PROPOSAL JUSTIFICATIONS

Proposal to further delineate pest free areas of pine pitch canker (*Fusarium circinatum* (syn. *Fusarium subglutinans* f sp. *pini*)) in California, USA.

Proposal to delineate the world wide area of infestation of *Phytophthora ramorum* (Sudden Oak Death).

13 December 2002

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1. BACKGROUND

1.1 Proposal for PPC Free Areas within California

1.1.1 The current import requirements for *Pseudotsuga menziesii* nursery stock require that the imported material be sourced from a Pine Pitch Canker (PPC) free area. A list of areas MAF considers to be free of PPC was widely circulated by MAF in 1998 as part of the *Pinus* spp. and *Pseudotsuga menziesii* seed for sowing standards. At that time a number of seed and nursery stock importers pointed out that California, listed as not free of PPC, is a big area and zones within California could be considered PPC free. MAF agreed at that time to consider proposals to import host materials from these areas on a case by case basis.

1.1.2 A report completed 2 September 2002 proposed that a single county within California (Butte County) be approved as an area considered by MAF to be free of PPC for the import of *Pseudotsuga menziesii* nursery stock material (only). The Director, Forest Biosecurity subsequently approved that proposal.

1.1.3 It is now proposed to extend the areas considered by MAF to be free of PPC to include a number of other counties within California. The extension is designed to adequately capture the areas from which importers wish to source their *Pseudotsuga menziesii* nursery stock material. The principles applied in the original proposal for Butte County are considered to be applicable in this instance also.

1.2 Proposal to establish SOD Free Areas

1.2.1 Sudden Oak Death (SOD) disease, believed to be caused by the pathogen *Phytophthora ramorum*, is an emerging disease inflicting considerable mortality to the North American oak forests within California. While the pathogen is not believed to infect *Pinus* species, recent reports suggest both Redwood (*Sequoia sempervirens*) and Douglas Fir (*Pseudotsuga menziesii*) are susceptible to infection by the *Phytophthora ramorum*.

1.2.2 Information about this disease is incomplete, hampering MAF's ability to predict the impact this pest may have on New Zealand and the measures that would be effective in ensuring the causal fungus was unlikely to enter and/or establish in New Zealand.

1.2.3 Until sufficient information is available to allow an assessment to be completed on the efficacy of any treatments that might be applied, the phytosanitary measures of "area freedom" should be required where general heat treatments (70^{O}C core temperature for 4 hours) can not be applied.

1.2.4 MAF must establish what areas can be considered pest free before accepting an area-freedom declaration.

1.3 Definition of Pest Free Areas

1.3.1 An area can be considered a pest free area if it meets the requirements of ISPM 4: Requirements for the Establishment of Pest Free Areas (1996). Requesting that an NPPO confirm the pest free status of the area within which the nurseries are situated is

currently a standard requirement for all imported PPC-host material regardless of whether MAF considers the area to be free of the pathogen. Areas with well developed pest surveillance or monitoring systems can often give area-freedom assurances in smaller regions within a country or state.

2 AREA FREEDOM ASSESSMENT FOR PPC IN CALIFORNIA, USA

2.1 Introduction

2.1.1 The proposal is that MAF allow imported *Pseudotsuga menziesii* propagative material to come from areas within California that are not immediately adjacent to an area known to be infested with PPC.

2.1.2 The counties within California nominated to be accepted as being free of PPC all have a buffer zone (at least one county) between them and a county known to be infested with PPC (see Appendix 1, figure 1). The proposed "area free" counties include:

Del Norte	Siskiyou	Modoc	Shasta
Lassen	Plumas	Butte	Sierra
Yuba	Placer	El Dorado	Amador
Tulare	Inyo	Mariposa	Nevada
Calaveras	Alpine	Tuolumne	Mono

2.2 Risk Assessment of Surface Contamination by PPC Spores

2.2.1 The likelihood of *Pseudotsuga menziesii* scion material acting as a vector for establishment of PPC in New Zealand can be summarised as follows:

The likelihood of this* Pseudotsuga menziesii *scion material being infected with PPC
X
The likelihood of the infected material leading to the establishment of PPC in New Zealand

2.2.2 There are a number of factors supporting the acceptance of county area-freedom within California for PPC on *Pseudotsuga menziesii* propagative material:

- The distribution of PPC within California has been extensively studied and seems to be restricted to coastal areas or areas with a coastal climate.
- Spread of PPC in California is thought to be principally through insect vectors and therefore unlikely to naturally spread quickly over large distances.
- The selected counties are no closer than 100 km from the nearest known site of infestation, and do not have coastal type climates.
- It seems that the coastal provenance *Pseudotsuga menziesii* are either resistant to PPC, or sufficiently resistant to ensure that only trees in relatively close proximity to PPC-infected pines are likely to become infected.
- The inoculate source for the spread of PPC international seems to have been restricted to infested material imported for propagation from infested areas.

2.2.3 There are a number of factors against accepting county area-freedom within California for PPC on *Pseudotsuga menziesii* propagative material:

- Infective spores of PPC have been shown to be wind dispersed requiring, in California at least, insect wounding to affect infection.
- Little work has been done on spore load requirements for infection and wind dispersal patterns from infected areas.
- It is often difficult to distinguish disease symptoms from harvest or pruning damage on trees in seed orchards, reducing the chances of detecting PPC infection.
- Partially resistant *Pseudotsuga menziesii* may not show any symptoms unless inoculate load is very high. It therefore may be possible that infection of *Pseudotsuga menziesii* may be going undetected in areas distant from infected *Pinus* trees, or in post-entry quarantine within New Zealand.
- *Pseudotsuga menziesii* may be a symptom-less carrier of the fungus.

