Department of
Environment and Conservation

Our environment, our future

Dieback Interpretation Report
Fitzgerald River National Park

Total area interpreted (ha)	850 km
DRA	No
Method of interpretation	Transect Survey
Re-Check	No
Date Commenced	05/10/09
Date Completed	04/12/09
Interpreters	Malcom Grant
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Map Expiry Date (recheck date)	**4/12/2012**

ALBANY DISTRICT
Department of Environment and Conservation
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1 INTRODUCTION 3

1.1 Background 3

1.2 Location and Size of Areas 3

1.3 Historical Land Use and Past Disturbances 4

2 METHODS 4

2.1 Interpretation 4

2.2 Demarcation 5

2.3 Soil and Tissue Sampling 5

2.4 Mapping 6

3 RESULTS 7

3.1 Disease Distribution 7-10

3.2 Disease Expression and Impact 10

3.3 Sample Results 11

4 RECOMMENDATION 11

4.1 Hygiene Management 11

4.2 General Recommendations 11-14

5 CONCLUSION 14

6 REFERENCES 15

Introduction

1.1 Background

Dieback disease caused by the pathogen *Phytophthora cinnamomi* is a major threat to the biodiversity of South Western Australia. The spread of this water mould is facilitated by the movement of soil infested with spores, particularly under warm, moist conditions. Consequently, a major component of the strategy to constrain this disease involves managing access and soil-disturbance activities within native vegetation. Knowledge of the occurrence of the disease in the landscape is therefore an essential prerequisite to formulating suitable hygiene management practices.

The Fitzgerald River National Park is now known to be the single largest area of susceptible native vegetation across the entire South Coast of Western Australia that is not extensively infested with the pathogen *Phytophthora cinnamomi.* There are however four known infestation centers within the National Park that pose serious threat to the remainder of the National Park with autonomous and or vectored spread. These four known disease infestations are the

Bell track infestation	1976
Jacup Ranger Station infestation	1990
Sussetta River infestation	2007
Pabelup Drive infestation	2009

There have been extensive surveys for the presence of *Phytophthora cinnamomi* undertaken across the National Park since the mid 1980's. These have been undertaken as foot surveys along existing walk trails and around known infestation sites, such as the Bell track infestation, vehicle based surveys along management tracks and public access roads across the National Park and helicopter based surveys along management tracks, public access road, along river and water courses and most importantly along historical fire containment tracks that have now been rehabilitated and are not accessible by vehicles.

There have been a number of trials undertaken using large scale color aerial photography

1.2 Location and Size of Areas

A total of 850 km of roads and tracks were assessed for *Phytophthora spp.* occurrence.

Interpretation commenced on the 05/10/2009 and was completed on 04/12/2009. A total of 38 days was spent carrying out disease interpretation in the field.

1.3 Historical Land Use and Past Disturbances

Albany to Adelaide section of the London to Adelaide Telegraph line

The Albany to Adelaide section of the overland telegraph line was commenced in 1873 and was operational from 1877 to the 1920's. The section of management track within the Wilderness zone known as the Telegraph track is situated along the original alignment of the above ground telegraph line.

Number # 2 Rabbit Proof Fence

This fence construction was commenced in 1905 starting at Point Anne and connecting to the Number # 1 Rabbit Proof fence in the Murchison. This fence was patrolled and maintained until the 1930's.

Mining for Spodumene and Manganese in Copper Mine creek

Mining activity commenced in the lower reaches of the Dempster Inlet around 1900 to 1930's. The early mining activities were single shafts focussed on surface expression of these minerals.

Bell Resources contracted an Earthmoving company from Albany in 1971 to construct an improved access alignment into this locality for mineral exploration of their exploration and mining leases. This access alignment is now known as the Bell track.

Mining for Spongolite at the Twertup Quarry

With the onset of the depression an enterprising local Mr Horry Worth seeks a mining lease and is granted permission to quarry spongolite from the cliff faces in the Fitzgerald river valley. This operation continues into the early 1970's with the creation of the National Park.

Recreation and Fisherman access

The local Jerramungup and Ravensthorpe Shire community had, for many years since release of land for agricultural development in the 1950's and 1960's, recreated in this area prior to its vesting as a National Park in 1973. Much of this recreational visiting and fishing activity was undertaken in the drier summer months, when activities on the farms were at a low and access into the landscape was available without becoming stuck in mud and or bog holes. Most of the coastal access tracks were established and or formalised during this twenty year period of time.

The level of visitation and the timing of this visitation appeared to undergo a marked change around 1985 with the arrival of four wheel drivers and camper trailers visiting all year round. Management measures were put in place after 1985, where most of the four wheel drive tracks were seasonally closed dependant upon soil moisture conditions.

Formal Management

After vesting of the reserve as a National Park in 1973, the National Parks Board assigned staff to manage the Fitzgerald River National Park in the late 1970's. The early National Park rangers were based at the Quaalup property, which one of the National Park rangers subsequently bought and continued to use as a base for the job. In time Ranger Stations were established at Hopetoun (East Mt Barren) and then Jacup in the early 1980's.

In 1978 and 1979, the Bushfires Board constructed the twin fire management tracks between the National Park and unallocated Crown lands south of the private properties across the northern portion of the National Park.

During the early 1980's, the National Parks Board upgraded and consolidated many of the historical four wheel drive tracks into management tracks for a variety of purposes, in particular fire control operations. Hamersley Drive and Pabelup Drive were realigned to avoid seasonally wet locations and gravel sheeting of these roads commenced. National Park Rangers and members of the public established walk trails on West Mt Barren and East Mt Barren.

A draft management plan for the National Park was developed and released for public comment in 1989. A key feature of management intent within the draft management plan was the issue of Phytophthora cinnamomi and disease it causes. It was now widely recognised that the vegetation was extremely vulnerable to the affects of the pathogen given the extent of Phytophthora susceptible components within the unique vegetation of the reserve, the rainfall and the infertile shallow duplex soil types that are a feature of the National Park. Evidence of the potential devastation that could ensue was to be observed at the already identified and established *Phytophthora cinnamomi* infestation on the Bell track.

Machinery being used in road upgrading and fire containment operations ie earth moving operations, is now subject to clean down hygiene practises as a measure to avoid accidental introduction of the pathogen.

2 Methods

2.1 Interpretation

Interpretation of roads and tracks followed the standard methods and operating procedures described in the document titled “Volume 2 - *Phytophthora cinnamomi* and disease caused by it: Interpreter guidelines for detection, diagnosis and mapping” (CALM 2001).

Background information was sought through DEC records prior to engaging in field work.

In this survey effort across the Fitzgerald River National Park all roads and management track were driven at low speed, around 15 to 20 km hour in order to assess the native vegetation along the both sides of the alignments and up road and track side drains for evidence of dead and dying native vegetation that may be attributable to decline from *Phytophthora cinnamomi*.

The public access roads and management tracks that were assessed in this project have been plotted and a map detailing these alignments is attached as Appendix #1.

2.2 Soil and Tissue Sampling

One Hundred (Mal in SOS FRNP Project, Mal 24 with MRWA survery of H Drive , Freebs ? FRNP West survey) and soil and tissue sample(s) associated with dead or dying plants were taken to confirm the presence or absence of the *Phytophthora spp.* These soil and plant samples were forwarded to the Vegetation Health Service laboratory at Kensington, where diagnostic baiting was conducted. The samples were used as evidence for the presence of *Phytophthora cinnamomi* in the area.

2.3 Mapping

All soil and tissue samples collected in the field were also captured by GPS to accurately locate their field positions for future identification and for plotting into GIS data sets.

This set of data has been imported into GIS 9 and a map detailing the location of all of the sample points is attached as appendix #2

3 Results

3.1 Field Interpretation and Sample Information

John Forrest road

There were no plants deaths in susceptible native vegetation noted along the entire length of John Forrest road from the junction of No Tree Hill management track south to the southern boundary of the National Park. The vegetation associations along this road contain multiple species of native flora susceptible to *Phytophthora cinnamomi*.

A foot based survey was undertaken around the four historical gravel extraction pits located along this road. These pits have been rehabilitated and there was no evidence of dead and dying native vegetation that is susceptible to *Phytophthora cinnamomi*. .

Evidence of aerial canker effects was noted in Dryandra (now Banksia) species along the John Forrest road. These symptoms were the typically observed single and or multiple limb declines in Dryandra cirsiodes, D quercifolia and D cuneatus.

Pitchie Ritchie track

There were no plants deaths in susceptible native vegetation noted along the Pitchie Ritchie track. The vegetation associations along the first section of this track west off John Forrest road contained multiple species of native flora susceptible to *Phytophthora cinnamomi*.

The southern portion of this track lower in the landscape within the Phillips river valley had vegetation associations that did not contain susceptible native flora and is considered uninterpretable for the presence of *Phytophthora cinnamomi*.

No Tree Hill Management track

The vegetation associations along the No Tree Hill management track east of the Phillips River valley all contained multiple species of native flora susceptible to *Phytophthora cinnamomi*. One site along this track was sampled for the presence of dieback. This sample was in a moisture gaining site midslope on the north side of the management track and contained a number of Banksia media deaths. The sample result tested negative to the presence of *Phytophthora cinnamomi*.

The vegetation within the Phillips River valley adjacent to the No Tree Hill management track does not contain any native flora susceptible to *Phytophthora cinnamomi*. It is therefore considered that this section of the No Tree Hill management track be considered as uninterpretable for the presence of *Phytophthora cinnamomi.*

Moir track

The vegetation associations along the southern and central section of Moir track contained multiple species of native flora susceptible to *Phytophthora cinnamomi*. The northern portion within the Phillips and West River valleys and the area just below the breakaway along the middle of the Moir track had vegetation associations that did not contain species of native flora susceptible to *Phytophthora cinnamomi*.

Nine soil and tissue samples were taken of dead and dying native vegetation along Moir track. These samples were of Dryandra cirsioides, Dryandra cuneatus and Banksia media. All of these samples tested negative to the presence of *Phytophthora cinnamomi*.

There is considerable decline present in the Dryandra species along Moir track from the effects of aerial cankers. There are numerous entire deaths and partial deaths to be observed within the vegetation associations along the southern portion of the Moir track on the upland sand plain landform. All other species of native flora susceptible to *Phytophthora cinnamomi* are alive and healthy along both sides of the track and adjacent to the track side water drains.

West Beach access road

The vegetation associations along West Beach access road all contain multiple species of native flora susceptible to *Phytophthora cinnamomi*. Two soil and tissue samples were taken of dead and dying susceptible flora species. These two samples taken were all of small seedlings regenerating from the Spring 2006 fire. Both of these samples tested negative to the presence of *Phytophthora cinnamomi*.

It was difficult to gauge whether these small seedling deaths were killed and or damaged from the recent road side slashing program and or were deaths due to drought decline from the below average rainfall experienced in winter 2009.

These dead seedlings are all located within the area interpreted exposed to *Phytophthora megasperma* in the 1992 outbreak observed across the Fitzgerald River National Park. It is very unlikely that these recent deaths are attributable to this species of Phytophthora given the below average rainfall experienced this winter and the need for the landscape to be extremely wet before this pathogen is activated.

East Mylies access road

The vegetation associations along East Mylies access road all contain multiple species of native flora susceptible to *Phytophthora cinnamomi*. No susceptible flora species were observed to be dead and or dying along this track and so no soil and tissue samples were collected.

The vegetation is regenerating from the Spring 2006 fire and even though the susceptible flora species were small in stature, they were still of sufficient size and distribution to make the road side interpretable.

West Mylies access road

The vegetation associations along West Mylies access road all contain multiple species of native flora susceptible to *Phytophthora cinnamomi*. No susceptible flora species were observed to be dead and or dying along this track and so no soil and tissue samples were collected.

The vegetation is regenerating from the Spring 2006 fire and even though the susceptible flora species were small in stature, they were still of sufficient size and distribution to make the road side interpretable.

Hamersley Drive

Barrens Beach access road to West Beach access road

The vegetation associations along this section of Hamersley Drive all contain multiple species of native flora susceptible to *Phytophthora cinnamomi*. The vegetation along this section of Hamersley Drive is regenerating from the Spring 2006 fire and even though the susceptible flora species were small in stature, they were still of sufficient size and distribution to make the road side interpretable. There is a section on the east side of East Mt Barren that was not exposed to the Spring 2006 fire and contains mature vegetation regenerating from the December 1989 fire, which is also interpretable for the presence of *Phytophthora cinnamomi*.

