

Smiths 2014 Pty Ltd

Lot 4131 Smiths Beach Road

Phytophthora Dieback occurrence assessment– Version 2.0



<i>Client</i>	<i>Smiths 2014 Pty Ltd</i>
<i>Report name</i>	<i>Lot 4131 Smiths Beach Road</i>

This report has been prepared in accordance with the scope of work agreed between Smiths 2014 Pty Ltd and Glevan Consulting and contains results and recommendations specific to the agreement. Results and recommendations in this report should not be referenced for other projects without the written consent of Glevan Consulting.

Procedures and guidelines stipulated in various manuals, particularly Phytophthora Dieback Interpreters Manual for lands managed by the Department (DBCA), are applied as the base methodology used by Glevan Consulting in the delivery of the services and products required by this scope of work. These guidelines, along with overarching peer review and quality standards ensure that all results are presented to the highest standard.

Glevan Consulting has assessed areas based on existing evidence presented at the time of assessment. The Phytophthora pathogen may exist in the soil as incipient disease. Methods have been devised and utilised that compensate for this phenomenon; however, very new centres of infestation, that do not present any visible evidence, may remain undetected during the assessment.

Executive Summary

Glevan Consulting conducted an assessment of the vegetation associated with Lot 4131 Smiths Beach Road for the presence of *Phytophthora Dieback*. The survey area is located in Yallingup, approximately 23 km west of Busselton CBD and covers an area of 40.5 ha.

The assessment was conducted on November 29, 2023 by Liam Brown of Glevan Consulting. No *Phytophthora Dieback* infestations were observed during the assessment. A single section of vegetation, comprising 0.4 ha was observed to be uninfested. The remaining 40.1 ha was classified as uninterpretable due to an insufficient coverage of reliable indicator species.

A desktop assessment of previous *Phytophthora* spp. recoveries for the area indicates that *Phytophthora* has not previously been recovered in the study area. No soil and tissue samples were taken during the assessment.

Table of Contents

1	<i>Introduction</i>	1
2	<i>Background</i>	3
3	<i>Materials and Methods</i>	4
3.1	Assessment Area	4
3.2	Assessment Method	5
3.3	Other <i>Phytophthora</i> Species	6
3.4	Collection of Evidence of <i>Phytophthora</i> Dieback	6
3.5	Determining Protectable areas	7
4	<i>Results</i>	8
4.1	<i>Phytophthora</i> Dieback Occurrence	8
4.2	Disease Symptoms and Expression	8
4.3	Other <i>Phytophthora</i> Species	8
4.4	Armillaria Root Disease (ARD)	8
4.5	Sample Results	9
5	<i>Discussion</i>	10
6	<i>Bibliography</i>	11
7	<i>Appendices</i>	12
7.1	<i>Phytophthora</i> Dieback Occurrence Map	12
7.2	Mapping Metadata	12
7.3	Shapefile Spatial Data	13

List of Figures

Figure 1 - Assessment Area Location.....	2
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List of Tables

Table 1 - Keighery Vegetation Condition Scale4

Table 2 - Phytophthora Dieback assessment for vegetation condition5

Table 4 - Results Summary of Assessment Area.....8

1 Introduction

Glevan Consulting was commissioned by JSB&G to conduct an assessment of the vegetation associated with Lot 4131 Smiths Beach Road for the presence of Phytophthora Dieback. The assessment was conducted on November 29, 2023 by Liam Brown of Glevan Consulting.

The survey area is located in Yallingup, approximately 23 km west of Busselton CBD and covers an area of 40.5 ha (Figure 1).



