Boffa Miskell

Thames Coromandel

Kauri Dieback Management Plan
Prepared for OceanaGold (NZ) Ltd

20 February 2025

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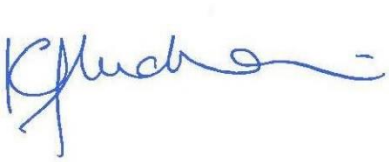
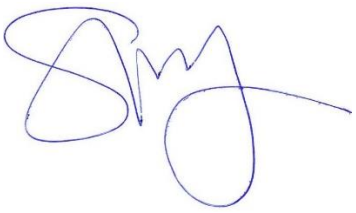
Prepared by:	Kat Muchna Senior Principal Ecologist Boffa Miskell Limited	
Reviewed by:	Sarah Flynn] Senior Principal Ecologist Boffa Miskell Limited	
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CONTENTS

Appendices

Figures

1.0 Introduction

1.1 Purpose

OceanaGold (NZ) Limited (OGNZL) is applying for approval to conduct monitoring activities within the Thames Coromandel District, in the Wharekirauponga (WKP) catchment in Coromandel Forest Park. Previous authorisations have required management of Kauri Dieback Disease (*Phytophthora agathidicida,* PA) as it presents a risk to the forest. This management plan was prepared to guide activities associated with the proposed monitoring activities which form part of the Waihi North Project.

The purpose of this management plan is to provide practical guidance on reducing the risk of *Phytophthora agathidicida* spread as a result of monitoring works associated with the Waihi North Project, and to ensure that these activities are undertaken in a way that does not infringe legislative requirements with respect to the Biosecurity Act 1993 and associated regulations.

Movement of machinery, equipment and people between sites is identified as a key pathway for the spread of kauri dieback and the methods proposed here are specific to this project and its constraints. This plan includes a description of recommended hygiene procedures and how these could be applied to the Thames Coromandel monitoring activities, as well as kauri dieback monitoring and site management recommendations. In particular, this report considers:

- Machinery, equipment and personnel movement of contaminated soil as a vector.
- Practical techniques and hygiene practices to contain the spread of Kauri Dieback Disease at each stage of exploration activities.
- Baseline monitoring, surveillance and reporting.
- Detection and escalation procedures.

This plan is consistent with the Biosecurity (National PA Pest Management Plan) Order (2022) and addresses the ten National PA Pest Management Plan (NPMP) rules set out in the Order. This plan is also consistent with guidance documents provided by Waikato Regional Council (Appendix 1) and Tiakina kauri (Kauri Protection) Management Agency.

1.2 Plan Objectives

The objectives of this plan are to provide practical methods to:

- minimise the risk of PA spreading into and (if present) within the Otahu catchment by reducing movement of soils; and
- monitor the health of kauri within the Otahu catchment along walking tracks and within Sites; and
- facilitate controlled access to kauri forests where it does not compromise the future or protection of kauri within the context of the Thames Coromandel monitoring activities.

1.3 Legal Status

National and regional legal recognition of pests and unwanted organisms plays a key part in their management and containment. *Phytophthora agathidicida* (PA) was declared an 'Unwanted Organism' under the Biosecurity Act (1993) in 2008.

In 2022, the Government confirmed a NPMP to provide consistency to manage the impact of *Phytophthora agathidicida*. The NPMP is the strongest form of regulation that the Ministry of Primary Industries (MPI) can put in place for an established pest. Tiakina kauri is the management agency for the NPMP, which applies in its entirety in Waikato, Bay of Plenty, Coromandel, Auckland and Northland.

The NPMP contains 10 rules to manage PA, these are briefly provided below and provided in full in Appendix 1 (bold rules are relevant to the activities in Wharekirauponga and are referenced where appropriate in this report):

Rule 1: Obligation to report

Rule 2: Provision of information

Rule 3: Restriction on the movement of kauri

Rule 4: PA risk management plans

Rule 5: Earthworks PA risk management plan

Rule 6: Stock exclusion notice

Rule 7: Restriction on the release of animals

Rule 8: Obligation to clean items before entering or exiting kauri forest

Rule 9: Obligation to use cleaning stations

Rule 10: Open tracks and roads in kauri forest

1.4 Kauri Dieback Disease Characteristics

Phytophthora agathidicida is the pathogen regarded as a primary causal agent of dieback disease in otherwise healthy kauri, while other *Phytophthora* species (in particular, *P. cinnamomi* and *P. multivora)* may also have a role in the expression and severity of disease symptoms.

Phytophthora infects trees through their roots, and spreads primarily through the movement of contaminated soil and water, as well as by root-to-root contact between trees.

Previous surveillance work (Hill et al., 2017) identified that *P. agathidicida* infections showed a strong association with tracks and watercourses, and human activity and disturbance is assumed to be a key vector of the disease.

The kauri dieback pathogen has two types of propagule. The oospore is formed within infected tissue and released into the soil where it can remain latent for an indefinite period. Soil movement is a key mode of dispersal of this type of propagule. The oospore is resistant to sterigene and other disinfectants.

Ultimately, the oospore germinates and produces zoospores which can ‘swim’ through micropores in saturated soil, and in this way actively disperse themselves. In this form, the pathogen finds and infects tree roots. The zoospores can be destroyed with disinfectant.

Sources and locations of kauri dieback pathogen are:

- Infected tree roots of kauri;
- Parts of the forest floor and waterbodies where oospores have been dispersed;
- Moist, porous soil layers where motile zoospores have emerged and dispersed.

Mineral sub-soil layers below the root zones of vegetation are at lower risk of contamination relative to organic soil layers, as inorganic parts of the substrate are not porous and do not contain living plant material.

2.0 Kauri Dieback in the Coromandel

2.1 Kauri Dieback within the Project Area

In 2014 Kauri Dieback Disease was confirmed present in the Coromandel Peninsula, in the Whangapoua catchment and the Hukarahi Conservation Area (Thames-Coromandel District Council, n.d.). Upon these discoveries both the Thames Coromandel District Council and the Waikato Regional Council have joined DOC and other agencies as partners in the Kauri Dieback Programme. There are no records for PA, or observations of infected trees in the vicinity of the Wharekirauponga catchment.

2.2 Consent, Access Arrangement and Concession Conditions

Prior to undertaking any activities associated with the consented exploration, OceanaGold is required to submit for certification a Kauri Dieback Management Plan to Thames Coromandel District Council.

2.3 Roles and Responsibilities under the KDMP

The roles and responsibilities of the key personnel are described below.

2.3.1 Site Supervisor

- Adhere to hygiene protocols before entering the Project site, when moving around the site and before exiting site [Rule 8, 9].
- Training all personnel on their responsibilities under the KDMP.
- Signing off on hygiene checks, conducting and documenting random inspections. Ensuring cleaning equipment (soap, water, brushes, plastic containers, Sterigene etc.)

are fully stocked and cleaning stations are set-up at the campsite, helipads and operational work sites [Rule 8, 9].

- Primary point of contact for contractors (i.e., contractors will report to the Site Supervisor if they observe kauri with symptoms of Kauri Dieback Disease) [Rule 1].
- If symptoms of Kauri Dieback Disease are observed, contact the Geological Support Coordinator and Superintendent - Environment as soon as possible [Rule 1].

2.3.2 Superintendent - Environment

- If symptoms of Kauri Dieback Disease are reported, the Site Supervisor will collaborate with the 'Manager'[1] , MPI / Tiakina Kauri and the Project Ecologists to produce and implement an adaptive management plan [Rule 1, Rule 2].

