



Department of  
Conservation  
*Te Papa Atawhai*



Biosecurity New Zealand

Ministry for Primary Industries  
Manatū Ahu Matua

A close-up photograph of vibrant red flowers with green foliage, set against a clear blue sky. The image is partially obscured by a large, dark grey diagonal shape on the left and a yellow triangle on the bottom right.

# New Zealand Myrtle Rust Strategy 2019-2023

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## Want to know more?

For further information, see  
[www.biosecurity.govt.nz/myrtle-rust/](http://www.biosecurity.govt.nz/myrtle-rust/)

Published by the Biosecurity New Zealand  
PO Box 2526  
Wellington

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ISBN 978-0-9951273-4-0 (Online)

ISBN 978-0-9951273-5-7 (Print)



# Glossary of Māori terms

<b>Hapū</b>	Extended family group
<b>Iwi</b>	Extended family group
<b>Kaupapa Māori</b>	Māori approach, principles or ideology
<b>Ko Aotearoa Tēnei</b>	The 2011 report by the Waitangi tribunal responding to the 1991 WAI 262 claim. The report recommends reform of laws, policies or practices relating to health, education, science, intellectual property, indigenous flora and fauna, resource management, conservation, the Māori language, arts and culture, heritage, and the involvement of Māori in the development of New Zealand's positions on international instruments affecting indigenous rights.
<b>mana whenua</b>	territorial rights, power from the land, authority over land or territory, jurisdiction over land or territory - power associated with possession and occupation of tribal land.
<b>Mātauranga Māori</b>	the body of contemporary and traditional Māori knowledge including cultural and creative practices
<b>Mauri</b>	Life force or vital essence
<b>Motu</b>	Island, country, nation
<b>Rohe</b>	Boundary, district territory or tribal area
<b>Rongoā</b>	Remedy, medicine or treatment
<b>Tāngata whenua</b>	Local people who have authority in a particular place
<b>Taonga</b>	Treasured resource or object
<b>Te Tiriti o Waitangi</b>	A treaty signed on 6 February 1840, at Waitangi in the Bay of Islands by Captain William Hobson, several English residents, and 46 Māori rangatira. Copies were also sent around the rest of the country collecting signatures of over 500 Māori.
<b>WAI 262</b>	The 262nd claim registered with the Waitangi Tribunal. Also known as the flora and fauna claim. Lodged in October 1991 by six claimants on behalf of themselves and their iwi: Haana Murray (Ngāti Kuri), Hema Nui a Tawhaki Witana (Te Rarawa), Te Witi McMath (Ngāti Wai), Tama Poata (Ngāti Porou), Kataraina Rimene (Ngāti Kahungunu), and John Hippolite (Ngāti Koata).
<b>Waka</b>	Canoe
<b>Whānau</b>	Extended family - the primary unit of Māori society

# 1. About this strategy

This is a strategy for all New Zealanders. It affirms and begins to fulfil the Biosecurity 2025 theme to build a biosecurity team of 4.7 million and the resulting Ko Tātou movement<sup>1</sup>. It provides the strategic direction for myrtle rust and outlines the key activities required to achieve a core set of objectives over the next five years.

This strategy has been approved by the Myrtle Rust Governance Group to guide the collective approach to dealing with myrtle rust until 2023. It features a partnership between individuals, tāngata whenua, non-government organisations, industries, businesses, community groups, and central, regional and local government. This document has been prepared by Biosecurity New Zealand following a series of co-design workshops with key partners and stakeholders including representatives from the Department of Conservation (DOC), Ministry of Culture and Heritage, Ministry for Primary Industries (MPI), regional councils, Wellington Gardens, Te Tira Whakamātaki, Iwi Chairs forum, The Project Crimson Trust, New Zealand Plant Producers Incorporated, New Zealand Farm Forestry Association and Māori. Special thanks are extended to Governance member Haami Piripi who provided extensive input and commentary into key parts of the strategy.

