

# **National (Kauri dieback) Pest Management Plan proposal – Working draft**

**Proposal to meet requirements of Section 61 of the Biosecurity Act**

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## 1. Introduction

This document is a proposal by the Kauri Dieback Governance Group to establish a National (Kauri Dieback) Pest Management Plan under the Biosecurity Act 1993, to meet the requirements under Section 61 of that Act.

This proposed National (Kauri Dieback) Pest Management Plan supports a locally implemented approach to kauri dieback management. It aims to unite and enable efforts of local communities, iwi and hāpu, agencies, industry and business, and other non-governmental organisations to take action. And it provides for appropriate consistency and a coordinated approach to management.

At the heart of the proposal is the Treaty of Waitangi partnership between the Crown and Māori. This partnership will be incorporated in new management agency arrangements, including how decision-making and resource allocation will work at all levels of the programme.

This proposal includes content to meet the requirements of Section 61 of the Biosecurity Act 1993 only. The NPMP is the primary regulatory tool to enable implementation of a new Kauri Protection Strategy and sits within a broader toolbox that includes voluntary tools and some other regulatory tools (e.g., Conservation legislation, RMA).

Information on this wider context and strategy implementation are provided in accompanying documents. Detail relating to 'consultation' and 'cost benefit analysis' is also provided in accompanying documents. The accompanying documents are:

- Accelerating Protection for Kauri - Results of consultation 2018.
- Cost Benefits Analysis: National Pest Management Plan for Kauri Dieback Disease.
- Management agency overview
- Kauri Protection Strategy
- Kauri Protection Strategy – Implementation Overview

## 2. The name of the person making the proposal [s.61(2)(a)]

The proposer of the plan is the Kauri Dieback Governance Group (KDGG). The KDGG was formed in 2009 and provides strategic oversight and leadership for the programme. The following organisations are represented on the KDGG; Auckland Council, Bay of Plenty Regional Council, Department of Conservation, Ministry for Primary Industries, Northland Regional Council, Tangata Whenua Roopu, Te Roroa and Waikato Regional Council.

Current members of the KDGG are:

- Roger Smith (Ministry for Primary Industries)
- Mike Slater (Department of Conservation)
- Phil Brown (Auckland Council)
- Mace Ward (Auckland Council)
- Taoho Patuawa (Te Roroa)
- Patrick Whaley (Waikato Regional Council, Bay of Plenty Regional Council)
- Don McKenzie (Northland Regional Council)
- Waitangi Wood (Tangata Whenua Roopu)
- Hori Parata (Tangata Whenua Roopu)

Contact details for the present Chair, who is submitting this proposal on behalf of the Kauri Dieback Governance Group, are: Roger Smith

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### 3. The subject of the proposal [s.61(2)(b)]

The organism *Phytophthora agathidicida* (PA) is proposed as the pest to be managed in accordance with the NPMP. Where PA means ‘the primary causal agent of kauri dieback disease, known as *Phytophthora agathidicida*’. [Note to legal drafters: It is important that this definition be “future-proofed” to account for potential developments in scientific understanding of kauri dieback. For example, if an additional causal agent or agents are identified, the policy intent is that the definition of the subject would ideally allow for such agents to fall under the definition of the pest to be managed]

PA (formally named in 2015, previously it was known as *Phytophthora* taxon *Agathis*) was first associated with kauri dieback disease symptoms in 2009. Its origin is unknown but is believed to have been introduced into New Zealand sometime within the last few hundred years.

Multiple life stages of PA exist, including:

- Oospores, the main long-term survival structures of PA. Oospores are formed within infected kauri tissues, and are released into the soil as these tissues break down
- Sporangia, which are formed from oospores in moist soil conditions and these release motile zoospores in wet conditions.
- Zoospores, which swim through soil water towards kauri roots, but the distance of this movement will generally only be a few millimetres or centimetres

PA is highly pathogenic on kauri, and trees of all ages can be infected and killed. PA symptoms on kauri include:

- Yellowing of leaves - kauri tree leaves turn yellow as the disease takes effect.
- Bleeding gum - basal trunk lesions.
- Thinning canopy - given the disease strangles kauri by preventing the movement of water and nutrients throughout the tree, the canopy eventually is reduced or thins out over time.
- Dead branches - dead kauri trees and trees showing severe dieback-like symptoms such as a thin canopy and dead branches.
- Death - the last stage of kauri dieback disease is death of the tree itself where there is no canopy of the tree. Most trees infected will eventually die.

To date, kauri is the only tree known to be susceptible to PA in the field. However, it is likely that there are many other native and exotic plants that can be colonised by PA, harbouring or proliferating the pathogen without necessarily showing symptoms (symptomless hosts).

There is no known cure for kauri dieback disease at this time, and the pathogen kills most if not all the kauri it infects. It is likely that genetic variation in susceptibility is present within kauri germplasm, but genuine resistance has not yet been found.

PA is a soil-borne pathogen, with no airborne phase. It can be spread by just a pinhead of soil. Vectors potentially include anything that moves soil or plant material. Infected soil and spore movement could be passive (such as in water run-off downhill from infected sites), or active (such as in movement of soil on hikers’ boots, vehicles, machinery, tools, feral animals such as pigs, domestic animals such as cattle, and movement of infected nursery material). The relative importance of these various pathways will be proportional to the volume of soil moved and the frequency and distance of such movement. The majority of long-distance dispersal is via human activity.

A full summary of technical knowledge and assumptions about kauri dieback disease and PA is provided in Appendix 1.

#### **4. A description of its adverse effects [s.61(2)(c)(i)]**

PA damages a kauri tree's root system, reducing the tree's ability to take water and nutrients from the soil and transport it throughout the plant.

The pathogen produces a definite but not unique symptomology. Initial signs of infection can be yellowing of the leaves; eventually branches starve and die before the whole tree succumbs. Trunk lesions can also occur, although not all infected trees show these.

It can take years for dieback symptoms to appear, there is an unknown latency period. Seedlings may show symptoms within weeks of being infected. In juvenile trees, it may take a few years or more for symptoms to appear, and even longer in mature trees, possibly decades.

Though these symptoms assist with identification of potentially infected trees, it is often hard to tell if a tree is infected by looking at the tree itself. Similar symptoms may occur for other reasons like drought or age. Ultimately, the disease can be difficult to detect.

Although knowledge of how kauri are infected is sound, the level of severity (or virulence) and latency of the disease in kauri is less well understood. Scientists (including mātauranga experts) do not know exactly what factors enable the pathogen to cause disease symptoms in some trees more quickly than others. It is likely environmental conditions – such as temperature and soil moisture – play a critical role in the speed of the infection process.

Although it is clear PA has significant impact on kauri, scientists are still trying to determine the long-term impacts on kauri and kauri forests.

As a keystone species, kauri play an important role in the type of flora that resides in a kauri forest. Many plants have evolved to live on and around kauri due to the type of soil that is developed over time. Without kauri, the ecosystem is likely to be very different. There has been research looking at the long-term impacts of the disease and determining the ecological composition around healthy and diseased kauri, however a lot more research is required.

A description of current technical knowledge and assumptions based on science and mātauranga understanding is provided in Appendix 1.

#### **5. The reasons for proposing a plan [s.61(2)(c)(ii)]**

Individual and group action(s) can assist the control of PA; including minimising its' spread within and between kauri forests. Effective management of disease requires concerted action from a range of individuals, community groups, iwi and hāpu, industry, scientists and mātauranga experts, educators, and central and local government agencies. This requires a uniting goal and coordination at a national level.

Further, an independent review of the Kauri Dieback Programme<sup>1</sup> recommended 'a nationally consistent approach is required' and that 'a national or pan-regional pest management strategy' be prepared. A subsequent investigation of regulatory options<sup>2</sup> recommended a 'National (Kauri Dieback) Pest Management Plan' be developed as the primary regulatory tool for the programme.

Both the independent review and subsequent investigation identified an 'over-reliance on voluntary compliance' as a key problem needing to be addressed, in order to strengthen management of kauri dieback.

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<sup>1</sup> IQANZ (2013). *Kauri Dieback Programme: Independent review of the programme and recommendations for its next phase*. 17 October 2013

<sup>2</sup> Harrison (2016). *Scoping regulatory support for the Kauri Dieback Programme. Report prepared for the Kauri Dieback Leadership Team*. December 2015.

In addition to the stronger focus on regulation and rules needed, there is strong agreement that utilising a broader suite of compliance tools<sup>3</sup> is essential. Utilising the right incentives/interventions is integral to achieving desired behaviours to minimise spread of kauri dieback.

A national pest management plan is preferred over multiple regional pest management plans or a pan-regional pest management plan. Because the decision to approve the plan sits at the appropriate level for a nationally significant programme; with a Minister, rather than with multiple regional Councils. A consistent regional/pan-regional model would rely upon Councillors across the four relevant regional councils agreeing to include consistent rules across regions. Then rely upon subsequent Councils over successive political cycles to agree to retain these/maintain consistency. This model also creates duplication and is less efficient.

Reflecting the context above, the reasons for proposing this plan are to:

- establish clear national objectives and a nationally coordinated and consistent approach to managing the risk of PA to New Zealand's kauri forests, our culture, our communities and economy;
- give access to powers under the Biosecurity Act to require specific actions of people that use, or come into contact with kauri trees and forests;
- provide for appropriate distribution of costs; and
- secure funding for implementation over the 10-year duration of this proposed plan, through an agreed funding model between central and regional government.

## **6. The objectives that the plan would have (including zones) [s.61(2)(c)(iii)]**

The following is the proposed primary objective:

To reduce the harmful effects of *Phytophthora agathidicida* (PA) by preventing, where possible, the spread of PA and minimising its impacts on New Zealand's kauri forests, our culture, our communities and economy.

The following are the proposed secondary objectives:

1. To minimise the spread of kauri dieback

*Explanation: Kauri dieback disease has had a devastating effect in many kauri forests, and this has had a negative impact on cultural and socio-economic wellbeing of communities. Reducing the spread of this disease as much as possible, principally by controlling the spread of soil between sites, is of vital importance for the future of kauri.*

2. Maintain kauri dieback-free areas

*Explanation: Landowners of currently dieback-free kauri are desperate to keep it that way. Creating sanctuaries of kauri dieback free areas is an important part of maintaining the ecological integrity of these great trees and their surrounds.*

3. To minimise the impact of kauri dieback within infected sites

*Explanation: Kauri dieback disease, once detected, can have devastating effects. Limiting these effects by treating the disease must be an integral part of our future actions to give kauri a fighting chance.*

4. Locally eradicate kauri dieback within infected sites, where possible

*Explanation: Areas like the Waitākere Ranges have been devastated by kauri dieback. In addition to finding treatments for the disease in the near term, longer term solutions to reduce and, if possible, eradicate, the disease are also investments worth making.*

5. To protect kauri trees and stands with special values from kauri dieback

*Explanation: The name Tāne Mahuta is seen by many as being synonymous with the rich, unique landscape of New Zealand. The tree itself has deep spiritual resonance with many New Zealanders, particularly Māori. Protecting important trees and pristine kauri forests is important for New Zealand. It is also important that we protect the genetic diversity of kauri through living seed banks and kauri plantation programmes located outside of the traditional kauri lands.*

## **7. The principal measures that would be in the plan to achieve the objectives [s.61(2)(c)(iv)]**

The following are proposed as the principal measures to achieve the Plan objectives:

1. determining and establishing either (Option A) prevention zones, disease control zones and sanctuaries, or (Option B) high risk areas; [Note these options are set out in section 20 of this proposal]
2. growing awareness, partnerships, collaboration and engagement across the community;
3. applying mātauranga and the results of science and research;
4. carrying out surveillance and monitoring to enable an understanding of:
  - i. the distribution of kauri and kauri forests;
  - ii. the presence or absence, distribution, and rate of spread of PA;
  - iii. the impacts of PA on kauri trees and forests;
  - iv. the application and effectiveness of PA control tools, mātauranga Maori and other management practices;
  - v. the levels of compliance with the requirements of the Plan’;
5. implementing hygiene standards and programmes, and imposing movement controls, on risk goods that are, or may be, capable of contributing to the spread of PA;
6. the exclusion of stock
7. exclusion or control of wild animal vectors;
8. managing kauri forest access
9. improving track user infrastructure;
10. applying effective treatments to kauri trees; and
11. protecting high value kauri germplasm and planting kauri trees with reduced susceptibility to PA.

The relationship between the proposed measures above and proposed objectives in section 6 of this proposal above is shown in Table 3 below.

## **8. Other measures that it would be reasonable to take to achieve the objectives, if there are any such measures, and the reasons why the proposed measures are preferable as a means of achieving the objectives [s.61(2)(c)(v)]**

A wide range of measures have been proposed, this is to allow flexibility to then select the appropriate mix of measures to achieve the best outcome for any given kauri forest. While maintaining minimum standards and requirements set in the NPMP or by the management agency.

Requirements and minimum standards (which reduce flexibility) have been proposed to address the risk of PA to kauri and kauri forests. This approach will be balanced by recommending best practice for lower risk activities. Enabling landowners, land managers, businesses, communities and other groups of people to consider that advice, then decide the management approach best suited to their situation.

One measure that was considered but not preferred is the **removal of infected hosts (excluding cultural harvest, which is provided for in this plan)**. Removal of infected hosts is a potential measure in any disease control programme, however, for the kauri dieback programme this measure was considered inappropriate for several reasons. Firstly, science does not currently support this measure as it is unknown how long PA would survive in the soil without its kauri host (e.g., in root material, in oospores, or in alternate hosts) and therefore effectiveness of this measure is unclear. The activity of kauri tree removal on a major scale is also a potential pathway for disease spread (through associated movement of soil on equipment etc.), and for damaging other species and ecological values within kauri forests. Public acceptability of this measure is also likely to be extremely low. Cultural harvest on a modest-scale, in accordance with mātauranga and under strict conditions to manage associated risk is provided for in this proposal (refer to section 7, measure 3, above).

Another measure considered but not preferred is the **total closure of all forests with kauri to public access** - including both diseased and non-symptomatic areas. Access would only be permitted for research and monitoring purposes, and for vector control of feral animals. Private landowners who retire stands of kauri would be compensated. This option was not preferred as total closure of all forests with kauri represents a significant loss of access for recreational purposes, and mana whenua groups, some only recently reconnected with ancestral lands, would be alienated from the whenua and ngahere. A corresponding and significant risk of this measure is the alienation of New Zealanders from the environment they regard as their birth right. From trampers to dog-walkers, hunters to sight-seers – limiting access will be felt deeply. For Māori, particularly those who whakapapa to the kauri forests, the inability to access what is deeply culturally significant may be distressing. Private landowners are likely to see such closures of their land as seriously undermining property rights. Enforcement and compliance for this measure are likely to be problematic, as when communities feel alienated in this way, they are much less likely to comply. This measure would also have a significant commercial impact on ancillary industries, including film and television, and tourism (see Cost Benefit Analysis that accompanies this proposal).

