

Best Practice Guideline

Land disturbance activities (including earthworks) around kauri

Prepared By: Tony Beauchamp
 Planning & Intelligence Workstream
 Kauri Dieback Programme

Prepared For: Travis Ashcroft
 Planning & Intelligence Workstream Lead
 Kauri Dieback Programme

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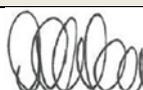
Version History

Date	Version	Author	Description of changes
August 2017	1.0	T. Beauchamp	Original version
October 2017	1.1	T. Ashcroft	Changes to Figure 1. Definition of 3x the radius of the canopy dripline.

Consultation and peer review

Role	Name	Date submitted
Operations Workstream	K. Parker	May 2017
Planning & Intelligence Workstream	C. Green, T. Ashcroft, W. Ho.	September 2016

Approval

Name	Role	Signature/ Date	Endorsement
Lynn McLveen Programme Manager	Approve / Note the contents of this document	 17/10/17	Yes <input checked="" type="radio"/> No <input type="radio"/>

Associated documents

Document name	Link
Hygiene Procedures for Kauri Dieback	https://www.kauridieback.co.nz/more/documents-and-resources/
Vehicle and Heavy Machinery Hygiene	
Tree Removal and Pruning of Kauri	
Landfill disposal of contaminated material	

Glossary

Terminology	Meaning
Dripline	The outer extent of the branch spread from the trunk.
Kauri dieback	Name of the disease that causes dieback on kauri caused by the pathogen <i>Phytophthora agathidicida</i>
KDP	Kauri Dieback Programme
Outermost dripline	The furthest (maximum) extend of the branch spread from the trunk.
PA	<i>Phytophthora agathidicida</i>
Propagule	Microscopic life stage (like seeds) whose role is to progress the propagation of an organism to the next stage in their life cycle.
Root Zone	The ground area around kauri, defined as 3 times the radius of the outermost canopy dripline.
SOP	Standard Operating Procedures
Sterigene	2% solution of detergent Sterigene®

Disclaimer

The information in this guideline is intended to be general information. It is not intended to take the place of, or to represent, the written law of New Zealand or other official guidelines or requirements. While every effort has been made to ensure the information in this document is accurate, the Kauri Dieback Programme (and any of their representatives involved in the drafting of these guidelines) does not accept any responsibility or liability for error of fact, omission, interpretation or opinion that may be present nor for the consequences of any decisions based on this information.

1.0 Purpose

To provide risk management guidelines to mitigate the spread of kauri dieback when working in and around kauri (*Agathis australis*).

The guidelines are based on managing the risks associated with land disturbance activities. A precautionary approach is taken to manage the level of scientific uncertainty around ascertaining whether kauri and the surrounding soil is infected or not.

2.0 Background

Kauri dieback is a soil-borne disease that spreads primarily through the movement of contaminated soil. Just a pinhead of soil is all that is needed to spread the pathogen (that cause's kauri dieback), *Phytophthora agathidicida* (PA), to other areas.

Humans and human related activity are the principle ways that this organism is being spread. It can take many years for Kauri dieback symptoms to be expressed in the canopy or the trunk so we do not know by looking at a tree if it is diseased or not. Currently the only way we have of controlling the spread of kauri dieback is to not move potentially contaminated soil and root material to new sites.

Land disturbance activities such as earthworks, gardening, and undertaking tree removal near kauri are more at risk of spreading potentially contaminated soil than activities further away. The disease can be moved in soil on roots of other plants, and by the equipment (including tyres) that is being used that may be contaminated with soil.

These guidelines apply to land disturbance activities where soil disturbance is likely to occur e.g. earthworks, gardening, and tree removal.

3.0 Assumptions & Constraints

Due to a number of uncertainties ascertaining whether an area is infected with kauri dieback or not, a number of assumptions have been made which has informed these guidelines:

- 3.1 Since we do not know the time from infection to when disease symptoms first occur on the tree, healthy trees may be infected. As a result all kauri and their root zone (i.e. 3 x the radius of the tree canopy dripline) are potentially infected with the disease.
- 3.2 Movement of contaminated root, trunk, bark materials and associated by-products such as sawdust, could spread PA.

- 3.3 Soil, litter debris and root materials within the entire root zone of infected kauri can contain viable propagules of PA.
- 3.4 Long-lived spores (oospores) of kauri dieback can survive and remain viable in the soil, long after a tree dies (at least 6 years and potentially a lot longer)(Horner & Hough, 2015).
- 3.5 Disease spread outside the kauri root zone can occur by movement of infected material via human and animal vectoring. Although yet to be proven (Bellgard *et.al*, unpub.), there is anecdotal evidence that spread via wastewater run-off and water catchment discharge is possible.
- 3.6 All planted kauri are susceptible to being infected with Kauri dieback. Seedlings generally die within months of infection and rickers have been known to die within 6 years of obvious canopy reduction.