An action plan is under development to give effect to, provide transparency and monitor this strategy. Implementation of the plan will be subject to agreement on roles, responsibilities, and resourcing. This strategy is non-statutory. It builds on existing commitments and assumes that people agree to work together in good faith to achieve its objectives.

A science plan will also be developed by the myrtle rust Strategic Science Advisory Group (SSAG) to ensure that myrtle rust science research is strategic, aligned, collaborative and impactful. The Science Plan will sit under this Strategy and feed into the future management of myrtle rust in New Zealand.

## 1.1 How we will work together

The following set of principles has been developed to help guide the implementation of this strategy and its action plan in a way that is consistent with Treaty obligations and international protocols:

- Te Tiriti o Waitangi provides a platform for a treaty partnership between the Crown and tāngata whenua<sup>2</sup>, with all participants agreeing to collaborate to achieve mutually agreed objectives.
- Decision-making is transparent and is underpinned by consideration of cultural, social, economic and environmental values, and the health and wellbeing of people in Aotearoa New Zealand and their relationships with nature.
- Decision-making is informed by a combination of relevant information from mātauranga Māori and science.
- A collective, integrated long-term approach to myrtle rust is taken, with community ownership and participation encouraged and local communities supported to take action as appropriate.

## 1.2 Review of the strategy

This strategy will be fully reviewed after it has been in place for three years. However, it may be amended earlier to take into account further community feedback, any significant change in myrtle rust's behaviour, or if new effective operational tools are identified.

<sup>1</sup> MPI, Biosecurity 2025 Direction Statement for New Zealand's biosecurity system (2016) Objective one: a biosecurity team of 4.7 million.

<sup>2</sup> The principle of partnership acknowledges that the Crown will act reasonably, honourably, and in good faith so that Māori can make informed decisions on matters affecting their own interests. The principle of participation informs the development of Crown strategy, policy, and process that enables the effective engagement and input of Māori.

The principle of active protection requires the Crown to take positive steps to ensure and respect that Māori interests, knowledge, and experience are valued in its decision making and activities.

# 2. What this strategy includes

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Based on the information currently available, eradication of myrtle rust will not be possible in the next five years.

This strategy provides the framework for a coordinated and collaborative approach to myrtle rust. In particular, it is focused on:

- growing knowledge of myrtle rust behaviour and impacts;
- identifying options for its future management and minimising impacts;
- identifying ways to conserve genetic material of myrtle species; and
- supporting tāngata whenua, partners and stakeholders as they make decisions about their plants and the places affected by myrtle rust that are important to them.

One myrtle rust strain is currently present in New Zealand. It is the pandemic strain found across the Pacific.

Implementation of this strategy and the resulting action plan can be used to inform readiness preparation for the arrival of future myrtle rust strains or other plant pathogens.

Biosecurity New Zealand is responsible for monitoring and enforcing New Zealand border controls to prevent the entry of other myrtle rust strains. Risk assessments are also undertaken to determine New Zealand's Import Health Standards to prevent new strains being accidentally imported into New Zealand.

# 3. Background

Myrtle rust (*Austropuccinia psidii*) is a fungal disease that impacts on our myrtle species including some of New Zealand's iconic and culturally significant trees and shrubs. Myrtle rust is an 'unwanted organism' under the Biosecurity Act 1993.

Myrtle rust was first detected on the New Zealand mainland in May 2017. MPI led the response in partnership with DOC providing operational support. By August 2018, the disease had been found across most climatically suitable parts of the North Island and the top of the South Island. Despite intensive operational activities it was evident that eradication or containment with the available tools was not possible. This led to the operational decision to downscale targeted surveillance and organism management activities.

