Managing External Dieback Threats to the Fitzgerald River National Park

FINAL REPORT

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SOUTHCOAST
NATURAL RESOURCE MANAGEMENT

Managing External Dieback Threats to the Fitzgerald River National Park

December, 2009

Prepared by *Steady State Consulting* for *South Coast NRM Inc.*

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Disclaimer

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PREFACE

This report provides direction for local area management of the external threat of Phytophthora Dieback to the Fitzgerald River National Park within the South Coast region of Western Australia.

The Threat of Dieback to Fitzgerald River National Park

The Fitzgerald River National Park (FRNP) is a large area of natural vegetation located on the central couth coast 420 km south-east of Perth and 170 km east of Albany with only minimal Dieback infestation. The high biodiversity and social values of FRNP are recognised internationally as a UNESCO *Man and the Biosphere Reserve*. This a high priority area within the South-west of Western Australian biodiversity 'hotspot' - one of only 34 recognised internationally. It is also highly valued by the people of Western Australia and the many national and international visitors to the park. Significantly, the 'Fitz' is very highly valued by the local rural communities of Hopetoun, Ravensthorpe, Jerramungup and Bremer Bay within the Shires of Jerramungup and Ravensthorpe. It is frequently accessed locally for recreation and a range of other purposes.

The values of the FRNP are well recognised – there are over 1700 species of plants, including the spectacular Royal hakea (*Hakea victoria*). The unique nectar-eating Honey Possum (*Tarsipes rostratus*) and the threatened Carnaby's Cockatoo (*Calyptorhynchus latirostris*) depend upon many of these plants for food and habitat. The coastal landscapes including West-, Mid- and East-Mount Barren, named by the explorer Mathew Flinders, are distinctive.

The biodiversity and social values of the FRNP are significantly threatened by Phytophthora Dieback. The soil-borne pathogen *Phytophthora cinnamomi* (and other related pathogens) infest native plant communities cause death of susceptible species.

More than 40% of plant species are susceptible to Phytophthora Dieback in south-west Western Australia. The banksia (Proteaceae), pea (Papillionaceae), southern heath (Epacridaceae) and grass-tree (Xanthorrhoeaceae) families are highly susceptible to the disease. A high proportion of plant species in FRNP are susceptible. The potential for disease to spread within the national park and adjacent vegetation is very high.

The pathogen now infests over 21% of the 4.7 million hectares interpreted in the south-west of Western Australia. The potential for spread is much greater.

The Southwest is "*... one of the world's jewels in terms of natural heritage....there are over 8,000 plant species half of which occur nowhere else on earth....it is a legacy beyond imagination...*".

It is the "*... worst plant disease pandemic on the planet at the moment in terms of the number of species that are being impacted*".

"*I can't think of anywhere I have been in my travels across the globe ... where I have seen so many species being hit by the one disease factor.*"

Professor Stephen D. Hopper, Director
Royal Botanic Gardens, Kew United Kingdom
and WA Plant Conservation Biologist

Fitzgerald River National Park – managing the external threat of Dieback

The *Phytophthora Dieback Regional Management Plan for the South Coast Region (2010-2017)* provides strategic direction for reducing the risk of Phytophthora Dieback. The FRNP is identified as one of the highest priority 'protectable' areas in the region.

Purpose and Scope

South Coast NRM Inc. initiated development of a plan for local area management of the external threat caused by Phytophthora Dieback to FRNP. This is to add-value to current management undertaken by the Department of Environment and Conservation (DEC) within the national park to contain existing *P. cinnamomi* infestations and to reduce the risk of further infestation.

The purpose of the plan is to identify specific actions that can be undertaken by organisations or groups that are required to minimise the external threat of Dieback to the FRNP. While the focus in on the national park, the actions are to apply also to disease risk reduction in the adjacent areas of Unallocated Crown Land , local government reserves and private remnant vegetation.

The 'terms of reference' for the plan include requirements to provide a strategic approach to stakeholder engagement which will outline specific actions required for:

- understanding of the social/community/recreational use of these areas,
- identifying where this use poses a disease risk,
- determining what behaviours need to change,
- providing direction for the change that would best be implemented, and
- processes to monitor the success of the actions once undertaken.

The scope of 'stakeholders' is to include all human activities or human-induced effects that may increase the threat of Dieback to the national park.

'Dieback Management Strategies' are prepared for the Shire of Jerramungup and the Shire of Ravensthorpe. These are consistent with this plan for actions that are within the expected role and capacity for each local government authority.

Actions of the plan are to be developed with consideration of outcomes from community consultation processes held in the Shires of Jerramungup and Ravensthorpe during February, 2008 for preparation of the *Phytophthora Dieback Regional Management Plan for the South Coast Region (2010-2017)*. Local Area Situation Statements for Dieback that contain outcomes from these processes are available through *South Coast NRM Inc.* in Albany.

SUMMARY

Fitzgerald River National Park (FRNP) is of high conservation value. It is an area of 329,039 ha with substantial areas of adjacent natural vegetation also of high value within the Fitzgerald Biosphere Reserve. Phytophthora Dieback is an external threat to the high biodiversity and social values of these areas.

Current management of Dieback within FRNP includes road closures during wet conditions and standards for 'clean-on-entry' conditions for works undertaken within the Park. There is a need to ensure that consistent management practices are adopted to minimise the external threat of Dieback.

Assessment of external Dieback threats to high conservation value areas shows high risk for soiled vehicles and machinery entering Dieback-free areas from locations known to have current Dieback infestations. Recreational vehicles and road maintenance of fire response vehicles are included in the high risk category. Maintenance of roads using infested gravel supplies is also high risk. The highest external Dieback risk however is with the poorly formed roads that cross land tenure and are often almost impassable due to wet conditions. The Doubtful Island road and the Gordon Inlet-Wellstead Estuary road are two particular examples.

A range of feasible and effective management actions are evaluated. These are considered within the context of community engagement processes for permanent practice change for identified groups.

Adoption of Standard Operating Procedures is required. These need to be adapted for specific stakeholder groups however standard practices need to be consistently applied. The requirement for 'clean-on-entry' conditions is paramount. Guidelines for procedures are provided.

The intention of the plan is to minimise the threat of Phytophthora Dieback to identified Regional Priority Areas – the Fitzgerald River National Park and adjacent areas of natural vegetation within the Fitzgerald Biosphere Reserve. This is consistent with strategic priorities of the *Phytophthora Dieback Management Plan for the South Coast Region 2010-2017*.

The **Goal** for achieving this is:

> *To ensure that no further Dieback infestation occurs within the Fitzgerald River National Park.*

Management is to be applied across the Fitzgerald Biosphere Reserve to achieve this Goal. Success in achievement will be by there being no new confirmed Dieback infestations within the Park due to human activities.

There are small areas of existing Dieback infestation within FRNP. These have potential to spread autonomously. The actions of this plan are to minimise the risk of new infestations due to human activities that affect the Park.

The **Objectives** for achieving the goal of no further Dieback infestations are:

1. Local communities within the Fitzgerald Biosphere Reserve (FBR) and visitors to the Fitzgerald River National Park have a high level of awareness about the potential risk of Dieback to high value biodiversity and landscape assets,
2. Local FBR communities understand, endorse and promote their stated intention to "*Keep the Fitz Dieback-free*",
3. Identified groups and organisations are adopting 'standard operating procedures' for Dieback control relevant to their activities.

Fitzgerald River National Park – managing the external threat of Dieback

A three-year Implementation Plan lists priority actions.

Jerramungup and Ravensthorpe Dieback Working Groups are proposed for delivery of actions within the Plan. Representation by local government and the Department of Environment and Conservation as well as other related organisations is proposed. Local arrangements for communication and action similar to those adopted for fire risk management within the area are suggested.

Rationalisation of tenure for land adjacent to FRNP would enable more effective management for Dieback risk.

The actions include:

Awareness and communication

- Information development and distribution
- Information displays
- Infested site photo-reference information
- Targeted engagement
- Community leader bus-tour
- Local endorsement program

Detection and mapping

- Assessment of local 'high conservation value' areas
- Roadside vegetation assessment in the Shire of Jerramungup
- Standard signage for infested areas
- Community-based Dieback reporting

Strategic use of signage

- Prepare a signage strategy
- Produce and deploy signs

Road risk reduction

- Assessment of road reforming and restricted access options
- Implementation of road reforming and restricted access options
- Assessment of road material resources

Wash-down facilities

- Implementing actions of Vehicle Wash-down Assessment
- Guidelines for footwear brush or wash stations

Alternative low-risk recreation areas

- Assessment of sites suitable for alternative recreational areas
- Application for local government control capability

Adoption of 'standard operating procedures'

- Targeted engagement for 'standard operating procedure' adoption
- Developing community expectations for hygienic practices

Fitzgerald River National Park – managing the external threat of Dieback

Project delivery

- Local steering committees
- Local area coordinators
- Community and visitors surveys

The Implementation Plan provides a timeframe, targets, key performance indicators and an estimate of costs for priority actions.

ACKNOWLEDGEMENTS

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The project was undertaken by Viv Read (*Steady State Consulting*) and managed by Paul Donovan (Regional Dieback Coordinator, South Coast NRM Inc.).

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The Threat of Phytophthora Dieback in FRNP

1.1 What is at risk?

Fitzgerald River National Park (FRNP) is comprised of two Class A reserves with a total area of 329,039 ha. A small section of the park is separate to the west at Dillon Bay although this is relatively inaccessible. The boundary of FRNP is shown in Figure 1.1 within the context of contiguous areas of natural vegetation and adjacent reserves. There is an estimated 120,000 ha of Unallocated Crown Land (UCL) adjacent to the park and additional smaller areas in roadside or local government reserves and in private remnant vegetation.

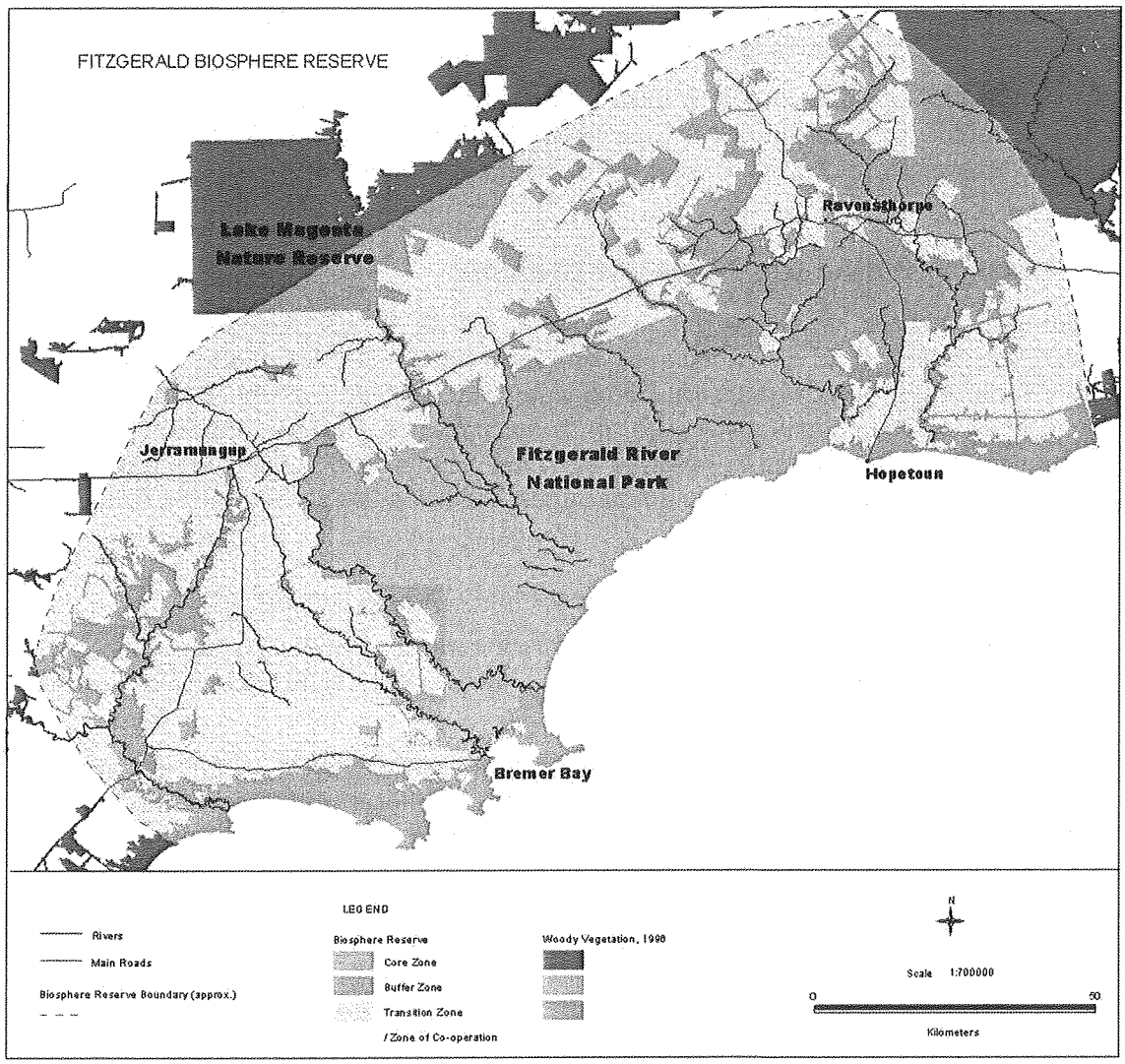


Figure 1.1 FRNP boundaries within the Fitzgerald Biosphere Reserve.
(Source: Greening Australia Western Australia)

The high biodiversity, landscape and social values of the FRNP are described in the *Fitzgerald River National Park Management Plan 1991-2001*. There are over 1700 species of native plants within the national park; many are rare or geographically restricted. There is a high level of endemics (occurring only within the park) especially in the Barren Ranges.