Twenty One soil and tissue samples of dead susceptible native flora species were taken along this section of Hamersley Drive. All of these samples tested negative for the presence of *Phytophthora cinnamomi*.

There is evidence of continuing effects of *Phytophthora megasperma* impacts within road side seedlings and mature plants of *Adenanthos venosus* and *Banksia speciosa*. This is most obvious within road side vegetation on the east side of Hamersley opposite the moist swamp complex located on the west side of Hamersley Drive some 1.1 kilometres west from the car park overlooking Barrens beach. Here there are numerous deaths in Banksia speciosa, Hakea victoreae, Adenanthos trilobus and a species of Hibbertia.

West Beach access road to Moir Track

This section of Hamersley Drive contains road side vegetation of mature stature regenerated from the December 1989 fire. All of the vegetation associations along this section of Hamersley Drive contain multiple species of native flora susceptible to *Phytophthora cinnamomi*.

Eleven soil and tissue samples of dead susceptible native flora species were taken along this section of Hamersley Drive. All of these samples tested negative for the presence of *Phytophthora cinnamomi*.

There is regular evidence of the effects of aerial canker within species of Dryandra along this section Hamersley Drive. This is most evident in the sand plain at the northern end of this section of Hamersley Drive near the junction with Moir track. All other species of native flora susceptible to *Phytophthora cinnamomi* are alive and healthy across this site though.

There appears to be an infestation of Armillaria opposite Sepulcralis Hill car park some 50 metres north of junction with Hamersley Drive and on the west side of Hamersley Drive within the *Dryandra quercifolia* and *Banksia lehmaniana*.

Moir Track to Old Ongerup Road

This section of Hamersley Drive contains road side vegetation of mature stature regenerated from both the December 1989 and December 1997 fires. All of the vegetation associations along this section of the Hamersley Drive contain multiple species of native flora susceptible to *Phytophthora cinnamomi*.

Nine soil and tissue samples of dead susceptible native flora species were taken along this section of Hamersley Drive. All of these samples tested negative for the presence of *Phytophthora cinnamomi*.

There is scattered evidence of the effects of aerial canker within species of Dryandra along this section Hamersley Drive, particularly within the older pre 1989 and 1989 regenerated vegetation.

Hamersley Inlet Access road

The vegetation associations along the first section of the Hamersley Inlet access road all contain multiple species of native flora susceptible to *Phytophthora cinnamomi*. One soil and tissue sample was collected from an entire plant death along Hamersley Inlet road. This sample returned negative to the presence of *Phytophthora cinnamomi*.

There are no species of native flora susceptible to *Phytophthora cinnamomi* within the Eucalyptus woodlands on the southern end of the Hamersley Inlet access road once the road departs the uplands and enters the dissected landscape lower in the profile adjacent to Hamersley Inlet.

There is the occasional evidence of aerial canker decline in Dryandra and Hakea species along this road, however this activity is confined to the occasional limb death and no entire plants deaths attributable to aerial cankers were observed.

Edwards Point Access track

The vegetation associations along the first and final sections of the Edwards Point access track all contain multiple species of native flora susceptible to *Phytophthora cinnamomi*. Two soil and tissue samples of native flora susceptible to *Phytophthora cinnamomi* were taken along this track. Both of these samples tested negative for the presence of *Phytophthora cinnamomi.*

The central portion of this track contains Eucalypt woodlands and open low sedge dominated heaths over limestone substrate soils that do not contain any native flora species susceptible to *Phytophthora cinnamomi.* This area of the track is to be considered uninterpretable for the presence of *Phytophthora cinnamomi.*

Telegraph track Hamersley Drive to Quoin Head Track junction

The vegetation associations along the Telegraph track all contain multiple species of native flora susceptible to *Phytophthora cinnamomi*. Two soil and tissue samples of native flora susceptible to *Phytophthora cinnamomi* were taken along this track. Both of these samples tested negative for the presence of *Phytophthora cinnamomi.*

There is a large area of deep sand soils due north of Whoogarup Ranges traversed by the Telegraph track that is devoid of Banksia and Hakea victoreae. There is however still numerous other non woody fruited Proteaceous species present along this section of the track It again appears as though this landscape has been historically exposed to a number of fires with intervals that have not permitted the Banksia and Hakea species to successfully establish mature fruit and seed set. It is important that this area is not interpreted as having been altered by the effects of *Phytophthora cinnamomi.*

Quoin Head track

The vegetation associations along the Quoin Head track all contain multiple species of native flora susceptible to *Phytophthora cinnamomi*. Three soil and tissue samples of native flora susceptible to *Phytophthora cinnamomi* were taken along this track. All three of these samples tested negative for the presence of *Phytophthora cinnamomi.*

The native vegetation on the southern end of the Quoin Head track is regenerating from a wildfire in the November 2006 and the susceptible native plants are small in stature. I would recommend that a further survey of this area be undertaken once the plants have reached a larger more mature state to improve the quality of interpretation in this area.

There is the occasional evidence of aerial canker effects within the Dryandra species in the landscape on the first sections of the Quoin Head access track. No entire plant deaths attributable to aerial canker were observed. However occasional limb deaths were noted.

Whalebone beach access track

The vegetation associations along the Whalebone beach track all contain multiple species of native flora susceptible to *Phytophthora cinnamomi*. Four soil and tissue samples of native flora susceptible to *Phytophthora cinnamomi* were taken along this track. All four of these samples tested negative for the presence of *Phytophthora cinnamomi.*

There is the occasional evidence of aerial canker effects within the Dryandra species in the landscape on the first sections of the Whalebone beach access track. No entire plant deaths attributable to aerial canker were observed. However occasional limb deaths were noted.

There is a section of landscape devoid of Dryandra quercifolia around the white quartzite hills mid way along Whalebone beach into the coast. It again appears as though this landscape has been historically exposed to a number of fires with intervals that have not permitted the Dryandra quercifolia to successfully establish mature fruit and seed set. It is important that this area is not interpreted as having been altered by the effects of *Phytophthora cinnamomi.*

Whisson track

The vegetation associations along the Whisson track all contain multiple species of native flora susceptible to *Phytophthora cinnamomi*. Three soil and tissue samples of native flora susceptible to *Phytophthora cinnamomi* were taken along this track. All three of these samples tested negative for the presence of *Phytophthora cinnamomi.*

Southern Fireline from Moir track to Hamersley Drive

The vegetation associations along the western and eastern end of this section of the Southern Fireline management track all contain multiple species of native flora susceptible to *Phytophthora cinnamomi*. No soil and tissue samples of native flora susceptible to *Phytophthora cinnamomi* were taken along this track as no complete deaths of flora susceptible to *Phytophthora cinnamomi* were observed.

The vegetation associations within the central portion of this section of the Southern Fireline management track within the West River valley and associated mineralized zone do not contain flora species known to be susceptible to *Phytophthora cinnamomi.* It is therefore considered that this section of the Southern Fireline be considered as uninterpretable for the presence of *Phytophthora cinnamomi.*

Southern Fireline from Hamersley Drive to Drummond track

The vegetation associations along this section of the Southern Fireline management track all contain multiple species of native flora susceptible to *Phytophthora cinnamomi*. Three soil and tissue samples of native flora susceptible to *Phytophthora cinnamomi* were taken along this section of the Southern Fireline management track. All three of these samples tested negative for the presence of *Phytophthora cinnamomi.*

There are two short lengths along this section of the Southern Fireline management track that do not contain vegetation associations with native flora that are susceptible to *Phytophthora cinnamomi*. These two areas are located within the floor of the Hamersley River valley and the valley floor of another minor drainage line east of the Hamersley River crossing. Both of these short sections of the landscape should be considered as uninterpretable for the presence of *Phytophthora cinnamomi.*

There is widespread evidence of aerial canker decline within species of Dryandra at the eastern end of this section of the Southern Fireline management track. The majority of this decline is only partial limb decline with very few entire plant deaths noted.

Short road and Short track

The vegetation associations along the upland plateau element of Short road have vegetation associations that all contain multiple species of native flora that are susceptible to *Phytophthora cinnamomi.* The vegetation on the west side of the Short road is regenerating from the November 2006 fire and the young seedlings are of a size that makes them identifiable and able to be interpreted for the presence of *Phytophthora cinnamomi.* No soil and tissue samples were collected along Short road or Short track as no entire plant deaths were located for sampling.

The vegetation along Short track at the southern end of the access alignment contains very few species of native flora susceptible to *Phytophthora cinnamomi* and is considered to be uninterpretable for the presence of *Phytophthora cinnamomi.*

Southern boundary of FR10 Management cell

The vegetation associations along the upland plateau elements of this management track along the southern boundary of management cell FR10 have vegetation associations that all contain multiple species of native flora that are susceptible to *Phytophthora cinnamomi.* However there are numerous sections of this track that drop off the plateau into the dissected creek lines that have vegetation that does not contain flora species that are susceptible to *Phytophthora cinnamomi.* These sections of the track are to be considered as uninterpretable for the presence of *Phytophthora cinnamomi.*

No entire plant deaths were located along this management track and as a result no soil and tissue samples were collected.

Drummond track

The vegetation associations along the Drummond track all contain multiple species of native flora susceptible to *Phytophthora cinnamomi*. There are a number of short lengths of native vegetation south of the barrier entry into the Wilderness zone and north of Mt Drummond atop the granite ridges that have vegetation associations that do not contain native flora that are susceptible to *Phytophthora cinnamomi.* These are very localized short sections and given the extent of interpretable native vegetation either side of these areas that do not create unnecessary concern about their disease status.

Four soil and tissue samples of native flora susceptible to *Phytophthora cinnamomi* were taken along this section of the Southern Fireline management track. All four of these samples tested negative for the presence of *Phytophthora cinnamomi.*

Of note is the presence of the occasional dead *Banksia media* along the edges of the Drummond track in and around the low lying poorly drained country just south of Mt Drummond. I was able to only locate the one fresh plant death for sampling. Unfortunately all of the other dead plants were of an age unsuitable for sampling. This site has been regularly sampled over the last twenty years and to date there has been no positive recovery of *Phytophthora cinnamomi.* I am still of the opinion that given there are no deaths within the other susceptible flora suite across this site that the Banksia deaths are not attributable to *Phytophthora cinnamomi.*

The historically identified *Phytophthora megasperma* infestation on the first section of the track after leaving the graveled portion at the northern end of the Drummond track was active with fresh deaths observed in Xanthorhoeae platyphylla on both sides of the track. A sample was collected from these deaths in order to confirm the absence of *Phytophthora cinnamomi.* All of the other susceptible flora species at this site were noted to be alive and healthy.

Southern Fireline from Drummond track to Fitzgerald River crossing

The vegetation associations along this section of the Southern Fireline management track all contain multiple species of native flora susceptible to *Phytophthora cinnamomi*. Six soil and tissue samples of native flora susceptible to *Phytophthora cinnamomi* were taken along this section of the Southern Fireline management track. All six of these samples tested negative for the presence of *Phytophthora cinnamomi.*

The vegetation within the Sussetta river crossing contains very few species of native flora susceptible to *Phytophthora cinnamomi* and is considered to be uninterpretable for the presence of *Phytophthora cinnamomi.*

There is evidence of aerial canker decline within species of Dryandra along the entire section of the Southern Fireline management track. The majority of this decline is only partial limb decline with very few entire plant deaths noted.

Telegraph track from Quoin Head junction to Fitzgerald Inlet track

The vegetation associations along this section of the Telegraph track all contain multiple species of native flora susceptible to *Phytophthora cinnamomi*. No plant tissue and or soil samples were collected from this management track as no entire plant deaths were noted.

The vegetation at the eastern end of the track is regenerating from the December 1997 fire and is now mature enough to easily interpret for the presence of *Phytophthora cinnamomi*. The vegetation along the southern side of Telegraph track from Twins Bays track junction to the Bell track junction is regenerating from the December 2007 fire and interpretation relied principally upon the presence of the resprouting *Xanthorhoeae platyphylla*. Fortunately the vegetation on the north side of the track in this section is of mature age and was susceptible flora species were easily identified.