2.3.3 Project Ecologists

- Adhere to hygiene protocols before entering the Project site, when moving around the site and before exiting site [Rule 8, 9].
- Mark out kauri along tracks and ensure tracks avoid KHZ [Rule 10].
- Undertake baseline visual kauri health assessment, describing the baseline condition of kauri within sites and along tracks between sites using standard surveillance documentation. This documentation can then be updated by trained staff throughout subsequent phases of the project.
- Mark out KHZ (3 x radius of dripline) for trees within sites.
- Remaining up-to-date with any advances in Kauri Dieback Disease research and legislation.
- Preparing and updating the KDMP and clearly communicating these with the Superintendent - Environment to ensure changes are implemented on the site [Rule 4, 5].
- If symptoms of Kauri Dieback Disease are observed, it is the role of the Project Ecologist to inform the Superintendent - Environment [Rule1].

2.3.4 Contractors

- Adhere to hygiene protocols before entering the Project site, when moving around the site and before exiting site [Rule 8, 9].
- Report any occurrences of suspected Kauri Dieback Disease to the Site Supervisor [Rule1].

[1] The "Manager" as referred to in the Access Agreement i.e. "… the person for the time being holding the office of Operations Manager, Hauraki District, Hauraki – Waikato - Taranaki Region of the Department of Conservation and includes any person authorised by the Operations Manager to act on his or her behalf in respect of this agreement."

3.0 Thames Coromandel Monitoring Works

3.1 Proposed Works

Proposed works within the Thames Coromandel District include:

- River flow gauging;
- River level and flow monitoring and associated telemetry;
- Two near stream piezometers and associated telemetry; and
- Pest monitoring activities.

The location of the proposed works is shown in Figure 1.

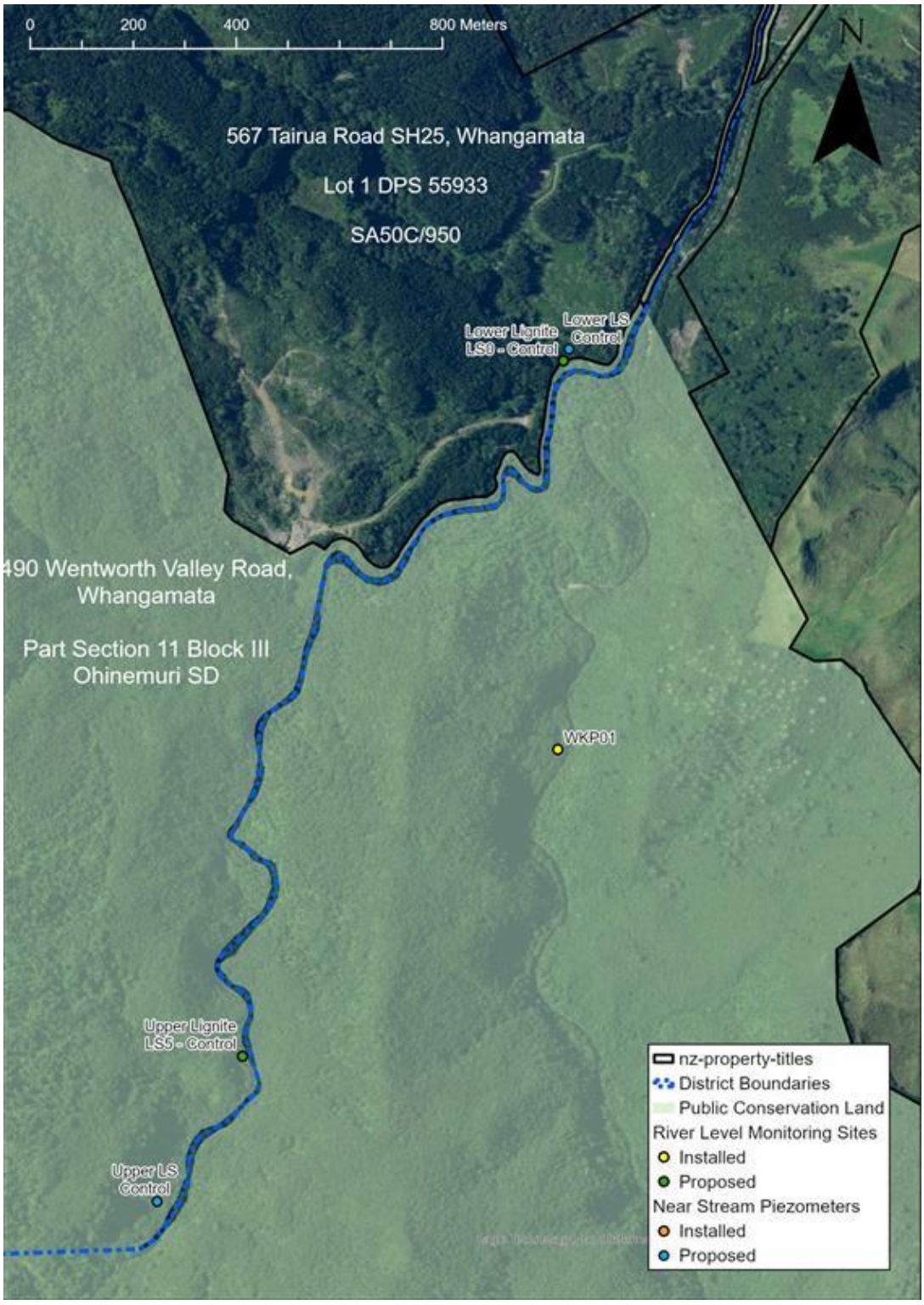
3.1.1 Site Selection and Survey

A site survey will be carried out to assess suitability of the flow gauging, level and flow monitoring, and near stream piezometer sites. The surveys required will involve working off track and within the root zone of kauri and other native trees. Kauri Hygiene Zones (KHZs) will be avoided except where these need to be specifically surveyed, and contractors will work downslope of kauri where possible. Hygiene procedures will be undertaken at catchment boundaries, or where areas of bare/ disturbed soil within KHZs are encountered.

The objective of the KDMP in this phase is to:

- Record the presence of kauri trees within and adjacent to potential work sites;
- Visually assess the health of kauri trees;
- Avoid using sites with kauri present, and avoid contact with kauri where possible;
- Carry out hygiene procedures at wash stations and where areas of bare/ disturbed soil within KHZs are encountered.

Figure 1: Thames Coromandel Monitoring Area



Visual health assessments (baseline survey) of any kauri at the sites or on/adjacent to the tracks between sites (**Error! Reference source not found.**, Appendix 2) will also occur.

All footwear and gear must be decontaminated at wash stations or using portable hygiene kits. If symptoms of infection are observed during surveillance surveys, or incidental observations, Section 4.5 of this plan will be invoked and this practice may be reviewed.

Demarcation of KHZs are described in Section 4.2.2.

The objective of the KDMP in this phase is to:

- Survey for kauri along tracks and within sites with the purpose of avoiding KHZ and groves of kauri where possible [Rule 10].
- Flag, georeferenced, and assess health of kauri adjacent to tracks for future surveillance.

3.1.2 Equipment Installation and Operations Phase - Near Stream Piezometers

Once a suitable site is selected, the site footprint measuring no more than 8m x 3m will be demarcated using tape. Untreated bed logs or plastic mesh will be installed on the site to minimise damage to the forest floor. The fly rig will then be flown into the site using a helicopter. All equipment will be flown in in parts and assembled on site. Once assembled, a drilling crew of two people will be on site for approximately one week. Access to the site will be on foot. At the completion of drilling contractors will install piezometer equipment and telemetry. This will take approximately two days. Following the piezometer installation, all drilling equipment will be flown out and piezometers will be visited by OGNZL environmental staff each quarter for calibration and maintenance.

3.1.3 Equipment Installation and Operations Phase -River Level and Flow Monitoring

Once a suitable river level and flow monitoring site is selected, monitoring equipment will be flown or carried into site. Installation will take approximately half a day at each site and will be completed by two OGNZL staff or contractors. Once installed, sites will be visited each quarter by OGNZL staff to complete site checks, maintenance and flow gauging.

3.1.4 Site Rehabilitation Phase

Upon the completion of monitoring operations, the equipment will be removed and flown out. Any leaf litter removed from the site will be laid over the site to promote regeneration.

