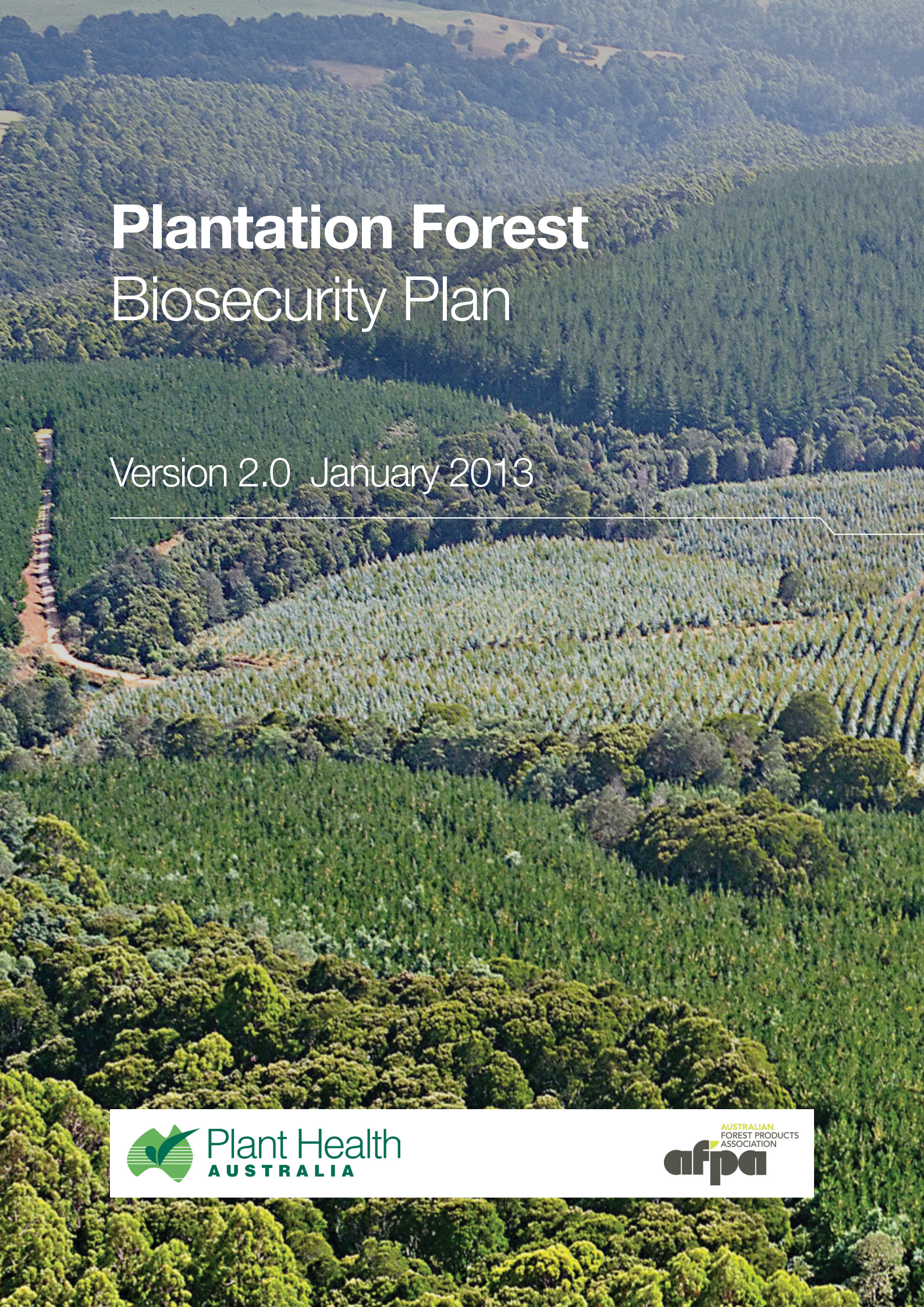


# Plantation Forest Biosecurity Plan

Version 2.0 January 2013

Plant Health AUSTRALIA

AUSTRALIAN FOREST PRODUCTS ASSOCIATION afpa

| | |
|---|---|
| **Location:** | Level 1, 1 Phipps Close<br>DEAKIN ACT 2600 |
| **Phone:** | +61 2 6215 7700 |
| **Fax:** | +61 2 6260 4321 |
| **E-mail:** | **biosecurity@phau.com.au** |
| **Visit our web site:** | **www.planthealthaustralia.com.au** |


An electronic copy of this plan is available from the web site listed above.



In referencing this document, the preferred citation is:
Plant Health Australia Ltd 2007 *Plantation Forest Biosecurity Plan (Version 2.0 – Jan 2013).* Plant Health Australia, Canberra, ACT.

**Disclaimer:**
*The material contained in this publication is produced for general information only. It is not intended as professional advice on any particular matter. No person should act or fail to act on the basis of any material contained in this publication without first obtaining specific and independent professional advice.*

*Plant Health Australia and all persons acting for Plant Health Australia in preparing this publication, expressly disclaim all and any liability to any persons in respect of anything done by any such person in reliance, whether in whole or in part, on this publication. The views expressed in this publication are not necessarily those of Plant Health Australia.*

# Acknowledgements

The *Plantation Forest Biosecurity Plan* was coordinated by Plant Health Australia (PHA) and developed through a partnership approach using government and industry resources and expertise. This review was undertaken with financial support from Forest and Wood Products Australia.

The following organisations and agencies were involved in the development and finalisation of the plan:

# Endorsement

The *Plantation Forest Biosecurity Plan (Version 2.0-2013)* was formally endorsed by the Plantation Forest industry (through Australian Forest Products Association) in November 2012, and the Australian Government and all state and territory governments (through the Plant Health Committee) in January 2013.

# Table of contents

# Figures



# Tables

# List of acronyms

| | |
|---|---|
| ACPPO | Australian Chief Plant Protection Office |
| AFG | Australian Forest Growers |
| AFPA | Australian Forest Products Association |
| APVMA | Australian Pesticides and Veterinary Medicines Authority |
| AQIS | Australian Quarantine and Inspection Service |
| AS/NZS | Australian Standard/New Zealand Standard |
| BOLT | Biosecurity On-line Training |
| DAFF | Department of Agriculture, Fisheries and Forestry |
| DAFF Qld | Department of Agriculture, Fisheries and Forestry, Queensland |
| DAFWA | Department of Agriculture and Food, Western Australia |
| DECWA | Department of Environment and Conservation, Western Australia |
| DPIF | Department of Primary Industry and Fisheries, Northern Territory |
| DPI NSW | Department of Primary Industries, New South Wales |
| DPI Vic | Department of Primary Industries, Victoria |
| DPIPWE | Department of Primary Industries, Parks, Water and Environment, Tasmania |
| DQMAWG | Domestic Quarantine and Market Access Working Group |
| EPP | Emergency Plant Pest |
| EPPRD | Emergency Plant Pest Response Deed |
| FWPA | Forest and Wood Products Australia |
| IBG | Industry Biosecurity Group |
| IBMP | Industry Best Management Practice |
| ICON | AQIS Import Conditions Database |
| IPM | Integrated Pest Management |
| IPPC | International Plant Protection Convention |
| IRA | Import Risk Analysis |
| ISPM | International Standards for Phytosanitary Measures |
| HPP | High Priority Pests |
| MAI | Managed Investment Schemes |
| NAQS | Northern Australian Quarantine Strategy |
| NGIA | Nursery and Garden Industry Australia |
| NIASA | Nursery Industry Accreditation Scheme Australia |
| PHA | Plant Health Australia |
| PIRSA | Primary Industries and Regions South Australia |
| QA | Quality Assurance |

| | |
|---|---|
| SARDI | South Australian Research and Development Institute |
| SFM | Sustainable Forest Management |
| SPHDS | Sub-committee on Plant Health Diagnostic Standards |
| SPS | Sanitary and Phytosanitary |
| TIMO | Timberland Investment Management Organisations |
| TST | Threat Summary Table |
| WTO | World Trade Organization |

# Reporting suspect pests


Any unusual plant pest should be reported immediately to the relevant state/territory agriculture agency through the **Exotic Plant Pest Hotline (1800 084 881).** Early reporting enhances the chance of effective control and eradication.

# EXECUTIVE SUMMARY

# Executive summary

To ensure its future viability and sustainability, it is vital that the Australian plantation forest industry minimises the risks posed by exotic pests and responds effectively to plant pest threats. The Plantation forest biosecurity plan is a framework to coordinate biosecurity activities and investment for Australia's plantation forest industry. It provides a mechanism for industry, governments, and stakeholders to better prepare for, and respond to, incursions of Emergency Plant Pests (EPP) that could have significant impacts on the plantation forest industry. It aims to assist plantation forest owners and managers to evaluate the inherent risks within their current activity across the biosecurity continuum, formally identify and prioritise exotic plant pests, and focus on future biosecurity challenges.

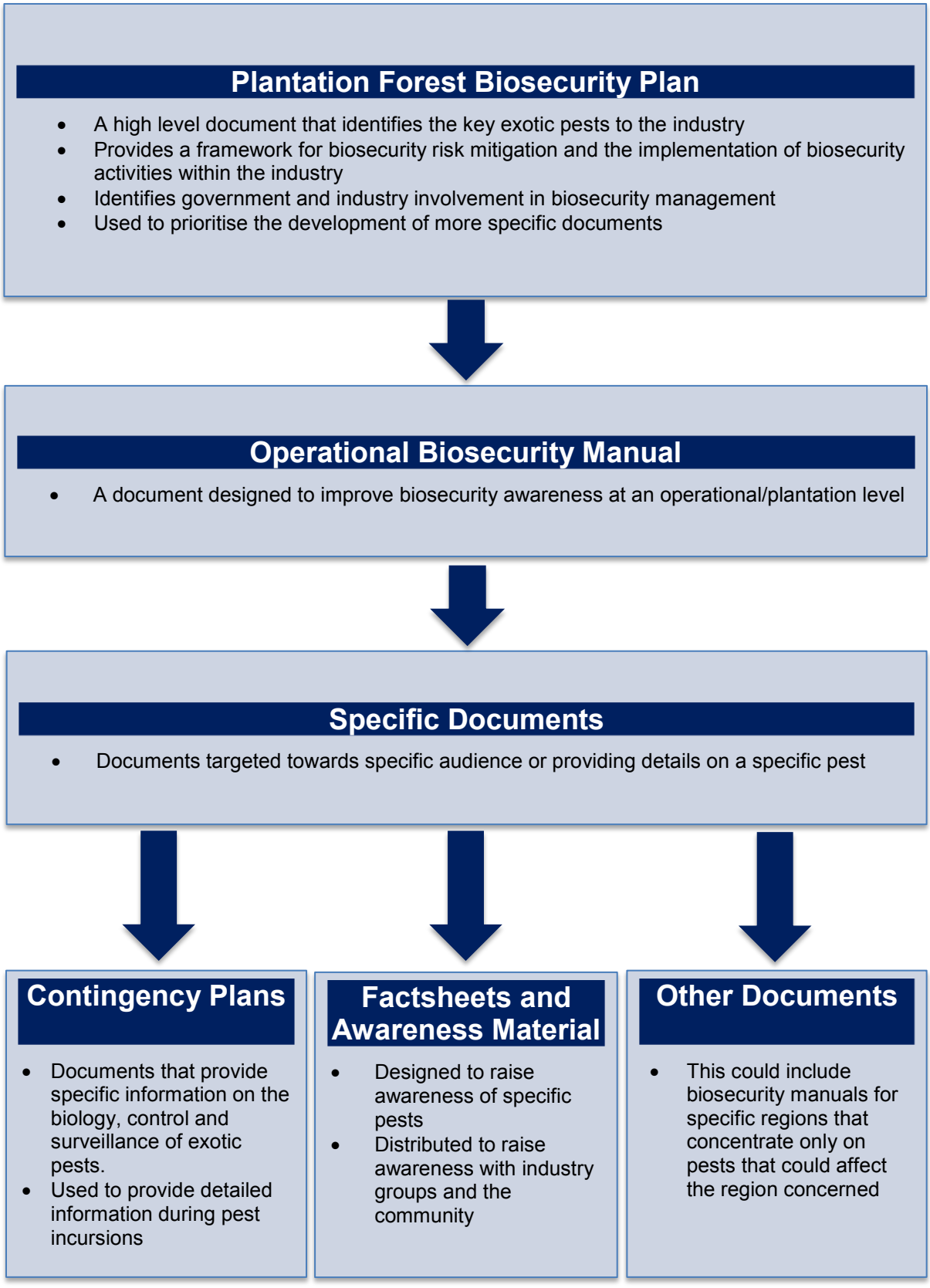
The Plantation forest biosecurity plan (IBP) was developed in consultation with the Industry Biosecurity Group (IBG), a select group of forest health and biosecurity experts. The IBG was coordinated by Plant Health Australia and included representatives from the Australian Forest Products Association (AFPA), the Australian Government, relevant state and territory agriculture agencies and research organisations.

A key role of the IBP was the compilation of the Threat Summary Tables (TST), a list of more than 50 exotic plant pests and the potential biosecurity threat that they represent. Each pest was given an overall risk rating based on four criteria; entry, establishment, spread potential, and economic impact. Through this process, and further consultation, the highest priority pests were identified and highlighted for future surveillance, on-site biosecurity and awareness activities.

The Plantation forest biosecurity plan also details current surveillance activities being undertaken by Australia's states and territories, and identifies where contingency plans, fact sheets and diagnostic protocols have been prepared for high priority pests. This enables the gaps to be identified and where actions need to be taken to increase the industry's biosecurity preparedness.

This plan provides the industry with a mechanism to identify exotic plant pests and identify strengths and weaknesses in its current biosecurity activities. This plan is principally designed for decision makers. It is one document in a hierarchy of biosecurity documents that the plantation forest industry intend to produce to better prepare itself for pest incursions. This plantation biosecurity document hierarchy is outlined below.

# Plantation biosecurity document hierarchy



# INTRODUCTION

# Introduction

## Plant Health Australia

Plant Health Australia (PHA) is a public company, with members including the Australian Government, all state and territory governments, and a range of plant industry organisations. The company was formed to address high priority plant health issues, and to work with all its members to develop an internationally outstanding plant health management system that enhances Australia's plant health status and the sustainability and profitability of plant industries.

## Australian Forest Products Association

The Australian Forest Products Association (AFPA) is the peak national body for Australia's forestry, wood and paper products industry. It represents the industry's interests to governments, the general public and other stakeholders on matters relating to the sustainable development and use of Australia's forest, wood and paper products. As owners and/or managers of large tracts of commercial plantations and natural forest in all States, and as importers and exporters of wood and paper products (such as logs, woodchips, sawn-timber, and other wood and paper products), AFPA members are subject to the quarantine requirements of Australia and other countries. Therefore, the forest and wood products industry has a substantial interest in quarantine and biosecurity issues across the biosecurity continuum, from pre-border to border to post-border transitions.

## Australian Forest Growers

Australian Forest Growers (AFG) are a not for profit organisation representing the country's private forestry and commercial forest growers at a national level.  AFG has branches in all states and provides a variety of services for its members.

## Forest and Wood Products Australia

Forest and Wood Products Australia Limited (FWPA) is a not-for-profit company that provides national, integrated research and development services to the Australian forest and wood products industry.

# Need for biosecurity plans

Australia's geographic isolation and lack of shared land borders have, in the past, provided a degree of natural protection from exotic threats. Australia's national quarantine system also helps to prevent the introduction of harmful exotic threats to plant industry. However, there will always be some risk of an exotic pest entering Australia, whether through natural dispersal or assisted dispersal as a result of increases in overseas tourism, imports and exports, mail and changes to transport procedures (e.g. refrigeration and containerisation of produce).

Biosecurity planning provides a mechanism for the plantation forest industry, government and other relevant stakeholders to actively determine pests of highest priority, analyse the risks they pose and put in place practices and procedures that would reduce the chance of pests becoming established, rapidly detect any incursion and/or minimise the impact if a pest incursion did occur.

Ensuring the plantation forest industry has the capacity to minimise the risks posed by pests, and to respond effectively to any pest threats is a vital step for the future sustainability and viability of the industry. Through this pre-emptive planning process, the industry will be better placed to maintain domestic and international trade, and reduce the social and economic costs of pest incursions on both growers and the wider community. The information gathered during these processes provides additional assurance that the Australian plantation forest industry is free from specific pests, which assists the negotiation of access to new overseas markets.

The definition of a **pest** used in this document covers all insects, mites, snails, nematodes, pathogens (diseases) and weeds that are injurious to plants, plant products or bees. **Exotic pests** are those not currently present in Australia. **Endemic pests** are established within Australia.

**Pest threats** are those that have or are being identified as significant to the industry. The most important threats are defined as **key** or **high priority threats**.

Under arrangements of the EPPRD, emergency plant pests (EPPs) are defined as those that meet one or more of the following criteria:

a) It is a **known exotic plant pest**, the economic consequences of an incident of which would be **economically or otherwise harmful** for Australia, and for which it is considered to be in the regional or national interest to be free of the plant pest
b) It is a **variant form of an established plant pest** which can be distinguished by appropriate investigative and diagnostic methods, and which if established in Australia, would have a regional or national impact
c) It is a **serious plant pest of unknown or uncertain origin** which may, on the evidence available at the time, be an entirely new plant pest, and which if established in Australia would have an adverse economic impact regionally and or nationally
d) It is a **plant pest of potential economic importance** to the area endangered thereby and **not yet present** there or widely distributed and being officially controlled, but is occurring in such a fulminant incursion form, that an emergency response is required to ensure that there is not either a large scale epidemic of regional or national significance or serious loss of market access.

# Background on the plantation forest industry

Australia's total plantation estate was slightly over two million hectares in 2010-11, with a softwood plantation estate of 1.025 million hectares and a hardwood plantation estate of approximately 0.980 million hectares (Gavran 2012). While the softwood plantation estate has remained relatively stable at around 1 million hectares over the past decade, the hardwood plantation area expanded rapidly, increasing by 70% between 2000-01 and 2008-09. This expansion has since stalled, as the industry experiences a major restructuring, with a marginal decrease in the plantation area over the past three years (Gavran 2012).

The timber plantations are grown mainly in the higher rainfall zones along the east coast and southwest corner of mainland Australia, as well as in Tasmania and Bathurst Island in the Northern Territory (See Figure 1).

***Figure 1***. *Distribution of plantations in Australia. (Source: Parsons et al., 2006)*


There has been a significant shift in plantation ownership over the past decade, from being predominantly government owned to being predominantly privately owned. The softwood plantation estate established prior to the 1990s was mainly owned and managed by state government agencies. However, in recent years, some state governments have sold these assets to private interests — mainly timberland investment management organisations (TIMOs) and/or superannuation funds (notably Victoria, South Australia, Queensland and Tasmania). The hardwood plantation estate was developed over the past decade, mainly through private investment by managed investment schemes (MIS). However following the collapse of the MIS sector, many of these assets have been acquired by TIMOs and/or superannuation funds. In 2010, only one quarter of the plantation resource was government

owned, and the remainder in private ownership (with over 50% held by TIMOs and/or superannuation funds) (ABARES 2011; Parsons et al., 2006).

The timber species composition of the plantation estate has also changed from being predominantly softwood based prior to the 1990s, to today's almost fifty-fifty mix of hardwood and softwood plantations (see Table 1). This composition also reflects the intended markets for the timber products and duration of the timber plantation. Hardwood plantations are predominately short rotation and producing pulp and woodchip (often exported). Softwood plantations are predominately long rotation and produce integrated products such as sawlog, peeler logs and pulp. These changing dynamics also impact on the biosecurity focus, with different timber species affected by different pests and the resulting timber products being destined for different markets with different biosecurity risks (e.g. export woodchip to other countries and sawn timber used in domestic construction).

