

Phytophthora Fieldwork Hygiene Protocol 2021



Government of South Australia
Department of Primary Industries
and Regions

LANDSCAPE
SOUTH AUSTRALIA
KANGAROO ISLAND

Phytophthora fieldwork hygiene protocol

Purpose

This protocol has been developed to provide advice to people undertaking fieldwork on the practical measures to be implemented to minimise the risk of spreading *Phytophthora* on Kangaroo Island.

Implementation of this protocol will also reduce the risks associated with other biosecurity concerns, such as spreading weeds and other plant diseases.

Introduction

Phytophthora cinnamomi is a microscopic, soil and water borne organism that attacks the roots and basal stem tissue of living plants and prevents the uptake of water and nutrients by the plant, causing dieback.

Phytophthora probably arrived in Australia around the late 1800s from SE Asia. On Kangaroo Island, *Phytophthora* dieback symptoms were first observed in vegetation in the late 1980s.

Its presence on Kangaroo Island was confirmed in the early 1990s and soil testing in the late 1990s confirmed the widespread presence of *Phytophthora* along roadsides on western Kangaroo Island.



Figure 1: Multiple, adjacently located yacca showing visual signs of *Phytophthora* infection and death.

Whilst the spread and impacts of Phytophthora can be suppressed, to a degree, using phosphite treatments, there is currently no known way to eradicate Phytophthora. Once an area is infected with Phytophthora it is always infected. Preventing the spread of Phytophthora is therefore critical.

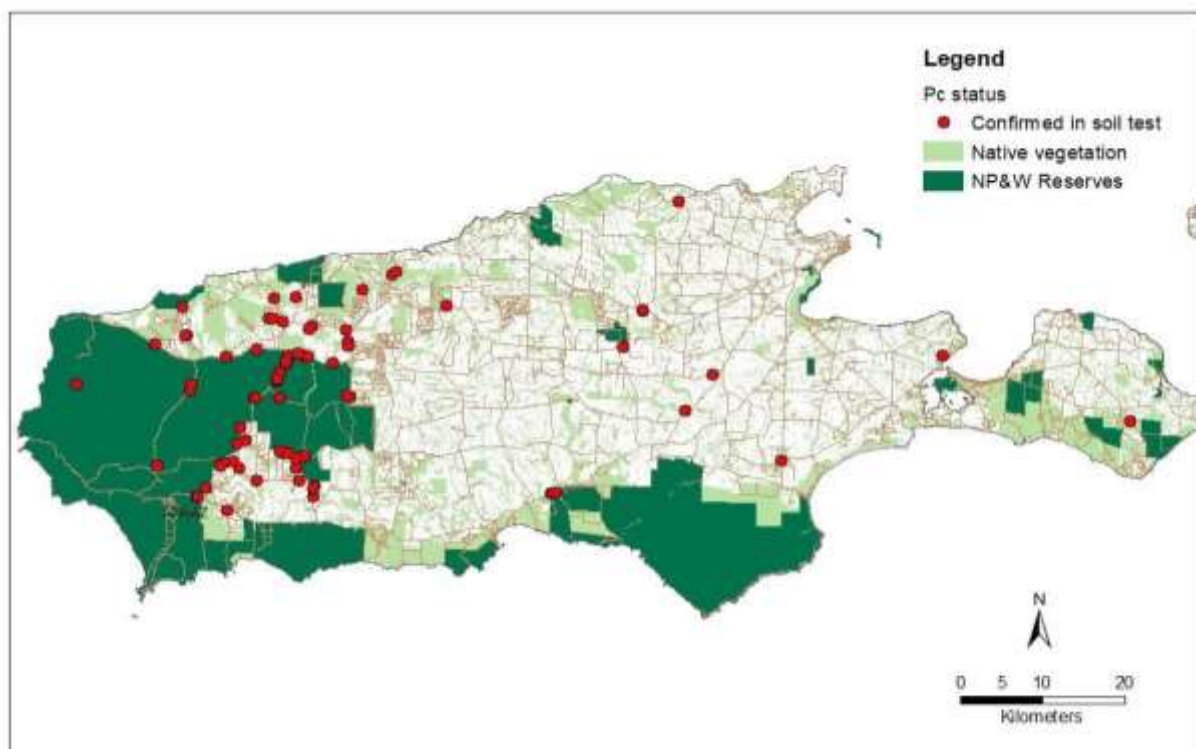
New infections of Phytophthora are mainly caused by human activities involving the movement of soil and plant material on vehicles, footwear, equipment and tools.