Government agencies, councils, research providers, Māori communities, and others are working together to conduct research and other activities to address potential detrimental impacts on New Zealand's environmental, economic, social, spiritual and cultural values. The impact of myrtle rust on our native myrtle plants (and species that depend on those natives), as well as some of our important exotic species (e.g. feijoa, eucalyptus) is currently unknown and may be considerable. We are already seeing severe impacts e.g. ramarama (*Lophomyrtus bullata*), a native shrub found throughout the North Island and in the top of the South Island. Ramarama and its varieties are widely used in the foliage (cut-flower), and landscape gardening industries.

To safeguard our native myrtle species, a seed collection and storage programme began in 2017, with the goal of ensuring that representative and viable samples of all myrtle species are collected and stored. Seed banking continues and work to identify options for those species where seed is not easily stored has commenced.



# 4. Why the strategy matters

This section sets out a high level description of the values potentially at risk from myrtle rust in New Zealand. A definitive risk assessment cannot be completed, as myrtle rust is highly unpredictable and affects values that are difficult to measure. Research and science is underway to explore how myrtle rust behaves in the New Zealand environment and what impacts it could have.

At least ten other potential strains have been described worldwide to date. To the best of our knowledge, only the pandemic strain of myrtle rust is currently present in New Zealand. This strain is the same as that known to be present in Australia. It is possible that other strains could arrive in New Zealand in the future, and that this strain could evolve or adapt to local conditions and new hosts.

Myrtle rust arrived in Australia eight years ago, which is a relatively short time for impacts to be observed. However, significant damage to natural ecosystems and tree mortality have already been observed. These impacts have undoubtedly also had a large impact on indigenous Australians and their relationship with valued medicinal and food plants. Leading Australian researchers have noted that myrtle rust is now ubiquitous in native rainforest ecosystems all along the eastern seaboard where it has caused the decline of native species, had a significant impact on Australian native plant communities, and affected the health and reproductive capacity of endangered tree species.

Myrtle rust infection in Australia has badly affected the flowering and fruiting structures of a number of species. This suggests that there could also be knock-on effects for New Zealand species that depend on flowering and fruiting plants for their primary food sources (such as our nectar-feeding geckos, and birds like tūi and kākāriki).

Evidence from Kermadec pōhutukawa (*Metrosideros kermadecensis*) on Raoul Island suggests that mainland pōhutukawa and rātā (*Metrosideros* spp.) could be seriously affected. DOC has set up a comprehensive monitoring programme on the island, but it will be several years before we fully understand the implications for the island's pōhutukawa dominated ecosystem<sup>3</sup>.

Surveillance surveys in New Zealand have found limited myrtle rust symptoms on mānuka plants, however this low finding should not be interpreted as New Zealand mānuka being resistant to myrtle rust. Myrtle rust symptoms have been observed on mānuka plants grown from New Zealand-sourced seed and artificially inoculated with myrtle rust spores at the Queensland Department of Agriculture and Fisheries (DAF) research facility in Brisbane. Some plants with more resistance were found during the initial assessment, but it will be some time before enough lines of mānuka, kānuka, pōhutukawa and other New Zealand natives have been assessed to determine the likely distribution and prevalence of resistance in our native myrtle species in their natural environment<sup>4</sup>.

## 4.1 Environmental values

We are still learning what environmental impacts myrtle rust may have in the New Zealand context. New Zealand has 28 formally described species of native myrtles and nine other currently unnamed varieties<sup>5</sup>. Many of our native myrtles are endemic (found only in New Zealand and nowhere else in the world). Several of these are threatened with extinction, or have a very limited distribution which places them at risk (see Appendix I). Examples include the critically endangered white flowered rātā moehau (*Metrosideros bartlettii*) the 'geothermal kānuka' (*Kunzea tenuicaulis*), endemic to the Central Plateau of the North Island and maire tawake or swamp maire (*Syzygium maire*) which is scarce or absent over large parts of its former range due to the clearance of swamp forest.

More commonly occurring plants such as mānuka, kānuka and pōhutukawa are keystone species in a number of native ecosystems. Mānuka and kānuka are among our most widespread early colonisers and important in restoration of native forest at a landscape scale. A range of native species of liverworts, mistletoes, reptiles, birds, insects, and other organisms depend on our native myrtles.