2.2.4 It is important to separate risks from imported nursery stock in general from the risks associated with scions of *Pseudotsuga menziesii*. Any nursery stock imported from areas adjacent to PPC-infected trees may be coated in PPC spores. Used machinery imported from these areas may also have spores attached to their outer surfaces. Currently New Zealand has no specific phytosanitary measures against PPC on non-host material. Therefore the import of *Pseudotsuga menziesii* scion material should not be prohibited solely on the basis of potential surface contamination by PPC spores.

2.2.4 That being said, one of the import requirements for the *Pseudotsuga menziesii* scion material is that it be dipped or sprayed to soaking in a contact fungicide effective against *Fusarium* spores. This treatment, if carried out appropriately, should all but eliminate the risk of surface contamination by viable PPC spores.

2.3 Risk Assessment of Symptom-less PPC infection

2.3.1 The risk that is unique to *Pseudotsuga menziesii* (and other potential host plants) is that the plant itself may act as a vector for the fungus into New Zealand. The status of coastal *Pseudotsuga menziesii* as a host is in doubt. The lack of evidence of infection or symptoms of infection in the field suggests that coastal *Pseudotsuga menziesii* is either mostly resistant to PPC or acts as a symptom-less host of the disease.

2.3.2 For *Pseudotsuga menziesii* nursery stock to act as a vector for the introduction of PPC into New Zealand, it must be able to act as a source of inoculates for the infection of other host plants. While *Pseudotsuga menziesii* may act as a host, if it remains symptom-less there would be little opportunity for PPC to spread within New Zealand from an infected tree.

3 PHYTOSANITARY MEASURES FOR IMPORTED *PSEUDOTSUGA MENZIESII* SCION MATERIAL

3.1 Introduction

3.1.1 The import requirements detailed in Appendix 2 are equivalent to or exceed the requirements currently specified for *Pseudotsuga menziesii* scion material in MAF Standard 155.02.06: Importation of Nursery Stock.

3.2 Pre export measures

3.2.1 PPC free area declaration on phytosanitary certificate: This declaration, if made in compliance with ISPM 4, would ensure that there are no infective sources of PPC within the area from which the scion material has been collected.

3.2.2 Scion material should be healthy and be collected from trees showing no visible signs of disease: This should reduce the likelihood of the scion material being diseased.

3.3 Measures on arrival in New Zealand

3.3.1 Fungicide treatment: The addition of both contact and systemic fungicides before planting in quarantine will significantly reduce the risk of the scion material being infected with PPC

3.3.2 Testing for PPC in tissue samples taken from the quarantine material imported from California, and showing symptoms of fungal infection, should also reduce the likelihood that infected material will be released into New Zealand.

3.4 Summary

3.4.1 While these measures will reduce the likelihood of *Pseudotsuga menziesii* scion material vectoring PPC into New Zealand, the risk still exists that the scion material will act as a symptom-less host and a source of inoculate in future years. This is true for any imported Douglas Fir scion material, but the risk could be considered to increase the closer the parent trees are to a source of inoculate. The question that can not be easily answered at this time is "does *Pseudotsuga menziesii* scion material 100km (or so) from a known inoculate source pose a significantly greater and therefore unacceptable risk to New Zealand biosecurity than similar material 500km from an inoculate source?"

4 AREA FREEDOM ASSESSMENT FOR SUDDEN OAK DEATH

4.1 Introduction

4.1.1 The proposal is that MAF designates areas as being free of the pathogen thought to be primarily responsible for Sudden Oak Death (SOD), namely *Phytophthora ramorum*.

4.1.2 As this is a new emerging disease details of its distribution in most areas is limited. It is proposed those countries or regions either known to be contaminated by *Phytophthora ramorum* or showing evidence of SOD infestation will not be considered pest free areas. Should an infested country or region employ what MAF considers to be suitable or adequate pest surveillance system to monitor the distribution of SOD, MAF may consider areas within the country or region to be free of SOD.

4.2 Known or believed distribution of SOD or *Phytophthora ramorum*

4.2.1 The following countries or regions have, as of October 2002, been recorded as having either SOD or the causative pathogen *Phytophthora ramorum*:

- USA (California, Oregon)
- EU (Germany, Netherlands, Poland, Spain, United Kingdom)

Figure 2 in Appendix 1 further delineates the proposed areas within the USA that can not be considered free of SOD or the causative pathogen *Phytophthora ramorum*. The acceptance of a restricted distribution in California and Oregon is primarily based on the high level of active surveillance for SOD within these areas and the wide availability of host (and therefore indicative) material.

4.2.2 The following countries or regions have surveillance systems that MAF considers adequate in providing New Zealand MAF with assurance that they are (as of October 2002) free of either SOD or the causative pathogen *Phytophthora ramorum*:

- Australia
- Canada
- South Africa
- Israel

4.2.3 New Zealand is currently considered free of SOD or the causative pathogen *Phytophthora ramorum*. MAF Forest Biosecurity and the forest industry base New Zealand's country freedom status on the use of an extensive risk site and general surveillance system.

4.2.4 For overseas countries or regions it should be noted that the distribution of SOD and/or the causative pathogen *Phytophthora ramorum* is expanding. The increasing distribution is occurring as a result of either natural or human assisted spread, or as surveys are undertaken and biosecurity authorities world-wide become more aware of the disease. MAF intends to monitor the progress of the disease internationally and update the distribution list when new information becomes available.