The are two sections of native vegetation along this section of the Telegraph track that do not contain native flora species susceptible to *Phytophthora cinnamomi* and so have to be considered as uninterpretable for the presence of *Phytophthora cinnamomi*. These sections are the red soil hills associated with the historical mining activity around the junction of the Bell track and within the drainage line of eastern branch of the Copper mine creek, which crosses and then runs parallel to the Telegraph track due north of the Dempster Inlet.

Twin Bays track

The vegetation associations along Twin Bays track all contain multiple species of native flora susceptible to *Phytophthora cinnamomi*. No plant tissue and or soil samples were collected from this management track as no entire plant deaths were noted.

The vegetation on the west side of Twin Bays track is regenerating from the December 2007 fire and interpretation relied principally upon the presence of the resprouting *Xanthorhoeae platyphylla*. The vegetation on the east side of the Twin Bays track is regenerating from the December 1997 fire and is now mature enough to permit successful interpretation for the presence of and interpretation relied principally upon the presence of the resprouting *Xanthorhoeae platyphylla*.

The vegetation within the first major creek crossing along the Twin Bays track that had been previously exposed to an episode of *Phytophthora megasperma* in was healthy and was not displaying any symptoms of recent plant deaths associated with the presence of this pathogen.

Bell Track

Telegraph track junction to Animal Exclusion fence

The vegetation associations along this section of the Bell track all contain multiple species of native flora susceptible to *Phytophthora cinnamomi*. No plant tissue and or soil samples were collected from this management track as no entire plant deaths were noted.

The River valley at the southern end of the Bell track with the junction of the Telegraph track does not contain any native flora species susceptible to *Phytophthora cinnamomi*. As a result this short 500 meter section of track is considered to be uninterpretable for the presence of *Phytophthora cinnamomi*.

There is a large section of native vegetation on the west side of the Bell track south of the Bell track dieback infestation animal exclusion fence that was burnt in 2007. This section of native vegetation was difficult to interpret for the presence of *Phytophthora cinnamomi.* I had to rely upon the resprouting *Xanthorhoeae platyphylla* as evidence of alive and healthy susceptible plants as the remainder of the susceptible flora species are still small in size.

Bell Track around the entire Animal Exclusion fence

The native vegetation around the entire animal exclusion fence has been burnt in 2007 on the west side, 2008 on the south and east side and in 2005 on the north side. The vegetation associations all contain multiple species of native flora susceptible to *Phytophthora cinnamomi*. The majority of these susceptible plants are however small in size having been all recently burnt and are now regenerating. Again I had to rely heavily upon the resprouting *Xanthorhoeae platyphylla* as evidence of alive and healthy susceptible plants on these sites.

No dead and or dying plants were observed around the perimeter of the fence and as a result no soil and or tissue samples were taken.

Bell track north from the Animal Exclusion fence to Drummond track

The vegetation associations along this section of the Bell track all contain multiple species of native flora susceptible to *Phytophthora cinnamomi*. No plant tissue and or soil samples were collected from this management track as no entire plant deaths were noted.

Management track between FR8 and FR9

The vegetation associations along this section of the management track all contain multiple species of native flora susceptible to *Phytophthora cinnamomi*. No plant tissue and or soil samples were collected from this management track as no entire plant deaths were noted.

Northern Boundary Access tracks across the top FR8 and FR9 Management cells

The vegetation associations along these sections of management tracks all contained multiple species of native flora susceptible to *Phytophthora cinnamomi*.

Six soil and tissue samples of native flora susceptible to *Phytophthora cinnamomi* were taken along this section of the Southern Fireline management track. All six of these samples tested negative for the presence of *Phytophthora cinnamomi.*

There is a considerable amount of dead and dying *Banksia caleyii* scattered across this northern portion of the National Park south of these management tracks. The six soil and tissue samples collected along these management tracks were all taken from dead and dying *Banksia caleyii* plants. These deaths have been noted and sampled regularly over the last twenty years of dieback interpretation activities across the northern portions of the National Park. To date none of these background deaths sampled have returned positive to the presence *Phytophthora cinnamomi.* The remainder of the *Phytophthora cinnamomi* susceptible native flora within the vegetation associations containing Banksia caleyii is alive and healthy and there was no evidence of any Phytophthora related decline.

There is widespread evidence of aerial canker effects across the entire northern portions of the National Park within management cells FR8 and FR9. This impact is greatest within the Dryandra species with large proportions of plants displaying occasional limbs decline through to entire plants deaths in *Dryandra pteridifolia*.

There is no evidence of the known *Phytophthora cinnamomi* infestation on the South Coast Highway at the junction with Mallee road expressing within the National Park. This is despite several high rainfall events in this landscape that has resulted in considerable water flow events from the infested landscape into the National Park and into the Fitzgerald river valley. Unfortunately the floor of the drainage line within the National Park draining off South Coast Highway has been extensively infested with African Love grass and this has made the floor of the creek uninterpretable for the presence of *Phytophthora cinnamomi*.

Southern Fireline from the Fitzgerald River crossing to Paebulup Drive

The vegetation associations along the western end and central section of this section of the Southern Fireline management track all contain multiple species of native flora susceptible to *Phytophthora cinnamomi*. Two soil and tissue samples of native flora susceptible to *Phytophthora cinnamomi* were taken along this section of the Southern Fireline management track. Both of these samples tested negative for the presence of *Phytophthora cinnamomi.*

The are two sections of native vegetation along this section of the Southern Fireline management track that do not contain native flora species susceptible to *Phytophthora cinnamomi* and so have to be considered as uninterpretable for the presence of *Phytophthora cinnamomi*. These sections of the Southern Fireline track not interpretable are located within the Fitzgerald River and the Twertup creek valleys.

There is a considerable amount of dead and dying *Banksia caleyii* noted at the western end of this management track adjacent to and at distance off the management track. These are same ongoing signs of *Banksia caleyii* decline that has been noted across the entire landscape of the Northern Fitzgerald River National Park for some twenty years. One of the above reference samples was taken of a dead *Banksia caleyii* and this did not return positive to the presence *Phytophthora cinnamomi.*

Northern Fireline from Fitzgerald River to Paebulup Drive

The vegetation associations along the western end and central section of this section of the Northern Fireline management track all contain multiple species of native flora susceptible to *Phytophthora cinnamomi*. Three soil and tissue samples of native flora susceptible to *Phytophthora cinnamomi* were taken along this section of the Southern Fireline management track. All three of these samples tested negative for the presence of *Phytophthora cinnamomi.*

The are two sections of native vegetation along this section of the Northern Fireline management track that do not contain native flora species susceptible to *Phytophthora cinnamomi* and so have to be considered as uninterpretable for the presence of *Phytophthora cinnamomi*. These sections of the Northern Fireline track not interpretable are located within the Fitzgerald River and the Twertup creek valleys.

There is a considerable amount of dead and dying *Banksia caleyii* noted at the western end of this management track adjacent to and at distance off the management track. These are same ongoing signs of *Banksia caleyii* decline that has been noted across the entire landscape of the Northern Fitzgerald River National Park for some twenty years. One of the above reference samples was taken of a dead *Banksia caleyii* and this did not return positive to the presence *Phytophthora cinnamomi.*

FR7 Northern Boundary Access tracks

The vegetation associations along the western and eastern end of this management track all contained multiple species of native flora susceptible to *Phytophthora cinnamomi*. The vegetation association within the Twertup valley did not contain any flora species susceptible to *Phytophthora cinnamomi* and is therefore uninterpretable for the presence of *Phytophthora cinnamomi.*

Five soil and tissue samples of native flora susceptible to *Phytophthora cinnamomi* were taken along this section of the Southern Fireline management track. All five of these samples tested negative for the presence of *Phytophthora cinnamomi.*

There is a considerable amount of dead and dying *Banksia caleyii* noted at the western end of this management track adjacent to and at distance off the management track. These are same ongoing signs of *Banksia caleyii* decline that has been noted across the entire landscape of the Northern Fitzgerald River National Park for some twenty years. One of the above reference samples was taken of a dead *Banksia caleyii* and this did not return positive to the presence *Phytophthora cinnamomi.*

Quiss Road

The vegetation associations along the entire length of Quiss road to the entry into the National Park all contained multiple species of native flora susceptible to *Phytophthora cinnamomi*. One soil sample of a dying susceptible native plant was collected and this tested negative to the presence of *Phytophthora cinnamomi*.

The vegetation along the western side of Quiss road is regenerating from a November 2004 fire. The regenerating susceptible flora can now be successfully interpreted for the presence of *Phytophthora cinnamomi*. The majority of young plants are up to 50 cm in height and all of the *Xanthorhoeae platyphylla* plants have resprouted with their fronds easily identified for interpretation purposes within the plant community.

The Shire of Jerramungup repaired the Quiss road pavement in a resheeting program in 2004 and 2005 with gravel sourced from the MRWA and Shire of Jerramungup gravel reserve, Reserve17857. A sample of a dead *Xanthorhoeae platyphylla* collected in September 2005 tested positive for the presence of *Phytophthora cinnamomi*. At this stage there is no evidence that any of the gravel used in the resheeting program has introduced *Phytophthora cinnamomi* onto Quiss road. Continued monitoring of the native vegetation along Quiss road is recommended.

Pabelup Drive

The vegetation associations along this section of Paebulup Drive all all contained multiple species of native flora susceptible to *Phytophthora cinnamomi*. No soil and tissue samples were collected in this section of Paebulup Drive.

The native vegetation along this section of Paebulup Drive is long unburnt and very mature. There are numerous Banksia caleyii deaths scattered throughout the landscape either side of Paebulup Drive. In addition there is considerable evidence of decline within Dryandra species from the effects of aerial canker impacts.

Red Hills to Pt Anne Road Intersection

The vegetation associations along this section of Paebulup Drive all contained multiple species of native flora susceptible to *Phytophthora cinnamomi*. Five soil and tissue samples were collected in this section of Paebulup Drive. All five of these samples tested negative for the presence of *Phytophthora cinnamomi.*

There has been historical sampling effort undertaken along the section of Paebulup Drive between the Red Hills gravel pits and Fitzgerald Inlet track. Dead and dying *Banksia media* have been observed in this area for some twenty years. I noted on this survey effort that there were the occasional dead *Banksia media* observed within the 1898 fire regrowth landscape. Historically the deaths in the *Banksia media* were confined to the long unburnt landscape north of the 1989 fire boundary to the Red Hills gravel pits.

Pt Anne Road to Quaalup North Road Intersection

The vegetation associations along this section of Paebulup Drive all contained multiple species of native flora susceptible to *Phytophthora cinnamomi*. Three soil and tissue samples were collected in this section of Paebulup Drive. All three of these samples tested negative for the presence of *Phytophthora cinnamomi.*

The native vegetation along this section of Paebulup Drive is regenerating from the December 2006 fire and from Doggers swamp westward on the north side of Paebulup Drive regenerating from an early 1970's, a 1989 and a 1988 fire. The native flora species susceptible to *Phytophthora cinnamomi* were all readily identifiable, including within the December 2006 fire, for interpretation purposes.

Quaalup North Road to Devils Creek Road intersection

The vegetation associations along this section of Paebulup Drive all contained multiple species of native flora susceptible to *Phytophthora cinnamomi*. One soil and tissue samples was collected along this section of Paebulup Drive. This sample tested negative for the presence of *Phytophthora cinnamomi.*

There is widespread evidence of aerial canker effects within the Dryandra species within the landscape either sides of Paebulup Drive between Quaalup North road and the entry into the National Park. The majority of this activity is notable by the occasional limb decline within all the species of Dryandra. There is only the occasional entire plant death, which can be attributed to the effects of aerial cankers.

Twertup track

The vegetation associations along Twertup track all contained multiple species of native flora susceptible to *Phytophthora cinnamomi*. No soil and or tissue samples were taken, as there were no complete plant deaths observed.

Though the native vegetation is regenerating from the December 2007 the native flora species susceptible to *Phytophthora cinnamomi* are all around 15 to 20 cm in height and are readily identifiable on the sides of the road and up the road side drains. In addition the fronds of Xanthorhoeae platyphylla are very obvious in amongst the regeneration and provide another level of interpretation confidence.