<sup>3</sup> Source: <https://www.doc.govt.nz/nature/pests-and-threats/diseases/myrtle-rust/our-work-on-raoul-island/>

<sup>4</sup> Dr Grant Smith, 2018 personal communication

<sup>5</sup> Source: De Lange PJ, Rolfe JR, Barkla JW, Courtney SP, Champion PD, Perrie LR, Beadel SM, Ford KA, Breitwieser I, Schonberger I, Hindmarsh-Walls R, Heenan PB, Ladley K. 2018. Conservation status of New Zealand indigenous vascular plants, 2017. Department of Conservation.

## 4.2 Kaupapa Māori: Māori cultural and environmental values

For tāngata whenua, cultural health, wellbeing and identity are strongly linked to the physical environment and any impacts are considered holistically together with the impacts on myrtle health. The myrtle family includes several taonga species, with pōhutukawa, rātā, kānuka and mānuka being recognised as particularly important to a large number of iwi and hapū. Many native myrtles have traditional and contemporary uses as materials for structures and art, as indicators of seasonal change and/or harvest times, and as rongoā<sup>6</sup>. Some exotic species like feijoa (*Acca sellowiana*) and blue gum (*Eucalyptus globulus*) are also important resources for tāngata whenua and may be considered equally important.

Tāngata whenua across the motu place particular importance on individual trees. A well-known example is Te Rerenga Wairua the ancient pōhutukawa at Cape Reinga. Further examples include Te Waha o Rerekohu in Te Araroa on the East Cape, and Tangi te Korowhiti and Te Papa o Karewa, two revered pōhutukawa associated with the anchoring of the Tainui waka when it first arrived in Kāwhia, Waikato.

The mauri of forests and shrub-lands is linked to the health of the plants and animals found there. The mauri reflects the resilience of the relationship between people and nature, which can result in changes to practices and associated knowledge systems, language, cultural iconography and overall human mental, spiritual and physical health. Losing our native myrtles would have the effect of erasing centuries of practice and the knowledge systems associated with them.

Other considerations are the implications for decision-making related to:

- the role and status of tāngata whenua as mana whenua under obligations derived from Te Tiriti o Waitangi (including the various unique treaty settlements and principles therein); and
- high profile indigenous claims and movements such as those under WAI 262 (flora and fauna), and the Mataatua Declaration.

The declaration, WAI 262 and various pieces of settlement legislation, may offer solutions including innovative and practical co-management, co-governance and co-design mechanisms which provide for the relevant experience and learnings of both partners and are given effect to in this strategy. This will enable Māori involvement in the strategy on a number of fronts, as landowners, kaitiaki Māori, Iwi participation and Māori whanau as New Zealand citizens.

## 4.3 Economic values

In New Zealand, the most commercially valuable myrtles include eucalyptus, feijoa, guava, ornamental plants and mānuka, with a combined export worth of approximately \$250 million per annum (value in 2016). The majority of value is derived from mānuka honey and the industry is aiming to grow to \$1.2 billion in exports over the next 10 years<sup>7</sup>.

Preliminary estimates show a possible fall in New Zealand mānuka honey exports of \$5-70 million per annum in badly impacted regions. The overall national impact to mānuka honey is likely to be modest, over the medium- to long-term, but impacts in particular regions could be higher. The New Zealand Institute of Economic Research (NZIER) estimates that myrtle rust could negatively impact on GDP by between \$144 and \$411 million by 2030.

We have yet to see how myrtle rust could affect mānuka flowering in New Zealand. It is possible that year-on-year infections may result in decreased nectar-production. Reports from Australia confirm that infection has been identified on all flower parts of multiple different native species there causing early senescence of flowers and preventing the development of fruit and seed.<sup>8</sup>

If the impact of myrtle rust on mānuka honey production is such that management is considered necessary, there could be wide ranging implications. For instance, should the mānuka honey industry introduce preventative spraying regimes for mānuka plantations, this would need to be managed in a way that prevents fungicidal residues appearing in honey as this could have a profound impact on trade. There are also practical, economic, social, and cultural considerations for employing this type of intervention.