Another measure considered but not preferred is **mandatory stock exclusion across all properties with kauri forest**. This measure was considered both unaffordable and as poor value for money; that is, it would direct funds to stock exclusions where those funds could be better spent on other measures that reduce the impact of PA on kauri.

## **9. The reasons why a national plan is more appropriate than a regional plan [s.61(2)(c)(vi)]**

The natural range of New Zealand's kauri forests spans Northland, Auckland, Waikato and Bay of Plenty regions. Kauri dieback has been found across three of these (Northland, Auckland, Waikato), but has not been detected in the Bay of Plenty to date.

A national pest management plan is preferred over multiple regional pest management plans or a pan-regional pest management plan. This is because the decision to approve the plan sits at the appropriate level for the national significance of the programme and with a Minister, rather than with multiple regional Councils.

It is difficult to achieve the nationally consistent approach required to manage PA with four separate planning processes, with final 'plan approval' decisions made by four separate and autonomous decision makers (i.e. regional councils). If an inconsistent approach is taken across regions this would increase the likelihood of PA having greater impact on kauri forests.

A consistent regional planning approach would rely upon Councillors of the day across the four regions agreeing to include consistent provisions, then on subsequent Councils over successive political cycles to agree to retain these.

Four plans are more confusing than one plan, noting that some landowners, business or other stakeholders operating in multiple regions could be subject to multiple plans. Any such confusion is likely to reduce levels of compliance and, therefore, effectiveness of PA management.

Administration of four plans is less efficient and more complex than administration of a single plan (e.g., duplicate issuing of permissions, reporting, audit etc.), including to manage jurisdiction issues (e.g., where an exemption is sought to move a risk good between regions).

## **10. An analysis of the benefits and costs of the plan [s.61(2)(c)(vii)]**

A full analysis of the benefits and costs of the NPMP and alternative scenarios is provided in the accompanying reports:

- Deloitte 2018. *Cost Benefits Analysis: National Pest Management Plan for Kauri Dieback Disease*. Report prepared for the Ministry for Primary Industries, December 2018.
- Deloitte 2019. *Cost Benefits Analysis Addendum: National Pest Management Plan for Kauri Dieback Disease*. Report prepared for the Ministry for Primary Industries, January 2019.

The overall cost benefit analysis is summarised as follows:

Kauri has cultural, spiritual and ecological significance to mana whenua, New Zealanders and to international visitors. Our tangata whenua are kaitiaki (guardians) of the environment and of kauri, connected to mana whenua (authority of ancestor-owned land) through customs, culture and whakapapa. New Zealanders collectively share a strong connection with and care for the environment. The outdoor culture is embraced and promoted nationally and internationally, so people can share in New Zealand's environmental beauty.

However, Kauri Dieback disease is threatening the survival of a New Zealand icon. Five distinct scenarios have been considered for the future management of Kauri Dieback: kauri extinction, status quo, forest closure, National Pest Management Plan (light funding) (NPMP light funding), and the proposed National Pest Management Plan (NPMP).

Costs and benefits of these scenarios have been quantified where possible, using Net Present Value (NPV) analysis. The analysis shows that over a 50 year period, the kauri extinction and status quo scenarios are NPV negative (\$1,189.2m and \$138.9m respectively) while the forest closure, NPMP light funding and NPMP scenarios are NPV positive (\$505.2m, \$334.4m and \$546.8m respectively). The analysis shows however that the NPV result is highly sensitive to assumptions related to the social cost of carbon, the amount of trees and the base level of disease spread. For the NPMP scenario the NPV sensitivity test results varied between (\$162.1)m and \$1,255.7m, and the NPMP light funding NPV varied between (\$374.5)m and \$1043.3m.

However, when considering the importance of kauri it is not possible to quantify all impacts under a traditional NPV framework. Costs and benefits have been assessed in qualitative form using the Treasury's Living Standards Framework with a Te Ao Māori overlay, informed by desktop research and stakeholder interviews. This qualitative discussion shows there are a number of significant qualitative or intangible benefits to the NPMP and NPMP light funding scenarios relative to the counterfactual status quo funding scenario.

These include the value of a Māori role in joint decision-making to protect biodiversity and adhering to Te Tiriti o Waitangi/The Treaty of Waitangi principles through partnership and protection of taonga, while also preserving Māori whakapapa and identity. Other benefits include an improvement of forest health and biodiversity through development of biosecurity tools based on both Western science and Mātauranga Māori. These benefits are greater for the NPMP scenario relative to the NPMP light funding scenario.

Beneficiaries of a programme to address kauri dieback include the Crown, hapū/iwi and general public. Exacerbators are landowners/occupiers, contractors, plant nurseries and the general public. The majority of the benefits fall to either the Crown / NZ Inc. or the general public as a 'public good', and so it is considered appropriate that the NPMP is funded by agencies that represent the 'public good', being Crown and local government, including local government agencies administering publicly owned lands. [Note these are considered further in sections 11 and 12 below.

Key implementation risks relate to preserving and enhancing Māori-Crown partnership, public compliance and the ability to achieve the desired behaviour change through a national plan.

Considering quantitative, qualitative and risk analysis overall the NPMP scenario is identified as the preferred method for the management of Kauri Dieback.

**11. The extent to which any persons, or persons of a class or description, are likely to benefit from the plan [s.61(2)(c)(viii)] and the extent to which any persons, or persons of a class or description, contribute to the creation, continuance, or exacerbation of the problems proposed to be resolved by the plan [s.61(2)(c)(ix)]**

A workshop held with key MPI participants identified the following beneficiaries and exacerbators in relation to Kauri Dieback. It was acknowledged that it is difficult to fully describe the beneficiaries and exacerbators and that in many cases the beneficiaries will also be exacerbators and vice versa (e.g. a runner who stays on track is not inherently an exacerbator but they can be if they go off track).

Beneficiaries	Exacerbators
Crown / NZ Inc. <ul style="list-style-type: none"> <li>- Domestic reputation</li> <li>- International reputation</li> <li>- Relationship with Māori</li> </ul> Hapū/iwi <ul style="list-style-type: none"> <li>- Food and medicine</li> <li>- Cultural identity</li> </ul> General public <ul style="list-style-type: none"> <li>- Recreationalists</li> <li>- Tourism</li> <li>- Long-term continued use of kauri forests</li> <li>- Jobs</li> <li>- Capability development</li> </ul>	General public <ul style="list-style-type: none"> <li>- Walkers / runners</li> <li>- Mountain bikers</li> <li>- Hunters</li> <li>- 4WD users</li> <li>- People who release feral animals</li> <li>- International tourists</li> </ul> Landowners / occupiers (Crown, regional councils, private) <ul style="list-style-type: none"> <li>- Soil movement</li> <li>- Turf movement</li> <li>- Stock movement</li> <li>- Market gardeners</li> <li>- Vectors: possums, pigs, deer, goats</li> </ul> Contractors <ul style="list-style-type: none"> <li>- Forestry</li> <li>- Tracks / Roads</li> <li>- Utilities</li> <li>- Fencing</li> <li>- Agricultural / horticultural contractors</li> </ul> Plant nurseries

A full breakdown of the different classes of persons who are exacerbators in relation to the spread of PA, and their associated level of risk and residual risk, is provided in Appendix 2.

## **12. The rationale for the proposed allocation of costs [s.61(2)(c)(x)]**

There is no industry or group who benefit or have the ability to limit the spread of the disease. In addition to this unique characteristic of Kauri Dieback, non-market values are difficult to model because of the lack of fundamental data. It is therefore considered unrealistic to attempt to impose costs for the identified beneficiaries or exacerbators.

Targeted marketing and education are ideal methods to promote biosecurity compliance and positive behaviour change. The process that would generate the best outcomes would be to educate exacerbators and forest user groups, and support and empower them to make positive changes.

Key forest user groups are identified as:

- Private Land Owners
- Recreational Users
- Locals
- Hunters
- Community Groups
- Contractors
- Tangata whenua
- Schools
- Tourists (Domestic and International)

In some cases, the changes required by exacerbators may incur a cost, which may be passed on to another party (e.g. forestry contractors will need to be more careful with soil movements, which they may add to the cost of their services).

The majority of the benefits fall to either the Crown / NZ Inc. or the general public as a 'public good'. It is therefore considered appropriate that the NPMP is funded by agencies that represent the 'public good', being Crown and local government, including local government agencies administering publicly owned lands.

## **13. If it is proposed that the plan be funded by a levy under section 100L, how the proposed levy satisfies section 100L(5)(d) and what matters will be specified under section 100N(1) [s.61(2)(c)(xi)]**

N/A – it is not proposed that the plan be funded by a levy.

## **14. Whether any unusual administrative problems or costs are expected in recovering the costs allocated to any of the persons whom the plan would require to pay the costs [s.61(2)(c)(xii)]**

No unusual administrative problems or costs are expected.

## **15. Any other organism intended to be controlled [s.61(2)(d)]**

Wild animals that potentially spread PA will be subject to disease control measures in accordance with this proposal (refer to sections 7 and 20 of this proposal). Kauri plant material, including seeds and nursery plants, will also be subject to disease control measures in accordance with this proposal (refer to sections 7 and 20 of this proposal).

**16. The effects that, in the opinion of the person making the proposal, implementation of the plan would have on economic wellbeing, the environment, human health, enjoyment of the natural environment, and the relationship between Māori, their culture, and their traditions and their ancestral lands, waters, sites, wāhi tapu, and taonga [s.61(2)(e)(i)]**

**Effects on economic wellbeing**

Financial benefits of undertaking the NPMP are quantified in the accompanying CBA, including:

- Carbon sequestration provided by kauri trees \$279.3m NPV
- Market value of kauri wood \$712.5m NPV

Note the market value referred to here is not intended to fully capture the intrinsic value of kauri but rather set a minimum value.

There is potential for kauri to be commercially planted and harvested, with kauri timber highly valued for its wood-working properties and appearance. Its scarcity also adds to its value. Planted stands can be high-performing and yield good growth rates. Commercial kauri have demonstrated a significant and positive net present value on land with no assigned land value – which may make it most suitable for cultivation on multiply owned Māori land, where ownership is intergenerational and for which no other land use is applied. More immediately, there are initiatives in place at the regional level, with partnerships between hapū/iwi, communities and authorities.

Domestic and international film and television producers base many of their activities in Auckland, considered to be an ideal location for filming due to the close proximity of forest filming and studio production. Restrictions on access to forests and bush may push screen production to other locations in New Zealand or to other jurisdictions.

New Zealand's kauri forests attract tourists and contribute to the landscape and image New Zealand is famous for – and which New Zealanders are proud of. Tourism spend across regions with kauri forest is \$13,979m<sup>4</sup>. The specific economic impact of kauri dieback and NPMP implementation on New Zealand's tourism sector is considered further under section 16 below.

The impact Kauri Dieback could have on regional GDP is difficult to quantify. The total GDP across regions with kauri forest is \$145,508m<sup>5</sup>, and it could be assumed there would be some impact to these figures, particularly in Northland.

The financial costs associated with the NPMP in relation to the status quo largely relate to the additional funding required to implement the plan. If short-term closures are required in certain areas of kauri forests, tourism may be impacted; anecdotal evidence suggests tourism operators are already being affected by track closures as part of regional management plans.

Further information on effects of NPMP implementation on economic wellbeing are covered in the cost benefit analysis referred to in section 10 of this proposal.

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<sup>4</sup> Regional Tourism Spend, YE June 2018. Source: MBIE; <https://www.mbie.govt.nz/info-services/sectorsindustries/tourism/key-tourism-statistics>

<sup>5</sup> Regional GDP, YE March 2017. Source: Statistics New Zealand; <https://www.stats.govt.nz/informationreleases/regional-gross-domestic-product-year-ended-march-2017>

## **Effects on the environment**

Although the emphasis of protection is on kauri, its health has benefits to the biodiversity of a much wider forest ecosystem. The presence of kauri makes forests distinctive; even when it is not the dominant tree in the canopy, a stand is still called a 'kauri forest'.

Kauri's longevity and size means that it has been cited as a foundation species. Along with its ability to change the soil environment, kauri influences the surrounding plant life and creates a distinct mix of natives, including totara, rimu, tanekaha and puriri. As part of a healthy forest, kauri also provide wider ecosystem services such as protection from soil erosion and floods.

Kauri's role as an 'ecosystem engineer' means its absence could have a ripple effect throughout bushlands. The spread of Kauri Dieback could result in the loss of endemic species, changes in plant community structure, increased soil erosion, and changes in hydrology. Because of the ecological influence and dominance that kauri exerts, the loss of kauri as a result of Kauri Dieback will have dramatic ecological consequences. This would increase the chances of extinction for many species highly dependent on kauri. As well, loss of kauri patches and their species diversity, would result in an overall loss of forest diversity at local and landscape scales.

Kauri Dieback infects all sizes of kauri and does not appear to behave differently in different landscapes or ecological situations. This suggests the disease will eventually strongly reduce abundance or entirely eliminate kauri in forests in which Kauri Dieback occurs, leading to large changes in forest structure and composition.

A loss of kauri could negatively impact air quality and greenhouse gas pollution within the local vicinity.

The effect of NPMP implementation is to reduce or reverse, where possible, impacts on the environment referred to above. This includes application of measures that slow the spread of the pathogen, reduce its distribution where possible, protect high value germplasm and plant more tolerant strains of kauri, and improve kauri tree health (with associated beneficial impacts for wider biodiversity given kauri's role as an ecosystem engineer).

Further information on effects of NPMP implementation on the environment are covered in the cost benefit analysis referred to in section 10 of this proposal.

## **Effects on human health**

Kauri is more than a tree to New Zealanders. It is an icon – a symbol of the country. It has aesthetic appeal and spiritual connection to many, and particular spiritual significance to Māori, especially those who whakapapa to the kaurilands. Our tangata whenua are kaitiaki (guardians) of the environment and of kauri, connected to mana whenua (authority of ancestor-owned land) through customs, culture and whakapapa. The connection between kauri and cultural health and wellbeing of Māori are covered further below.

Its role in New Zealand's forests attracts tourists and contributes to the landscape and image New Zealand is famous for – and which New Zealanders are proud of. New Zealanders collectively share a strong connection and care for the environment. The outdoor culture is embraced and promoted nationally and internationally, so people can share in New Zealand's environmental beauty.

There are general health and wellbeing benefits provided from nature and green spaces. While not specific to kauri forests, a large body of international research suggests that exposure to natural environments has direct positive effects on health and wellbeing benefits. Green spaces seem to influence health and wellbeing benefits in three main ways: by providing opportunities to partake in physical activity; by facilitating the development of social capital; and through direct restorative effects, including recovery from stress and 'mental recharging'.