Historically there have been regular samples taken of dead and dying Banksia media on the north side of Twertup track in the large valley floor half way into Twertup visitor center. These deaths were generally at the end of three drains that drain water off the lowest point of the road through the valley. I surveyed this area on foot and was not able to locate any dead and or dying young regenerating *Banksia media* plants within the area sampled historically.

Fitzgerald Inlet track

The vegetation associations along the western and eastern portions of the Fitzgerald Inlet all contained multiple species of native flora susceptible to *Phytophthora cinnamomi*. Four soil and tissue samples were collected along the Fitzgerald Inlet track. All four of these samples tested negative for the presence of *Phytophthora cinnamomi.*

The vegetation associations along the central section of the Fitzgerald Inlet track, within Echo glen and across the low lying country of the Fitzgerald River valley, contained very few native flora species susceptible to *Phytophthora cinnamomi*. There is the occasional very mature Banksia media growing on the colluvial sands in the Fitzgerald River valley, however they were not in large enough numbers and or not frequently occurring enough to assist in interpretation for the presence of *Phytophthora cinnamomi*.

There is widespread evidence of aerial canker effects with the suite of Dryandra species growing within the plant communities on the spongolite soils atop the ridge systems in this landscape.

Point Anne road

The vegetation associations along the Point Anne road all contained multiple species of native flora susceptible to *Phytophthora cinnamomi*. Five soil and tissue samples were collected along the Fitzgerald Inlet track. All five of these samples tested negative for the presence of *Phytophthora cinnamomi.*

There is widespread evidence of aerial canker effects with the suite of Dryandra species growing in the plant communities all the way along the Point Anne road. This is evident with the frequent limb deaths in the Dryandra species and the occasional entire plant death.

The native vegetation along much of the south side of Pt Anne road is regenerating from the December 2006 fire. The native flora species susceptible to *Phytophthora cinnamomi* were all readily identifiable and in particular the fronds of Xanthorhoeae platyphylla which very obvious.

Triggelow Beach track

The vegetation associations along the Triggelow Beach access track all contained multiple species of native flora susceptible to *Phytophthora cinnamomi*. There are large numbers of entire plant deaths attributable to the effects of aerial canker scattered across the entire area along the Triggelow beach access track. No soil and tissue samples were taken of these entire plant deaths, as they are all very obviously stage decline deaths.

West Mt Barren road

The vegetation associations along the West Mt Barren road all contained multiple species of native flora susceptible to *Phytophthora cinnamomi*. No entire plant deaths were observed within the native vegetation along the entire length of this road and so no soil and or tissue samples were taken.

The native vegetation along this road is regenerating from a December 2006 fire and those species of native flora that are susceptible to *Phytophthora cinnamomi* were readily identifiable and visible for interpretation purposes. In particular the fronds of regenerating *Xanthorhoeae platyphylla* were most obvious within the vegetation during the survey.

Quaalup North road

The vegetation associations along the Quaalup North road all contained multiple species of native flora susceptible to *Phytophthora cinnamomi*. No entire plant deaths were observed along this road during the survey and so no soil and or tissue samples were taken.

The native vegetation on the east side of the Quaalup North road was burnt in December 2006 and has regenerated to permit interpretation for the presence of *Phytophthora cinnamomi.*

There is widespread evidence of the effects of aerial canker within the old mature vegetation on the west side the Quaalup North road mid way between Quaalup and Paebulup Drive.

Quaalup South road

The vegetation associations along the Quaalup South road all contained multiple species of native flora susceptible to *Phytophthora cinnamomi*. No entire plant deaths were observed along this road during the survey and so no soil and or tissue samples were taken.

The vegetation along the Quaalup South road is regenerating from fires in autumn 1999, 2005 and 2006. All of those species of native flora that are susceptible to *Phytophthora cinnamomi* were readily identifiable and visible for interpretation purposes.

Gairdner River north side management track

The vegetation associations along the Gairdner River management track all contained multiple species of native flora susceptible to *Phytophthora cinnamomi*. One soils and tissue sample was taken of an entire plant death observed along this road during the survey. This sample returned negative to the presence of *Phytophthora cinnamomi*.

The vegetation on the north side of this management track is regenerating from a December 2006 fire and is capable of being interpreted for the presence of *Phytophthora cinnamomi.*

Gairdner River road (south side of river Quallup south road to Gordon Inlet road)

The vegetation associations along the Gairdner River track all contained multiple species of native flora susceptible to *Phytophthora cinnamomi*. There were no entire plant deaths that were suitable for sampling.

There were however numerous Dryandra species with limb deaths attributable to the effects of aerial cankers. There was also the occasional entire plant death that could be attributed to the effects of aerial canker.

Gordon Inlet road

The vegetation associations along the Gordon Inlet road all contained multiple species of native flora susceptible to *Phytophthora cinnamomi*. There were no entire plant deaths that were suitable for sampling.

Doubtful Island road

The vegetation associations along the Doubtful Island road all contained multiple species of native flora susceptible to *Phytophthora cinnamomi*. One soil and tissue sample was taken which returned a negative result for *Phytophthora* species.

Rabbit Proof fence track

The vegetation associations along the Rabbit Proof fence management track all contained multiple species of native flora susceptible to *Phytophthora cinnamomi*. Three soil and tissue samples were taken which returned a negative results for *Phytophthora* species.

Boundary track between FR1/FR2 and FR15

The vegetation associations along these management tracks all contained multiple species of native flora susceptible to *Phytophthora cinnamomi*. There were no entire plant deaths that were suitable for sampling.

There is the occasional creek crossing and Moort euclaypt thicket along these two tracks that do not have native flora susceptible to *Phytophthora cinnamomi* present within these plant communities. It should be considered that these plant communities are not interpretable for the presence of *Phytophthora cinnamomi.*

Boundary track between FR3 and FR15

Western boundary of unallocated Crown lands and Private Properties

South Coast Highway to Monkey Rocks road

Monkey Rocks road to Marningarup East road

Murray road to Doubtful Island Bay road

Walk trails within FRNP

East Mt Barren

West Mt Barren

Sepulcralis Hill

Mt Maxwell

3.2 Disease Expression and Impact

During the interpretation project I inspected the known infestations of *Phytophthora cinnamomi* at the Bell track site, the Magenta road and South Coast Highway site and the Hamersley river crossing site with South Coast Highway.

There was very obvious disease expression at the Bell track and Mallee road junction site with Highway One infestations with numerous recent plant deaths in a broad range of susceptible species. Visiting these sites greatly improved confidence in being able to relate to anticipated symptoms of disease expression with any established infestation that I may have encountered during the survey.

Of course infestations that have only recently established would not necessarily display multiple species plants deaths and would more than likely be just one or two plant deaths on the side of road, track or up a drain.

3.3 Sample Results

No positive identifications of Phytophthora cinnamomi were recorded from the 124 (plus Greg Freebury's FRNP West samples) collected from the Fitzgerald River National Park in September, October and November 2009.

4 Recommendation

4.1 Hygiene Management

Applying and maintaining hygiene standards for all machine operation activities and soil moving operations within the Fitzgerald River National Park will greatly reduce the risk of introducing and or spreading the disease.

This cannot be reinforced any more than by reviewing the situation that has resulted in the recently located new Phytophthora cinnamomi infestation off to the west of Paebulup Drive on the northern boundary of the February 2003 wildfire.

4.2 General Recommendations

It is paramount that the Albany District embark upon a very strict protocol of Hygiene planning and sign off by relevant District and Regional staff for all machine and soil moving operations that pose a threat with regards to the introduction and or spread of existing infestations within and or adjacent to the National Park.

The Sussetta River crossing on the southern Fireline management track needs to be permanently signed to ensure that all staff and contract machine operators are aware of the presence of dieback within the river crossing and so the need to apply appropriate hygiene when crossing the river.

The Gordon Inlet and Doubtful Island Bay access roads are currently in a sub standard condition for hygienic all weather access into the Gordon Inlet and the Doubtful Island Bay peninsula. They both have multiple locations along their lengths where vehicle traffic has to negotiate water and mud holes on and off the road alignments.

These two roads are located in the highest rainfall receiving zones of the National Park and in combination with the extent of susceptible native flora within the surrounding vegetation and the extremely muddy soils when wet pose a significant threat from accidental introduction and then subsequent spread along these roads and many others within the National park and adjoining Shire reserves.

A survey needs to be undertaken within the Fitzgerald River and Sussetta River valleys some five to seven years post the January 2008 wildfire. This survey needs to be undertaken to determine the extent of spread of the infestations from South Coast Highway Mallee Road intersection infestation into the Fitzgerald River valley and the Sussetta river valley infestation from the Old Ongerup road crossing of the river.

5 Conclusion

This survey effort has been able confirm that there are no new infestations of *Phytophthora cinnamomi* other than the known infestations of infestations at Bell Track, Jacup Ranger Station, Sussetta River and the recently located Paebulup Drive infestation.

Though soil moisture conditions may not have been as ideally suitable for disease expression as required for ideal interpretation effort there would have been evidence of the effects of *Phytophthora cinnamomi* within the National Park with the typical multiple susceptible species decline as observed at the above mentioned already known sites.

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Fitzgerald River National Park Improvement Project

Phytophthora Dieback Management Plan

2009-2012

Final Draft

Department of
Environment and Conservation
Our environment, our future

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WESTERN AUSTRALIA

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Table of Contents

1 Introduction 1
2 Dieback Management Goals and Objectives 2
2.1 Goals: 2
2.2 Objective: 2
2.3 Success criteria: 2
2.4 Timeframe: 2
3 Dieback Risk Activities 2
4 Roles and Responsibilities 3
5 Planning Procedure for *Phytophthora* Dieback Management 4
5.1 Design of the Road, Recreation Sites, and Walking Trail 4
5.2 Environmental Induction 4
5.3 Pre-construction Hygiene Plans 4
5.4 Pre-construction Surveys 4
5.5 Environmental Management Plans 4
5.6 Compliance Monitoring 5
5.7 Post Construction Monitoring 5
6 *Phytophthora* Dieback Management Protocol 6
6.1 Green Card Inductions Protocols 6
6.2 Weather Conditions Protocols 7
6.3 Personnel Hygiene Protocols 8
6.4 Vehicle and Machinery Hygiene Protocols 9
6.5 Split-phase Road Operations Protocols 10
6.6 Raw Materials Protocols 11
6.7 Management of Pits Protocols 12
6.8 Water Protocols 13
6.9 Infrastructure and other materials Protocols 13
References: 14
ATTACHMENT 1: Example of Hygiene Plan 15

1 Introduction

The Fitzgerald River National Park Improvement Project (FRNP-IP) is a State and Federal Government funded project to enhance tourist access and facilities in the Park and assist economic and social development in local communities.

The Commonwealth and State Governments have committed a total of $40 million to the project to deliver the following outcomes:

- Sealing 16 km of existing roads from Culham Inlet to Hamersley Inlet
- Sealing 66 km of existing roads from Bremer Bay Road to Point Ann
- Redeveloping associated spur roads, car-parks, day use areas and camping facilities
- Enhancing signage and interpretive information
- Developing a coastal walk trail linking Hamersley Inlet to Point Ann

Phytophthora Dieback is considered to be one of the most significant threats to the Fitzgerald River National Park (FRNP), the largest conservation reserve in southwest Western Australia that is currently relatively free of dieback.

There are three relatively small *Phytophthora cinnamomi* infestations known in the FRNP (Bell Track, Susetta Creek south of the Old Ongerup Road, and near Pabelup Drive) (DEC 2009). However these infestations are not in the FRNP-IP area and will not be impacted by this project. There are also several other infestations of *Phytophthora cinnamomi* in the region around the Park, in particular Jacup and gravel extraction pits on Reserve Road and Mallee Road (South Coast NRM 2009). Four other *Phytophthora* species have also been recovered from the FRNP.

Phytophthora can be spread by humans through the introduction of spores in soil and plant material attached to boots, vehicle tyres and underbodies, machinery and equipment. Once introduced to an area the pathogen will also be transferred by root to root contact between plants and via surface and subsurface water flow.

