

Phytophthora Dieback Assessment Report

Minninup Pool Project Development Investigation Area (DIA)

A report prepared for the: Shire of Collie, Western Australia

December 2021



What is Phytophthora Dieback?

Phytophthoras are a group of microscopic soil-boil water moulds that can survive in soil, water and organic material. They can infect the roots of susceptible plants causing them to rot so they cannot effectively uptake water and nutrients. This contributes to infected plants dying-back! Some Phytophthoras are native. Others have been introduced like *Phytophthora cinnamomi* that means 'plant destroyer' in ancient Greek and this species has been found extensively in the greater Collie area.

The greatest plant disease threat to biodiversity conservation (DPaW, 2015)

Phytophthora Dieback threatens biodiversity, placing important flora and fauna species at risk of death or extinction. We are very concerned about how many plant species it can kill. Approximately 40% of the flora species in vulnerable areas of the South West Botanical Province (an International Biodiversity Hotspot!) can be negatively impacted. The impacts of this disease can be severe affecting ecosystem health, biodiversity, flora and fauna habitat and survival, cultural heritage and amenity; with significant financial costs to government, industries and landholders in mitigating its spread and impacts.

Phytophthoras spread easily when their spores in soil, water or organic material are carried on unclean vehicles, equipment, tools and footwear and deposited elsewhere. Natural spread also occurs between plants via root-root contact. Therefore, current management practices aim to prevent further spread by assessing the risks of disturbance activities, mapping disease distribution and quarantining activities and areas by applying stringent biosecurity-hygiene protocols.

Western Australia's biodiversity is unique and invaluable for current and future generations. Further research on this pathogen and its mitigation is essential and to date there has been excellent collaboration between all tiers of the Australian government, science practitioners, not-for-profit associations, affected industries and communities. But more work is needed on Environmental Biosecurity to transfer the intentions of policies and innovative science into practical applications that can be easily deployed within affected areas by affected land managers and communities.

You can help STOP Dieback's spread now by Arriving Clean and Leaving Clean!



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1. INTRODUCTION

To Shire of Collie is undertaking planning investigations for the proposed development of short-term accommodation on R34343, known locally as Minninup Pool. BARK Environmental was commissioned to re-assess the status of Dieback within the investigation area and to provide Dieback Management Plan recommendations for construction activities.

R34343 was previously assessed for Phytophthora Dieback in 2010 and the results showed extensive infested areas within and proximate to R34343 (NPC Consulting, 20210). Given the methodology for Dieback interpretation has improved since then, and the subject area contains plants susceptible to the pathogen; this 2021 assessment adds certainty to the areas Dieback status that is required to develop relevant Dieback management actions.

This report includes the methods, results, discussion and recommendations in the form of a Dieback Management Plan table. A GIS map showing the current disease occurrence is attached. This assessment was completed by Bruno Rikli, a Dieback Interpreter with 25 years of experience who is a Registered Dieback Interpreter by the Department of Biodiversity, Conservation and Attractions (DBCA, W.A.).

2. METHODOLOGY

2.1 Interpretation

Field interpretation applied the comprehensive assessment methodology described in *"Forest and Ecosystem Management Division 2015 (047), Phytophthora Dieback Interpreter's manual for lands managed by the department, Department of Parks and Wildlife, Perth, Western Australia."* (DPaW, 2015).

Presence or absence of *Phytophthora cinnamomi* ('the pathogen') was determined through field observations and soil and plant tissue sampling of dead/dying indicator plants. Non-differential, hand-held Global Positioning System (GPS) receivers were used for navigation and to assessment boundaries and waypoints with a nominal accuracy of 3 to 5 metres. Field data was mapped using GIS and current *Phytophthora* Occurrence Categories were then allocated (Table 1).