The objective of the KDMP in this phase is to ensure:

- Hygiene standards are maintained and soil exposure is minimised.
- Machinery is cleaned to remove all soil before being flown out of the Wharekirauponga catchment, or after flying in to the Baxter Road compound. Site Supervisor signoff is required before removing any tools or equipment from the site.

3.2 Machinery and Personnel

The principal machinery involved in the proposed monitoring operations will be the portable rig; as shown in **Error! Reference source not found.** below.

Operation of this machinery requires 2-3 personnel to be on site during the installation of the near stream piezometer. Section **Error! Reference source not found.** describes the hygiene protocols these personnel will undertake to ensure both their personal equipment (e.g. footwear) and the machinery they are operating are free of soil and decontaminated.

Other personnel working on the Project site may include ecologists, OceanaGold staff or other contractors. These personnel will comply with the same hygiene protocols to ensure their equipment does not become a vector for soil movement. As stated above, this will be particularly important for personnel such as ecologists and weed control operators whose tasks require working off track.

Figure 2: Typical portable rig set up.

4.0 Kauri Dieback Management

4.1 General Principles

Phytophthora agathidicida produces both motile waterborne spores (zoospores) and resting soil-borne spores (oospores). The primary purpose of this management plan is to prevent the introduction of PA to the Wharekirauponga area or contain the spread of PA within the Wharekirauponga area (if present) through the movement of spores through soil and water.

Fundamental to the success of this management plan is ensuring the proposed approach is practicable during the activities described in Section 3.0. This will be achieved by employing the general principles identified below:

- Implement decontamination procedures whereby all soil is removed from footwear, equipment, tools and machinery that may have come into contact with soil, prior to entering the site.
- Avoid areas with kauri present where possible, and plan routes to avoid kauri, using established tracks where possible (see Section **Error! Reference source not found.**).
- Survey monitoring sites and walking tracks for trees with symptoms of Kauri Dieback Disease prior to project commencement.
- Avoid infected sites and report any potentially infected trees immediately (Section 4.4).
- Avoid activities upslope of kauri and avoid muddy areas.
- Keep soil disturbance to a minimum and prevent the deposition of soil into watercourses.
- When vegetation felling is required, all vegetation should be retained on site in the immediate locality of the works.
- Implement ongoing surveillance throughout the life of the project.

4.2 Kauri Dieback Disease Surveillance and Monitoring

There is little known about the timeframe between the initial PA infection and the onset of Kauri Dieback Disease symptoms. The regular surveillance recommended in this Management Plan is intended to provide an opportunity to detect any evidence of PA infection in the Project site.

Staff and contractors are also trained to recognize the symptoms of kauri dieback disease and report that observation for follow-up assessment. These measures will facilitate a rapid management response to any suspected infections.

4.2.1 Approach

The consent requires procedures to be put in place when working within, and moving between, KHZs[2]. However, previous surveys indicate that isolated kauri and small stands of kauri are present throughout the wider project area. For this reason, kauri dieback management procedures will apply to the Project site as a whole, and all kauri will be treated as at risk of infection and avoided where possible.

For the purposes of this management plan, a KHZ includes any area within 3 times the radius of the canopy drip line of any kauri tree (Figure *3*). Ecologists will undertake baseline surveys for the presence of kauri across all work areas. KHZs will be delineated on sites in order to ensure decontamination measures are implemented wherever soil disturbance occurs within one of these zones, and to enable routing of any new access points so as to avoid or minimise contact

[2] "Kauri Contamination Zone" is defined in the Access Arrangement agreement as any area within 3 times the radius of the canopy drip line of a kauri (*Agathis australis*) tree.

with KHZs. The KHZ of kauri along tracks will not be delineated, but the track will be rerouted to avoid contact with the KHZ.

For practical purposes, wash stations and written hygiene protocols will be provided at the Waihi North Project helipads and the entry/exit points of field tracks that service the monitoring sites from the main public track (**Error! Reference source not found.**). Personal cleaning kits are to be carried when conducting surveys off the tracks and in the first instance personnel will endeavour to avoid kauri. The location of any kauri that display symptoms of Kauri Dieback will be noted and reported and if they cannot be avoided then hygiene measures will be undertaken with the personal cleaning kit upon exit of the KHZ.

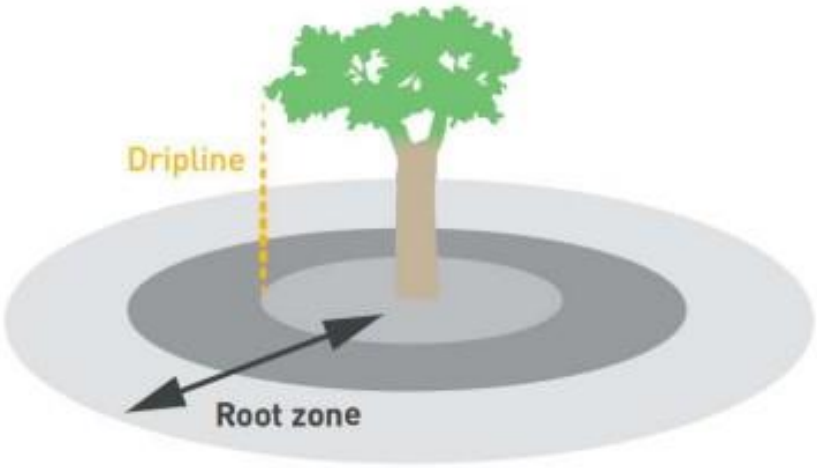


Figure 3: Kauri hygiene zone of a kauri tree.

4.2.2 Baseline Surveys

Baseline Survey Methodology

- During the pre-monitoring ecological surveys required, ecologists will identify, GPS and also visually assess all kauri trees for symptoms of Kauri Dieback Disease at each monitoring site (covering an 8 m X 3 m area for piezometer sites, and 2m x 2m for river level monitoring sites). Kauri locations will be mapped for reference for all staff working on the project.
- All trees will be flagged and their GPS coordinates will be recorded, along with a description of the severity of their conditions (if any) using the kauri surveillance form (Appendix 1). Information about any tree displaying symptoms will be forwarded onto the Superintendent - Environment who will inform the DOC 'Manager', MPI and the Kauri Dieback Hotline (0800 69 52874).
- Further to the survey plots required, Kauri Dieback Disease visual assessments will be undertaken along the edges of the tracks that will be used to move between sites. As above, kauri trees will be flagged and marked with GPS.

Establishment of Kauri Hygiene Zones

- During the baseline surveys described in Section 4.2.2, measurements will be taken from the widest point of the canopy drip line to the trunk for all kauri trees within the sites where monitoring activities will be undertaken. These measurements will be multiplied by three and this number will be marked down on flagging tape[3] and attached to the relevant tree. This number is the radius in metres of the contamination zone that will be established around each kauri tree before the commencement of monitoring operations.
- Before monitoring operations commence at each working area, any KHZs present will be demarcated by biodegradable flagging tape around the kauri trees at the distance indicated on the flagging tape described above. Where there are groups of kauri that have KHZs that overlap, the flagging tape marker flags will only be set up around the outside of the kauri stand to avoid confusion.
- For clarity it will be assumed that all public walking tracks will traverse KHZs, and therefore boot wash stations will be established at the entry/ exit points of any field tracks off the public walking track that are used to access the aforementioned sites (**Error! Reference source not found.**). It is recognised that the area is subject to moderate public use and significant off track hunting throughout the area, traversing many KHZs with no biosecurity measures in place.
- All workers on site will be informed about what the flagging tapes indicate and the correct hygiene procedures to be undertaken before entering, and after exiting, a KHZ.