Figure 1 - Assessment Area Location

2 Background

Thousands of Australian native plant species are susceptible to Phytophthora Dieback—a destructive disease caused by the pathogen *Phytophthora cinnamomi* and other *Phytophthora* species. This disease is a major threat to Australia’s biodiversity, placing important plant species at risk of death, local extirpation or even extinction. Its dramatic impact on plant communities can also result in major declines in some insect, bird and animal species due to the loss of shelter, nesting sites and food sources. *Phytophthora* Dieback can cause permanent damage to ecosystems. Once an area is infested with the pathogen, eradication is usually impossible. Awareness that human activity can easily spread the pathogen will help prevent an increase in the extent of this disease (Commonwealth of Australia, 2018)

Phytophthora spp. are a group of microscopic water moulds that belongs to the class Oomycetes. Oomycetes organisms are filamentous and absorptive and reproduce both sexually and asexually. *Phytophthora* spp. are considered parasitic. The species behave largely as a necrotrophic pathogen causing damage to the host plant’s root tissues because of infection and invasion. (Department of Parks and Wildlife, 2015) The pathogen infects a host when it enters at a cellular level and damages the cell structure.

Phytophthora Dieback is the result of interaction between three physical components forming a ‘disease triangle’: the pathogen (*Phytophthora* spp.), the environment and the host. All three components are needed for the disease to develop over time. The relationship between the presence of *Phytophthora* spp. and the development of *Phytophthora* Dieback disease is variable and based on the susceptibility of native plant species and the different environmental characteristics, landform types and rainfall zones across bioregions.

Armillaria Rot Disease (ARD) is a pathogen frequently encountered during *Phytophthora* Dieback assessments. It is caused by an indigenous fungus which is endemic to the south-west of Western Australia, occasionally presenting symptoms consistent with *Phytophthora* Dieback presence. The impact of the fungus on the vegetation may range from single dead plants to complete devastation of understorey and overstorey species.

3 Materials and Methods

3.1 Assessment Area

As per DPAW (2015), areas within a project's development envelope are excluded from assessment if the vegetation is suffering from significant disturbance. Significant disturbance is based on Vegetation Condition Scale (Keighery, 1994) shown in Table 1. Any remaining area, including the area outside of the development envelope if necessary, is categorised post-assessment into Phytophthora Dieback occurrence categories (Table 2, Map 1).

Table 1 - Keighery Vegetation Condition Scale

Scale		Vegetation condition
1	Pristine	Pristine or nearly so; no obvious signs of disturbance.
2	Excellent	Vegetation structure intact; disturbance affecting individual species and weeds are non-aggressive species.
3	Very good	Vegetation structure altered; obvious signs of disturbance. For example, disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and grazing.
4	Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. For example, disturbance to vegetation structure caused by very frequent fires, the presence of some very aggressive weeds at high density, partial clearing, dieback and grazing.
5	Degraded	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. For example, disturbance to vegetation structure caused by frequent fires, the presence of very aggressive weeds, partial clearing, dieback and grazing.
6	Completely degraded	The structure of the vegetation is no longer intact, and the area is completely or almost completely without native species. These areas are often described as 'parkland cleared' with the flora comprising weed or crop species with isolated native trees or shrubs.

Table 2 - Phytophthora Dieback assessment for vegetation condition

Vegetation Condition	Phytophthora occurrence category
Naturally vegetated areas. Keighery disturbance rating of 3 or less. Phytophthora occurrence categorisation is possible.	Infested - Determined to have plant disease symptoms consistent with the presence of <i>Phytophthora cinnamomi</i> .
	Uninfested - Determined to be free of plant disease symptoms that indicate the presence of <i>P. cinnamomi</i>
	Uninterpretable - Undisturbed areas where susceptible plants are absent, or too few to make a determination of the presence or absence of <i>P. cinnamomi</i> .
	Not yet resolved.
Vegetation structure temporarily altered.	Temporarily Uninterpretable - Areas of disturbance where natural vegetation is likely to recover.
Vegetation structure severely altered. Keighery disturbance rating 4 or greater. Phytophthora occurrence assessment is not possible	Excluded.

