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
	Greg Freebury
Map Expiry Date (recheck date)	**4/12/2012**

ALBANY DISTRICT
Department of Environment and Conservation
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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.

6 References

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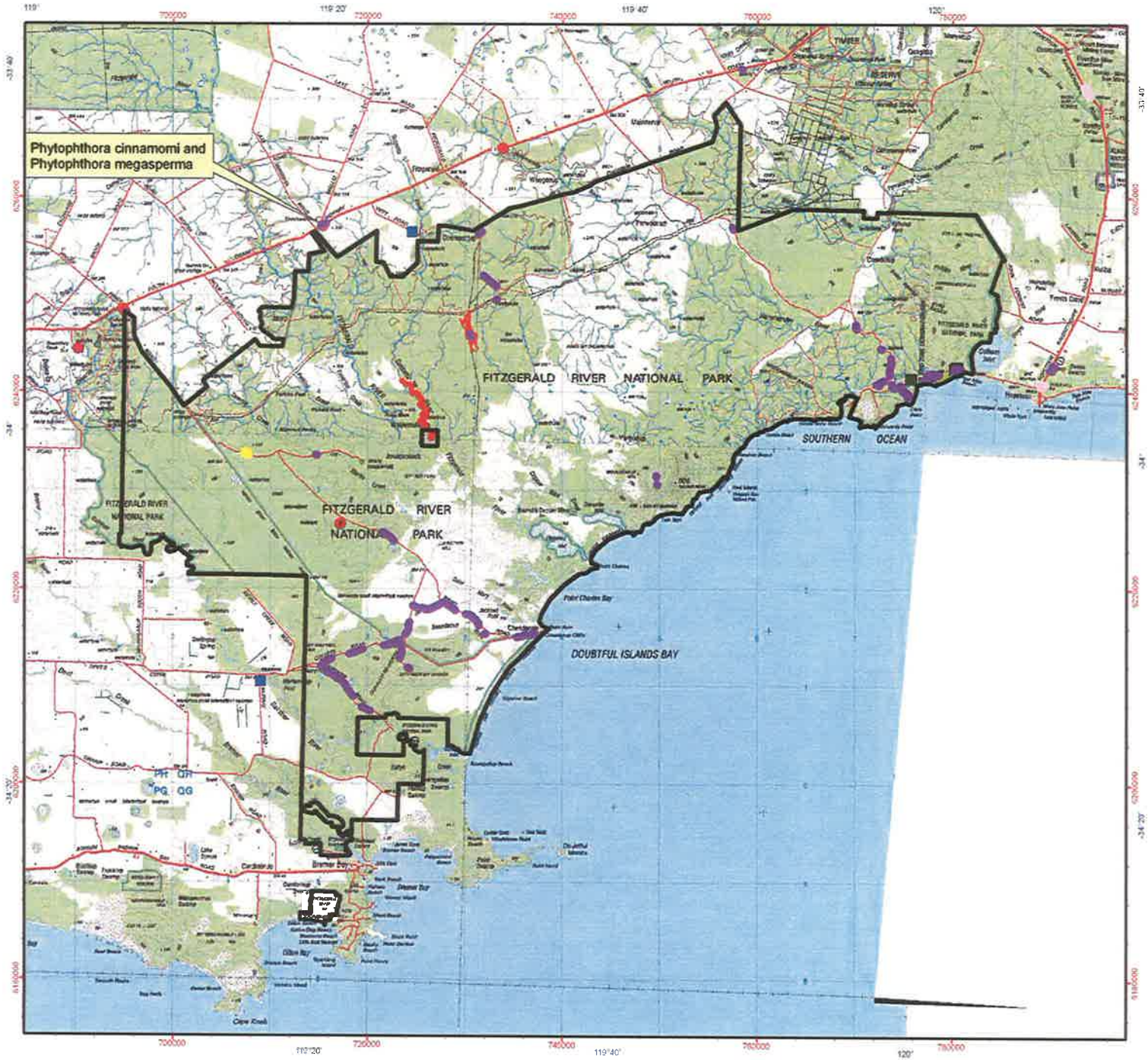
Muir G. 2009. Standard Dieback Signage Protocol – For the use of Standard Phytophthora Dieback Signage on all land tenures in Western Australia. Unpublished report.