The FRNP-IP was referred to the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The referral decision of 'not controlled action if undertaken in a particular manner' (Referral: 2009/4958) included the required measure to be undertaken to avoid significant impacts on listed threatened species and communities and migratory species:

> *'There must be no further spread of dieback to special environmental areas as a result of the development, its associated activities and/or its consequential impacts.'*

The EPBC Act only refers to dieback caused by *Phytophthora cinnamomi*. However the *Fitzgerald River National Park Management Plan* considers all *Phytophthora* species that have the potential of causing dieback as a significant threat to the Park (Moore *et al.* 1991). An objective of the management of FRNP is to prevent the introduction of dieback into disease-free areas and the control of current infestations.

The FRNP-IP is recognised as being a very high risk activity in relation to *Phytophthora* management for the Park, as the activities involve the use of large machinery, the movement of soil, water and vegetation, and will occur in significant dieback-free areas of the FRNP. Therefore all activities in this project will adhere to the highest standards of dieback management protocols.

This *Fitzgerald River National Park Improvement Project Phytophthora Dieback Management Plan* details the planning process and management protocols that will be followed as part of the FRNP-IP. This Plan is for the FRNP-IP, and does not relate to other activities in the FRNP or the on-going management of the Park. It is proposed that a Dieback Management Plan will be developed for the on-going maintenance of the Park.

2 Dieback Management Goals and Objectives

2.1 Goals:

- No *Phytophthora cinnamomi* is introduced as a result of the Fitzgerald River National Park Improvement Project.
- No new infestations of other *Phytophthora* spp. are introduced and no spread of current infestations as a result of the Fitzgerald River National Park Improvement Project.

2.2 Objective:

To provide the Fitzgerald River National Park Improvement Project with a consistent set of dieback management protocols to be followed to reduce the risk of *Phytophthora cinnamomi* being introduced.

2.3 Success criteria:

No new infestations or spread of current infestations of *Phytophthora* spp. recorded in the project area within ten years of the completion of the FRNP-IP that are attributed to the implementation of the project.

2.4 Timeframe:

This Dieback Management Plan covers the FRNP-IP project from June 2009 to June 2012.

The dieback management of the FRNP-IP will require on-going monitoring for *Phytophthora* spp. in the project area for ten years following the completion of the project. This monitoring is detailed in Section 5.7.

3 Dieback Risk Activities

The primary dieback management risks associated with the FRNP-IP are:

- Introduction of *Phytophthora cinnamomi* or other *P.* species into a currently un-infested area as a result of *Phytophthora* infected soil/plant material transported into the FRNP-IP area.
- Spread of current infestations of *Phytophthora* spp. as a result of the movement of infected soil/plant material across the FRNP-IP area.
- Risks to completion of FRNP-IP within current timeframe.
- Construction delayed due to wet weather conditions.
- The project delayed due to construction being delayed by wet weather conditions, or construction being halted following a serious breach to this Dieback Management Plan.
- Individuals or corporations penalised under the EPBC Act due to breaching the measures of the EPBC Act referral (i.e. 'spread dieback to special environmental areas').

The dieback risk activities that will be conducted as part of the FRNP-IP are listed below as either high or lower risk activities for the introduction or spread of *Phytophthora*. A comprehensive risk assessment of this project is being conducted by DEC in conjunction with this Management Plan.

<u>High Risk Activities</u>

- Earth moving and other large machinery
- Imported Basic Raw Materials (BRM)
- Trucks transporting in the Basic Raw Materials, infrastructure and other materials
- Light vehicles

<u>Lower Risk Activities</u>

- The boots of personnel or other equipment
- Movement of infrastructure and other materials

4 Roles and Responsibilities

Main Roads Western Australia (Main Roads) and the Department of Environment and Conservation (DEC) are responsible for the implementation of the FRNP-IP.

DEC is responsible or the ongoing management of the FRNP, providing advice regarding the environmental management of the project and approval of environmental documentation including hygiene plans and Environmental Management Plans (EMP).

Main Roads is responsible for the environmental performance of their staff and contractors including training, implementation and monitoring of the EMP in relation to the road construction.

All individuals involved in the project are responsible for their own compliance with the hygiene protocols detailed in this Management Plan.

Project and Construction Managers
The Project Managers for each section of the FRNP-IP are responsible for the overall environmental performance of the project through the implementation of the EMP. The Construction Managers are responsible for ensuring that any work conducted under their supervision is done in accordance with the EMP.

DEC Environment Officer
DEC Environment Officer is responsible for providing advice regarding the environmental management of the project and coordinating approval of environmental documentation including hygiene plans, environmental surveys and EMP on behalf of the DEC South Coast Nature Conservation Leader. This person also monitors, assesses and audits compliance with the EMP for the recreation sites and walking trail and coordinates with the Main Roads Environment Officer for the road construction EMP. This person regularly reports on the projects compliance to this Management Plan to the DEC South Coast Nature Conservation Leader.

Main Roads Environment Officer
Main Roads Environment Officer is responsible for the planning and documentation of the environmental management (i.e. hygiene plans, EMP) of the road construction part of the FRNP-IP. This person also monitors, assesses and audits compliance with the EMP for the road construction and coordinates with the DEC Environment Officer. This person reports to the Main Roads South Coast Regional Manager.

On-site Environment Officers
The on-site Environment Officers are responsible for overseeing the implementation of the EMP and monitoring the compliance of staff and contractors. These officers report to the Project Managers and liaise with the Main Roads Environment Officer for the roads and DEC Environment Officer for recreation sites and walking trail.

5 Planning Procedure for *Phytophthora* Dieback Management

5.1 Design of the Road, Recreation Sites, and Walking Trail

The road, recreation sites and walking trails being constructed as part of the FRNP-IP are being designed by Main Roads and DEC to minimize the risk of dieback being introduced by visitors to the Park. This includes:

- Dieback hygiene infrastructure (e.g. boot cleaning stations, wash down facilities) to be install where appropriate
- Increasing visitor awareness and appreciation of dieback and required hygiene protocols through signage and interpretation.
- Locating the walking trail within the coastal catchments, to reduce the risk of dieback being spread inland from the walking trail.

5.2 Environmental Induction

All staff and contractors working on the FRNP-IP will be required to undertake the DEC South Coast Region's Green Card induction (Section 5.1). This induction details best practice for individuals working on the project to minimize environmental impacts. It also includes background information on *Phytophthora* dieback, its impacts and the management protocols that must be followed for this project.

Following the induction, staff and contractors will be required to sign a 'Code of Conduct' and will receive a 'Green Card' to show they have completed the induction. DEC Environment Officer will maintain a database of those that have completed the induction.

5.3 Pre-construction Hygiene Plans

All actions undertaken prior to the dieback surveys and development of an Environmental Management Plan will be undertaken under a DEC '*Phytophthora* spp. Hygiene Plan' (Attachment 1). This plan documents the dieback hygiene procedures to be undertaken. These Plans will be developed by the DEC Environment Officer and Project Managers must ensure that all staff and contractors involved in the pre-construction work are provided with a copy.

5.4 Pre-construction Surveys

Prior to construction activities a dieback survey will be conducted of the areas that will potentially be impacted by the project. This will provide the locations of any current *Phytophthora* spp. infestations so that construction activities can be planned so that soil is not moved from an infested area to an uninfested area. The surveys will also provide baseline data for monitoring to determine if there is any spread of *Phytophthora* spp. as a result of the project. The dieback survey will be conducted by accredited dieback interpreter. These surveys are only valid for 12 months, so will be repeated where construction continues for longer than 12 months.

If an infestation of Phytophthora cinnamomi is found in the project area, access to the infested area will immediately be closed and management will then be determined by DEC. This may include permanently closing access to the area, application of Phosphite, sealing any roads so that vehicles don't come into contact with the infestation and other containment/eradication measures.

5.5 Environmental Management Plans

Construction activities will be undertaken following an Environmental Management Plan (EMP) that documents the environmental controls that will be undertaken as part of the activities. An EMP will be developed for each section of the project (i.e. Hamersley Drive, recreation sites, walking trail). For dieback management this will follow the protocols that are detailed in Section 5. The EMP will also detail the environmental monitoring and reporting requirements.

5.6 Compliance Monitoring

The On-site Environment Managers will be responsible for regular monitoring of compliance to the EMPs and reporting to the Main Roads and DEC Environment Officers. The EMP's compliance monitoring templates will include compliance to the dieback hygiene and management protocols. Reporting requirements are listed with the protocols in Section 5.

A breach to this Phytophthora Dieback Management Plan is any activity contrary to the protocols in this Plan that has a medium or greater risk of spreading Phytophthora dieback. .

Any breach to this Phytophthora Dieback Management Plan must be immediately reported to an On-site Environment Officer. It must then be reported to the DEC Environment Officer. The DEC South Coast Nature Conservation Leader will determine what mitigation actions will be required.

5.7 Post Construction Monitoring

On-going monitoring for *Phytophthora* infestations will be required following the completion of this FRNP-IP in order to determine the project's compliance with the EPBC referral requirement that there is 'no further spread of dieback'.

Phytophthora spp. infestations may not be identified in an area until the pathogen that causes plant dieback can be identified by an accredited dieback interpreter. The timeframe between the introduction of the pathogen and visible symptoms appearing is dependant on numerous factors such as weather conditions, soil type and the number of susceptible plant species in the area.

The FRNP-IP will require ongoing annual interpretation and dieback mapping of the project area for at least 10 years following the completion of the FRNP-IP to ensure that any dieback introduced during the project is identified.

This annual interpretation and dieback mapping will be conducted by a DEC accredited dieback interpreter and include all the roads, recreation sites and walking trails associated with the FRNP-IP.

6 *Phytophthora* Dieback Management Protocol

The dieback management protocols detailed in this Plan for the FRNP-IP follow the standard operating procedures and management guidelines detailed in the following documents:

- *Phytophthora cinnamomi* and Disease Caused by it: Volume I – Management Guidelines (CALM 2003)
- CALM Policy Statement No. 3 (CALM 1998)
- Guidelines for the Management and Rehabilitation of Basic Raw Material Pits (DEC 2008)
- Managing *Phytophthora* Dieback: Guidelines for Local Government (DWG 2000)
- Management of *Phytophthora* Dieback in Extractive Industries (DWG 2004)

NOTE: Individuals or corporations that breach the measures of the EPBC Act referral (i.e. 'spread dieback to special environmental areas') could be penalised (e.g. required to repair and mitigate any damage, fines) under the EPBC Act.

6.1 Green Card Inductions Protocols

Description	All personnel involved in the FRNP-IP must be aware of the threat *Phythophthora cinnamomi* poses to FRNP and the possible environmental consequences of their actions. Prior to conducting field work for this project, all personnel are required to have completed DEC's 'Green Card' induction.
Objectives	To raise the awareness of personnel of the threat *Phythophthora cinnamomi* poses to the FRNP and the possible environmental consequences of their actions.
Actions	• All personnel will complete the DEC 'Green Card' induction. This induction includes presentations of: o Environmental assets of the FRNP o Threatening processes of the FRNP o *Phythophthora* management protocols o DEC's Environmental Code of Conduct • Following completion of the DEC 'Green Card' induction all personnel will sign the Environmental Code of Conduct and be given a Green Card. • All personnel must complete the Green Card induction at least every two years.
Location	DEC Albany office or on-site
Equipment	• Powerpoint projector (if available) • DVD playing equipment • '*Phytophthora* Dieback and the Fitzgerald Biosphere' DVD • 'Green Card' Induction package
Responsibilities	• Project Managers to ensure all staff and contractors have completed 'Green Card' induction prior to work. • Green Card presenters: DEC Environment Officer, on-site Environment Officers or other staff members trained to present the induction.
Reporting, Monitoring	• 'Green Card' presenters to ensure all personnel sign the Environmental Code of Conduct at the completion of the induction. • DEC Environment Officer to provide all personnel that sign the Environmental Code of Conduct with a Green Card. • DEC Environment Officer to maintain a 'Green Card' induction database of the personnel that have completed the induction.