***Table 1.*** *Summary of plantation area (ha) by state - adapted from: Gavran 2012*

| State or Territory | Hardwood | Softwood | Other | Total |
|---|---|---|---|---|
| Australian Capital Territory | 0 | 8,000 | 0 | 8,000 |
| New South Wales | 93,000 | 296,000 | 3,000 | 392,000 |
| Northern Territory | 38,000 | 2,000 | 0 | 40,000 |
| Queensland | 41,000 | 189,000 | 2,000 | 232,000 |
| South Australia | 60,000 | 129,000 | 0 | 189,000 |
| Tasmania | 236,000 | 75,000 | 0 | 311,000 |
| Victoria | 206,000 | 226,000 | 1,000 | 433.000 |
| Western Australia | 307,000 | 100,000 | 6,000 | 413,000 |
| Total | 981,000 | 1,025,000 | 12 | 2,018,000 |

## The softwood estate

The softwood plantation estate in Australia consists of a number of species including:

- Radiata pine (*Pinus radiata)*
- Southern pine (*P. elliottii, P. caribaea* (and hybrids between these species) also *P. taeda*)
- Maritime pine (*P. pinaster*)
- Hoop pine (*Araucaria cunninghamii*).

Of these only the Hoop pine is a native species, the others are all exotic species. *P. radiata* is the most planted species, making up 75% of the softwood estate (ABARES 2011; Parsons et al., 2006). Australia's softwood plantations are primarily managed for 25-40 year rotations to produce timber for both the pulp industry and for the creation of solid wood products. Smaller diameter logs from the thinning operation are sold as pulp, while larger diameter logs from the thinning operations and the final harvest operation are sold to sawmills to create solid wood products.

## The hardwood estate

The hardwood plantation estate in Australia consists of a variety of species including:

- Southern (Tasmanian) blue gum (*Eucalyptus globulus*)
- Shining gum (*E. nitens*)
- Blackbutt (*E. pilularis*)
- Spotted gum (*Corymbia* spp.)
- Flooded gum (*E. grandis* and *E. grandis* hybrids)
- Dunn's white gum (*E. dunnii*)
- Mangium (*Acacia mangium*)
- Sandal wood (S*antalum spicatum* and *S. album*)
- And smaller plantations of other species such as:
    - Teak (*Tectona grandis*)
    - African mahogany (*Khaya senegalensis*)
    - Sydney blue gum (*E. saligna*)
    - Western white gum (*E. argophloia*)

Of these, Eucalyptus, Corymbia, *Santalum spicatum* and Acacia are all native species. Southern blue gum, Shining gum and Mangium make up the majority of the estate. These are mostly managed on short rotations (8-15 years) to produce pulp for paper production. Blackbutt, Spotted gum, Flooded gum, Dunn's white gum and some Shining gum are typically managed on longer rotations to produce saw logs. The exotic species, such as Teak and African mahogany, are planted at a much smaller scale but grow a high value product.

Sandal wood (S*antalum spicatum* (a native species) and *S. album* (an exotic species)) are grown in Western Australia and Queensland for the production of fragrant timber and oils. Unlike other plantation species sandalwoods are hemiparasites, meaning that a host plant (often an Acacia) must be planted near the sandalwood seedling. This means that diseases and pests that affect the host can affect the sandalwood tree directly or indirectly.

## Market Value:

Over 20 million cubic meters of logs were harvested from Australia's plantations in 2010-11, with an estimated gross value of $1.33 billion (ABARES 2011). This supports a domestic wood processing sector valued at over $22 billion and woodchip exports valued at over $884 million (ABARES 2012). Plantation establishment and management provides direct employment to more than 14,000 people (Parsons et al., 2006), and supports employment of a further 87,000 people in wood product manufacture, many from rural areas (ABARES 2012).

# The Emergency Plant Pest Response Deed

The Emergency Plant Pest Response Deed (EPPRD) has been negotiated between the government and industry members of PHA to cover the management and funding arrangements of eradication responses to Emergency Plant Pest (EPP) incidents. The EPPRD came into effect on October 26, 2005 and is a formal legally binding agreement between PHA, the Australian Government, all state and territory governments and 27 plant industry signatories. The EPPRD is based on the following key principles:

- cost minimisation for all parties
- reimbursement to growers whose crops or property are directly damaged or destroyed as a result of implementing an approved Response Plan
- early detection and response
- ensuring rapid responses to exotic pests - excluding weeds in the first instance
- ensuring decisions to eradicate are based on appropriate criteria (must be technically feasible and cost beneficial)
- an industry commitment to biosecurity and risk mitigation and a government commitment to best management practice
- cost sharing/payment of eligible costs
- an Agreed Limit for cost sharing (calculated as 2% of local value of production for one year of the Affected Industry Party or as defined in Schedule 14 of the EPPRD). The Agreed Limit can be exceeded with the agreement of Affected Parties.
- an effective industry/government decision-making process
- a limit in scope (to only cover exotic pest threats relevant to PHA Member Industries).

For further information on the EPPRD, including copies of the EPPRD, a Fact Sheet or frequently asked questions, visit **www.planthealthaustralia.com.au/epprd**.

# What is industry biosecurity planning?

Industry biosecurity is the protection from risks posed by exotic pests through actions such as exclusion, eradication, and control. Effective industry biosecurity relies on all stakeholders, including government agencies, industry, and the public (Figure 2). The components of the plant industry biosecurity continuum have been identified and described in PLANTPLAN. A summary of the incursion management plan from PLANTPLAN (2011) has been summarised in Figure 3 (see Contingency Plans and Response Management section for details).

This Industry Biosecurity Plan was developed to identify key exotic pests to the plantation industry so that industry groups, researchers and decision makers can better prepare the industry for incursions of exotic pests that could have significant impacts on the plantation forest industry if an incursion was to occur.

***Figure 2.*** *Industry biosecurity: a shared responsibility*

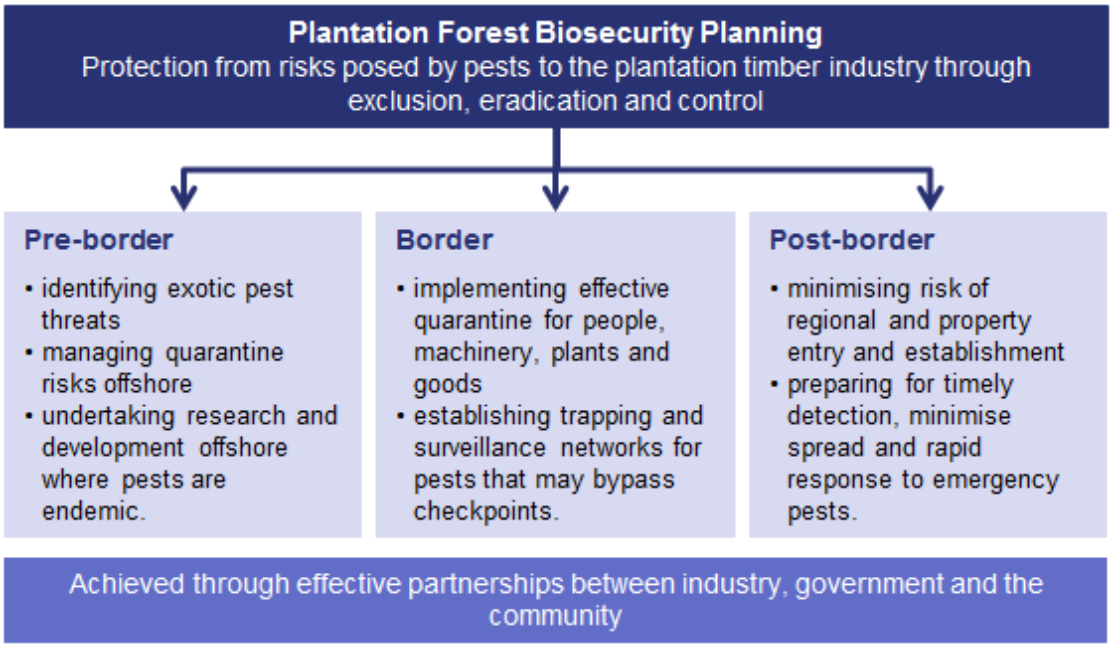
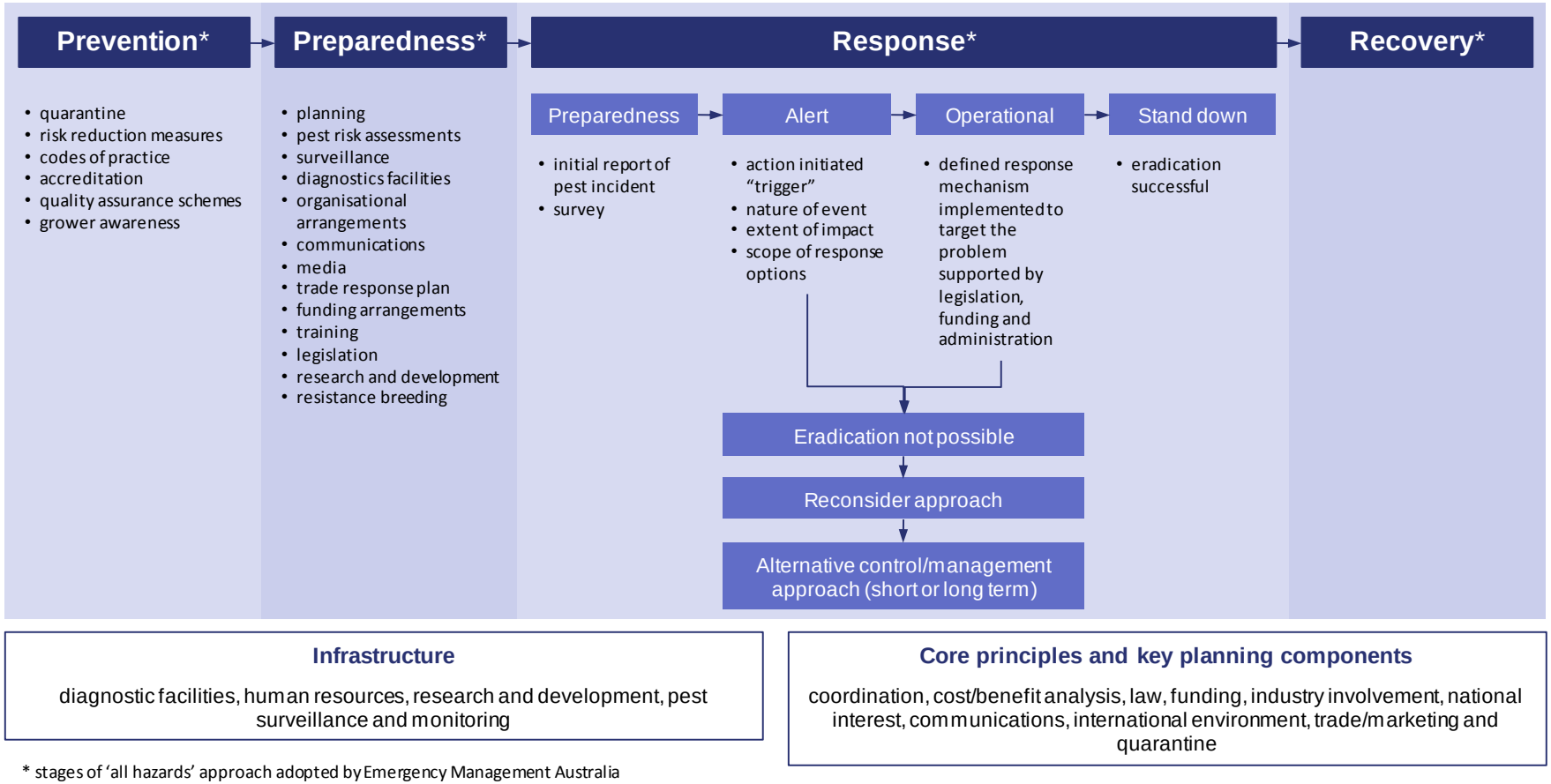


***Figure 3.*** *Summary of incursion management for plant industries according to PLANTPLAN (2011)*




**Infrastructure**

diagnostic facilities, human resources, research and development, pest surveillance and monitoring

**Core principles and key planning components**

coordination, cost/benefit analysis, law, funding, industry involvement, national interest, communications, international environment, trade/marketing and quarantine

* stages of 'all hazards' approach adopted by Emergency Management Australia

To assist with the revision of a national biosecurity plan for the plantation forest industry, PHA formed and coordinated an Industry Biosecurity Group (IBG) — a select group of forest health/biosecurity experts from various states, and representatives of PHA and AFPA (Table 2). The IBP carried out the initial pest identification and risk assessment. A broader stakeholder consultation process followed, with stakeholder's comments incorporated to improve the accuracy of the document.

***Table 2.*** *Members of the plantation forest IBG*

| Name | Organisation |
|---|---|
| Peter Grist | Australia Forests Products Association |
| Gavin Matthew | Australia Forests Products Association |
| Chris Howard | Commonwealth Department of Agriculture Fisheries and Forestry |
| Mike Cole | Commonwealth Department of Agriculture Fisheries and Forestry |
| Simon Lawson | Department of Agriculture Fisheries and Forestry, Queensland |
| Geoff Pegg | Department of Agriculture Fisheries and Forestry, Queensland |
| Ian Dumbrell | Department of Agriculture and Food, Western Australia |
| Karl Wotherspoon | Forestry Tasmania |
| Christine Stone | NSW Department of Primary Industries |
| Angus Carnegie | NSW Department of Primary Industries |
| Caroline Mohammed | University of Tasmania |
| Jo Slattery | Plant Health Australia |
| Rohan Burgess | Plant Health Australia |

Key steps in the development of the Plantation forest biosecurity plan included:

- identifying and documenting key threats to the plantation forest industry
- confirming an agreed emergency plant pest priority list
- documenting pest-specific contingency plans for high priority pests
- documenting the roles and responsibilities of stakeholder groups

# Document overview

The biosecurity package developed for the Australian plantation forest industry focuses on a number of key areas.

## Threat identification, pest risk reviews and funding arrangements

Guidelines are provided for the identification and categorisation of biosecurity threats through a process of qualitative risk assessment. The primary goal is to coordinate identification of exotic pest threats that could impact on productivity, sustainability, and marketability and to assess their potential impacts. This plan strengthens risk assessment work already being done both interstate and overseas. Pest risk reviews have been included for individual pests where available. Key plantation forest biosecurity threats are detailed in threat summary tables (TSTs; Appendix 1), along with the plant pest threat priority list (the top ranked threats to the plantation forest industry).

## Risk mitigation plan

This section provides a summary of activities to mitigate the impact of pest threats on the Australian plantation forest industry, along with a set of guidelines for managing risk at all operational levels. Many pre-emptive practices can be adopted by plant industries and government agencies to reduce risks. Examples used by other industries that may be applicable to the plantation forest industry include:

- surveillance, awareness and training activities
- exclusion activities
- propagation of high health status planting materials
- control of alternative hosts and weeds
- use of warning and information signs
- use of dedicated equipment when working in high risk areas
- restricting the use of high risk vehicles during high risk times
- reporting suspect pests to appropriate authorities
- including biosecurity in Industry Best Management Practice (IBMP) and Quality Assurance (QA) schemes

## Contingency plans and response management

PHA has coordinated the development of PLANTPLAN, a generic emergency response plan for the Australian plant industries (see page 80 for further details). This plan details the procedures required and the organisations responsible in the event of an incursion of an emergency plant pest. Pest-specific contingency plans may be developed as a result of the pest threats identified in this plan.

# Review processes

With the support of the IBG, PHA is responsible for reviewing this plan on a 3-4 year basis. The review process will be used to determine:

- strategies to maximise the adoption of recommended practices
- where further improvements can be made
- revisions/updates to the plan
- where resources should be allocated to improve the plan

# Biosecurity implementation

Biosecurity is all about protecting the industry from pests and diseases that could be damaging to plant health, environmental health and the financial wellbeing of growers.

The Plantation forest biosecurity plan provides a framework for the implementation of biosecurity practices within the industry to minimise the risks of introducing exotic pests. Good biosecurity practices (such as good hygiene, checking for new pests, etc.) can also help reduce the spread of endemic pests. Currently a range of biosecurity practices are undertaken within the plantation forest industry and these are outlined in the Risk Mitigation chapter (page 53). Further implementation within the framework of the Plantation forest biosecurity plan, such as those practices outlined in Figure 4, should be investigated. Such activities are designed to better prepare the industry to effectively respond in the event of a new pest incursion.

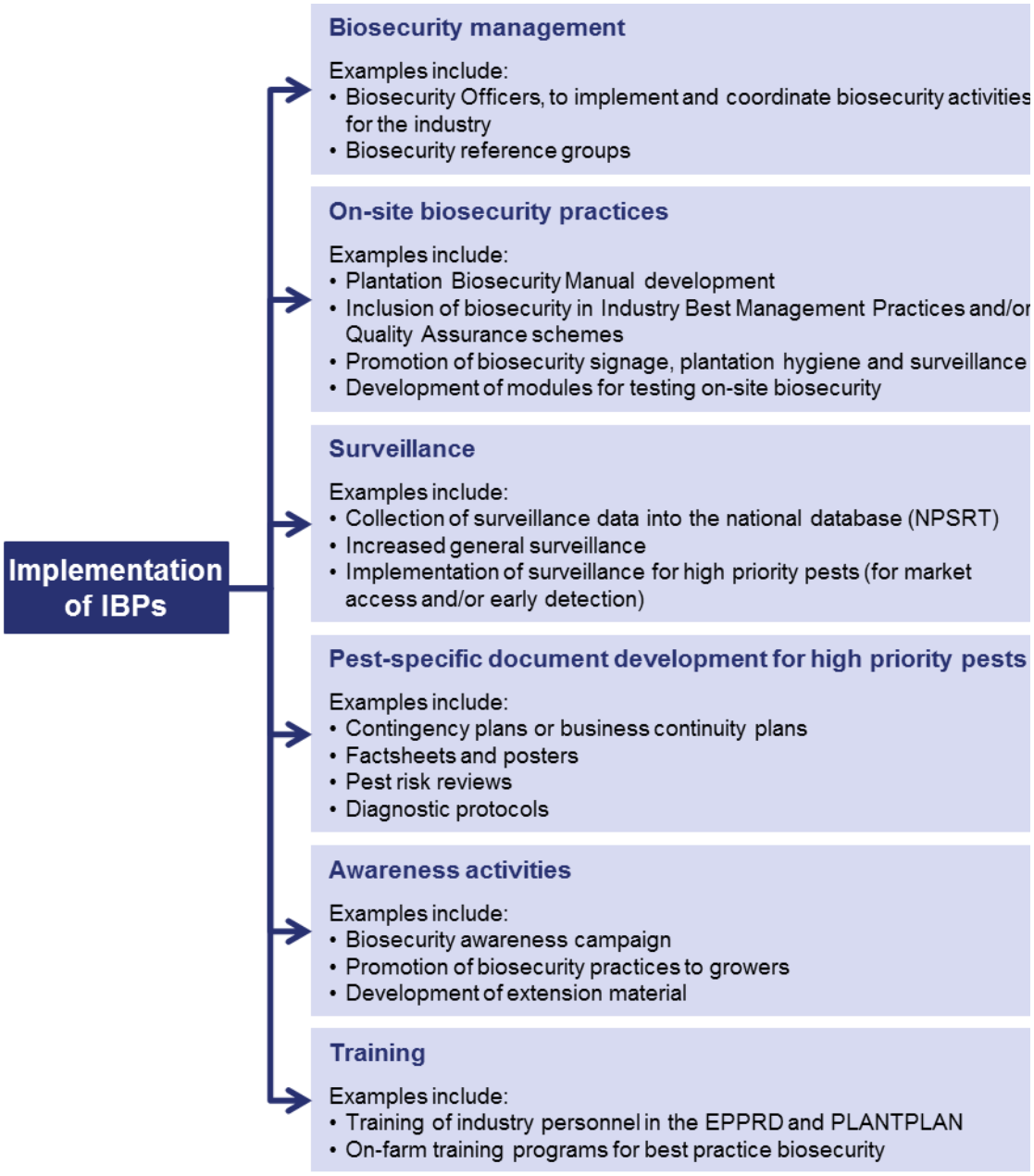



***Figure 4.*** *Potential biosecurity implementation activities within the framework of the Plantation forest biosecurity plan*

Through review of the Plantation forest biosecurity plan, a list of biosecurity action items to be considered by stakeholders in the industry has been developed (Table 3). This list is intended to provide proposed or potential biosecurity priorities for the plantation forest industry that are gaps in the current activities listed in the Risk Mitigation section of the biosecurity plan. Future versions of this document will contain information on the progress made on the listed items.