The effect of NPMP implementation is to prevent loss of human health benefits associated with kauri forests. And to empower communities to take a role in protecting kauri, better enabling them to be closer to decision-making and make a contribution to its protection. NPMP implementation is likely to result in greater awareness among New Zealanders, and greater capability among local communities to fight Kauri Dieback, occurring as resources flow to them. An NPMP should be a positive and affirming process for both the Crown, mana whenua and New Zealanders.

Further information on effects of NPMP implementation on human health are covered in the cost benefit analysis referred to in section 10 of this proposal.

### **Effects on enjoyment of the natural environment**

As a nation, New Zealanders care about their environment. Statistics New Zealand's General Social Survey (GSS) 2017 shows the environment rated first equal with 'Freedom, rights and peace', in important characteristics defining New Zealand. Outdoor activities, socialising and embracing the rich environment is a large part of New Zealanders' culture – it is part of who we are.

Tramping, camping, hunting, mountain biking and running in the bush are everyday activities New Zealanders take for granted. Restrictions on these popular recreational activities could come through both the management of Kauri Dieback limiting the use of the forests (including forest closure or track re-routing), but also the progression of the disease causing kauri loss and limiting the quality of recreation.

Further information on effects of NPMP implementation on enjoyment of the natural environment are covered in the cost benefit analysis referred to in section 10 of this proposal.

### **Effects on the relationship between Māori, their culture, and their traditions and their ancestral lands, waters, sites, wāhi tapu, and taonga**

Māori share a special connection with the whenua (land) and environment as Māori traditions emphasise the responsibility to act as kaitiaki (guardians, caretakers) of the. Māori creation stories describe Tane Māhuta (God of the Forest) as the creator of mankind and the forest, including natives such as kauri (Royal, 2007). Through the connection man and forest have with Tane Māhuta, Māori and kauri are whānaunga (related, connected) through whakapapa (genealogy). The whanaungatanga (kinship, sense of connection) between hapū/iwi and kauri are influenced by the local variety of plantation within hapū/iwi rohe (region) throughout New Zealand. Kauri are prominent in northern areas, such as Te Tai Tokerau (Northland, Far North), Tamaki Makaurau (Auckland), Waikato, and Te Moana-a-Toi (Bay of Plenty), where the environment nourishes kauri growth and seeding. The hapū/iwi of these regions traditionally weaved the significance of kauri into their way of life, voicing their whanaungatanga through waiata (song) which describe hapū/iwi history and landscapes; through tikanga (protocol); rongoā (indigenous medicines); and through acknowledging and voicing their shared whakapapa (genealogy) with nature. Kauri forests are also used as a place to spend time with whānau and for spirituality. Through these practices cultural identity is intricately woven into the fabric of

ancestral whenua (Forster, 2012), and hapū/iwi are the kaitiaki of their mana whenua (authority of ancestor-owned land).

As an example of the effects on Māori culture and custom, Te Roroa, an iwi from the Far North and kaitiaki (guardian) of the Waipoua forest, feel the health of Waipoua forest, the mauri of the kauri forest and the mana of Te Roroa are inextricably linked; where one suffers, all suffer. Kauri are a taonga, and if Kauri Dieback spreads or is left untreated, kauri could become effectively extinct in its native habitat and northern hapū/iwi could experience loss to their mana, wairua and whenua. The effective extinction of part of hapū/iwi whakapapa may affect Crown-Maori relations. Hapū/iwi with local kauri may consider this a violation of Te Tiriti o Waitangi/Treaty of Waitangi principles leading to Treaty claims, seen recently with Te Kawerau ā Maki. The loss of kauri could negatively impact Māori ability to access and produce traditional medicines, like kauri gum for burns. Kauri has also been used for traditional customs, including resin used in burning soot for tattooing, for waka and more recently for marae.

Benefits of an NPMP on the relationship between Māori, their culture, and their traditions and their ancestral lands, waters, sites, wāhi tapu, and taonga are in relation to:

- Kaitiakitanga (Intergenerational, Sustainability)
  - Māori role in joint decision-making to protect biodiversity
  - Disease spread decreased or halted
  - Kauri survival for future generations
  - Recognition of rahui
  - Use of Mātauranga Māori and tikanga to protect kauri
- Whanaungatanga (Connectedness)
  - Community effort with all people playing their part · Recognition of mana whenua · Protection of whakapapa
- Ōhanga/Whairawa (Prosperity)
  - Māori enterprises, particularly tourism and social enterprise
  - Controlled harvesting of deceased kauri
- Manākitanga (Care, Reciprocity)
  - Adherence to Te Tiriti/Treaty principles and protecting a taonga – joint decision-making
  - Hapū/iwi trust in the relationship with the Crown
  - Faith in biosecurity measures that are informed by Te Ao Māori
  - Improved capability, knowledge and skills in the kete

Costs of an NPMP on the relationship between Māori, their culture, and their traditions and their ancestral lands, waters, sites, wāhi tapu, and taonga are in relation to:

- Kaitiakitanga (Intergenerational, Sustainability)
  - Conservation; cost of imposing a rahui
  - Self-restriction and cost of caring
- Whanaungatanga (Connectedness)
  - Reduced control and rangatiratanga over aspects of ancestral whenua
- Ōhanga/Whairawa (Prosperity)
  - Tourism; impacting Māori enterprise
  - Contribution to co-fund land management
- Manākitanga (Care, Reciprocity)
  - Developing Mātauranga Māori
  - Upskilling “champions”

- Building capability among hapū/iwi members to inform community and visitors

Further information on effects of NPMP implementation on the relationship between Māori, their culture, and their traditions and their ancestral lands, waters, sites, wāhi tapu, and taonga are covered in the cost benefit analysis referred to in section 10 of this proposal.

### **17. The effects that, in the opinion of the person making the proposal, implementation of the plan would have on the marketing overseas of New Zealand products [s.61(2)(e)(ii)]**

The NPMP supports the international reputation of New Zealand as a “green and clean country” with “an advanced and comprehensive natural resource management system” (OECD, 2015)<sup>6</sup>. An overview of place-branding by Hall (2010)<sup>7</sup> notes the array of campaigns successive government agencies have used to underscore the value of the country’s landscapes and environment. 100% Pure has been in use for nearly 20 years, and multiple sources acknowledge it as a highly successful tourism campaign. Hall notes the role of ‘clean and green’ in New Zealand’s international image has only been enhanced by 100% Pure and it is ‘arguably New Zealand’s international place brand.’

The NPMP is likely to benefit New Zealand’s tourism industry. New Zealand’s kauri forests attract tourists and contribute to the landscape and image New Zealand is famous for – and which New Zealanders are proud of. Tourism spend across regions with kauri forest is \$13,979m (refer to Table 1. Below).

According to the Lonely Planet Guide for New Zealand, the top three sights in New Zealand are based in Northland; Waitangi Treaty Grounds, Te Matua Ngahere and Tāne Mahuta respectively. The implementation of an NPMP will preserve these attractions for future tourists and assist in local tourism spend for Northland.

Table 1 below illustrates the 2018 regional tourism spend for regions with naturally occurring kauri. While it is not possible to disaggregate the spend directly attributed to kauri-related tourism, Northland has a strong branding focus on nature-based recreational activities, so it can be assumed that a portion of the tourism spend in Northland is at risk. If the attractiveness of Northland as a tourist destination were undermined by the loss of kauri which is not unreasonable to consider – it may be tourists simply spend more time elsewhere in New Zealand and thus the impact is much more significant to Northland than to New Zealand as a whole. It is however possible that some tourists may choose to spend longer in New Zealand so that they may have time to visit Northland.

Table 1. Regional Tourism Spend, YE June 2018 (\$m)

Region	Domestic	International	Total
Northland	852	269	1,121
Auckland	3,997	4,360	8,357
Waikato	1,943	683	2,626
Bay of Plenty	1,281	594	1,875

Source: MBIE; <https://www.mbie.govt.nz/info-services/sectorsindustries/tourism/key-tourism-statistics>

<sup>6</sup> OECD. (2015). Environmental performance reviews: New Zealand 2017. Retrieved from [https://www.oecd.org/environment/countryreviews/Highlights\\_OECD\\_EPR\\_NewZealand.pdf](https://www.oecd.org/environment/countryreviews/Highlights_OECD_EPR_NewZealand.pdf)

<sup>7</sup> Hall, C.M. (2010) Tourism destination branding and its affects on national branding strategies: Brand New Zealand, clean and green but is it smart? European Journal of Tourism and Hospitality Research, 1 (1), 68-89.

For much of Northland, kauri is inseparable from its identity as a region. A Google search shows over 944,000 websites with the combination of 'Kauri' and 'Coast', and the Kauri Coast identity shows through in some of the region's most well-known attractions, including the Waipoua Forest Park and the Matakoho Kauri Museum. Northland's tourism offering also hinges on various nature walks and ancient living forests, which have high volumes of kauri trees. In the Waipoua forest lives Tane Māhuta, the largest known kauri tree standing 51 metres tall, alongside the second- and third-largest kauri. This means tourists can walk among the kauri giants.

Kauri is also a fulcrum in Northland's Regional Growth Programme. The Northland Journeys – Byways initiative includes three road-based journeys, of which one is the Ancient Kauri Trail. The Byways is expected to bring \$20 million to Northland's economy from 2020. Northland Inc is also investing in upgrading walking tracks around key kauri visitor sites.

While Northland puts a high level of emphasis on kauri in its tourist offerings compared with other regions, there are significant kauri forests located in Auckland and Waikato and smaller local kauri forests in Bay of Plenty. These forests too have their place in the tourism and recreational offerings of their respective regions.

Further information on effects of NPMP implementation on the marketing overseas of New Zealand products are covered in the cost benefit analysis referred to in section 10 of this proposal.

**18. If the plan would affect another pest management plan or a pathway management plan, how it is proposed to co-ordinate the implementation of the plans  
[s.61(2)(f)]**

Regional Councils are reserving decisions until they see final NPMP content. This section will be revisited and considered at a later stage.

What is clear in law is that to the extent to which a rule in a national pest management plan is inconsistent with a rule (in a regional pest management plan), the rule in the national pest management plan prevails.

## 19. The powers in Part 6 that it is proposed to use to implement the plan [s.61(2)(g)]

It is proposed that the following Part 6 powers be conferred on the management agency to enable it to implement the plan:

<b>Section</b>	<b>Power</b>	<b>Reason why the power is needed</b>
106	Power to require assistance	So an 'authorised person' can seek assistance when required
109	Power of inspection	To carry out monitoring for the purpose of confirming presence, former presence, or absence of PA, and for locally eradicating or managing PA.
111	Entry in respect of offences	To investigate potential non-compliance where all reasonable efforts to achieve cooperation have been exhausted
113	Power to record information	To enable recording or gathering of information when sections 109 or 111 are used
114	General powers	To enable expedient actions to be taken to manage any serious risks that could lead to further spread of PA when sections 109 or 111 are used
114A	Application of articles or substances from aircraft	To enable kauri trees to be sprayed by helicopter where this is the most cost-effective approach This may be useful for research purposes or if a new aerial applied tool is developed during the 10-year period of the plan <i>[Note: Approval by a chief technical officer in the Ministry of Primary Industries is required to access this power]</i>
118	Power to seize evidence	To enable evidence to be collected when section 111 is used
119	Power to seize abandoned goods	To enable seizure, treatment or disposal of any risk goods that appear to have been abandoned and that create a serious risk
121	Power to examine organisms	To enable collection and testing of material for the purpose of establishing whether PA is present or absent
121A	Power to apply article or substance to place	To enable monitoring where equipment or a substance need to be left in a kauri forest in order to collect information
122	Power to give directions	To enable the management agency to give directions to comply with rules in this plan
123	Power to Vaccinate	To enable the management agency to apply any procedure to organisms (e.g., a treatment to improve tree health or control PA)
128	Power to act on default	To enable the management agency to act on default where a notice has been issued, and to recover the costs and expenses reasonably incurred
130	Declaration of restricted place	To enable management of new incursions of PA (detected for the first time in a zone), so that specific requirements can be applied in high risk situations, or potentially used for 'sanctuary zones' to create highly restricted access
131	Declaration of controlled area	To enable movement controls to be put in place, including the controls on various risk goods (machinery, people/boots, plant material etc.)
135	Options for cost recovery	To enable recovery of costs (e.g., where a landowner or occupier responsible for an area of kauri forest refuses to cooperate and comply with a notice of direction)
136	Failure to pay	To enable recovery of costs

## **20. Each proposed rule and an explanation of its purpose (including the option to establish zones and sanctuaries, or high risk areas) [s.61(2)(h)]**

The proposed NPMP includes a core set of ‘rules’ and powers relating to how kauri forests are used and managed, to ensure the plan is effective. The rules may require businesses to undertake new procedures (like cleaning vehicles) when going in and out of kauri lands, or require landowners to report regularly on the progress of dieback, and visitors to kauri forests might be subject to inspections and compulsory cleaning of shoes and equipment.

Many of the powers in the proposed NPMP are similar to ones already used by organisations such as councils and government agencies to control animal health, risks to the environment, or public safety. Businesses are required to make management plans and keep records about a range of issues such as health and safety, and provide them to officials if asked. Certain diseases or pests have to be reported by farmers if seen in animals or plants, and changes made to procedures to stop them spreading. For kauri, Controlled Area Notices already allow the councils to put up barriers to stop people entering tracks and spreading PA, or require people to go through cleaning stations. But they are limited in scope.

The NPMP provides an opportunity to bring many of these existing powers together into a cohesive set that can be used anywhere kauri trees are growing. These rules will be aimed at protecting kauri alone, rather than trying to cover a lot of biosecurity and environmental issues. They would also give the Management Agency the power to take action against individuals or organisations that are deliberately or negligently endangering kauri by not following the rules. This could be in the form of infringement fines or prosecution in court.

Consultation in 2018 told us the rules used must be enforceable (with “teeth”), must be clearly backed by science and Mātauranga Māori, with clear lines of accountability and responsibility for implementation. The key issue of managing soil movement was identified, along with the need to manage soil movement resulting not just from the activities of people, but also those of wild animals.

Further work with key stakeholders, including the Kauri Dieback Governance Group, regional councils, MPI, DOC and key industry bodies, has been undertaken to produce a draft set of 13 rules to be included in the NPMP proposal. These rules are captured in Table 2 (see next page), and will be consulted on in Round Three consultation. It is proposed that the contravention of all rules in this proposal be an offence under the Biosecurity Act 1993. It is proposed that the contravention of Rule 6 be an infringement offence pursuant to s.165 of the Biosecurity Act 1993 (i.e. under a Biosecurity (Infringement Notice) regulation).

Rule 12 includes two options for organising the programme:

Option A: Zones: The first option is to establish two types of “zone” based on disease presence or absence. Each would then have a clear set of requirements, some of which are common across zones and others that differ. The relationship between the two types of zone and corresponding plan objectives is set out in [Table 1](#) below.

