measures, especially improving road surfaces and drainage;
f) featuring POC on low-risk sites;
g) public information efforts;
h) prohibiting or regulating bough collecting and other special forest product harvests;
i) use of lowest risk logging systems in harvest operations;
j) vehicle washing;
k) roadside sanitation treatments;
l) seasonal road closures; and

m) permanent road closures or refraining from building roads into uninfested areas at all.

Virtually all of these techniques were originally suggested by Roth et al. (1957, 1972, 1987). Long-term observations (over 40 years in the case of Roth, a very active Oregon State University professor and PL researcher) suggested that no technique completely eliminated all possibility of PL spread, but that the ones listed did reduce probability of spread to varying degrees depending on how they were applied and what conditions prevailed at the time. It was suggested that most of the techniques should be used with others in integrated disease management strategies for best results. Unfortunately, PL is quite difficult to work with and definitive studies showing exactly how treatments effect actual PL inoculum loads have rarely been done.

Two types of effectiveness monitoring have been conducted with POC root disease: (1) field observations in and around treatment areas, and (2) use of POC seedling baits to determine occurrence and location of PL inoculum.

1) Field observation over time on sites in and around project areas where treatments have been conducted: A professional forester or forest technician visits the site several times to determine (a) if the prescription has been correctly implemented and (b) whether or not any evidence of POC mortality/PL infection has developed in or near the project area. Each project is given a rating of 1 to 5 for correct implementation after the project is complete. Each disease management technique is given a rating of 1 to 3 for effectiveness (1= not effective, 2= partially effective, 3= effective) based on combined results of root disease observations for all visits. The data below summarizes the average results for 70 multifaceted projects done on a variety of sites on the Siskiyou NF between 1994 and 1999.

Activity	Average Implementation Rating	Average Effectiveness Rating
Temporary road closures	4.4	2.5
Roadside sanitation	4.7	2.9
Vehicle washing	4.9	2.9
Dry season operations	4.3	2.9
Access avoiding infested areas	4.6	2.9
Entering units in priority	4.4	2.9
Minimizing risk by road location	4.6	2.4
Improving road surfaces	3.9	2.4
Directing water off roads	5.0	2.5
Preventing deposit of soil waste in uninfested areas	4.5	2.3
Dry season road maintenance and construction	4.5	2.9
Avoiding use of infested water sources	3.8	2.4

Results suggest that POC management activities in these prescriptions were usually implemented as planned and were perceived to be effective in many cases based on apparent lack of new infections observed in and around the project areas. Limiting project activities to dry seasons, planning access to avoid infested areas, entering uninfested areas before infested areas, vehicle washing, roadside sanitation, and limiting road construction and maintenance to dry seasons were deemed most effective of the kinds of activities evaluated. In most of the projects, several management techniques were used together. Apparent effectiveness may have been due more to the combined effects of several than to the individual treatments.

2) More intensive evaluations that monitor actual PL occurrence by use of POC seedling baits to determine presence of the pathogen: Unfortunately, in spite of considerable research, no accurate, easy, and quick soil assay technique for PL has been devised that can be used in the field. A baiting technique using POC seedlings has been developed and used by the Southwest Oregon Forest Insect and Disease Service Center. The baiting technique is fairly laborious. It takes about a month and a half for each reading and requires access to a laboratory for culturing to confirm presence of the pathogen. (Culturing does not have to be done from every seedling; only those that show atypical stain and a sub-sample of trees showing typical stain.) The baiting technique is being used to investigate effectiveness of two commonly employed but controversial POC management techniques: washing and roadside sanitation.