***Table 3.*** *Biosecurity action items identified by the plantation forest industry*

| Action item | Details |
|---|---|
| Awareness material | Identify and produce appropriate awareness material (e.g. Biosecurity manual, factsheets, etc.) that raise awareness of the importance of biosecurity and the main exotic pest threats to the plantation forest industry for distribution to growers. |
| Cost-benefit analysis of HPPs | A cost benefit analysis should be carried out for high priority pests of the plantation forest industry in order to better make decisions relating to pest eradication/control in the event of an exotic pest incursion. |
| Development of pest-specific contingency plans | Develop pest specific contingency plans for high priority pests. This could include the development of “mini contingency plans” that briefly list key attributes of the pest (e.g. distribution, appearance, controls). |
| Research on key pests | Research key pests to determine potential host ranges etc. to better determine the risk posed by specific pests. |
| Chemical registrations | Investigate the need for emergency registration of chemicals for high priority pests in order to better prepare the industry for exotic pest incursions. |
| Research on Threat Summary Tables | Review the current Threat Summary Tables to complete information on risk ratings for pests. |
| National Biosecurity Coordinator | Appoint a person to act as a “national biosecurity coordinator” to coordinate plantation biosecurity activities and provide operational knowledge in the event of pest incursions. |
| Surveillance of key plantation pests | Targeted surveillance of plantation pests at borders. |
| Training | Training of staff to be better prepared in the event of an exotic pest incursion. |
| Build relationships with agriculture agencies | Strengthened relationships between plantation sector, forest health experts and the broader state-level agricultural biosecurity entities.<br>Increase the awareness of plantation biosecurity issues within the state/territory biosecurity agencies.<br>Ensure that high priority plantation pests are included within agricultural focused surveillance programs aimed at ports of entry. |
| Skills and capability audit | Audit to identify strengths/weaknesses in the plantation forest industries to carry out surveillance and capability to deal with exotic pest incursions. |
| Support and engagement of sectors and members of the plantation forest agencies | Continue to support the state-level forest biosecurity committees.<br>Re-activate committees that have lapsed.<br>Continue engagement with state-level conservation forest agencies. |

# References

ABARES ( 2012), Australian forest and wood products statistics, September and December quarters 2011, Australian Bureau of Agricultural and Resource Economics and Sciences, Canberra, May.

ABARES (2011) Australia's forests at a glance 2011. Bureau of Rural Sciences Canberra.

Gavran, M (2012) Australian plantation statistics 2012 update, ABARES technical report, Canberra, June.

Parsons, M, Gavran M, and Davidson J (2006) Australia's Plantations 2006, Bureau of Rural Sciences Canberra.

# THREAT IDENTIFICATION, PEST RISK ASSESSMENTS AND CATEGORISATION

# Introduction

This section identifies high risk exotic pest threats to the plantation forest industry, and presents a framework for assessing the potential economic, social, and environmental impacts associated with each threat. This part of the biosecurity plan uses a nationally consistent and coordinated approach to threat identification and risk assessment to provide a strong base for future risk management in the plantation forest industry.

By identifying key threats a pre-emptive approach may be taken to risk management. Under this approach, mechanisms can be put into place to increase our response effectiveness if pest incursions occur. One such mechanism is the EPPRD that has been negotiated between PHA's government and industry members. The EPPRD ensures reliable and agreed funding arrangements are in place in advance of emergency plant pest incursions, and assists in the response to emergency plant pest incursions.

Identification of high risk pests will also assist in the implementation of effective grower and community awareness campaigns, targeted biosecurity education and training programs for growers and diagnosticians, and development of pest-specific incursion response plans.

# Threat identification

Information on biosecurity threats to the plantation forest industry described in this document came from a combination of:

- past records
- existing industry protection plans
- relevant experience
- relevant published literature
- specialist and expert judgment

At this time, only invertebrate pests (insects, mites, molluscs and nematodes) and pathogens (disease causing organisms) have been identified, although the issue of weeds may be revisited through future reviews of this plan.

# Ranking pest threats

Key questions required for ranking the importance of pests include the following:

- what are the probabilities of entry into Australia, establishment, and spread, for each pest?
- what are the likely impacts of the pest on cost of production, overall productivity, and market access?
- how difficult is each pest to identify and control and/or eradicate?

The Threat Summary Tables (TSTs; Appendix 1) present a list of potential plant pest threats to the plantation forest industry and provide summarised information on entry, establishment and spread potential, the economic consequences of establishment, and eradication potential (where available).

This document considers the risk posed by which a pest might enter Australia, including natural spread and smuggling. This is a broader view of potential risk than the Import Risk Analyses conducted by DAFF which focus only on specific regulated import pathways.

While there are similarities in ranking system used in this document and the import risk analysis process followed by the Department of Agriculture, Fisheries and Forestry, an important distinction is that this document considers all potential pathways by which an exotic pest could enter Australia, including illegal pathways and natural spread. The methods used here also provide different guidance to assignment of qualitative probabilities when compared with DAFF's import risk analyses.

The most serious threats from the TSTs were identified through a process of risk assessment and are listed in Table 4.

# Description of terms used in pest risk tables

The descriptions below relate to terms in Table 4 to Table 7.

## Life form legend

| | |
|---|---|
| **BTLE** | Beetles (weevils etc.) (COLEOPTERA) |
| **FUN** | Fungi |
| **HYM** | Wasps, ants etc. (HYMENOPTERA) |
| **ISO** | Termites (ISOPTERA) |
| **LEP** | Butterflies and moths (LEPIDOPTERA) |
| **NEM** | Nematodes (NEMATODA) |

## Entry potential

| | |
|---|---|
| **Negligible** | Probability of entry is extremely low given the combination of factors including the distribution of the pest source, management practices applied, low probability of pest survival in transit and limited pathways for pest entry |
| **Low** | Probability of entry is low, but clearly possible given the expected combination of factors described above |
| **Medium** | Pest entry is likely given the combination of factors described above |
| **High** | Pest entry is very likely or certain given the combination of factors described above |
| **Unknown** | Pest entry potential is unknown or very little of value is known |

## Establishment potential

| | |
|---|---|
| **Negligible** | The pest has no potential to survive and become established |
| **Low** | The pest has the potential to survive and become established in approximately one third or less of the range of hosts. Could have a low probability of contact with susceptible hosts |
| **Medium** | The pest has the potential to survive and become established in between one-third and two thirds of the range of hosts |
| **High** | The pest has potential to survive and become established throughout most or all of the range of hosts. Distribution is not limited by environmental conditions that prevail in Australia. Based upon its current world distribution, and known conditions of survival, it is likely to survive in Australia wherever major hosts are grown |
| **Unknown** | The establishment potential of the pest is unknown or very little of value is known |

### Spread potential

| | |
|---|---|
| **Negligible** | The pest has no potential for natural spread |
| **Low** | The pest has potential for natural spread locally |
| **Medium** | The pest has potential for natural spread throughout a physiographic region |
| **High** | The pest has potential for natural spread to all production areas |
| **Unknown** | Spread potential is unknown or very little of value is known |

### Economic impact

This rating includes damage to plantations and long term management of a pest

| | |
|---|---|
| **Negligible** | There is no impact on yield, host longevity, production costs, storage or market access |
| **Low** | There is minor impact on standing trees or market access |
| **Medium** | There is moderate impact on trees, but host mortality is rare, and moderate impacts on market access may occur |
| **High** | There is severe impact on standing trees, with significant host mortality losses or severe impacts on market access |
| **Extreme** | There is extreme impact on standing trees, with extreme host mortality losses or extreme impacts on market access |
| **Unknown** | The economic potential of the pest is unknown or very little of value is known |

# Plantation forest industry high priority plant pest threat list

Table 4 provides an overview of the top ranked threats to the plantation forest industry. Further details on each pest along with the basis for the likelihood ratings are provided in the Threat Summary Tables (Appendix 1). Assessments may change given more detailed research, and the priority list will be reviewed with the Industry Biosecurity Plan on a 3-4 year basis. An explanation of the method used for calculating the overall risk can be found on the PHA website[1].

[1] Available from **www.planthealthaustralia.com.au/go/phau/biosecurity/general-biosecurity-information**

***Table 4.*** *High priority plant pests of the plantation forest industry (pests have been ranked alphabetically)*

| Common name | Life form | Scientific name | Primary hosts | Affected plant part | Entry potential | Establishment potential | Spread potential | Economic impact | Overall risk |
|---|---|---|---|---|---|---|---|---|---|
| **Invertebrates** | | | | | | | | | |
| **Mountain pine beetle** | Btle | *Dendroctonus ponderosae* | Pines (*Pinus*), spruce (*Picea*) | Tree trunks, larvae feed on cambium under bark | MEDIUM | HIGH<br>Aus. has over 1 mil ha of pine plantations | HIGH[2] | HIGH | **HIGH** |
| **Red turpentine beetle** | Btle | *Dendroctonus valens* | Attacks over 40 species of conifers in USA; esp. destructive to Radiata pine | Basal parts of tree trunks | MEDIUM | HIGH<br>Aus. has over 1 mil ha of pine plantations | HIGH[3] | HIGH | **HIGH** |
| **Spruce bark beetle** | Btle | *Ips typographus* | Spruce, recorded in pine | Beetles usually attack weakened, dying or recently felled trees | LOW<br>In Europe/ Eurasia | HIGH | HIGH | HIGH | **MEDIUM** |
| **Japanese pine sawyer, Pine sawyer, Southern pine sawyer, White-spotted sawyer** | Btle | *Monochamus* spp. incl. *M. alternatus*, *M. galloprovinicialis*, *M. titillator* and *M. scutellatus* | *Pinus* spp., spruce, fir | Whole plant, fruits, pods, leaves and stems. | MEDIUM<br>Entry may be thru packaging and dunnage | HIGH<br>Young beetle grubs survive well in cut lumber | HIGH | HIGH[4] | **HIGH** |
| **Pine shoot beetle** | Btle | *Tomicus piniperda* | *Pinus* spp. (including: *P. sylvestris*, *P. radiata*), *Abies* spp., *Larix* spp., *Picea* spp., *Pseudotsuga* spp. | Shoots | MEDIUM | HIGH | HIGH | HIGH | **HIGH** |

[2] Attacks pine monocultures on huge scale in Canada and USA; millions of trees can be killed in an outbreak
[3] Most widely spread bark beetle in USA; Aus. has the right combination of host and climatic suitability for this pest
[4] High economic impact because of association with the Pinewood nematode species complex (see Page 38)

| Common name | Life form | Scientific name | Primary hosts | Affected plant part | Entry potential | Establishment potential | Spread potential | Economic impact | Overall risk |
|---|---|---|---|---|---|---|---|---|---|
| **Formosan subterranean termite** | Iso | *Coptotermes formosanus* | Living and dead trees, timber in service, any material containing cellulose. i.e. paper etc. | Wooden parts of living and dead trees, timber in service | HIGH[5] | HIGH<br>Usually invades mildly temperate climates | MEDIUM | HIGH | **HIGH** |
| **Asian subterranean termite** | Iso | *Coptotermes gestroi* | Living and dead trees, timber in service, any material containing cellulose. i.e. paper etc. | Timber in service, living trees | HIGH | HIGH<br>Limited to tropical localities | MEDIUM | HIGH | **HIGH** |
| **Giant wood wasp** | Hym | *Urocerus gigas* | Pines | Wood of recently cut, fallen, weakened trees and green timber | HIGH | HIGH | HIGH | MEDIUM | **MEDIUM** |
| **Burning moth** | Lep | *Hylesia nigricans* | Acacia, Eucalyptus and other species | Leaves | HIGH<br>Egg masses have been intercepted on cargo and ships | HIGH<br>Australia has a number of host species | HIGH<br>Adults are strong fliers, larvae are processionary | HIGH<br>Major defoliator also public health concerns | **HIGH** |
| **Gypsy moth complex** | Lep | *Lymantria dispar* complex | Over 600 species of trees and shrubs including Eucalypts and pines | Larvae feed on foliage; can cause high mortality when forests are under stress from drought or other pests | HIGH[6] | HIGH | HIGH | HIGH<br>Aus. trees suffer from droughts and other pests. | **HIGH** |

[5] Regularly intercepted at the border
[6] Females can fly up to 15 km and larvae can balloon (i.e. use silk to float into the air as newly hatched larvae) up to 8 km under favourable wind conditions

| Common name | Life form | Scientific name | Primary hosts | Affected plant part | Entry potential | Establishment potential | Spread potential | Economic impact | Overall risk |
|---|---|---|---|---|---|---|---|---|---|
| **Nun moth** | Lep | *Lymantria monacha* | Wide range of hosts including fruit trees and confers such as *Pinus* spp., spruce (*Picea* spp.), fir (*Abies* spp.) and larch (*Larix* spp.). | Leaves | HIGH | HIGH | MEDIUM[7] | HIGH Defoliation by larvae can kill trees, causes economic loss | **HIGH** |
| **White spotted tussock moth** | Lep | *Orgyia thyellina* | Larvae feed on the foliage of urban trees and plants, horticultural plants, forest trees | Leaves | HIGH[8] | HIGH Absence of natural enemies may allow this sp. to become a serious pest of timber sp. and ornamentals | HIGH[9] | HIGH | **HIGH** |
| **Pinewood nematode species complex** | Nem | *Bursaphelenchus* spp. incl. *B. xylophilus* | *Pinus* spp. | Roots as well as all above ground tissues | MEDIUM | LOW | MEDIUM[10] | HIGH | **MEDIUM** |
| **Pathogens** | | | | | | | | | |
| **Eucalyptus canker disease** | Fun | *Chrysoporthe austroafricana* | *Tibouchina* spp. (amenity plant), *Eucalyptus* spp., *Corymbia* spp., *Syzygium* spp. | Stems | MEDIUM Pathogen in South Africa | HIGH | HIGH | MEDIUM Causes tree death. Presence in South Africa suggests similar areas in Australia could be affected | **MEDIUM**[11] |

[7] Most often found on forest products, shipping containers, cargo and ships' structures; adults strong fliers, attracted to light
[8] Present in China, Korea, Japan, Far Eastern Russia and Taiwan; eradicated from NZ in 1998
[9] Strong fliers, attracted to light; produces up to 3 generations per year; first 2 generations of females fly; the 3rd is wingless
[10] Transported with nematode infested logs or by *Monochamus* beetles (see Page 36)
[11] Significant pest in tropical/sub-tropical regions

| Common name | Life form | Scientific name | Primary hosts | Affected plant part | Entry potential | Establishment potential | Spread potential | Economic impact | Overall risk |
|---|---|---|---|---|---|---|---|---|---|
| **Western gall rust** | Fun | *Endocronartium harknessii* | Restricted to pine, the two-needle or three- needle pines (including *Pinus radiata*) | Branches, stems, seedlings | MEDIUM | HIGH | HIGH | HIGH | **HIGH** |
| **Pitch canker** | Fun | *Fusarium circinatum* | Pines and Douglas fir | Branches, exposed roots and trunks | MEDIUM | HIGH | HIGH | HIGH | **HIGH** |
| **Daño Foliar del Pino** | Fun | *Phytophthora pinifolia* | *Pinus radiate* | Foliage | LOW | HIGH | HIGH | HIGH | **MEDIUM** |
| **Sudden oak death** | Fun | *Phytophthora ramorum* | Numerous trees and shrubs incl. Eucalypts | Stems, twigs, branches leaves | MEDIUM[12] | HIGH | HIGH | HIGH | **HIGH** |
| **Eucalyptus /guava/myrtle rust** | Fun | *Puccinia psidii sensu lato* (exotic strains) | Myrtaceae | Leaves, shoots, young branches, epicormics, coppice | HIGH | HIGH | HIGH | HIGH | **HIGH** |
| **Coniothyrium eucalyptus canker** | Fun | *Teratosphaeria zuluensis* and *T. gauchensis* | *Eucalyptus* spp. | Tree stems, trunks and leaves | MEDIUM | HIGH | HIGH | MEDIUM<br>mostly risk to tropical/ sub-tropical areas | **MEDIUM** |

[12] Current restrictions on imports. Heat treatment temp, may need to be reviewed if Sudden Oak Death can survive

# Current resources for detection and identification of high priority pests

Australia's preparedness and ability to respond to High Priority Pests (HPPs) should they be detected is reliant on the level of diagnostic and surveillance capacity in place. Table 5 provides a summary of formal active surveillance programs and the status of national diagnostic protocols developed for each of the plantation forest industry's HPPs.

Development of national diagnostic protocols is managed through the Subcommittee on Plant Health Diagnostic Standards. While diagnostic capacity may exist in Australia in the absence of these documents, an endorsed national diagnostic protocol provides a consistent and agreed diagnostic approach for identifying new pests. Further information on these documents can be found on page 85.

***Table 5.*** *Status of diagnostic protocols and surveillance programs for high priority pests*[13]

| Common name | Life form | Scientific name | National diagnostic protocol | Surveillance programs |
|---|---|---|---|---|
| **Pinewood nematode species complex** | Nem | *Bursaphelenchus* spp. incl. *B. xylophilus* | Draft | Not developed |
| **Eucalyptus canker disease** | Fun | *Chrysoporthe austroafricana* | Not developed | Not developed |
| **Formosan subterranean termite** | Iso | *Coptotermes formosanus* | Not developed | Not developed |
| **Asian subterranean termite** | Iso | *Coptotermes gestroi* | Not developed | Not developed |
| **Mountain pine beetle** | Btle | *Dendroctonus ponderosae* | Draft | Not developed |
| **Red turpentine beetle** | Btle | *Dendroctonus valens* | Draft | Not developed |
| **Western gall rust** | Fun | *Endocronartium harknessii* | Not developed | Not developed |
| **Pitch canker** | Fun | *Fusarium circinatum* | Not developed | Not developed |
| **Burning moth** | Lep | *Hylesia nigricans* | Not developed | Not developed |
| **Spruce bark beetle** | Btle | *Ips typographus* | Not developed | Not developed |

[13] Information presented has been taken from the National Plant Health Status Report 2011 and confirmed or updated through Plant Health Committee, the Subcommittee on Plant Health Diagnostic Standards, the Subcommittee on National Plant Health Surveillance or other stakeholders.

| Common name | Life form | Scientific name | National diagnostic protocol | Surveillance programs |
|---|---|---|---|---|
| **Gypsy moth complex** | Lep | *Lymantria dispar* complex | Draft | National Asian gypsy moth trapping program. Funded by DAFF. Delivered by NSW DPI, PIRSA, DPIPWE, DPI Vic, DSE Vic, DAFWA, DAFF Qld<br>Urban hazard site surveillance program/ Multiple plant pest surveillance program funded by DAFF |
| **Nun moth** | Lep | *Lymantria monacha* | Not developed | Not developed |
| **Japanese pine sawyer, Pine sawyer, Southern pine sawyer, White-spotted sawyer** | Btle | *Monochamus* spp. incl. *M. alternatus (vector in Asia)*, *M. galloprovincialis (vector in Portugal and Spain)*, *M. titillator* and *M. scutellatus (other known vectors)* | Not developed | Not developed |
| **White spotted tussock moth** | Lep | *Orgyia thyellina* | Not developed | Not developed |
| **Daño Foliar del Pino** | Fun | *Phytophthora pinifolia* | Not developed | Not developed |
| **Sudden oak death** | Fun | *Phytophthora ramorum* | Endorsed (NDP5) | Not developed |
| **Eucalyptus /guava/myrtle rust** | Fun | *Puccinia psidii sensu lato* (exotic strains) | Draft | Eucalyptus rust[14]. Funded by DAFF, PIRSA. Delivered by PIRSA<br>Exotic plant pest response. Funded and delivered by DPI Vic<br>Myrtle rust survey[15] funded by PIRSA and DAFF, delivered by PIRSA<br>Myrtle rust passive surveillance. Funded and delivered by DAFWA and, DECWA<br>Myrtle rust survey. Funded and delivered by DPIPWE |
| **Coniothyrium eucalyptus canker** | Fun | *Teratosphaeria zuluensis* and *T. gauchensis* | Not developed | Not developed |
| **Pine shoot beetle** | Btle | *Tomicus piniperda* | Not developed | Not developed |
| **Giant wood wasp** | Hym | *Urocerus gigas* | Not developed | Not developed |

[14] Surveys focus on *Eucalyptus* spp.
[15] Surveys focus on Myrtaceae spp.