6.2 Weather Conditions Protocols

Description	*Phytophthora* can be spread through the movement of soil and plant material attached to boots, vehicle tires and underbodies, machinery and equipment. There is a much greater risk of soil adhering when wet, so all activities are to be undertaken during dry soil conditions.
Objectives	Reduce the risk of the spread of dieback by only working in conditions under which soil will not be spread by adhering to vehicles, boots and equipment.
Actions	• Work will only be conducted under conditions where the soil does not adhere to the undercarriages of vehicles. The on-site Environment Officer will be responsible for deciding whether the conditions are suitable. This will be dependant on the site and soil types but the minimum is that: – The conditions will be reassessed by the Environment Officer after two hours of rainfall or shutdown is required, – Shutdown is required for at least 0.5 days following a single rainfall event of 7.5mm or more. • Shutdown is required until the soil has dried to the extent that it does not adhering to the undercarriages of vehicles. • Works can only recommence with the approval of the On-site Environment Officer. • Work can continue under moist soil conditions beyond the above actions after the construction area has been surfaced with certified dieback-free material, as long as there is no movement of the base soils.
Location	FRNP
Equipment	• Weather monitoring system on-site • Bureau of Meteorology rainfall monitoring data for Hopetoun North, Bremer Bay, Jacup and Ravensthorpe (www.bom.gov.au/climate/data)
Responsibilities	• On-site Environment Officer will be responsible for deciding whether weather conditions are suitable for working.
Reporting, Monitoring	• Rainfall and weather conditions will be monitored and recorded for events which will require shutdown of works.

6.3 Personnel Hygiene Protocols

Description	All soil and plant material must be cleaned off boots and equipment to minimise the risk of spreading *Phytophthora* dieback.
Objectives	• Clean-on-entry and exit of the FRNP and micro-catchments • No introduction or spread of non-certified dieback-free soil or plant material to the FRNP or across micro-catchments by personnel or equipment.
Actions	• Boots must be cleaned of all soil and plant material and then either sprayed with methylated spirits, diluted with water to 70% solution or cleaned in a footbath of the 70% solution. • All equipment, including hand tools, must be cleaned of soil and vegetative matter and sterlised. • Sterlisation options: spray or soak with 70% methylated spirits solution as above, soak in bleach (1 part bleach to 10 parts water) for a few minutes, or steam clean. • Stay within the construction zone/micro-catchment and avoid moving into the vegetation. • All vehicles are to carry basic dieback hygiene kits.
Location	• Prior to entry and before leaving the Park • Between micro-catchments along the road works • Between sites
Equipment	• Basic hygiene kits: Spray bottle containing 70% methylated spirits solution, small stiff brush and portable footbath.
Responsibilities	• Individuals • Compliance monitoring: On-site Environment Officer, Construction Manager
Reporting, Monitoring	• On-site Environment Officer to conduct regular visual inspections. • Staff may be requested to leave the Park if do not comply.
Safety Note	• When using methylated spirits avoid all contact with flame, do not apply to hot car surfaces that may induce combustion, and avoid contact with the eyes.

6.4 Vehicle and Machinery Hygiene Protocols

Description	*Phytophthora* spp. can be spread by transporting infected soil or vegetative matter to an uninfested location, so all vehicles and machinery must be cleaned.
Objectives	• Clean-on-entry to the FRNP and between current *Phytophthora* sp. infestations. • No introduction or spread of non-certified dieback-free soil or plant material to the FRNP or across micro-catchments by vehicles or machinery.
Actions	• All machinery, such as light vehicles, bob cats, trucks, bucket loaders, graders, bulldozers and post-hole boring equipment will be required to be washed down prior to entry into the National Park so as to be free of all adhering soil and plant material. - CABIN – floor, mats; - ENGINE – radiator, engine bay & grill; - BODY – chassis, inside bumper bars, crevices, mud flaps; - WHEELS & TYRES – inside, outside, between dual wheels, spare wheels, - TRAY – inside & outside • All machinery and light vehicles to be washed down in a location where the effluent will be contained. • All machinery must be inspected before going on-site. • No soil or plant material is to be moved from one micro-catchment to another along the road works, other than certified dieback-free materials. • All vehicles and machinery will remain within the construction zone and not move into undisturbed vegetation. **Areas of known infestations of *Phytophthora* spp.** • Machinery working within infestations must be air cleaned in situ before exiting infestation and then removed to a wash down facility for full wash down. • No soil or plant material is to be removed from infested areas.
Location	• Prior to entry and before leaving the Park. Machinery should be inspected in a suitable area where the vehicle can be turned around and exit the area if not clean. • Between micro-catchments along the road works.
Equipment	• Wash down facilities: o Albany car wash o Hopetoun car wash o East Mount Barren rangers station (light vehicles only) o Gardner rangers station (light vehicles only) o Portable wash down facilities (must include containment of effluent) • Compressed air clean down equipment
Responsibilities	• Vehicle and machinery operators • Visual inspections: Environment Officers, Construction Manager
Reporting, Monitoring	• All machinery and a selection of light vehicles are to be visually inspected. A log is to be kept to sign-off vehicle inspections. • Visual inspections are to include anywhere where soil and plant material can adhere e.g. vehicle undercarriage, spare tyres, inside front bumpers, inside floor mats. • Machinery and vehicles will not be allowed on-site until cleaned.

6.5 Split-phase Road Operations Protocols

Description	The passive movement of *Phytophthora* spp. in water primarily occurs downslope, so an infestation is easier to contain and will not spread as far if it is restricted to a micro-catchment.
Objectives	Soil is not moved from one micro-catchment to another to prevent *Phytophthora* spp. being spread across catchments.
Actions	• **Micro-catchment spilt-phase operation:** Construction operations will avoid the movement of base soil from one micro-catchment to another. Machinery will be cleaned (*6.4: Vehicle and machinery hygiene protocols*) between micro-catchments. • Micro-catchments are to be clearly marked in the field. Micro-catchments will also be defined in Environmental Management Plan. • Works that involve the movement of soil will be conducted from upslope to downslope. • Use of cut and fill material will only be used within micro-catchments. • Earthmoving will be avoided in high winds to minimise dust. • **Constructed Imported Surface:** Once the road surface consists only of certified dieback-free imported material, operations are not required to be split-phase across micro-catchments.
Location	Micro-catchments
Equipment	Compressed air clean down equipment to clean machinery between micro-catchments
Responsibilities	• Project Manager to include micro-catchment split-phase road operations in road construction planning. • Construction Managers to ensure micro-catchments are clearly marked and operations follow split-phase operations.
Reporting, Monitoring	• On-site Environment Officer

6.6 Raw Materials Protocols

Description	The majority of basic raw materials (gravel, sand, rock and other mineral-earth materials) will be sourced outside the Park, though some may be sourced from within the Park. All these materials must be certified dieback-free by an Accredited Dieback Interpreter.
Objectives	All basic raw materials will be certified dieback-free to reduce the risk of dieback being introduced via the raw materials used for the FRNP-IP..
Actions	**Sourcing materials** • Gravel, sand, rock and other materials will be sourced from certified dieback-free locations. • New pits will only be certified dieback-free if the area is covered by vegetation with susceptible flora species that can be interpreted for dieback. These pits will be monitored and tested for dieback at least every 6 months during operations. • Raw materials from deep pit quarries, where there is no source of dieback (e.g. soil, plant material, water flow from adjacent infested areas or unhygienic entry of machinery into the site) mayl be certified dieback-free. • Medium to large rocks may be sourced from other un-interpretable locations (i.e. paddock) if there isn't any dieback infestations close by. These rocks will be mud-free and washed down with water and bleach prior to bringing into the Park. **Transport of materials** • Stockpiles of gravel and other materials must be on a hard, dry, well-drained surface (e.g. blue metal, crushed gravel) in a dieback-free area. • Haulage trucked will be washed down (as per wash down procedures) and regularly inspected. • The pits from which dieback-free raw materials are taken from will be managed as per '*6.7: Management of Pits Protocol*' to ensure the source remains dieback-free.
Location	• Certified dieback-free sources of basic raw materials
Equipment	
Responsibilities	• All material must be certified dieback-free by an Accredited Dieback Interpreter. • The source of all materials must be approved be DEC Environmental Officer.
Reporting, Monitoring	• The source location of all basic raw materials will be included in the Environmental Management Plans.

6.7 Management of Pits Protocols

Description	The certified dieback-free pits for the basic raw materials must be managed to prevent contamination of dieback into the pit during operations. The pits should be treated as quarantine areas with no unauthorized or unhygienic entry permitted.
Objectives	Raw material pits are treated as quarantine areas to prevent contamination of dieback into the pit.
Actions	• **Clean-on-entry:** All vehicles and other equipment entering pits and stockpile areas will be clean of soil and vegetative matter (as per *6.4: Vehicle and Machinery Hygiene Protocols*). All personnel will clean their boots prior to entry onto the site (as per *6.3: Personnel Hygiene Protocols*). • **Split phase operation**: machinery and equipment only entry the pit after being cleaned and loading of hauling trucks is keep separate from excavation, reducing the risk of the pit being contaminated with dieback by the haulage trucks. • **Site security:** pits and stockpile areas must be treated as quarantine areas with unauthorized or unhygienic entry not permitted. Pits will be fenced to prevent unauthorized entry. • All water used will be from main's supply or otherwise disinfected. • Topsoil will be stockpiled and used for rehabilitation of site. Only dieback-free materials will be used for rehabilitation. • Pit and stockpile sites will be monitored and tested for dieback at least every 12 months during operations. • Signage will be erected to explain quarantine and management procedures for the pit area.
Location	• Pits and stockpile areas • Haulage tracks
Equipment	• Haulage trucks and other equipment
Responsibilities	• Construction Manager responsible for the overall operation of the pits, haulage tracks and stockpile areas. • On-site Environment Officer responsible for monitoring environmental aspects of the pits, haulage tracks and stockpile areas. • Main Roads Environment Officer to ensure pit and stockpile sites are monitored and sampled for dieback at least every 12 months during operations.
Reporting, Monitoring	• Regular inspections during pit operations by on-site Environmental Officer.
References	• Management of *Phytophthora* Dieback in Extractive Industries (DWG 2004) • Guidelines for the Management and Rehabilitation of Basic Raw Material Pits (DEC 2008)

6.8 Water Protocols

Description	All water used for this project will be Mains water or otherwise sterilised. The survival of *Phytophthora* spores in free water is unknown and so using the precautionary principle, all water used for this project will be sterlised
Objectives	Reduce the risk of *Phytophthora* being introduced via the water used for construction during this project.

Actions	• All water used will be sterilised.
	• Treatment options for water include:
	  o Mains water
	  o UV water treatment systems
	  o Chlorine
	• Spray drift to be restricted to the construction zone as far as practicable.

Location	FRNP
Equipment	• Water treatment system if required
Responsibilities	• All water sources will be approved by DEC Environmental Officer. • Construction Manager will be responsible for ensuring all water treated. • Construction Manager or On-site Environment Officer to regularly check and maintain the UV treatment systems.
Reporting, Monitoring	• On-site Environment Officer

6.9 Infrastructure and other materials Protocols

Description	*Phytophthora* spp. could be introduced in soil or plant material being imported into the FRNP on infrastructure and other materials.
Objectives	All materials and infrastructure brought into the FRNP will be clean of soil or vegetative material that could introduce *Phytophthora* spp.
Actions	• All materials and infrastructure will be thoroughly cleaned and if required sterilised (options detailed in *5.3: Personnel Hygiene protocols*)
Location	• Prior to entry into the Park • Between sites within the Park
Equipment	• Wash down facilities
Responsibilities	• Individual staff and contractors • Visual inspections: On-site Environment Officers, Construction Manager
Reporting, Monitoring	• All infrastructure and other materials brought into FRNP is to be visually inspected for soil or vegetative material. • Infrastructure and other materials that are not clean will not be allowed in the Park.

References:

CALM (1998). *Management of Phytophthora and Disease caused by it, Policy Statement No. 3.* Department of Conservation and Land Management, Perth.

CALM (2003). *Phytophthora cinnamomi and the diseases caused by it, Volume 1 - Management Guidelines.* Department of Conservation and Land Management, Perth.

DEC (2008). *Guidelines for the Management and Rehabilitation of Basic Raw Material Pits.* Environmental Management Branch, Department of Environment and Conservation, Perth.

DEC (2009). *Dieback Interpretation Report: Fitzgerald River National Park.* Internal report, Department of Environment and Conservation, Albany.

DWG (2000). *Managing Phytophthora Dieback: Guidelines for Local Government.* Dieback Working Group.

DWG (2004). *Management of Phytophthora Dieback in Extractive Industries: Best Practice Guidelines.* Dieback Working Group, www.dwg.org.au.