4.2.3 Ongoing Surveillance

Little is known about the timeframe of the onset of Kauri Dieback Disease symptoms and it is likely that symptoms of new infections will not become visible during the life of the Waihi North Project. Monitoring the efficacy of hygiene protocols is the best means of identifying and minimising risks of PA spread throughout the duration of works. Included in this protocol is the requirement to conduct and document routine random equipment checking (audits) throughout all aspects of the work programme. This method will not only track potential movements of PA but also ensure compliance with hygiene protocols.

Routine random Kauri Dieback hygiene checks will be undertaken by the Site Supervisor and will involve:

- Approaching contractors at random in situations when hygiene procedures should have recently been undertaken i.e., when leaving a work site or a campsite.
- Inspecting footwear and/or equipment being moved for remnant soil.

Adaptive management may be required depending on the outcome of the review, adaptive procedures could include but are not limited to:

- New cleaning equipment, methods, or substances.
- The requirement for all hygiene procedure to be supervised by specifically appointed personnel to ensure the protocols are being properly adhered to.

Routine random checks will occur a minimum once a month during monitoring works.

4.3 Soil Removal Procedures

4.3.1 Personnel, PPE and Handheld Equipment

Prior to Entering Project Site

All equipment and personnel will undergo decontamination procedures prior to entering the wider Project site and will be signed off by the site supervisor prior to entry. The priority for decontamination is to ensure that equipment and personal gear is free of soil, and ideally, dry (sunlight and temperatures above 45 degrees are most effective).

The currently approved disinfectant is 2% Sterigene however it is recognised that oospores are not killed by disinfectants and should not be relied upon to sterilise residual soil.

Protocols for gear and small equipment include:

- Wash all hand held equipment with warm soapy water to ensure it is completely soil free.
- Dry gear and/ or spray with 2% Sterigene.
- Footwear will be cleaned to ensure it is free of soil and left to dry in the sun before use (if possible).

  Once free of soil, footwear will be washed at wash stations containing 2% Sterigene located at the helipads and the main office in Waihi (Figure 4). If personnel plan to enter the Project site on foot they will use the office wash station prior to leaving Waihi and then spray their boots with 2% Sterigene at the carpark immediately prior to entering the forest park. The wash station solution will be changed on a monthly basis, or more frequently if heavy useage requires, by placing the waste solution and solids into a sealed container for removal from site and disposal at an approved waste site and recharge of the station with fresh 2% Sterigene.
- The wash station will be set up a minimum of 20 m from waterways and native bush.

Figure 4 Example of wash station

On-site Hygiene Procedures

Before land disturbance:

- Define on the ground the individual KHZs comprising either individual kauri trees or kauri management stands (a kauri management stand is a group of kauri where radii of 3 times the drip lines of individual trees overlap and is treated as one kauri hygiene zone) that will be affected by the land disturbance (Figure 5).
- Establish wash stations at the access point(s) on the immediate margin of each KHZ.
- Establish the onsite infrastructure necessary to ensure that all equipment and boots can be cleaned to be free of soil and organic material and sprayed with 2% Sterigene before they enter/exit the KHZ.

Soil removal and decontamination will be undertaken whenever personnel are entering or exiting the monitoring site KHZ.

Personnel moving between sites will remain on designated tracks, designed to avoid KCZs as far as practicable, to reduce the risk of spreading potentially contaminated material. Wash stations will be established at the helipads, the campsite, the monitoring sites and at the entry/ exit points from the any field tracks servicing the aforementioned sites as illustrated in **Error! Reference source not found.**.

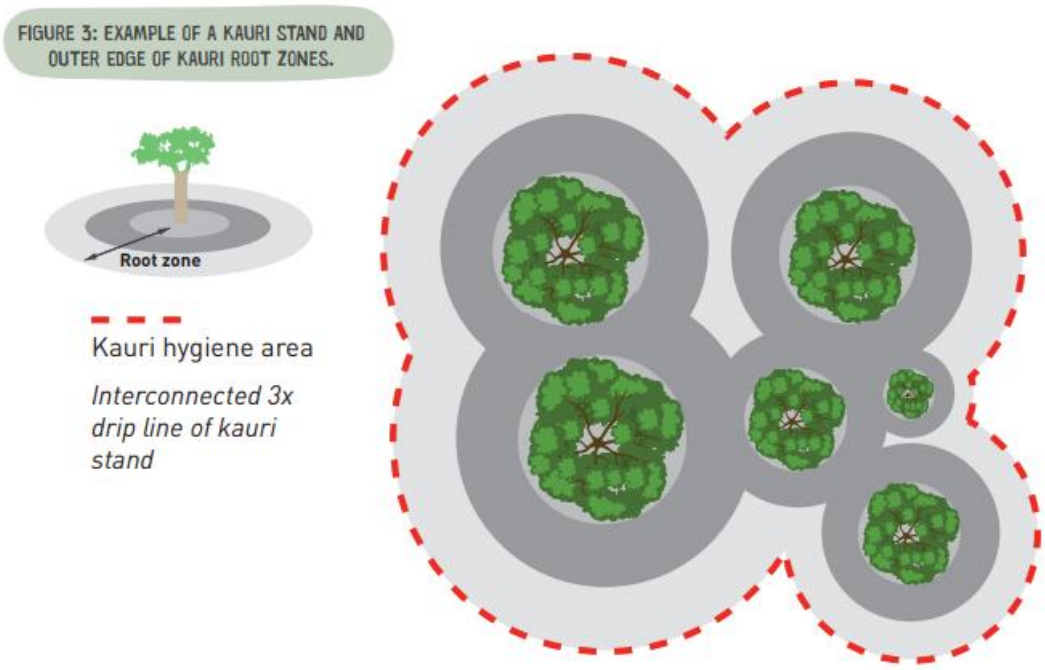


Figure 5: Example of a kauri stand and outer edge of kauri root zones.

After sites become operational/soil disturbance begins:

- Once on site, before heading to work areas personnel will undergo soil removal procedures. These same procedures will also be repeated before exiting work areas.
- Soil from PPE and handheld equipment will be cleaned off into wash stations. Solution from the wash stations is buried in a sump at least 20m from any watercourse.

4.3.2 Procedures for Large Equipment and Machinery

Prior to Entering Project Site

All previously used machinery will be cleaned off site in an area where water will be going directly into a storm water drainage system without coming into contact with native vegetation, particularly kauri. Off-site hygiene protocols include:

- Machinery will be sprayed down with a water blaster to remove all soil.
- All cleaned machinery will be inspected by the Site Supervisor and if they are satisfied that it is soil free it will then be sprayed with 2% Sterigene.

On-site Hygiene Procedures

If a site is within a KHZ then cleaning with water onsite should be minimised to reduce the potential for spread of waterborne PA spores. On site hygiene protocols within a Kauri Contamination Zone include:

- Any large pieces of equipment will be placed on clean untreated pine bed logs that will remain on the work site after the equipment has been removed, meaning the equipment will not come into contact with the ground (see **Error! Reference source not found.**).
- All equipment will still be put through the soil removal and decontamination process when leaving each work site.
    - Moveable equipment brushed down with a stiff brush to remove excess dirt.
    - The equipment will be inspected by the Site Supervisor and if they are satisfied that it is soil free it will then be sprayed with 2% Sterigene and signed off for moving by the Site Supervisor.
    - Where possible we will set up areas for changing out of and into area specific footwear (camp and the monitoring sites) and leaving footwear in labelled lockers/bags. This will minimise the amount of cleaning that we will need to do during the operation and keep the camp and monitoring areas clean from wet footwear.
- The equipment can then be airlifted to the next work site where it will be placed on new wooden bedlogs.

Figure 6: Example of equipment on raised wooden platform.

4.3.3 Equipment Entering Waterways

Equipment that comes into contact with stream systems will undergo decontamination procedures prior to their use and will stay in situ for as long as possible to reduce the risk of spreading potentially contaminated material.