Goheen et al. (2000) compared PL inoculum levels on a large piece of equipment, a pickup truck, and a person's boots before and after an operational washing treatment. A road grader, a pickup, and a person wearing boots passed through a muddy PL infested area, were washed, proceeded further up the road, and were washed again. Water from each washing was collected in tubs and was baited with POC seedlings. After 6 weeks exposure, seedlings with their roots in the water from the first wash of the road grader exhibited an average infection level of 27.8 percent, those from the pickup, 41.2 percent, and those from the boots, 65.0 percent. Seedlings with their roots in the water from the second wash exhibited average infection levels of 2.2 percent for the road grader, 3.7 percent for the pickup, and 2.5 percent for the boots. Decreases in the percent of infected bait seedlings observed in the second wash were attributed to removal of inoculum by the first wash. Based on the results, the investigators suggested that: (a) washing did have the potential to decrease inoculum on contaminated vehicles or boots, (b) washing did not necessarily eliminate all inoculum, suggesting that the treatment should be combined with other treatments in a comprehensive disease management strategy, (c) contrary to a generally held belief at the time, washing boots as well as vehicles might be an important disease management technique in some situations, and (d) the logistics of vehicle washing need to be carefully considered (though potentially effective in reducing inoculum, washing needs to be done in the right places and in the right kind of washing stations, for example). In addition to showing differences associated with washing, this case study demonstrated through actual sampling and pathogen reisolation that PL inoculum can indeed be picked up on vehicles and feet and carried from an infested site to another location. Though this has long been assumed to be true based on numerous observations, it had not been demonstrated conclusively in the past.

Goheen and Marshall (Goheen, D.J., personal communication) have an evaluation in progress to monitor the effects of operational roadside sanitation treatments on inoculum levels in already infested areas. The evaluation has not yet been completed; it is planned to be continued until all sample units are followed for 10 years, but results so far are illustrative. Twelve PL infested roadside strips that have received sanitation treatments have been monitored by planting 100 POC seedlings in 10 transects as baits at each site. Each spring, seedlings have been planted in the same locations along transects, collected after 6 weeks, and assayed for infection. Preliminary results show the following average percentages of infected bait trees for the 12 sample areas:

Year	0	1	2	3	4	5	6	7	8
% infested	20	13	12	11	6	5	1	3	3

Based on these preliminary results, the investigators suggest that: (a) sanitation treatments in infested areas do cause decreases in roadside inoculum; (b) amount of inoculum decline increases with time after treatment, declining substantially after 4 years; (c) sanitation treatments should be used in integrated strategies with other kinds of disease management techniques; (d) use of roadside sanitation (at least in the case of treatments in already infested areas) should be done strategically. Sanitizing a road into a project area (in already infested stands) where activities are occurring at the same time or immediately after the sanitation treatment are not likely to be valuable. The best approach will involve sanitation treatments on major roads that have the potential to be used in many projects over substantial time periods and that also are frequently traveled by other forest users besides those actually involved in the agency projects, and (e) sanitation treatments need to be kept track of and repeated when new POC regeneration becomes established.

Some estimated probabilities of successful PL spread and establishment when certain management activities have been used include:

Exclusion — This involves protecting uninfested areas by excluding vehicle entry. It can be done by permanently closing existing roads and/or by not building roads into uninfested drainages or upper portions of drainages. Cross-country travel or trail use by animals or humans on foot or in off-highway vehicles can still result in introductions, but probability is low, especially if the distance to the closest infested area is greater than 1 mile. This is believed to be the single most effective treatment, and suggested probability figure if this management approach is used is 1.

Temporary road closure — This involves closing roads with gates or barriers to regulate timing and amount of use. Roads are closed when weather conditions are favorable for PL spread and may be open during other seasons of the year. Gates can be driven around, forced open, or destroyed by vandals, but many remain intact and prevent road use. In a sampling of gated closures done by the Southwest Oregon Forest Insect and Disease Service Center in November of 2000, 90 percent were intact and apparently effective in preventing entry. The suggested probability that a currently uninfested area will be protected if this management approach is used is 2.

Washing — This involves washing vehicles used in projects to remove infested soil before they are moved out of an infested area or before they are moved into an uninfested area. In some instances, tools and boots are also washed. Limitations on washing include the possibility of picking up new inoculum on an infested road after washing, and the inability of the Agencies to require vehicle washing of numerous vehicles that use the roads, but are not controlled by the Agencies. The suggested probability figure if this management approach is used by itself is 4.

