



**CONSERVATION COMMISSION OF WESTERN AUSTRALIA
POSITION STATEMENT NO. 7
JUNE 2012**

**The threat of *Phytophthora* dieback to biodiversity values on lands vested in the
Conservation Commission of Western Australia**

Context and purpose

The adverse impacts of the invasive and destructive plant pathogen *Phytophthora cinnamomi* Rands (*P. cinnamomi*) on the biodiversity of the south-west of Western Australia (WA) are of utmost concern to the Conservation Commission. *P. cinnamomi* has impacted on a wide range of vegetation types throughout the south-west of the state, putting at risk the flora of areas that have been internationally recognised as part of a biodiversity hot spot.

Strategic mapping of dieback occurrence in areas infested by *P. cinnamomi* has enabled recognition of the extent of the epidemic (see Appendix 1 – Dieback occurrence in areas infested by *Phytophthora cinnamomi* and lands vested in the Conservation Commission under the *Conservation and Land Management Act 1984*). *P. cinnamomi* has a very wide host range and affects plant species that exhibit little resistance in their roots to infection and rot.

Vegetation types and communities have been threatened in some of the most heavily impacted areas, especially along the coast from Augusta to east of Esperance. Heathlands, woodlands and forests have lost diversity of plant species. Areas of high species endemism such as the Stirling Ranges and Mt Lindsay are also highly impacted by *P. cinnamomi*. The understory of the jarrah forest—especially in areas of poor drainage and low soil fertility—has changed dramatically and in the most heavily impacted areas, the loss of trees has resulted in structural change to communities (Shearer & Tippett 1989; Shearer et al. 2009).

The management of *P. cinnamomi* is complex and challenging. Although many reports and reviews have looked into the management of *P. cinnamomi* over the last two decades, there is still a need for an overarching strategy to define desirable and achievable outcomes for dieback management in the state.

The Commission is also aware of a number of other *Phytophthora* species which are pathogenic and potentially involved with death and decline of plant species in areas of the south-west of the state (e.g. *Phytophthora elongata*, *P. arenaria*, and *P. constricta*). Although none have the wide host range of *P. cinnamomi*, other species such as *Phytophthora multivora* associated with the decline of tuarts, are widely distributed and found in multiple land regions across the south-west of WA (Stukely 2012).

The term *Phytophthora* dieback (as a disease name) therefore refers to the damage caused by all species of *Phytophthora*, not only *P. cinnamomi* as in the past.

The purpose of this position statement is to identify key values and threats associated with *Phytophthora* dieback in lands vested in the Conservation Commission under the *Conservation and Land Management Act 1984* and outline the Conservation Commission's views on how the threat should be addressed through planning, management and monitoring.

Background

For thirty years, large-scale aerial photography has been used to map the extent of *Phytophthora* dieback disease in native forests in the southwest of Western Australia, with validation of the observations involving routine testing of soil and root samples for the presence of *Phytophthora cinnamomi* (Burgess et al. 2009). The spread of dieback through water, soils and road-making materials has seen most lowland areas with susceptible plants species in the south-west (that receive more than an average of 400 millimetres of rainfall) radically altered. The epidemic has reached a stage that requires the protection of disease-free areas. Efforts to protect these areas should be commensurate with their biodiversity values.

The cause of large areas of jarrah deaths was first studied in detail in WA fifty years ago as a result of threats to the sustainability of the timber industry. Recognition of the role of *P. cinnamomi* led to important responses including the establishment of movement and disturbance exclusion zones in the forest; first known as quarantine and later Disease Risk Areas.

In general, disease incidence is related to both the level and type of human activity along with site characteristics and structure of communities. The temperature and moisture status of soils and soil profiles critically affect pathogen activity (Shearer & Tippett 1989). All extensive disease free areas in the south-west are to some degree isolated and have had little human disturbance, such as roading, over the last 100 years. Examples of such areas include the unroaded forest blocks of the Walpole Wilderness, core area of the Fitzgerald River National Park and areas away from the coast in the Cape Arid National Park.

In the last five years, ten *Phytophthora* species new to science have been described from samples associated with dying plants from natural ecosystems in Western Australia (see Appendix 2 – Results of *Phytophthora* sample testing by DEC Vegetation Health Service 2010–2011). For example, *Phytophthora arenaria* is of concern in areas north of Perth and *Phytophthora constricta* has been associated with large patches of dying banksias near the Fitzgerald River National Park particularly in areas subjected to inundation after heavy summer rainfall events (Stukely 2012; Rea et al. 2011).