4.0 Before you begin

- 4.1 These guidelines has been developed to provide written advice on the management of kauri dieback during land disturbance operations within the root zone of kauri.
- 4.2 The guidelines are not policy but should be considered by planners, land managers and contractors when planning any operations.
- 4.3 Please contact your local council or land management agency if there are local policy or regulatory constraints.
- 4.4 The guide provides what is considered best practice based on the current information and uses risk management principles to reduce the likelihood of spread of PA during operations.

5.0 Planning Considerations

- 5.1 If you think you have found infected kauri, contain access to the site (containment zone) at 3 times the radius of the canopy, do not remove any soil or vegetative material and contact 0800 NZ KAURI immediately.
- 5.2 The following Best Practice Guidelines should be read in conjunction with these guidelines, prior to undertaking any on-site operations.

Best Practice Guideline	Link
Hygiene Procedures for Kauri Dieback	https://www.kauridieback.co.nz/more/documents-and-resources/
Tree Removal & Pruning of Kauri	
Vehicle and Heavy Machinery Hygiene	
Landfill disposal of contaminated material	

- 5.3 When working around kauri, treat all kauri as potentially infected as the disease (i.e. tree symptoms showing dieback) may not be obvious if the tree is recently infected.
- 5.4 Land disturbance around kauri should occur during dry periods. The only exception should be where trees pose an immediate health and safety hazard, or at sites where the contamination of personnel effects (e.g. footwear) and equipment with soil can be avoided.

6.0 The '3 times the radius' rule

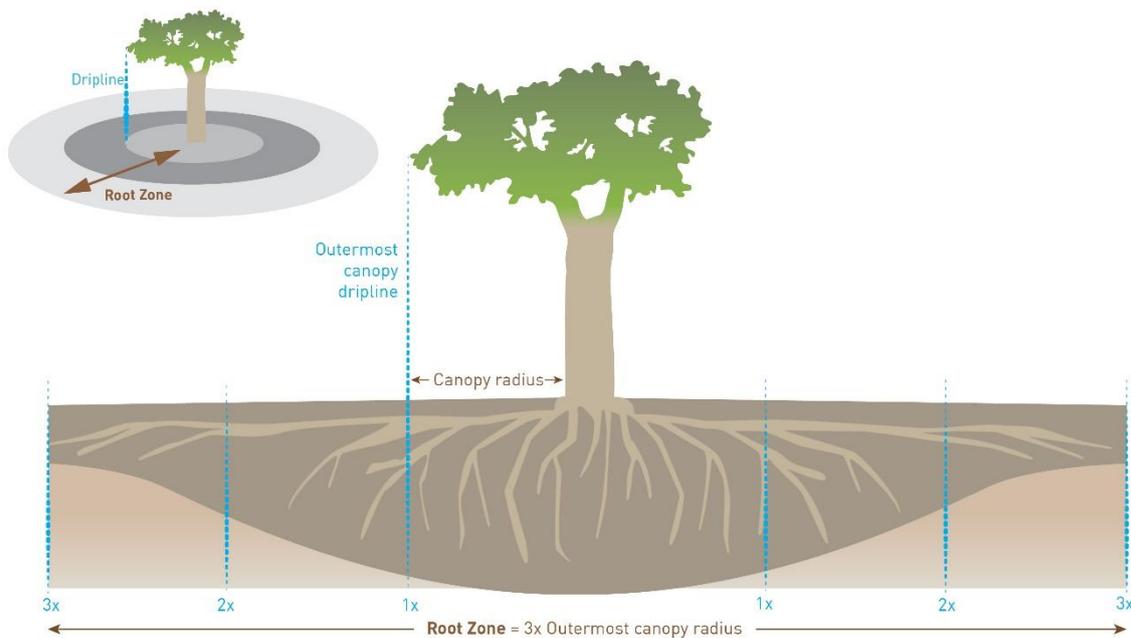
- 6.1 The KDP has looked carefully at finding ways of controlling the spread of kauri dieback in urban settings and more generally where earthworks are needed. Minor soil disturbance is expected near and under kauri trees.
- 6.2 It can be difficult to prove whether an area surrounding a kauri tree is infected or not. If soil is likely to be infected then the infection is likely to be within the root zone of kauri. We do not want this material to be spread further than is likely by natural processes should a tree be infected and the surrounding soil contaminated.
- 6.3 The area where soil is most likely to be infected around a kauri tree is based around the area occupied by the tree roots. The most precautionary way to deal with this is to form a relationship between the tree size and the distance to the edge of the trees root system where restrictions of soil movement should occur.
- 6.4 Kauri trees form surface feeding roots and structural peg roots. The surface roots are generally within the first meter of soil depth, and extend out beyond the canopy of many trees. Consequently, the distance that is judged to most likely be holding kauri roots **is up to 3 times the radius of the drip line of the canopy**. The radius is measured from the trunk to the outermost canopy dripline (Figure 1).