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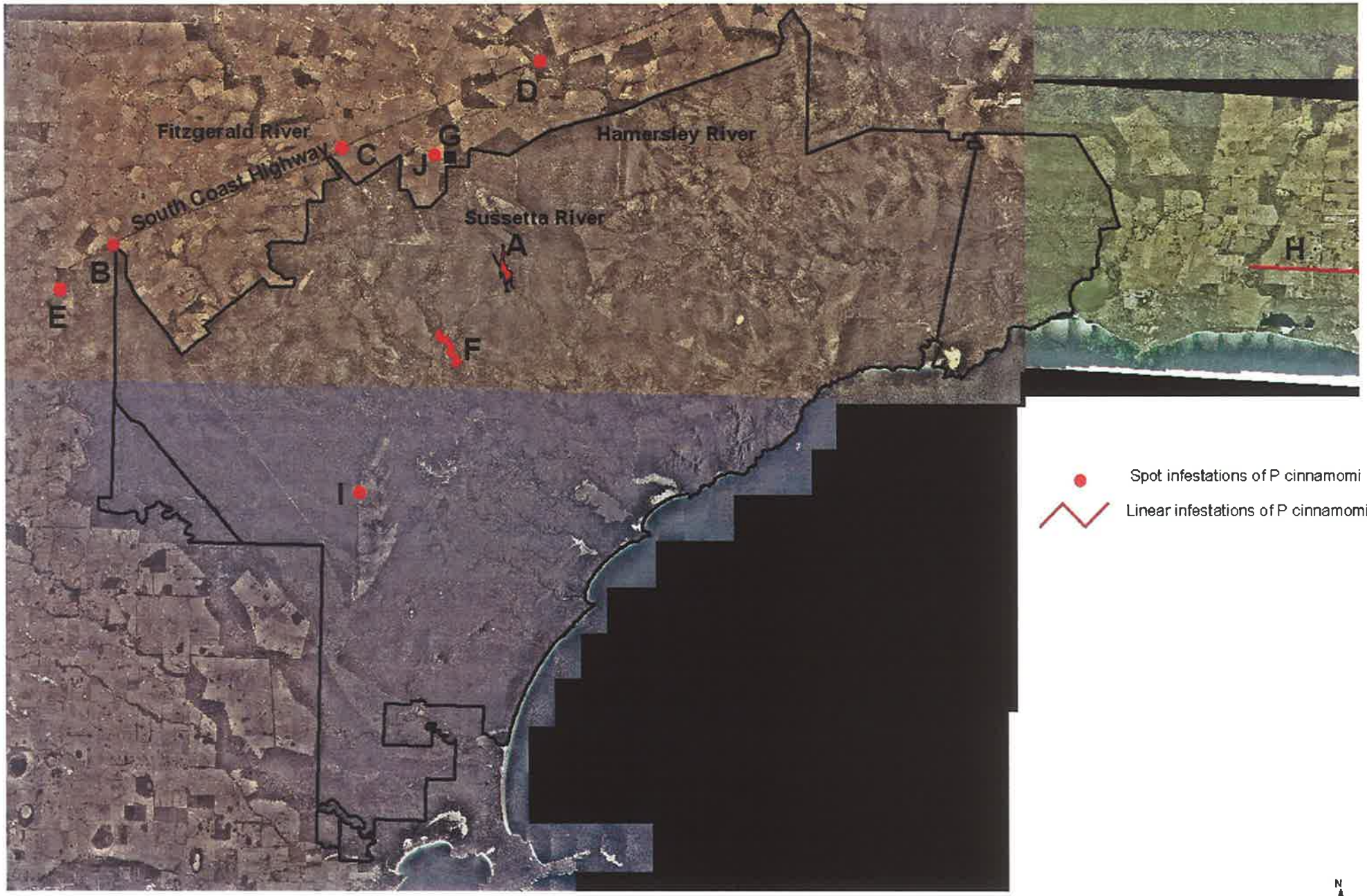
Produced under the Direction of
Keiran McNamara
Director General. Department of
Environment and Conservation

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

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

Phytophthora cinnamomi Occurences Within and Surrounding Fitzgerald River National Park November 2009



A - Bell Track FRNP B- Jacup Ranger Station C- Mallee Road jct South Coast Highway D- Hamersley River Crossing South Coast Highway E- Mains Roads Department Gravel Reserve
F- New infestation Sussetta River Valley FRNP G- Old Ongerup Road Crossing Sussetta River repaired using gravel from E post January 2006 Flood damage
H - Springdale road I- Paebulup Drive infestation Fire ? Feb 2003 J - WIN road infestation