Moore, S., Cavana, M., Gillen, K., Hart, C., Hopper, S., Orr, K., & Schmidt, W. (1991). *Fitzgerald River National Park Management Plan 1991-2001.* Department of Conservation and Land Management, Perth.

South Coast NRM (2009). *Managing External Dieback Threats to the Fitzgerald River National Park.* Prepared by Steady State Consulting (Viv Read) for South Coast NRM Inc.

ATTACHMENT 1: Example of Hygiene Plan

PHYTOPHTHORA SPP. HYGIENE PLAN

ALBANY DISTRICT PLAN

IDENTIFICATION NUMBER:

Type and Extent of Work:

Foot only pre-construction activities for recreation sites upgrade of the recreations sites along Hamersley Drive and Hamersley Inlet Road within the Fitzgerald River National Park (FRNP) as part of the Fitzgerald Improvement Project.

- General access e.g. project management, Landscape Architecture, project teams
- biological surveys i.e. flora, fauna, dieback,
- Aboriginal heritage surveys.

This will cover on-foot pre-construction activities at the recreation sites along Hamersley Drive and Hamersley Inlet Road as shown on Map 1.

Region: South Coast Region

District: Albany **Tenure: Fitzgerald River National Park**

Plan prepared by: **Janet Newell**

(PRINT NAME) **(SIGNED)** **(DATE)**

OBJECTIVE : To manage access and hygiene to ensure human activities are an inconsequential vector for establishment of new centres of infestation in *Phytopthora spp.* free "protectable" areas.

'PROTECTABLE' AREAS AND THEIR BOUNDARIES :

The occurrence of *Phytophthora spp.* and the "protectable" areas are recorded on Map No. attached.....

(Accredited Regional Interpreter) (SIGNED) (DATE)

Greg Freebury

Disease boundary checks are due on: November 2010

Re-mapping of disease occurrence is due on: November 2012

Summary of current infestations:

See attached map 2 for details: Current information suggests that the recreation sites in south eastern Fitzgerald River National Park are free of *Phytophthora cinnamomi.*

There are infestations of *P. megasperma* along Hamersley Drive and the road to West Beach and *P. multivora* sampled from Hamersley Drive. So these roads are to be accessed during dry conditions only, when soil does not adhere to vehicles.

ACCESS CONTROL AND HYGIENE MEASURES:

a) List the access control and hygiene measures required to minimise human vectoring of *Phytophthora spp.* into the "protectable"' areas, &

b) Prepare and attach a *Phytophthora spp.* Hygiene Management map that records the details specified in this plan.

HYGIENE MEASURES (What will be done)	LOCATION (Use legend in management guidelines)	WHEN (Target date)	WHO (Name of the accountable person for each task)	COMPLETED (Date and Initials)
1. Hygiene				
1.1 areas where "clean on entry" rule is to apply.	Fitzgerald River National Park			
1.2 areas where clean on entry & "no soil movement" is required.	All vehicles equipment and boots will be free of adhering soils and vegetation prior to arrival at FRNP. All boots and equipment are to be cleaned and sprayed with methylated spirits before and after entering vegetation from the road.			
1.3 Split-phase activities required - **front barrier** - **rear barrier** **1.4 Areas adjacent to "protectable" use uninfested materials**	Suggestion: When soil moist, wear heavy duty plastic bags over boots to prevent soil being caught in boot trends,			
1.5 "Wash down" or				

HYGIENE MEASURES (What will be done)	LOCATION (Use legend in management guidelines)	WHEN (Target date)	WHO (Name of the accountable person for each task)	COMPLETED (Date and Initials)
"Brush down" points (specify)	then plastic bag can easily be cleaned. N/A Wash down points for vehicles at Albany or Hopetoun car washes and Barrens Beach Ranger Station. All boots and tools are to be cleaned of soil and vegetative matter and sprayed with methylated spirits prior to entry to FRNP and between recreation sites.			
2. Roads 2.1 Roads to be closed permanently before other activities commence.	Hamersley Drive will be closed following rainfall events of greater than approx. 10mm. Advice on road condition to be obtained from Park Ranger.			

HYGIENE MEASURES (What will be done)	LOCATION (Use legend in management guidelines)	WHEN (Target date)	WHO (Name of the accountable person for each task)	COMPLETED (Date and Initials)
2.2 Roads to be closed as part of the activity. 2.3 Roads to be closed immediately after other activities are completed. 2.4 New roads/walktrails - Split phase method of road construction to be used - **clean on entry** - **uninfested raw materials to be used** 2.5 Culvert, bridge or cause-way needed to assist being clean on entry				
3. Entry Points 3.1 Gates required 3.2 Daily gate	Not applicable			

HYGIENE MEASURES (What will be done)	LOCATION (Use legend in management guidelines)	WHEN (Target date)	WHO (Name of the accountable person for each task)	COMPLETED (Date and Initials)
closure required 3.3 Signs required 3.4 Turn around point required for trucks 3.5 Cleandown point to be constructed				
4. Briefings required	All personnel must have completed the Green Card induction before entering working in the National Park. All personnel are to be briefed on location of wash down facilities.			
5. Other – specify	Review this pre-construction hygiene plan and develop a hygiene plan for the construction phase			

***PHYTOPHTHORA SPP.* HYGIENE PLAN RECOMMENDED FOR APPROVAL :**

Attachments: Tick (✓) the items that have been completed and attached

Phytophthora spp. Hygiene Management Map	☐
Phytophthora spp. Occurrence Map	☑
Phytophthora spp. Protectable Area Map	☐
Record of entry into a "protectable"' area	☐
Sign Management Checklist	☐

District *Phytophthora* Management Coordinator :

(PRINT NAME) (SIGNED) (DATE)

APPROVAL

I certify that this *Phytophthora spp.* Hygiene Plan adequately protects the nominated areas and that the hygiene measures can be uniformly applied for all activities within the "protectable" areas. This plan is approved for implementation.

Regional Leader Nature Conservation: DEON UTBER

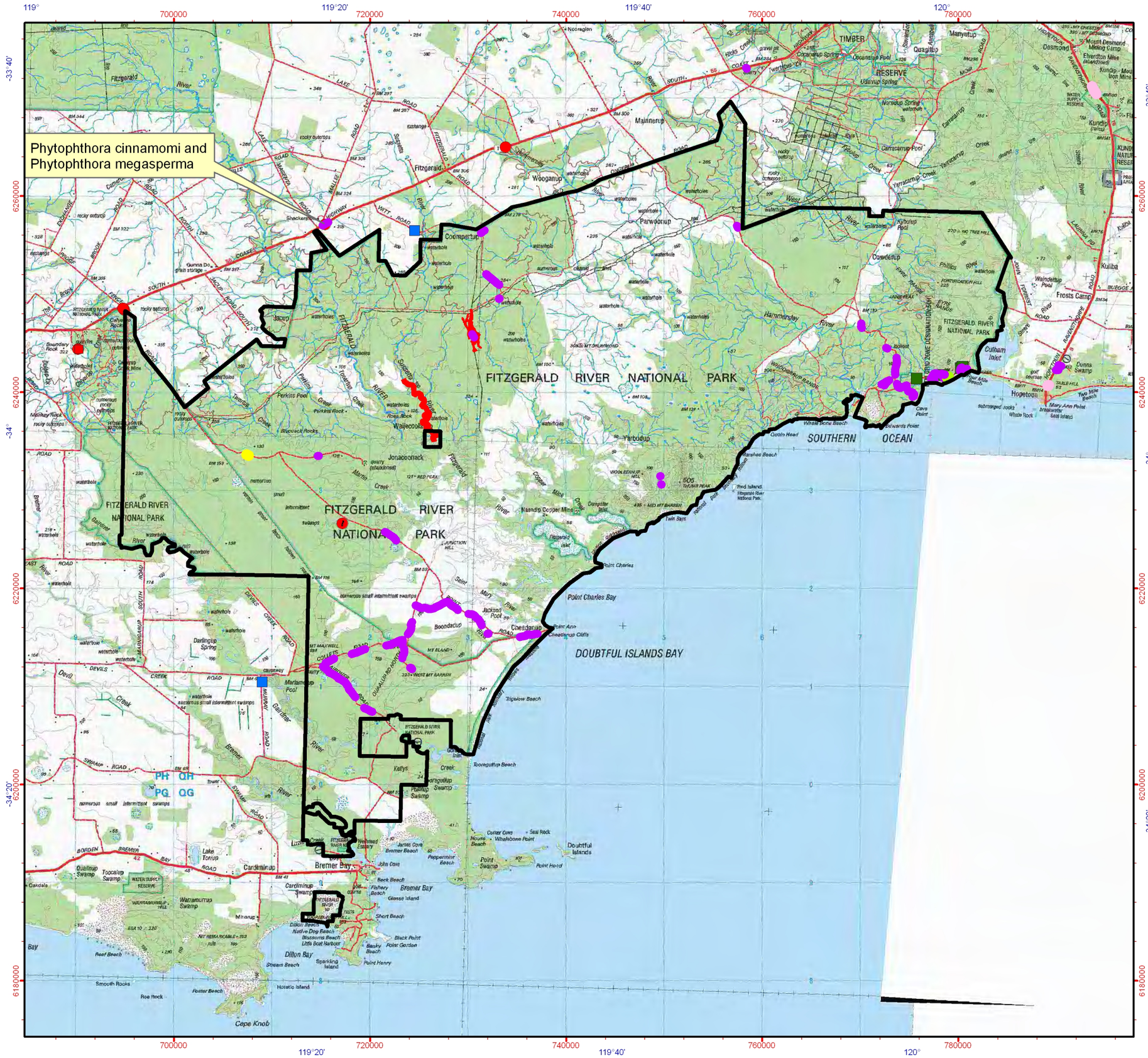
(SIGNED)

(DATE)

District Manager: MIKE SHEPHARD

(SIGNED)

(DATE)



Fitzgerald River National Park

Legend Known Phytophthora @ March 2010

FRNP_Boundary

all_phytophthora_frnp_mjg18042010

PHYTO_SPP

- P citricola
- P megasperma
- Phytophthora nicotianeae
- Phytophthora sp 9
- Pabelup_pc_2009
- Bell Track_Pc_2009
- FRNP_Phytophthora_cinnamomi_2010
- Suzetta_pc_2009
- CINNAMOMI
- CRYPTOGEA
- MULTIVORA

Note: Symbology is indicative of Phytophthora locations and generally symbols are much larger than actual infestations on the ground. This is to allow for small infestations to be viewed at this scale.

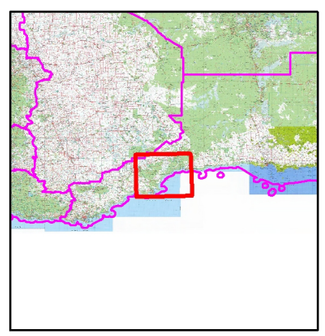
N

1:393,000 (A3)

0 3.75 7.5 15 22.5 30

Kilometers

Projection: Universal Transverse Mercator
MGA Zone 50. Datum: GDA94



Department of Environment and Conservation
Our environment, our future

Produced under the Direction of
Keiran McNamara
Director General, Department of
Environment and Conservation

Graticule shown at 20 minutes intervals
Grid shown at 20000 metre intervals

Produced at 10:12am, on April 19, 2010

NRG CONSULTANCY

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Survey for Dieback Disease caused by *Phytophthora cinnamomi* on Hammersly Drive Fitzgerald River National Park Spring 2009 for Main Roads Department Great Southern Regional Office

1 Introduction

1.1 Background

Dieback disease caused by the pathogen *Phytophthora cinnamomi* is a major threat to the biodiversity of south-western Australia. The spread of this water mould is facilitated by the movement of soil infested with spores, particularly under warm, moist conditions. Consequently, a major component is the strategy to constrain this disease involves managing access and soil-disturbance activities within native vegetation. Knowledge of the occurrence of the disease in the landscape is therefore an essential prerequisite to formulating suitable hygiene management practices.

1.2 Location of area surveyed and Dates of the survey for Dieback Disease

The survey for the presence of Dieback disease was undertaken along the eastern end of Hammersly Drive within the Fitzgerald River National Park from Hammersly Inlet road junction east to the start of the bitumen seal at East Mt Barren, Hammersly Inlet road, West Beach road and East and West Mylies roads.