4.3 Biology of SOD or *Phytophthora ramorum*

4.3.1 Sudden Oak Death first came to prominence in California on several North American species of oak, namely coast live oak (*Quercus agrifolia*) and California black oak (*Quercus kelloggii*), as well as tanoak (*Lithocarpus densiflorus*). The organism thought responsible for SOD, *Phytophthora ramorum*, was first identified from Rhododendron in Europe (Germany and Netherlands) as early as 1993.

4.3.2 On many emergent tree species SOD is characterised by a rapid decline and the development of bleeding or oozing of cankers on the lower trunk. The cankers eventually kill the tree by attacking the phloem and girdling the trunk. On understory shrubs, vines or some small trees the symptoms may also include leave spotting and/or dieback possibly leading to plant mortality.

4.3.3 A number of plant species are now believed either to act as natural hosts for *Phytophthora ramorum*, or are at least susceptible to infection by the pathogen. There are now 17 species considered natural hosts from 10 families of plants (see table 1).

Table 1: Confirmed Natural Hosts of *Phytophthora ramorum* (October 2002)

Plant Family	Scientific name	Common name(s)	Reference
Fagaceae (beech)	*Lithocarpus densiflorus*	Tanoak, tanbark oak	Storer et. al., 2001
	Quercus agrifolia	Coast live oak	Storer et. al., 2001
	Quercus parvula var. *shrevei*	Shreve's oak	Storer et. al., 2001
	Quercus kelloggii	Black oak	Storer et. al., 2001
Ericaceae (heath)	*Vaccinium ovatum*	Huckleberry	Storer et. al., 2001
	Rhododendron spp.	Rhododendron, azalea	Storer et. al., 2001
	Arbutus menziesii	Pacific madrone	COMTF
	Arctostaphylos manzanita	Manzanita	COMTF
Aceraceae (maples)	*Acer macrophyllum*	Big leaf maple	COMTF
Hippocastanaceae	*Aesculus californica*	California buckeye	COMTF
Lauraceae (laurel)	*Umbellularia californica*	California bay laurel	COMTF
Caprifoliaceae (honeysuckle)	*Viburnum x bodnantense*	Hybrid viburnum	COMTF
	Lonicera hispidula	California honeysuckle	COMTF
Rosaceae (rose)	*Heteromeles arbutifolia*	Christmas berry, toyon	COMTF
Rhamnaceae (buckthorn)	*Rhamus californica*	Coffeeberry	COMTF
Pinaceae (pines)	*Pseudotsuga menziesii*	Douglas fir	COMTF
Cupressaceae	*Sequoia sempervirens*	Coast redwood	COMTF

4.3.4 The life cycle of the pathogen *Phytophthora ramorum* is somewhat unusual for an Oomycete. It seems that the fungus principally infects the aerial portions of the host plants. It is believed that an inoculate build up develops in the leaves of understory hosts in cool damp conditions. The reservoir of inoculum then infects the woody tissues of the emergent trees.

4.3.5 *Phytophthora ramorum* produces both thick-walled chlamydospores and mobile zoospores. While zoospores are usually distributed by rain water the presence of cankers as high as 20 metres from the ground suggests some form of airborne dispersal is likely, either by air currents or by insects (or both).

4.3.6 Long distance dispersal of the causal fungus *Phytophthora ramorum* is likely to be restricted to the movement of nursery stock material from an infected host. Initial investigations suggest that the fungus will not sporulate from infected wood, and seeds

are not likely to become infected. While soil is also not likely to cause long distance spread of the pathogen, normal precautions against soil should be sufficient to appropriately manage any risk.

4.4 Assessment of Risks of Establishing Pest Free Areas for SOD

4.4.1 As already mentioned in the introduction (section 1.1.1), as little is known about SOD disease, unless the general wood heat treatment for fungal infection (70^{O}C for 4 hours core temperature) can be applied, "area freedom" from *Phytophthora ramorum* is the only other phytosanitary measure that can at this time be considered effective.

4.4.2 Factors in favour of establishing areas or regions considered by MAF to be free of *Phytophthora ramorum*:

- Symptoms of the disease are obvious during certain (wetter) periods of the year.
- Dispersal of the causal pathogen (*Phytophthora ramorum*) is likely to be relatively restricted in natural ecosystems.
- Spread and/or establishment of the disease may be climate dependent.
- The main host materials (nursery stock) all require a period of post entry quarantine in New Zealand. Given the virulence of the disease on the known hosts, it is likely that disease symptoms would become apparent during the minimum 3-month quarantine period.

4.4.3 Factors against establishing areas or regions considered by MAF to be free of *Phytophthora ramorum*:

- Infective spores of *Phytophthora ramorum* may be wind dispersed.
- It is often difficult to distinguish disease symptoms of SOD from other common diseases of the host plants.
- The host range is as yet not fully understood, and a number of symptom-less hosts may exist.

5 PHYTOSANITARY MEASURES FOR HOST MATERIALS OF *PHYTOPHTHORA RAMORUM*

5.1 Introduction

5.1.1 The import requirements for a number of potential host materials are detailed separately below. At this stage only the phytosanitary measures for the host nursery stock materials will vary from current import requirements.

5.2 Nursery Stock from Host Plants

5.2.1 All nursery stock from plants that may host the pathogen *Phytophthora ramorum* should be accompanied by a phytosanitary certificate stating that the material within the consignment originated from an area free of SOD disease or the causative fungus *Phytophthora ramorum*. This declaration, if made in compliance with ISPM 4, would ensure that there are no infective sources of PPC within the area from which the scion material has been collected.