Fitzgerald River National Park – managing the external threat of Dieback

The FRNP and adjacent areas has international Biosphere Reserve status (under the UNESCO *Man and the Biosphere* program) conferred in 1978 due to extremely high floral diversity combined with high local community interest in the park. The intention was to include local communities in an active program of management within the biosphere reserve. The Fitzgerald Biosphere Reserve area, a total of 1.3 million ha, is shown in Figure 1.1.

There is an area of freehold land surrounded by the FRNP at Quaalup. Most of this area has natural vegetation cover. There is further extensive natural vegetation in coastal areas of local reserve vested with the Shires of Jerramungup and Ravensthorpe. The boundaries between these and the FRNP is complex however the high biodiversity values and the high risk of Dieback in these areas occur across tenure.

The Ravensthorpe Range has extensive areas of natural vegetation north of Ravensthorpe. Over 1600 species of plants have been identified in an area that is approximately 1/3 the size of FRNP. Most of the area is considered to be vulnerable to Phytophthora Dieback.

Coastal vegetation is highly valued by local communities and visitors. Coastal areas in the Shire of Jerramungup are especially valued where the Scarlet Banksia (*B. coccinea*) occurs. Many similar swampy areas further west are currently infested by Dieback.

1.2 Understanding the Threat of Dieback

Phytophthora Dieback is a root pathogen that infests plants resulting in death of susceptible species in forest, woodlands and heathlands of Australia. Phytophthora Dieback is caused by a microscopic soil-borne water mould (*Phytophthora* spp.). There are many species of *Phytophthora* however *P. cinnamomi* has greatest impact on natural ecosystems. It was introduced to Australia early last century and spread significantly with the increased use of heavy earth-moving machinery following the Second World War.

P. cinnamomi is spread in two ways:

1. transport of infected soils or plant material (vectoring spread), or
2. by water in the landscape or root-to-root contact between plants (autonomous spread). The disease can spread rapidly downslope by water flow or soil erosion from an infested area.

Any process that transports soil from an infested area has potential to spread the disease. This includes vehicle movement, soil disturbance and local flooding. Soil may be transported from a separate infested area (e.g. by mud on a vehicle coming from an area where the level of infestation is high) or by redistribution of soil from an infested site (e.g. grading a road where gravel contains the pathogen).

1.2.1 Existing infestations within FRNP

Phytophthora Dieback does occur within the Park. *P. cinnamomi* is known to occur at four locations. The *Fitzgerald River National Park Management Plan 1991-2001* (CALM, 1991) identified two infestations (along Bell Track and at the Jacup Ranger Station). More recent identification of infestations occurs within Susetta Creek south of the Old Ongerup Road, and along Pabelup Drive.

One *P. citricola* infestation has been identified along Pabelup Drive near the Twertup turn-off.

Fitzgerald River National Park – managing the external threat of Dieback

The Department of Environment and Conservation (DEC) has recently undertaken disease interpretation surveys of all roads and tracks within FRNP. This has shown one additional *P. cinnamomi* infestation on Witt Road near Susetta Creek.

A Dieback Hazard Map has been previously prepared for the FRNP (CALM, 1991). This shows most of Park to have high-very high potential for infestation.

1.2.2 Other infested sites

There are other sites near to FRNP that are currently infested by *P. cinnamomi*. These are grouped as follows:

Gravel extraction pits

P. cinnamomi is know to occur in a gravel pit on Reserve Road off the South Coast Highway (Highway One), and in a pit on Mallee Road within the Shire of Jerramungup. Gravel from these sources is considered to be the cause of the infestation within Susetta Creek.

A gravel extraction pit near Boxwood Hill in the Shire of Jerramungup is also known to contain *P. cinnamomi*.

The infested gravel pits are managed by Main Roads WA.

Roads east of FRNP

Springdale Road, Starvation Bay Road and Masons Bay Road east of Hopetoun in the Shire of Ravensthorpe are known to have extensive infestations of *P. cinnamomi*. These roads have been significant access roads for local community and tourists to Hopetoun, coastal areas and FRNP. Recent upgrading of Jerdacuttup Road will reduce tourist use of these roads.

A recent comprehensive interpretation of roadside vegetation communities within roads and gravel pits in the Shire of Ravensthorpe east of FRNP has shown that 195km of road is infested (Ficifolia Consulting, 2008). The location of these roads is shown in Map 1.1.

Roads west of FRNP

There is no known occurrence of Phytophthora Dieback within vegetation communities of roads within the Shire of Jerramungup west of FRNP.

Other local infestations

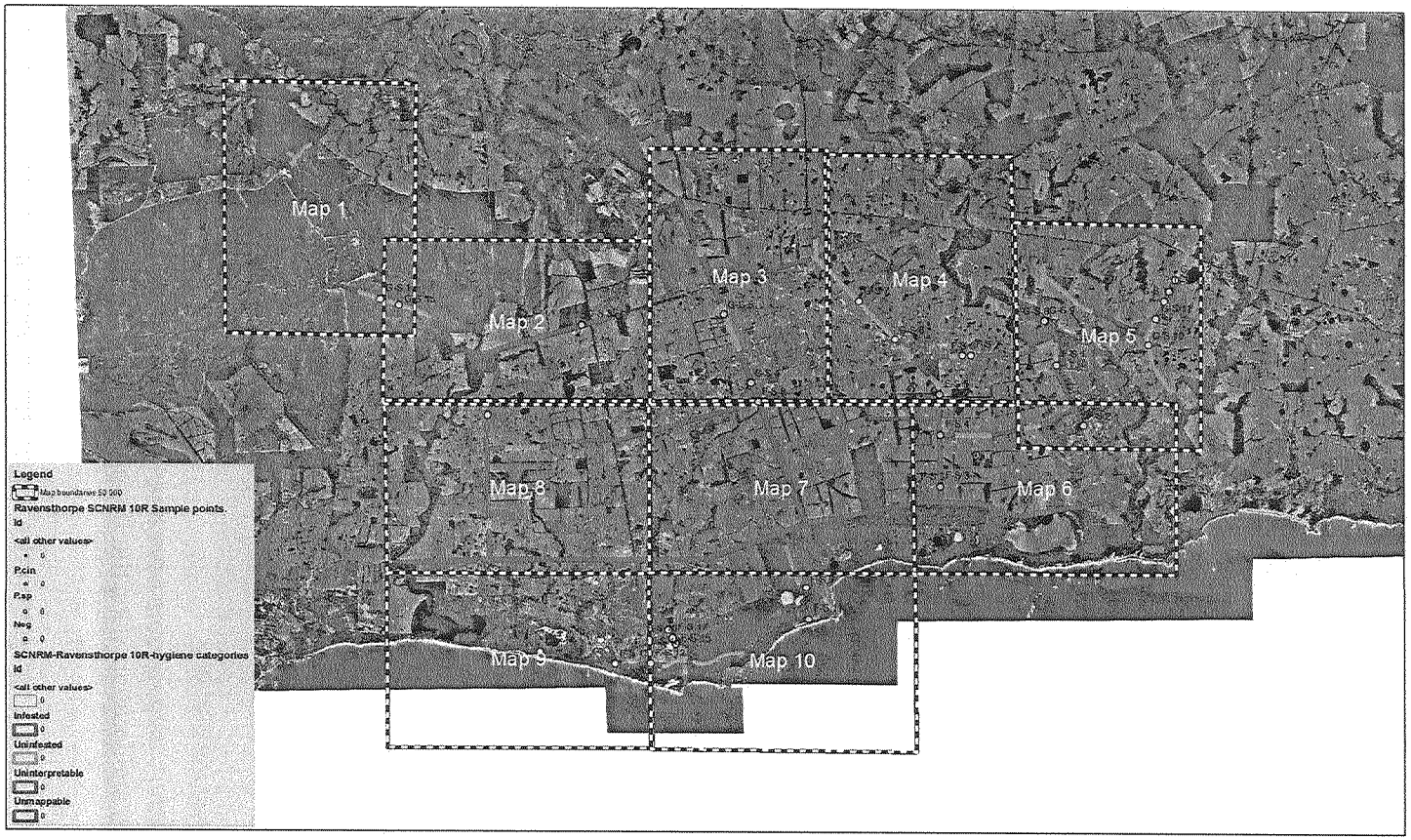
Areas with *P. megasperma* have been identified within the Culham Inlet catchment, including one location along the Hopetoun-Ravensthorpe Road.

1.2.3 Infested sites within the South Coast region.

The *Dieback Atlas* (DEC, 2007) shows the distribution of Phytophthora Dieback in the South Coast region (Map 1.2). This shows the high level of infestation in the Stirling Range National Park 130km to the west of FRNP, and in the Cape le Grande National Park near Esperance. There is further extensive infestation in coastal areas and reserves within the City of Albany local government area.

Map 1.1 Distribution of Phytophthora Dieback on roads in the Shire of Ravensthorpe (source: Ficifolia Consulting, 2008).

Shire of Ravensthorpe Dieback Hygiene Status.
Map Index and Sample locations



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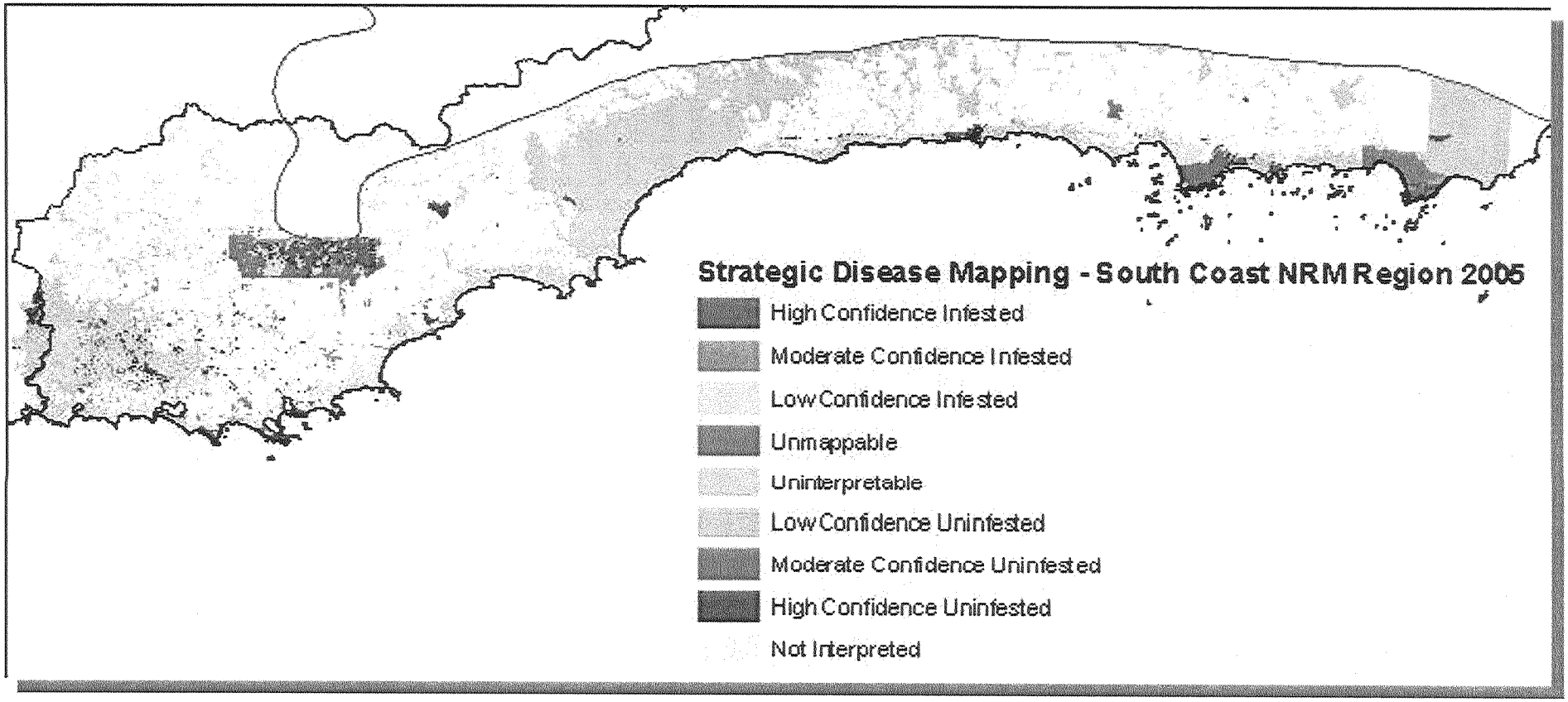
Map Produced by Simon Watkin.
Ficifolia Consulting,Albany WA.
Map Data from SCNRM
DLA 04SC1-10R.

Map 1.2 Disease mapping for *Phytophthora cinnamomi* within the South Coast region. (Source: DEC, 2007)



1.3 Current management practices for Dieback

1.3.1 Management within the Park

The *Fitzgerald River National Park Management Plan 1991-2001* (CALM, 1991) has Objectives to:

1. *Prevent the introduction of dieback and other disease into disease-free areas, and*
2. *Control the spread and intensification of, and where possible eradicate, dieback and other diseases where they are already present.*

The Management Plan emphasises the importance of management to minimise the further introduction and spread of Dieback. The main management actions taken are listed below.