- Prior to entering the Project site, pumps, water lines, river level and flow monitoring devices and associated equipment will be cleaned as described in Section 4.3.2.
- If the pump site lies within a KHZ, prior to moving equipment:
    - Pump hose fittings will be cleaned and washed with a stiff brush.
    - The pump and pipe fittings will be inspected by the Site Supervisor and if they are satisfied that it is soil free it will then be sprayed with 2% Sterigene, left to stand for at least 1 minute and then signed off for moving by the Site Supervisor.
- Should the pipeline traverse a KHZ and come into contact with the soil within that zone then that section of pipe will be scrubbed with a stiff brush, washed and sprayed with 2% Sterigene and left to stand for at least 1 minute before moving it. Where possible, the pipe should be elevated to avoid contact with the ground.

4.4 Detection and Escalation Procedures

Phytophthora agathidicida is not known to be present in the vicinity of the Wharekirauponga catchment, and surveys of kauri trees within the project site have detected no evidence of infected trees. Protocols outlined in this plan are a precautionary measure to prevent the disease being introduced into the area, and to prevent its further spread if it is present but not detected. However, the Superintendent - Environment (in liaison with DOC and/ or MPI) may revise or expand management provisions if PA is confirmed within the locality.

Clear communication pathways will be key to a rapid response. Upon identification of changes in tree condition (identified in baseline assessment), the tree(s) will be photographed, and its condition updated including a description of the severity of its condition. This information will be forwarded onto the Superintendent - Environment who will inform the DOC 'Manager', MPI and Tiakina Kauri as soon as possible.

"Adaptive management" procedures will be context specific and be dependent on advice received from the 'Manager' and other expert parties (i.e., MPI / Tiakina Kauri) who can trigger a requirement for any or all of the following management actions that could include:

- Review of hygiene procedures.
- Review of soil disposal procedures.
- Stopping works and placing a quarantine over contaminated monitoring sites while hygiene procedures are reviewed.

4.5 Training Communication and Signage

4.5.1 Training

Ensuring all contractors are aware of the potentially severe impacts of kauri dieback disease and how it is spread is a critical aspect of this KDMP. All contractors will be trained before entering the site. Training should be carried out by the Site Supervisor and should include the following:

- The background of Kauri Dieback disease; the organism that causes it and how it infects kauri.
- The impacts of Kauri Dieback Disease on kauri and the wider forest ecosystem.
- How the disease is spread with particular emphasis on how only the smallest amount of contaminated soil could create a widespread infection in the long term.
- That there is no known cure for Kauri Dieback Disease and that if PA is introduced to the area it is not currently possible to eradicate it.
- How to identify kauri trees and the symptoms of kauri dieback.
- Where mapped kauri are located relative to tracks and sites within the project area.
- The appropriate escalation procedure if they find evidence of Kauri Dieback Disease.

The goal of this training is to engage with contractors about the potential and irreversible impacts of Kauri Dieback Disease and to ensure that they are fully aware that their actions are the primary defence against the spread of Kauri Dieback Disease. The training will focus on how each individual making sure their equipment is completely clean of soil is crucial and if procedures are

not adhered to the potential outcomes will be irreversible. This aim of this approach is to facilitate contractors to understand that they have a key role in protecting the environment they are working in rather than just following instructions with little context as to why the protocols have been put in place.

Training will be undertaken at the beginning of the project and will be repeated for any new personnel before they enter the site. Refresher training will be undertaken as required should there be changes to the KDMP for example. This can be incorporated into the mandatory pre-checks carried out by the Site Supervisor to ensure all equipment is clean before entering the site (see Section 4.3.1).

4.5.2 Signage

Signage will be placed around the campsite and active monitoring sites to reinforce the hygiene procedures outlined in the training and to provide clear instructions on the escalation procedures if they find kauri with symptoms of dieback.

5.0 Updates to the plan

It is the responsibility of the Project Ecologist to stay up to date with advances in the research of Kauri Dieback Disease.

If new information is supplied, the Project Ecologist will assess the need to update the KDMP, update it accordingly and send it to the Superintendent - Environment for review before sending onto the 'Manager' for approval. Once approved, the updated plan will be sent to the Site Supervisor who will implement it on the Project site.

6.0 Reporting

As indicated in multiple sections of the document, all suspected sightings of Kauri Dieback Disease, will be reported to the Superintendent - Environment who will report it to the DOC 'Manager', MPI and Tiakina Kauri.

Further to these case by case reports, an annual memo will be issued to the 'Manager' which consolidates these reports and provides information on the ongoing condition of infected trees as well as adaptive management procedures undertaken to contain the spread of the disease.

Reports will also be provided whenever new tracks are established to document any kauri near the track that should be included in surveillance monitoring.

Reports will accompany the Annual Work Programme summary report.

7.0 Conclusion

Kauri Dieback Disease is a currently untreatable infection caused by the fungus-like organism (PA) that is having large scale impacts on forest ecosystems containing kauri throughout the Auckland and Northland regions. It is believed that people moving contaminated soil on their footwear and various other equipment is the primary long range vector of PA. To date Kauri Dieback Disease is contained to just two areas on the Coromandel Peninsula, and strict hygiene measures for anyone entering forested areas are pivotal in the containment of the disease in the Coromandel. This is particularly the case for works such as the Thames Coromandel monitoring activities as they consist of multiple personnel and equipment/machinery of various sizes entering and moving around a forest site containing kauri on an ongoing basis.

The consent outlines the requirements of a Kauri Dieback Disease Management Plan with the purpose “set out the procedures to be used to prevent the activities authorised under this consent in the Coromandel Forest Park causing the introduction and/or spread of Kauri Dieback Disease”. The KDMP achieves this by following the NPMP for PA and guidance from available supporting documents.

The plan outlines a set of simple principles (Section 4.1) and proposes achievable but effective hygiene procedures that minimise the risk of PA being introduced and/or spread around the Project site. Further to these procedures a rapid adaptive management response is provided for should the disease be identified in the area.

The management plan will be reviewed as new information relating to Kauri Dieback Disease comes to hand to ensure the plan provides the best known methods for preventing the introduction and/or spread of the disease to the Project area.

Appendix 1: National Pest Management Plan for PA – Rules that Apply to the Thames Coromandel Monitoring Activities

Plan rule 1: obligation to report

(1) An occupier of land who recognises that a kauri on the land is exhibiting any symptoms of PA must, as soon as is reasonably practicable, report the symptoms and the location of the kauri to the management agency, an inspector, or an authorised person.

(2) Subclause (1) does not apply to an occupier who knows that the management agency is aware that the tree is or may be exhibiting symptoms.

Plan rule 2: provision of information

1) A person must provide the management agency, an inspector, or an authorised person with any information of a kind described in subclause (3) that is requested in writing by the management agency, inspector, or authorised person.

2) The person must provide the information within the time specified in the request, which must be reasonable and not less than 48 hours from the time the request is made.

3) The information is any information about—

(a) kauri trees, including dead kauri trees, or any alternative PA host plant material; and

(b) soil or growing medium that has or may have come into physical contact with a kauri tree or alternative PA host plant material; and

(c) machinery, equipment, or persons that may have come into physical contact with—

(i) any kauri tree or alternative PA host plant material; or

(ii) any soil or other growing medium that has been in physical contact with any kauri tree or alternative PA host plant material.

Plan rule 4: PA risk management plans

(1) An occupier of land must have, and operate in accordance with, an approved PA risk management plan if a management agency, an inspector, or an authorised person gives the occupier written notice that the land is at risk of PA.

(2) The occupier must submit a PA risk management plan for approval by the management agency, an inspector, or an authorised person within a time that is reasonable and not less than 90 working days after the notice is given.

(3) The objective of a PA risk management plan is to detail how—

(a) the spread of PA will be controlled, including how it will be contained to exclude it from any kauri forest; or

(b) the effects of PA will be limited.