5.2.2 The nursery stock material should also be healthy and be collected from plants/trees showing no visible signs of disease.

5.2.3 The phytosanitary measure above should be required in combination with all other current phytosanitary requirements for nursery stock material entering New Zealand. This includes conditions on the packaging media, cleanliness of the consignment, and fungicidal treatments prior to entering quarantine.

5.3 Wood from Host Plants

5.3.1 All wood must be free of bark or either heat treated for 70^{O}C for 4 hours (core temperature) or fumigated with methyl bromide.

5.3.2 Wood showing signs of fungal infection (including cankers) must be heat-treated for 70^{O}C for 4 hours (core temperature).

5.4 Machinery used in Forestry Activities (Pre-Border)

5.4.1 All imported machinery that has been used in forestry or forest related activities must be clean before entering New Zealand.

5.5 Summary of risk

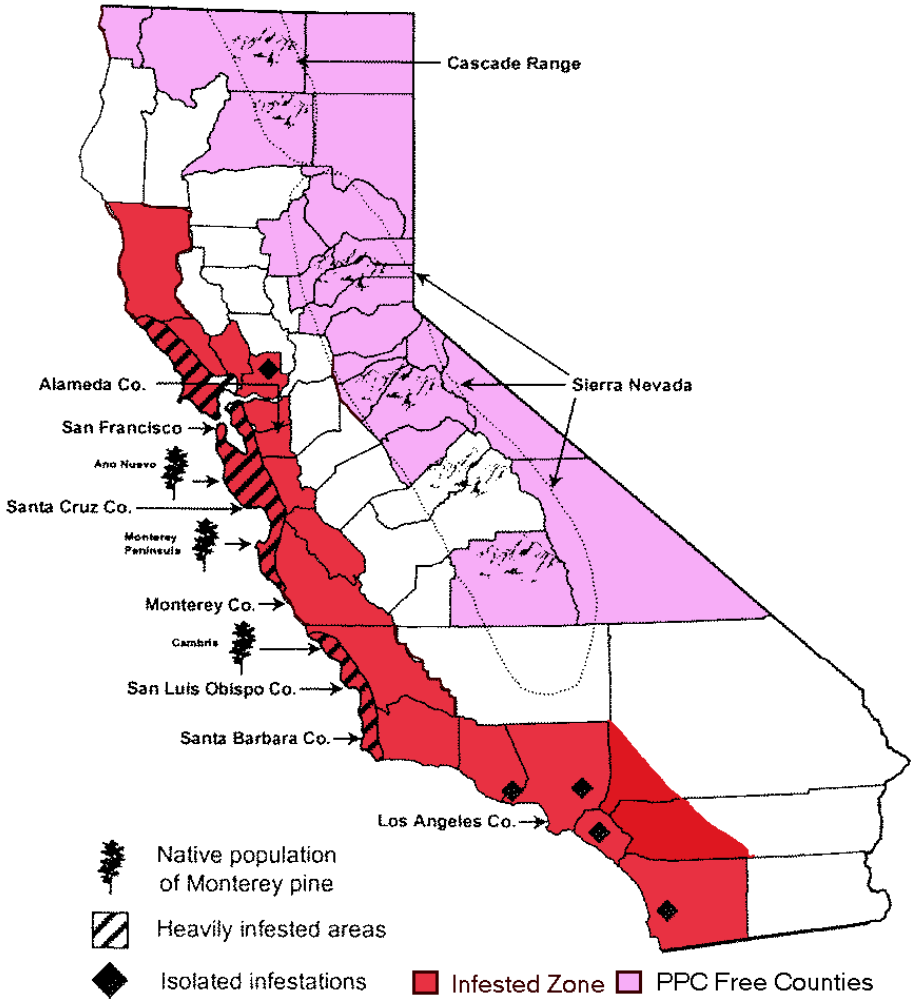
5.5.1 As mentioned in the introductory section, SOD is an emerging disease and much has still to be discovered about its aetiology. Requiring area freedom from the disease or its causative fungus at this time should effectively mitigate the risk of the disease entering and establishing in New Zealand from imported host nursery stock material. The proposal to establish MAF approved pest free areas provides a framework within which the importation of host materials can be managed by applying the pest free area or equivalent requirement.

6 REFERENCES

- COMTF. California Oak Mortality Task Force web-site: http://www.cnr.berkeley.edu/comtf/
- Gadgil, P., Dick, M., Simpson, J., Bain, J., Ridley, G., Wylie, R. (2001): Management Plan for Response to an Incursion of Pine Pitch Canker in Australia and New Zealand. Prepared for the Standing Committee on Forestry. ~100pp
- Gordon, T. R., Storer, A. J., Wood, D. L. (2001): The Pitch Canker Epidemic in California. Plant Disease. 85. 1128-1139
- ISPM 4: Requirements for the Establishment of Pest Free Areas (1996). http://www.ippc.int/cds_ippc/IPP/En/default.htm
- Storer, A. J., Keirnan, K. E., Palkovsky, N. K., Hagen, B. W., Slaughter, G. W., Kelly N. M., Svihra, P. (2001). Sudden Oak Death: Diagnosis and Management. University of California, Co-operative Extension in Marin County. Pest Alert #5. 12 pp.
- Rizzo, D.M., Garbelotto, M., Davidson, M. J., Slaughter, G. W., Koike, S. T. (2002). Phytophthora ramorum as the Cause of Extensive Mortality of Quercus spp. and Lithocarpus densiflorus in California. Plant Disease 86, 205-214.