# Pests of limited distribution

Pests present in Australia but with limited distribution that are of significance to the plantation forest industry are listed in Table 6. This list will be reviewed with the Plantation forest biosecurity plan every 3-4 years.

# Pests requiring more research

Pests listed in Table 7 have been identified by the plantation forest industry as a priority for additional research due to their threat to the plantation forest industry.

***Table 6.*** *Pests identified as priority that are of limited distribution within Australia*

| Common name | Life form | Scientific name | Hosts | Distribution in Australia | Plant part affected |
|---|---|---|---|---|---|
| **Cryphonectria canker** | Fun | *Chrysoporthe cubensis* | *Eucalyptus* spp. *Tibouchina heteromalla, Syzygium* spp. | WA, Qld | Roots. Stem cankers can also develop overseas |
| **Five spined engraver; five spined bark beetle** | Btle | *Ips grandicollis* | Pines | Pine growing regions of SA, WA, Vic, Qld, NSW (only absent from Tas) | Bark and phloem |
| **Sirex wood wasp** | Hym | *Sirex noctilio* | Pines | Pine growing regions of NSW, Tas, Vic, ACT, SA, and limited distribution in Qld (only absent from WA) | Bole |
| **Eucalypt leaf blight** | Fun | *Teratosphaeria destructans* | *Eucalyptus* spp. | WA, NT | Leaves |
| **Rust of Myrtaceae** | Fun | *Uredo rangelii*[16] | Myrtaceae | East coast of Australia | Leaves, shoots, flowers, fruits especially on young trees |

[16] *Uredo rangelii* is a member of the *Puccinia psidii sensu lato* group of rusts

***Table 7.*** *Pests identified as priority that require more research*

| Common name | Life form | Scientific name | Area in need of research |
|---|---|---|---|
| **Pine wood nematode species complex** | Nem | *Bursaphelenchus* spp. incl. *B. xylophilus* | Susceptibility of commercial *Pinus* species, including *P. radiata* and various southern pines |
| **Ceratocystis wilt disease** | Fun | *Ceratocystis* spp. | Review of literature to determine species of significance and threat in relation to host range and proximity to Australia |
| **Cronartium pine gall rust** | Fun | *Cronartium* spp. | Review of literature to determine risk to Pine species in Australia |
| **Pitch canker** | Fun | *Fusarium circinatum* | Susceptibility of sub-tropical pines |
| **Myrtle rust** | Fun | *Puccinia psidii sensu lato* | Susceptibility of commercial species to exotic strains |
| **Sirex wood wasp** | Hym | *Sirex noctilio* | Susceptibility of sub-tropical pines and effectiveness of biological controls in sub-tropics |

# Pest risk assessments

The assessment process used in this IBP was developed in accordance with the International Standards for Phytosanitary Measures (ISPM) No. 2 and 11 (FAO, 2004; 2007). A summary of the pest risk analysis protocol followed in this IBP is shown in Table 8, and the complete protocol used for pest risk analysis in this IBP can be found on the PHA website[17].

While there are similarities in the ranking system used in this document and the import risk analysis process followed by DAFF, there are differences in the underlying methodology and scope of consideration that may result in different outcomes between the two assessment systems. This includes different guidance to assignment of qualitative probabilities when compared with DAFF's import risk analyses.

Modifications of the Biosecurity Australia protocol have been made to suit the analysis required in the IBP development process, including, but not limited to:

- **Entry potential:** The determination of entry potential in this IBP takes into account multiple possible pathways for the legal importation of plant material as well as illegal pathways, contamination and the possibility of introduction through natural means such as wind. Therefore the scope is wider than that used by Biosecurity Australia in their Import Risk Analyses, which only consider legal importation of plants or plant commodities.
- **Potential economic impact** of pest establishment in this document only takes into account the impacts on the plantation forest industry. The Biosecurity Australia Import Risk Analyses have a wider scope, including the effects to all of Australia's plant industries, trade, the environment and public health.
- **Risk potentials and impacts:** The number of categories for describing the entry, establishment and spread, and the potential economic impact in IBP (see 'Description of terms used in pest risk tables' above) differs in comparison to that used in Biosecurity Australia (2009).

[17] Available from **www.planthealthaustralia.com.au/go/phau/biosecurity/general-biosecurity-information**

***Table 8.*** *Summary of pest risk assessment process used in IBPs*

| | | |
|---|---|---|
| **Step 1** | Clearly identify the pest | • Generally pest defined to species level<br>• Alternatively a group (e.g. family, genus level) can be used<br>• Sub-species level (e.g. race, pathovar, etc.) may be required |
| **Step 2** | Assess entry, establishment and spread likelihoods | • Assessment based on current system and factors<br>• Negligible, low, medium, high or unknown ratings |
| **Step 3** | Assess likely consequences | • Primarily based on likely economic impact to industry based on current factors<br>• Negligible, low, medium, high, extreme or unknown ratings |
| **Step 4** | Derive overall risk | • Entry, establishment and spread likelihoods are combined to generate a likelihood score<br>• Likelihood score combined with the likely economic impact to generate an overall risk score |
| **Step 5** | Review the risk | • Risk ratings should be reviewed with the IBP |

The objective of risk assessment is to clearly identify and classify biosecurity risks and to provide data to assist in the evaluation and treatment of these risks. Risk assessment involves consideration of the sources of risk, their consequences, and the likelihood that those consequences may occur. Factors that affect the consequences and likelihood may be identified and addressed via risk mitigation strategies.

Risk assessment may be undertaken to various degrees of refinement, depending on the risk, information and data available. Assessment may be qualitative, semi-quantitative, quantitative, or a combination of these. The complexity and cost of assessment increase with the production of more quantitative data. It is often more practical to first obtain a general indication of the level of risk through qualitative risk assessment, and if necessary, undertake more specific quantitative assessment later (AS/NZS-4360, 1999).

# Formal Categorisation of pests for inclusion in the Emergency Plant Pest Response Deed

The following section outlines the EPPRD between all government and most industry members of PHA. The EPPRD aims to manage the impact of Emergency Plant Pests (EPPs) by establishing an industry/government agreement to cover eradication of emergency pests, reducing delays in securing funding, providing industry with greater involvement in eradication efforts, and removing disincentives to report emergency pests. The Australian Forest Products Association (AFPA) is the peak Australian plantation forest industry body and is currently a member of Plant Health Australia (1 November 2012) and became a signatory to the EPPRD in 3 December 2012.

The EPPRD only covers eradication responses to EPPs when based on an approved EPP Response Plan. Weeds are not covered by the EPPRD at this stage. Under the EPPRD, both industry and government contribute to the total cost of an approved EPP Response with the ratio of contribution based on the Category of the EPP (Table 9). The Category of the EPP is determined by the Categorisation Group and is based on the relative public versus private benefits of eradication of the EPP.

A copy of the EPPRD can be downloaded from the Plant Health Australia website (**www.planthealthaustralia.com.au/go/phau/epprd**).

## Pest categorisation

The EPPRD outlines a mechanism whereby Industry and Government Parties will contribute to the total cost of a response to an EPP Incident based on agreed Categories. These Categories determine the ratio each party will pay, based on the relative public and private benefits of EPP eradication. Four Categories are included in the EPPRD, as outlined in Table 9 and Figure 5.

Categorisation of a pest is done to determine the Parties that are most affected and who will therefore be the beneficiaries of an eradication response. It does not indicate its likelihood of eradication or its overall importance i.e. a pest listed as Category 1 is not deemed to be any more or less important than a pest listed as Category 4.

Pests listed in the HPP threat list (Table 4) may be put forward for categorisation and inclusion in Schedule 13 of the EPPRD. Other pests identified in TSTs or identified via other means as being priority pests, may also be categorised if required. The process for requesting categorisation of a Pest is set out in Schedule 3 of the EPPRD.

Pests that enter Australia, but which have not been formally categorised will be treated as belonging to Category 3 until an appropriate Category has been formally determined.

The Categorisation Group will be responsible for determining a cost sharing Category applicable for high priority pests. Only pests meeting the Emergency Plant Pest criteria will be considered for categorisation. Taking into account relevant scientific and other knowledge and experience, the Categorisation Group will consider requests for pest categorisation, re-categorisation or removal from Schedule 13 of the EPPRD. Figure 5 outlines the decision-making process used by the Categorisation Group in deciding pest Categories.

When more than one industry is Affected by an EPP, the Categorisation Group will also determine, and when requested, will review the Funding Weight for each industry. Funding Weights provide a means for calculating each industry's Proportional Share of the total industry contribution if a pest affects multiple industry Parties.

***Table 9.*** *Cost sharing categories*

| Category | Description | Funding share |
|---|---|---|
| **Category 1:**<br>Very high public benefits | Pest which if not eradicated would:<br>• cause major environmental damage to natural ecosystems; and/or<br>• potentially affect human health or cause a major nuisance to humans; and/or<br>• cause significant damage to amenity flora; and<br>• have relatively little impact on commercial crops.<br>• This category also covers situations where the pest has a very wide range of hosts including native flora and there is considerable uncertainty as to the relative impacts on the different crops. In short, it is almost impossible to properly determine which industries benefit from eradication and to what extent, and in any case, the incursion primarily affects native flora and/or amenity plants, and/or is a major nuisance if not a health risk to humans. | 100% Government |
| **Category 2:**<br>High public benefits | Pest which if not eradicated would:<br>• cause significant public losses either directly through serious loss of amenity and/or environmental values and/or effects on households or indirectly through very severe economic impacts on regions and the national economy, through large trade losses with flow on effects through the economy; and<br>• also impose major costs on the industries concerned so that these industries would significantly benefit from eradication. | 80% Government<br>20% Industry |
| **Category 3:**<br>Moderate public benefits | Pest which if not eradicated would:<br>• primarily harm the industries concerned but there would also be some significant public costs as well (that is, moderate public benefits from eradication). In this case the pest could adversely affect public amenities, households or the environment, and/or could have significant, though moderate trade implications and/or national and regional economic implications. | 50% Government<br>50% Industry |
| **Category 4:**<br>Mostly if not wholly private benefits | Pest which if not eradicated would:<br>• have little or no public cost implications and little or no impacts on natural ecosystems. The affected commercial industries would be adversely affected primarily through additional costs of production, through extra control costs or nuisance costs; and<br>• generally there would be no significant trade issues that would affect national and regional economies. | 20% Government<br>80% Industry |

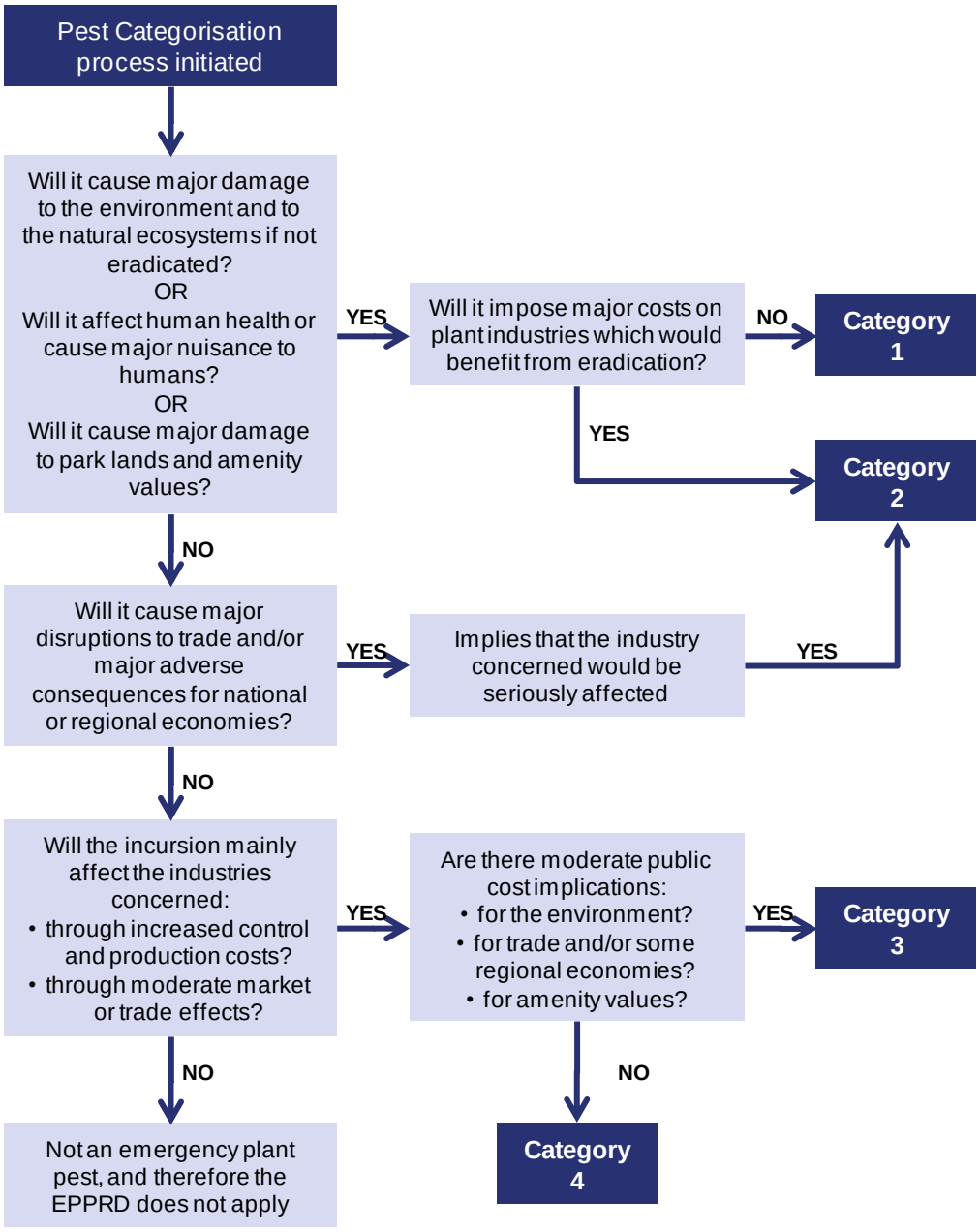



***Figure 5.*** *Summarised pest categorisation decision tree*

## Composition of the Categorisation Group

As described by Part 4 of Schedule 8 of the EPPRD, the membership of the Categorisation Group for each industry will comprise (at a minimum):

- an independent chair from Plant Health Australia
- a standing representative of industry parties
- three technical experts [people with specific expertise in the areas of plant pathology or entomology], one nominated by the Australian Government, one nominated by the states/territories and one nominated by plant industry(s)
- a person with relevant economic expertise including social, trade and regional impact assessment
- a nominee from each plant industry or industries affected by the exotic plant pest being categorised

The Categorisation Group may also seek advice from:

- a person with human health expertise, if a public health risk may exist
- a conservation representative (e.g. Australian Government Department of Environment and Heritage) or
- other relevant members determined by the independent chair

Advisers who have specific expertise may accompany members of the Categorisation Group, but will not be part of the decision-making process.

Categorisation Group composition taken from Part 4 of Schedule 8 of the EPPRD.

## Plantation forest Emergency Plant Pests categorised to date

EPPs for the plantation forest industry that have received formal pest categorisation (included within Schedule 13 of the EPPRD) are listed in Table 10. For the latest version of Schedule 13, refer to the EPPRD version found at **www.planthealthaustralia.com.au/go/phau/epprd**.

***Table 10.*** *Formal categories for pests of the plantation forest industry as listed in the EPPRD (as at August 2012)*

| Scientific name | Common name | Formal Category |
|---|---|---|
| *Phytophthora ramorum* | Sudden oak death | 1 |
| *Uredo rangelii*[18] | Myrtle rust | 1 |

# References

AS/NZS-4360 (1999) Risk Management Standards Association of Australia, Strathfield, NSW.

Biosecurity Australia (2009) Draft pest analysis report for '*Candidatus* Liberibacter psyllaurous' in fresh fruit, potato tubers, nursery stock and its vector the tomato-potato psyllid. Biosecurity Australia, Canberra.

FAO (2004) Pest risk analysis for quarantine pests including analysis or environmental risks and living modified organisms. International Standards for Phytosanitary Measures No. 11. Secretariat of the International Plant Protection Convention, Food and Agriculture Organization of the United Nations, Rome.

FAO (2007) Framework for pest risk analysis. International Standards for Phytosanitary Measures No. 2. Secretariat of the International Plant Protection Convention, Food and Agriculture Organization of the United Nations, Rome.

[18] *Uredo rangelii* is a member of the *Puccinia psidii sensu lato* group of rusts

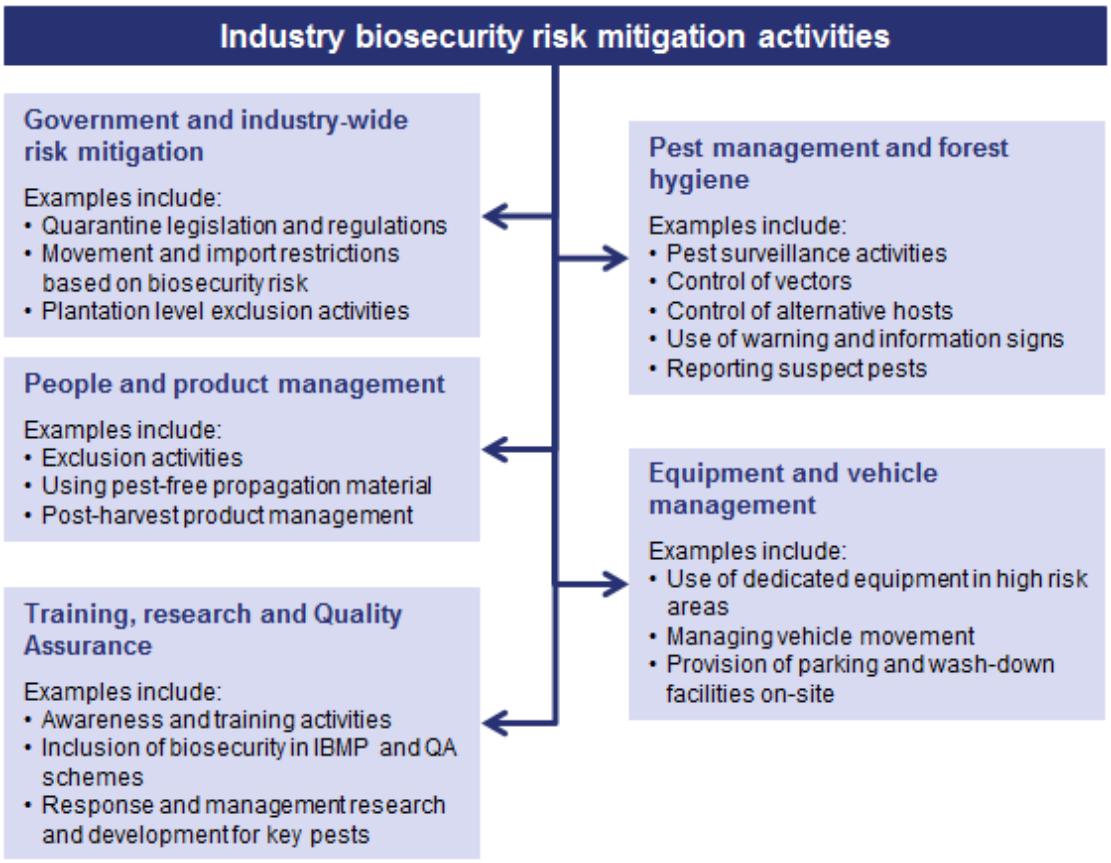
# RISK MITIGATION PLAN

# Introduction

There are a number of strategies that can be adopted to help protect and minimise the risks of exotic and emergency pests under International Plant Protection Convention (IPPC) standards (**www.ippc.int/IPP/En/default.jsp**) and Commonwealth and State legislation. Many pre-emptive practices can be adopted to reduce the risk of exotic pest movement for the plantation forest industry (Figure 6). Such risk mitigation practices are the responsibility of governments, industry and the community.