Management action	Description	Comment
1. Road closure	Key roads within the FRNP are closed for up to a week following a 10mm or greater rainfall event (when road puddles form) and are re-opened when Rangers consider the roads are dry. There are 11 closure gates (7 are east in the Park and 4 are in the western section). The public is informed of closures through an email/fax communication network.	This action is considered to be important and is probably the reason that Dieback is not more widespread within the Park. Road closures occur on up to 20 occasions each year. This is done manually by Rangers. Each trip to close or open roads is approximately 300 km. The task is onerous when one of the two Rangers is absent. Rangers currently have vehicle use limits. Road closure occurs based on road conditions within the Park, however roads in adjacent areas where infestation may occur could be hazardous due to significant rainfall events not recorded within the Park. Employees from the Shire of Jerramungup have an effective co-operative arrangement with Park Rangers for road closures west of FRNP.
2. Road alignment and drainage	The *FRNP Management Plan* provided direction for minimum risk management of roads.	Some roads adjacent to the park are hazardous for the spread of Dieback due to very poor alignment and drainage (e.g. Doubtful Islands Road, Gordon Inlet Road-Wellstead).
3. Clean road	Road construction and	Gravel extracted from the

	materials	maintenance materials are sourced from sites known to be free of disease.	infested pit on Reserve Road in the Shire of Jerramungup for maintenance of the Old Ongerup Road is considered to have caused *P. cinnamomi* infestation within the Park.
4.	**'Clean on Entry' contractor requirements**	Contractors working on roads and other facilities are required to adopt standard hygiene protocols including 'clean on entry' condition for machinery.	Similar standards are required in adjacent areas of natural vegetation within the FBR.
5.	**Restricted public access**	Some areas are restricted from public vehicle access. Some highly vulnerable areas are further restricted from access by walkers.	
6.	**Design of visitor facilities**	The *FRNP Management Plan* provided direction for minimum risk management of visitor facilities.	
7.	**Information and signage**	Information about Dieback is provided at entry point to the Park and at commencement points for tracks and trails within the Park.	Some signage is relevant and effective. Information at Park entry points is currently unattractive and limited in content.
8.	**Staff training**	The *FRNP Management Plan* prescribes that staff associated with the Park are comprehensively trained with Dieback management skills.	Current training of DEC staff for Dieback management within the Park is not comprehensive. Specific training for other organisations within the FBR, including LGA's, is required. This could be linked with broader environment training (e.g. for weed management).
9.	**Wash-down facilities at ranger Stations**	The *FRNP Management Plan* required wash-down facilities at Ranger Stations. These exist at East Mt. Barren and at the Jacup Ranger Stations.	Existing facilities are not adequately designed or maintained. Storm water run-off limits the effectiveness of both facilities. There are currently no wash-down facilities at the Murray Road Ranger Station.
10.	**Foot-ware cleaning**	Metal trays are brushes provided at commencement	Signage to inform of purpose of facilities missing from some

facilities. points for walk trails. sites.

1.3.2 Management in other areas

There is currently very limited adoption of effective Dieback management in most areas adjacent to the FRNP. Dieback management strategies are currently being prepared for the Shires of Jerramungup and Ravensthorpe (to be integrated with this Local Area Plan).

Mining and mineral exploration companies, particularly those active within the hire of Ravensthorpe, have Dieback management requirements conditional to Mining and Exploration Licenses under the *Mining Act (1978)*.

Private landholders and catchment group members are generally aware of Dieback.

There is very limited information available in public places for local communities within the Shires of Jerramungup and Ravensthorpe.

Section 2

Assessment of External Threats

This document is focused on managing the external threat of Dieback spread to the Fitzgerald River National Park and adjacent areas of natural vegetation. It is not intended to provide direction for management of existing infestations within the Park (including autonomous spread from these areas), or for other internal park management activities.

2.1 Assessing the threat of Dieback

The external threat of further Dieback spread to Fitzgerald River National Park and adjacent areas is directly related to the potential for people visiting the park for work or recreation to transport soil from infested areas to vulnerable vegetation communities.

The factors that increase the potential for Dieback introductions are:

- Proximity of existing infestations (the source),
- Transport of infested soils (the pathway), and
- Access to vulnerable areas (the receiving environment).

2.1.1 The source - existing infestations

The current level of infestation within the Park is low so spread from these source areas can be contained.

There is currently only low infestation of areas west of the Park in the Shire of Jerramungup so local sourcing of infested soil is not significant. However, the potential for rapid spread within vulnerable areas, particularly along poorly drained roads, should local infestations occur, is very significant.

Recent surveys show that roads east of the Park in the Shire of Ravensthorpe now have extensive Dieback infestation. These are a potentially significant source of infested material increasing the risk of infestation within the local area and into the Park.

Major source areas are the Stirling Range National Park, Cape le Grande National Park, reserves and coastal areas. Locally, source areas include infested roads and gravel pits.

2.1.2 The pathways – transport of infested soils

Vehicles, earthmoving equipment and footwear that transport soils from an infested area provide pathways for disease spread. For vehicles, soil adheres to mud flaps, wheel housings, suspended spare wheels and other under-carriage projections. Some vehicles can be substantially covered in mud that could include Dieback infested material.

Soil retained in buckets, blades, tracks and under-carriage of earthmoving equipment has potential to transport infested soil.

Boots covered in mud from infested areas are a further pathway for disease spread.

2.1.3 The receiving environment – access to vulnerable areas

Plant assemblages of the FRNP and adjacent areas of natural vegetation are highly susceptible to Dieback. Vulnerability of an area is increased where susceptible species occur in waterlogged or inundated areas with high vehicle access. Swampy areas containing the Scarlet Banksia (*B. coccinea*) are an example.

An assessment is made of the range of external threats of Dieback to the Park in Table 2.1.

Table 2.1 External Dieback threat assessment matrix

External Threat	Description	Assessment	Comment
Local government road design, construction and maintenance.	Potential for contaminated road materials to infest FRNP and adjacent bush areas due to erosion and sediment transport. Includes issues of disease-free gravel supply, run-off and stormwater drainage.	Very high	Infestation has occurred in Susetta Creek within FRNP due to use of contaminated materials.
Main road design, construction and maintenance.	Potential for contaminated road materials to infest FRNP and adjacent bush areas due to erosion and sediment transport. Includes issues of disease-free gravel supply, run-off and stormwater drainage.	Very high	MRWA gravel pit adjacent to South Coast Highway is infested.
High risk un-infested roads: Doubtful Island coastal access roads, Gordon Inlet–Wellstead Estuary road.	Poorly constructed and maintained 4WD access tracks with highly hazardous bog-holes causing vehicles to continuously divert through natural vegetation. The Doubtful Island Road east of Murray Rd is within a reserve vested with the Shire of Jerramungup that continues to the extent of private land. The road is within the FRNP as it continues east. The track is almost impassable in wet weather so vehicle use is low. However the risk is high due to visitors coming from infected areas, especially those who regard passage of the boggy track as a challenge. The Gordon Inlet-Wellstead Road is closed when required at the Wellstead Estuary by co-operation between Park Rangers and Shire employees. Passage along this road is poor in wet conditions so vehicle numbers are relatively low.	Extreme	The threat of Dieback will be substantially increased if an infestation is established in these areas. It will spread rapidly. Upgrading these roads to minimise hazardous conditions will reduce Dieback risk however it may attract more visitors so the risk may remain high. Careful management of road upgrades is required. The Shire of Jerramungup does not support development of a causeway for vehicle access crossing the Wellstead Estuary.
High risk infested roads: Springdale Road and other infested roads east of FRNP.	Springdale Road is unsealed within the Shire of Ravensthorpe with the exception of a small section at the western end. The road is sealed within the Shire of Esperance from approximately 1km east of Fuss Road to the Ravensthorpe-Esperance boundary. Grading the 'shoulder' and drains of	Very high	Identified need for landholders adjacent to infested roads to adopt hygiene practices.

External Threat	Description	Assessment	Comment
	these is at risk of spreading the pathogen.		
Unauthorised road access: Temporary road closure for Dieback control	When roads are closed following rain, gates are not locked. Some access to popular locations occurs despite road closure (e.g. the Moir track to gain access to the Phillips River.	Moderate	Most road users understand and respect the need for temporary road closures for Dieback control. Some local people continue to access some closed tracks.
Unauthorised road access: Permanent road closure	Roads that are permanently closed eventually revegetate and become impassable. Some unauthorised access occurs soon after road closures.	Moderate	Some roads would have high unauthorised access if closed without adequate engagement in information for current road users.
4WD recreational vehicle use: Organised tours or clubs	Members tour to a range of difficult to access locations primarily for the purpose of remote camping but also for challenging off-road driving. Some vehicles may have recently been in infected areas and are at risk of transporting soil (especially on mud flaps and wheel housings).	High	
4WD recreational vehicle access: Individual vehicles or small groups	Individuals or groups travel to difficult to access locations often for the primary purpose of challenging driving. Vehicles are often covered in mud from similar activities in other areas which may be Dieback infested.	Very high	
Recreational motor bike access: Clubs	Trail bike and enduro clubs arrange competitive events that challenge rider skills. There is potential for spread of Dieback if events traverse both infested and un-infested areas.	High	The Ravensthorpe Enduro Club arranges an annual *Rat Run* for members and visitors. Hygienic practices are adopted for the event.
Recreational motor bike access:	Individuals or groups of bikes travel to difficult to access locations often for the primary purpose of challenging off-road	Very high	

External Threat	Description	Assessment	Comment
Individual vehicles or small groups	riding. Bikes are often covered in mud from similar activities in other areas which may be Dieback infested.		
Eco-tour operators	Passenger vehicles with off-road capability. Many of these vehicles will have undertaken similar activities in other areas which may be Dieback infested.	High	Most eco-tour operators will be adopting hygienic practices understanding that these are required for being permitted to operate within the Park.
Fire prevention and suppression activities	Disease risk potential by vehicles or earthmoving equipment used for firebreaks, control burns and wildfire suppression. Disease risk is greatest during wildfire events when it is difficult to ensure 'clean on entry' conditions. Risk can be reduced by use of aerial water bombers and by allowing inaccessible areas to burn out.	Very high	Plant is often sourced to be on standby. There is a need for the controlling authority (DEC, FESA or Shire) to assess the urgency of response when requesting assistance from contractors or others to ensure that there is not an over-reaction to a situation resulting in high disease risk.
Increasing park visitation; Day visitors	Current annual visitation for FRNP is approaching 40,000. Approximately 65% enter from the east through Hamersley Drive. While visitor numbers are low compared with other popular national parks, the number is expected to increase significantly with roads into and within the Park being bituminized. Many visitors arrive from highly infested areas (e.g. Stirling Range or Cape le Grande national parks).	High	The potential for spread of Dieback is high if visitor vehicles access smaller tracks or go off-road. Many day visitors have been itinerant workers from Hopetoun and Ravensthorpe during a recent period of mining activity.
Increasing park visitation;	Most overnight visitors camp in designated camp areas within the Park or at private facilities (e.g. Quaalup Homestead).	Low	

External Threat	Description	Assessment	Comment
Overnight camping	Some people camp in non-designated areas, particularly in coastal dunes.		
Increasing park visitation; Long-distance walkers	Currently, very few bushwalkers traverse the Park due to distance from Perth and very limited water availability. There are existing controls to prevent walkers accessing susceptible plant communities in some locations (Mid- Mt Barren, Woolbernup Hill, Thumb Peak)	Low	
Increasing park visitation; Local recreation	The number of local recreational visitors increased with mining activity in the Shire of Ravensthorpe. While this has recently diminished, there is potential for this to re-occur with increased population in Hopetoun.	High	
Summer visitors from Great Southern and Wheatbelt rural areas	Traditional post-harvest holidays on the South Coast have included access to FRNP for fishing, camping.	Moderate	Most visitors from dryer areas (<400mm rainfall) are unlikely to transport infested soils to the area. Regional visitors from higher rainfall areas pose a higher disease risk.
Local community access	Local people accessing beaches for fishing, camping. Young people access bush areas for train-bike riding. Access to FRNP and adjacent coastal areas is often by using poorly-defined tracks. Hamersley Inlet and Quoin Head are high access areas for local community.	High	Some families have continued to enjoy access to the Park over generations. Traditional local access may become restricted with increasing Park visitation.
Neighbouring landholder recreation access	Private landholders, their families and visitors frequently access FRNP by 4WD, quad bike, trail bike or mountain bike. Some neighbouring landholders may have Dieback on their properties or in road reserves bounding their property.	High	

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External Threat	Description	Assessment	Comment
Research or monitoring activities	People involved in research or monitoring activities often access remote areas occasionally taking vehicles off-road. Research vehicles are used in many similar locations some of which may be Dieback infested.	High	
Catchment group activities.	Fencing, site rehabilitation and revegetation have potential to introduce and spread Dieback.	Moderate.	
Management responsibility for UCL adjacent to the Park.	Extensive areas with highly susceptible plant communities with uncontrolled vehicle access.	High	
Private eco-tourism activities	Individual vehicles and buses travel to a range of sites particularly for wildflower viewing or related excursions.	Moderate	
Bee-keepers	Apiarists access areas of natural vegetation within the South Coast region especially during dry seasons in the Wheatbelt.	High	
Starling control	Starling control teams employed by the Agricultural Protection Board (APB) require access to vegetated areas.	High	
Power pole maintenance	Maintenance vehicles follow tracks aligned with power transmissions lines. The traverse swampy areas where the risk of Dieback infestation is high.	High	Excavation equipment used for pole replacement increase the potential for spread of Dieback.
Commercial tree plantations	Earthmoving equipment used for road and firebreak construction and maintenance has potential to spread Dieback from infested areas.	Moderate	

Section 3

Options for Action

3.1 Range of options

A strategic approach requires that all options for management are considered but that only some are adopted according to their feasibility and effectiveness, and according to funding that is available.