Appendix 1: Maps of PCC and SOD distribution in or near California

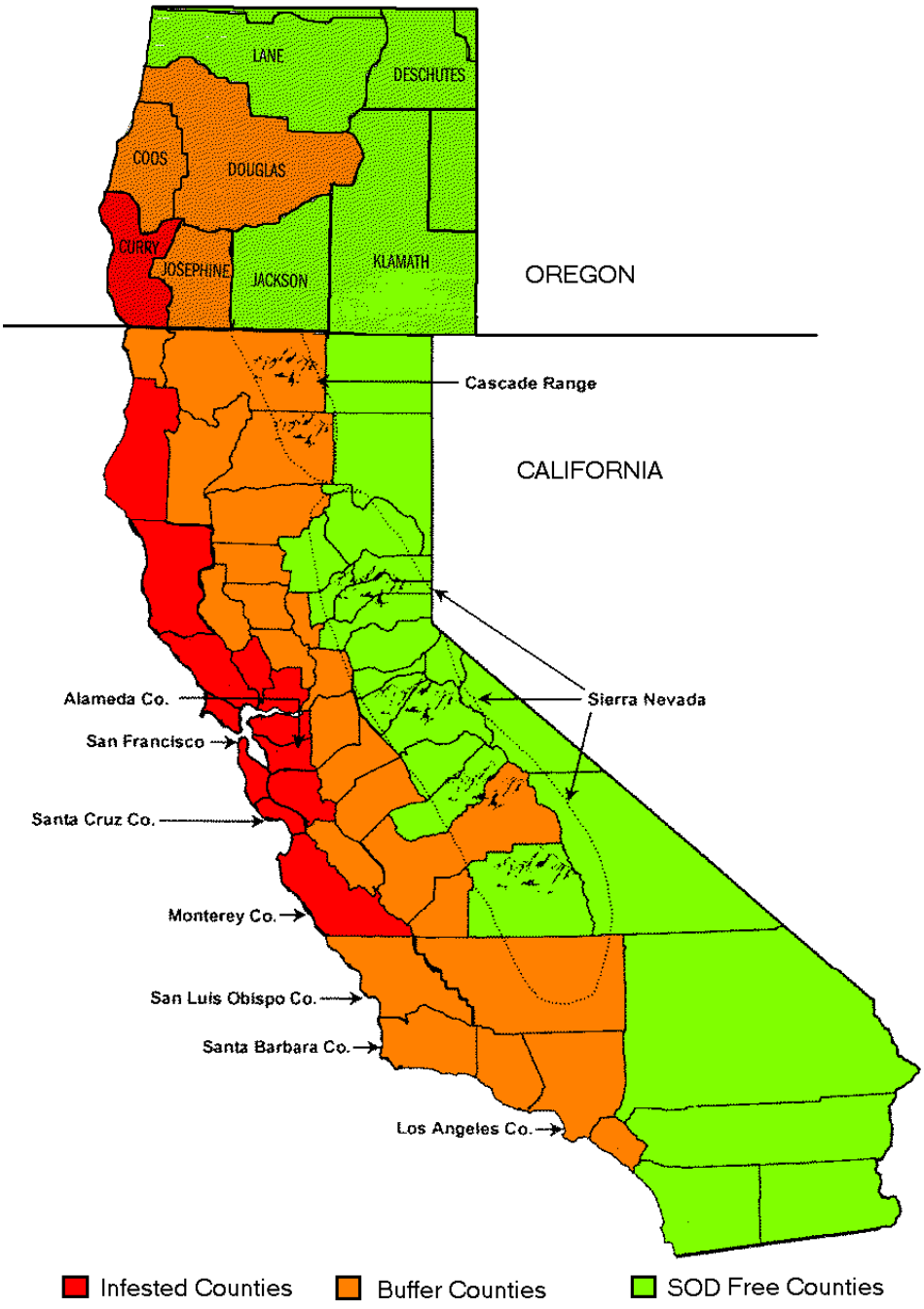
Fig 1: Pine Pitch Canker Distribution in California



(From Gordon, T. R., Storer, A. J., Wood, D. L. (2001), with colour added)

The red coloured area is the "Coastal Pitch Canker Zone of Infestation" established by the State Board of Forestry in California. The zone encompasses all infested areas, adjacent areas that are expected to also become infested in the near future, and a buffer zone around such areas. Movement of host material is restricted within and from this zone. The light purple area includes the counties that are being considered for PPC pest free areas status.

Fig 2: Sudden Oak Death Distribution in California and Oregon



Appendix 2: Import Requirements for Douglas Fir (*Pseudotsuga menziesii*) Bud Wood (Scion)

PART 1: PRE-SHIPMENT REQUIREMENTS

I. REQUIRED DOCUMENTATION

Permit to Import

A permit to import must be obtained from MAF prior to importing *Pseudotsuga menziesii* bud wood material into New Zealand. A completed application form (http://www.maf.govt.nz/biosecurity/imports/forests/) must be returned to National Adviser, Import Health Standard, Forest Biosecurity, MAF Biosecurity Authority, P.O. Box 2526 Wellington.

Phytosanitary Certificate

A completed phytosanitary certificate issued by the exporting country NPPO is required for all nursery stock.

The phytosanitary certificate must contain all information as detailed in the "model phytosanitary certificate" (ISPM # 12: Guidelines for phytosanitary certificates, IPPC, FAO, 2001: found on the IPPC web site, http://www.ippc.int/cds_ippc/IPP/En/default.htm).

II. PRE-SHIPMENT PHYTOSANITARY ACTIONS

Pseudotsuga menziesii bud wood can only be imported from areas considered by MAF to be free of Pine Pitch Canker (*Fusarium circinatum*) (see Appendix 3).