3.2 Assessment Method

All Phytophthora Dieback detection, diagnosis and mapping are performed to standards and procedures defined in *FEM047 Phytophthora Dieback Interpreter's Manual for lands managed by the department* (DPAW 2015), Chapter 6. These procedures are grounded on the presence of indicator species in the vegetation, and the observance of deaths in these plants. An indicator species is a plant species that is reliably susceptible to *Phytophthora cinnamomi*. Indicator Species Deaths (ISDs) alone do not necessarily indicate disease presence and it is necessary to consider all environmental and ecological factors that may be present. These other factors (as listed in FEM047) include:

- Chronology of deaths;
- Pattern of deaths;
- Topographical position;
- Vectoring – causal agencies, and;
- Biomass and biological diversity reduction.

Other causes of plant deaths need to be considered when determining the presence of Phytophthora Dieback, including (from FEM047):

- *Armillaria Root Disease*
- various cankers;
- insects;
- drought, wind scorch and frost;
- salinity and waterlogging;
- fire and lightning;
- senescence and competition;
- physical damage, and;
- herbicides and chemical spills.

For the majority of the assessment, the assessment type used was the comprehensive type (featuring transect lines) using standards defined by Chapter 8, FEM047. Prior to assessment, all information relevant to the project was assembled to assist the interpretation process (as defined in Chapter 7, FEM047). This information included previous assessments of the area, history of burning and possible other disturbances.

3.3 Other *Phytophthora* Species

Phytophthora species other than *P. cinnamomi* are identified using DNA analysis by the Centre for Phytophthora Science and Management (CPSM) at Murdoch University following the identification of the presence of a *Phytophthora* species in baiting analysis performed by Vegetation Health Service (VHS) at the Department of Biodiversity, Conservation and Attractions (DBCA).

3.4 Collection of Evidence of Phytophthora Dieback

During the assessment process, the collection of evidence to support the field diagnosis was recorded using a tablet running the ESRI Collector application. Waypoints are recorded at locations to show evidence of:

- where field diagnosis is certain or almost certain of Phytophthora Dieback infestation;

- healthy indicator species where field diagnosis is almost certain of the site being uninfested;
- sites with too few or devoid of indicator species, thus supporting uninterpretable classification, or
- areas of disturbance, which are temporarily uninterpretable or excluded from assessment.

Additional waypoints recorded include:

- points requiring soil and tissue sampling;
- points located where samples have been taken;
- points located at ISDs, and
- points that need to be revisited for further examination.

3.5 Determining Protectable areas

Protectable areas will be:

- Determined to be free of the pathogen *Phytophthora cinnamomi* by a certified disease interpreter;
- Situated in areas receiving more than 600 millimetres rainfall a year or those that are water-gaining sites in the 400- to 600-millimetres a year rainfall range;
- Both positioned in the landscape and of sufficient size such that it is adjudged that the pathogen will not autonomously engulf them in the short term (greater than four hectares with an axis greater than 100 metres);
- Includes areas of high conservation and/or socio-economic value (for example, areas with a known population of a susceptible species of threatened flora), and;
- Areas where human vectors are controllable. (Department of Parks and Wildlife, 2015)

4 Results

4.1 *Phytophthora* Dieback Occurrence

No *Phytophthora* Dieback infestations were observed during the assessment. A single section of vegetation, comprising 0.4 ha was observed to be uninfested. The remaining 40.1 ha was classified as uninterpretable due to an insufficient coverage of reliable indicator species.

A desktop assessment of previous *Phytophthora* spp. recoveries for the area indicates that *Phytophthora* has not previously been recovered in the study area. No soil and tissue samples were taken during the assessment.

Table 3 - Results Summary of Assessment Area

Category	Protectable (ha)	Unprotectable (ha)	% of total area assessed
Infested		0	0
Uninfested	0.4	0	1
Uninterpretable	40.1	0	99
Excluded	0	0	0
TOTAL AREA	40.5	0	100.0

4.2 Disease Symptoms and Expression

No evidence of disease presence was observed during the assessment.

4.3 Other *Phytophthora* Species

No other *Phytophthora* spp. were identified during the assessment.

4.4 Armillaria Root Disease (ARD)

No ARD infestations were observed during the assessment.

4.5 Sample Results

No recently deceased indicator species were observed during the assessment, therefore no soil and tissue samples were taken.