Roadside sanitation — This treatment involves removing POC in buffer zones along both sides of roads. Objectives are either to (1) eliminate or minimize the amount of inoculum readily available for vehicle transport from already-infested roadsides, or (2) prevent/reduce new infections along roadsides in currently uninfested areas. The basis for this kind of treatment is the fact that PL only infects living POC roots (Zobel et al. 1985). PL can survive for a time in already infected roots after a POC dies, but it cannot colonize the roots of already dead POC. The objective of the treatment is to create a zone along roads where live POC roots are absent. The suggested probability figure to

decrease inoculum if this management approach alone is used on already infested roads is initially 8, dropping to 5 in 4 years after the treatment. Probability can increase again if roadsides are not monitored and treated again when/if POC regenerates on the site. However, if POC exclusion is successfully carried out, the probability drops to 1 after 7 years.

Integrated management — Employing a planned combination of treatments can reduce probability of long-distance spread more than single kinds of treatment. An integrated treatment program that uses a combination of sanitation treatments, vehicle washing treatments, road drainage improvements, timing of activities during dry seasons, using certified clean or Clorox bleach-treated water, scheduling treatments in uninfested before infested areas, regulation of special use activities such as cedar bough collecting, and public education efforts has a suggested probability of 2. If such treatments are combined with road closures, the suggested probability is 1. If combined with permanent road closure, probability by this system is 1, but protection is more effective than if only the closure by itself was used. Probabilities with an integrated management approach would be slightly higher in situations where some of the management techniques could not be used (for example, in a situation where a large wildfire was burning and safety and suppression success considerations prevented use of some of the techniques that might normally be used).

Character of site and stand conditions where the potential introduction event occurs. Introduction of inoculum and establishment of disease in a new, previously uninfested site is influenced by site characteristics as well as occurrence, numbers, and distribution of POC. If carriers deposit viable inoculum on a wet site with POC nearby, and when there are numerous additional cedars downslope in high-risk sites, probability of disease establishment is high. Clearly, depositing inoculum in sites with no POC and no mechanism for moving the inoculum to any POC is low (1). When inoculum is deposited along a road, probability is highest when there are wet conditions and at least some POC within 10 feet (8). When cedars occur more than 10 feet from the road, but less than 50 feet away, predicted probability drops to 4. When inoculum is introduced directly into water at a stream crossing or ditch, probability of establishment is high (8) if there are POC with their roots in water downstream within 50 feet. For similarly situated POC between 50 and 100 feet from the road, probability would be 4. Jules et al. (2002), in their dendrocronological study, indicated that there was evidence of initial infections as far as 525 feet down a stream; however, by the nature of their study, they were unable to evaluate small trees that had died many years before and were no longer detectable on the sites. It is possible that what they viewed as a single spore infection event actually was a several-stage event initially involving small trees closer to the road. Nevertheless, this suggests a probability of 2 for potential introductions in stream crossings if there are no POC in the first 100 feet, but cedars do occur in the subsequent 500 feet.

Number of potential transport and introduction events. The probability figures provided above can be used together to evaluate the relative likelihood of various long-distance PL spread/establishment scenarios involving individual potential carriers. The number of potential transporting events should also be taken into account when evaluating possibility of new introductions. Very low probability events become more likely to occur when they are repeated, and especially so if they are repeated many times.

Reference 3: Clorox Label Information

The following information copied verbatim from the Clorox label is pertinent to POC root disease control (FSEIS, Appendix 4).

ULTRA CLOROX ® BRAND REGULAR BLEACH (EPA Reg. No. 5813-50)
FOR PORT ORFORD CEDAR ROOT DISEASE (Phytophthora lateralis) TREATMENT USE

When used as directed, this product is effective in controlling the spread of the fatal fungus Phytophthora lateralis [Port Orford Cedar Root Disease] in areas of California and Oregon where Port Orford Cedar (Chamaecyparis lawsoniana) grows.

Water is commonly drafted from streams and fire ponds within forested areas to use in dust abatement on forest roads, equipment cleaning, and for fire suppression. The water source can spread the root disease fungus to uninfested areas. Treating water prior to use helps control the spread of the fungus.