This is the distance where soil and root material will need to either be removed and held in an approved landfill, or be left on site within 3 times the radius of the canopy of the tree.

This area we have defined as the kauri ‘root zone’, whereas all land disturbance activities should be managed to prevent spread of potentially contaminated soil and organic material from leaving this area (Figure 1).

- 6.5 The root zone can also apply to locations where a kauri tree has died from kauri dieback, and is no longer standing (i.e. the area 3 times the radius of the canopy of that dead tree).

Figure 1: Root zone of kauri (3 times the radius of the outermost canopy dripline).



Operational Considerations

7.1 General Requirements

- Hygiene procedures are adopted when working within the root zone of a kauri tree, so that soil or organic material is not transferred into or out of that area, AND;
- Soil or organic material from land disturbance within the root zone is not transported beyond that area unless being transported to an approved KDP landfill for disposal (see the guidelines for Landfill disposal of contaminated material).

7.2 Earthwork activities or removing ‘contaminated’ trees:

- Before you begin operations, define your root zone around each kauri that will be affected by the land disturbance. If these zones overlap with other zones, then treat all areas as one contiguous root zone.
- Establish entry and exit routes to/from each zone to reduce the risk of spread of PA from/to other kauri.
- Cleaning infrastructure for a zone should be within 3 times the radius of the trees being pruned or felled. **Extreme care** should be taken to make sure any equipment and machinery does not damage the roots within this zone.
- Establish the on the ground infrastructure necessary to ensure that all vehicles and equipment remain clean, or are cleaned to be free of soil and organic material when leaving the zone or moving between kauri zones.
- The wash water, soil and organic material from any other zone **must not** be brought onto another zone.
- All personnel effects (e.g. footwear) and equipment must be cleaned of soil and organic material and sprayed with Sterigene before entering, leaving or moving between zones, or the equipment must be contained to prevent soil loss before cleaning at a depot with soil containment facilities.
- Soil and organic material retrieved from cleaned vehicles and equipment must be either retained within the root zone from which it originated, or else collected, contained and disposed of at an approved landfill (see Best Practice Guidelines - Landfill disposal of contaminated material).
- Pruning and tree felling operations should also follow the “Tree Removal & Pruning of Kauri” Guidelines.

7.3 Gardening Activities (e.g. planting & weeding)

- Kauri dieback affects the fine (1mm diameter) feeder roots of kauri trees. These are the roots that people will be digging up when planting or gardening under kauri trees or undertaking more invasive earthworks.
- Land owners with kauri need to consider how they will manage the area within the kauri root zone. This includes where material that contains soil will be placed and where equipment will be cleaned.

- Planting other plants that is collected from the wild may be contaminated with kauri dieback. Soil collected from the site must be retained at that site to make sure that if the tree is contaminated that the PA spores are not distributed more widely. In urban situation each tree may require separate consideration.
- Carefully consider the type of gardening you will be carrying out in this area and where you will place soil you move, within the root zone of kauri.
- Consider the footwear, clothing and other soil contact equipment (mowers, weed-eaters) you will be using at the site and how and where you will clean it before and after use in that area (see the Hygiene procedures).
- Set up any clean equipment before you do work in the root zone.
- Obtain plants from known clean sources, or grow the plants from seed in sterilised soil.
- Work in kauri areas under drier soil and moisture conditions that will make cleaning your gear after use easier.
- Disposal or recycling of contaminated kauri materials into green-waste, compost etc. should not take place as use of these materials may spread PA.

8.0 Other considerations

- 8.1 Keep to formed tracks as much as possible.
- 8.2 Be particularly vigilant working around kauri stands, trees, streams and sites where the disease is known to be present.
- 8.3 Confine ground based machines to well drained country and configure machines to low ground pressure operations.

For further information on kauri dieback contact 0800 NZ KAURI (695 2874) or visit www.kauridieback.co.nz

References

Bellgard, S; Pattison, N; Probst, C; Walker, C; Leddy, N; and Winder, L. (unpub.) Stream-based surveillance for the kauri dieback pathogen and other *Phytophthora* species in catchments of Auckland. Landcare Research.

Horner I.J, Hough E.G. June 2015. Assay of stored soils for presence of *Phytophthora agathidicida*. A Plant & Food Research report prepared for: The Ministry for Primary Industries. Contract No. 32294. Job code: P/345061/01. PFR SPTS No. 11718.