A number of key risk mitigation areas are outlined in this guide, along with summaries of the roles and responsibilities of the Australian Government, state/territory governments, and plantation forest industry members. This section is to be used as a guide outlining possible activities that may be adopted by industry and growers to mitigate risk. Each grower will need to evaluate the efficacy of each activity for their situation.

***Figure 6.*** *Examples of biosecurity risk mitigation activities*



# Barrier quarantine

Barrier quarantine should be implemented at all levels of the plantation forest industry including national, state, regional, and plantation levels.

## National level – importation restrictions

**Responsibility >** Australian Government

The Department of Agriculture, Fisheries and Forestry (DAFF) is the Australian Government department responsible for maintaining and improving international trade and market access opportunities for agriculture, fisheries, forestry, and food industries. DAFF achieves this through:

- establishment of scientifically-based quarantine policies
- provision of effective technical advice and export certification services
- negotiations with key trading partners
- participation in multilateral forums and international sanitary and phytosanitary (SPS) standard-setting organisations
- collaboration with portfolio industries and exporters

DAFF is responsible for developing biosecurity sanitary and phytosanitary (SPS) risk management policy and reviewing existing quarantine measures for the importation of live animals and plants, and animal and plant products. In particular, DAFF undertakes Import Risk Analyses (IRAs) to determine which products may enter Australia, and under what quarantine conditions. DAFF also consults with industry and the community, conducting research and developing policy and procedures to protect Australia's animal and plant health status and natural environment. In addition, DAFF assists Australia's export market program by negotiating other countries' import requirements for Australian animals and plants. Further information can be found at **www.daff.gov.au**.

The administrative authority for national quarantine is vested in DAFF under the *Quarantine Act 1908*. Quarantine policies are developed on the basis of an IRA process. This process is outlined in the Import Risk Analysis Handbook 2011 (DAFF 2011). DAFF maintains barrier quarantine services at all international ports and in the Torres Strait region. The management of quarantine policy, as it relates to the introduction into Australia of fruit, seed, or other plant material, is the responsibility of DAFF.

The Schedule 5 “Permitted Seeds” list from the *Quarantine Proclamation 1998* is maintained on the Import Conditions (ICON) database at **www.aqis.gov.au/icon**. ICON contains the current Australian import conditions for more than 20,000 foreign plants, animal, mineral and human products and is the first point of access to information about Australian import requirements for a range of commodities. It can be used to determine if a commodity intended for import to Australia requires a quarantine import permit and/or treatment or if there are any other quarantine prerequisites. There are currently a number of cases for plantation forest plants or plant parts listed on ICON. A brief summary is provided in Table 11, however due to the constantly changing nature of the database interested persons should refer to the ICON database for up to date information relating to import conditions. For export conditions see the Manual of Importing Country Requirements (MICoR) database at **www.daff.gov.au/micor/plants**.

The Australian Government is responsible for the inspection of machinery and equipment being imported into Australia. Any machinery or equipment being imported into Australia must meet quarantine requirements. If there is any uncertainty, contact DAFF on (02) 6272 3933 or 1800 020 504, or visit the website at **www.daff.gov.au/aqis**.

The World Trade Organization (WTO) Sanitary and Phytosanitary Agreement (SPS Agreement) facilitates international trade while providing a framework to protect the human, animal and plant health of WTO members. SPS measures put in place must minimise negative effects on trade while meeting an importing country’s appropriate level of protection. For plant products these measures are delivered through the International Plant Protection Convention (IPPC) standard setting organisations and collaboration with portfolio industries and exporters. For more information on the IPPC visit **www.ippc.int**.

***Table 11.*** *Import condition summary for the plantation forest industry listed in ICON (as at August 2012)*[19]

| Commodity | End use | Import status | Import permit | Additional comments |
|---|---|---|---|---|
| *Acacia* spp. | Nursery stock and seeds for sowing | Permitted | Required | Condition for import from all countries.<br>Table of permitted and prohibited species can be found on ICON website. |
| *Eucalyptus* spp. | Nursery stock | Permitted | Required | Condition for import for all countries excluding Canada, European countries, New Zealand and USA.<br>Goods must be accompanied by an official government Phytosanitary certificate |
| *Eucalyptus* spp. | Nursery stock | Not Permitted | | Condition for import from Canada, New Zealand, USA and European countries.<br>The importation of plants and plant parts (other than tissue cultures) of this genus/species is prohibited entry into Australia. See ICON for further details. |
| Timber packaging and dunnage | All uses other than as animal foods, fertilisers or for growing purposes | Permitted | Not required | Condition for import from all countries.<br>All solid wood components of timber packaging and dunnage are subject to mandatory treatment either prior to shipment or on arrival in Australia<br>See ICON for further details |
| *Pinus* spp. | Nursery stock and seeds for sowing | Permitted | Required | Condition for import on all countries excluding Chile, Haiti, Honduras, Iraq, Italy, Japan, Mexico, New Zealand, North Korea, Philippines, South Africa, Portugal, South Korea, Spain, Tanzania, New Zealand and USA.<br>Only certain species are permitted entry, for a full list see ICON website. All other species are prohibited.<br>Tissue cultures of only certain species are permitted entry, for a full list see ICON website. All other species are prohibited. |

[19] This is a summary only and should not be used as a substitute for consulting the ICON database or AQIS directly to confirm the details of import conditions and any recent changes

The World Trade Organization (WTO) Sanitary and Phytosanitary Agreement (SPS Agreement) facilitates international trade while providing a framework to protect the human, animal and plant health of WTO members. SPS measures are put in place to minimise negative effects on trade. For plant products these measures are delivered through the International Plant Protection Convention (IPPC) standard setting organisations and collaboration with portfolio industries and exporters. For more information on the IPPC visit **www.ippc.int**.

## State and regional level – movement restrictions

**Responsibility >** state/territory government

The ability to control movement of materials that can carry and spread pests of the plantation forest industry is of high importance. Each state has quarantine legislation in place to control the importation of plant material interstate and intrastate, and to manage agreed pests if an incursion occurs (refer to Table 12). Further regulations have been put in place in response to specific pest threats and these are regularly reviewed and updated by state/territory authorities and the Domestic Quarantine and Market Access Working Group (DQMAWG).

Moving plant material between states/territories generally requires permits from the appropriate authority, depending on the plant species and which territory/state the material is being transferred to/from. Moving plant material intrastate may also require a permit from the appropriate authority. Information on pre-importation inspection, certification and treatments and /or certification requirements for movement of plantation timber can be obtained by contacting your local state or territory agriculture agency directly (see Table 12), or through contacts listed on the DQMAWG website **www.domesticquarantine.org.au/go/dqmawg**.

The movement of harvesting vehicles and equipment between states is also restricted because of the high risk of inadvertently spreading pests. Each state has quarantine legislation in place governing the movement of machinery, equipment and other potential sources of pest contamination. Information on vehicle and equipment movement restrictions can be obtained by contacting your local state/territory department of agriculture (Table 12).

***Table 12.*** *Interstate and interregional movement of plant products – legislation, quarantine manuals and contact numbers*

| State | Administering authority | Legislation | Links to quarantine manual[20] | Phone |
|---|---|---|---|---|
| ACT | Environment ACT<br>**www.environment.act.gov.au** | *Plant Disease Act 2002*<br>*Pest Plants and Animals Act 2005* | See NSW conditions | 13 22 81 |
| NSW | Department of Primary Industries<br>**www.dpi.nsw.gov.au** | *Plant Diseases Act 1924*<br>*Plant Diseases Regulation 2008*<br>*Noxious Weeds Act 1993*<br>*Noxious Weeds Regulation 2008* | **www.dpi.nsw.gov.au/legislation-acts/plant-diseases** | 02 6391 3100 |
| NT | Department of Primary Industry and Fisheries<br>**www.nt.gov.au/d/Primary_Industry** | *Plant Health Act 2008*<br>*Plant Health Regulations 2011* | **www.nt.gov.au/d/Primary_Industry/index.cfm?newscat1=&newscat2=&header=NT%20Quarantine** | 08 8999 5511 |
| Qld | Biosecurity Queensland, a part of the Department of Agriculture, Fisheries and Forestry, Queensland<br>**www.biosecurity.qld.gov.au** | *Plant Protection Act 1989*<br>*Plant Protection Regulation 2002* | **www.daff.qld.gov.au/26_114.htm** | 13 25 23 |
| SA | Primary Industries and Regions SA<br>**www.pir.sa.gov.au** | *Plant Health Act 2009*<br>*Plant Health Regulations 2009* | **www.pir.sa.gov.au/biosecuritysa/planthealth/legislation/plant_quarantine_standard** | 08 8207 7820 |
| Tas | Department of Primary Industries, Parks, Water and Environment<br>**www.dpipwe.tas.gov.au** | *Plant Quarantine Act 1997*<br>*Weed Management Act 1999* | **www.dpipwe.tas.gov.au/inter.nsf/Topics/LBUN-7YQVX9?open** | 1300 368 550 |
| Vic | Department of Primary Industries<br>**www.dpi.vic.gov.au** | *Plant Biosecurity Act 2010*<br>*Plant Health and Plant Products Regulations 2006* | **http://dpi.vic.gov.au/agriculture/horticulture/moving-plants-products/About-Plant-Quarantine-Manual** | 13 61 86 |
| WA | Department of Agriculture and Food<br>**www.agric.wa.gov.au** | *Biosecurity and Agricultural Management Act 2007*[21] | **www.agric.wa.gov.au/PC_92916.html** | 08 9368 3333 |

[20] If the link does not work, the relevant documents can be found by going to the department home page and checking the quarantine section of each website
[21] Will replace *Plant Diseases Act 1914* and *Plant Diseases Regulations 1989*. Implementation soon to be underway.

## Australian Capital Territory

Generally the regulations in the ACT will be the same as those in NSW. But it is important to check the current ACT regulations before moving plant material between places. Information on pre-importation inspection, certification and treatment requirements may be obtained from the Compliance and Quarantine Services branch of ACT government Department of Territory and Municipal Services by phone (02) 6207 6376 or 13 22 81.

## New South Wales

Information on pre-importation inspection, certification and treatment requirements may be obtained by contacting the Regulatory Compliance Manager on 02 63913384 or email: **biosecurity@dpi.nsw.gov.au**. Alternatively information can also be found at the DPI – Biosecurity website: **http://www.dpi.nsw.gov.au/biosecurity/plant**.

## Northern Territory

Administrative authority for regional quarantine in the Northern Territory is vested in the Department of Primary Industry and Fisheries (DPIF) under the *Plant Health Act 2008* and *Plant Health Regulations 2011*. The Act enables notifiable pests to be gazetted, quarantine areas to be declared and inspectors appointed to carry out wide ranging control and/or eradication measures. Plant import requirements for particular pests, plants or plant related materials are identified in the Regulations. Further information on Northern Territory import requirements and treatments can be obtained by contacting Northern Territory Quarantine on (08) 8999 2118 or email **quarantine@nt.gov.au.** For more information refer to the DPIF website (**www.nt.gov.au/d**).

## Queensland

Information on specific pre-importation inspection, treatments and/or certification requirements for movement of any fruit or plant material into Queensland, as well as maps of pest quarantine areas, may be obtained from the Biosecurity Queensland part of the DAFF Qld website (**www.daff.qld.gov.au/26_114.htm**). Further details can be obtained from the DAFF Qld Customer Service Centre (13 25 23 within Queensland, or phone (07) 3404 6999 or fax (07) 3404 6900 interstate).

## South Australia

Information on pre-importation inspection, certification and treatments and /or certification requirements for movement of fruit or plant material in South Australia may be obtained from PIRSA Biosecurity - Plant Health by phone (08) 8207 7820 or fax (08) 8207 7844. Further information can be found at **www.pir.sa.gov.au/biosecuritysa/planthealth**.

PIRSA have strict regulations and requirements regarding the entry of plant material (including plantation species) into the State of South Australia. Plants and plant material are not permitted to enter South Australia unless accompanied by a Plant Health Certificate or Plant Health Assurance Certificate issued by a departmental inspector or accredited business in the State of origin. The original certificate must accompany plants during transport. A transport manifest, detailing all plant consignments, must be sent to PIRSA (fax (08) 8124 1467 or email to **Pirsa.PlantHealthManifest@sa.gov.au**) prior to plants arriving in South Australia. For further information on import conditions consult the Plant Quarantine Standard (**www.pir.sa.gov.au/biosecuritysa/planthealth/legislation**).

## Tasmania

General and specific import conditions apply to the importation of plant material into Tasmania to prevent the introduction of pests and diseases into the State. Import of vegetables and plants into Tasmania must meet State import requirements and be accompanied by a Notice of Intention to import. For further information on import conditions consult the Department of Primary Industries, Parks, Water and Environment (DPIPWE) Biosecurity website (**www.dpipwe.tas.gov.au/biosecurity**).

## Victoria

The movement into Victoria of plants and plant products may be subject to a prohibition, or to one or more conditions which may include chemical treatments. These prohibitions and conditions are described in the Plant Quarantine Manual (see link in Table 12). Further information on pre-importation inspection, certification and treatment requirements may be obtained from the DPI Customer Service Centre by phone 13 61 86.

## Western Australia

The lead agency for agricultural biosecurity in Western Australia is the Department of Agriculture and Food (DAFWA). Western Australia is free from many insect or animal pests, plant or animal diseases and weeds which are found elsewhere in Australia. Quarantine WA prevents their entry into the State and controls the post-border spread of existing pests, diseases and weeds. Restrictions apply to any plants or parts of plants, including fruit and seed, brought into Western Australia. Only permitted species of plants or parts of plants can be imported, and these MUST satisfy applicable treatment and certification requirements.

Quarantine WA actively protects Western Australia's agriculture, environment and lifestyle by conducting inspections for quarantine risk material at entry points for private travellers and commercial clients arriving from interstate.

For further information on pre-importation inspection, certification and treatment requirements contact Quarantine Western Australia on (08) 9334 1800 or fax (08) 9334 1880.

## Plantation level – exclusion activities

**Responsibility >** state/territory government, industry/growers and nursery operators

A significant risk of spreading pests onto plantations arises when propagation material, people, machinery and equipment move from property to property and from region to region. It is the responsibility of the industry and the owner/manager of each plantation to ensure these risks are minimised.

It is in the interests of industry to encourage and monitor the management of risk at the plantation level, as this will reduce the probability of an incursion and increase the probability of early detection. This should in turn reduce the likelihood of a costly incident response, thereby reducing costs to industry, government and the community.

One major way this can be achieved is through management of industry biosecurity at the plantation level using exclusion practices (signs, gates, etc.). Further detail on potential strategies is included in the Plantation Biosecurity section (page 74). This could be used as a reference source for developing extension material for promoting good plantation hygiene.

## Nurseries and retailers – 'hitch-hikers'

**Responsibility >** state/territory government, industry/growers and nursery operators

Nurseries (commercial and retail) and retail outlets, including chain stores, can be the primary distributors of plantation species in a region. It is vital to ensure that pests are not introduced into new areas as 'hitch-hikers' on nursery material.

Produce transporters and purchasers must obtain advice from state quarantine authorities before moving plant material between regions or interstate. Advice in all states is available free of charge from the Domestic Quarantine website (**www.dqmawg.org.au**).

Nursery stock should be labelled in a manner that allows the source to be identified for trace-back purposes. Where pest or disease symptoms are found on nursery stock it is important to identify the causal agent. New or unfamiliar pests should be reported for identification (see Reporting Suspect Pests section on page 77).

Good nursery hygiene practices help to prevent pest spread. The Nursery and Garden Industry Australia (NGIA) Nursery Industry Accreditation Scheme (NIASA) and similar schemes provide guidelines for nursery owners and growing media suppliers for maintaining hygiene standards. Examples of relevant nursery hygiene practices include training of staff to

recognise pest and disease symptoms, controlling pests in nursery crops, and sterilisation of growing media and equipment. Information on NIASA can be obtained from the NGIA (**www.ngia.com.au**) or the Nursery and Garden industry office in your state.

# Surveillance

Surveys enhance prospects for early detection, minimise costs of eradication and are necessary to meet the treaty obligations of the WTO Sanitary and Phytosanitary Agreement (SPS) with respect to the area freedom status of Australia's states, territories, and regions.

The SPS agreement gives WTO members the right to impose SPS measures to protect human, animal and plant life health provided such measures do not serve as technical barriers to trade. In other words, for countries (such as Australia) that have signed the SPS Agreement, imports of food, including fresh fruit and vegetables, can only be restricted on proper, science-based quarantine grounds. Where quarantine conditions are imposed, these will be the least trade restrictive measures available that meet Australia's appropriate level of quarantine protection. The agreement also stipulates that claims of area freedom must be supported by appropriate information, including evidence from surveillance and monitoring activities. This is termed "evidence of absence" data and is used to provide support that we have actively looked for pests and not found them.

There are currently no international standards for structured pest surveys. Their planning and implementation depends on the risk involved, the resources available, and the requirements of trading partners (particularly when Australia wishes to access overseas markets). The intensity and timing of surveys also depend on the spread characteristics of the pest and the costs of eradication. Some examples of surveillance activities undertaken by the plantation forest industry, and state/territory agencies on behalf of the plantation forest industry, are listed in Table 13.

Early detection of an exotic incursion can significantly increase the likelihood of a successful eradication campaign, and reduce the associated costs. Effective surveillance plays a critical role in working toward this goal. Surveillance can be either targeted toward specific pests, or general in nature. General non-targeted surveillance is based on recognising normal versus suspect plant material. Targeted surveillance is important for establishing whether particular pests are present in each state or region, and if so, where these occur.

Industry personnel can provide general surveillance as part of their normal management procedures, provided individuals are aware of what to look for and of reporting procedures (i.e. 'passive surveillance'). Forestry personnel (foresters, consultants, contractors, etc.) can provide valuable information as they are regularly in the field, and hence can observe any unusual pest activity or symptoms on plants.

## National surveillance programs

**Responsibility >** Australian Government, industry (national associations)

DAFF maintains barrier quarantine services at all international ports and in the Torres Strait region. DAFF also surveys the northern coast of Australia, offshore islands and neighbouring countries for exotic pests that may have reached the country through other channels (e.g. illegal vessel landings in remote areas, bird migrations, wind currents) as part of the Northern Australia Quarantine Strategy (NAQS).

## State surveillance programs

**Responsibility >** state/territory governments, industry/growers and nursery operators

State level surveillance of the plantation forest industry depends on the participation of all stakeholder groups, industry representative groups, large plantation companies and smaller forest growers.

The state agriculture agency can provide for:

- planning and auditing surveillance systems
- coordinating surveillance activities with those of industry and interstate groups
- providing diagnostic services
- providing field diagnosticians for special field surveillance
- carrying out surveillance on non-commercial sites
- liaising with industry members
- developing communication, training and extension strategies with industry
- carrying out training
- reporting to all interested parties (DAFF, national bodies, trading partners and industry)

Various pest surveillance programs are managed by DAFF, state/territory agriculture departments and the forest industry, some of which are described. Many state departments provide diagnostic services whereby suspect samples can be forwarded and diagnosed for the

presence of exotic pests free of charge. Official state sponsored surveillance programs that target pests of the plantation forest industry (exotic or those under official control in a region or state) are shown in Table 13. Individual forest growers or private companies also have surveillance programs that may not be captured in Table 13.

