

Best Practice Guideline

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Vehicle and Heavy Machinery Hygiene

Prepared By: Travis Ashcroft
Planning & Intelligence Workstream
Kauri Dieback Programme

Prepared For: Lynn McLveen
Programme Manager
Kauri Dieback Programme

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Document Information

Version History

Date	Version	Author	Description of changes
September 2017	1.0	T. Ashcroft	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
Planning & Intelligence Workstream	C. Green / T. Beauchamp	August 2017
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Approval

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

Associated documents

Document name	Link
Hygiene Procedures for Kauri Dieback	https://www.kauridieback.co.nz/more/documents-and-resources/
Land disturbance activities (incl. earthworks) around kauri	
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 area	The ground area around kauri, defined as 3 times the radius of the canopy dripline. Considered contaminated with PA, until proven otherwise.
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®
Wash-down	Removal of soil and organic material using pressurised water and brushes.
Wastewater	Water generated from washing down vehicles and heavy equipment.

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 hygiene guidelines to mitigate the spread of kauri dieback on vehicles and heavy machinery when operating near kauri (*Agathis australis*).

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 their activities are the primary cause of spread through soil contaminated conveyances. Vehicles (e.g. cars, trucks, four-wheel drives, tractors) and heavy machinery (e.g. dozers, excavators, graders) are often used in and around kauri forests where earthworks, maintenance and construction operations are involved. It is therefore important that vehicle and heavy equipment hygiene practices are followed before, during and after an operation to reduce soil contamination and hence reduce the likelihood of spread of the disease on these pathways.

These guidelines outline best practice hygiene measures when using vehicles and heavy machinery and the use of such vehicles when transporting potentially contaminated soil or other loads from an infected or potentially infected area.

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 outermost 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 Vehicles and other similar conveyances such as heavy equipment are vectors for disease dispersal.

Soil samples were taken from soil-contaminated vehicles during an Auckland Council study (unpublished) to link the movement of vehicles to the spread of PA. Even though a small sample size was taken, *Phytophthora* species were detected in 4 out of 6 samples which indicates that vehicle movements can facilitate the spread of pathogens (Lee Hill, pers. comm.).

- 3.4 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.
- 3.5 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, 2015).

4.0 Before you begin

- 4.1 These guidelines has been developed to provide written advice on the management of kauri dieback during vehicle and heavy machinery use in a kauri forest and 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 Prior to using a vehicle or heavy machinery near kauri, proper planning is required to ensure that you have considered the following factors in reducing the likelihood of contamination onto vehicles and heavy machinery.
- Consider using vehicles or heavy machinery that will do the job but are also easy to clean, such as machines with rubber tyres rather than tracks.
 - Undertake operations in dry weather wherever possible to reduce contamination of vehicles and equipment and to make decontamination operations easier. If necessary postpone operations and reschedule when there are drier conditions. Wet soil tends to cling to vehicles and heavy equipment making it easier for PA to be transported.
 - Where possible, consider leaving heavy machinery and vehicles onsite for the duration of the job to minimise the risk of introducing kauri dieback each time the vehicles or heavy machinery is brought to the site.
- 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/
Land disturbance activities (incl. earthworks) around kauri	
Tree Removal and Pruning of Kauri	
Landfill disposal of contaminated material	