Directions for Use: Add 1 gallon this product to 1000 gallons (~50 parts per million available chlorine) of drafted water. Prepare the mixture at least 5 minutes prior to application for dust abatement; fire suppression; and cleaning trucks, and logging, road building, and maintenance equipment. [FSEIS-adopted mitigation measure: To reduce the likelihood of getting Clorox in streams, add Clorox to fire trucks and road watering equipment only after they have left the stream area where they were just filled.]

DILUTION TABLE

Approximate available Chlorine	Volume of Bleach	Volume of Water
50	16 drops	1 quart
	¾ tsp.	1 gallon
	1 Tbsp. (1/2 oz)	4 ½ gallons
	2 ½ Tbsp.	10 gallons

PRECAUTIONARY STATEMENTS: HAZARDS TO HUMANS AND DOMESTIC ANIMALS

DANGER: CORROSIVE
May cause severe irritation or damage to eyes and skin. Harmful if swallowed. Protect eyes when handling. For prolonged use, wear gloves. Wash after contact with product. Avoid breathing vapors and use only in a well-ventilated area.

FIRST AID IF IN EYES: Rinse with plenty of water for 15 minutes. Get prompt medical attention. IF SWALLOWED: Drink large amounts of water. DO NOT induce vomiting. Call a physician or poison control center immediately. IF IN CONTACT WITH SKIN: wash skin thoroughly with water.

PHYSICAL OR CHEMICAL HAZARDS: Product contains a strong oxidizer. Always flush drains before and after use. Do not use or mix with other household chemicals, such as toilet bowl cleaners, rust removers, acids, or products containing ammonia. To do so will release hazardous irritating gases. Prolonged contact with metal may cause pitting or discoloration.

For Institutional use only:
ENVIRONMENTAL HAZARDS: Do not discharge effluent containing this product into lakes, ponds, estuaries, oceans or other waters unless in accordance with the requirements of a National Pollutant Discharge System (NPDES) permit and the permitting authority has been notified in writing prior to discharge.

STORAGE AND DISPOSAL: Store this product upright in a cool, dry area, away from direct sunlight and heat to avoid deterioration. In case of spill, flood areas with large quantities of water. Small quantities of spilled or unusable product should be diluted with water before disposal in a sanitary sewer. Do not reuse empty container, but rinse and place in trash or recycle where facilities accept colored HDPE bottles. Do not contaminate water, food, or feed by storage, disposal or use of this product. Store away from children. Reclose cap tightly after each use. Offer empty container for recycling. If recycling is not available, discard container in trash. DO NOT allow product [and/or rinsate] to enter storm drains, lakes, streams, or other bodies of water.

CLOROX CUSTOMER ASSISTANCE (800) 292-2200

Reference 4: Final SEIS 100-year P. lateralis Spread Prediction for the Selected Alternative

A question in the Monitoring section of the Land and Resource Management Plan Amendment asks if the spread or non-spread of the disease significantly departed from the predictions made in the FSEIS that were used to select this management strategy. The following is the 100-year PL spread prediction applicable to the selected alternative, Alternative 2 (FSEIS, p. 3&4-53, Table 3&4-10).

Table R-3.—100-year infestation prediction for Oregon for Alternative 2

% of risk region high risk	Currently infested high-risk area [as % of risk region]	Uninfested high-risk area [as % of risk region]	% of uninfested high-risk areas predicted to become infested [new] in 100 years	Uninfested high-risk areas predicted to become infested [as % of risk region]	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]	Total [new and current] area to be infested in 100 years [as % of high-risk areas only]
North Coast Risk Region [126,248 acres]							
20	15	5	30	2	17 [Current]	20,800 [18,900]	82 [75]
Siskiyou Risk Region [116,374 acres]							
40	11	31	30	9	20 [Current]	23,600 [12,800]	51 [27]
Inland Siskiyou Risk Region [29,341 acres]							
60	9	51	30	15	24 [Current]	7,100 [2,600]	40 [15]
Totals [271,963 acres]							
33	13	21	30	6	19 [Current]	51,600 [34,400]	58 [38]