Values and threats

Operations planned for Conservation Commission vested lands which involving soil disturbance and movement of plant materials in the south-west (area receiving more than an average annual rainfall of 400 millimetres) present a risk of spreading dieback. It is crucial to consider both intra and inter site vectoring, as human activity is highly correlated with dieback occurrence in the south-west of WA, except where stringent hygiene has been

implemented. The flora of the south-west has a large component of susceptible species particularly *Proteaceous* and *Epacridaceous* species (Wills 1993). Once *P. cinnamomi* establishes, impacts are severe and irreversible. The threat heightens for susceptible species of limited distribution with increasing proximity to existing infestations.

The Conservation Commission recognises the biodiversity, social and economic values threatened by the spread of *P. cinnamomi* and the risk posed by other species of *Phytophthora*. These include:

- loss of individual species in an ecosystem, declared rare or priority species
- loss of vulnerable species and susceptible threatened ecological communities
- increased invasion of weed species in impacted areas
- decreased volumes of timber in areas used for sustainable wood production
- reduced ecotourism value.

The Conservation Commission's position

The Conservation Commission recognises the severity of the disease situation and the need for prompt measures to prioritise and ensure the protection of key areas in the medium to long term. Work to maintain populations or seed banks of species most at risk needs to continue and complement plans for protecting vegetation at a range of scales.

The spread of dieback may put at risk efforts to manage flora species that are declared threatened or in need of special protection under the *Wildlife and Conservation Act 1950* and other Priority flora species as identified by the Department of Environment and Conservation <www.dec.wa.gov.au/content/view/852/2010>. Arresting the spread of the disease into disease-free areas of significance is therefore of critical importance as restoration of areas once diseased is usually cost-prohibitive.

The Conservation Commission acknowledges the following:

- Prevention is the most cost-effective management strategy.
- Eradication is costly, with methods only appropriate for use over relatively small infestations.
- There are areas where knowledge of the disease is limited and the precautionary principle should be applied.

The Conservation Commission also recognises the severity of the dieback epidemic and budget constraints associated with its management. Any proposed activities such as harvesting, silviculture or ecotourism on lands vested in the Conservation Commission should be guided by clear and attainable objectives that are appropriate for dieback management at different scales.

Accordingly, the Conservation Commission is of the view that the following objectives should be adopted to maintain biodiversity and other values in the south-west (particularly in the area mapped as receiving more than 400 millimetres of annual average rainfall):

Objectives for the management of dieback

- Identify, prioritise and protect vegetation from dieback infestation in areas representative of a wide range of vegetation types across the south-west. Develop and widely communicate the strategies to be employed for their protection.
- Protect biodiversity and give priority to areas with concentrations of threatened taxa, high biodiversity or critical habitat.
- Maintain the health and vitality of vulnerable areas free of dieback from other threats.
- Integrate dieback management with the management of other invasive species.
- Minimise impacts of *Phytophthora* species on forest productivity and forest structure.

Approaches to disease management

The Conservation Commission encourages the following approaches to disease management underpinned by risk assessment principles:

- The precautionary principle should be adopted particularly in areas where knowledge of the disease is limited.
- Hygiene management planning and practices should reduce the likelihood of spreading infested soil and plant material.
- Priority areas should be identified through planning. Priority areas may be large areas of native vegetation currently disease free or of high biodiversity values threatened by the disease.
- The use of any potted plants originating from plant nurseries in revegetation or restoration of conservation areas should only be adopted with caution and as an option of last resort. Horticultural mulches may also harbour propagules of pathogens especially if procured from infested forest areas. There is increasing evidence that nurseries and movement of potted plants are commonly associated with *Phytophthora* species. Potting mix used for nursery plants being sent to WA has been described as a potential source of plant pathogens, and may be an important avenue for their introduction into WA and provide a route for their movement within and between nurseries within a state (Davison et al. 2006).
- Research should be applied in developing and improving management measures (e.g. the sterilisation or treatment of basic raw materials for roading). Research programs should also incorporate monitoring the effectiveness of treatments.
- Management measures should include investment in minimising the risk of spreading all *Phytophthora* species during fire management operations, timber harvesting, installation of infrastructure and its maintenance.
- A system for monitoring and recording disease spread across the conservation estate is still needed to assess any progressive improvement or otherwise in relation to dieback environmental outcomes (Conservation Commission 2010).

The Conservation Commission acknowledges the complex interactions between pathogen, hosts and environment that take place in the spread of dieback. However, the Commission also recognises that achievable measures focused on prevention, containment and impact reduction provide opportunities to minimise the further spread of the disease (Stukely 2012).

Risk management approaches including appropriate hygiene practices are of particular relevance in addressing the threat posed by new species of *Phytophthora*. The Commission therefore supports and encourages interagency efforts to assess and manage the threat of dieback and ensure the protection of Western Australia's biodiversity.