Preventative hygiene practices are therefore an important means of reducing the spread of Phytophthora.

The risk of Phytophthora becoming established is highest in areas with:

- Greater than 400 mm average annual rainfall
- Warm, moist conditions (optimum temperature = 15-30°C)
- Neutral to acid soils, low in nutrients and organic matter, open textured with few micro-organisms
- Poor drainage
- Plant species that are susceptible to infection.

Map of confirmed Phytophthora sites since 2016



Common signs of Phytophthora

Currently positive identification of Phytophthora requires laboratory analysis of soil samples collected from around the roots of affected plants, by qualified scientists. However, some highly susceptible plant species do display obvious signs of infection.

On Kangaroo Island, yacca (*Xanthorrhoea semiplana* ssp. *tateana*) and banksia (*Banksia marginata* and *B. ornata*) are particularly susceptible to Phytophthora. For this reason, these species can provide a good visual indicator of the presence of Phytophthora.

Disease symptoms vary between plant species. Yacca often die rapidly, within a few months, followed by structural breakdown over time, while it may take longer for other species to show visual sign of infection. In some cases, visual symptoms in susceptible plant species may take years to develop after the initial infection and may not develop until the plants are under stress.

Absence of visual symptoms of Phytophthora cannot therefore provide assurance that Phytophthora is not present.

Furthermore, laboratory analysis does not always confirm the presence of Phytophthora in soil samples even when it is present at the sampled site. If the presence of Phytophthora is suspected, the area must be treated as if Phytophthora presence has been confirmed (*Phytophthora Management Guidelines 2006*).

The presence of Phytophthora should always be suspected when a number of adjacently located individuals of a susceptible species are displaying visual symptoms of infection.

As Phytophthora is a water borne organism, individuals of a susceptible species displaying symptoms of infection will usually follow drainage lines and surface water flow paths.

People working in the field on Kangaroo Island should familiarise themselves with the signs and symptoms of Phytophthora to increase their ability to identify potentially infected areas.



Figure 2. Yacca showing signs of Phytophthora infection.



Figure 3. Banksia species showing signs of Phytophthora infection.



Figure 4 Multiple individuals of susceptible species showing signs of Phytophthora infection, with yaccas long dead.

1. General Phytophthora fieldwork hygiene protocols



1.1 Always:

- Thoroughly wash and clean vehicles on a weekly basis (including the vehicles interior, as mud and soil often collect in floor pans/mats).
- Ensure vehicles, footwear and equipment are clean and free of mud, soil and plant material on arrival and departure from a worksite (including instances when multiple properties/sites/locations are visited in a single day).
- Check records of known and suspected Phytophthora infections before undertaking field work and make sure you discuss known and suspected Phytophthora infections with property owners before undertaking field work.
- Ensure you manage your workload to allow sufficient time to implement the requirements of this protocol.

1.2 Whenever possible:

- Avoid working in areas with known or suspected Phytophthora infections.
- Avoid working in wet conditions and muddy areas.
- Avoid driving on less travelled tracks or off-road.

1.3 Travelling to and from Kangaroo Island

- Always ensure that vehicles, footwear and equipment are clean and free of soil, mud and plant material, using the cleaning procedures described below, when travelling to and from Kangaroo Island.

1.4 Vehicle use on Kangaroo Island

- Vehicle cleaning procedure **does not need** to be implemented when travel only involves driving on public roads (sealed and unsealed). **All year**
- Vehicle cleaning procedure **must** be implemented when the vehicle has been in contact with soil (not a public road surface) within 500m of locations with **confirmed** or **suspected** Phytophthora infections. **All year**
- Vehicle cleaning procedure **must** be implemented when entering and departing properties/sites/locations that are not public access or are off-road. **Winter and wet conditions**. *Note: Seek landowner permission to implement cleaning procedure on their property.*
- Vehicle cleaning procedure **must** be implemented when entering and departing less travelled tracks (e.g. no-public access).

- Vehicle cleaning procedure **must** be implemented before and after driving off-road, particularly in locations that are not accessible to the public.

1.5 Fieldwork on Kangaroo Island

- Always carry a personal Phytophthora Hygiene Kit when walking more than 500 m from vehicle. **All year**
- Always carry a personal Phytophthora Hygiene Kit in backpack when you will not be working in close proximity to your vehicle. **All year**
- Personal cleaning procedure for footwear, tools and other equipment **must** be implemented when departing a property/site/location that is within 500 m of a **confirmed** or **suspected** Phytophthora infection. **All year**
- Personal cleaning procedure for footwear, tools and equipment **must** be implemented on arrival and departure from each property/site/location. **Winter and wet conditions**



Figure 5. Using a brush to remove soil from boots to prevent *Phytophthora* spread.