(4) A PA risk management plan must contain—

(a) the objective of the plan; and

(b) the actions to achieve the objective of the plan; and

(c) a map of the land identifying any kauri tree locations and other significant features such as roads, other trees, tracks, and cleaning stations; and

(d) procedures and practices to ensure that the actions in paragraph (b) meet the objective of the plan; and

(e) procedures for reporting to the management agency, inspector, or authorised person on the implementation of, and compliance with, the plan.

(5) In subclause (1), land is at risk of PA if—

(a) there is a risk of kauri trees on the land being infected by PA; or

(b) the land—

(i) has kauri or alternative host material that is infected by PA; or

(ii) is a pathway from land on which kauri or alternative PA host plant material is infected by PA to other land

Plan rule 5: earthworks PA risk management plan

1) An earthworks risk management plan must contain—

(a) the objective of the plan; and

(b) the actions to achieve the objective of the plan; and

(c) a map of the land (which may include areas outside the kauri hygiene zone) identifying—

(i) kauri tree locations; and

(ii) the boundary of any earthworks; and

(iii) points from where the earthworks site may be accessed; and

(iv) signs identifying from where the earthworks site may be accessed; and

(v) where kauri hygiene protocols are displayed; and

(vi) where vehicles may be parked (if applicable); and

(vii)where items contaminated with soil may be washed down; and

(d) procedures for cleaning all vehicles and equipment to prevent PA entering or leaving the site; and

(e) procedures for—

(i) the management of any soil, sludge, or organic material that is retained within a kauri hygiene zone; and

(ii) transportation of that soil, sludge, or organic material to a landfill approved by the management agency, inspector, or authorised person for that purpose; and

(f) procedures to limit the risk of water potentially contaminated with PA entering—

(i) a kauri hygiene zone; or

(ii) a kauri forest; or

(iii) a water course connected to a kauri hygiene zone or kauri forest; and

(g) procedures to ensure that all persons entering the earthworks site are provided with a copy of the plan; and

(h) procedures for reporting to the management agency, inspector, or authorised person on the implementation of, and compliance with the plan, which must include—

(i) annual reporting on compliance with the plan; and

(i) immediate reporting when there is significant non-compliance with the plan; and procedures to ensure that the management agency, inspector, or authorised person is notified of the start and end of each earthworks

Plan rule 8: obligation to clean items before entering or exiting kauri forest

(1) Immediately before entering or exiting a kauri forest, a person must clean any risk item that is in

their possession.

(2) The person must clean the risk item so that visible soil and organic matter is removed.

Plan rule 9: obligation to use cleaning stations

(1) A person who uses a track or road in a kauri forest must clean applicable items at each cleaning station they pass.

(2) The item must be cleaned so that visible soil and organic matter has been removed.

(3) An applicable item is an item that the cleaning station is designed to clean.

Plan rule 10: open tracks and roads in kauri forest

1) This rule—

(a) applies to an owner of land in a kauri forest if a track or road passes through that land; but

(b) does not apply in respect of a track of which the owner is unaware or that is not intended for public use.

(2) The owner must comply with 1 or more of the following requirements:

(a) ensure all tracks and roads avoid the kauri hygiene zone:

(b) install 1 or more cleaning stations to remove visible soil and organic matter from risk items:

(c) install track surfacing to minimise the risk of—

(i) the spread of soil or organic matter into, within, or from a kauri hygiene zone; and

(ii) contact with kauri fibrous roots by risk items.

(3) If the owner complies with subclause (2)(b) or (c) the owner must ensure that groundwater and surface water drain away from kauri trees.

Appendix 2: Kauri health assessment form

Individual sampling tree Version 5

Sample Reference number _____

Site Name **Tree point number** **Date**

Soil temperature __C Soil moisture Saturated/Wet/Moist/Dry

Collection Members _____

NZMGE	MZMGN	Altitude	Aspect (compass)	Tree location	
				Plateau / Ridge / Spur / Gully	
HEIGHT CLASS	Canopy/emergent	Ricker/pole >4m	Sapling 1-4 m	Seedling 0.1 <1 m	
Trunk diameter (m)					
MANAGEMENT and IMPACTS	Distance to track/road or disturbance (m)	Tree has insect damage to trunk (**if yes add comments back of sheet**)	Plantation or management (**if yes add comments back of sheet**)	Potentially swamped with water during the year	Lichens or epiphytes on trunk (**if yes take photo and comments on back of sheet**)
		yes / no	yes / no	yes / no	yes / no
CANOPY	Good condition (1)	Foliage thinning (2)	Some branch dieback (3)	Severe dieback (4)	Dead (5)
CIRCUMFERENCE OLD BLEEDS	None	<10%	10-50%	51-80%	81-100%
CIRCUMFERENCE NEW BLEEDS	None	<10%	10-50%	51-80%	81-100%
TOP HEIGHT OF FRESH RESIN BLEED	None	<20 cm	20-50 cm	>50-100 cm	
and PHOTOS	Trunk / Bleeds	Canopy shot	Insect damage photo Yes / no	Fungal bodies photo Yes / no	
PIG ROOTING	None	Few holes	Moderate (>10-<50%)	Extensive (>50%)	

Appendix 3: Protecting kauri: Principles of hygiene.

PROTECTING KAURI: PRINCIPLES OF HYGIENE

Preventing the spread of kauri dieback disease with best practice hygiene guidelines

Prepared by:
Kim Parker (Waikato Regional Council)
Yue Chin Chew (Auckland Council)

Endorsed by:
Auckland Council, Waikato Regional Council, Northland Regional Council, Bay of Plenty Regional Council and Department of Conservation.

Consultation and peer review
Thanks to the following for their expert advice and support in the development of these principles.

Agency	Participants
Kauri Dieback National Programme - planning and intelligence workstream	Chris Green (DOC), Travis Ashcroft (MPI), Tony Beauchamp (DOC), Gavin Clapperton (NRC), Murray Fea (AC)
Auckland Council Kauri Dieback Team	Lisa Tolich, Zacc Forbes-Smith, Murray Fea, Alistair Smith
Department of Conservation	Lindi Eloff, Tony Beauchamp
Northland Regional Council	Gavin Clapperton, Adrian Peachey

PRINCIPLES OF HYGIENE

The following six principles are fundamental truths when it comes to the best actions to protect kauri from kauri dieback disease. They have been developed for people who are operating off track and serve as the foundation for behaviours to aid in protecting kauri. They are based on best current scientific information available.

Kauri dieback disease is caused by a microscopic soil-borne organism called *Phytophthora agathidicida* (*P. agathidicida*). This organism enters the tree through its root system and affects the tree's ability to transfer nutrients and water, in effect starving the tree.

For further information on kauri dieback and for best practice guidelines around specific activities, visit **kauriprotection.co.nz.**

This is an interim document while the National Kauri Protection Programme establishes the National Kauri Dieback Pest Management Plan and management agency. Once established, the National Kauri Protection Programme will create materials for the implementation of the plan which will include principles of hygiene for kauri protection and other supporting materials for activity type.

1. AVOID KAURI FORESTS

Choose to undertake your activity or event away from forests with kauri in them, where possible. This is the best action you can take to protect kauri as it wholly stops human-mediated movement of dirt into kauri areas.

2. AVOID KNOWN INFECTED SITES

a) No activities should take place in areas contaminated with *P. agathidicida*.

b) Avoid activities downslope of known infected areas.

c) If activities are required within a contaminated area, get advice from the appropriate land management agency or regional council kauri dieback team prior to undertaking them.