Option B: High risk areas – The second option is for the same requirements to apply across all kauri forests, but with ability for compliance officers (authorised persons) to identify ‘high risk areas’ and require landowners within these to have management plans and take specified actions. [Table 2](#) sets out the relationship between the high risk areas and corresponding plan objectives.

For more information on the above options please refer to the paper entitled “Key decisions for National Pest Management Plan and Management Agency consultation options” (available on the website).

**Table 1. The two different types of kauri dieback zone, and corresponding secondary plan objectives, and the ‘type of programme’ and other information relevant to the setting of these objectives (the ‘intermediate outcome’ and ‘the particular level of the outcome’, and ‘the period within which the outcome is expected to be achieved’)**

<i>Categories</i>	<i>Description</i>	<i>Corresponding plan objectives</i>	<i>Type of programme</i>	<i>Intermediate outcome</i>	<i>The particular level of the outcome (if applicable)</i>	<i>The period within which the outcome is expected to be achieved</i>
Prevention zones	Kauri forests where PA is undetected (but could still be present)	<ol style="list-style-type: none"> <li>1. To minimise the spread of kauri dieback</li> <li>2. Maintain kauri dieback-free areas</li> </ol>	Exclusion programme	To prevent the establishment of PA that is present in New Zealand but not yet established in an area	Exclude PA from all prevention zones where possible.	Next 10 years
Disease control zones	Kauri forests or other sites where PA has been detected	<ol style="list-style-type: none"> <li>1. To minimise the spread of kauri dieback</li> <li>3. To minimise the impact of kauri dieback within infected sites</li> <li>4. Locally eradicate kauri dieback within infected sites, where possible</li> </ol>	Sustained control programme	To provide for ongoing control of PA to reduce its impacts and its spread to other properties	Contain PA to currently known diseased trees within zones, where possible. Less than 5% of trees within a zone die as a result of PA.	Next 10 years

**Table 2. The relationship between high risk areas and corresponding secondary plan objectives, and the ‘type of programme’ and other information relevant to the setting of these objectives**

<i>Categories</i>	<i>Description</i>	<i>Corresponding plan objectives</i>	<i>Type of programme</i>	<i>Intermediate outcome</i>	<i>The particular level of the outcome (if applicable)</i>	<i>The period within which the outcome is expected to be achieved</i>
High risk areas	<p>Kauri forests or parts thereof or other sites where PA has been detected. Where there is a high risk of disease transfer into the property or forested area.</p> <p>Kauri forest sites with special values that warrant a higher intensity of management and protection</p>	<p>2. To minimise the spread of kauri dieback</p> <p>5. To minimise the impact of kauri dieback within infected sites</p> <p>6. Locally eradicate kauri dieback within infected sites, where possible</p> <p>7. To protect kauri trees and stands with special values from kauri dieback</p>	Sustained control programme	To provide for ongoing control of PA to reduce its impacts and its spread to other properties/area(s)	<p>a) Contain PA to currently known diseased trees; or</p> <p>b) Less than 5% of trees within a high risk area as a result of PA; or</p> <p>c) No spread of PA. Treat all infected trees. Manage all high-risk vectors (human and animal).</p>	within 1 year of the management plan approved by the management agency or agent thereof.

## Sanctuaries

Sanctuaries apply to both options above. They are kauri forest sites with special values that warrant a higher intensity of management and protection.

It is proposed that “sanctuaries” and their boundaries be determined and established by the management agency, having regard to specific criteria.

The primary sanctuary criteria the management agency has regard to include the protection of:

- i. important genetic variability within kauri and species dependent on kauri;
- ii. iconic kauri trees or stands;
- iii. kauri trees or forests of significance to mana whenua that have tangible and intangible cultural values in association with historic events, occupation and cultural activities;
- iv. old growth (not significantly modified) forest;
- v. nationally significant ecological values.

In addition, when considering whether to establish a new sanctuary and determine a sanctuaries’ boundaries, the management agency would also take into account the following secondary sanctuary criteria:

- hydrology and land characteristics, including the degree of physical isolation or natural barriers, which influence the potential for PA to spread;
- pathways for spread of PA, including the extent to which pathways connect areas of kauri forest and influence the likelihood that PA will spread between them; [note where ‘pathway’ has the same meaning as defined in the Biosecurity Act]
- land use and frequency of use, including the likelihood that PA can be spread due to activities associated with the land use.
- the need for a buffer area to preclude or control activities that could result in natural spread of PA into, or from, the area of kauri forest or any other hosts of PA;
- whether achieving objectives is technically feasible and affordable;
- the perspectives of mana whenua, local communities and existing land owners and managers;
- the level of co-funding by landowners or other funders.

The proposed boundaries for sanctuaries may change over time, for example, if the disease and health status significantly change in an area of kauri forest, or if new information on the values at a site arises.

Details of the decision-making process, including detailed criteria and process for engagement with Treaty partners, land owners or managers, local communities and other stakeholders, will be captured in a policy on sanctuaries, to be included in the Annual Operational Plan.

Sanctuaries would be represented as an “overlay” (equivalent to use of overlays under the RMA), with a sanctuary overlay map recording official boundaries of sanctuaries, which would be made available online. Sanctuary overlay rules (below) would then apply specifically to sanctuaries, which support achieving a higher level of protection.

Sanctuaries and corresponding secondary objectives are set out in Table 3. Table 3 also identifies the 'type of programme'<sup>8</sup> that will be carried out in sanctuaries and other information relevant to the setting of objectives<sup>9</sup> - this information is relevant to understanding how requirements of the *National Policy Direction for Pest Management 2015* have been met.

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<sup>8</sup> The 'type of programme' refers to the six potential types of programme identified in the *National Policy Direction for Pest Management 2015* (Directions on Programme Description).

<sup>9</sup> The 'intermediate outcome', the 'particular level of the outcome' and the 'period within which the outcome is expected to be achieved' are information requirements set out in the *National Policy Direction for Pest Management 2015* (Directions on Setting of Objectives).

**Table 3. The relationship between sanctuary overlays and corresponding secondary plan objectives, and the ‘type of programme’ and other information relevant to the setting of these objectives**

<i>Categories</i>	<i>Description</i>	<i>Corresponding plan objectives</i>	<i>Type of programme</i>	<i>Intermediate outcome</i>	<i>The particular level of the outcome (if applicable)</i>	<i>The period within which the outcome is expected to be achieved</i>
Sanctuaries	Kauri forest sites with special values that warrant a higher intensity of management and protection, including sites of important genetic variability, iconic kauri trees or stands, sites of significance to mana whenua, old growth forests and sites with nationally significant ecological values	<p>5. To protect kauri trees and stands with special values from kauri dieback</p> <p>And</p> <ul style="list-style-type: none"> <li>The secondary objectives relevant to the zone(s) the sanctuary overlays (refer to Table 1)</li> </ul>	Corresponds to the zone(s) the sanctuary overlays (refer to Table 1)	Corresponds to the zone(s) the sanctuary overlays (refer to Table 1)	No spread of PA. Treat all infected trees. Manage all high-risk vectors (human and animal).	Next 10 years

The following are proposed general rules (Rules 1 – 13). Rule 12A and 12B present two options.

Draft rule	Policy intent
<p><b>Obligation to report</b></p> <p>1. Every person who recognises the symptoms, or potential symptoms, of kauri dieback must report the symptoms, and the location of the suspicious symptoms, to the management agency within 48hrs of, or as soon as reasonably/ practically possible after (whichever comes first), first recognising those symptoms.</p>	<p>The intent of this rule is to enable the management agency to gather new information on PA distribution, so it can arrange further testing/diagnostics when new symptoms or potential symptoms appear. This information is fundamental to decisions on the best approach to disease management, to setting the boundaries of zones and sanctuaries, and to understanding whether NPMP objectives are being achieved.</p>
<p><b>Provision of information</b></p> <p>2. If the management agency asks a person for information of the following kind, the person must provide the information within 48 hours or any longer time agreed with the agency. The information is information that the management agency reasonably believes is necessary to:</p> <ul style="list-style-type: none"> <li>• monitor the distribution of PA;</li> <li>• trace movements of any risk good in order to identify the source, or potential source, of any new PA infection; and</li> <li>• identify where a risk good has been moved to and whether that movement could result in further PA infection.</li> </ul>	<p>The intent of this rule is to enable the management agency to understand the disease status of kauri forests (e.g., the presence / absence of symptoms, the range of symptoms, the areas of forests affected), and to understand the nature of any movements of risk goods that could impact disease status.</p> <p>This information is fundamental to decisions on the best approach to disease management, including understanding the mechanisms by which PA can spread, and tracing where PA may have spread ‘from’ and/or ‘to’ in specific situations so the management agency can respond to mitigate any further risk of spread and/or manage compliance.</p>
<p><b>Restrictions on movement of soil and PA host plant material into certain areas</b></p> <p>3. If the management agency has identified an area as an area of special risk, no person may move soil, or good that have any soil on them, or any PA host plant material, into the area. [However, this rule does not apply unless the agency has clearly identified (by signs or in some other way) that the area is an area of special risk.</p>	<p>The intent of this rule is to prevent PA from spreading into areas that, as far as is known, are not yet affected by PA. There is a high risk associated with movements of soil and kauri plant material and goods that could harbour soil or plant material contaminated with PA (e.g., contaminated machinery and equipment) into these areas.</p> <p>The Minister would have the ability to issue exemptions to this rule (under s.67 of the BA). Such exemptions the Minister may consider include:</p>

	<ul style="list-style-type: none"> <li>• for activities directly controlled by the management agency and its contractors (with associated risk to be addressed through contractual requirements)</li> <li>• for emergency operations carried out by emergency services</li> <li>• where groups (e.g., industries) implement certification to standards that effectively address the risk of PA spreading.</li> </ul>
<p><b>Obligation to have and implement a kauri dieback management plan for earthworks close to kauri trees</b></p> <p>4. Every person undertaking earthworks must have and implement an approved kauri dieback risk management plan that complies with Schedule 1 if the earthworks come within a radius of three times the maximum radius of a kauri tree.</p> <p>The person undertaking the earthworks must report annually to the management agency, using templates, forms and/or checklists provided by the management agency, and recording all earthworks undertaken in the area covered by the plan, including the date, type of equipment and vehicles, the cleaning procedures followed, and the disposal location of all disturbed soil and organic material.</p> <p>The management agency will review the annual report and may require amendments to the management plan</p>	<p>The intent is this proposed rule is to manage the general risk associated with the movement of soil across all lands with kauri trees. This includes both the risk of moving soil contaminated with PA from, and to, a site which has the potential to spread PA and infect kauri trees.</p> <p>It would apply to all earthworks near kauri trees, not just kauri trees in kauri forest areas.</p> <p>The Minister would have the ability to issue exemptions to this rule (under s.67 of the BA). Such exemptions the Minister may consider include:</p> <ul style="list-style-type: none"> <li>• for activities directly controlled by the management agency and its contractors (with associated risk to be addressed through contractual requirements)</li> <li>• for emergency operations carried out by emergency services</li> <li>• where groups (e.g., industries) implement certification to standards that effectively address the risk of PA spreading.</li> </ul> <p>The wording of this proposed rule closely aligns with requirements the Environment Court has ruled (in its 2<sup>nd</sup> interim decision) must be included within Thames Coromandel District Plan regulation of activities on account of kauri dieback disease.</p> <p>[Note there is a difference in labelling of ‘kauri hygiene areas’ (referred to as ‘kauri hygiene zones’ in the Environment Court ruling), and a submission to the Environment Court seeking a change to align with the NPMP rule wording is proposed to avoid confusion around the meaning of ‘zones’]</p> <p>[Note this rule would create a dual regulatory requirement under both the Biosecurity Act 1993, and the RMA 1991 where local bodies have included kauri dieback policies and rules in their statutory plans under the RMA 1991 (to date this is limited to Auckland and part of the Waikato region only).</p>

	Coordinated implementation to minimise duplication and compliance costs, and ensure flow of information, would be needed]
<p><b>Movement of kauri and alternative PA host plants and seeds</b></p> <p>5. A person must not sell, offer for sale, or move between premises any kauri plant or seed, or alternative PA host plant or seed, unless it is certified to ‘National Kauri Dieback Standard for Nurseries’.</p> <p>The standard will be set out in a Schedule to the Rule (though if it is too long for that, it may be incorporated by reference instead).</p>	<p>The intent of this rule is to address the high risk associated with movement of young kauri trees and seeds, and any other plants and seeds that are alternative hosts of PA. It recognises kauri dieback could be inadvertently and rapidly spread through this activity, increasing the risk that PA is spread either directly into kauri forests (i.e. through kauri tree or alternative host planting), or indirectly (e.g., through PA spread to gardens or restoration plantings, then spread from these into kauri forests).</p> <p>The nature of the plant production industry and associated transport system is such that young plants, such as kauri, are grown right across NZ (well outside the native range of kauri) and can be transported across NZ within 24 hours. There is no control over where trees are then planted following point of sale. Therefore, this proposed rule would apply across NZ and to all kauri trees and alternative PA host plants. Likewise, there is no existing control over the collection of seeds, which can be collected from across NZ.</p> <p>The current state of knowledge of alternative PA host plants and associated risk is limited. Best available science and technical advice is that to date, kauri is the only tree known to be susceptible to kauri dieback in the field. However, it is likely that there are many other native and exotic plants that can be colonised by PA, harbouring or proliferating the pathogen without necessarily showing symptoms (i.e. symptomless hosts).</p> <p>Improving this is a significant focus of current research. Any such improvement in knowledge will be reflected within a formal register of alternative host plants to be maintained by the management agency (with that register referenced in the National Kauri Dieback Standard for Nurseries).</p> <p>The Plant Production Biosecurity Scheme is a risk-based certification scheme, with development and implementation led by a coalition inclusive of MPI, NZPPI (New Zealand Plant Producers Incorporated), DOC, regional councils and other plant-based industries. It includes development of a ‘National Kauri Dieback Standard for Nurseries (‘module’) within the first quarter of 2019, led by Auckland Council and MPI.</p>