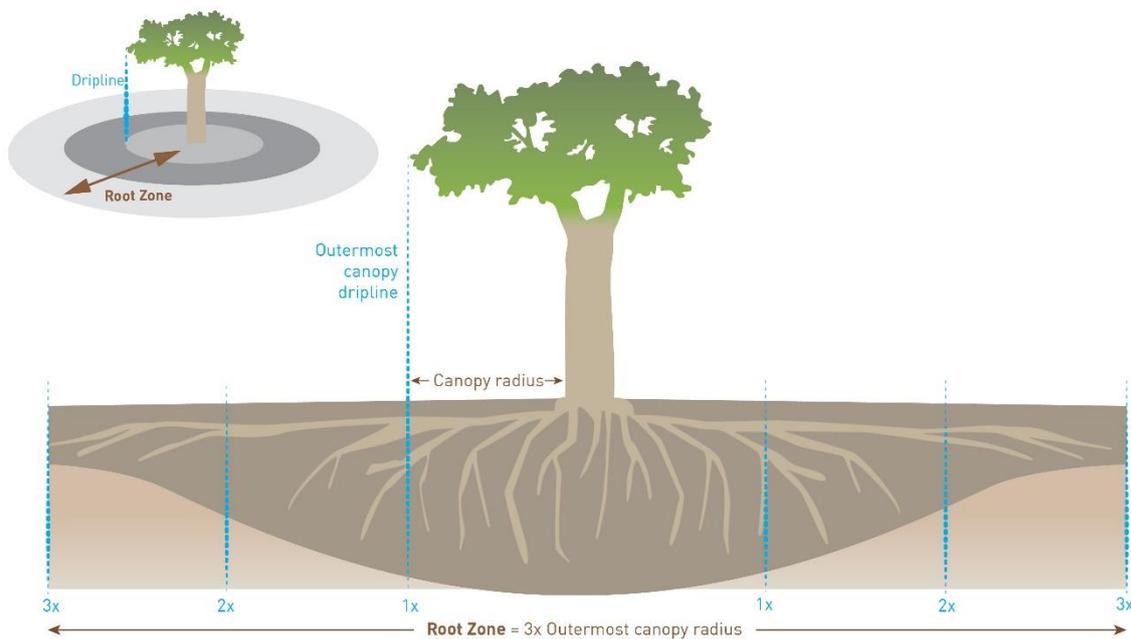
6.0 General Considerations

- 6.1 All heavy machinery and vehicles should be **free of soil or organic material** when (1) entering and exiting a kauri forest; and (2) entering, moving between and existing a kauri root zone (Figure 1).
- 6.2 Upon exiting a root zone, a full wash-down of soil and debris should occur on site prior to movement, thereby containing any problems at the source.
- 6.3 Alternatively, if this cannot occur then vehicles and heavy machinery may be taken off site and cleaned in a wash-down facility, but all loose soil and debris must be

removed at the kauri site prior to moving and care should be taken to ensure that risk of spread during transport to that facility is minimised.

- 6.4 Soil and organic material cleaned from vehicles and heavy equipment should, where possible, be collected and disposed of appropriately at an approved landfill (see Best Practice Guidelines - Landfill disposal of contaminated material). Alternatively the material can be left in situ at the source.
- 6.5 **Extreme care** should be taken as to not damage the kauri roots when using vehicle or heavy machinery near kauri.

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



7.0 Wash-Down Sites

7.1 Site Selection in a kauri forest

- Wash down of vehicles and/or heavy machinery that was used within a kauri root zone should occur within that area where possible.
- If vehicles and/or heavy machinery have been operating outside a root zone, then wash-down should occur prior to exiting a kauri forest.
- The following considerations should be taken into account when selecting a suitable wash-down site:

- Hard-stand area and well-drained surface e.g. a road near the edge, firm grass or gravel.
 - At least 30m away from a water course or water body.
 - An area within the root zone, if use of equipment and vehicles has occurred in this area.
 - Is of gentle slope to drain wastewater away from (1) the wash-down area and into a kauri root zone; (2) water catchment; (3) areas outside the kauri root zone and; (4) vehicles and heavy machinery being washed to prevent potential re-contamination.
 - Enable cleaned objects to exit without being re-contaminated.
 - Undertaking a risk assessment of the site to inform a health & safety risk management plan e.g. working around powerlines.
- Where run-off cannot be managed to an acceptable standard (e.g. large quantity of wastewater and/or an extensive run-off) construction of a bund and sump may be required to safely dispose of the wastewater.
 - Commercially available bunds or containment berms are available as temporary wash-down solutions. This will allow the decontamination of heavy equipment and vehicles on site where the wastewater is contained, collected and removed for safe disposal. An example of a portable containment berm in use is in the below link.

<https://www.nzta.govt.nz/innovations-and-ideas/innovations/decontamination-wash-down-bay-for-geotechnical-investigation-equipment/>
 - If wash down cannot occur in the forest then the vehicles and/or heavy machinery should be taken to a suitable facility off site for decontamination.

7.2 Off-site facilities

- **Commercial Operators - Vehicle wash facilities (e.g. Petrol stations).**
 - Different commercial operators have different wastewater discharge consents which is dependent on the council by-laws of that area. The commercial operator environmental policy may also place voluntary conditions on the discharge of wastewater from the site. Regardless, a large percentage of the wastewater generated from urban vehicle wash facilities is likely to end up in the reticulated storm water system and then onto waterways.
 - If the wastewater is infected with PA, the discharge consents (ranging from the use of on-site detergents to sediment separators) is unlikely to reduce PA oospore viability. As a result, commercial operators of wash-down facilities can be used, as long as the wastewater from the facility does not drain into catchments running into or near a kauri forest or an area with kauri.
 - A purpose built vehicle wash-down facility instead of an automated washing facility (as seen in petrol stations) is preferred due to the availability of the

facilities equipment to remove contaminants in difficult to reach places such as the undercarriage of vehicles and heavy machinery. An automated wash facility (such as a car wash at a petrol station) may be suitable if soil contamination is in areas of the vehicle where the automated system can effectively remove the soil during the washing process.