The *Phytophthora Dieback Management Plan for the South Coast Region 2010-2017* provides the framework for adopting a strategic approach. There are seven Risk Reduction Strategies in the regional plan:

1. Practice Change through Awareness and Engagement,
2. Diagnosis, Detection and Mapping,
3. Priority Area Protection,
4. Local Area Risk Reduction,
5. Operational Planning for Organisations,
6. Standard Operating Procedures, and
7. Compliance and Regulation.

These are adopted to guide development of local area actions.

The regional Management Plan emphasises the importance of reducing the risk of Dieback spread to high value un-infested areas, particularly the Fitzgerald River National Park. There is currently no feasible method for eradication of the pathogen from an area. Containment of infestations and recovery from the impact of disease is very expensive and not with guaranteed success.

3.2 Feasible and effective actions

The range of actions relevant to the area has been identified for each of the risk reduction strategies. They vary in their feasibility (i.e. technically practical and manageable) and their effectiveness (i.e. their potential for Dieback risk reduction if established or adopted). Some options are relatively in-expensive (e.g. information brochures), others have high installation costs and on-going maintenance costs (e.g. vehicle wash-down stations).

The context for the range of suggested actions is provided in the sections below.

An assessment of the feasibility and effectiveness of options is provided in Table 3.1.

3.2.1 Practice change through awareness and engagement

The greatest Dieback risk is due to activities in vulnerable areas by people where contaminated soils may be transported. Most are unaware of the risk due to their individual activity. Many are inadequately aware of the biodiversity and social values at risk to Dieback. Very few people are adequately informed about the actions they should be taking.

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There is a need for many people visiting or local to the area to recognise their own Dieback risk potential and to be well informed about the actions they should be taking to minimise this risk.

Adoption of practices for Dieback risk reduction needs to become permanent change. It needs to become the 'new way of doing things' in vulnerable areas. This may challenge some established values and traditional practices however the risks are too high to not respond.

Permanent practice change will require:

1. **Whole-of-community 'ownership'** of managing the Dieback threat (i.e. change from it being a problem for government),
2. **Local leadership** especially by DEC and local government (ensuring that these organisations adopt a high level of hygiene practice adoption as an example for others),
3. **Consistency of practices cross-tenure** (e.g. use of clean road materials in all areas),
4. **Responding to new information** - 'adaptive management' (e.g. changing management if new infestations occur).

Options include:

- Local leadership (e.g. community-based Dieback Working Group)
- Signage (e.g. FBR and LGA boundaries, park entrance, community facilities, shopping centres, town 'entry statements', tourism and accommodation centres),
- Information displays (entry to Park and to towns),
- Targeted engagement (e.g. training sessions, workshops),
- Brochures, posters, bumper stickers, DVD (existing),
- Maps of Dieback distribution,
- Information for schools,
- 'Dieback-free' accreditation signs for landowners,
- Photo signs at infested sites (showing vegetation prior to infestation), and
- Bus tours for community leaders (e.g. comparative between FRNP and SRNP).

Some of these actions have occurred previously relating to management within FRNP however most need to be revised to develop a high level of appreciation of the threat to biodiversity values and to foster a whole-of-community and cross-tenure approach.

All actions taken for Dieback risk reduction should recognise and reflect differences in land use activities and community interests between the Shire of Jerramungup and the Shire of Ravensthorpe.

3.2.2 Diagnosis, detection and mapping

Interpretation of Dieback needs to be undertaken by a qualified interpreter. It can be easily misdiagnosed.

The *Dieback Atlas* (DEC, 2007) contains most current information about occurrence of Dieback. There are many areas in the South Coast region where this information is only of 'low confidence' (i.e. not based on field verification).

Current information is available on 1:100,000 scale hardcopy maps. This information can also be reproduced at any scale required (contact through *South Coast NRM Inc.* Dieback Coordinator).

It should be noted that this information is not suitable for operational planning (e.g. road construction or re-alignment). Detailed site mapping is required for operational activities.

a) Local 'high conservation value' areas

FRNP is identified as a regional priority 'high conservation area'. There is a need to identify additional local 'high conservation areas in the Shires of Jerramungup and Ravensthorpe that are vulnerable to Dieback. Reconnaissance-scale survey by a qualified interpreter or botanist with advice from locally informed people is required to assess these areas.

b) Roadside vegetation

Roadside vegetation east of FRNP has been recently interpreted and mapped. The same is proposed for areas west of the Park in the Shire of Jerramungup.

c) Use of Standard Signage

There is a *Standard Dieback Signage Protocol* for the use of Phytophthora Dieback signage across all tenure in Western Australia. The signage system is based on the following symbols:

Standard signage should be deployed following roadside vegetation mapping to ensure hygienic operations during road maintenance works (e.g. not grading from an infested site to a Dieback free area).

d) Community-based detection

Vigilance by community members for evidence of Dieback should be encouraged to increase awareness and to be alert to high risk activities. Information about what to look out for should be made available.

Final diagnosis needs to be made by a qualified interpreter. Sites of community concern should be collated over a period of time (about a year) then provided to DEC for consideration.

Some suggestions include involvement of schools and school bus commuters. A '*Dieback Watch*' initiative could be established in a similar way to the '*Rural Watch*' program. Signage for these initiatives will provide a continuous reminder of the Dieback threat.

3.2.3 Priority area protection

The Fitzgerald River National Park is a regional priority area for protection from Dieback. There is however other areas connected or near to the Park that also have high biodiversity and social value. These areas include the Ravensthorpe Range, Unallocated Crown Land (UCL) adjacent to the part, local reserves, private remnant vegetation and roadside vegetation.

To provide consistent and effective protection from Dieback, it is suggested that the area of interest become the complete Fitzgerald Biosphere Reserve (noting that the risk of Dieback occurrence is low for areas with less that 400mm rainfall – which are generally the areas north of Highway One).

3.2.4 Local area protection

There is a range of significant actions that can be integrated within the Fitzgerald Biosphere Reserve.

a) Strategic Signage

Signage is needed for awareness leading to practice change for Dieback risk reduction. There needs to be a strategic approach to the use of signs within the FBR to maximise their effect.

There are currently no effective signs about Dieback on any roads outside the Park or in any towns. Information within FRNP needs substantial improvement and linkage with broader information external to the Park.

The actions needed should be included within a *FBR Dieback Signage Strategy* which should include:

- Clear, simple messages (e.g. '*Keep the Fitz Dieback-free*'),
- Consistent symbolic images. These may differ between the Shires of Jerramungup and Ravensthorpe,
- Progressive information on approach to FRNP (e.g. awareness → engagement → assertion → control)
- Location of signs (e.g. 'awareness' signs upon entrance to FBR, 'engagement' signs within towns, 'assertion' signs at entrance to the Park, 'control' signs within the park),
- Timing of sign usage (e.g. engagement signs for use of wash-down facilities only after facilities are available).

The *FBR Dieback Signage Strategy* should be developed in close consultation with and endorsement by local community organisations (e.g. LGA's, progress associations, FBG, RAIN and others).

b) Road re-alignment, design and surfacing

Roads leading to and within FRNP are currently being assessed and re-designed in preparation for sealed surfacing for improved visitor access. While this will reduce Dieback risk in some locations (due to improved road drainage), increased visitation to vulnerable areas adds new threat potential.

A strategic approach to road construction and maintenance across tenure is relevant. This should include:

- Location of roads or tracks low in the landscape,
- Road drainage to safe disposal (i.e. minimising erosion risk),
- Hygienic construction and maintenance practices,
- Aesthetic values (some consider that well-maintained gravel roads are more consistent with the character of FRNP compared with a black bitumen surface).

Signage will be required to ensure visitors stay on designated roads and tracks within the FRNP.

c) Wet road closures

Roads within FRNP are closed by DEC Rangers when there has been more than 10mm of rain. They are re-opened when assessed to be dry (i.e. no road ponding). These actions are considered to be essential for Dieback risk reduction within the Park.

Most visitors to the park are aware of possible road closures and know where to access information (e.g. DEC website). Unauthorised access to closed roads is not common.

There are other roads in natural vegetation adjacent to FRNP that are of high Dieback risk when wet. Consideration is required for some of these roads to become 'summer access' only or have closure arrangements using criteria adopted by DEC for FRNP. Some roads with potential risk cross tenure (i.e. FRNP, UCL or Shire reserves) providing recreational access to coastal areas. A Dieback Risk Assessment of gravel roads within the FBR is required, including all high access roads and tracks within FRNP (these have been recently assessed for Dieback occurrence), UCL, Shire and freehold land with vulnerable natural vegetation.

If Dieback is identified in road reserves west of FRNP, the need for wet road closure will increase significantly.

d) Road reformation and closures

There are many 4WD tracks through FRNP, UCL and Shire reserves within the Shire of Jerramungup. Some are surveyed roads (e.g. Doubtful Islands Road (part) and the Gordon Inlet Road), however there are many unauthorised access tracks. These provide southern beach access or are diversions around impassable road sections (Figure 3.1).

The wet, muddy conditions of these roads and tracks deter many 4WD road users however they become a challenge to some. The risk of Dieback spread under these conditions is extremely high. Photos 3.1 and 3.2 show the hazardous road conditions.

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Public access to coastal areas (e.g. House Beach, Tooregullup Beach) and Gordon Inlet is required. The potential for Dieback infestation and spread can be substantially reduced by providing 'all weather' access roads. This will require road formation to eliminate wet conditions. Some road re-alignment options should be considered. This would benefit local residents and visitors.

The distance of the Doubtful Island Road from Murray Road to the Gordon inlet Road intersection is approximately 13 km. The Doubtful Islands Road is hazardous for a further 4.5 km through swampy land then there is approximately 5.5km of sand track to the coast.

Hazardous conditions of the Gordon Inlet Road from the Wellstead Estuary to the Doubtful Islands Road intersection occur within an 8km section. The Gordon Inlet Road north of the intersection has been previously reformed for 'all-weather' access.

The 'trade-off' for improved road access should be permanent closure of alternative roads and tracks identified to be of potentially high Dieback infestation potential.

A high level of consultation and information will be required to minimise unauthorised access to permanently closed roads.

Photo 3.1 Diversion tracks to avoid wet conditions are a high Dieback risk

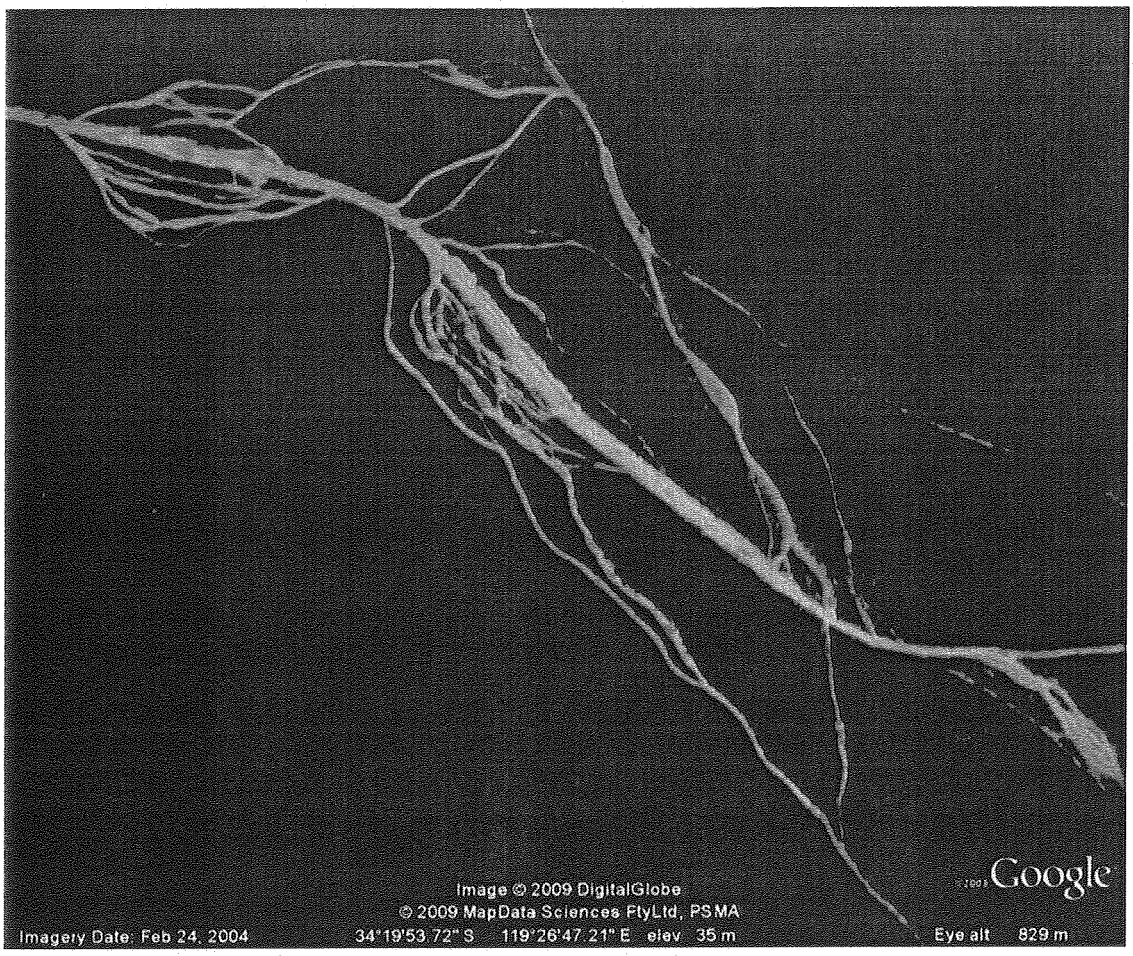

Photo 3.2 Diversion tracks on the Doubtful Islands Road

e) Road material resource assessment

Gravels, sands and other materials used for construction and maintenance of roads has potential to be a major source of disease spread if excavated from an infested pit. Access to road materials should be from source areas known to be Dieback-free.