	<p>When completed (well before the NPMP is made) the standard will be approved by either the Kauri Dieback Governance Group or any new kauri dieback governance body that replaces this, and any amendments thereof will be approved by the management agency.</p>
<p><b>Release of animals into wild state</b></p> <p>6. No person may release, cause to be released, or allow the release of, any pig, deer, goat, cattle, sheep, or horse into a kauri forest, or in a place where the animal could (with or without encouragement) get into a kauri forest</p> <p>However, this does not apply if the animal is (a) a wild animal, as defined in section 2(1) of the Wild Animal Control Act 1977 and is released on land that is administered under any of the Acts listed in Schedule 1 of the Conservation Act 1987; or (b) farm stock that is intended to continue to form part of the farm stock.</p> <p>The offence of breaching this rule may be made an infringement offence.</p>	<p>The intent of this rule is to strengthen the regulatory framework for managing risk of PA spread associated with release of high-risk animals into a wild state. It is intended to cover both active releases, and other more passive methods that could be used to release such animals (e.g., feeding to attract animals, or failing to contain such animals through poor fencing, leaving a gate open etc.).</p> <p>This rule is directed to people who release animals into the wild for any purpose, including hunting. The rule prohibits such a release if it means that the animal gets into, or could get into, a kauri forest. The containment of farm stock is dealt with by rule 11.</p> <p>This rule is designed to complement, and not to duplicate, provisions under the Wild Animal Control Act 1977, which have a more limited scope (refer to definition of ‘wild animal’ in that Act).</p> <p>This rule needs to apply broadly to avoid release into other areas from which animals can then spread to kauri forest.</p>
<p><b>Obligation to use approved hygiene stations</b></p> <p>7. Every person who encounters a kauri dieback hygiene facility on a kauri forest track must use it as instructed by signs on the facility and ensure that anything that comes into contact, or may have come in contact, with the ground (such as footwear, walking sticks, poles, or bicycles) are clean (ie, free of soil and organic matter and sanitised) before leaving or moving past the facility.</p> <p>The offence of breaching this rule may be made an infringement offence.</p>	<p>The intent of this rule is to reduce the risk associated with forest users using tracks, to require that hygiene facilities provided are used effectively, so that things such as footwear, bicycles and any associated or other equipment used on tracks are free of soil.</p> <p>All hygiene stations would need to be clearly labelled to make explicit they are kauri dieback facilities approved by the management agency.</p> <p>This rule needs to be complemented by education and provision of supporting information and infrastructure to strongly encourage voluntary compliance – and to build a culture of good forest use, with behaviour change and social science work being key to informing this activity.</p>
<p><b>Open tracks to meet the national kauri dieback track standard (within three-years)</b></p>	<p>The intent of this rule is to ensure all tracks open to the public (including such tracks on public land, private land, or lands of other tenure, and including walking, running, biking and 4wd tracks and unsealed roads) are constructed</p>

<p>8. The person responsible for a kauri forest area must ensure that every track in the forest that is open to the public meets the 'National Kauri Dieback Track Standard' within three years of the date the NPMP (Order in Council) comes into force. This will include an obligation to install hygiene stations on the track.</p> <p>The standard will be set out in a Schedule to the Rule (though if it is too long for that, it may be incorporated by reference instead).</p>	<p>and maintained to the minimum national standard set by the management agency (the National Kauri Dieback Track Standard), in order to minimise the risk of PA spread to, within, or from kauri forests. The standard will require that hygiene stations and signage be installed and maintained.</p> <p>The three-year proposed timeframe is to give the persons responsible for kauri forest areas a reasonable lead-in time to scale up track improvements, to install hygiene stations, to undertake community consultation where applicable, and to implement statutory closures where closures are the most appropriate option. This envisages an accelerated programme that works through priority tracks as quickly as possible during the three-year period, with completion and full compliance by the end of the three-year period.</p>
<p><b>Obligation to carry out hygiene for off-track users</b></p> <p>9. Every person entering or leaving a kauri forest area, other than on a track that has hygiene stations on it, or who goes off-track while in a kauri forest area must clean, and spray with an approved sanitiser, anything that comes, or may have come, into contact with the ground (such as footwear, vehicles, equipment, or companion animals) when entering or leaving the kauri forest area, or when leaving or returning to a track. For the purpose of this rule, "clean" means being free of soil and organic matter.</p> <p>The offence of breaching this rule may be made an infringement offence.</p>	<p>The intent of this rule is to reduce the risk associated with off-track forest users, including hunters, commercial operators, community groups and others, by establishing a basic minimum requirement.</p> <p>Off-track use of kauri forests is diffuse; off-track forest users will frequently not use a track entry or exit points with hygiene facilities, and they pose a greater inherent risk relative to track users as they are directly in contact with soil and surface kauri tree roots (cf. on a managed track surface).</p> <p>The management agency will maintain a list of approved sanitisers on its website.</p> <p>This rule needs to be complemented by inclusion and monitoring of hygiene requirements within contracts, concessions, permits or other forms of agreement with commercial off-track users. And by working closely with hunters and community groups to build a culture where good hygiene, keeping away from kauri tree roots, and reporting symptoms are a routine part of off-track use.</p> <p>Potential for simple and common-sense guidelines and/or a voluntary certification approach (supported with education, training, resources) is an option that may support this rule and be considered further during detailed design.</p> <p>Such approaches are only likely to be effective if developed in partnership with peak bodies or other groups representing off-track users (e.g., hunting groups, iwi,</p>

	<p>and peak bodies representing contractors), and with strong leadership by such groups to drive implementation with appropriate support of the management agency.</p>
<p><b>Obligation to have and implement a kauri dieback management plan if required</b></p> <p>10. If the management agency identifies any kauri forest area as requiring a kauri dieback management plan, the person responsible for that area must co-operate with the agency in preparing a kauri dieback management plan that complies with Schedule 1 and, once the plan is approved, must implement it.</p> <p>The criteria that the management agency must use to determine whether a kauri forest area requires a management plan are as follows:</p> <ul style="list-style-type: none"> <li>• The values of the kauri forest to be protected;</li> <li>• Pathogen status - Whether PA presence is confirmed or likely, and the level and distribution of PA within kauri forest on the property;</li> <li>• Property location – The distance from known kauri dieback site(s);</li> <li>• Vectors - The risk of PA spread into, within, or from the property on risk goods; and</li> <li>• Any other relevant factors.</li> </ul> <p>The responsible person must report annually to the management agency, using templates, forms and/or checklists provided by the management agency, on how the management plan has been implemented.</p>	<p>The intent of this rule is to enable the management agency (through its network of authorised persons) to focus on properties that may be at risk of becoming infected or create a serious risk to other properties. Plan content and associated requirements and timeframes will be determined by an authorised person on behalf of the management agency.</p> <p>It is proposed requirements imposed under this rule be subject to compensation provisions as set out in section 25 of this proposal.</p>
<p><b>Stock exclusion for certain kauri forest areas</b></p> <p>11. If the management agency identifies a kauri forest area as requiring the exclusion of stock in order to reduce the risk of spreading PA, the person responsible for the area must exclude all stock from the when required to do so by the management agency. The criterial the management agency must use to</p>	<p>The intent of this rule is to address situations where stock movements on a property are creating a high risk of PA spreading.</p> <p>This rule identifies the matters that must be taken into account when determining when stock must be excluded. Importantly, this includes ensuring the risk associated with stock movements is considered</p>

<p>determine whether stock must be excluded from a kauri forest area are as follows:</p> <ul style="list-style-type: none"> <li>• The values of the kauri forest to be protected;</li> <li>• Pathogen status – Whether PA presence is confirmed or likely, and the level and distribution of PA within kauri forest on the property;</li> <li>• Vectors - The risk of spreading PA into, within, or from kauri forest on the property through domestic stock movements, relative to the risk associated with wild animals and other risk goods;</li> <li>• Feasibility of exclusion;</li> <li>• Property location – The distance from known kauri dieback site(s) or special sites (e.g. nearby sanctuaries); and</li> <li>• Any other relevant factors.</li> </ul>	<p>alongside/within context of the overall level of risk and risk management approach for other relevant vectors of PA.</p> <p>It is proposed requirements imposed under this rule be subject to compensation provisions as set out in section 25 of this proposal.</p>
<p><b>Management agency to designate zones and/or high risk areas</b></p> <p>For this rule, there are 2 options:</p> <p>12A. The management agency must designate all kauri forest areas as being either a disease zone or a preventive zone (ie, a zone in which PA is not yet known to be present). The agency must ensure that the zoning of each area is clearly indicate on its maps, and by signage at the areas, and by any other appropriate means.</p> <p>12B. The management agency must identify parts of kauri forest areas that are high risk. The agency must ensure that high risk areas are clearly indicated on its maps, and by signage at the areas, and by any other appropriate means</p>	<p>This rule is about designating different parts of kauri forest areas in ways that indicate something about their PA status. This could be useful for administrative, educational, or presentational purposes, and different legal requirements may apply to different types of area. There are 2 options, and we could have either of them or neither of them, without affecting the other rules.</p> <p>Option A would require the management agency to designate all kauri forests as one of 2 zones. The zones would distinguish between areas in which PA has been detected and those where it has not.</p> <p>Option B would require the management agency to identify “high risk” areas. These may be high risk because they are a potential source of infection, or because they are currently free of PA but are at high risk of becoming infected.</p>
<p><b>Kauri forest sanctuaries</b></p> <p>13. The management agency must designate any kauri forest area that has outstanding cultural, physical, or other values, in relation to its kauri trees, as a kauri sanctuary. In an area designated as a</p>	<p>This rule allows a special designation for certain parts of a kauri forest. The criteria for determining that an area should be a sanctuary would need to be developed. The legal consequences of being a sanctuary are that it applies the management plan rules and stock exclusion rules immediately, but there may be significant</p>

<p>sanctuary, rules 10 (requirement to have plans) and 11 (stock exclusion) apply immediately to every person responsible for the kauri forest area within the boundaries of the sanctuary.</p>	<p>administrative and educative or presentational advantages to having areas designated as sanctuaries.</p> <p>This rule could be additional to the optional rules above, or could apply even if neither of those rules were adopted.</p>
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## **21. The rules whose contravention is proposed to be an offence under the Biosecurity Act 1993 [s.61(2)(i)]**

It is proposed that the contravention of all rules in section 20 of this proposal be an offence under the Biosecurity Act 1993.

It is proposed that the contravention of rules 5, 6 and 9 be an infringement offence under s.165 of the Biosecurity Act (i.e. under a Biosecurity (Infringement Notice) regulation).

## **22. The management agency [s.61(2)(j)]**

The management agency is the body appointed by the Minister and responsible for implementing the NPMP. The management agency holds the powers under the Biosecurity Act 1993 to enable this.

The content in this section will include detail on both the new management agency and its governance arrangements, along with the overall model for implementing the NPMP across national, regional and local levels. This includes how the principles under the Treaty of Waitangi, including partnership at the heart of new arrangements for the protection of kauri, will be given effect to in decision-making and resourcing. Proposals in relation to these are included in the overall consultation pack.

The final proposal will capture all of the elements above. The proposed new arrangements (including giving effect to Treaty principles) will then be incorporated in a new constitution (or equivalent), which is submitted as part of the final proposal and will be considered by Cabinet and approved by the Minister for Biosecurity.

Two possible forms the management agency could take will be tested during consultation. The two options are 'a government department' and a 'not for profit company'.

### A government department

The first is a government department, similar to how the kauri dieback programme operates now. While MPI currently coordinates the kauri dieback programme, that does not mean it would be the department appointed.

A department-based agency would be quick to establish and comparatively low risk. It would be responsible to the relevant minister for its performance.

If the departmental model is chosen it would likely have an independent external 'voice' through the establishment of a stakeholder advisory group. People would be appointed to this group based on their skills and representation. Appointments would be by the minister on the advice of the department's chief executive.

The group would that would have access to the programme's papers and provide advice to the department, bringing independent views to the table. It could also report directly to the Minister, providing independent advice and raising issues of concern. But it would be advisory only. It would not make decisions on priorities or investment decisions, and the agency would not be required to take its advice.

### A not for profit company

The second is option is forming a new not for profit Crown-owned company that becomes responsible for implementing the plan and strategy. This is similar to the company Predator Free 2050, which funds predator reduction projects.

Under this proposal the company would have government ministers as shareholders who would appoint the company's board. It would have a formal constitution that would set the approach, direction and priorities for the company. A commitment to treaty principles and partnership with councils and communities could be included. The constitution would also constrain it from going outside its mandate in relation to kauri dieback.

Stakeholder input could be established by a stakeholder council or group that is appointed by the board. This group could report to the board and provide advice on investment decisions of the company. Members of the stakeholder group could be selected on a skills and/or representational basis.

**23. Being a company means it could have a more flexible or commercial approach to its business. It might be able to take up partnership opportunities more easily than a government department could. Having the agency as a company may provide more options in terms of its location. The means by which it is proposed to monitor or measure the achievement of the plan's objectives [s.61(2)(k)]**

Performance measures will be included in annual operational plan that implements the National Kauri Dieback Pest Management Plan. The following measures will be used, but adapted over time as needed, to monitor achievement of the plan's objectives:

- A. Change in the distribution of PA across kauri forests;  
*For example, this measure could include monitoring change in the:*
- *proportion of kauri forests that are dieback-free (total area across prevention zones, as a proportion of total area across all zones);*
  - *proportion of old growth and iconic trees (greater than 1.5m diameter at breast height) that are infected with PA;*
- B. Change in the health of kauri forests in response to PA;  
*For example, this measure could include monitoring change in the:*
- *cultural indicators of kauri forest health;*
  - *other ecological indicators of kauri forest health;*
- C. Level of active engagement in the management of PA;  
*For example, this measure could include monitoring change in the:*
- *proportion of sampled public who self-report they are aware of kauri dieback, and are actively involved in managing kauri dieback;*
  - *proportion of Treaty partners and kaitiaki actively involved in kauri dieback management;*
  - *number of community groups actively involved in kauri dieback management;*
  - *proportion of businesses operating in, or near, kauri forests actively implementing kauri dieback hygiene standards, protocols or equivalent;*
  - *number of landowners with kauri that have, and are implementing, a kauri dieback management plan;*
  - *proportion of sampled forest users who rate their experience with kauri dieback measures in kauri forests as "good", or better.*
  - *levels of activity on social media;*
- D. Improved access to capability, knowledge and tools to support effective management of PA;  
*For example, this measure could include monitoring change in the:*
- *number of people or organisations that have completed kauri dieback training, certification or equivalent;*
  - *number of new tools, or more effective applications of existing tools, that have been developed and validated as effective in the management of kauri dieback, as a result of science, mātauranga or "smart ideas" innovation;*
- E. Extent to which operational activities have been effectively implemented to achieve NPMP objectives; and  
*For example, this measure could include monitoring change in the:*
- *proportion of kauri trees observed with dieback through aerial surveillance that have been ground trothed;*
  - *proportion of open tracks that meet an approved standard;*
  - *proportion of stock exclusion fencing completed (number of kilometres completed as a proportion of total number of kilometres planned);*

- number of new kauri forests established;
- number of zones or sanctuaries within which effective treatments and/or rongoā have been applied;

F. Level of compliance with NPMP requirements.

*For example, this measure could include monitoring change in the:*

- proportion of people using approved track hygiene stations;
- number of compliance issues reported to the management agency or identified by authorised persons, which result in some form of action (e.g., warning, formal letter, infringement, prosecution);

In interpreting such measures, it will be important to take into account the following:

- That the current distribution of PA will be substantially greater than that presumed from tree symptomology, meaning disease expression will continue to grow over the next 20-30 years. And there is likely to be a lag phase (as much as 20-30 years) before the full effects of current management are observed.
- That control of PA is only one of the factors that influences the mauri and health of kauri forests (other factors include other pests and pathogens, climate and land use).