Phytophthora occurrence category	Description
Infested	Determined by a registered interpreter to have plant disease symptoms
	consistent with the presence of <i>P. cinnamomi</i> .
Uninfested	Determined by a qualified Interpreter to be free of plant disease
	symptoms which indicates the presence of <i>P. cinnamomi</i> .
Uninterpretable	Where susceptible plants are absent or too few to enable the
	interpretation of <i>P. cinnamomi</i> presence or absence.
Temporarily Uninterpretable	Area of temporary disturbance, natural vegetation is likely to recover.
Not Yet Resolved	Area where P. cinnamomi occurrence diagnosis cannot be easily made
	within the required timeframe because of inconsistent evidence.
Excluded (not coloured on figures)	Area of long-term high disturbance where natural vegetation has been
	cleared and is unlikely to recover.

Table 1: Phytophthora Occurrence Categories

2.2 Demarcation and Sampling

Boundary demarcation with flagging tapes was not applicable based on the results of this 2021 assessment.

Samples of soil and plant tissue were collected from dead or dying indicator plant species as further evidence to confirm the presence or absence of *Phytophthora* spp. All samples were processed at DBCA's Vegetation Health Service (VHS) laboratory in Kensington using diagnostic-baiting techniques.



3. **RESULTS**

3.1 **Phytophthora Dieback Occurrence Categories , Impact and Disease Expression**

Two Dieback occurrence categories have been determined over the subject area (Table 2). Figure 1 shows the spatial distribution of these two Dieback mapping categories (see attached).

Dieback occurrence category	Total Area (ha)	
Infested	24.61	
Excluded	2.48	
Total Assessment Area:	27.09	

Table 2: Total areas of Phytophthora occurrence categories mapped over R34343 (2021).

3.2 **Disease Impact and Expression**

The assessed area falls within the 'vulnerable area' of south Western Australia where disease can develop (DPaW, 2021). Disease impact at this site is Low to Moderate and is approaching an endemic status (i.e. it has been present for a very long time). The disease was primarily expressed amongst dead and dying plants in the *Banksia and Xanthorhoeacea* genus. The abundance of Banksia's also significantly reduces or is absent in some parts where it would typically occur. *Armillaria luteobubalina* (the endemic Australian honey-fungus) was observed and mapped at one point.

A portion of the completely degraded cleared foreshore was Excluded from this assessment. It was important to consider the landscape scale of known disease in this locality as its vectors include runoff through vegetated (and flooded) areas towards the Collie River, importation of untreated gravel for roading along the eastern end of Minninup Road and past disturbance activities.

3.3 Sample Results

Six samples were collected. Two tested positive for *P. cinnamomi* and four tested negative (see Appendix 1: Lab sample results sheet). All samples were purposely widely separated to give a broader perspective. It was difficult to find suitable freshly infected plants to gain positive results and many of the grass trees and Banksias had been severely damaged by past fire.

The four negative sample results were all collected from very old plant deaths where it is likely that the inoculum's viability was likely reduced to the point that standard laboratory baiting techniques could not detect the pathogen. Note, negative sample results cannot be used alone to dismiss the possibility that Phytophthora disease is present (DPaW, 2018). At this site, observable factors on site and past sampling evidence provided a strong basis to allocate the Infested category over these sampled points.

4. **DISCUSSION**

No Uninfested areas exist of a mappable size to warrant special protection.

Phytophthora Dieback caused by *P. cinnamomi* is extensive in these assessed areas. The results from this 2021 assessment are strongly supported by the previous assessment (NPC Consulting, 2010).

Despite the extensive distribution of Phytophthora disease at this site, it still contains native vegetation, habitat and important ecological functions along this section of the Collie River. Unfortunately, a common misconception about Infested sites is that further investment in Dieback management is not required – This is not the case here and the focus should be on avoiding disease spread from this site to other protectable areas particularly during construction when heavy machinery is involved. The Infested status has however simplified the attached Dieback Management Plan objectives and actions (see attached Table 3).