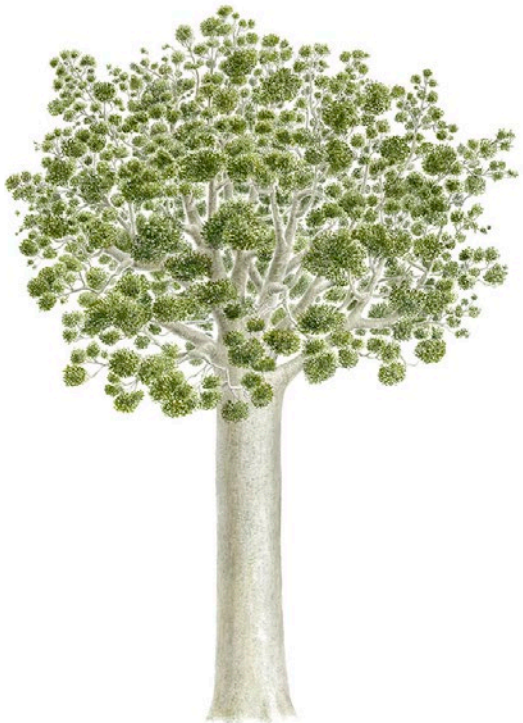
Hygiene considerations will include, but are not limited to, not moving footwear, clothing and equipment from contaminated areas to other sites.

For further information on kauri locations or kauri dieback sites on public land, contact your local Department of Conservation (DOC) office. Regarding kauri in regional parks or private land, contact Auckland Council, Northland, Waikato or Bay of Plenty regional councils or the Ministry for Primary Industries. Visit kauriprotection.co.nz/kauri-maps to view a kauri dieback locations map (note not all sites are marked on this map due to Privacy Act requirements).

LIFE STAGES OF KAURI

RICKER

EMERGENT



MATURE

3. IF IN KAURI FORESTS, AVOID KAURI

It is best to avoid contact with kauri as far as possible. Therefore, planning your activities prior to undertaking them is critical.

In situations where it is not possible to avoid kauri, and hygiene measures can be undertaken, the following procedures must be performed.

a) Undertake your activities away from kauri. Plan routes to avoid kauri.

b) Structure work procedures to take place in low-risk locations first, for example, work on-track before working off-track.

c) Stay outside the kauri root zone (see figure 1). This includes all vehicle, machinery and equipment.

d) When selecting a route to avoid kauri, stay downslope of healthy kauri and upslope of infected kauri where possible (see figure 2). This further reduces the likelihood of the pathogen entering healthy stands through downward soil movement.

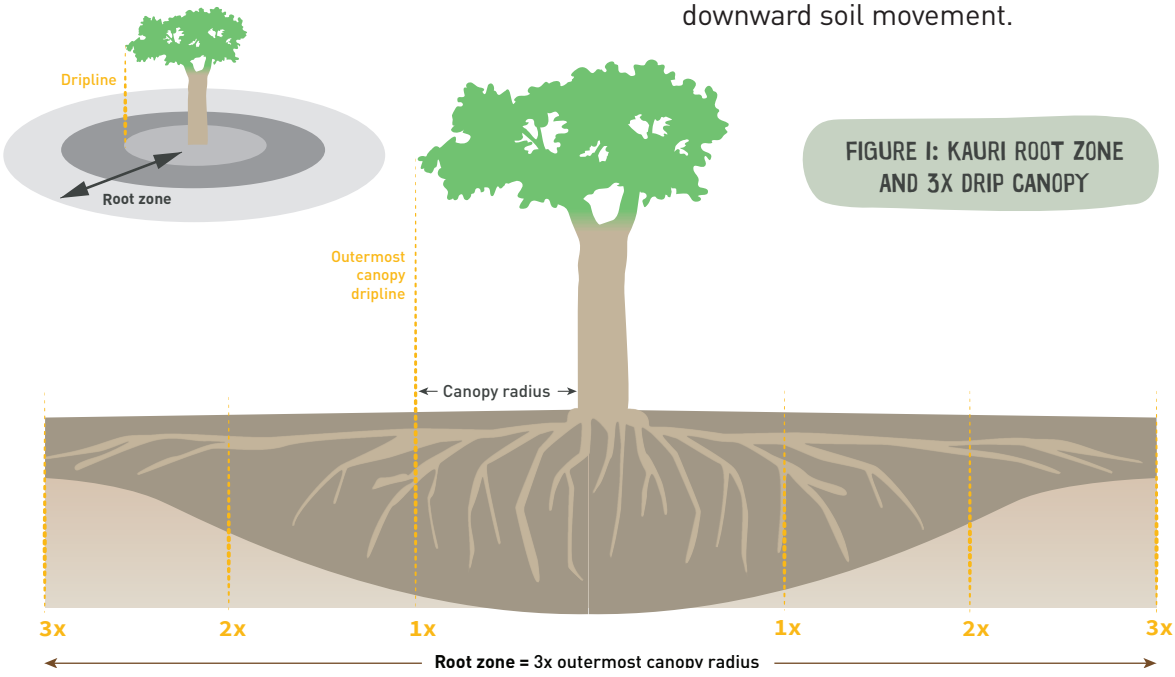


FIGURE 1: KAURI ROOT ZONE AND 3X DRIP CANOPY

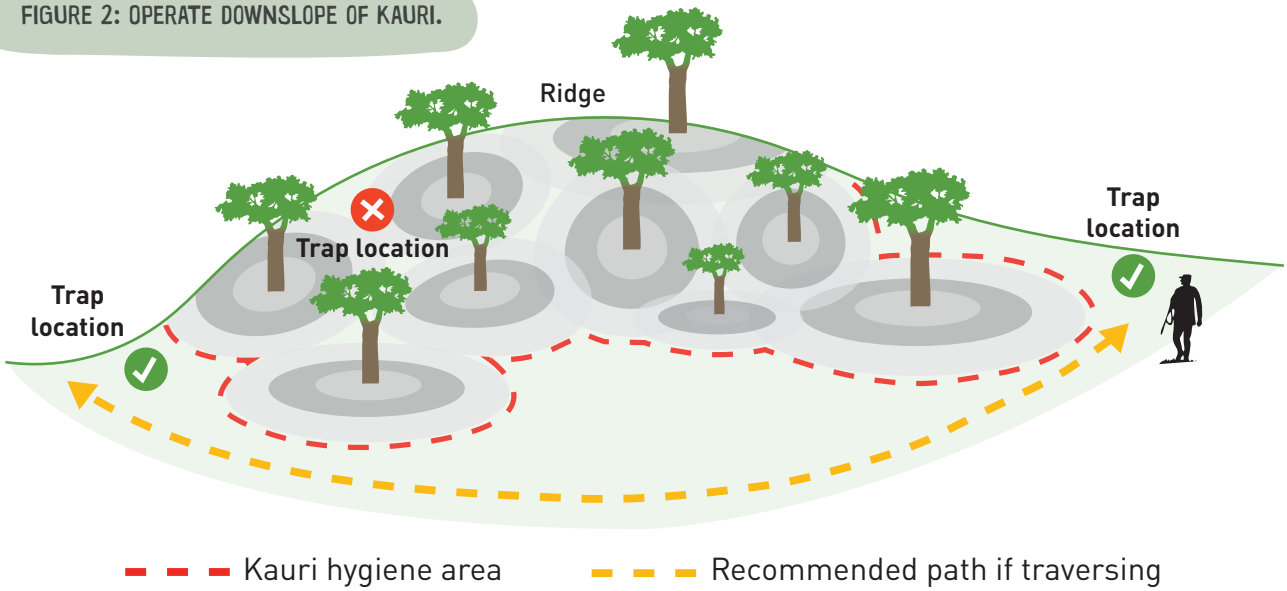


FIGURE 2: OPERATE DOWNSLOPE OF KAURI.

4. KEEP AWAY FROM KAURI IN WET CONDITIONS

Carry out your activities in dry conditions and avoid muddy areas. Reschedule activities when weather forecasts are for rain and underfoot conditions will be or are wet.

P. agathidicida spores are more active when it is wet, and muddy conditions make it more difficult to manage dirt movement. Working when it is dry underfoot is much better for protecting kauri.