***Table 13.*** *Official state sponsored surveillance programs that target pests of the plantation forest industry (exotic or those under official control in a region or state)*[22]

| Surveillance program | Pests targeted | State/region | Funder | Deliverer |
|---|---|---|---|---|
| Plant pest hotline WA | Various | WA – major urban and forestry regions | DAFWA | DAFWA |
| National Gypsy Moth Trapping Program | *Lymantria dispar, Lymantria* spp. | NSW, SA, Qld, TAS, WA, Vic – major urban regions and ports of entry | DAFF | DAFWA, DAFF Qld, DPIPWE, DPI Vic, NSW DPI, PIRSA, DSE |
| Phytophthora surveillance | *Phytophthora cinnamomi* | NT – agricultural and urban regions | DPIF | DPIF |
| Exotic plant pest response | *Puccinia psidii sensu lato* | Vic – major urban areas | DPI Vic | DPI Vic |
| Eucalyptus rust | *Puccinia psidii sensu lato* | SA – major urban regions | DAFF and PIRSA | PIRSA |
| Myrtle rust surveillance | *Puccinia psidii sensu lato* | WA - forest, agricultural and major urban regions | DAFWA, DECWA | DAFWA, DECWA |
| Myrtle rust survey | *Puccinia psidii sensu lato* | Tas –hardwood plantations on State forest | Forestry Tasmania | DPIPWE, Forestry Tasmania |
| Sirex wood wasp surveillance program | *Sirex noctilio* | SA – forestry regions | Forestry SA | Forestry SA |
| Sirex wood wasp surveillance program | *Sirex noctilio* | WA – forestry regions | Forest Products Commission WA | DAFWA |
| Sirex wood wasp static trapping program | *Sirex noctilio* | Tas – softwood plantations on State forest | Crop owner | Forestry Tasmania |
| Cape York Peninsula Surveys | Various | Qld – Cape York Peninsula community regions | DAFF Qld | DAFF Qld |
| Forest pest surveillance – exotic and endemic pests | Various exotic and endemic pests | NSW – forests | Forests NSW | DPI NSW |

[22] Information presented has been taken from the National Plant Health Status Report 2011 and confirmed or updated in November 2011 by the Subcommittee on National Plant Health Surveillance (sub-committee of the Plant Health Committee)

| Surveillance program | Pests targeted | State/region | Funder | Deliverer |
|---|---|---|---|---|
| Forest health surveillance - hardwoods | Various exotic and endemic pests and diseases | Tas – hardwood plantations on State forest | Forestry Tasmania | Forestry Tasmania |
| Forest Health surveillance - softwoods | Various exotic and endemic pests and diseases | Tas – softwood plantations on State forest | Crop owner | Forestry Tasmania |
| Forest Health surveillance - softwoods | Various exotic and endemic pests and diseases | SA – Softwood plantations | Forestry SA | Forestry SA |
| Forest pest surveillance | Various including *Dothistroma pini* | NT – forest and natural environment | DPIF | DPIF |
| Urban hazard site surveillance program/ Multiple plant pest surveillance program | Various including *Lymantria dispar* | NSW – major urban regions | DAFF | NSWDPI |

# Plantation and nursery surveillance activities

**Responsibility >** industry/growers and nursery operators

Plantation level surveillance involves the participation and interaction of growers, agribusiness and industry representative groups. Examples of the surveillance activities that can be carried out by each of these groups are outlined in Figure 7. Conducting regular surveys of plantations and nurseries provides the best chance of spotting new pests early and implementing eradication or management responses.

Nurseries operating to NIASA guidelines are required to monitor pest activity in the nursery, effectively control pests, and keep a pest management record diary.

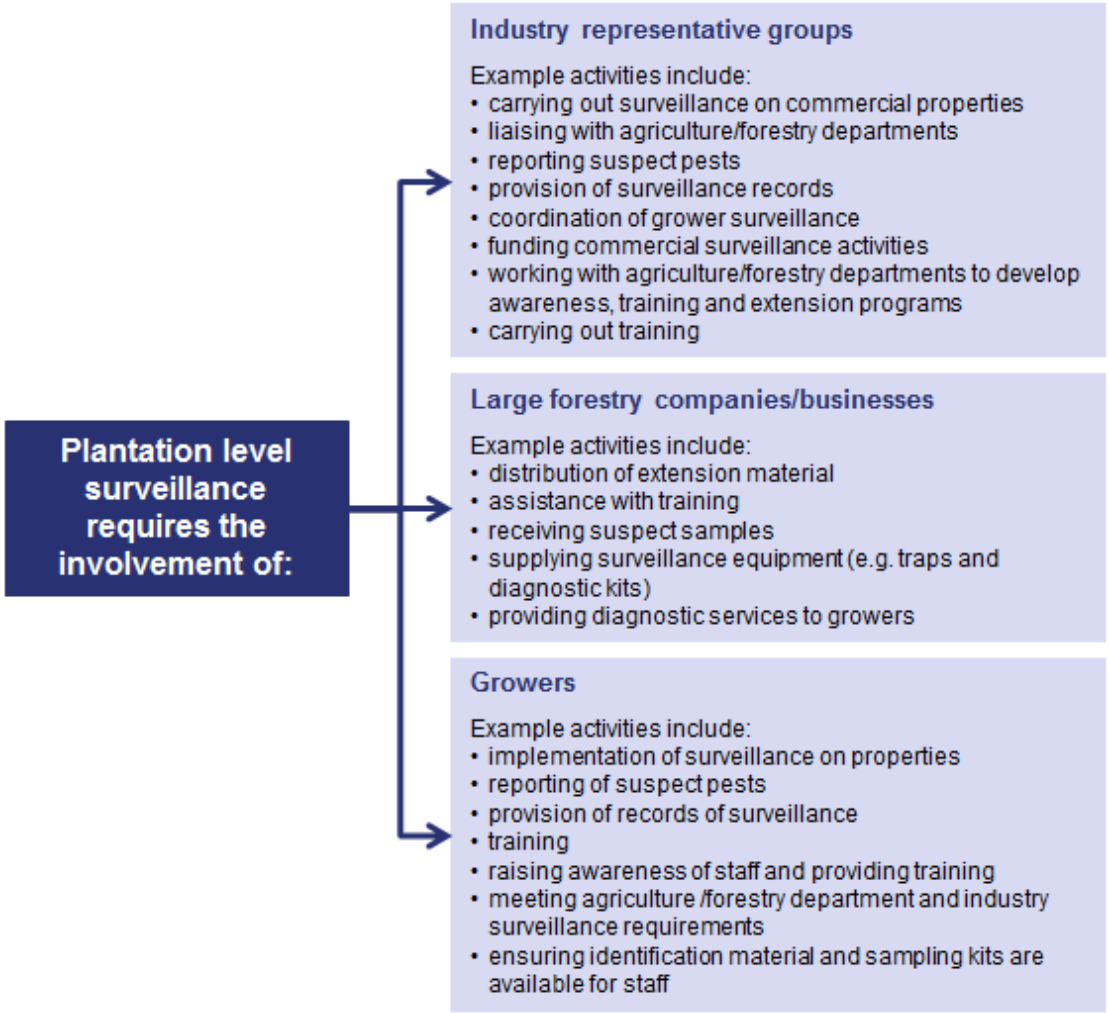



***Figure 7*** *Examples of surveillance activities that could be undertaken by the plantation forest industry*

# Training

A key component of emergency plant pest preparedness is ensuring suitable and effective training for people involved in responding to emergency plant pest incursions. Effective training is the responsibility of both government and industry.

## PHA's national training program for EPP preparedness

The PHA national training program is a program for industry and government personnel who have roles and responsibilities as members of the various committees under PLANTPLAN, the national emergency response plan for the plant industries. This includes training for Industry Liaison Officers and Industry Liaison Coordinators.

Training programs will help ensure personnel involved in responding to emergency plant pests are proficient and have the skills required to effectively perform their duties.

Additionally, training material on biosecurity awareness has been developed that is available to all PHA members to assist raising awareness of biosecurity issues (Table 14). This is targeted at industry leaders, forestry consultants/extension officers, growers and the general community.

***Table 14.*** *Training materials from PHA's National Training Program for EPP preparedness*[23]

| Training/briefing material available |
|---|
| Consultative Committee on Emergency Plant Pests |
| Domestic Quarantine and Market Access Working Group |
| National Management Group |
| Industry Liaison Officer/Coordinator |
| PLANTPLAN incursion response roles - various |
| Biosecurity awareness (industry leaders, consultants/extension officers, growers, community) |
| EPPRD awareness training |
| PHA Biosecurity On-line Training (BOLT) |

[23] Refer to the PHA website for the most up-to-date information, or contact PHA for further details

# Awareness

Early reporting enhances the chance of effective control and eradication. Awareness activities (such as the postcard shown in Figure 8) raise the profile of biosecurity and exotic pest threats to the plantation forest industry, which increases the chance of early detection and reporting of suspect pests. Responsibility for awareness material lies with industry and government, with assistance from PHA as appropriate. Any unusual plant pest should be reported immediately to the relevant state/territory agriculture agency or contact the Exotic Plant Pest Hotline (ph. 1800 084 881).

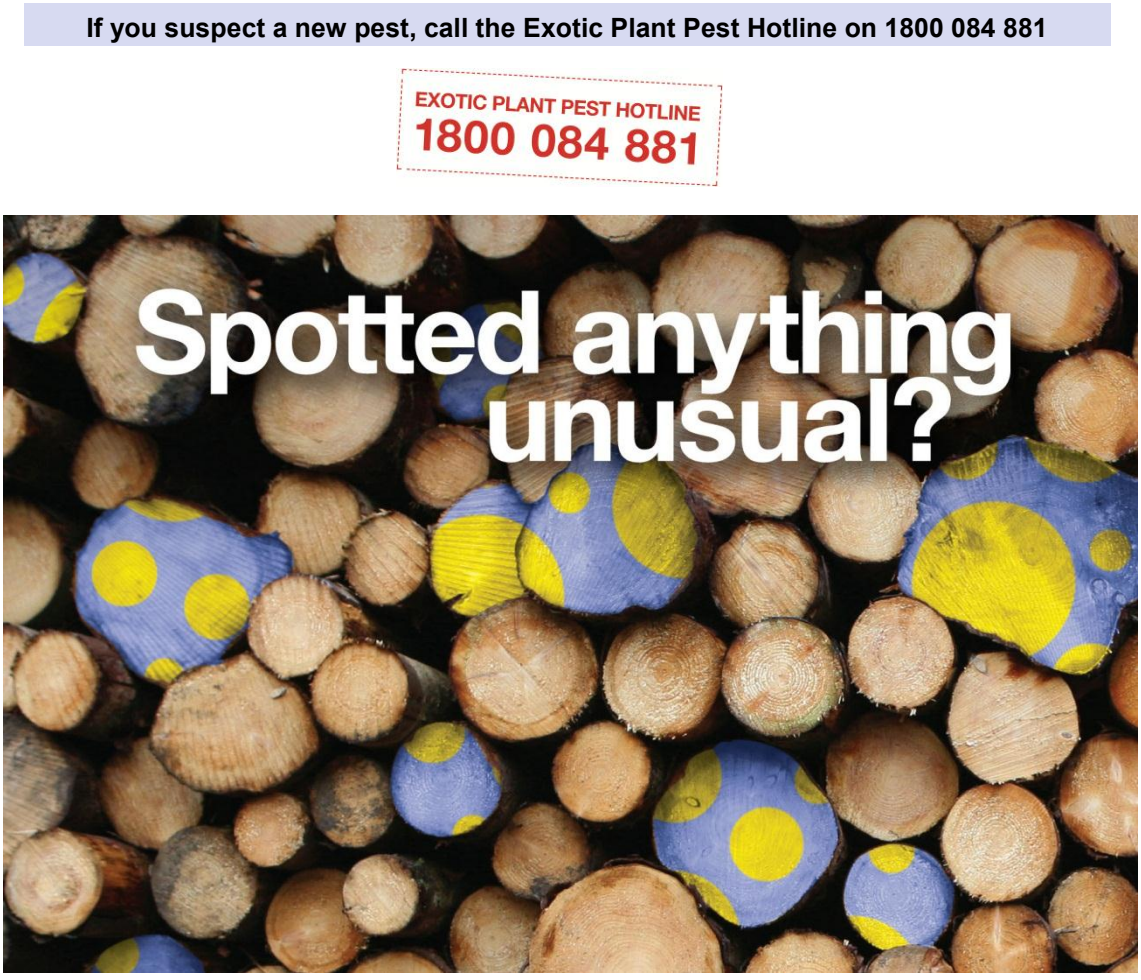



***Figure 8.*** *Postcard from Plant Health Australia's plant health awareness campaign*

# High priority plant pest threat-related documents

Pests listed in Table 4 have been identified as high priority threats to the plantation forest industry by members of the IBG. They have been assessed as having a high or medium overall impact on the plantation forest industry. This list should provide the basis for the development of awareness material for the industry.

## Further information on high priority pests

In addition to the fact sheets listed in Table 22, the websites listed below (Table 15) contain information on pests across most plant industries, including the plantation forest industry.

***Table 15.*** *Sources of information on high priority pest threats for the plantation forest industry*

| Source | Website |
|---|---|
| Department of Agriculture, Forestry and Fisheries (DAFF) | **www.daff.gov.au** |
| Pest and Disease Image Library (PaDIL) | **www.padil.gov.au** |
| DAFF Qld exotic plant pests and disease list | **http://www.daff.qld.gov.au/26_6460.htm** |
| University of California Statewide Integrated Pest Management (IPM) Program | **www.ipm.ucdavis.edu/EXOTIC/exoticpestsmenu.html** |
| Victorian Department of Primary Industries | **http://www.dpi.vic.gov.au/forestry/pests-diseases-weeds** |

# Further information/relevant web sites

A range of government and grower organisation details and websites are provided below (Table 16) for persons seeking further information on plantation forest industry biosecurity.

***Table 16.*** *Relevant sources of further biosecurity information for the plantation forest industry*

| | Website/email | Phone | Address |
|---|---|---|---|
| **National** | | | |
| Australian Forest Products Association | **http://www.ausfpa.com.au/** | (02) 6285 3833 | PO BOX 239 Deakin West ACT 2600 |
| Australian Government Department of Agriculture, Fisheries and Forestry | **www.daff.gov.au**<br>**www.daff.gov.au/aqis** | (02) 6272 3933 | GPO Box 858<br>Canberra, ACT 2601 |
| Plant Health Australia | **www.planthealthaustralia.com.au**<br>**biosecurity@phau.com.au** | (02) 6215 7700 | Level 1, 1 Phipps Cl<br>Deakin, ACT 2600 |
| **New South Wales** | | | |
| Department of Primary Industries | **www.dpi.nsw.gov.au** | 1800 808 095<br>02 6391 3100 | Locked Bag 21<br>Orange NSW 2800 |
| **Queensland** | | | |
| Biosecurity Queensland, a part of the Department of Agriculture, Fisheries and Forestry, Queensland | **www.daff.qld.gov.au**<br>**callweb@daff.qld.gov.au** | 13 25 23 | 80 Ann Street<br>Brisbane, QLD 4000 |
| **Northern Territory** | | | |
| Department of Primary Industry and Fisheries | **www.nt.gov.au/d/Primary_Industry**<br>**info.DPIF@nt.gov.au** | (08) 8999 5511 | Berrimah Farm, Makagon Road<br>Berrimah, NT 0828 |

| | Website/email | Phone | Address |
|---|---|---|---|
| **South Australia** | | | |
| Primary Industries and Regions SA | **www.pir.sa.gov.au**<br>**www.pir.sa.gov/customer_enquiry_form** | (08) 8226 0222 | GPO Box 1671<br>Adelaide SA 5001 |
| Biosecurity SA-Plant Health | **www.pir.sa.gov.au/biosecuritysa/planthealth** | (08) 8207 7820 | 33 Flemington Street<br>Glenside SA 5065 |
| South Australian Research and Development Institute | **www.sardi.sa.gov.au**<br>**sardi@sa.gov.au** | (08) 8303 9400 | 2b Hartley Grove<br>Urrbrae SA 5064 |
| **Tasmania** | | | |
| Department of Primary Industries, Parks, Water and Environment | **www.dpipwe.tas.gov.au**<br>**BPI.Enquiries@dpipwe.tas.gov.au** | 1300 368 550 | GPO Box 44<br>Hobart, TAS 7001 |
| **Victoria** | | | |
| Department of Primary Industries | **www.dpi.vic.gov.au** | 13 61 86 | Plant Biosecurity and Product Integrity<br>Private bag 15, Ferntree Gully Delivery Centre, Vic 3156 |
| **Western Australia** | | | |
| Department of Agriculture and Food | **www.agric.wa.gov.au**<br>**enquiries@agric.wa.gov.au** | 08 9368 3333 | 3 Baron-Hay Court<br>South Perth WA 6151 |
| **Australian Capital Territory** | | | |
| Environment ACT | **www.environment.act.gov.au** | 13 22 81 | GPO Box 158<br>Canberra City ACT 2601 |

# Plantation biosecurity

## Introduction

Plant pests can have a major impact on production if not managed effectively. This includes pests already present in Australia and a number of serious pests of the plantation forest industry that Australia does not have.

Basic biosecurity practices at the plantation level can help minimise the spread of pests both before and after their presence is known. This section outlines some simple biosecurity and hygiene measures that should be incorporated into everyday forestry operations.

## Major elements of plantation-level biosecurity

- Managing the movement of people, vehicles and equipment
- Selection of propagation material
- Field surveillance/monitoring
- Chemical control measures
- Industry Best Practice and Quality Assurance schemes

## Managing the movement of people, vehicles and equipment

### Plantation level controls

Movement of unclean vehicles and equipment between properties and between regions can potentially spread pests. Soil and plant debris can transport weed seeds, insect pests and fungal pathogens.

Some simple ways to help minimise these risks include:

- Physically prevent movement of unclean machinery, equipment, and people onto the property through the use of gates and using clear signage that contains contact details
- Where possible, have workers visually inspect machinery and equipment before entry and direct unclean units for wash-down
- Provide high-pressure wash down facilities to allow people to meet your biosecurity requirements

- By using a visitor/contractor register you will be aware of who is on your property, this also assists with trace back investigations if pests are found.
- Provide a dedicated parking/visitor area to prevent unwanted movement into the production area
- Be mindful of visitors who have recently travelled overseas who may be inadvertently carrying fungal spores onto your property in their clothing or footwear.

### National and State controls

For interstate or international movements of forestry equipment and vehicles, contact your state/territory agriculture department (Table 16) or DAFF respectively. Each state has quarantine legislation in place governing the movement of machinery, equipment and other potential sources of pest contamination. Additional information can be found on the Domestic Quarantine website (**www.dqmawg.org.au**).

## Selection of propagation material

Plantation trees and propagation material should not be distributed without screening for pests. Infected planting material can be the main source of some serious pests.

Planting material that has been certified as being free of pests and pathogens provides a useful safeguard for growers. The value of certified planting material is enhanced if the seedlings or cuttings have been grown in pest free areas. Growers should also investigate all variety and species options available to determine their known tolerance to certain pests and diseases.

## Field surveillance/monitoring

Regular monitoring for pests and disease symptoms is essential to detect new populations of pests, and to ensure the overall health of your plantation. Regular pest monitoring provides information to support export regulatory programs and allows early reporting of exotic pests. Keeping well maintained records and providing basic pest and tree health training to workers allows monitoring to be incorporated into everyday operations. If you see anything unusual, call the Exotic Plant Pest Hotline

## Chemical control measures

Chemical control programs may be required during a rotation to control pests or be required around the plantation to control weeds or volunteers that may harbour pests. A planned and effective monitoring and pest management program, prepared in consultation with an Integrated Pest Management (IPM) consultant and/or your local Department of Primary Industries will minimise the impact of pests on the plantation.