Overall, the plant community along this section of the Collie River has changed over time because of many factors including, but not limited to: past disturbance, intense fire damage and an abundance of non-susceptible plant species post-fire, localised soil saturation/flooding in parts and the widespread distribution of Phytophthora disease for over a decade. *Armillaria luteobubalina* (the endemic Australian honey fungus) was observed in this and the 2010 assessment, but this is common in the region and does not require specific control at this site.

A Dieback Occurrence Map has been prepared that shows disease occurrence boundaries and current/historic sample points (See Figure 1).

Thank you for your interest in managing Phytophthora Dieback. If you have any queries on this aspect, please contact me.

Regards

Bruno Rikli (BSc) DIRECTOR, BARK ENVIRONMENTAL PTY LTD Scientist, Trainer, Biosecurity & Dieback Specialist, Facilitator T 0400 208 582 E <u>barkenv@gmail.com</u> W <u>barkenviro.com</u> ARRIVE CLEAN - LEAVE CLEAN in all natural areas!



5. **REFERENECES**

BOM, 2021. Climate statistics. http://www.bom.gov.au/climate/data/

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- Dieback Working Group (DWG). 2000. Managing Phytophthora Dieback: Guidelines for Local Government.
- Keighery, B.J. 1994. Bushland Plant Survey: A Guide to Plant Community Survey for the Community. Wildflower Society of WA Inc. Nedlands, Western Australia.

6. APPENDIX A – LAB SAMPLE RESULTS

CONTACT DETAILS of sender Name: Bruno Rikli Phone No. 0400208582Email: barkenv@gmail.com Company Name: BARK ENVIRONMENTAL				GDA (I) GDA 94		Job Type (Please indicate) DBCA (C) Alcoa (A) Recoup (R) FPC Private (P) Other		VHS USE ONLY Date Processed 11/10/21 Date 18 40-21 reported 25 10 -24			NOTIFY DFWA?
VHS Identification Number (VHS USE ONLY) Date (Give location, eg. Forest Block or Shire, etc. and sample number)		Plant species sampled		Site Zone Impact 50 or 51 (2)		Map Reference (3)		Land Tenure (4)	RESULT s/s root (5)	RESULT bait (5)	
VHS 43451	7.09.21	MPS1	Xanthorrhoea preissii		L		E 420680 N 6306697		R		CHN
VHS 43452	7.09.21	MPS2	Xanthorrhoea preissil		L		E 420864 N 6306600		R		NEG
VHS 43453	8.09.21	MPS3	Xanthorrhoea preissii		L		E 420769 N 6306522		R		NEG
VHS 43454	8.09.21	MPS4	Xanthorrhoea preissii		L		E 420218 N 6306466		R		CIN
VHS 43455	8.09.21	MPS5	Banksia littoralis		L		E 419439 N 6306767		R		NEG
VHS 43456	8.09.21	MPS6	Banksia	a littoralis	L		E 419684 N 6306425		R		NEG
							E			1	
							E				

VEGETATION HEALTH SERVICE - PHYTOPHTHORA SAMPLE INFORMATION SHEET

NOTES:

NOTES:
Please tick this box if your map references are supplied in the GDA 94 standard. If not, please specify the datum used.
Site impact - Low, Moderate, or High (as in the Dieback Interpreter's Manual).
An MGA map reference with prefixes <u>must</u> be supplied for all samples.
Land Tenure - State Forest (SF), National Park (NP), Reserve (R), Westrail (W), Private (P), Gravel Pit (GP), or other. (Other - describe in comments below).
Result codes used - CIN = Phytophithrar cirmamormi, MUL = P. multivora, CRY = P, cryptogea, PI = P, inumdata, ARE = P, arenaria, ELO = P, elongata, THE = P, thermophila, = P, megasperma, PN = P, nicolianae, CON = P, constricta, ALT = P, atticola, NEG = negative, SUB = subcultured for further tests
Please Note: a), NEG results cannot be used to represent a total absence of Phytophithora in the sampled area. b). Information from your samples will be incorporated into the VHS database.