#### **24. The actions that it is proposed local authorities, local authorities of a specified class or description, or specified local authorities may take to implement the plan, including contributing towards the costs of implementation [s.61(2)(l)]**

The actions that it is proposed regional councils will take to implement the Plan, including contributing towards the costs of implementing the plan are:

- Regional coordination, managing regional compliance and/or regional implementation where the regional council is best placed – this activity is to be funded by the management agency;
- Ensuring that all regional council staff and contractors implement effective kauri dieback hygiene protocols and comply with requirements of the NPMP – this activity is to be funded by the regional council;
- Actively managing kauri dieback on publicly-owned lands in accordance with the NPMP, where the regional council is the statutory land manager – this activity is to be funded by the regional council, but with ability to apply to the management agency to contribute funding under exceptional circumstances.
- Including appropriate rules and other requirements in regulatory plans administered by Council and implementing these, including ensuring consent conditions provide for the effective protection of kauri from PA and associated compliance monitoring and reporting.

The actions that it is proposed territorial local authorities will take to implement the Plan, including contributing towards the costs of implementing the plan are:

- Ensuring that all local authority staff and contractors implement effective kauri dieback hygiene protocols and comply with requirements of the NPMP – this activity is to be funded by the local authority;
- Actively managing kauri dieback on publicly-owned lands in accordance with the NPMP, where the local authority is the statutory land manager – this activity is to be funded by the local authority, but with ability to apply to the management agency to contribute funding under exceptional circumstances;
- Minimising the risk of kauri dieback spread by regulating earthworks under the Resource Management Act 1991 - this activity is to be funded by the local authority.

#### **25. The basis, if any, on which the management agency is to pay compensation for losses incurred as a direct result of the implementation of the plan [s.61(2)(m)]**

Section 162A of the Biosecurity Act 1993 allows for compensation to be paid when powers under the Act are exercised for the purpose of eradicating or managing an organism, resulting in loss to a person as a result of damage to or destruction of the person's property or restrictions imposed under the Act on the movement or disposal of the person's goods. The NPMP may expressly alter this general compensation provision, and determine the circumstances (if any) under which compensation may be provided.

Other compensation regimes under the Biosecurity Act rely on levies on commercial activities to provide funding for compensation claims. It is noted that as there is no commercial activity related to kauri which might be levied in a similar way, any compensation paid would be derived from the general funds available to fight kauri dieback and would be at the expense of funding other kauri protection activities.

The question of compensation is one of high public interest and should be further consulted on. The following questions will be asked during consultation: "Should compensation for activities required to be undertaken under the NPMP be available as a matter of principle? If yes, what activities should be compensated and under what circumstances?"

## **26. Information on the disposal of the proceeds of any receipts arising in the course of implementing the plan [s.61(2)(n)]**

It is not envisaged that there will be any receipts arising in the course of implementing this plan. In the unforeseen event that any receipts do arise, these would be applied to the costs of implementing this plan.

## **27. Whether or not the plan would apply to the EEZ and, if it would, whether it would apply to all of it or parts of it and, if it would apply to parts, which parts [s.61(2)(o)]**

The plan will not apply to the Exclusive Economic Zone.

## **28. Whether the plan includes portions of road adjoining land it covers, as authorised by section 6, and, if so, the portions of road proposed to be included [s.61(2)(p)]**

The plan includes all public and private roads that have not been sealed (such as gravel or dirt roads) and which pass through a kauri forest. The plan also includes the repair and construction of sealed roads, where repair or construction involves the movement of soil or equipment that may come into contact with soil, which pass through a kauri forest.

## **29. The anticipated costs of implementing the plan [s.61(2)(q)]**

The anticipated costs of implementing the Plan will be made available to the Minister in a separate document, which is confidential/Budget sensitive.

## **30. How it is proposed that the costs be funded [s.61(2)(r)]**

It is proposed that costs be funded by the Crown, with modest contributions from regional councils (detailed below), and local authorities responsible for funding management costs on publicly-owned lands they administer.

The level of Crown funding will be considered by the Minister separately through the Budget process.

Auckland Council has secured \$108 million over ten years (2018-2028) through a natural environment targeted rate to fund management of kauri dieback across the region and in particular its regional park network.

Waikato Regional Council has secured \$172k in 2019/20FY and \$222k in the 2020/21FY and out years until 2028. [Note: this includes redirection of \$72k national programme contribution from 19/20 FY]

Northland Regional Council has secured \$3.5 million over ten years (2018-2028), approx. \$350k per annum, this includes \$88k contribution to the programme for 2018/19 and redirection of \$88k national programme from 2019/20.

The programme currently receives philanthropic funding of (amount) from (who). Securing future philanthropic funding will be a task for the new management agency.

## **31. The period for which it is proposed the plan be in force [s.61(2)(s)]**

It is proposed the duration of the plan be 10 years from the date that the plan is made.

The plan will be subject to non-statutory reviews at three-year intervals, or at any other time as determined by the management agency.

### **32. The consultation, if any, that has occurred on the proposal and the outcome of it [s.61(2)(t)]**

Consultation was undertaken as part of the “Accelerating Protection for Kauri” project, which both developed the NPMP proposal and refreshed New Zealand’s strategy for managing kauri dieback disease.

This consultation included three formal rounds:

ROUND ONE – this focused on helping get the big picture view for managing kauri dieback disease. And early feedback to inform how the National Pest Management Plan could best support the work to protect kauri.

ROUND TWO – this presented feedback from round 1, tested a first draft of the refreshed strategy for protecting kauri, sought feedback on a first draft (high level view) of the National Pest Management Plan, and tested a model for the organisation to implement the National Pest Management Plan where you can tell us your ideas on what could be in the National Pest Management Plan.

ROUND THREE – Description to be added. [Note this entails presenting feedback from round 2, testing the NPMP proposal (both a summary version and the full draft), testing the refreshed version of New Zealand’s strategy for managing kauri dieback disease, and seeking views on proposed management agency and implementation options and proposals.]

These rounds included both public hui and meetings, and targeted hui and meetings with some specific affected parties. Each round covered a four-week period, with opportunity to provide feedback at hui, meetings, or in advance of or following these via multiple channels (electronic, written, verbal).

Summary stats will be added on number of hui, meetings etc. once consultation round 3 is complete.

All feedback submitted outside of formal consultation rounds was also accepted and carefully considered.

An overall summary of feedback will be added here once round 3 is complete.

A separate report detailing the specific consultation undertaken during the three rounds above, meetings or feedback received outside of these rounds, the results of consultation and matters raised, and how these matters have been considered, accompanies this proposal (reference to be added once this report is completed following round 3).

### **33. Any matter that the national policy direction requires be specified in a plan [s.61(2)(u)]**

Directions on setting objectives – information to meet the NPD requirements on setting objectives is set out in section 6 of this proposal.

Directions on programme description – information to meet the NPD requirements on programme description is set out in section 6 of this proposal.

Directions on analysing benefits and costs – information to meet the NPD requirements on analysing benefits and costs is provided in section 10 of this proposal, and cost benefit analysis documents prepared by Deloitte (as referenced in that section).

### **34. Directions on proposed allocation of costs for pest and pathway management plans**

information to meet the NPD requirements on proposed allocation of costs is provided in section 12 of this proposal, with further detail in cost benefit analysis documents prepared by Deloitte (as referenced in section 10 of this proposal).

**35. The steps that have been taken to comply with the process requirements in the national policy direction, if there were any [s.61(2)(v)]**

There are no process requirements in the NPD to be met. The Minister must make a determination under section 100E of the Act, as to whether this National pest Management plan proposal is inconsistent with the national policy direction.

## Glossary/Interpretation

<i>Term</i>	<i>Definition</i>
Authorised person	Means a person appointed under section 103 of the Biosecurity Act 1993 as an authorised person for the purposes of this NPMR
Commercial operators	Means any person operating within a kauri forest for a commercial purpose.
Cultural harvest	Means the removal, and use for a cultural purpose by mana whenua, of a kauri tree that has died as a result of PA infection.
Disease control zones	Means a geographic area of kauri forest where PA has been detected, determined in accordance with section 6 of this proposal, and part of an “exclusion” programme, an intended outcome of which is to prevent the establishment of PA that is present in New Zealand but not yet established in an area
Earthworks	Means the disturbance of land by excavating, blasting, moving, depositing and any associated compacting of soil or rock, excluding mineral prospecting.
Ecologically valuable	Means an area considered to have: <ul style="list-style-type: none"> <li>• important genetic variability within kauri and species dependent on kauri;</li> <li>• iconic kauri trees or stands;</li> <li>• kauri trees or forests of significance to Mana Whenua that have tangible and intangible cultural values in association with historic events, occupation and cultural activities;</li> <li>• old growth (not significantly modified) forest;</li> <li>• nationally significant ecological values; or</li> <li>• any other relevant factor.</li> </ul>
Kauri containment area	Means the area identified in an approved kauri dieback risk management plan within which all soil and organic material from earthworks within a kauri hygiene zone is contained (unless it is transported offsite to a landfill approved for disposal by the management agency), including the cleaning of all vehicles, equipment and personnel before entering and exiting the kauri containment area.
Kauri dieback	Means the disease caused by PA
Kauri Dieback Management Plan	Means a plan developed in accordance with Schedule 1.
Kauri plants	Means any living kauri ( <i>Agathis australis</i> ) plant for planting or propagation, including containerized, field grown and tissue culture plants, and parts thereof, including seeds and germplasm.
Kauri forest area	Means- <ol style="list-style-type: none"> <li>a) an area of uncultivated land that contains or surrounds 1 or more kauri trees, along with all the uncultivated land between such trees and, if a kauri tree is at the edge of uncultivated land, extends to at least 3 times the maximum radius of that tree; and</li> <li>b) any area of land identified by the management agency as an area containing alternate host plants of PA</li> </ol>

Kauri forest track	Means any track in or through a kauri forest area that is used or intended to be used by any person for any purpose, other than: sealed roads; and bait lines maintained by organisations for the purpose of carrying out pest control or associated monitoring only
Kauri hygiene area	Means three times the maximum radius of the canopy dripline of a New Zealand kauri tree
Kauri tree	Means any living kauri ( <i>Agathis australis</i> )
KDGG	Means the Kauri Dieback Governance Group
Locally eradicate	Means to completely remove PA from a defined local area of New Zealand.
Management agency	Means the management agency specified for the purpose
Mātauranga	Means the knowledge, comprehension or understanding of everything tangible or intangible [such as spiritual and metaphysical values] that exists across the universe from a Māori perspective. In relation to kauri dieback it takes many forms including karakia, whakapapa, mātauranga (traditional environmental knowledge) and knowledge of cultural practises, such as cultural harvest, rongoā (healing and medicines) and rāhui (a form of tapu restricting access to, or use of, an area or resource).
Person responsible, or responsible person	Means, in relation to a kauri forest area, the person (whether an individual, department, regional authority, iwi authority, body corporate, or any other legal entity) with the current right to determine who may or may not enter the area
Off-track	Refers to any activity (such as walking, running, biking, or operating of a vehicle) In a kauri forest area that occurs other than on a kauri forest track
PA	Means 'the primary causal agent of kauri dieback disease, known as <i>Phytophthora agathidicida</i> '
PA host plant	Means any plant that can harbour PA, and is identified by the management agency as a host plant on an official register of host plants maintained on the management agency's website
Pathway	As per its meaning under the Biosecurity Act 1993
Plan	Means the proposed National (Kauri Dieback) Pest Management Plan
Proposal	Means the proposed National (Kauri Dieback) Pest Management Plan
Rahui	Means a form of tapu restricting access to, or use of, an area or resource by unauthorised persons
Rongoā	Means traditional Māori healing, being a system of healing that was passed on orally, comprising diverse practices and an emphasis on the spiritual dimension of health.
Stock	Means any pig, cattle, deer, goat, sheep or other animal that is herded or handled as a domestic animal or kept for farming purposes.
Treatment	Means any substance or technique applied to protect the health of kauri trees, including

	chemical, biological control, alternative natural products and traditional Māori medicines.
Wild animal vector	Means any pig, cattle, deer, goat, possum, sheep or horse that is living in a wild state and is not being herded or handled as a domestic animal or kept for farming purposes.
Zero density	All known individuals of the pest at the site have been controlled, however re-infestation may be possible from, for example, from invasion from neighbouring properties.

## Appendix 1: Current technical knowledge and Assumptions

Our current technical knowledge about mātauranga Māori and assumptions about contemporary science (including biological, social science and ecological science), on which the draft National Pest Management Plan (NPMP) for Kauri Dieback Disease is based are set out below.