The impact of myrtle rust is beginning to be felt in the New Zealand nursery industry due to changes in consumer behaviour, as consumers choose to plant alternatives to myrtles to avoid the disease. At the same time, nurseries are experiencing increased management costs, including fungicide treatments. Plant producers will need to play their part in protecting their stock against myrtle rust and managing the disease when it is found. In Australia, nurseries have seen an increase in management costs, increased reliance on regular chemical applications, and removal of the more susceptible species from production and sale<sup>9</sup>.

<sup>6</sup> Simpson, P. 2005: Pōhutukawa and rata: New Zealand's iron-hearted trees. Te Papa Press, Wellington. 346p

<sup>7</sup> NZIER 2017 Economic Impacts of myrtle rust – a dynamic CGE assessment

<sup>8</sup> Pegg G., Carnegie A., Giblin F. and Perry S. 2018 Final Report: Managing myrtle rust in Australia

<sup>9</sup> Carnegie A. and Pegg G. (2018) Lessons from the Incursion of Myrtle Rust in Australia: "the establishment of myrtle rust in eastern Australia resulted in a significant impact on the nursery and garden industry, with growers ceasing to grow highly susceptible species—and needing to find acceptable alternatives—and requiring increased fungicide applications".



Other economic value is derived from the contribution of native myrtles to the aesthetic and tourist appeal of New Zealand landscapes, especially as tourism is New Zealand's largest export industry in terms of foreign exchange earnings<sup>10</sup>. The potential economic impact of myrtle rust on native ecosystems is also a factor, but one that is much more difficult to quantify.

#### 4.4 Social and cultural values

Coastal pōhutukawa stands in the North Island, and flowering rātā throughout inland forests (especially in the South Island) are particularly iconic and contribute significantly to the cultural identity of all New Zealanders. Mānuka and kānuka dominated bush and scrublands are recognisable parts of the rural and coastal landscapes throughout the country.

Individual or groups of myrtle plants and myrtle ecosystems can hold strong emotional connections in people's personal stories or history. Pōhutukawa is often known as New Zealand's Christmas tree.

Many of our native myrtles are commonly used in garden amenity and commemorative plantings, as urban street trees, and to attract and provide food for native birds. Non-native species such as eucalyptus and feijoa hold social, amenity and historic value for many New Zealanders. Selected cultivars of native myrtles are very popular in the home garden and for urban landscaping. Response data indicates that garden hybrids of ramarama (*L. x ralphii*) may be particularly susceptible to myrtle rust.

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<sup>10</sup> Source <https://www.tourismnewzealand.com/about/about-the-industry/>

# 5. Vision

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The vision for the New Zealand myrtle rust strategy is:

**The mauri of myrtle plants and dependent ecosystems is safeguarded and sustained.**



## 6. Objectives

The objectives for the strategy are:

1. The behaviour and impact of myrtle rust in Aotearoa New Zealand is understood and options for managing it are identified.
2. Native myrtle and dependent species are safeguarded and sustained.
3. The resilience and integrity of ecosystems vulnerable to myrtle rust is enhanced.
4. Whānau, hapū and iwi are supported to exercise their responsibilities as kaitiaki of their taonga, and natural and cultural resources that may be affected by myrtle rust.
5. Those with an interest in myrtles and associated ecosystems work collaboratively to manage myrtle rust in Aotearoa New Zealand.
6. The impact of myrtle rust on places and plants of particular value to people is minimised (to the greatest extent possible).

## 7. Success

We know what success looks like when:

1. We have viable representative germplasm of priority species impacted by myrtle rust.
2. Myrtle rust research is strategically planned and aligned, and informs myrtle rust management.
3. Our culture and wellbeing experiences with myrtles do not decline.
4. Whanau, hapu, iwi, communities and industry are actively safeguarding their myrtle plants and ecosystems.
5. Collaboration between partners results in better relationships and more effective delivery.