- **Truck wash facilities**

- There are a number of truck wash facilities operated by private trucking companies that are used to wash-down cattle or livestock trucks. Some of these companies may be accessible to the public.
- These facilities are **not recommended** where the effluent generated from the wash-down is used to irrigate farmland, hence if the effluent is contaminated with PA, then spread of PA directly onto rural farmland is likely to occur. This applies only to irrigation of farmland close to kauri forests or in catchment areas leading into kauri forests or surrounding areas.

- **Landfills disposal**

- Disposal of soil and organic material at a landfill, requires the truck/trailer unit to be washed down after unloading.
- The majority of landfills recommended in the ‘Best Practice Guideline: Landfill disposal of contaminated material’, have dedicated on-site wash down facilities that can be used for this purpose.

- **Council Depots**

Council depots have wash down facilities however you will need to contact the relevant local government authority to seek permission to use them. As long as the wastewater discharge is away from catchments leading too or near kauri forests, these facilities can be used.

8.0 Wash-Down Procedural Guidelines

8.1 Field - On site

- If the vehicle or heavy machinery cannot be washed down effectively on site, all loose soil and vegetation should be removed where possible, before it is transported off-site to a wash down facility.
- Attempt to remove as much soil and mud (preferably when it is dry) by first physically removing it using a hard brush or broom or by using compressed air.

- Pay attention to the underside, between dual wheels, sump guards, mud flaps, hollow sections, foot wells, bumper bars. Minimise the amount of water to be used.
- Remove any soil/debris inside the vehicle, particularly on the vehicle floor and workers footwear as well as any tools used to remove the soil/debris at completion of the job.
- If possible, minimise the use of pressurised water in situations where the wastewater is not sufficiently contained and/or the runoff is not controlled.
- If possible, it is advised that vehicles and heavy machinery are washed using a pressurised spray unit (to reduce run-off) and then sprayed with a solution containing 2% Sterigene solution **before** the vehicle or heavy machinery leaves the area.
- Do not drive through wash-down wastewater as this may re-contaminate the vehicle and/or machinery.
- No dirt or loose soil should be present after wash-down.

8.2 Public & Commercial Facilities - Off site

- A purpose built vehicle wash-down facility is preferred due to the availability of the facilities hand-held equipment to remove contaminants in difficult to access places such as the undercarriage of vehicles.
- Decontaminating off site mainly involves washing down the vehicle and heavy machinery with high pressure water at a wash-down facility and then spraying with a solution containing 2% Sterigene solution.
- Pay attention to the body underside, crevices and ledges, sump guards, mud flaps, hollow sections, foot wells, bumper bars, chassis. Between dual wheels, inside and out, spare wheel.
- Clean interior (floors, mats, under seats).
- Wash wastewater away from vehicle, do not drive through wastewater.
- An automated wash facility at a petrol station won't be effective if undersides and concealed areas are likely to be contaminated with soil but may be suitable if soil contamination is restricted to areas where the automated system can effectively remove the soil.

9.0 Loading and transport of material out of an area

- 9.1 The movement of potentially contaminated loads via vehicle transportation out of an area containing kauri, may result in the spread of the disease if part of the load falls off during transit. A load can be (1) soil resulting from earthworks, (2) wood debris from road maintenance or (3) soil contaminated heavy machinery that are transported on a trailer (that cannot be washed down on site).
- 9.2 Certain practices should therefore be taken into consideration during the loading and transportation of such loads to reduce the risk of accidental exposure of the disease during transit.

- 9.3 Transport vehicle trailers should have sealed sides (or liners installed) to ensure all loads being transported is appropriately contained and leakage from soil or debris is reduced during transit. There may be situations where this is not practical, however every care should be taken to reduce the risk of soil or debris from falling off the transport vehicle.
- 9.4 Liners should be of a suitable thickness and durability to prevent rupture during transport and contain the material sufficiently to prevent any leakage.
- 9.5 Water can be mist sprayed onto soil loads to reduce dust and spillage during transportation.
- 9.6 The liners can be folded over to encompass the entire load and then appropriately secured.
- 9.7 Loads carrying potential contaminated material i.e. soil and/or wood debris shall be transported to one of the recommended landfills listed in the Best Practice Guideline 'Landfill disposal of contaminated material'.

The vehicle (including trailer) should be cleaned after unloading, using the wash-down facilities at the landfill (if available) and the liners subsequently disposed of.

The trailer unit should be sprayed with a solution containing 2% Sterigene solution either at the landfill (if available) or back at the depot prior to re-use.

References

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