5. ELIMINATE DIRT MOVEMENT.

ARRIVE CLEAN, CLEAN WITHIN, AND LEAVE CLEAN

If it is not possible to avoid operating near kauri, you must apply stringent hygiene procedures. These must be undertaken **before** heading into kauri areas, **within** kauri areas and **after** leaving kauri areas.

a) Prior to arrival, ensure that you, your footwear, clothing and equipment are dirt-free and disinfected.

b) Keep all equipment off the ground.

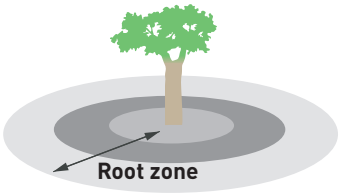
- Consider using carabiners or ropes to keep items off the ground or use single-use tarpaulin (to be disposed of) to keep items off the ground.

c) When moving between kauri trees or stands, ensure you remove all dirt from footwear, clothing and equipment, then apply disinfectant and leave on for at least one minute. Do these actions outside the root zone of kauri (see figure 3).

- Use disposable overshoe booties. They are an effective means of stopping dirt transfer from footwear as they provide a barrier between footwear and dirt.
- Use disposable gloves when working with dirt within kauri root zones.
- Do not reuse booties or gloves unless they can be heat-treated. If so, treat at a minimum temperature of 50 degrees Celsius for 24 hours. (See **kauriprotection.co.nz/how-to-guides**.)

DISPOSABLE OVERSHOE BOOTIE EXAMPLE

FIGURE 3: EXAMPLE OF A KAURI STAND AND OUTER EDGE OF KAURI ROOT ZONES.



Kauri hygiene area

Interconnected 3x drip line of kauri stand

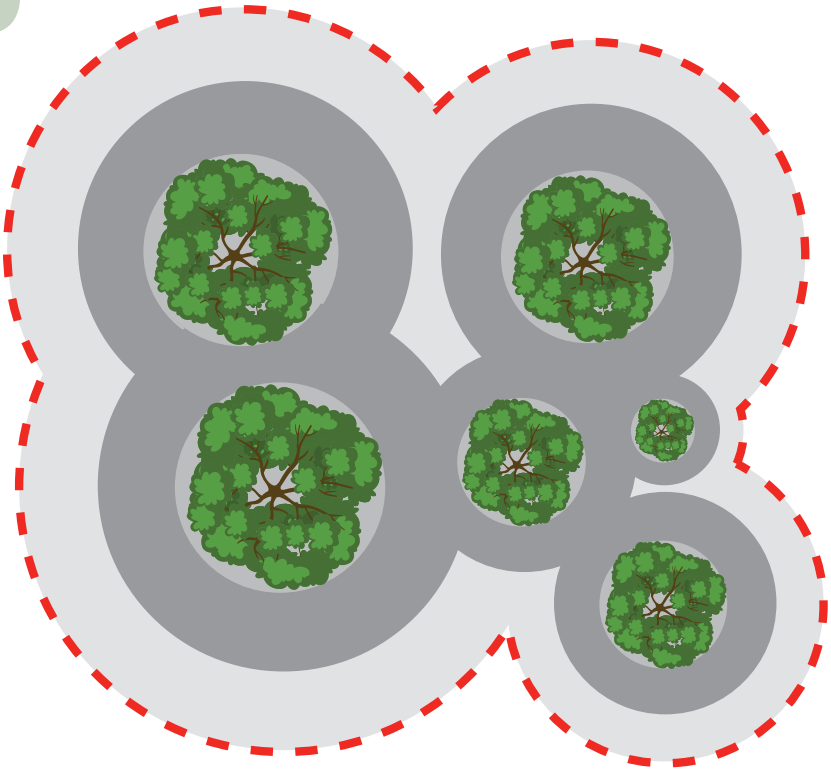
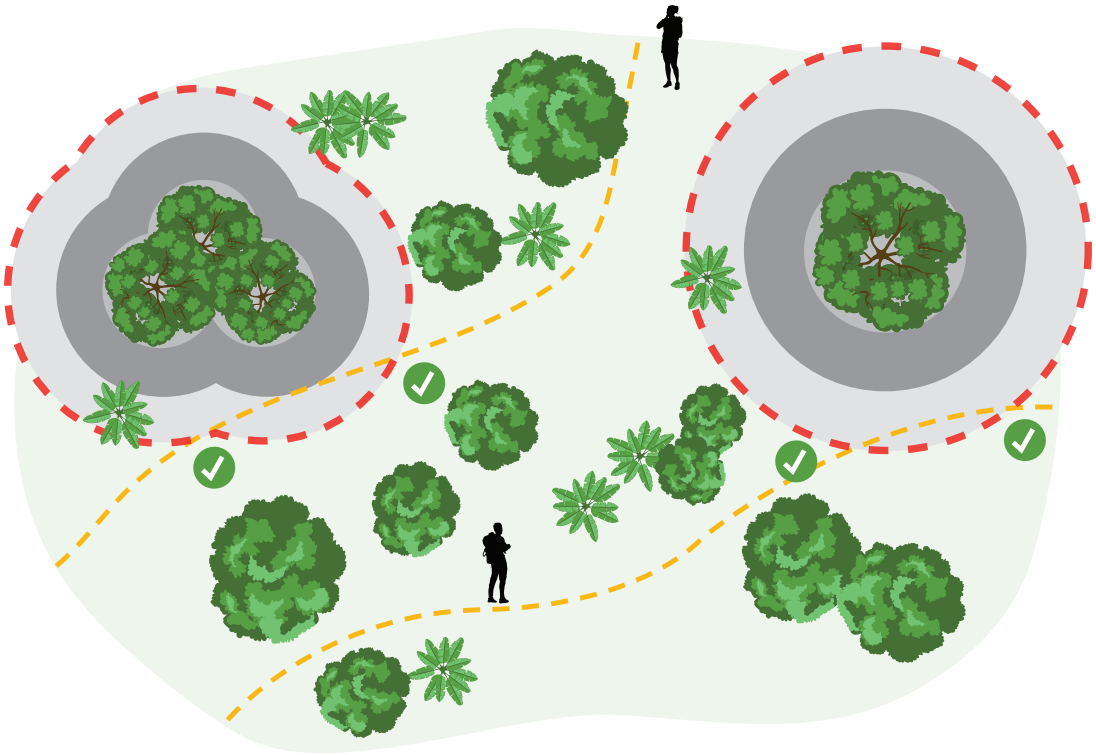


FIGURE 4: EXAMPLE OF CLEANING AREAS, FOR WHEN IT IS NOT POSSIBLE TO AVOID KAURI.



Point to clean gear and/or put on overshoe booties

Kauri hygiene area

Path you are taking

6. REMOVE ALL DIRT THEN DISINFECT

a) Clean/remove all dirt from all gear, equipment, machinery and people.

b) After all dirt is removed, apply disinfectant* and leave on for at least one minute.

c) Where possible, use heat to sterilise equipment at a minimum temperature of 50 degrees Celsius for 24 hours (see **kauriprotection.co.nz.how-to-guides**).

*The disinfectant approved by the National Kauri Protection Programme is SteriGene at 2 per cent for broad-spectrum use. Methylated spirits (minimum concentration of 70 per cent) can also be used for spot treatment and cleaning of small equipment (i.e. handheld tools).

CARRY A HYGIENE KIT. USE HYGIENE STATIONS.

Always use hygiene stations where available and carry a hygiene kit. A hygiene kit should include:

- a hard brush to remove all dirt from footwear
- overshoe booties and/or disposable gloves for when working within kauri root zone (if not possible to avoid)
- a spray bottle containing disinfectant
- a disposable sealable bag to store dirty items.

Ensure there is separation between areas where you store dirty items and clean items. For example, in your backpack, have set areas for clean equipment and dirty items.

DIRTY SHOES VS DIRT-FREE SHOES.

FOR MORE INFORMATION ON PROTECTING KAURI HEAD TO KAURIPROTECTION.CO.NZ

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