# 8. Measures

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Quantitative and qualitative elements will inform our progress in the following areas:

1. Public knowledge and awareness of myrtle species and myrtle rust increases.
2. Scientific understanding of the spread and impacts of myrtle rust increases.
3. All native myrtle species have a viable collection of germplasm stored.
4. Improved understanding and application of mitigation options is underway.
5. Trust and respect between all partners increases.
6. Partners are clear about everyone's roles and responsibilities.
7. A programme is in place that recognises kaitiakitanga and supports active participation by communities.



# 9. Programme activities

This section provides a high level overview of a work programme to support the objectives above. Detailed activities will be developed further in the next phase of the project for each agency including identification of the requisite resources, roles and responsibilities, and prioritisation of the work. The activities will be developed with all objectives in mind as they are interdependent.

The Strategic Science Advisory Group's Science Plan will be a key input into the implementation of the Strategy, and it will be important that the Advisory Group and Governance Group work together in establishing the programme activities and action plan.

## **1. The behaviour and impact of myrtle rust in Aotearoa New Zealand is understood and options for managing it are identified**

### **Activities**

- 1.1 Develop a myrtle rust science network to promote sharing of information
- 1.2 Develop a Science Plan (research strategy)
- 1.3 Acquire and share knowledge about myrtle rust behaviour
- 1.4 Acquire and share existing knowledge of myrtle rust impacts
- 1.5 Acquire and share knowledge about managing myrtle rust and impacted species/systems
- 1.6 Identify a suite of tools for use across a range of landscape scales and types

## **2. Native myrtle and dependent plant species are safeguarded and sustained**

### **Activities**

- 2.1 Develop a national germplasm strategy (for example, seed collection)
- 2.2 Develop an implementation approach for the national germplasm strategy
- 2.3 Implement national germplasm strategy

## **3. The resilience and integrity of ecosystems vulnerable to myrtle rust are enhanced**

### **Activities**

- 3.1 Gather ecological information on myrtle based ecosystems, including important interactions, indicators of ecosystem health and other factors that exacerbate myrtle rust's impact on ecosystems
- 3.2 Apply what we learn from research to develop guidance on how to enhance ecosystems vulnerable to myrtle rust
- 3.3 Identify links with other programmes that are associated with vulnerable myrtle ecosystems, and integrate with these

#### **4. Whānau, hapū and iwi are supported to exercise their responsibilities as kaitiaki of their taonga, and natural and cultural resources that may be affected by myrtle rust**

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##### **Activities**

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4.1 Enable whānau, hapū and iwi to deliver and participate in programmes based on matauranga Māori

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4.2 Information is translated into Te Reo Māori, and provided in formats that suit whanau, hapū and iwi

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4.3 See all actions under objectives 1, 2, 3, 5 and 6

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#### **5. Those with an interest in myrtles and associated ecosystems work collaboratively to manage myrtle rust in Aotearoa New Zealand**

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##### **Activities**

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5.1 Develop a framework for delivery of the strategy

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5.2 Develop a data management and sharing framework

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5.3 Develop and publish agreed messaging

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5.4 Seize/enable/create/identify opportunities to collaborate

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5.5 Collaborate internationally through scientific journals and publications, field research, symposiums, community based indigenous knowledge systems

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#### **6. The impact of myrtle rust on places and plants of particular value to people is minimised (to the greatest extent possible)**

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##### **Activities**

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6.1 Develop an engagement strategy and implementation approach

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6.2 Develop a communication and social media plan for key audiences

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6.3 Develop a strategy to work with affected and / or potentially contributing industry groups

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6.4 Assist communities, including NGOs, to identify individual trees and sites of significant value to them so that they can take appropriate action

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6.5 Support communities, including NGOs, to take action