COMMENTS: All samples collected within Minninup Pool area (MP) Collie. No double-bailting requested.

PN





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DIEBACK MANAGEMENT PLAN – R34343 DEVELOPMENT AREA

The following objectives and actions table is based on the results of a Phytophthora Dieback occurrence assessment in 2021 and existing best practice in the south west region for publicly accessible natural areas. Employing these recommendations can contribute to protecting biodiversity, vegetation health, habitat and visitor experiences at this site and others. The management emphasis at this Infested site should be to reduce the risk of spreading known Phytophthora disease from this site to external vulnerable vegetated areas. This DMP will require further consideration and consultation before implementing and will compliment weed prevention during disturbance activities of the project.

Aspect	Management Objectives	Management Actions
Managing Info contractors stan distu	Inform contractors of the need to apply	Include the following Dieback Hygiene requirements in relevant contractor tender documentation:
	standard Biosecurity-Hygiene protocols for all disturbance activities within the Reserve.	Contractors undertaking disturbance activities must complete GREEN CARD training before commencement an (This is now standard practice in DMP's used in the DBCA and various industries and development
		• Apply Clean-Down before arrival and upon departure at this site (in a designated Clean Down area).
		(Clean-Down includes removal of all soil, mud, organic material and weed/seed material from vehicles, machine records of this for compliance monitoring. The Clean-Down procedure required is explained in Green Card Traini
Signage	All Dieback signage is relevant and installed	Install a Clean-Down area sign to direct contractors to a designated hardstand area.
	where Contractors/Public can easily view it.	Site Entry/Exit signage should identify the Dieback status of the area.
		Consider installing a Phytofighter1000 boot cleaning station with signage for bushwalkers exiting this Infested sit
		• If the Shire chooses to install Dieback awareness signage, apply the Dieback Signage Protocol templates (2009 g regional Dieback signage. (source: www.dwg.org.au).
		Consider adding QR codes to signage to direct visitors to helpful information such as camping/fire restrictions, Di
Access Rationalise bour management any excess vehic camp sites.	Rationalise boundaries of clearing limits and	Clearly delineate clearing limits and camping/parking areas to avoid vehicles parking on vegetation.
	any excess vehicle tracks, walking trails and camp sites.	Consider installing gates at any non-public access and install "Management access only" type of signage at these ent
		• Design roading and drainage structures to avoid ponding of water where traffic will regularly traverse.
Social media	Raise awareness of acceptable and non- permitted activities within the reserve in	• Utilise social media wherever possible such as the Shire's website, facebook, etc. to promote the Shires investment maintaining the integrity of Collie's natural areas.
	social media.	• Clearly promote the trail network in this reserve (along with any environmental requirements and laws) because maps with trail information in the public domain.
Minimise importing Basic RawMaterials	Minimise the risk of introducing pathogens	All machinery involved with carting and spreading Basic Raw Materials should be carefully managed so it is clean o
	and weeds beyond the development footprint. (Basic Raw Materials such as gravel.	• Drainage design along roads/tracks should be directed as far downslope as possible along the formation before rec
	sand and limestone may carry and spread Phytophthora spores and weeds. Within infested sites sourcing Dieback free BRM is not typically required).	• Utilise road base; and/or clean crushed brick and rubble to create hard surfaces such as along any trail entry points
Phosphite Treatment	Minimise the visual and biological impact and rate of spread of Dieback.	 Consider strategic application of Phosphite to support susceptible trees and under-storey along key access roads buffers.
		(This strategy has been used widely in the region to protect visual amenity along high visitation roads and trails).



nd provide evidence of this to Principal. ent projects. ery, tools and footwear; and maintaining ing). te. guideline) as this is considtent with other eback awareness videos, etc. try points. t into Dieback management and nany businesses now publish their own on entry/exit. directing into Infested areas or a sump. s, wet soil areas, Clean-Down points, etc. and trail routes to form treatment