Pre-Shipment Inspection and Treatment Requirements

The exporting country's NPPO must inspect the *Pseudotsuga menziesii* bud wood material for visually detectable pests. Should regulated pests be detected, the consignment must be either rejected for export to New Zealand or undergo a treatment effective against the detected pests prior to shipment.

Before a phytosanitary certificate is to be issued, the exporting country NPPO must be satisfied that the following activities required by New Zealand MAF (NZ MAF) have been undertaken.

The *Pseudotsuga menziesii* bud wood have been:

- inspected in accordance with appropriate official procedures and found to be free of any visually detectable regulated pests.

AND

- sourced from pest free areas that are, as verified by pest surveillance methods (in accordance with the ISPM # 4; Requirements for the Establishment of Pest Free Areas, IPPC, FAO, 1996), free from *Fusarium circinatum* (syn. *Fusarium subglutinans* f sp. *pini*) and from Sudden Oak Death disease or its causative fungus *Phytophthora ramorum* (see Appendix 3 for MAF approved pest free areas).

AND

- sourced from areas (as per ISPM # 4; Requirements for the Establishment of Pest Free Areas, IPPC, FAO, 1996) or production sites (as per ISPM # 10: Requirements for the Establishment of Pest Free Places of Production and Pest Free Production Sites, IPPC, FAO, 1999) free of *Heterobasidion annosum* (anamorph *Spiniger meineckellum*), *Phellinus weirii,* and *Sirococcus conigenus*.

AND

- sprayed/dipped in MAF approved contact and systemic fungicides (refer to Approved Treatments in Appendix 2: Part 2) within 7 days prior to shipment.

AND

- sprayed/dipped in MAF approved contact and systemic insecticides and mineral oil (refer to Approved Treatments in Appendix 2: Part 2) within 7 days prior to shipment.

AND

- sprayed/dipped in a MAF approved miticide (refer to Approved Treatments in Appendix 2: Part 2) within 7 days prior to shipment.

Note 1: Treatment may occur on arrival in New Zealand at a registered Transitional Facility (New Zealand Ministry of Agriculture and Forestry Regulatory Authority Standard 152.04.03F: Requirements for Holding and Processing Facilities for Uncleared Risk Goods). To avoid delays on arrival, treatment arrangements should be made by the importer prior to arrival.

Note 2: Should certifying countries wish to use of what may be considered an equivalent phytosanitary measure, they must first apply to New Zealand MAF to have the measure approved for use.

Additional declarations to the phytosanitary certificate

If satisfied that the pre-shipment activities have been undertaken, the exporting country NPPO must confirm this by providing the following additional declarations to the phytosanitary certificate:

"The *Pseudotsuga menziesii* bud wood in this consignment have been:

- inspected in accordance with appropriate official procedures and found to be free of any visually detectable regulated pests, and to conform with the current phytosanitary requirements of NZ MAF."

  NOTE: This additional declaration is not required if the phytosanitary certificate issued by the NPPO is in accordance with the "model phytosanitary certificate" (ISPM # 12: Guidelines for phytosanitary certificates: found on the IPPC web site, http://www.ippc.int/cds_ippc/IPP/En/default.htm).

AND

- sourced from pest free areas that are, as verified by pest surveillance methods (in accordance with the ISPM # 4; Requirements for the Establishment of Pest Free Areas, IPPC, FAO, 1996), free from *Fusarium circinatum* (syn. *Fusarium subglutinans* f sp. *pini*) and from Sudden Oak Death disease or its causative fungus *Phytophthora ramorum*."

AND

- sourced from areas (as per ISPM # 4; Requirements for the Establishment of Pest Free Areas, IPPC, FAO, 1996) or production sites (as per ISPM # 10: Requirements for the Establishment of Pest Free Places of Production and Pest Free Production Sites, IPPC, FAO, 1999) free of *Heterobasidion annosum* (anamorph *Spiniger meineckellum*), *Phellinus weirii*, and *Sirococcus conigenus*."

AND

- sprayed/dipped in _____ (names of approved contact and systemic fungicides)_____ at dosages of _____ (dosages to be specified for each)_____ within 7 days prior to shipment."

AND

- sprayed/dipped in _____ (names of approved contact and systemic insecticides)_____ at dosages of _____ (dosages to be specified for each)_____ within 7 days prior to shipment."

AND

- sprayed/dipped in _____ (name of approved miticide and mineral oil)_____ at a dosage of _____ (dosage to be specified for each)_____ within 7 days prior to shipment."

III. LABELLING

Each type of plant in the consignment must be clearly identified with its scientific name (genus and species).

IV. PACKING MEDIA

Only clean, new material specified below may be used as packing. If plant material arrives packed in media other than those listed the consignment will be reshipped or destroyed.

- Peat:

  Peat is only permitted entry into New Zealand if the exporting country NPPO is satisfied that the following additional declaration has been undertaken and therefore included on the phytosanitary certificate.
  "The peat in this consignment is free from unwanted animal and regulated plant pests, soil and other organic material, and has been treated by irradiation at a dose of 12 kGy".

- Paper
- Perlite
- Sphagnum moss:

  Sphagnum moss is only permitted entry into New Zealand if the exporting country NPPO is satisfied that the following additional declaration has been undertaken and therefore written on the phytosanitary certificate.
  "The sphagnum moss in this consignment is free from unwanted animal pests and regulated plant pests, soil and other organic material, and has been treated by irradiation at a dose of 12 kGy"".