5 Discussion

A significant portion (99%) of the study area was classified as uninterpretable due to an insufficient coverage of reliable indicator species. Within the uninterpretable areas, the understorey was typically very sparse or completely absent. The midstorey and overstorey were generally comprised of *Agonis flexuosa*, *Corymbia callophylla* and *Acacia* species, none of which are reliable indicator species and cannot be used to determine the Dieback status of the vegetation.

Healthy *Xanthorrhoea preissii* specimens were observed throughout many sections of the study area, however they were scattered and the coverage was inconsistent. The presence of healthy *X. preissii* specimens across much of the study area would indicate that the study area is likely to be uninfested, however due to the insufficient numbers and inconsistent coverage of this species, it is not possible to confidently classify the vegetation as uninfested. The uninterpretable vegetation has been classified as protectable.

The small uninfested section of vegetation that was observed during the assessment contains a significant number of healthy *Banksia attenuata* and *Banksia menziesii* trees. These trees are excellent indicator species and enable the Dieback status to be determined with a high level of confidence. The uninfested area is only 0.4 ha in size and as such is depicted on the occurrence map but has not been demarcated in the field. The uninfested area is not considered large enough to be treated as a separate protectable area and no additional hygiene measures are required for this area.

6 Bibliography

Commonwealth of Australia. (2018). *Threat abatement plan for disease in natural ecosystems caused by Phytophthora cinnamomi*.

Department of Parks and Wildlife. (2015). *FEM047 Phytophthora Dieback Interpreter's Manual for lands managed by the department*. Unpublished.

Keighery, B. (1994). *Bushland Plant Survey: a Guide to Plant Community Survey for the Community*. Wildflower Society of WA (Inc.).

7 Appendices

7.1 Phytophthora Dieback Occurrence Map

The provided map is the Phytophthora Dieback occurrence map.

The assessment area is displayed as a blue boundary line. The following categories are also shown (if present in the assessment area):

- Excluded (shown as uncoloured). Areas of high disturbance where natural vegetation has been cleared and is unlikely to recover to a level that is interpretable.
- Infested (shown as red). Determined from the assessment to have the plant disease caused by *Phytophthora cinnamomi*. Phytophthora Dieback caused by other *Phytophthora* species will be displayed as other colours, typically shades of orange and yellow.
- Uninfested (shown as green). Determined from the assessment to be free of plant disease Phytophthora Dieback.
- Uninterpretable (shown as purple). Undisturbed areas where susceptible plants are absent, or too few to decide the presence or absence of Phytophthora Dieback.
- Temporarily Uninterpretable (shown as grey). Areas of disturbance where natural vegetation is likely to recover.

Additional spatial data that may be shown include:

- Sample location

7.2 Mapping Metadata

DATASET DESCRIPTION	
Title	Lot 4131 Smith Beach Dieback assessment
Data Created	29-11-2023
Date Last Updated	01-02-2024
Abstract	Phytophthora Dieback Occurrence and sample location shapefiles for the Lot 4131 Smith Beach Dieback assessment.
Purpose	Dieback category boundary mapping
Document Number	GC-23-1555
Contact Organisation	Glevan Consulting
Contact Name	Simon Robinson

Contact Position	Phytophthora Dieback Interpreter
Contact Phone	0427 113 336
Contact Email	simon.robinson@glevan.com.au
Lineage	All field data recorded using ESRI Collector on a GPS enabled tablet.
Datum / Coordinate System	GDA94 Zone 50
Geographic Description	Smiths Beach, Yallingup
Restrictions	None

7.3 Shapefile Spatial Data

Spatial data is contained in the attached file named Lot_4131 Smiths_Beach_Road_Dieback_Shapefiles.zip.



**Map 1
Phytophthora Dieback
Occurrence Map**

**Lot 4131 Smiths Beach Road
JBS&G**

- Study Area
- Occurrence
- Uninfested
- Uninterpretable

Author: Simon Robinson
Date: 01-02-2024

Datum: GDA94 Zone 50
Mapping expiry: 29-11-2024