The Australian Pesticides and Veterinary Medicines Authority (APVMA) is the national authority responsible for registration and deregistration of chemicals and can be contacted by phone on (02) 6210 4701. The APVMA Permit Section deals specifically with emergency registrations for chemicals. Further information can be obtained from the APVMA website (**www.apvma.gov.au**).

## Industry Best Practice and Quality Assurance schemes

Including such measures in Industry Best Management Practice (IBMP) and Quality Assurance (QA) schemes will strengthen the ability to rapidly detect, control and eradicate exotic pest incursions in the plantation forest industry before extensive damage occurs. IBMP and QA schemes that cover some of the above biosecurity measures are listed in Table 17.

***Table 17.*** *Plantation forest IBMP and QA schemes*

| Scheme | Key areas of biosecurity relevance |
|---|---|
| Australian Forest Certification Scheme (**http://www.forestrystandard.org.au/**) | The Australian Forest Certification Scheme, which includes the Australian Standard for Sustainable Forest Management (SFM) sets out the requirements for forest owners seeking SFM certification. It includes requirements for the management of pests and diseases. |
| ISO 14001 | ISO 14001 is an international standard that describes the specifications and requirements for an Environment Management System. |
| Forest Stewardship Council (**http://www.fscus.org/**) | Forest Stewardship Council is another SFM certification scheme. It also includes requirements for the management of pests and diseases within forests/plantations. |

## Plantation forest biosecurity checklist

Use the checklist (Table 18) to do a quick biosecurity assessment of your plantation forest, and see sections of this document for further detail on each point.

***Table 18*** *Plantation forest biosecurity checklist*

| Plantation forest biosecurity checklist | Yes | No |
|---|---|---|
| Do you have information signs placed at the entry gate to demonstrate hygiene/biosecurity requirements? | | |
| Do you provide movement controls (people and vehicles) and wash down areas to prevent spread of pests onto your plantation? | | |
| Do you have designated parking for visitors? | | |
| Have contractor machinery been cleaned correctly? | | |
| Do you use high health nursery stock? | | |
| Do you conduct regular monitoring for pests and tree health? | | |
| Do you ensure that your staff are adequately trained in the correct use of pesticides? | | |
| Do you provide biosecurity training and awareness for staff? | | |
| Do you use quality assurance and/or best management practice systems? | | |
| Have you sought advice from a consultant in developing and implementing a property biosecurity plan? | | |
| Have you been to an overseas forest or a suspect area? If so, wash your clothes, boots and hair, and declare your international visit to quarantine! | | |

# Reporting suspect pests


Any unusual plant pest should be reported immediately to the relevant state/territory agriculture agency through the Exotic Plant Pest Hotline (1800 084 881). Early reporting enhances the chance of effective control and eradication.

Any unusual plant pest should be reported to either the relevant state/territory agriculture agency or to the Exotic Plant Pest Hotline. Careless use of information, particularly if a pest has not been confirmed, can result in extreme stress for individuals and communities, and possibly damaging and unwarranted trade restrictions.

**If you suspect a new pest, call the Exotic Plant Pest Hotline on 1800 084 881**

Calls to the Exotic Plant Pest Hotline will be forwarded to an experienced person in the department of agriculture from the state of origin of the call, who will ask some questions about what you have seen and may arrange to collect a sample. Every report will be taken seriously and treated confidentially. In some states and territories, the Exotic Plant Pest Hotline only operates during business hours. Where this is the case, and calls are made out of hours, callers should leave a message including contact details and a brief description of the issue. Staff from the department of agriculture will return the call the following business day.

Suspect material should not be moved or collected without seeking advice from the relevant state/territory department, as incorrect handling of samples could spread the pest or render the samples unsuitable for diagnostic purposes. State/territory agriculture department officers will usually be responsible for sampling and identification of pests.

Some pests have been recognised as posing particularly high threats and have been put on a list of notifiable pests maintained as part of the each state/territory's quarantine legislation. A list of notifiable pests can be downloaded from the PHA website[24]; however, each state and territory's list of notifiable pests are subject to change over time so contacting your local state/territory agricultural department (details in Table 12) will ensure information is up to date. Landowners and consultants have a legal obligation to notify the relevant state/territory agriculture department of the presence of those pests within a defined timeframe (refer to Table 19).

***Table 19.*** *Timeframe for reporting of notifiable pests as defined in state/territory legislation*

| State/territory | Notifiable pest must be reported within |
|---|---|
| NSW | 24 hours |
| NT | 24 hours |
| Qld | 24 hours |
| SA | Immediately |
| Tas | As soon as possible |
| Vic | Without delay |
| WA | 24 hours |

# References

DAFF (2011) Australian Government Department of Agriculture, Fisheries and Forestry, Import Risk Analysis Handbook 2011, Canberra.

[24] Available from **www.planthealthaustralia.com.au/go/phau/biosecurity/general-biosecurity-information**

# CONTINGENCY PLANS AND RESPONSE MANAGEMENT

# Introduction

Gathering information, developing procedures, and defining roles and responsibilities during an emergency can be extremely difficult. To address this area, PHA coordinated the development of PLANTPLAN, a national set of incursion response guidelines for the plant sector, detailing procedures required and the roles and responsibilities of all parties involved in an incursion response.

Following PLANTPLAN, a set of threat-specific contingency plans will be developed to cover the key exotic pests to the plantation forest industry. These pests are detailed in the high priority plant pest threat list (Table 4) and have been identified through a process of qualitative risk assessment. Information will be provided on the host range, symptoms, biology and epidemiology of each pest, along with guidelines for general and targeted surveillance programs, diagnosis, and control. These documents are designed to assist with the development of response plans and will be used in conjunction with the emergency response guidelines in PLANTPLAN.

This section includes key contact details and any communication procedures that should be used in the event of an incursion in the plantation forest industry. Additionally, a listing of pest-specific emergency response and information documents are provided. Over time, as more of these documents are produced for pests of the plantation forest industry they will be included in this document and made available through the PHA website.

# PLANTPLAN

PLANTPLAN provides a description of the general procedures, management structure and information flow system for the handling of a plant pest emergency at national, state/territory and district levels. This includes the operations of the control centres, principles for the chain of responsibility, functions of sections and role descriptions. PLANTPLAN is a general manual for use by all jurisdictions for all plant pest emergencies.

PLANTPLAN is regularly reviewed and updated to ensure it provides the best possible guidance to plant industries and governments in responding to serious plant pests. The most recent version of PLANTPLAN can be downloaded from the PHA website (**www.planthealthaustralia.com.au/plantplan**).

Following the detection of a suspect exotic plant pest, the relevant state agency should be immediately notified directly or through the Exotic Plant Pest Hotline. Within 24 hours of the initial identification, the agency, through the State Plant Health Manager, will inform the Australian Chief Plant Protection Office (ACPPO) which will notify other relevant Australian Government Departments and relevant state agencies and industry representatives (process outlined in
Figure 9). Following the detection or reporting of the pest, the relevant state/territory agriculture agency may collect samples of a suspect pest and seek a positive identification. If the pest is suspected to be an exotic pest (not yet present in Australia), the general process is as outlined in Figure 10.

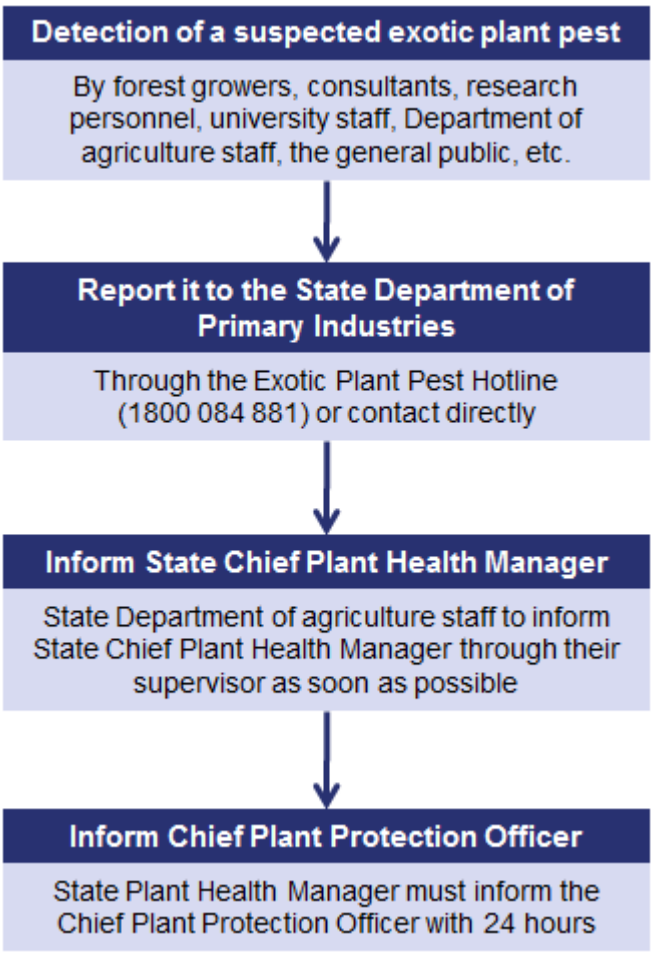



***Figure 9.*** *Suspect exotic plant pest detection reporting flowchart*

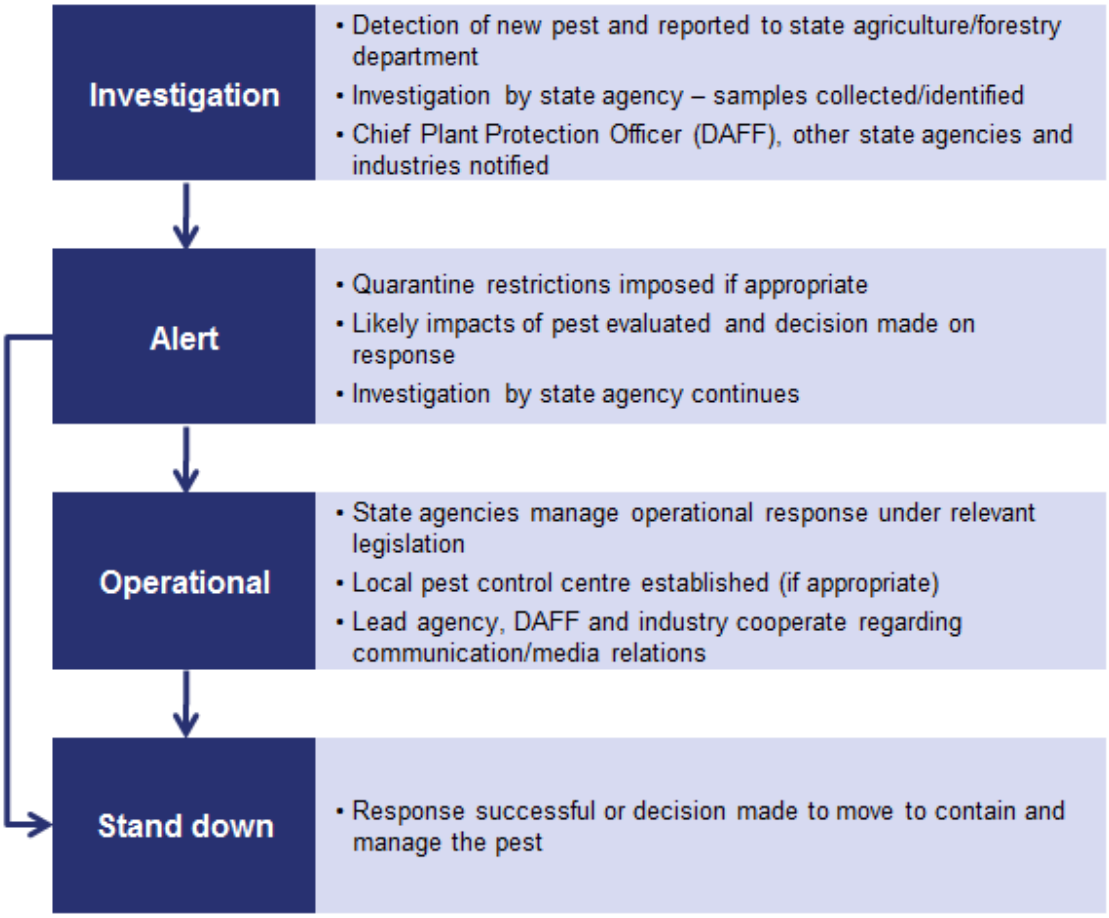



***Figure 10.*** *General decision making and communication chain for a plant pest emergency response*

If the pest is considered potentially serious, then the relevant state/territory agriculture/forestry department may adopt precautionary measures. These measures, depending on the pest, may include:

- restriction of operations in the area
- withdrawal of people, vehicles and machinery from the area and disinfection
- restricted access to the area
- interim control or containment measures

If a new plant pest is confirmed, technical and economic considerations are reviewed. A decision is then made on whether to eradicate, contain or do nothing about the incursion (depending on the feasibility of the response and likely costs and impacts of the pest). Under the EPPRD all decisions are made by Committees with government and industry representation.

During this investigation/alert period, the affected area will be placed under quarantine until a decision is made on whether to eradicate or control the pest. Once a decision has been made on a suitable response, efforts enter the operational phase. Eradication or control methods used will vary according to the nature of the pest involved and infested material will be destroyed where necessary. All on ground response operations are undertaken by the relevant state department(s) in accord with relevant state/territory legislation.

In the stand down phase, all operations are wound down. Where a plant pest emergency was not confirmed, those involved will be advised that the threat no longer exists. Where an eradication or management/control campaign has taken place, quarantine measures will be finalised and reviewed.

# Industry specific response procedures

## Industry communication

In the event of a pest incursion affecting the plantation forest industry, AFPA will be the key industry contact point and will have responsibility for relevant industry communication and media relations (see PLANTPLAN for approved communications during an incursion), AFPA should be contacted immediately (Table 20) to ensure those appropriate delegate/s are secured for meetings of the Consultative Committee or National Management Group.

Close cooperation is required between relevant government bodies and industry in regards to the effective management of a pest response and media/communication issues. Readers should refer to PLANTPLAN for further information.

***Table 20.*** *Contact details for Australian Forest Products Association*

| | |
|---|---|
| Website | **http://www.ausfpa.com.au/** |
| Address | PO BOX 239 Deakin West<br>ACT 2600 AUSTRALIA |
| Telephone | (02) 6285 3833 |
| Fax | (02) 6285 3855 |
| Email | **enquiries@ausfpa.com.au** |
| Contacts | David Pollard<br>Chief Executive Officer |

# Counselling and support services

Provision for counselling and advice on financial support for growers is made available through various agencies as listed in Table 21. Up-to-date information relating to mental health can be found at **http://www.health.gov.au/mentalhealth**. Local providers of counselling services can be found through contacting your local state or territory agriculture agency (Table 16) or your growers association (Table 20).

***Table 21.*** *Counselling and financial counselling services*

| Organisation | Contact |
|---|---|
| Lifeline | **13 11 14** (24 hours)<br>**www.lifeline.org.au**<br>Anyone can call Lifeline. The 13 11 14 service offers a counselling service that respects everyone's right to be heard, understood and cared for. We also provide information about other support services that are available in communities around Australia. |
| Mensline | **1300 789 978** (24 hours)<br>**www.menslineaus.org.au**<br>Mensline Australia is a dedicated service for men with relationship and family concerns. |
| Kids Help Line | **1800 551 800** (24 hours)<br>**www.kidshelpline.com.au**<br>Kids Help Line is Australia's only free, confidential and anonymous, telephone and online counselling service specifically for young people aged between 5 and 25. |
| BeyondBlue | **1300 224 636**<br>**www.beyondblue.org.au**<br>Beyondblue is an independent, not-for-profit organisation working to increase awareness and understanding of depression, anxiety and related substance-use disorders throughout Australia and reduce the associated stigma. |
| Centrelink | **13 23 16** (Drought Assistance Hotline)<br>**http://www.humanservices.gov.au/customer/subjects/drought-assistance**<br>The Exceptional Circumstances Relief Payment is delivered by Centrelink on behalf of the Department of Agriculture, Fisheries and Forestry. The payment provides assistance to farmers living in 'exceptional circumstances' affected areas who are having difficulty meeting family and personal living expenses. |

| Organisation | Contact |
|---|---|
| Rural Financial Counselling Service | **1800 686 175** (free call for referral to your nearest Rural Financial Counselling Service provider)<br>**www.daff.gov.au/agriculture-food/drought/rfcs**<br>Rural financial counsellors can:<br>• help clients identify financial and business options<br>• help clients negotiate with their lenders<br>• help clients adjust to climate change through the Climate Change Adjustment Program, identify any advice and training needed and develop an action plan<br>• help clients meet their mutual obligations under the Transitional Income Support program<br>• give clients information about government and other assistance schemes<br>• refer clients to accountants, agricultural advisers and educational services<br>• refer clients to Centrelink and to professionals for succession planning, family mediation and personal, emotional and social counselling. |
| DAFF Queensland Farm Financial Counselling Service | **13 25 23** DAFF Queensland Customer Service Centre<br>DAFF Queensland financial counsellors can help you:<br>• understand and develop improved financial management<br>• negotiate with financial institutions<br>• identify and assess the financial impact of options<br>• compare the viability of various enterprises<br>• prepare applications for loans and government assistance schemes through the Queensland Rural Adjustment Authority (QRAA) and Centrelink. |

# Pest-specific emergency response and information documents

As part of the implementation of the Plantation forest biosecurity plan, pest-specific information and emergency response documents, such as fact sheets, contingency plans and diagnostic protocols should be developed over time for all medium to high risk pests listed in the TSTs (Appendix 1). Currently, a number of documents have been developed for pests of the plantation forest industry (Table 22) and are available for download from the Pest Information Document Database at **www.planthealthaustralia.com.au/pidd**.

***Table 22.*** *Pest-specific information documents for the plantation forest industry*[25]

| Common name | Scientific name | Fact sheet | Pest risk review[26] | Contingency plans |
|---|---|---|---|---|
| Pinewood Nematode Complex | *Bursaphelenchus* spp. including *B. xylophilus* | | ✓ | |
| Subterranean Termites | *Coptotermes* spp. | | ✓ | |
| Eucalyptus canker disease | *Chrysoporthe austroafricana* | ✓[27] | | |
| Mountain pine beetle | *Dendroctonus ponderosae* | ✓[27] | | |
| Red turpentine beetle | *Dendroctonus valens* | ✓[27] | | |
| Western Gall Rust | *Endocronartium harknessii* | ✓ | | |
| Pitch Canker | *Fusarium circinatum* | ✓ | | |
| Burning moth | *Hylesia nigricans* | ✓[27] | | |
| Spruce bark beetle | *Ips typographus* | ✓[27] | | |
| Powder Post Beetle | *Lyctus africanus* | | ✓ | |
| Gypsy Moth complex | *Lymantria dispar* | ✓ | ✓ | ✓[28] |
| Nun moth | *Lymantria monacha* | ✓[27] | | |
| Longhorn Beetle | *Monochamus* spp. | ✓[27] | ✓ | |
| White spotted tussock moth | *Orgyia thyellina* | ✓[27] | | |
| Daño Foliar del Pino | *Phytophthora pinifolia* | ✓[27] | | |
| Sudden Oak Death | *Phytophthora ramorum* | ✓ | ✓ | ✓[29] |
| Myrtle/Guava/Eucalyptus Rust | *Puccinia psidii sensu lato* | ✓ | | ✓[29] |
| Drywood Longicorn Beetle | *Stromatium barbatum* | ✓ | | |
| Coniothyrium eucalyptus canker | *Teratosphaeria zuluensis* and *T. gauchensis* | ✓[27] | | |
| Pine shoot beetle | *Tomicus piniperda* | ✓[27] | | |
| Giant wood wasp | *Urocerus gigas* | ✓[27] | | |

[25] Copies of these documents are available from **www.planthealthaustralia.com.au/pidd**
[26] Over time Pest Risk Reviews will be updated through the development of pest specific contingency plans
[27] Factsheet under development
[28] PHA has a contingency plan for this pest (developed for Nursery and Garden Industry Australia). A similar document called "A response plan and strategy for Gypsy moth, *Lymantria dispar* dispar, in Australia" has also been produced by DAFF
[29] PHA has a contingency plan for this pest (developed for Nursery and Garden Industry Australia)

## Threat-specific contingency plans

Over time, threat-specific contingency plans will be completed for the exotic threats identified in the high priority plant pest list (Table 4). To date, three contingency plans have been produced for pests of the plantation forest industry (Table 22).