Assessment of available road materials, especially suitable gravel, is required. This should be undertaken for the Shires of Jerramungup and Ravensthorpe in liaison with Main Roads WA. Consideration of material quality, quantity, accessibility, haul distance, disease-free status and cost is required. Access to 10-12 strategic source areas for each Shire is required. These are likely to occur on agricultural land so negotiated arrangements with landholders will be required.

f) Wash-down facilities

There are wash-down facilities for Dieback control located at the East Mt Barren and Jacup Ranger Stations and at the DEC depot in Ravensthorpe. There are currently none available for public access within the Fitzgerald Biosphere Reserve.

A separate scoping document evaluates options for wash-down facilities to minimise the threat of Dieback within the FBR.

g) Alternative low-risk recreational areas

Demand for recreational opportunities will rise with local and regional population increase. This includes trail, enduro, quad and mountain bikes, 4WD and equestrian use, and coastal access for fishing.

There is a need to ensure that those involved are well informed about the potential for Dieback infestation resulting from these activities.

Alternative sites where Dieback risk to biodiversity and social assets is considered to be lower could be considered. An assessment of options within the FRB considering also management arrangements and responsibilities is required. Individuals and groups who should use these sites would need to be identified and representatives to be involved in any site development.

Penalties should apply to those who access identified high risk areas (see section 3.2.7).

3.2.5 Operational planning for organisations

Organisations with operations that have potential to spread Dieback within the Fitzgerald Biosphere Reserve should have plans and processes adopted to minimise the risk.

Operational planning for Phytophthora Dieback is known to be undertaken by DEC, Main Roads WA and Landcorp. Strategies are being prepared for the Shires of Jerramungup and Ravensthorpe.

There is a required for organisations to have plans and processes for:

- Site operations,
- Adoption of Standard Operating Procedures, and
- Staff and contractor induction and training.

Many other organisations should also ensure appropriate plans and processes are adopted. These include:

State Government agencies

NGO's

Research and monitoring organisations

Community Conservation Groups

Catchment/NRM Groups

Infrastructure Managers

Earthmoving Contractors

Recreation operators

Mining and mineral exploration

Plantation Forestry (and forestry services)

Nurseries/ Landscaping/Soil Suppliers

Land Development (Developers and Surveyors), and

Fire Response organisations (including Fire Brigades).

Guidelines for consistent adoption of operational planning and processes are required.

There is further requirement to ensure a high level of compliance with planning and processes within the FBG (e.g. service contracts to require compliance in contractual agreements).

3.2.6 Standard operating procedures

A range of Standard Operating Procedures and management guidelines has been previously prepared including:

- *Phytophthora cinnamomi and disease caused by it: Volume 1 – Management Guidelines* (CALM, 2003)
- *Interpreter's Guidelines for Detection, Diagnosis and Mapping* (CALM, 2001)
- *Phosphite Operations Guidelines* (CALM, 1999)
- A *Dieback Hygiene Manual*, and
- *Best Practice Guidelines for the management of* Phytophthora cinnamomi (DEC, 2004)
- *Managing* Phytophthora Dieback *in Bushland* (DWG, 2008, Edition 4),
- *Managing* Phytophthora Dieback*, Guidelines for Local Government* (DWG, 2000),
- *Code of Practice for Extractive Industries* (DWG, 2004), and
- *The Nursery and Garden Industry Accreditation Scheme* (NIASA, 2003)

Standard operating procedures are based on the 'Clean on Entry' principle for dieback management (applicable to any operation site vulnerable to Dieback) which requires effective hygiene through cleanliness of all vehicles, machinery, equipment (including clothing and footwear) and materials to ensure that soil is not spread from infected to uninfected areas.

A specific area for which Standard Operating Procedures are required is in sourcing disease-free road building materials.

The main standard operating procedures expected to be adopted by many key stakeholder groups are:

- Site risk assessment,
- practical wash-down methods and facilities (permanent or mobile),
- identification and supply of dieback free basic raw materials (e.g. gravel for road construction and maintenance operations),
- dry soil activities,
- split-phase or barrier-system operations,
- surface water control and drainage,
- quarantine areas and road closures,
- control of public access,
- use of standard signage, and
- disturbed site restoration.

Guidelines for development of localised Standard Operating procedures are provided in Section 4.2.

3.2.7 Compliance and regulation

Planning, policies and legislation currently available to manage or control the risk of human activities spreading Phytophthora Dieback within the South Coast region are reviewed in the *Phytophthora Dieback Management Plan for the South Coast Region 2010-2017.* This shows that the revised WA *Environmental Protection Amendment Act 2003* makes provision for Phytophthora Dieback infestation to be considered as causing environmental harm.

Conditions may be applied for approval of mineral exploration and mining proposals through *Mining Act 1978*. These may restrict activity in high risk Phytophthora Dieback areas or require adoption of hygiene practices.

Local government may apply for powers to control vehicle access under the *Control of Vehicles (Off-road areas) Act 1978* applicable to all land tenure.

Otherwise, statutory and non-statutory planning processes provide some opportunities to control human activities within infested or high disease risk areas.

Full benefit of a regulatory approach will require adequate capacity to ensure compliance.

Table 3.1 Assessment of feasible and effective actions for external Dieback threat reduction

Proposed action	Feasibility	Effectiveness	Comment
Information – FRNP and FBR values: – Signage at park entrance, – Brochures, DVD, posters etc., – Personal contact (groups, schools etc.)	High	High	Current signage at entrance to FRNP is unattractive and not adequately targeted. Need to maintain a focus on vulnerable proteaceous-rich communities. All households and enterprises in the Shire of Fitzgerald have had access to the FRNP DVD.
Information – the threat of Dieback: – Entry signage for FBR, – Signage at park entrance, – Brochures, DVD, posters etc., – Personal contact (groups, schools etc.)	High	High	Community leaders from the Shire of Ravensthorpe undertook an effective bus tour for comparison between FRNP (un-infested) and SRNP (infested). 'Pre-dieback' site photo signage suggested.
'Ownership' of the Dieback issue – attitude shift	High	High	Local endorsement statement (e.g. *"Keep the Fitz Dieback-free"*). The purpose of endorsement is to provide a public statement that this is important to the values of those who live locally. Local engagement signage (e.g. *"Land without Dieback"* linked to DEC *"Land for Wildlife"* program)
Walker/foot access hygiene: – Relevant signage, – Functioning brush-down facilities, – Effective and accessible facility location.	High	Medium	Bushwalkers and trail users are sometimes uncertain about the purpose of these facilities and often question their value. It is unclear if they should be used prior to or after being on the trail.
Road reserve interpretation and	High	Medium	Mapping complete for roads east of FRNP.

Proposed action	Feasibility	Effectiveness	Comment
mapping.			Similar mapping required for areas west of FRNP. Detailed mapping by private service providers for extensive areas can be costly. Reconnaissance-scale mapping may be adequate.
Site interpretation for operations planning	High	High	Private service providers available for site interpretation and mapping. There is a need for interpreters to understand site operations. The cost of engaging a private service provider is justified for larger, long-term projects but not for smaller operations. Assessment of options for site assessment for small operations required.
Standard signage ('infested' and 'un-infested')	High	High	Signage needs to be accurate and decisive. Use of unclear terms not acceptable. Directions for community response to signage information needs to be clear (i.e. what should be done in response to an area signed as 'infested'?).
Community observation and reporting.	Medium	Medium	Potential to generate community interest and awareness although would require time by trained Dieback interpreter to confirm infestation.
Fitzgerald Biosphere Reserve as buffer zone for FRNP priority area protection			Proposal to apply Dieback risk reduction to Fitzgerald Biosphere Reserve. Actions relevant to the Shire of Jerramungup and the Shire of Ravensthorpe are identified within respective Dieback Management Strategies. Information to identify the importance of adjacent vegetation remaining disease-free.
Road re-alignment, design and surface sealing	Medium	Medium	Currently occurring in the Shire of Ravensthorpe (Jerdacuttup Road). Planned for Hamersley Inlet Drive in FRNP. Proposed for Swamp Road and Devils Creek Road in the Shire of Jerramungup (dependent upon Federal government funding allocation). Previously suggested for Parbelup Road and Point Anne access within FRNP. Road sealing has higher surface water run-of compared with gravel surfaces (so that smaller rainfall events may disperse Dieback) however there is less soil mobilisation if the road surface is sealed. Sealed roads will also attract more visitors although more will use 2WD vehicles. This may increase

Proposed action	Feasibility	Effectiveness	Comment
			Dieback risk by increased use of smaller tracks or by going off-road although these tracks can be closed.
Park road closures – wet road conditions	High	High	High cost in time for Rangers. Shire employees currently assist Park Rangers with road closure operations (e.g. for roads near Bremer Bay). These arrangements could continue based on DEC road closure decisions. Reduced effectiveness with only two Rangers, especially when one is not available for road closure processes. Need for clearer closure criteria, procedures and decision processes by DEC. Need for clear communications networks for visitors. Road closure in FRNP is based on road conditions within the Park. There is a need for additional consideration of the condition of roads leading into the Park. Involvement of local community in park road closures is not considered to be an effective option.
Local government road closures – summer access only	Medium	Medium	Local road Dieback risk to be assessed. Local government staff capacity and signage required for road closure, Need for clear closure criteria and responsibilities, Difficult to ensure compliance (although most visitors would comply with closure).
Local government road closures – permanent	Medium	High	High staff capacity and signage required for road closure, Would need to be linked with high level communication with local community and visitors to the area.
Strategic sourcing of Dieback-free road materials.	High	High	Proposed contract arrangement for soil/landscape survey and land capability assessment of suitable road materials within the Shires of Jerramungup and

Proposed action	Feasibility	Effectiveness	Comment
			Ravensthorpe to ensure suitable materaisl is available from Dieback-free source areas.
Wash-down facilities and practices	Medium	High	Needs a high level of compliance needed for facilities to be effective. See separate assessment of options for wash-down facilities.
Alternative low-risk recreation areas: – Coastal access, – Trail, enduro, motocross, quad-bike use, – Mountain bike tracks, – 4WD course, – Equestrian trails.	Medium	Medium	Clubs may use alternative areas effectively however non-club members will continue to access FRNP and adjacent areas. This is difficult to control. Coastal access considered to be acceptable for some areas. Development of specific sites may be high costs. LGA's unwilling to use local rate-payer funds for facilities used mostly by non-rate-payers. Some local communities are opposed to recreational vehicle activities as they are socially un-desirable and potentially damaging to the environment. It may be difficult to find locations that would be acceptable. LGA's may not want to create new recreational opportunities for people from other areas.
Local and main road construction and maintenance procedures: – Clean materials (extractive industries policy, resource assessment and extraction plan) – Standard hygiene operating procedures, – staff training,	High	High	See also separate Dieback strategies for the Shires of Jerramungup and Ravensthorpe.
Fire prevention and suppression procedures: – 'Clean-on-entry' policy	High	High	Requirement by the responsible authority (DEC, FESA or Shire) at a fire event (wildfire or controlled burn) to ensure all vehicles and equipment are 'clean on entry' to the site.

Proposed action	Feasibility	Effectiveness	Comment
– Standard hygiene operating procedures, – staff training.			
Coastal zone management: – Site operational planning, – Standard hygiene operating procedures linked to statutory planning and approvals processes,	High	Medium	
Tourism operators: – 'Clean-on-entry' policy – Standard hygiene operating procedures, – staff training.	Medium	Medium	Relatively easy to control in FRNP although more difficult in adjacent areas.
Research/monitoring organisations: – 'Clean-on-entry' policy – Standard hygiene operating procedures, – staff training.	High	High	
Farm catchment groups: – Clean nursery supplies, – Standard hygiene operating procedures (fencing, earthworks, site rehabilitation), – Hygiene protocols for contractors.	Medium	Medium	Worth doing although difficult to obtain a high level of adoption.

Proposed action	Feasibility	Effectiveness	Comment
Exploration and mining within UCL – Site operational planning, – Standard hygiene operating procedures linked to statutory approvals processes, – Compliance auditing procedures, – Staff and contractor training.	High	High	
Road construction and maintenance: - Drainage and run-off design, - Vehicle and machinery wash-down, - clean source materials, - dry soil operations, - working within defined areas of infestation, - clean nursery supplies.	High	Medium	Current operations range from basic to good road building practices. Road works can't proceed in excessively wet conditions, however some soil moisture is required for good road building.
'Codes of Practice' – community organisations	High	Medium	
Control of off-road vehicle use	Low	Low	LGA's capacity for control under the *Control of Vehicles (Off-road areas) Act 1978* applicable to all land tenure (Shire application required to take effect).

Section 4

Key Stakeholder Engagement

The importance of engaging identified groups and organisations for adoption of changed practices to minimise the threat of Dieback is outlined in Section 3.2.1.

Key stakeholder groups are derived from sources including:

- Ravensthorpe and Districts Telephone Directory,
- Shire of Jerramungup Telephone and Service Directory, and the
- Phytophthora Dieback *Situation Statements* for Jerramungup and Ravensthorpe.

4.1 Key factors for engagement

Disease risk reduction will be best achieved by identified stakeholder groups recognising the potential risk of their operations and implementing change processes to adopt 'standard operating procedures' relevant to their activities.

An assessment of the key factors for engagement of identified stakeholder groups in adoption of practice change options is provided in Table 4.1.

Table 4.1 Assessment of key stakeholder engagement for Dieback risk reduction.