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6.6 Support land owners and managers (including private landowners, DOC and councils) to take appropriate action

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6.7 Develop contingency plans in case myrtle rust is causing impacts worse than expected

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# 10. Key risks

The key risks and mitigation approaches identified to deliver the strategy are:

Risks	Mitigation
Effective management tools are not developed or their use is unacceptable	Work with researchers and other agencies to identify and develop the tools and resources that are needed and accepted by communities/individuals.
Germplasm (genetic material including seed) of threatened native species or iconic trees is lost or cannot be stored	Conduct urgent research to develop new methods for conserving difficult to store native species. Collect seed from plants that are still free from myrtle rust and support community initiatives to collect and store viable seed and other ex situ conservation
There is insufficient funding available to implement the strategy	Seek resources for activities from Government, regional councils, and community funding.
There is insufficient time and resource to implement the strategy	Clearly delineate roles and responsibilities and collaborate to ensure optimal use of resources
There is insufficient capacity to implement the strategy	Encourage retention and increased capacity through the tertiary education and crown research sectors
Risk of potential extinction of vulnerable native myrtles and other dependent species	<p>Retain Unwanted Organism status to allow regulation against new strains</p> <p>Share ongoing research and identification of strains</p> <p>Undertake research on taxonomy and genetics of native myrtles</p> <p>Continue seedbanking and maintain it over time Encourage the continued planting of native myrtle species using seed collected from unaffected plants</p>
Apathy and resignation -perception that it is too late - the horse has bolted Pathogen fatigue – people are overloaded and pushback on consultation	<p>Keep myrtle rust in the spotlight by developing an engagement and social media strategy focused on what we are trying to protect (i.e. forest/ecosystem health and broader biodiversity and biosecurity).</p> <p>Maintain links to Biosecurity 2025 work programme.</p>
Myrtle rust spreads faster and impacts are much worse than we anticipate and/or other strains are introduced.	<p>Take a precautionary approach to myrtle rust and prepare a crisis plan for the worst case scenario. Regularly review and update the strategy to ensure it is fit for purpose.</p> <p>Identify actions to ensure knowledge capture and lessons learnt for contingency planning.</p>
Public health and safety is put at risk because we cannot keep up with removal of dying trees on streets and in parks	Preparation of a crisis plan.

Risk management actions will be further developed and implemented to ensure that risks are managed and mitigated.

# 11. Management of the programme

This section provides a high level overview of how the programme will be managed. The coordination and management of the programme will have a major influence on its effectiveness. The key activities and responsibilities for management of the work programme are:

<b>Key activities</b>	<b>Responsibilities</b>	<b>Lead</b>
Effective governance	Leadership Decision-making	Governance Group
Programme management	Coordination Planning Monitoring and reporting Risk and issues management Review	Biosecurity New Zealand, MPI (long-term arrangements TBC)
Collaboration	Communication Feedback Adaptive management	Shared between Biosecurity New Zealand, DOC, and regional councils, Myrtle Rust Strategic Science Advisory Group
Strategic research	Science plan Science symposium Communicate research findings	Myrtle Rust Strategic Science Advisory Group, MBIE and CRIs