As plans are developed they will be uploaded onto the PHA website (**www.planthealthaustralia.com.au/pidd**).

## National diagnostic standards for priority plant pest threats

National diagnostic standards have been commissioned for a number of exotic/emergency plant pests. These protocols would be used nationally in the event of an incursion, thus ensuring a rapid response and nationally consistent test results that are directly comparable. However, given the rapid development of improved molecular diagnostic techniques, these protocols need to be regularly reviewed and updated.

The development and endorsement of these protocols is managed by the Subcommittee on Plant Health Diagnostic Standards (SPHDS). Diagnostic standards that have been formally nationally endorsed are available on the SPDHS website (**http://www.padil.gov.au/Sphds/**). Prior to endorsement, completed draft protocols are made available on the pest information document database (**www.planthealthaustralia.com.au/pidd**). Further information on diagnostic standards and their endorsement process can be found on the SPHDS website.

# APPENDIX 1: THREAT SUMMARY TABLES

# Plantation forest industry threat summary tables

The information provided in the threat summary tables (invertebrates, Table 23 and pathogens, Table 24) is an overview of exotic plant pest threats to the plantation forest industry. Summarised information on entry, establishment and spread potentials and economic consequences of establishment are provided where available. Pests under official control[30] or eradication may be included in these tables where appropriate. However, plantation forest pests that are endemic but regionalised within Australia are not included in the TST, but may be assessed in state biosecurity plans. Assessments may change given more detailed research, and will be reviewed with the biosecurity plan.

Additional information on a number of the pests listed in the TSTs can be found in pest-specific information documents (Table 22). An explanation of the method used for calculating the overall risk can be found on the PHA website[31].

## Description of terms

The descriptions below relate to terms in the TSTs (Table 23 and Table 24). Full descriptions of the risk rating terms can be found on page 34.

### Life form legend

| | |
|---|---|
| **BTLE** | Beetles, weevils, etc. (COLEOPTERA) |
| **FUN** | Fungus |
| **HYM** | Ants and wasps (HYMENOPTERA) |
| **ISO** | Termites (ISOPTERA) |
| **LEP** | Butterflies and moths (LEPIDOPTERA) |
| **NEM** | Nematode |

[30] Official control defined in ISPM No. 5 as the active enforcement of mandatory phytosanitary regulations and the application of mandatory procedures with the objective of eradication or containment of quarantine pests or for the management of regulated non-quarantine pests
[31] Available from **www.planthealthaustralia.com.au/go/phau/biosecurity/general-biosecurity-information**

# Invertebrates

***Table 23:*** *Plantation forest industry threat summary table; invertebrates (pests have been ranked according to life form and then alphabetically by scientific name)*

| Common name | Life form | Scientific name | Primary hosts | Affected plant part | Entry potential | Establishment potential | Spread potential | Economic impact | Overall risk |
|---|---|---|---|---|---|---|---|---|---|
| **Varicose borers** | Btle | *Agrilus* spp. including *A. maculiventris* and *A. sexsignatus* | *Eucalyptus deglupta* | Larvae feed on the cambium of their living host. Adults feed on young foliage of host tree. | MEDIUM<br>*A. opulentus* and *A. viridissimus* present in PNG. *A. sexsignatus* present in Philippines | LOW<br>Confined to tropics. Impact on other species not known | LOW | HIGH<br>May result in death of host | **VERY LOW** |
| **Burnt pine longicorn** | Btle | *Arhopalus ferus* | *Pinus* spp. and, less commonly, Norway spruce (*Picea abies*). | Logs, stumps and standing, dead or damaged trees of pine sp.[32] | MEDIUM<br>In NZ | MEDIUM | MEDIUM | HIGH<br>Esp. affects stressed trees | **MEDIUM** |
| **Southern pine beetle** | Btle | *Dendroctonus frontalis* | Pines. Slash pine seems to be more resistant to attacks than Loblolly pine. No information on susceptibility of Radiata pine. | Tree trunks | LOW<br>Restricted distribution | HIGH<br>Aus. has over 1 mil ha of pine plantations | HIGH[33] | HIGH | **MEDIUM** |
| **Mountain pine beetle** | Btle | *Dendroctonus ponderosae* | Pines (*Pinus*), spruce (*Picea*) | Tree trunks; larvae feed on cambium under bark | MEDIUM | HIGH<br>Aus. has over 1 mill ha of pine plantations | HIGH[34] | HIGH | **HIGH** |

[32] Especially following a short-lasting scorch by a forest fire
[33] Adult beetles can fly up to 3 km; infestation rates of 15 m/day during epidemics in USA
[34] Attacks pine monocultures on huge scale in Canada and USA; millions of trees can be killed in an outbreak

| Common name | Life form | Scientific name | Primary hosts | Affected plant part | Entry potential | Establishment potential | Spread potential | Economic impact | Overall risk |
|---|---|---|---|---|---|---|---|---|---|
| **Red turpentine beetle** | Btle | *Dendroctonus valens* | Attacks over 40 species of conifers in USA; esp. destructive to Radiata pine | Basal parts of tree trunks | MEDIUM | HIGH<br>Aus. has over 1 mill ha of pine plantations | HIGH[35] | HIGH | **HIGH** |
| **European large pine weevil** | Btle | *Hylobius abietis* | Pines incl. Radiata pines | Seedlings | LOW | HIGH | HIGH | MEDIUM | **LOW** |
| **Araucaria bark beetle** | Btle | *Hylurdrectonus araucariae* | *Araucaria cunninghamii* (4-12 yr old trees the most susceptible) | Branchlets and leaves | MEDIUM<br>In PNG | HIGH[36] | LOW | LOW | **VERY LOW** |
| **Spruce bark beetle** | Btle | *Ips typographus* | Spruce, recorded in pine | Beetles usually attack weakened, dying or recently felled trees | LOW<br>In Europe/ Eurasia | HIGH | HIGH | HIGH | **MEDIUM** |
| **Ips bark beetles** | Btle | *Ips* spp. | *Pinus* spp., spruce | Bark; Ips beetles usually attack weakened, dying or recently felled trees. | LOW | HIGH<br>Depending whether it would attack Radiata pine | HIGH<br>Depending whether it would attack Radiata pine | MEDIUM<br>Depending whether it would attack Radiata pine | **LOW** |
| **Japanese pine sawyer, Pine sawyer, Southern pine sawyer, White-spotted sawyer** | Btle | *Monochamus* spp. incl. *M. alternatus*, *M. galloprovincialis*, *M. titillator* and *M. scutellatus* | *Pinus* spp., spruce, fir | Whole plant, fruits, pods, leaves and stems. | MEDIUM<br>Entry may be thru packaging and dunnage | HIGH<br>Young beetle grubs survive well in cut lumber | HIGH | HIGH[37] | **HIGH** |
| **Pine shoot beetle** | Btle | *Tomicus piniperda* | *Pinus* spp. (including: *P. sylvestris*, *P. radiata*), *Abies* spp., *Larix* spp., *Picea* spp., *Pseudotsuga* spp. | Stems and shoots prefers damaged/ weak trees | MEDIUM | HIGH | HIGH | HIGH | **HIGH** |

[35] Most widely spread bark beetle in USA; Aus. has the right combination of host and climatic suitability for this pest
[36] Host native to Aus. and there are suitable climatic conditions in wet tropics
[37] High economic impact because of association with the pine wood nematode as beetle is the main vector (see Page 95)

| Common name | Life form | Scientific name | Primary hosts | Affected plant part | Entry potential | Establishment potential | Spread potential | Economic impact | Overall risk |
|---|---|---|---|---|---|---|---|---|---|
| **Steely-blue wood wasp** | Hym | *Sirex juvencus* | Norway spruce, Scots pine, larch, fir | Stem. Prefers damaged, sick stands | HIGH | LOW | LOW | MEDIUM<br>Decreases value of wood | **VERY LOW** |
| **Wood wasp, Long horntail** | Hym | *Xeris spectrum* | All conifers, except Yew. Mainly Firs, European black pine and Scots pine | Stem. Prefers damaged, sick stands | HIGH | MEDIUM | MEDIUM | MEDIUM<br>Decreases value of wood | **LOW** |
| **Giant wood wasp** | Hym | *Urocerus gigas* | *Pinus*, *Picea*, *Abies*, *Pseudotsuga* and *Larix* spp. | Wood of recently cut, fallen, weakened trees and green timber | HIGH | HIGH | HIGH | MEDIUM | **MEDIUM** |
| **Formosan subterranean termite** | Iso | *Coptotermes formosanus* | Living and dead trees, timber in service, any material containing cellulose. i.e. paper etc. | Wooden parts of living and dead trees, timber in service | HIGH[38] | HIGH<br>Usually invades mildly temperate climates | MEDIUM | HIGH | **HIGH** |
| **Asian subterranean termite** | Iso | *Coptotermes gestroi* | Living and dead trees, timber in service, any material containing cellulose. i.e. paper etc. | Timber in service, living trees | HIGH | HIGH<br>Limited to tropical localities | MEDIUM | HIGH | **HIGH** |
| **Carpenter worm** | Lep | *Chilecomadia valdiviana* | Broad native host range. Attacks *Eucalyptus nitens* occasionally infests *E. camaldulensis* and *E. gunnii.* | Infests live trees greater than 4 cm in diameter, attacks occur in all parts of the bole. Tree stress not a prerequisite for attack | LOW | LOW | LOW | HIGH<br>Attacks Eucalypts and exotic amenity trees | **LOW** |

[38] Regularly intercepted at the border

| Common name | Life form | Scientific name | Primary hosts | Affected plant part | Entry potential | Establishment potential | Spread potential | Economic impact | Overall risk |
|---|---|---|---|---|---|---|---|---|---|
| **South African cossid moth** | Lep | *Coryphoderma tristis* | Wide host range. *Eucalyptus nitens* is attacked in South Africa | Tree trunks | LOW[39] | MEDIUM | LOW | HIGH<br>In southern Australia | **LOW** |
| **Burning moth** | Lep | *Hylesia nigricans* | Acacia, Eucalyptus and other species | Leaves | HIGH<br>Egg masses have been intercepted on cargo and ships | HIGH<br>Australia has a number of host species | HIGH<br>Adults are strong fliers, larvae are processionary | HIGH<br>Major defoliator also public health concerns | **HIGH** |
| **Gypsy moth complex** | Lep | *Lymantria dispar* complex | Over 600 species of trees and shrubs including Eucalypts and Pine | Larvae feed on foliage, can cause high mortality when forests are under stress from drought or other tree pests | HIGH[40] | HIGH | HIGH | HIGH<br>Australian trees suffer from droughts and other pests | **HIGH** |
| **Nun moth** | Lep | *Lymantria monacha* | Wide range of hosts including fruit trees and confers such as Pinus spp., spruce (*Picea*), fir (*Abies*) and larch (*Larix*). | Leaves | HIGH | HIGH | MEDIUM[41] | HIGH<br>Defoliation by larvae can kill trees, causes enormous economic loss | **HIGH** |

[39] Mandatory treatment of Eucalypt timber from South Africa reduces the entry potential of this pest
[40] Females can fly up to 15 km and larvae can balloon up to 8 km under favourable wind conditions
[41] Often found on forest products, shipping containers, cargo and ships' structures; adults strong fliers, attracted to light

| Common name | Life form | Scientific name | Primary hosts | Affected plant part | Entry potential | Establishment potential | Spread potential | Economic impact | Overall risk |
|---|---|---|---|---|---|---|---|---|---|
| **White spotted tussock moth** | Lep | *Orgyia thyellina* | Larvae feed on the foliage of urban trees and plants, horticultural plants, forest trees | Leaves | HIGH[42] | HIGH<br>Absence of natural enemies may allow this sp. to become a serious pest of timber sp. and ornamentals | HIGH[43] | HIGH<br>Defoliates a range of tree species | **HIGH** |
| **European pine shoot moth** | Lep | *Rhyacionia* spp. incl. *R. buoliana* | *Pinus* spp. | Needles and terminal buds | LOW | MEDIUM | HIGH | HIGH | **MEDIUM** |
| **Pinewood nematode species complex** | Nem | *Bursaphelenchus* spp. incl. *B. xylophilus* | *Pinus* spp. | Roots as well as all above ground tissues | MEDIUM | LOW | MEDIUM[44] | HIGH | **MEDIUM** |

[42] Present in China, Korea, Japan, Far Eastern Russia and Taiwan; eradicated. from NZ in 1998
[43] Strong fliers, attracted to light; produces up to 3 generations per year; first 2 generations – females fly; the 3rd is wingless
[44] Transported with nematode infested logs or by *Monochamus* beetles (see Page 92).

# Pathogens

***Table 24.*** *Plantation forest industry threat summary table; pathogens (pests have been ranked according to life form and then alphabetically by scientific name)*

| Common name | Life form | Scientific name | Primary host | Affected plant part | Entry potential | Establishment potential | Spread potential | Economic impact | Overall risk |
|---|---|---|---|---|---|---|---|---|---|
| **Armillaria root disease** | Fun | *Armillaria* sp. incl. A. *ostoyae* and *A. mellea* | Conifers | Roots. Destruction of bark, sapwood and heart wood is mainly caused by enzymatic activities | LOW | LOW | LOW | MEDIUM | **VERY LOW** |
| **Eucalyptus canker disease** | Fun | *Chrysoporthe austroafricana* | *Tibouchina* spp. (amenity plant)<br>*Corymbia* spp.,<br>*Eucalyptus* spp.,<br>*Syzygium* spp. | Stems | MEDIUM<br>Pathogen in South Africa | HIGH | HIGH | MEDIUM<br>Causes tree death. Presence in South Africa suggests it could affect similar climates in Australia | **MEDIUM**[45] |
| **Wilt disease** | Fun | *Ceratocystis albifundus* | *Acacia* spp. | Whole plant. Causes wilting | MEDIUM<br>Pathogen in South Africa | HIGH | HIGH<br>Associated with insects | MEDIUM<br>Only known to affect *A. mearnsii*, *A. decurrens* in South Africa | **MEDIUM** |

[45] Significant pest in tropical/sub-tropical regions

| Common name | Life form | Scientific name | Primary host | Affected plant part | Entry potential | Establishment potential | Spread potential | Economic impact | Overall risk |
|---|---|---|---|---|---|---|---|---|---|
| **Wilt disease** | Fun | *Ceratocystis fimbriata* complex | *Eucalyptus* spp., *Acacia* spp. | Whole plant. Causes wilting. | MEDIUM<br>Pathogen in South America and Africa | HIGH | HIGH<br>Associated with insects | MEDIUM<br>Causes tree death in tropical/ sub-tropical areas | **MEDIUM** |
| **Western gall rust** | Fun | *Endocronartium harknessii* | Restricted to *Pinus* spp., (including *Pinus radiata*) | Branches, stems, seedlings | MEDIUM | HIGH | HIGH | HIGH | **HIGH** |
| **Pitch canker** | Fun | *Fusarium circinatum* | Pines and Douglas fir | Branches, exposed roots and trunks | MEDIUM | HIGH | HIGH | HIGH | **HIGH** |
| **Annosus root & butt rot** | Fun | *Heterobasidion annosum* | Primarily affects conifers, also oaks | Roots and butts | MEDIUM[46] | HIGH[47] | HIGH [48] | MEDIUM | **MEDIUM** |
| **White rot** | Fun | *Inonotus splitgerberi* | Trees and woody shrubs incl. *E. globulus* | Living trees | LOW<br>Tropical America | MEDIUM<br>Wide host range | LOW | MEDIUM | **VERY LOW** |
| **White rot** | Fun | *Inocutis jamaicensis* | *E. globulus* and Table and wine grapes | Living trees | LOW<br>North and South America | MEDIUM<br>Wide host range | LOW | MEDIUM | **VERY LOW** |
| **Black stain root disease** | Fun | *Leptographium wageneri* | Pine | Vascular wilt of mature trees | MEDIUM | HIGH | HIGH | MEDIUM | **MEDIUM** |
| **Nectria canker** | Fun | *Neonectria fuckeliana* | Fir, larch, and spruce, present on Radiata pine in NZ | Tree trunks, stems | MEDIUM[49] | HIGH | HIGH | MEDIUM | **MEDIUM** |

[46] Recorded in British Columbia on Douglas fir and Western red cedar
[47] Very wide host range incl. both coniferous and broadleaved species.
[48] Spores usually dispersed by air over many km and infect trees via wounds etc.
[49] Most of NZ Radiata pine timber kiln dried; green sawn timber from Canada may be a risk

| Common name | Life form | Scientific name | Primary host | Affected plant part | Entry potential | Establishment potential | Spread potential | Economic impact | Overall risk |
|---|---|---|---|---|---|---|---|---|---|
| **Eucalypt leaf blight** | Fun | *Phaeophleospora destructans* | *Eucalyptus* spp. | Leaves | HIGH | HIGH | HIGH | MEDIUM<br>Tropical/ sub-tropical pest | **MEDIUM** |
| **Laminated root rot** | Fun | *Phellinidium weirii* | Douglas fir, western red cedar | Roots and butts | MEDIUM[50] | LOW | LOW | LOW | **NEGLIGIBLE** |
| ***Phytophthora captiosa*** | Fun | *Phytophthora captiosa* | *Eucalyptus* spp. | Crown dieback | HIGH | HIGH | HIGH | MEDIUM | **MEDIUM** |
| ***Phytophthora fallax*** | Fun | *Phytophthora fallax* | *Eucalyptus* spp. | Crown dieback | HIGH | HIGH | HIGH | MEDIUM | **MEDIUM** |
| ***Phytophthora kernoviae*** | Fun | *Phytophthora kernoviae* | Wide range (30 species) on trees and shrubs (ornamentals) | Leaf blight, aerial dieback and bleeding cankers | HIGH<br>Great Britain, Ireland and New Zealand | HIGH | HIGH | LOW | **LOW** |
| **Daño Foliar del Pino** | Fun | *Phytophthora pinifolia* | *Pinus radiata* | Foliage | LOW | HIGH | HIGH | HIGH | **MEDIUM** |
| **Sudden oak death** | Fun | *Phytophthora ramorum* | Numerous trees and shrubs incl. Eucalypts | Stems, twigs, branches leaves | MEDIUM[51] | HIGH | HIGH | HIGH | **HIGH** |
| **Rust of Myrtaceae** | Fun | *Puccinia psidii sensu lato* (exotic strains) | Myrtaceae | Leaves, shoots, young branches, epicormics, coppice | HIGH | HIGH | HIGH | HIGH | **HIGH** |
| **Coniothyrium eucalypt canker** | Fun | *Teratosphaeria zuluensis* and *T. gauchensis* | *Eucalyptus* spp. | Tree stems, trunks and leaves | MEDIUM | HIGH | HIGH | MEDIUM<br>Mostly risk to tropical/ sub-tropical areas | **MEDIUM** |

[50] Recorded in British Columbia on Douglas fir and Western red cedar
[51] Current restrictions on imports. Heat treatment temp. may need to be reviewed if Sudden Oak Death can survive

**Plant Health Australia**
ABN 97 092 607 997
Level 1/1 Phipps Close
DEAKIN ACT 2600

Phone 02 6215 7700
Fax 02 6260 4321
Email biosecurity@phau.com.au
**www.planthealthaustralia.com.au**

AUSTRALIAN FOREST PRODUCTS ASSOCIATION
afpa

EXOTIC PLANT PEST HOTLINE
**1800 084 881**

Plant Health AUSTRALIA

PHA12-084