### Mātauranga Māori knowledge

- How the NPMP is implemented will be just as important as the plan itself. Partnership with hapū and iwi, and strong connections and alignment across the science system will be critical to the success of the NPMP
- Tangata whenua consider that health of kauri cannot be ascertained by looking at kauri alone, rather a “ngahere”, or kauri ecosystem approach should be taken.
- Rongoā interventions and cultural health indicators are Mātauranga Māori tools being investigated by mana whenua and have potential as treatments and management tools.
- Rāhui is a valid tool for managing kauri dieback and when based on tikanga and Mātauranga Māori can be supported by forest closures under an NPMP.
- Mana whenua are the kaitiaki of kauri. Kaitiaki mandated by their hapū/iwi have the capability to act as authorised persons under an NPMP.
- All Mātauranga Māori is subject to Te Tiriti (&Wai262 etc) and appropriate protocols must be in place to ensure this knowledge is protected.
- Māori hapū and iwi will endure throughout the timeframe of the programme i.e. beyond 1000 years

### Contemporary science assumptions

- The primary causal agent of kauri dieback is the fungal-like chromist *Phytophthora agathidicida* (PA)
- PA is probably exotic to NZ, introduced within the last few hundred years
- Reducing the increase in the spread of PA is critical for the Kauri Dieback response
- The use of a 1000 year plus timeframe is appropriate given the age and lifespan of kauri
- Distribution of PA is sporadic, with many forests known to be infected, but many others likely to be pathogen-free
- The full distribution of PA is not known. Recorded infections cover much of the natural range of kauri, scattered throughout forest, farm and peri-urban kauri stands from Northland to Auckland to Coromandel
- The distribution of kauri dieback within infected forests usually appears patchy and sporadic, reflecting past incursions and subsequent spread from disease foci
- PA is highly pathogenic on kauri, and trees of all ages can be infected and killed
- PA is a soil-borne pathogen, with no airborne phase

- Primary infection is probably via feeder roots, with subsequent spread into main roots and lower trunk. Canopy symptoms (yellowing, leaf loss, dieback) may occur before or after trunk symptoms (bleeding lesions/cankers)
- Colonisation is primarily in roots and into the lower trunk, with no evidence of trunk or wood colonisation beyond the visible lesions
- Above-ground symptoms may first appear months, years or even decades after initial tree infection, with longer latent periods for large trees
- The current distribution of PA will be substantially greater than that presumed from tree symptomology, meaning disease expression will continue to grow over the next 20-30 years.
- Current evidence suggest that most infected trees die prematurely
- Long-term survival of kauri ecosystems is dependent upon prevention of PA spread to forests that are not currently contaminated
- It is likely that genetic variation in susceptibility is present within kauri germplasm, but genuine resistance has not yet been found
- Oospores are the main long-term survival structures of PA. Oospores are formed within infected kauri tissues, and are released into the soil as these tissues break down
- Chlamydospores have not yet been observed in PA, but stromata-like swellings and microtubules have been noted in kauri roots. These structures could contribute to long-term survival and proliferation of the pathogen (M)
- Sporangia are formed in moist soil conditions and these release motile zoospores in wet conditions. Zoospores swim through soil water towards kauri roots, but the distance of this movement will generally only be a few millimetres or centimetres
- Long-distance dispersal of PA will predominantly be via oospores, carried in infected soil or root material
- Any movement of soil or plant material, including forest duff, from PA-infested sites has the potential to spread the pathogen
- Oospores can survive within infected plant material or soil for months or possibly years
- Oospores can survive in dry soil, but duration of survival is not known
- Once infected, forests are likely to remain infected for the foreseeable future
- Natural spread rates within infected stands are not known, but are likely to be 1-5 m per annum uphill or on flat sites. Downhill spread is likely to be more rapid than uphill spread.
- The kauri dieback spread and impact is faster than the timescale required for an evolutionary response from kauri to occur
- The impact of environmental factors (other than pathogen presence) on disease expression is not known
- Diagnostics of infected sites/trees are currently based initially on symptomology, verified by soil testing

- Vectors potentially include anything that moves soil or plant material. Infected soil and spore movement could be passive (such as in water run-off downhill from infected sites), or active (such as in movement of soil on hikers' boots, vehicles, machinery, tools, feral animals such as pigs, domestic animals such as cattle, and movement of infected nursery material).
- The relative importance of these various pathways will be proportional to the volume of soil moved and the frequency and distance of such movement
- The majority of long-distance dispersal is via human activity
- For disease transfer to occur, there needs to be contamination with infected soil or organic matter from a diseased area, and subsequent deposition of that soil or organic matter near a susceptible host tree such as kauri
- Without intervention, kauri dieback will continue spreading
- With effective intervention, kauri dieback will continue spreading, but at slower rates and limited geographic spread
- Avoiding contact with soil (e.g. track closures, raised boardwalks etc.) will minimise long-distance dispersal (if there is good compliance!)
- To date, kauri is the only tree known to be susceptible to kauri dieback in the field. However, it is *likely* that there are many other native and exotic plants that can be colonised by PA, harbouring or proliferating the pathogen without necessarily showing symptoms (i.e. symptomless hosts)
- Currently there are no known cures for kauri dieback
- Eradication is practically impossible, except perhaps for very small infections
- Effective use of cleaning stations will reduce the risk of PA spread
- Treatment options are few, with phosphite injection the only proven treatment to date. But this is a temporary treatment, not a cure
- Other treatments or systems, including chemicals, biological control and Mātauranga Māori could potentially be available in the future, but efficacy is yet to be proven
- There are large gaps in the knowledge of kauri dieback biology (e.g. host range, natural spread rates, latency periods, role of environmental factors, role of other *Phytophthora* species, cultural health indicators, impacts on forest structure) all of which will influence implementation and effectiveness of management practices.

#### Ecological science assumptions

- Some sites where kauri dieback is known to have been present for (30) years do still have kauri trees present/regenerating (e.g. Great Barrier).
- Some plant species are only found in kauri forest. We do not know if these species are dependent on kauri for survival though we expect they will decline if kauri forest declines or reduces in extent. (this may have already started)

- In the one plot-based study available changes in forest composition due to kauri dieback are likely (other podocarps such as miro and rimu increased their growth rates as the kauri canopy declined)
- We assume that a healthy, less disturbed, kauri forest ecosystem is more resilient to the impacts of PA than a forest on a site with a long history of disturbance (...because soil condition and microbial diversity are expected to be higher/better and therefore more suppressive of the pathogen but also because kauri trees are healthier and more able to fight the pathogen).
- Alternate hosts are expected based on pot trials but as yet no research in the wild has detected this. It is not known whether asymptomatic or asymptomatic alternate hosts can harbour or vector PA in a forest.
- Kauri is a threatened species
- Multiple sanctuary sites, in geographically disparate regions, are required utilizing a variety of seed types
- If kauri is lost, we do not know what type of forest will replace it
- We do not know the ecosystem consequences of the kauri dieback, e.g., changes in biodiversity, carbon storage (productivity), decomposition rates or nutrient cycling.
- The rhizosphere of kauri in natural ecosystems is not well known. The diversity of a healthy kauri soil ecosystem vs a soil infested with PA is not known. We expect there are interactions between the natural kauri soil biota and PA and it is possible that native soil biota may provide antagonistic effects against PA (guesses).
- We do not know if sites with a history of felling, burning or forestry are more susceptible than sites with less disturbance (i.e. pests and weeds and tracks but no clearing).
- We do not know if different successional stages of kauri forest, or different kauri forest types (e.g. pure, kauri/beech or kauri-podocarp forest) are more or less resilient to PA.
- There are at least six kauri forest associated species that may be *Phytophthora* sensitive based on *P. cinnamomi* sensitive families in Australia (e.g. Proteaceae - *Toronia toru*, *Knightsia excelsa*; Ericaceae - *Leucopogon fasciculatus*, *Leptocophylla juniperina*, *Dracophyllum latifolium* and *D. sinclairii*)
- The role of physiological stressors such as drought or high rainfall on kauri health and disease expression is unknown. Therefore, we do not know if there is physiological resistance to PA (not just genetic resistance) or ecological variation in susceptibility (spatially or temporally e.g. is PA found only in environmentally-stressed forests, different aspects, forests on certain soil types or pH levels, forests under drought conditions, etc.)
- It is not known if kauri ecosystems can be restored using resistant forms of kauri, when and if they are identified in pot trials.
- The impact on the kauri ecosystem of phosphite treatment (on individual trees or the soil microbiome) is unknown.

#### Social science assumptions

- Kauri dieback is regarded as a complex problem because of its bio-physical and social complexities.

- Understanding and managing the social complexities surrounding kauri dieback is critical for the ongoing management of the disease.
- Kauri dieback affects multiple stakeholders from inside and outside the science sectors, who often hold differing perspectives about how the disease or forest should be managed
- Social science research has to date been a very under-researched area in the KDP and has largely focused on compliance around cleaning stations and tracks and public awareness of the disease with the intention of directing human behaviours.
- Fostering effective and meaningful community engagement is dependent on robust social science research and methodologies to inform, guide, monitor and evaluate stakeholder engagement.
- Social science research will need to be integrated into all aspects of the KDP to inform decision-making to ensure it is based on sound, robust and rigorous social science evidence.
- Managing Kauri dieback will require affected community and wider public buy-in to the programme.
- Successfully managing kauri dieback will require meaningful engagement with affected communities to facilitate their ongoing involvement in programme planning, decision-making and delivery.
- Participatory approaches (including citizen science and action research) are recognised as effective and appropriate approaches that can facilitate meaningful stakeholder engagement as they are known to foster collaborative development of a shared vision to manage complex environmental problems.
- To successfully manage kauri dieback, it will be critical to examine and understand human behaviours to understand people's responses to programme tools and strategies so as to enable people to positively contribute to kauri dieback management and / or to comply with biosecurity control methods.
- Recent social science research shows that behavioural studies using the ABC (attitude = behaviour = choice) haven't delivered the insights required to effect behaviour change. Understanding social practises (e.g. individual, societal, institutional, regulatory, policy) is needed to understand the drivers of human choice / behaviours so as to develop effective strategies to change behaviours e.g. track design will need to recognise how people use tracks, to design these to facilitate greater user compliance.
- Self-reporting of compliance has been shown to over-estimate rates of compliance (observational studies show that people overestimate their compliance rate).
- Due to the latency of kauri dieback disease, evidence of changed behaviours may not be easily associated with environmental outcomes that show improved kauri survival. This will present enormous challenges for programme communication.
- Forest users' compliance to biosecurity measures is affected by how they associate/identify with the forest and how much controls may limit this association e.g. a person who values their experience of running in the forest may be less accepting of controls that limit their activity than a person who enters the bush for more environmental reasons.

- Effective communication with the wider public is essential to ensure they are informed about the KDP particularly its successes.
- Education of the public to raise awareness will not necessarily increase public support for the programme. People's lack of buy-in is rarely due to them being ill-informed but rather due to larger considerations such as whether they trust the managing organisation, or believe agencies are doing a good job; or feel affected by control measures; or belief that the control measures are making a difference.
- Evidence shows that Information about how people can assist /comply is more useful than understanding details about the science of the disease.
- There is evidence that a forest user's request for more information about the science of kauri dieback, is driven more from a need to be convinced to act than a genuine desire to learn more about the disease.
- Regulation can be a useful tool for improving public compliance with control measures, however it should only be seen as one of many tools and "carrot" approaches are usually far more effective strategies than "stick" approaches.
- Communication with the public about the programme will need to be regularly updated to assist with public/stakeholder buy-in. However, as reports of disease spread may actually lead to the public believing that it is not worth complying with management strategies, it will be essential to not over-promise potential successes and to realistically manage public/stakeholder/politician expectations.
- Identifying high risk groups and key target stakeholders will be critical to inform the NPMP.
- Risk assessments and social network mapping/analysis are necessary to identify human induced 'risk' pathways (e.g. through nurseries) and to identify key target audiences.
- Community is not uniform in its views (there are many voices in a community) - just as there are many publics and not one public.
- It is not known if the limited geographical spread of kauri may affect people's association with kauri and therefore their perception of the importance of the disease.
- It will be important to understand how different New Zealanders value Kauri and if they value it as a national icon.
- It will be critical to engage with private landowners; however, evidence shows that private landowners have significant resistance to authorities working on their land as they fear if dieback is identified on their land, that this will limit the control they have over their land. The use of "local" intermediary's has been shown to be critical for private owner buy-in.
- Social science research has shown that local community liaisons and "champions" can greatly support kauri dieback programmes when working in communities.
- Social science research recognizes that successful engagement in communities requires trusting relationships / partnerships where community feel valued participants who can contribute meaningfully to programme planning and delivery.

- A socio-economic impact assessment of affected stakeholders, e.g. concessionaires should be undertaken to properly inform the development of an NPMP as this can identify potential barriers to engagement of affected parties.
- A cultural impact assessment of affected communities is required to be completed to properly inform the development of an NPMP
- Social science evidence is accessed from many sources – e.g. from the literature (through literature review), the grey literature (reports), observations, and from people’s oral narratives (accessed through interviews / focus groups etc) –
- A stakeholder register needs to be compiled to record key stakeholders who hold ‘local’ ‘traditional’ / ‘tacit knowledge’ that does appear in the published or grey literature.
- Gaining a Social Licence to Operate will be required for any new technologies that may be considered for managing dieback. This is critical when working in and with Maori communities.
- Gaining social licence to operate requires continued and meaningful conversations with community. It is granted to agencies from community - a bottom up process.
- Social science recognises the importance of the local context e.g. communities in Northland are quite different from those in the Waitakere or Coromandel. Understanding the uniqueness of communities is essential for programme success.
- Social science findings can provide general principles, however because local contexts matter, findings may not necessarily be universal.
- Organisations and agency unwillingness to share information with each other (institutional guarding of their ‘patches’) is already shown to be a major barrier to programme effectiveness.
- Programme success will require Institutional willingness to recognise and value different forms of knowledge and to include these in programme delivery
- Programme success will require Institutional willingness to share decision-making and resources.
- Social science and science view problems from different paradigms that can present both challenges and opportunities for multi-disciplinary work.
- Social science can be the glue that holds the KDP together by providing methodologies and approaches to engagement to facilitate a cohesive transdisciplinary environment for multi-stakeholder collaboration.

**Appendix 2. A full breakdown of the different classes of persons (audiences) who are exacerbators in relation to the spread of PA, and their associated level of risk and residual risk.**

<i>Audience</i>	<i>Sub-audience</i>	<i>Commentary in relation to this audience and level of risk</i>	<i>Inherent risk (level of perceived risk in absence of management - 1 lowest to 5 highest)</i>	<i>Residual risk (where are the greatest perceived risks today given current management – H/M/L)</i>
<b>Landowners</b>	<b>Covenants –</b> including those funded through: <ul style="list-style-type: none"> <li>• Nature Heritage Fund</li> <li>• QE II National Trust</li> <li>• local authorities</li> <li>• Ngā Whenua Rāhui (for Māori land)</li> </ul>	<ul style="list-style-type: none"> <li>• Depends on where they are and proximity to kauri</li> <li>• Landowners more likely to be conservation minded and working with covenant agencies</li> <li>• Although difference between self-imposed covenants cf. those imposed by others (e.g., agreement as part of subdivision consent)</li> <li>• Some multiple use – covenant alongside productive uses</li> <li>• Maori covenant lands used for medicine gathering</li> <li>• Biggest risk where fences are not in place</li> </ul>	2	L
	<b>Maori landowners –</b> noting different types of land holdings, including: <ul style="list-style-type: none"> <li>• Post-settlement lands</li> <li>• Maori customary lands</li> <li>• Maori freehold lands</li> </ul>	<ul style="list-style-type: none"> <li>• Frequently multiple owners</li> <li>• Often abounds other native forest blocks and multiple use (e.g. native vegetation, forestry, farming)</li> <li>• Settlements often involve return of land but not \$ to be able to deal with land management issues – resourcing an issue</li> </ul>	5	H

	<ul style="list-style-type: none"> <li>Forestry trusts in Maori ownership</li> <li>Farm trusts in Maori ownership</li> </ul>	<ul style="list-style-type: none"> <li>Stocking of pigs in some lands as a food source may increase risk?</li> </ul>		
	<b>Farmers</b>	<ul style="list-style-type: none"> <li>Particular risk where not fencing in stock &amp; bush grazing</li> <li>Where PTA is in stock yards and Kauri are in the local environment presents a key risk</li> <li>Risk is stock movements within and between sites and associated vehicles and machinery</li> </ul>	5	H
	<b>Forestry</b>	<ul style="list-style-type: none"> <li>Historic NZFS replanting work in forestry blocks a key risk</li> <li>A lot of knowledge in the forestry sector around disease issues, and strict hygiene standards of its own</li> <li>Movement of trucks and machinery is key area of risk, on unsealed roads, over larger distances compared to farming</li> <li>Indigenous forest management practices and sustainable forest management permits relevant</li> </ul>	4	M
	<b>Lifestyle and other rural private land</b>	<ul style="list-style-type: none"> <li>Less grazing and movement of stock</li> <li>More conscious of environment and not commercially driven</li> <li>Less aware and capable as land managers</li> </ul>	4	M
	<b>Urban/Peri-urban land</b>	<ul style="list-style-type: none"> <li>Big differences across urban and peri-urban environments, e.g., Epsom extremely low risk cf.</li> </ul>	3	M