- Vermiculite
- Any inert (non-organic) packaging medium.

The registered Operator of the registered Quarantine Facility to which the consignment has been transferred is to destroy all packing material either by burning or as instructed by an Inspector (e.g. quarantine waste bin).

V. CONSIGNMENT CLEANLINESS

Contamination with Soil and/or Foliage

Detection of soil or other extraneous material that cannot be readily removed will result in reshipment or destruction of the consignment.

VI. IN-TRANSIT REQUIREMENTS

All nursery stock must be packed and shipped in a manner that will prevent contamination by regulated pests. Packages must not be opened in transit. If a consignment is under the control of the transiting country NPPO, and it is either stored, split up or has its packaging changed while in that country (or countries) *en route* to New Zealand, a "Re-export Certificate" is required.

Where a consignment is held under NPPO control as a result of the need to change conveyances, and it is kept in the original container, a "Re-export Certificate" is not required.

PART 2: ENTRY REQUIREMENTS ON ARRIVAL AT THE BORDER

I. DOCUMENTATION UPON ARRIVAL

The importer must present the Phytosanitary Certificate to the MAF inspector when the plant consignment arrives at the border. For nursery stock requiring a single entry permit the importer must also present the original version of the import permit.

If the MAF inspector is satisfied that the Phytosanitary Certificate, import permit and other required documents are in order, the material will either receive Biosecurity Clearance, or be given Biosecurity Direction to the appropriate transitional facility designated as the quarantine destination.

II. INSPECTION UPON ARRIVAL (PRIOR TO PEQ)

All lots of nursery stock within a consignment will be inspected using a randomly selected sample (as specified in the Nursery Stock Sampling Table below) to ensure that it complies with the entry conditions.

Sampling plan

MAF inspectors will sample each lot within a consignment. By inspecting the randomly drawn sample of nursery stock units relative to the lot size (outlined in the following table) there is 95% confidence that if no infested units (by live regulated organisms) are found the consignment is not contaminated.

NURSERY STOCK SAMPLING TABLE		
Lot Size (No. of nursery stock units)	**Sample Size**	**Acceptance Level of Live Visually Detectable Regulated Pests of Any Type**
0 – 200	**100%**	**ZERO**
201 – 400	**310 units**	
401 – 600	**378 units**	
601 – 1,000	**450 units**	
1,001 +	**600 units**	

Actions on Interception of Live Pests

If live organisms are detected the importer will be given the option (at their expense) of reshipment or destruction of the consignment or identification of the pest and treatment (if possible).

Once the identification is completed, the nursery stock must be treated, reshipped or destroyed as directed by the MAF Inspector, at the expense of the importer. Where an organism is identified as a non-regulated pest, MAF reserves the right to demand treatment of the consignment upon arrival at the PEQ facility. This treatment is done to ensure that PEQ facilities are maintained free of pests and diseases.

III. POST ENTRY QUARANTINE

Imported nursery stock requiring post-entry quarantine (PEQ) at a MAF accredited transitional facility must be directed to a Level 2 PEQ.

PEQ at a MAF Accredited Level 2 Transitional Facility

Pseudotsuga menziesii bud wood material (with all of the required pest free phytosanitary declarations) must undergo a period of PEQ at a MAF approved Level 2 facility. An indicative minimum quarantine period is 6 months' continuous active growth. This period may be extended if material is slow growing, pests are detected and/or treatments are required. The MAF Inspector determines whether the plant material held in the Level 2 PEQ facility will be granted Biosecurity Clearance or will require additional testing and/or treatment.

Bud wood material originating from within California must be separated from other plant material in the PEQ facility. The separation need only be achieved by erecting a temporary wall such as floor-to-sealing shade cloth or clear plastic. The separation should be sufficient to impede the movement of any potential Pine Pitch Canker-vectoring insects e.g. *Hylastes ater* (Scolytidae), *Hylurgus ligniperda* (Scolytidae), *Ernobius mollis* (Anobiidae), *Navomorpha* spp. (Cerambycidae), *Aspidiotus nerrii* (Diaspididae), *Coccus hesperidium* (Coccidae), *Essigella california* (Aphididae), *Pineus* spp. (Adelgidae) etc. (These are examples only for an indication of likely insect size. Not all are found on Douglas Fir in New Zealand and none are confirmed vectors of Pine Pitch Canker)

The bud wood material may be held in a transitional facility (approved by MAF for the purpose) prior to planting in quarantine. The bud wood material may be grafted onto rootstock on entry into the PEQ facility.

Testing of infected tissue

For scion originating from within California only, any tissue showing disease symptoms must be sampled twice. The first sample shall be sent to NPPRL for identification of associated pathogens, while the second sample shall be sent to the Forest Health Unit of the Forest Research Institute to be tested specifically for the presence of *Fusarium circinatum* (syn. *Fusarium subglutinans* f sp. *pini*). The registered Operator of the quarantine facility shall meet all costs associated with testing and any subsequent treatment. Other scion need only be sampled once and the sample sent to NPPRL for testing.

IV. BIOSECURITY CLEARANCE

The MAF Inspector may give biosecurity clearance when the entry conditions, according to the import permit and import health standard, have been met for all the imported nursery stock.