Figure 6. Yacca dieback potentially due to *Phytophthora*, vicinity Scott Cove (April 2021, 15 months post-fire).

2. Personal Phytophthora hygiene kits and cleaning procedure



2.1 Personal Phytophthora hygiene kit

(footwear, tools and other equipment):

1. Self-contained tub with lid (optional: can be used as a boot bath)
2. 1 litre of Methylated Spirits/Phytoclean or another recommended Phytophthora disinfectant
3. Hoof pick and/or hard brush
4. Small spray bottle (for applying Phytophthora disinfectant)
5. Disposable gloves
6. Zip lock plastic bags (for glove disposal)

Note: Items 1. and 2. do not need to be carried when working away from your vehicle

2.2 Personal cleaning procedure

(footwear, tools and other equipment):

1. **Always** ensure you clean and disinfect vehicles **before** footwear when departing a site to avoid re-contaminating footwear during vehicle cleaning procedure.
2. Remove soil from footwear, tools and other equipment using a hard brush and/or hoof pick.
3. Disinfect the entire sole of shoe using spray bottle with disinfectant.
4. Step forward to avoid recontamination of shoe.
5. Repeat Steps 2. and 3. for the other shoe.
6. Disinfect tools and other equipment using spray bottle and disinfectant.
7. Disinfect the brush and hoof pick used to remove soil.

Note: Footwear can also be disinfected using boot-bath containing disinfectant. This is useful when large groups of people need to disinfect their footwear at one location. Make sure soil has been removed from footwear before entering boot-bath to ensure disinfectant remains activated. Do not leave boot-bath unattended where children and animals may come in contact with the chemical.

Maximum dilution rate:

- Methylated spirits = 700ml Methylated Spirits/300ml litres water
- Phytoclean = 100ml Phytoclean/1 litre water

3. Vehicle Phytophthora hygiene kits and cleaning procedure



3.1 Vehicle Phytophthora hygiene kit:

1. [Portable Self-Priming Water Pump Kit](#)

Note: This kit can be used to apply Phytophthora disinfectant but may lead to unnecessary and excessive use of disinfectant.

2. 5 L pressurised weed sprayer
3. Water container (20 litres minimum)
4. Hard brush
5. Paint scraper
6. 4 L of Methylated Spirits/Phytoclean or another recommended Phytophthora disinfectant

3.2 Vehicle cleaning procedure:

1. Always ensure you clean and disinfect vehicles **before** footwear when departing a site to avoid re-contaminating footwear during vehicle cleaning procedure.
2. Implement cleaning procedure for vehicles on or adjacent to a vehicle track/road and as close as possible to the entry/exit point.
3. Choose a suitable location, such as a large gravel area with no vegetation and away from bodies of water.
4. Remove mud and soil from vehicle using portable self-priming water pump kit (pay particular attention to the tyres, wheels, mudflaps and undercarriage). *Note: This step may not be required in dry conditions.*
5. Spray vehicle using the 5 L pressurised weed sprayer with disinfectant (pay particular attention to the tyres, wheels, mudflaps and undercarriage).
6. Move vehicle forward 30 cm to allow complete disinfection of tyres.
7. Remove all soil and mud from floor pan/mat and spray with disinfectant used for footwear.
8. Disinfect all equipment used to remove mud and soil. *Note: Disinfectant should be allowed to penetrate for at least one minute (preferably 10 minutes) before equipment departs. Do not drive through washdown effluent. Do not allow mud and wash-down effluent to drain into bushland and surface waters, such as rivers, creeks, reservoirs and dams. If necessary, dig a trench to contain washdown effluent.*

Maximum dilution rate:

- Methylated spirits = 3.5 litres Methylated Spirits/1.5 litres water
- Phytoclean = 100ml Phytoclean/5 litre water

References and recommended reading

Phytophthora Management Guidelines, 2nd edition, Phytophthora Technical Group SA (2006)

Management of Phytophthora cinnamomi for Biodiversity Conservation in Australia, Murdoch University (2006)

Arrive Clean, Leave Clean - Guidelines to help prevent the spread of invasive plant diseases and weeds threatening our native plants, animals and ecosystems, Commonwealth of Australia (2015)

Phytophthora Dieback Management Manual, WA Department of Biodiversity, Conservation and Attractions (2020)

Acknowledgements

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