Stakeholder category	Potential Dieback risk	Key factors for engagement	Comments
State Government Agencies DEC, DoW, Department of Fisheries	High – frequent vehicle access to vulnerable areas, including some that may be Dieback infested	▪ Recognition of risk within agencies (all branches), ▪ Organisational planning and Standard Operating Procedures needed, ▪ Induction and training for new	Important for government to be adopting hygienic practices to provide leadership for other stakeholders. DEC capacity in FRNP currently

Stakeholder category	Potential Dieback risk	Key factors for engagement	Comments
		staff.	limited to 2 Park Rangers.
Local government Shires of Jerramungup and Ravensthorpe, South Coast Management Group,	High – gravel road maintenance	▪ Organisational planning and Standard Operating Procedures needed, ▪ Links to coastal zone management, ▪ Capacity for Shire Ranger to control off-road vehicle use in all land tenure (excepting land with DEC responsibility for management), ▪ Induction and training for new staff.	Strategies currently being prepared for the Shires of Jerramungup and Ravensthorpe. Most change required should not required additional resources or capacity.
NGO's Gondwana Link, Birds Australia WA,	Medium – field surveys, equipment for revegetation and site rehabilitation projects, nursery supplies	▪ Threat assessment in Functional Landscape Planning, ▪ Organisational plans and Standard Operating Procedures needed, ▪ Induction and training for new staff.	Some groups (e.g. Gondwana Link) currently have a high level of awareness about the threat of Dieback.
Community Conservation Groups Friends of Wellstead Estuary, Ravensthorpe Range Reference Group, Friends of Fitzgerald River National Park, Wellstead Estuary Advisory Committee	Low – opportunity for information and pro-active engagement processes. Some small risk with field excursions.	▪ 'Code of Conduct' statements, ▪ Links with associated organisations.	Some community groups could have key roles in engaging other organisations for Dieback risk reduction. However, there is a need to ensure that Dieback risk reduction is not perceived as a 'green issue' to be adopted by conservation groups only.
Progress associations	Low – potential key roles for	▪ Benefits to community need to be	The potential for Dieback risk

Stakeholder category	Potential Dieback risk	Key factors for engagement	Comments
Hopetoun, Ravensthorpe and Jerdacuttup Progress Associations.	leadership in engaging local community response	evident, ▪ Need for relevant signage that is consistent with local values, ▪ Limitations to administrative capacity of associations.	reduction will be substantial if actions are endorsed and adopted by community leaders. Hopetoun Progress Association recognises the lead role that can be adopted.
Catchment/NRM Groups Coordinated through Ravensthorpe Agricultural Initiative Network (RAIN), Fitzgerald Biosphere Group (FBG)	Medium – potential risks with shared tree-planter equipment, contract operations (e.g. site ripping, fencing) or nursery supplies	▪ Members need to be made aware of the potential risks of their operations, ▪ Clear guidelines required for hygienic operations	A 'Code of Conduct' for Phytophthora Dieback should be developed that is relevant to members for shared equipment and to their contractors.
Individual landholders adjacent to infested areas or valued biodiversity assets	High – landholders with properties adjacent to infested roadside vegetation have potential to spread the pathogen (e.g. cultivated firebreak operations)	▪ Landholders need to be made aware of the potential risks, ▪ Information about simple and practical hygiene operations.	Individual contact will be required in high risk areas
Infrastructure Managers Main Roads WA, Southern Roads Services, Horizon Power	High – vehicle access, road maintenance, gravel supplies	▪ Awareness of infested areas and high priority assets, ▪ Clear guidelines for operational planning required, ▪ Need for 'chain of responsibility' for hygienic practices (e.g. for adoption by contractors and sub-contractors), ▪ Access to clean road materials supplies.	Main Roads WA has Term Network Contract arrangements for road maintenance. The Contract Manager has responsibility to ensure appropriate processes are adopted for hygienic operations.
Earthmoving Contractors	High – potential for significant soil	▪ Time and difficulty of cleaning	There is a need for the earthmoving

Stakeholder category	Potential Dieback risk	Key factors for engagement	Comments
Small to large contractors, plant operators, equipment hire	transport. Some contractors operate in infested areas. Machines are difficult to clean (2 hours for a grader and up to 2 days for a bulldozer). Highest risk is during wildfire response (machinery may be relocated urgently from an infested area).	machinery (especially bulldozers) is a deterrent to hygiene practice, ▪ Contracts need to include 'clean on entry' conditions and allow payment for the wash-down time required, ▪ The reputation of contractors (for hygiene practices) is significant in contracting arrangements. Clients should expect a high standard of hygiene, ▪ A weakness is in the line of contractor responsibility. Equipment owners and works supervisors need to adopt responsibility and ensure all staff (existing and new) is informed about hygiene practices.	industry to recognise plant wash-down is 'a part of the job' – it should be built into the job cost. Maintenance works for roads should be undertaken under dry conditions. Criteria for inclusion on State Government 2-year 'Panel of Contractors' should include a requirement for the 'responsible person' (e.g. Works Supervisor) to have completed a Dieback training course (not currently available). Contractors anticipating wildfire response contracts can prepare machinery to hygienic standards prior to the high risk fire season.
Recreation 4WD clubs, Enduro clubs, fishing, equestrian	High – off-road vehicles accessing infested areas then relocating to vulnerable sites.	▪ Information and awareness of potential risk for members, ▪ 'Code of Conduct' for adoption by clubs, ▪ Knowledge (e.g. mapped information) of infested areas, ▪ Access to wash down facilities, ▪ Understanding (e.g. through club policy) that events may be cancelled if wet conditions prevail, ▪ Potential for access to be denied or restricted.	Individuals who are not in a club are difficult to engage.

Stakeholder category	Potential Dieback risk	Key factors for engagement	Comments
Tourism Tour operators, accommodation, caravan parks, cafes, hotels/motels, roadhouses, vehicle hire companies	High – tour operators, vehicle hire companies Low – other tourism service providers (opportunity for information dissemination)	▪ Road closures restrict tour operations (itineraries are set often 18 months ahead), ▪ 'Code of Practice' (stay on track, clean wheels, foot-ware) ▪ Company insurance default if operators gain unauthorised access to closed roads, ▪ Staff (tour leaders, drivers) induction and training.	Tour operator risk as passenger vehicles travel between national parks (from some infested areas). Key role for caravan parks to provide information about Dieback risk, road closures, wash-down facilities.
Mining 'Grange' mining (Wellstead), Galaxy Resources, Tracker Resources, Tectonic, Pioneer Resources	High – particularly for mineral exploration and mining operations.	▪ Statutory conditions for hygienic operations applied to license under the *Mining Act 1978*, ▪ Clear guidelines for operational planning required, ▪ Access to wash down facilities, ▪ Need for 'chain of responsibility' for hygienic practices (e.g. for adoption by contractors and sub-contractors), ▪ Auditing for compliance with hygienic operations requirements.	Larger operations generally have capacity for maintaining a high level of hygiene and compliance with operational process requirements.
Plantation Forestry FPC, ITC, Southern Plantations	Medium – contract operations (road construction, firebreak maintenance, logging and transport), especially where machinery is located from infested areas.	▪ Awareness of infested areas and high priority assets, ▪ 'Code of Conduct' for adoption by companies and implementation by managers, ▪ Access to wash down facilities, ▪ Need for 'chain of responsibility'	

Stakeholder category	Potential Dieback risk	Key factors for engagement	Comments
		for hygienic practices (e.g. for adoption by contractors and sub-contractors),	
Nurseries/ Landscaping/Soil suppliers	High – potential for wide distribution of infested soils.	▪ Information and awareness of the potential risks, ▪ Accreditation through the *Nursery and Garden Industry Accreditation Scheme* (NIASA, 2003) ▪ Customers seeking assurance of clean materials in nursery supplies.	
Land Development DPI, LGA's, Landcorp, developers, surveyors	High – road construction, site operations	▪ Contracts need to include 'clean on entry' conditions and allow payment for the wash-down time required, ▪ The reputation of contractors (for hygiene practices) is significant in contracting arrangements. Clients should expect a high standard of hygiene,	*Landcorp* has prepared a Dieback Management Plan for implementation at development sites.
Fire Response DEC, FESA, brigades	High – use of machinery relocated from infested areas during urgent wildfire response operations.	▪ Information and awareness for organisations, brigades and potential contractors, ▪ Clear operational planning and procedures, ▪ Accepted process for 'clean on entry' hygiene inspection prior to on-site operations	

Stakeholder category	Potential Dieback risk	Key factors for engagement	Comments
Agricultural Industry Organisations Contractors, Machinery Dealers Association, Starling control officers,	Medium – vehicle use in swampy areas by starling control teams.	▪ Information and awareness for those involved, ▪ Clear operational planning and procedures, ▪ Access to wash down facilities.	
Other Commercial Farm floriculture, apiarists, seed collectors, wildflower pickers	Medium -	▪ Awareness of potential for economic impact to own enterprise, ▪ Restrictions on access for non-compliance with hygiene practices.	
Research/monitoring Organisations	High – vehicle use in vulnerable areas following field access to infested areas	▪ Information and awareness for those involved, ▪ Clear organisational operational planning and procedures, ▪ Access to wash down facilities.	
Schools, other education institutions	Low – opportunity for information and awareness.	▪ Information relevant for use in schools, ▪ Field excursions for staff and students.	

4.2 Guidelines for Standard Operating Procedures

Guidelines are provided for developing 'standard operating procedures' for organisations within or visiting the Fitzgerald Biosphere Reserve. It is expected that each organisation will have developed own policy and protocols applicable to their operations consistent with these guidelines.

Reference to documents with detailed information for hygienic procedures is provided in Section 3.2.6.

Detailed 'standard operating procedures' are provided Appendix 5 of the *Phytophthora Dieback Management Plan for the South Coast Region 2010-2017* for:

- Roading operations,
- Boundary management, Firebreak construction/maintenance, and fencing,
- Patrol, tourism and survey,
- Rehabilitation and revegetation,
- Exploration for extractive industries, and
- Geotechnical investigations and drilling.

The key points provided for stakeholder groups here are for general guidelines only.

4.2.1 Government agencies, researchers and bio-security control

DEC has a high level of 'standard operating procedures' to which staff and contractors are expected to comply for operations within the conservation estate. Leadership is required from DEC within the area through ensuring that adoption of these procedures occurs consistently and at a high level.

Other activities external to FRNP include vehicle access to vulnerable areas of natural vegetation. Guidelines for hygienic practice of these activities include:

- Knowledge of Phytophthora Dieback infestation and risk within the area of operation,
- 'Clean-on-Entry' requirement. All vehicles, machinery, tools and equipment to be maintained in a condition that is free of all mud and soil (use of wash-down facilities if required),
- Timing of operations. Activities should be restricted to dry soil conditions and postponed during and following rainfall (which causes surface water ponding or soil adheres to vehicles),
- Vehicles to stay on well formed roads and tracks. All wet and boggy areas on site should be avoided,
- Hygienic practice conditions for contractors,
- Footwear should be free of soil (brushed and sprayed with methylated spirits) before entering the site and commencing duties, and
- Staff induction and training.

4.2.2 Local Government

Guidelines are required for road contraction and maintenance, road materials supply, local reserve management, recreation facilities and site rehabilitation or revegetation. These will be considered in detail within the Dieback Management Strategies being developed for the Shires of Jerramungup and Ravensthorpe (separate documents).

4.2.3 Earthmoving contractors

Transport of soil on earthmoving equipment has been a significant cause of Dieback infestation in many areas. Two *P. cinnamomi* infestations that do occur within the FRNP are considered to have been caused by the use of heavy machinery.

Standard practices should include:

- Knowledge of Phytophthora Dieback infestation and risk within the area of operation,
- Use of an operational hygiene plan specific to a particular site,
- 'Clean on Entry' requirements for all vehicles, equipment and machinery for dieback free sites,
- Clean-down of all vehicles, equipment and machinery before leaving dieback infected areas.
- Control of soil movement across identified disease boundaries (to be identified by standard Dieback signage),
- Conducting operations in dry soil conditions or with split phase operations,
- Site operations manager to adopt responsibility for hygienic operations by all staff and contractors,
- Staff induction and training.

4.2.4 Fire prevention and response

Managing fires often requires vehicles and heavy equipment to leave roads and tracks with risk of Dieback infestation. Urgent response to wildfires can increase this risk. The potential for Dieback infestation due to fire management activities can minimised by:

- Knowledge of Phytophthora Dieback infestation and risk within the area of operation,
- Use of an operational hygiene plan specific to a particular site,
- 'Clean on Entry' requirements for all vehicles, equipment and machinery for dieback free sites (including during wildfire response operations),
- Clean-down of all vehicles, equipment and machinery before leaving dieback infected areas,
- Slashing and spraying are preferred to cultivation for firebreaks,
- Site operations manager to adopt responsibility for hygienic operations by all staff and contractors,
- Staff induction and training.

4.2.5 Off-road recreation vehicle use

Whether it is an organised club event or a small group of friends recreating in off-road vehicles, there is a need to undertake relatively simple hygiene practices. They include:

- Knowledge of Phytophthora Dieback infestation and risk within the area of operation (maps showing the location of disease and disease-free areas are suggested),
- 'Clean-on-Entry' requirement. All vehicles should be maintained in a condition that is free of all mud and soil (use of wash-down facilities if required),
- Timing of activities is important. Activities should be restricted to dry soil conditions and postponed during and following rainfall (which causes surface water ponding or soil adheres to vehicles) in vulnerable disease-free areas,
- Vehicles to stay on well formed roads and tracks. Wet and boggy areas should be avoided,
- Club or group member and event visitor induction processes.