The survey commenced on the 15th September and finished on the 29th September 2009

1.3 Historical Land Use and Past Disturbances

The above mentioned roads were historically established as four wheel drive access tracks into the Crown lands that in the early 1970's were gazetted as the Fitzgerald River National Park. Many of these tracks were established in the 1920's and have been regularly used in all weather conditions over the many years.

In the late 1970's and early 1980's the National Parks Board commenced rationalising the road network in the National Park, realigning many sections and sheeting portions of the road network with gravel sourced from within the National Park.

Major road gravel sheeting and realignment programs were then undertaken by the Department of Conservation and Land Management in the mid 1980's again using gravel sourced from within the National Park. This program of gravel sheeting and upgrading the standards of the road surfaces continues to this day across the entire National Park.

Dieback Disease Hygiene protocols for such major soil moving operations commenced with the first of the operations being supervised by the Department of Conservation and Land Management staff. Fortunately the early National Parks Board operations were undertaken in summer months for ease of operational delivery and this factor may have well contributed to reducing the risk of introducing the soil borne pathogen with these historical operations.

Unfortunately recent lapses in attitudes about dieback disease hygiene by the now Department of Environment and Conservation has seen a major road re sheeting and realignment operation on Hammersly Drive around East Mt Barren being undertaken in the middle of the very wet Spring of 2008 in conditions that were high risk for the introduction and spread of Dieback disease.

These sorts of lapses in hygiene standards pose significant threat to the nature conservation values of this incredible National Park. In addition there has now been a period of below average rainfall for the last eighteen months since this operation. There exists the potential for disease propagules to have been introduced during this operation and without the necessary suitable climatic conditions having prevailed over the last eighteen months these propagules may yet have not germinated and established a disease centre.

1.3 Historical Knowledge of Phytophthora species in the Eastern portion of Fitzgerald River National Park

There have been numerous dieback disease survey efforts to date in the eastern portion of the Fitzgerald River National Park having been undertaken by staff from the Department of Conservation and Land Management and the Department of Environment and Conservation. These surveys have either been undertaken in advance of planned road upgrade operations, car park upgrades, patch gravelling - re sheeting operations and or opportunistically when climatic factors have created suitable conditions for the germination, spread and demise of native vegetation susceptible to Phytophthora species.

To date there has been no positive recoveries of *Phytophthora cinnamomi* from any samples taken in the eastern end of the Fitzgerald River National Park.

There has been however an extensive outbreak of *Phytophthora megasperma* in 1988, 1992 and again in 1995 following above average and short duration rainfall events. These disease outbreaks resulted in considerable demise of susceptible native vegetation at the time of epidemic. However once the landscape dried out and the epidemic ceased there was no annual outbreaks following winter rainfall which is unlike the normal behaviour of *Phytophthora cinnamomi.*

It is now impossible to map the extent of the *Phytophthora megasperma* outbreak in the field as disease killed plants have collapsed and infested sites have returned to a relatively "healthy" situation.

2. Methods

2.1 Interpretation

Interpretation of roads and tracks followed the standard methods and operating procedures described in the document titled "Volume 2 - *Phytophthora cinnamomi* and disease caused by it: Interpreter guidelines for detection, diagnosis and mapping" (CALM 2001).

This survey was undertaken along both sides of the

- eastern end of Hammersly Drive within the Fitzgerald River National Park from Hammersly Inlet road junction east to the start of the bitumen seal at East Mt Barren,
- Hammersly Inlet road,
- West Beach road and
- East and West Mylies roads.

My survey technique was to walk both sides of the above mentioned roads, the road side drains and areas down slope of these searching for any evidence of dead and or dying native vegetation known to be susceptible to *Phytophthora cinnamomi*.

This survey technique improves the opportunity to locate symptoms of dieback disease that may be attributable to *Phytophthora cinnamomi*, particularly in those areas where the landscape has been recently burnt and the dieback susceptible native vegetation species are only small in stature and not easily identified from within a motor vehicle.

2.2 Soil and Tissue Sampling

Twenty four soil and tissue samples associated with dead and dying and native vegetation were taken within the survey effort to confirm absence and or presence of *Phytophthora cinnamomi*. All sample location points were captured using a Gobal Positioning System (GPS) hand held unit.

These soil and tissue samples were taken forwarded to the Department of Environment and Conservations Vegetation Health Service Laboratories in Kensington where diagnostic baiting was conducted.

3. Results

3.1 Disease Distribution

- **Hammersly Drive**

20 soil and tissue samples were collected from road side drains and the road side along Hammersly Drive in this survey effort. No samples returned positive to the presence of *Phytophthora cinnamomi* taken along Hammersly Drive. Four samples returned positive to the presence of *Phytophthora multivora* and one sample has returned positive to a new yet to be named species of Phytophthora.

The native vegetation along this section of Hammersly Drive can be divided into two levels of interpretability based upon the age since last being burnt by fire. The vegetation around the eastern side of East Mt Barren and from West Beach Road to Hammersly Inlet Road junction is mature and was last burnt in December 1997. The native vegetation within these areas is mature in stature with average Banksia and Hakea plants being about 1m to 1.5m in height and as a result is readily interpretable for the symptoms of dieback disease.

The native vegetation at the eastern end of Hammersly Drive and from the tight bend overlooking Mylies Beach west to West Beach road junction was last burnt in September 2006. This vegetation is now only 4 years old and is still less than 50 cm in height. In these situations where there native susceptible plants are small in stature it is very important to walk the area being interpreted for the presence of dieback so as to ensure that all dead and dying plants that may have been affected by the pathogen can be identified. Fortunately in this landscape there are numerous healthy grass trees, *Xanthorhoeae platyphylla*, that provide very important supporting evidence on the absence of *Phytophthora cinnamomi* along the road sides and road side drains.

- **Hammersly Inlet Road**

1 soil and tissue samples were collected from road side drains and the road side along Hammersly Inlet road. No samples returned positive to the presence of *Phytophthora cinnamomi* taken along Hammersly Inlet road.

The native vegetation along this section of Hammersly Inlet road is mature and was last burnt in December 1997. The native vegetation within these areas is mature in stature with average Banksia and Hakea plants being about 1m to 1.5m in height and as a result is readily interpretable for the symptoms of dieback disease.

- **West Beach Road**

3 soil and tissue samples were collected from road side drains and the road side along West Beach road. No samples returned positive to the presence of *Phytophthora cinnamomi* taken along Hammersly Inlet road.

The native vegetation along the first section of West Beach road is now only 4 years old having been burnt in September 1996and is still less than 50 cm in height. In these situations where there native susceptible plants are small in stature it is very important to walk the area being interpreted for the presence of dieback so as to ensure that all dead and dying plants that may have been affected by the pathogen can be identified. Fortunately in this landscape there are numerous healthy grass trees, *Xanthorhoeae platyphylla*, that provide very important supporting evidence on the absence of *Phytophthora cinnamomi* along the road sides and road side drains.

The native vegetation along the final portion of West Beach road into the West Beach car park is mature in age being last burnt in December 1997 and as a result the Banksia and Hakea heaths are readily interpretable for the presence of *Phytophthora cinnamomi.*

- **East Mylies Road**

No dead and dying native vegetation susceptible to *Phytophthora cinnamomi* was observed on the sides of the road or up road side drains and so no soil and tissue samples were collected from along East Mylies road.

The native vegetation along East Mylies road is now only 4 years old having been burnt in September 1996 and is still less than 50 cm in height. In these situations where there native susceptible plants are small in stature it is very important to walk the area being interpreted for the presence of dieback so as to ensure that all dead and dying plants that may have been affected by the pathogen can be identified. Fortunately in this landscape there are numerous healthy grass trees, *Xanthorhoeae platyphylla*, that provide very important supporting evidence on the absence of *Phytophthora cinnamomi* along the road sides and road side drains.

- **West Mylies Road**

No dead and dying native vegetation susceptible to *Phytophthora cinnamomi* was observed on the sides of the road or up road side drains and so no soil and tissue samples were collected from along West Mylies road.

The native vegetation along West Mylies road is now only 4 years old having been burnt in September 1996 and is still less than 50 cm in height. In these situations where there native susceptible plants are small in stature it is very important to walk the area being interpreted for the presence of dieback so as to ensure that all dead and dying plants that may have been affected by the pathogen can be identified. Fortunately in this landscape there are numerous healthy grass trees, *Xanthorhoeae platyphylla*, that provide very important supporting evidence on the absence of *Phytophthora cinnamomi* along the road sides and road side drains.

4. Recommendations

4.1 Hygiene Management

This survey has been undertaken in advance of plans by the State Government to upgrade Hammersly Drive into Hammersly Inlet and including West Beach, East and West Mylies access roads into a road with a bitumen sealed road surface.

Given the scale of such a planned operation, hygiene planning to avoid accidental introduction of the pathogen *Phytophthora cinnamomi* is paramount and will require careful monitoring and supervision for compliance with all key attributes of such a plan.

4.2 General Recommendations

- **Vehicle Hygiene**

All machinery, such as light vehicles 2wd and 4wd, bob cats or similar, trucks, bucket loaders, graders, dozers, rollers and post hole boring equipment will be required to be washed down prior to entry into the National Park so as to be free of all adhering soils and vegetation matter.

It is recognised that many light and some heavy earth moving machinery that will be returning to Hopetoun town site at the end of each days operations. Given that the road is sealed into Hopetoun it is not considered necessary to wash down the vehicles prior to their return into the National Park, as long as these vehicles have not access any other gravel roads during their absence from the Park.

It is considered the Hopetoun Carwash facility will meet the requirements to successfully clean light and heavy machinery down prior to access and commencement of operations within the National Park.

- **Operations during and post rainfall**

Should rainfall occur during the road construction operation it is important to manage vehicle hygiene so as to not accidentally introduce and or spread the pathogen within the National Park.

It has been historically recognised that the gravel road surface becomes very sticky, with road surface soils adhering to the underside of vehicles and so hygiene becomes difficult to manage when greater than 7.5mm of rain has fallen in one event and or 100 mm in combined events occurs.

It is recommended that all operations temporarily cease until the road running surfaces dry out to permit hygienic access and operations.

- **Basic Raw Materials source for road upgrade**

It is strongly recommended that all materials being sourced for use in the construction of road upgrade are free of Phytophthora propagules and have been sampled to confirm this disease free status. This includes all gravels soils, all sand soils and any rock, crushed or otherwise that may contain soil materials being brought into the National Park.

- **Road side spoil Management**

In the event that road side spoil is produced in greater quantities than will be used on the direct road side shoulder for base material and is required to be removed from the site it is strongly recommended that this material is not available for relocation and use within any section of the remainder of the planned road upgrade.

It is recommended that this surplus road side spoil be relocated to a known Phytophthora megasperma infested site in the lower reaches of the Hammersly Inlet road gravel pit.

5.0 Conclusion

The Spring 2008 upgrade operation on Hammersly Drive around East Mt Barren has posed an considerable dilemma in ascertaining the disease status of Hammersly Drive.

It must be recognised that there is still a considerable element of uncertainty with the disease status of this section of Hammersly Drive given the below average rainfall experienced since this operation that has yet triggered the potential for disease germination and expression within the susceptible native flora.

At this point in time the survey and sampling effort can confirm the *Phytophthora cinnamomi* free status of the road side native vegetation along Hammersly Drive from the East Mt Barren walk trail car park west to Hammersly Inlet road junction, East Mylies, West Mylies and West Beach roads.

Basic vehicle and soil moving equipment hygiene conditions need to be imposed and complied with during the entire operation. All operations need to comply with the shutdown after a single greater than 7.5 mm rainfall or combined greater than 10mm rainfall event situations. This shutdown will be required for the period of time until the road surface has dried to the extent that surface soils are not being picked up on the under bodies of motor vehicles.

Once early winter rains arrive it is paramount that the operation cease and that the operation only recommences once the risk of spring rainfall has ceased.

Dieback Survey Sample Location Points Hammersly Drive Hammersly Inlet Road, West Beach Road and East and West Mylies Roads

Sample Location Points FRNP Spring 2009.shp

2 0 2 4 Kilometers

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Phytophthora megasperma Infestation along Hammersly Drive as mapped in 1994