References

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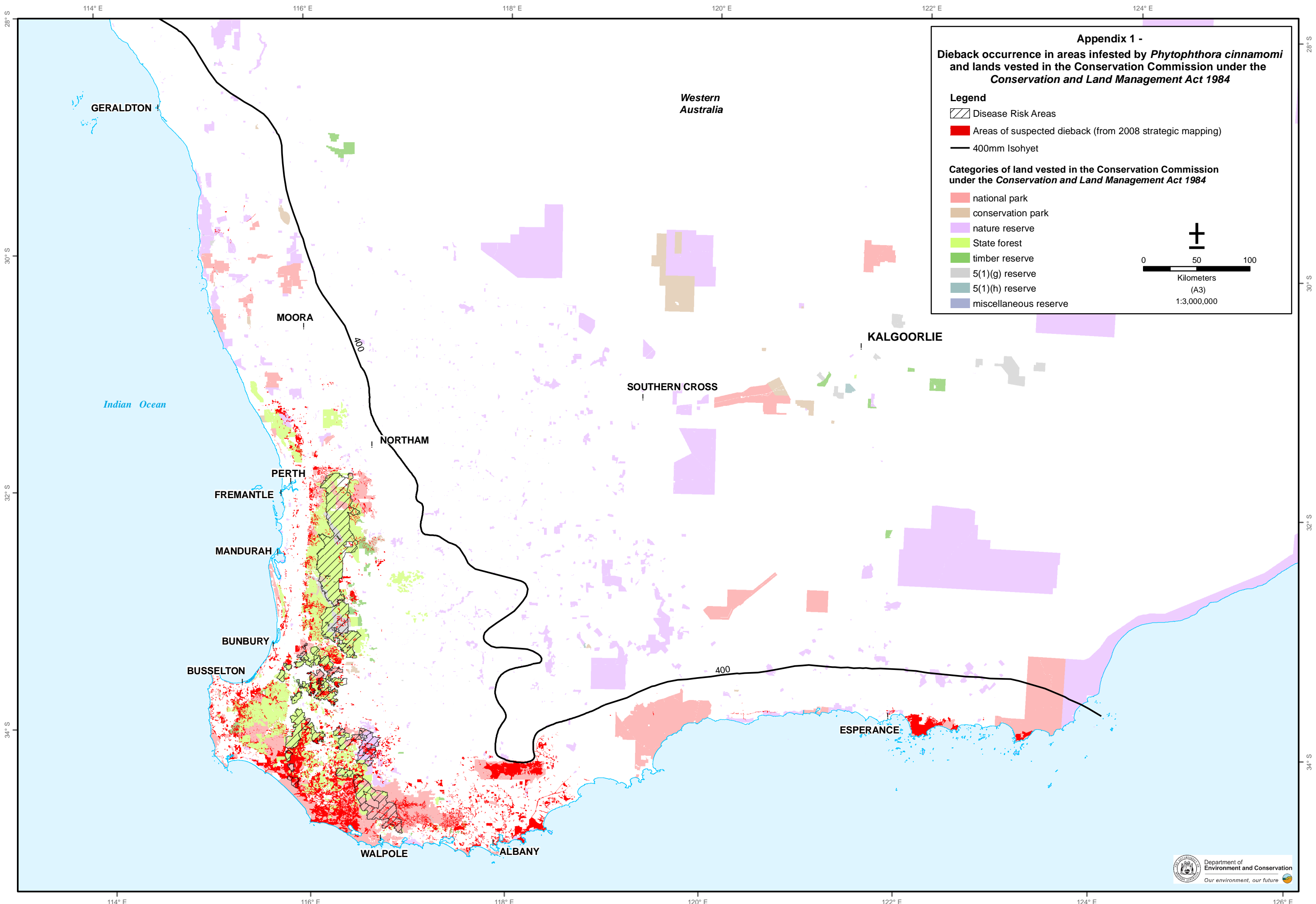
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**Appendix 1 -
Dieback occurrence in areas infested by *Phytophthora cinnamomi*
and lands vested in the Conservation Commission under the
Conservation and Land Management Act 1984**

Legend

- Disease Risk Areas
- Areas of suspected dieback (from 2008 strategic mapping)
- 400mm Isohyet

**Categories of land vested in the Conservation Commission
under the Conservation and Land Management Act 1984**

- national park
- conservation park
- nature reserve
- State forest
- timber reserve
- 5(1)(g) reserve
- 5(1)(h) reserve
- miscellaneous reserve

Kilometers
(A3)
1:3,000,000

Map produced for the Conservation Commission by the Department of Environment and Conservation. The Conservation Commission does not guarantee that the information depicted is without flaw of any kind and disclaims all liability for any loss, error or other consequence which may arise from relying on any information depicted.