PART 3: MAF Approved Treatments for *Pseudotsuga menziesii* bud-wood

1. Dip/Spray Treatment For Fungi

One Treatment is required from the following list.			
Contact & Systemic Fungicides			
Active ingredient	**Application:**	**Time required**	**Rate of application**
250g/litre chlorothalonil & carbendazim	All plant parts	15 minutes	6ml/litre of water
125g/litre chlorothalonil & thiophanate methyl	All plant parts	15 minutes	6ml/litre of water
250g/litre chlorothalonil & thiophanate methyl	All plant parts	15 minutes	3g/litre of water

2. Dip/Spray Treatment For Insects

Two treatments are required – One contact insecticide treatment AND the systemic insecticide treatment		
Contact Insecticides		
Active ingredient	**Application:**	**Rate of application**
80g/litre bifenthrin	All plant parts	25 ml/100 litres of water
750g/kg chlorpyrifos	All plant parts	33 g/100 litres of water
50g/litre cyfluthrin	All plant parts	500 ml/ha (apply in enough water for thorough coverage)
200g/litre methomyl	All plant parts	120 ml/100 litres of water
240g/litre naled	All plant parts	125 ml/100 litres of water
Systemic Insecticide		
Active ingredient	**Application:**	**Rate of application**
350g/l imidachloprid	All plant parts	45 ml/100 litres of water

3. Dip/Spray Treatment for Mites

Treatment with one contact miticide AND the mineral oil is required.		
Contact Miticide		
Active ingredient	**Application:**	**Rate of application**
18g/litre abamectin	All plant parts	50 ml/100 litres of water
500g/litre bromopropylate	All plant parts	200 ml/100 litres of water
500g/litre clofentezine	All plant parts	40 ml/100 litres of water
350g/kg dicofol	All plant parts	150 g/100 litres of water
480g/litre dienochlor	All plant parts	65 ml/100 litres of water
500g/kg fenbutatin oxide	All plant parts	40 g/100 litres of water
240g/litre taufluvalinate	All plant parts	40 ml/100 litres of water
200g/kg tebufenpyrad	All plant parts	100 g/100 litres of water
Mineral Spraying oil		
Active ingredient	**Application**	**Rate of application**
900-995 ml/litre mineral oil	All plant parts	1 litre/100 litres of water (1 %)

Appendix 3: Part A

NEW ZEALAND MINISTRY OF AGRICULTURE AND FORESTRY APPROVED PEST FREE AREAS FOR
***Fusarium circinatum* (syn. *Fusarium subglutinans* f. sp. *pini*)**

NAME OF COUNTRY	States/Provinces with approved pest free status within each Country
Argentina	All
Australia	All
Austria	All
Belgium	All
Brazil	All
Canada	All
Czech Republic	All
Denmark	All
Finland	All
France	All
Germany	All
Greece	All
Hungary	All
Ireland	All
Luxembourg	All
Netherlands	All
Norway	All
Poland	All
Portugal	All
Slovakia	All
Switzerland	All
Spain	Albacete, Alicante, Almeria, Asturias, Avila, Badajoz, Barcelona, Burgos, Cáceres, Cádiz, Cantabria, Castellón, Ciudad Real, Córdoba, Corunna, Cuenca, Gerona, Granada, Guadalajara, Huelva, Huesca, Islas Baleares, Jaén, León, Lérida, Lugo, Madrid, Málaga, Murcia, Orense, Palencia, Pontevedra, Rioja, Salamanca, Saragossa, Segovia, Seville, Soria, Tarragona, Teruel, Toledo, Valencia, Valladolid, Zamora
Sweden	All
Turkey	All
United Kingdom	All
USA	Alaska, Colorado, Connecticut, Delaware, Hawaii, Idaho, Illinois, Indiana, Iowa, Kansas, Maryland, Maine, Massachusetts, Minnesota, Montana, Michigan, Missouri, Nebraska, New Hampshire, New Jersey, New York, North Dakota, Ohio, Oklahoma, Oregon, Pennsylvania, Rhode Island, South Dakota, Utah, Vermont, Washington, West Virginia, Wisconsin, Wyoming, and (in certain circumstances) selected counties of California (see next page).

The following counties within California are considered MAF approved Pine Pitch Canker (*Fusarium circinatum* (syn. *Fusarium subglutinans* f sp. *pini*) free areas for the importation of Douglas Fir (*Pseudotsuga menziesii*) scion material only;

Del Norte	Siskiyou	Modoc	Shasta
Lassen	Plumas	Butte	Sierra
Yuba	Placer	El Dorado	Amador
Tulare	Inyo	Mariposa	Nevada
Calaveras	Alpine	Tuolumne	Mono

No other countries/states/provinces are New Zealand Ministry of Agriculture and Forestry approved pest free areas for *Fusarium circinatum* (syn. *Fusarium subglutinans* f. sp. *pini*).

Part B

NEW ZEALAND MINISTRY OF AGRICULTURE AND FORESTRY APPROVED PEST FREE AREAS FOR
***Phytophthora ramorum* and the Sudden Oak Death disease**

The following countries or regions may soon be considered MAF approved free areas for the Sudden Oak Death disease or the causative fungus *Phytophthora ramorum*;

Australia	All parts thereof
Canada	All parts thereof
South Africa	All parts thereof
Israel	All parts thereof
USA	Excluding the following counties of Oregon and California: Coos, Douglas, Josephine, Curry (Oregon), Del Norte, Siskiyou, Humboldt, Trinity, Shasta, Tehama, Mendocino, Glen, Colusa, Lake, Sonoma, Napa, Yolo, Sutter, Marin, Solano, Sacramento, San Francisco, San Joaquin, Contra Costa, Alameda, San Mateo, Santa Cruz, Santa Clara, Stanislaus, Merced, San Benito, Monterey, Fresno, Kings, San Luis Obispo, Santa Barbara, Kern, Ventura, Los Angeles, Orange (California).