4.2.6 Infrastructure managers

Infrastructure managers undertake a range of construction and maintenance activities with potential for Dieback infestation of disease-free areas.

Standard practices should include:

- Site risk assessment and use of an operational hygiene plan specific to a particular site,
- 'Clean on Entry' requirements for all vehicles, equipment and machinery for dieback free sites,
- Clean-down of all vehicles, equipment and machinery before leaving dieback infected areas.
- Control of soil movement across identified disease boundaries (to be identified by standard Dieback signage),
- Conducting operations in dry soil conditions or with split phase operations,
- Control of surface water and drainage at the site,
- Footwear should be free of soil (brushed and sprayed with methylated spirits) before entering the site and commencing duties,
- Site operations manager to adopt responsibility for hygienic operations by all staff and contractors,
- Staff induction and training.

4.2.7 Landholders and catchment groups

Activities undertaken by landholders and catchment group members also have risk of Dieback infestation.

Standard practices to be considered include:

- Knowledge of Phytophthora Dieback infestation and risk within the area of operation (maps showing the location of disease and disease-free areas are suggested),

- 'Clean on Entry' requirements for all vehicles, equipment and machinery for dieback free sites,
- Clean-down of all vehicles, equipment and machinery before leaving dieback infected areas.
- Slashing and spraying are preferred to cultivation for firebreaks,
- Direct seeding should be considered as a preference to revegetation with seedlings in non-infested areas.
- Seedlings to be sourced from a Dieback-free accredited nursery,
- Gravel, soil or sand brought onto the site to be free of Dieback.

4.2.8 Tour operators

Operators of tours to natural areas within the South Coast region commonly include sites that are infested by Dieback. The potential for Dieback spread can be minimised by:

- Knowledge of Phytophthora Dieback infestation and risk at sites being visited,
- 'Clean-on-Entry' requirement – ensuring vehicles are free of mud and soil (use of wash-down facilities if required),
- Activities should be restricted to dry soil conditions and postponed during and following rainfall (which causes surface water ponding or soil adheres to vehicles) in vulnerable Dieback-free areas,
- Vehicles to stay on well formed roads and tracks. All wet and boggy areas on site should be avoided,
- Footwear should be free of soil (brushed and sprayed with methylated spirits) before entering the site and commencing duties, and
- Staff induction and training.

Section 5

Implementation Plan

5.1 Goals and Objectives

The intention of this plan is to minimise the threat of Phytophthora Dieback to identified Regional Priority Areas – the Fitzgerald River National Park and adjacent areas of natural vegetation within the Fitzgerald Biosphere Reserve. This is consistent with strategic priorities of the *Phytophthora Dieback Management Plan for the South Coast Region 2010-2017*.

The **Goal** for achieving this is:

> *To ensure that no further Dieback infestation occurs within the Fitzgerald River National Park.*

Management is to be applied across the Fitzgerald Biosphere Reserve to achieve this Goal. Success in achievement will be by there being no new confirmed Dieback infestations within the Park due to human activities.

There are small areas of existing Dieback infestation within FRNP. These have potential to spread autonomously. The actions of this plan are to minimise the risk of new infestations due to human activities that affect the Park.

The **Objectives** for achieving the goal of no further Dieback infestations are:

4. Local communities within the Fitzgerald Biosphere Reserve (FBR) and visitors to the Fitzgerald River National Park have a high level of awareness about the potential risk of Dieback to high value biodiversity and landscape assets,
5. Local FBR communities understand, endorse and promote their stated intention to *"Keep the Fitz Dieback-free"*,
6. Identified groups and organisations are adopting 'standard operating procedures' for Dieback control relevant to their activities.

Targets for Actions to achieve these Objectives are provided in Table 5.1. Key Performance Indicators (KPI's) to measure achievement of targets are also provided.

5.2 Timeframe

The actions of the Implementation Plan are to be completed within a three year period (2010 – 2013).

Outcomes from some actions may occur some time after the period of this plan.

Some actions will be on-going (i.e. beyond the 3-year period) and others will require additional actions in a subsequent period.

5.3 Delivery arrangements

Local leadership for effective delivery of actions in the Implementation Plan is needed. It is suggested that the lead is provided through the Department of Environment and Conservation (DEC) and the Shires of Jerramungup and Ravensthorpe with support from South Coast NRM Inc.

There are differences in the values and activities of local communities between the two Shires. Proposed arrangements that respond to these differences include initiating two steering committees – the **Jerramungup Dieback Working Group** and the **Ravensthorpe Dieback Working Group**. It is expected that both would be coordinated by frequent contact and by at least one combined meeting annually.

The key role of the Dieback Working groups is to provide local coordination for implementation of the actions of this plan.

Membership of the steering committees should include DEC and the respective Shire, and be open to other relevant community and industry organisations. The number of members should not be large (about 4-5 is suggested). Broader stakeholder engagement processes (e.g. public meeting to update progress) occurring at least annually should meet the needs of other organisations.

There is a need to clarify roles and responsibilities for conservation management within the FBR. While the Dieback Working Groups provide a mechanism for coordination, there is a need for clarity about statutory and non-statutory responsibilities for the actions required to minimise the threat of Dieback to the FRNP and more broadly within the FBR.

It is proposed that the South Coast NRM inc. position role of Regional Dieback Coordinator initiate the processes for delivery arrangements and facilitate on-going processes for the 3-year period. Additional local capacity (up to 0.25 FTE in each Shire) may be required. This capacity is included as an action in Table 5.1.

5.4 Linkage with other plans

Implementing the actions of this plan should be integrated with other planned processes, including:

- *Phytophthora Dieback Management Plan for the South Coast Region 2010-2017*,
- *Fitzgerald River National Park Management Plan 1991-2001* (while beyond its intended period, this plan remains relevant),
- DEC operational plans within the FRNP and adjacent areas,
- Dieback management strategies for the Shires of Jerramungup and Ravensthorpe (prepared concurrent with this plan),
- Other LGA statutory and non-statutory plans,
- *Southern Shores* coastal management plan,
- Scoping of options for wash-down facilities (prepared concurrent with this plan),
- *Wellstead Estuary Management Plan*,
- *Culham Inlet Management Plan*,
- Operations planning for other organisations (e.g. Gondwana Link project).

Most stakeholder organisations identified for engagement will also have policies, plans or protocols relevant to Dieback management.

5.5 Land tenure and management responsibility

Consistent management to minimise Dieback risk is required across land tenure. This is difficult to achieve where different land tenure has vested managers with differing statutory responsibilities.

Land with and adjacent to FNP is either conservation estate (managed by DEC), UCL (vested with the Department of Regional Development and Lands with contract management service arrangements within the region), local reserves (managed by LGA's) and private land (both for agricultural and lifestyle use). Consistent management across sometimes complex boundaries is difficult to achieve.

The *Fitzgerald River National Park Management Plan (1991-2001)* identifies specific locations where rationalisation of land tenure is recommended for improved management efficiency of the conservation estate. These changes would also increase the efficiency of managing external threats of Dieback to FRNP.

There is a further need to clarify roles and responsibilities across land tenure for for both conservation land management and for conservation threat abatement.

5.6 Priority actions

The range of actions to minimise the external threat of Dieback to the Fitzgerald River National Park are outlined in Section 3. These are aligned with the strategic approach of the *Phytophthora Dieback Management Plan for the South Coast Region 2010-2017*. An assessment of the feasibility and effectiveness is provided in Table 3.1.

The most effective actions for implementation have been identified for the seven local area strategies. These are outlined in the following sections. An additional section is included for project delivery (i.e. the capacity required to deliver the actions over the three year period).

The suggested period of implementation, Targets, Key Performance Indicators (KPI's) and an estimate of costs is provided for each action in Table 5.1.

5.6.1 Awareness and engagement

Strategy description

People as individuals or within groups and organisations will engage and adopt recommended practices when they are aware and well informed about the reasons for change. To minimise Dieback risk, there needs to be clear information delivered to targeted groups of people. The information needs to be valid (i.e. understood and believed), locally relevant and consistent.

Information needs to have a whole-of-community intent developed though community, industry and government consultation processes. It should be informing and engaging

rather than instructing and negating (i.e. what you 'can' do rather than what you 'can't' do).

There also needs to be clear 'evidence' to substantiate the information. This includes maps and photos. Evidence of strong community support is also required (e.g. through local endorsement signs).

Actions

Action 1.1 Information development and distribution

Developing content of background information, valued assets at risk, potential threat of Dieback, key management messages, symbols and logos, endorsement statements suitable for consistent use on signs, in brochures and other communications materials.

Distribute information to key visitation points (e.g. caravan parks, café's, tourist information centres), including infested areas, and stakeholder groups as a part of 'targeted engagement' processes (see Action 1.3).

Action 1.2 Information displays

Replace or improve existing information at major entrance points to FRNP (Hamersley Inlet Drive, Quiss Road and Devils Creek Road) and on the Visitor Information panels at the entrance to towns.

Information needs to emphasise the biodiversity and social values at risk within the FRNP and adjoining areas. It should also clearly identify what activities are considered to be 'high risk' (e.g. vehicles covered in mud arriving from potentially infested areas) and clearly identify the actions that are expected (e.g. to be 'clean on entry' to the park by wash-down).

Visitors also need to be informed of 'clean on entry' requirements prior to arriving at the Park.

Action 1.3 Infested site photo-reference information

Design information suitable for signs and brochures that use photos to show the vegetation that was at a particular infested site that now is absent due to Dieback.

Action 1.4 Targeted engagement

Arrange meetings or other engagement processes to inform identified 'high risk' stakeholder organisations or groups of their potential to spread Dieback. These processes need to include actions for hygienic activities that can be adopted.

Action 1.5 Community leader bus-tour

Arrange a bus tour of both the FRNP and the SRNP for comparison between 'un-infested' and 'infested' areas (note – this was very effective

when undertaken for community leaders in the Shire of Ravensthorpe about 5 years ago).

Action 1.6 Local endorsement program

Initiate a program for individuals, landholders, groups, schools or organisations who support the intentions of *'Keeping the Fitz Dieback-free'* to demonstrate their support by endorsement using bumper stickers, front-gate signage or other methods.

5.6.2 Detection and mapping

Strategy description

There is a need to have current information about the distribution of Dieback infestation locally and within the region. This requires survey and mapping by a qualified interpreter (i.e. by undertaking DEC training course). The *Dieback Atlas* provides benchmark information for the areas. There are some areas where information is inadequate so further field interpretation is needed.

While community members are not qualified to confirm possible Dieback sightings, there should be encouragement for local community interest in the potential spread of Dieback (e.g. with a *Dieback Watch* local initiative).

Actions

Action 2.1 Assessment of local 'high conservation value' areas

Reconnaissance-scale survey by a qualified interpreter or botanist with advice from locally informed people is required to assess these areas.

The outcome required is to identify locally significant areas of 'high conservation value' natural vegetation vulnerable to Dieback. It is expected that these areas will include Unallocated Crown Land, local reserves and private remnant vegetation.

Following initial assessment of the most significant sites 9perhaps 20-30 areas), an on-going process for other identified sites can occur with lower priority.

Action 2.2 Roadside vegetation assessment in the Shire of Jerramungup

Recent mapping of roadside vegetation in the shire of Ravensthorpe has shown more extensive infestation than was previously known. Similar survey and mapping is required for roads west of FRNP in the Shire of Jerramungup (dependent upon availability of funding).

Action 2.3 Standard signage for infested areas

Standard signs have been developed for demarcation of known 'infested' and 'uninfested' areas. This is required for roads and gravel supplies to ensure hygienic operations can be undertaken in uninfested areas.

Action 2.4 Community-based Dieback reporting

Short workshop process or field excursions with interested groups to inform about the signs of infestation (e.g. death of key indicator plant species). Area of concern to be recorded on standardised *proforma*.

Area of continuing concern to be assessed by qualified Dieback interpreter.

Community-based reporting is proposed at a local *Dieback Watch* program. Local leadership (e.g. a volunteer resident) is required.

5.6.3 Strategic use of signage

Strategy description

Carefully considered use of signs and information is essential for the level of local community and visitor engagement required for Dieback risk reduction (see also section 3.2.4). A strategy is required to ensure that in information, visual imagery, location and timing of placement of the signs is optimal.

Actions

Action 3.1 Prepare a signage strategy

Arrange contract service for preparation of the *Fitzgerald Biosphere Reserve Dieback Signage Strategy.*

Action 3.2 Produce and deploy signs

Arrange for production and erection of signs. This will require formal approval from the organisation with whom the land is vested (e.g. from Main Roads WA for signs on Highway One)

5.6.4 Road risk reduction

Strategy description

Identified 4WD access roads and tracks in the Shire of Jerramungup are potentially high risk for the spread of Dieback (see also section 3.2.4). The risk potential would increase substantially should Dieback be introduced to the area. Significant actions are required to reduce the risk of Dieback infestation from road use in vulnerable areas.

The highest risk roads are the Doubtful Island and the Gordon Inlet roads and diversion tracks associated with them. The options include restricting access during high risk periods, re-alignment, redesign and surfacing for some roads or their permanent closure. Assessment of these options for some high-risk roads is proposed.

The cost of road re-construction is high. Proposed road closures would require considerable community consultation. For these two reasons, detailed planning is required.

Actions

Action 4.1 Assessment of road reforming and restricted access options

Arrange contract services for detailed assessment, including community consultation, for restricted access and road closure to minimise the potential for Dieback to be introduced and spread. Responsibility for contracted assessment of roads to determined by the (proposed) Jerramungup Dieback Working Group and (proposed) Ravensthorpe Dieback Working Group (options include DEC, LGA's and South Coast NRM Inc.)