		<p>Oratia / Titirangi / Hunua in close proximity to kauri stands</p> <ul style="list-style-type: none"> <li>• Growth in housing accords and associated developments in peri-urban areas close to Kauri is an emerging risk</li> <li>• Potential risk in terms of PTA contaminated sites on urban properties, which are then a source of infection (kauri may not even be present e.g., if removed or contaminated soil brought on site)</li> <li>• Significant activity and on and off properties that could move soil (e.g., landscape and gardening, building, even mail delivery)</li> </ul>		
	<p><b>Campgrounds, campsites and associated campers</b> - including:</p> <ul style="list-style-type: none"> <li>• Legal campsites</li> <li>• Freedom campers</li> <li>• Illegal campsites</li> </ul>	<ul style="list-style-type: none"> <li>• Variable – depends on proximity to kauri</li> <li>• Illegal campsites within kauri forest areas such as Waipoa a significant issue</li> <li>• Activities associated with users of campsites are the risk (walking, MTB etc.) cf. act of camping itself</li> <li>• A number of camping areas in kauri forest areas (e.g., DOC and Auckland Council administered campgrounds, private Christian campgrounds)</li> </ul>	2	L
	<p><b>Crown landowners</b> –</p> <p>Primarily DOC, noting numerous other departments own and/or administer land (e.g., LINZ, NZTA, Ministry of Education etc.)</p>	<ul style="list-style-type: none"> <li>• Large risk given scale – large areas of high value kauri forest</li> <li>• Higher risk given greater public access</li> <li>• High risk given off-track use by staff and contractors</li> </ul>	5	H

		<ul style="list-style-type: none"> <li>Higher risks given Crown landowner priorities and diminishing funding (e.g., DOC focus on “doubling profit from the Conservation Estate within 10 years)</li> <li>Poor connection within agencies and associated risk of low kauri dieback awareness</li> <li>Really there is DOC vs other Crown landowners, and the big risks are associated with public conservation lands and DOC’s diminished resourcing (others are a 1)</li> </ul>		
	<b>Territorial Local Authority landowners</b>	<ul style="list-style-type: none"> <li>Higher risk given public access and lower level of resourcing and political interest in conservation / Kauri dieback issue</li> <li>Risk associated with local sports park and water catchment management is high</li> <li>Growing area of risk as level of political support and resourcing has diminished for some councils</li> </ul>	5	H
<b>Infrastructure/ Construction / Civil contractors</b>	<b>National roading and infrastructure –</b> NZTA and its contractors	<ul style="list-style-type: none"> <li>Risk is machinery, excavators and equipment moving soil in close proximity to kauri forests - large scale soil movement</li> <li>Risk is site specific (proximity to kauri and PTA)</li> <li>Includes cleaning up slips as well as repairs, resealing and new road construction</li> <li>Extreme weather events a key area of risk (e.g., attention to hygiene goes out the door)</li> <li>National highways cut through significant areas of kauri forests</li> </ul>	2	L

		<ul style="list-style-type: none"> <li>NZTA doing a great job and well resourced,</li> <li>Some big operators, such as Fulton Hogan, with strong willingness to comply and good in-house capability/systems – so a very manageable risk</li> </ul>		
	<b>Regional and Local roading and infrastructure</b>	<ul style="list-style-type: none"> <li>Risk is machinery, excavators and equipment moving soil in close proximity to kauri forests - large scale soil movement</li> <li>Risk is site specific (proximity to kauri and PTA)</li> <li>Includes cleaning up slips as well as repairs, resealing and new road construction</li> <li>Extreme weather events a key area of risk (e.g., attention to hygiene goes out the door)</li> <li>A lot of local roads cut through kauri forests</li> <li>Regional land transport agencies and local authorities are not so good – less compliant, not as well resourced, lesser systems and capability cf. NZTA</li> </ul>	4	M
	<b>Mining –</b> including for: <ul style="list-style-type: none"> <li>Metals</li> <li>Coal</li> <li>Gravel and aggregates</li> <li>Kauri gum</li> <li>Peat</li> </ul>	<ul style="list-style-type: none"> <li>DOC conditions in place where mines are on public conservation lands</li> <li>RMA conditions</li> <li>This would be major in Northland if it came up, and is a growing issue in some regions</li> <li>Source of aggregate for track building important, particularly as mines away from kauri lands are exhausted (e.g., Winstones Three Kings) and supply shifts to other mines (e.g., Whakatiwai and Hunua)</li> </ul>	3	M

		<ul style="list-style-type: none"> <li>• Most consents are historic and have no KD conditions, however, most mines have protocols and systems to deal with soil/dirt to keep this off roads, so this may reduce risk</li> <li>• Lack of scientific certainty around risk associated with mining</li> <li>• Small-scale footprint</li> </ul>		
	<b>Exploration associated with mining</b>	<ul style="list-style-type: none"> <li>• DOC conditions in place where exploration takes place on public conservation lands</li> <li>• But what about private lands where DOC is not involved?</li> <li>• Involves accessing remote country and moving equipment via vehicles (higher risk) or helicopter (lower risk)</li> </ul>	4	M
	<b>Power lines and telecommunications</b>	<ul style="list-style-type: none"> <li>• Laying cables – digging and moving vehicles, machinery and equipment</li> <li>• Monitoring / Inspection / Repairs</li> <li>• Access some remote areas/adjacent to kauri forests</li> <li>• Very few controls / largely do whatever they want</li> <li>• Risk may further increase with development of new National Environmental Standard under RMA that proposes even more discretion</li> </ul>	4	M
	<b>Developers</b>	<ul style="list-style-type: none"> <li>• Some areas with a lot of property development and kauri (e.g., Mangawhai, Oratia, Titirangi, Hunua)</li> </ul>	4	M

		<ul style="list-style-type: none"> <li>• Developers working across sites - region-wide transfers of machinery, equipment, soil</li> <li>• RMA application patchy and light overall, with little or no monitoring</li> <li>• Effectiveness of risk management process has high dependency on RMA effectiveness, which is vulnerable to political influence / selection of commissioners</li> <li>• Footprint (areas where land development and kauri coincide) is relatively small</li> </ul>		
	<p><b>Other contractors</b> - including:</p> <ul style="list-style-type: none"> <li>• Fencers</li> <li>• Earthworks</li> </ul>	<ul style="list-style-type: none"> <li>• Other contractors using vehicles and equipment that comes into contact with soil working in kauri areas present risk</li> </ul>	4	M
Freight/Logistics	<p>Including:</p> <ul style="list-style-type: none"> <li>• Ports</li> <li>• Distribution centres/hubs</li> <li>• Freight carriers – road and rail</li> </ul>	<ul style="list-style-type: none"> <li>• General freight and logistics operating on sealed roads and typically in urban/industrial context</li> </ul> <p><i>[Note: Trucks machinery and equipment associated with farming, forestry and any earthworks in close proximity to kauri are the issue (this risk is captured under the relevant headings above)]</i></p>	1	L
Nursery and garden industry	Nurseries	<ul style="list-style-type: none"> <li>• Big difference between large professional nurseries/industry certified (FMS certification by NGINZ), through to community nurseries and backyard nurseries</li> </ul>	4	H

	<ul style="list-style-type: none"> <li>Historically known to be an issue/source of PTA spread and unregulated</li> <li>Nursery stock are potential vectors given inputs (both soil and plant material)</li> <li>Main area of risk is revegetation planting close to or within kauri stands on private land and by community groups</li> <li>Illegal harvesting of seed an issue</li> </ul>			
<b>Arborists</b>	<ul style="list-style-type: none"> <li>Pruning and dead tree removal / contamination of equipment (sterilising?)</li> <li>Generally arborists are good and cooperative when aware of KDP, with some trying to educate themselves and their industry – but level of awareness still can be improved</li> <li>Hi risk if illegally milling trees</li> </ul>	3		L
<b>Landscape</b>	<ul style="list-style-type: none"> <li>Unregulated movement of soil and equipment between sites</li> <li>More landscape activity in urban/peri-urban context and lower risk where remote from kauri. But some urban/peri-urban areas with or close to kauri stands where this is a significant risk (e.g., Oratia, Titirangi, Hunua)</li> </ul>	2		M
<b>Compost</b>	<ul style="list-style-type: none"> <li>Unsure – depends if PTA survives composting process (science question?)</li> <li>Can eliminate risk through effective heating during composting process (oospores killed at 50 degrees)</li> </ul>	1		L

Beekeepers		<ul style="list-style-type: none"> <li>• Low risk associated with vehicles when moving hives between sites</li> <li>• Beekeeper tend to like to stick to hard roads where possible, and preference for forest areas with manuka cf. kauri forests</li> </ul>	2	L
Community groups	Includes groups participating in restoration, revegetation, track development and maintenance and/or pest control	<ul style="list-style-type: none"> <li>• Variable – some groups are very proactive while others are “gung ho”</li> <li>• Big difference between national community groups with a formal/managed link to KDP, compared to smaller groups, well-intentioned with no link to KDP</li> <li>• This audience needs to be constantly reminded</li> <li>• Community initiatives like Kauri 2000 involve significant kauri planting and associated risk</li> <li>• Schools (Arbor day) important from risk and community education perspective</li> <li>• Do these groups travel around or only go to “their own patch”?</li> </ul>	4	H

<p style="text-align: center;"><b>Tourism operators</b></p>	<p>Includes:</p> <ul style="list-style-type: none"> <li>• Legal/official operators concessionaires</li> <li>• Illegal/unofficial operators</li> </ul>	<ul style="list-style-type: none"> <li>• Frequently accessing high value kauri forests and areas with PTA, and moving between sites</li> <li>• Variable hygiene practice depending upon quality of operators</li> <li>• Legal operators issued permits that typically include KD conditions</li> <li>• Tourists groups on buses lower risk – tend not to go beyond the car park</li> <li>• Those running sporting events are vigilant</li> <li>• Some very onto it and evidence that tracks used by tourism operators have much high level of compliance with cleaning station use (based on volumes of trigen used)</li> </ul>	<p style="text-align: center;">4</p>	<p style="text-align: center;">L</p>
<p style="text-align: center;"><b>Kaitiaki</b></p>	<p>Cultural uses of kauri forests, such as monitoring and gathering rongoā</p>	<ul style="list-style-type: none"> <li>• Settlements include remnant kauri forests available for cultural uses</li> <li>• Small number engaged in this activity, typically harvesting from areas close to roads</li> </ul>	<p style="text-align: center;">3</p>	<p style="text-align: center;">L</p>
<p style="text-align: center;"><b>Recreation/ Leisure</b></p>	<p><b>Mountain bikers</b></p>	<ul style="list-style-type: none"> <li>• Similar profile to walkers/runners</li> <li>• Generally stick to tracks</li> <li>• Generally clean bikes on-site if there are facilities available, and between rides</li> </ul>	<p style="text-align: center;">5</p>	<p style="text-align: center;">H</p> <p>(off-track users higher than track users)</p>
	<p><b>4WD</b></p>	<ul style="list-style-type: none"> <li>• Not interested in rules or conservation and use kauri lands</li> <li>• Generally don't go into infected areas</li> </ul>	<p style="text-align: center;">5</p>	<p style="text-align: center;">H</p> <p>(off-track users higher than track users)</p>

		<ul style="list-style-type: none"> <li>Limited numbers of 4wd'ers and limited access/places they can go</li> </ul>		
	<b>Walkers/Runners</b>	<ul style="list-style-type: none"> <li>Large numbers of users/scale of activity</li> <li>Backcountry more likely to go off-track</li> </ul>	5	H (off-track users higher than track users)
	<b>Horse treks</b>	<ul style="list-style-type: none"> <li>Some horse trekking operations using or in close proximity to kauri lands</li> <li>Risk of soil movement on hooves</li> </ul>	4	H (off-track users higher than track users)
	<b>Geocaches/Orienteers</b>	<ul style="list-style-type: none"> <li>Off-track users</li> <li>Small in number/scale</li> <li>Low level of awareness or concern – do as they please</li> <li>Not allowed on Public Conservation Lands, but likely to just use areas whether allowed or otherwise</li> </ul>	4	H (off-track users higher than track users)
	<b>Hunters – Deer, Pig, Goats</b>	<ul style="list-style-type: none"> <li>Off-track users moving sometimes large distances and between sites</li> <li>Hunters seen as part of the solution by some – “eyes on the ground”</li> <li>No evidence of hunters spreading PTA</li> </ul>	5	H (off-track users higher than track users)
<b>Agency staff, scientists and contractors</b>	<b>KDP programme staff and scientists</b>	<ul style="list-style-type: none"> <li>Moving between kauri sites with and without PTA, so very high risk</li> </ul>	5	M

		<ul style="list-style-type: none"> <li>Level of discipline/attention to hygiene is not as good as it should be</li> <li>Some doubts around effectiveness of cleaning and sterilisation with trigene – it's hard to clean effectively and there is a level of residual risk</li> </ul>		
	<b>Weed control/pest control staff and contractors</b>	<ul style="list-style-type: none"> <li>Off-track and widespread activity</li> <li>Are KDP hygiene measures in contracts – should be</li> </ul>	4	H
	<b>Other agency staff and contractors –</b> including: <ul style="list-style-type: none"> <li>Flood protection / Soil management – “Engineering and Works”</li> <li>Building inspectors</li> <li>Park rangers</li> </ul>	<ul style="list-style-type: none"> <li>Very high risk if working around kauri, but some are not often in areas where kauri are present</li> <li>Variable level of awareness and degrees of acceptance – at the end of the day some other parts of agencies have commercial drivers</li> <li>High risk around emergency events</li> <li>Direct soil movement on people, vehicles and equipment</li> <li>Potential for downstream spread issues</li> </ul>	3	H
	<b>Other scientists and professional consultants</b>	<ul style="list-style-type: none"> <li>Typically good with hygiene, but high inherent risk as working in PTA infected areas</li> <li>KDP hygiene measures typically a condition of permit (although no checking of this)</li> </ul>	4	H

<p>People illegally harvesting kauri timber and swamp kauri</p>		<ul style="list-style-type: none"> <li>• Very high risk</li> <li>• Enforcement shared between DOC (public conservation lands) and MPI (timber on private lands and swamp kauri for export)</li> <li>• Difficult area – if can't catch them illegally harvesting not going to catch them avoiding hygiene responsibilities</li> </ul>	5	<p>H</p> <p>*Note there is not a lot that can be done to manage this risk</p>
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