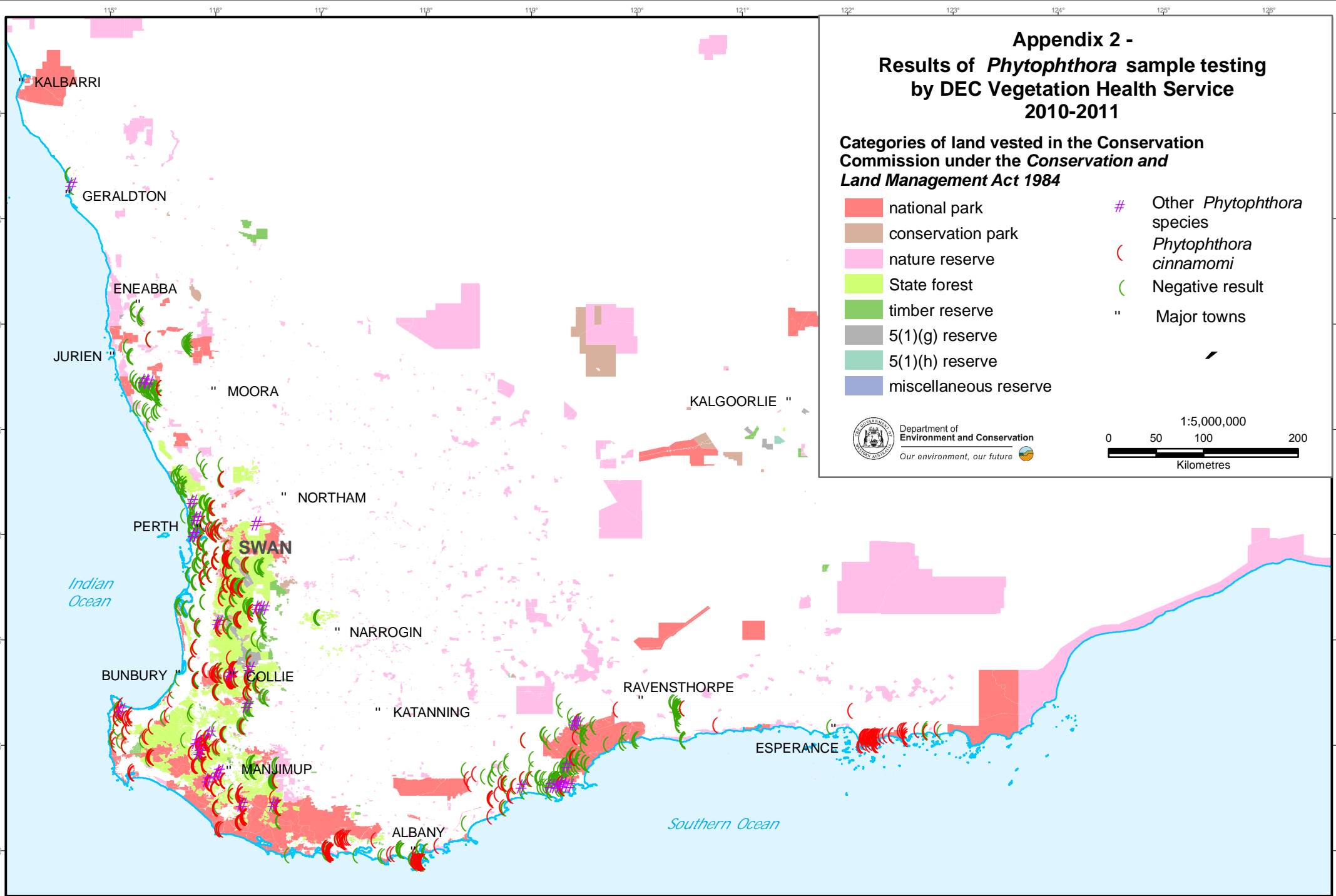
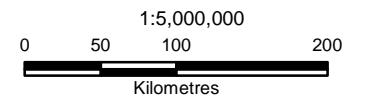
Appendix 2 - Results of *Phytophthora* sample testing by DEC Vegetation Health Service 2010-2011

Categories of land vested in the Conservation Commission under the *Conservation and Land Management Act 1984*

- | | |
|--|-------------------------------------|
| national park | # Other <i>Phytophthora</i> species |
| conservation park | () <i>Phytophthora cinnamomi</i> |
| nature reserve | () Negative result |
| State forest | " Major towns |
| timber reserve | |
| 5(1)(g) reserve | |
| 5(1)(h) reserve | |
| miscellaneous reserve | |



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Graticule shown at 1 degree intervals