The assessment should include options for re-constructing Doubtful Island Road and Gordon Inlet Road from the intersection with the Doubtful Island Road to the Wellstead Estuary sandbar crossing as 'all-weather' access roads. Options for crossing Wellstead Estuary are to be considered.

Action 4.2 Implementation of road reforming and restricted access options

Implement recommendations of the assessment (Action 4.1).

Action 4.3 Assessment of road material resources

Assessment of available road materials, especially suitable gravel, is required. This should be undertaken for the Shires of Jerramungup and Ravensthorpe in liaison with Main Roads WA. Consideration of material quality, quantity, accessibility, haul distance, disease-free status and cost is required. Access to 10-12 strategic source areas for each Shire is required. These are likely to occur on agricultural land so negotiated arrangements with landholders will be required.

5.6.5 Wash-down facilities

Strategy description

Vehicle wash-down is required for 'clean on entry' requirements for site operations and visitor entry to vulnerable high conservation areas. An assessment of options for vehicle wash-down facilities is being prepared concurrent with this plan (see separate documentation).

Actions

Action 5.1 Implementing actions of Vehicle Wash-down Assessment

See separate document.

Action 5.2 Guidelines for footwear brush or wash stations

Dry brushing of footwear is encouraged with facilities and signage at entry points for walk trains within FRNP.

Guidelines are required for dry and wet-brushing options suitable for adoption by organisations and groups prior to entry to the Park or other sites where visitors have access to vulnerable natural vegetation.

5.6.6 Alternative low-risk recreation areas

Strategy description

Provision of alternative low-risk recreation areas for off-road vehicle use will reduce the potential for Dieback spread in vulnerable areas (see also section 3.2.4). Assessment of options needs to be undertaken in association with the Shires of Jerramungup and Ravensthorpe to ensure consistency with Council policies and local community values.

Support is required for applications by LGA's for increased off-road regulation capacity.

Actions

Action 6.1 Assessment of sites suitable for alternative recreational areas

Initial 'desktop' study to identify potentially suitable alternative recreation sites within the Shires of Jerramungup and Ravensthorpe (considering also UCL and private land). Undertake feasibility assessment of most suitable sites that are acceptable to the landholder/manager and the respective LGA.

Action 6.2 Application for local government control capability

Provide support for an application by the Shire of Jerramungup for increased vehicle control capacity under the *Control of Vehicles (Off-road areas) Act 1978* applicable to all land tenure.

5.6.7 Adoption of 'standard operating procedures'

Strategy description

Standard Operating Procedures are adopted for operations with FRNP and are available for other activities (see also section 3.2.6).

There is a requirement to ensure that information is locally relevant for all identified organisations and groups (see also guidelines provided in Section 4.2).

Targeted engagement will be required to ensure a high level of permanent adoption of hygienic practices.

Actions

Action 7.1 Targeted engagement for 'standard operating procedure' adoption

Initiate processes (meetings, short training courses) to ensure adoption of locally-relevant 'standard operating procedures'.

Action 7.2 Developing community expectations for hygienic practices

Communicate broadly that service providers and recreation groups are expected to adopt hygienic practices for Dieback risk reduction within the Fitzgerald Biosphere Reserve. The outcome required is that only services adopting hygienic practices are employed (e.g. for earth-moving equipment) and that visiting recreational groups are invited conditional

upon their adoption of standard hygiene practices (e.g. for off-road vehicle use).

5.6.8 Project delivery

Strategy description

Effective delivery of the actions required minimising the external threat of Dieback to FRNP and adjacent vegetated areas will require project management capacity. This is best provided through proposed local steering committees with leadership provided by DEC and the tow Shires.

Local people with an understanding of the threat of Dieback and of local community interests should be engaged in project delivery either in a voluntary capacity or by part-time employment.

'Entry' and 'exit' surveys are required to assess community and visitor attitudes to adopting practice change over the 3-year period.

Actions

Action 8.1 Local steering committees

Form two local steering committees with suggested titles of Jerramungup Dieback Working Group and Ravensthorpe Dieback Working Group. The Regional Dieback Coordinator should initiate these committees.

Steering committees are to include membership of DEC, the respective Shire and 2-3 others.

The role of steering committees is to provide direction and support for implementation of the actions of the plan relevant to each local area.

Action 8.2 Local area coordinators

Voluntary or part-time employed local coordinators are required to deliver actions of the plan. The Regional Dieback Coordinator should initiate these roles. The tasks of some actions will exceed the capacity of volunteer positions so part-time professional appointments will be needed.

Action 8.3 Community and visitors surveys

"Entry' and 'exit' surveys are required to measure community and visitor response to proposed actions over the 3-year period.

5.7 Monitoring and review

The proposed steering committees will continuously assess performance for implementation of the actions of the plan. Periodic revision of proposed actions will occur during implementation.

Prior to completion of the 3-year period, a review of the effectiveness of actions is required. This should include analysis of 'entry' and 'exit' community and visitor survey results. Findings of the review are to guide new or ongoing actions for permanent reduction of the Threat of Dieback to FRNP and adjacent vegetated areas.

Table 5.1 Timing, targets, KPI's and estimated costs for priority actions.

PRIORITY ACTIONS	SUGGESTED PERIOD[1]	TARGETS	KPI's[2]	ESTIMATED COST excluding GST[3]
1. Awareness and Engagement				
1.1 Information development and distribution	Year 1 (1-2) On-going distribution	Information materials containing locally endorsed information available from at least 10 tourism focal points in each town.	The number of tourism focal points distributing locally endorsed information within each town.	$5,000 for design and printing.
1.2 Information displays	Year 1 (3-4)	New or revised information displays at three park entrances and four town entry visitor information points.	The number of park and town entry points with current information displays.	$75,000 for 3 park entrance displays. $20,000 for 4 town entry displays.
1.3 Infested site photo-reference information	Year 1 (3)	Photo signs erected at 4 infested sites locations on major roads within FBR.	Number of photo signs erected in relevant locations.	$8,000 for 4 photo signs.
1.4 Targeted engagement	Year 1-2	Over 75% of identified stakeholder organisations and groups are well informed and are endorsing information and/or supporting Dieback control initiatives.	Exit survey information for local community and visitors.	$10,000 travel, meeting and project costs over 2 years for Regional and Local Dieback Coordinator roles.
1.5 Community leader bus-tour	Year 1 (3)	Bus tour of FRNP and SRNP completed with over 40 local community people participating.	Number of people on the completed bus tour.	$5,000
1.6 Local endorsement program	Year 1-3	Over 50 properties or enterprises display endorsement signs.	Number of endorsement signs displayed.	Costs included in Action 1.4
2. Detection and Mapping				
2.1 Assessment of local 'high conservation value' areas	Year 1 (2-4)	Assessment of identified significant remnant vegetation.	Number of local 'high conservation are' sites assessed.	$15,000 (external funding source to be sought)
2.2 Roadside vegetation mapping in the Shire of Jerramungup	Year 1 (3)	Identified high risk roads interpreted and mapped for Dieback (estimated distance of 250km within the Shire of Jerramungup)	Completion of Shire of Jerramungup Dieback interpretation road mapping.	$50,000 (external funding source to be sought)

PRIORITY ACTIONS	SUGGESTED PERIOD[1]	TARGETS	KPI's[2]	ESTIMATED COST excluding GST[3]
2.3 Standard signage for infested areas	Year 1-2	Standard signs are installed for identified 'infested' and 'uninfested' sites for over 400km of roads and at over 20 gravel pits	Length or roads and the number of gravel pits with standard signage.	$3,000 for the cost of signs
2.4 Community-based Dieback reporting	Year 2-3	10 community or school information workshops or field excursions	Number of information workshops or field excursions	Role for Local Dieback Coordinators.
3. Strategic use of Signage				
3.1 Prepare a signage strategy	Year 1 (2)	Completion of signage strategy in the first year.	Completed strategy	$15,000 (external funding source to be sought)
3.2 Produce and deploy signs	Year 1 (4), Year 2-3	12 major signs and 20 smaller signs are erected to inform local community and visitors of the threat of Dieback	The number of major and smaller signs erected.	$25,000 (external funding source to be sought)
4. Road Risk Reduction				
4.1 Assessment of road reforming and restricted access options	Year 1 (2-3)	Completion of hazardous road assessment in year 1.	Completed assessment	$80,000 (external funding source to be sought). Controlling authorities for roads to administer or otherwise advise on the assessment project.
4.2 Implementation of road reforming and restricted access options	Year 2-3	To be developed from the assessment.	To be developed from the assessment.	Provisional estimate of $250,000 (external funding source to be sought) Controlling authorities for roads to administer or otherwise advise on the implementation

	PRIORITY ACTIONS	SUGGESTED PERIOD[1]	TARGETS	KPI's[2]	ESTIMATED COST excluding GST[3]
					project.
4.3	Assessment of road material resources	Year 1 (2-3)	Identification of 10-12 suitable road material source areas in each of the Shires of Jerramungup and Ravensthorpe.	Completion of two road material source assessments (one for each of the Shires of Jerramungup and Ravensthorpe).	
5. Wash-down facilities					
5.1	Implementing actions of Vehicle Wash-down Assessment	Year 1-2	To be developed from the option scoping assessment.	To be developed from the option scoping assessment.	Provisional estimate of $200,000 (external funding source to be sought)
5.2	Guidelines for footwear brush or wash stations	Year 1 (2)	Relevant guidelines adopted at 10 locations to reduce Dieback risk within the FBR.	The number of additional locations with footwear cleaning facilities.	$3,000 for cost-sharing the facilities (external funding source to be sought)
6. Alternative Low-risk Recreation Areas					
6.1	Assessment of sites suitable for alternative recreation areas	Year 2-3	Up to 3 new facilities for off-road recreation are assessed.	Number of additional low-risk recreation areas assessed.	Unknown – to be arranged in a way that is compatible with LGA recreation management planning.
6.2	Application for local government control capability	Year 1 (1-2)	Shire of Jerramungup to have vehicle control powers on all land tenure.	Delegation of powers under the *Control of Vehicles (Off-road areas) Act 1978*	N/A
7. Adoption of 'Standard Operating Procedures'					
7.1	Targeted engagement for 'standard operating	Year 1-3	More than 75% of identified high risk stakeholders are adopting 'standard	Number of stakeholders with significant adoption of	Costs included in Action 1.4.

PRIORITY ACTIONS		SUGGESTED PERIOD[1]	TARGETS	KPI's[2]	ESTIMATED COST excluding GST[3]
	procedure' adoption		operating procedures' at a significant level.	'standard operating procedures' measured by the proposed 'exit' survey.	
7.2	Developing community expectations for hygienic practices	Year 1-3	More than 50% of identified community organisations have policies or protocols that require service providers to adopt hygienic practices.	Number of identified community organisations with relevant policies or protocols.	Costs included in Action 1.4.
8. Project Delivery					
8.1	Local steering committees	Year 1-3	Formation of two effective local steering committees	Number of committee meetings held annually.	$6,000 for meeting costs for the two committees over the 3 years.
8.2	Local area coordinators	Year 1-3	Employment of at least one part-time local area coordinator	Number of months of effective part-time employed coordinator services.	$120,000 (based on $30,000 p.a. salary plus $10,000 p.a. costs) The key roles of the coordinator(s) are to implement the actions of this plan.
8.3	Community and visitors surveys	Year 1 (1), Year 3 (3)	Completion of an 'entry' and 'exit' stakeholder survey.	Completed survey reports.	$30,000 for two stakeholder surveys

Notes: 1 – the numbers in brackets are year quarters.
2 – Key Performance Indicators are measures of achieving targets
3 - Costs are indicative estimates. Detailed quotation for products and services is required prior to implementation.

Acronyms

CALM	Department of Conservation and Land Management
CEO	Chief Executive Officer
CPSM	Centre for Phytophthora Science and Management
DEC	Department of Environment and Conservation
DoW	Department of Water
DWG	Dieback Working Group
FBG	Fitzgerald Biosphere Group
FBR	Fitzgerald Biosphere Reserve
FESA	Fire and Emergency Services Authority
FPC	Forest Products Commission
FRNP	Fitzgerald River National Park
FTE	Full Time Equivalents
GST	Goods and Services Tax
LGA	Local Government Authority
NRM	Natural resource management
NIASA	Nursery Industry Accreditation Scheme Australia
RAIN	Ravensthorpe Agricultural Initiative Network
SRNP	Stirling Range National Park
UCL	Unallocated Crown Land

References and Source Information

CALM (1998) *Management of Phytophthora and Disease caused by it* Policy Statement No. 3.

CALM (1999) *Phosphite Operations Guidelines*

CALM (2001) *Interpreter Guidelines for Detection, Diagnosis and Mapping*

CALM (2003) *Phytophthora cinnamomi and disease caused by it: Volume 1 – Management Guidelines.*

Department of Environment and Conservation (2004) *Best Practice Guidelines for the management of* Phytophthora cinnamomi.

Dieback Working Group (2000) Managing Phytophthora Dieback, *Guidelines for Local Government*

Dieback Working Group (2008) *Managing Phytophthora Dieback in Bushland,* Ed. 4.

Dieback Working Group (2004) *Code of Practice for Extractive Industries*

Nursery Industry Accreditation Scheme Australia (2003) *The Nursery and Garden Industry Accreditation Scheme*

Dieback Working Group (2008) *Managing Phytophthora Dieback in Bushland* Edition 4.

Ecosystem Solutions (2008) *Biodiversity Sub-Strategy for the South West Catchments Council.* Unpublished consultants report.

Ficifolia Consulting (2009) *Phytophthora* Dieback Assessment - Shire of Ravensthorpe. Unpubl. Report prepared for South Coast NRM Inc.

WWF/DCC (2004) *Arresting* Phytophthora Dieback*: The Biological Bulldozer*