# Appendix I: New Zealand native myrtles

Scientific name	Common name	2017 threat status <sup>11</sup>
<i>Kunzea</i> aff. <i>robusta</i>	Weeping kānuka	Not assessed
<i>Kunzea amanthicola</i>	sand kānuka; rauwiritoa	Nationally vulnerable
<i>Kunzea ericoides</i>	kānuka	Nationally vulnerable
<i>Kunzea linearis</i>	northern kānuka; rauwiri	Nationally vulnerable
<i>Kunzea robusta</i>	lowland kānuka; rauwirinui	Nationally vulnerable
<i>Kunzea salterae</i>	Moutohorā kānuka;	Nationally endangered
<i>Kunzea serotina</i>	upland kānuka; mākahikātoa	Nationally vulnerable
<i>Kunzea sinclairii</i>	Barrier kānuka	Nationally critical
<i>Kunzea tenuicaulis</i>	geothermal kānuka	Nationally vulnerable
<i>Kunzea toelkenii</i>	Bay of Plenty kānuka	Nationally critical
<i>Kunzea triregensis</i>	Three Kings kānuka	Nationally critical
<i>Leptospermum</i> aff. <i>scoparium</i> "Auckland"		Nationally vulnerable
<i>Leptospermum</i> aff. <i>scoparium</i> "coastal silver prostrate"		Nationally vulnerable
<i>Leptospermum</i> aff. <i>scoparium</i> "East Cape"		Nationally vulnerable
<i>Leptospermum</i> aff. <i>scoparium</i> "North Cape"		Nationally vulnerable
<i>Leptospermum</i> aff. <i>scoparium</i> "Surville Cliffs"		Nationally critical
<i>Leptospermum</i> aff. <i>scoparium</i> "Three Kings"		Nationally critical
<i>Leptospermum</i> aff. <i>scoparium</i> "Waikato peat bog"		Nationally critical
<i>Leptospermum</i> aff. <i>scoparium</i> var. <i>incanum</i> "North Cape"		Nationally critical

<sup>11</sup> Source: De Lange et al., 2018. Conservation status of New Zealand indigenous vascular plants, 2017. Department of Conservation

Scientific name	Common name	2017 threat status <sup>11</sup>
<i>Leptospermum scoparium</i> var. <i>incanum</i>	northern mānuka	Nationally vulnerable
<i>Leptospermum scoparium</i> var. <i>scoparium</i>	mānuka, kahikātoa;	At risk declining
<i>Lophomyrtus bullata</i>	ramarama; rōhutu	Nationally critical
<i>Lophomyrtus obcordata</i>	rōhutu	Nationally critical
<i>Metrosideros albiflora</i>	kauri rātā vine; akatea	Nationally vulnerable
<i>Metrosideros bartlettii</i>	Bartlett's rātā; rātā moehau	Nationally critical
<i>Metrosideros carminea</i>	carmine rātā vine	Nationally vulnerable
<i>Metrosideros colensoi</i>	pendant rātā vine	Nationally vulnerable
<i>Metrosideros diffusa</i>	white rātā vine	Nationally vulnerable
<i>Metrosideros excelsa</i>	pōhutukawa	Nationally vulnerable
<i>Metrosideros fulgens</i>	scarlet rātā vine	Nationally vulnerable
<i>Metrosideros kermadecensis</i>	Kermadec pōhutukawa	Nationally critical
<i>Metrosideros parkinsonii</i>	crimson rātā	Nationally vulnerable
<i>Metrosideros perforata</i>	small white rātā vine	Nationally vulnerable
<i>Metrosideros robusta</i>	northern rātā	Nationally vulnerable
<i>Metrosideros umbellata</i>	southern rātā	Nationally vulnerable
<i>Neomyrtus pedunculata</i>	rohutu	Nationally critical
<i>Syzygium maire</i>	swamp maire; maire tawake	Nationally critical

**Name**<sup>12</sup> = indicates that myrtle rust infection has been confirmed on this host plant in New Zealand as at 29/03/2019

<sup>12</sup> Ho W, Toome-Heller M, Quinn B, Ganley B, Alexander B. Myrtle rust in New Zealand. (manuscript in preparation)

# Appendix II: Exotic myrtle species confirmed as infected in New Zealand

Scientific name	Common name
<i>Acca sellowiana</i>	Feijoa
<i>Agonis flexuosa</i>	Willow myrtle
<i>Callistemon salignus</i>	bottlebrush
<i>Callistemon viminalis</i>	bottlebrush
<i>Eucalyptus globoidea</i>	White stringybark gum
<i>Metrosideros collina</i>	
<i>Myrtus communis</i>	Common myrtle
<i>Syzygium australe</i>	Lilly pilly
<i>Syzygium jambos</i>	Rose apple
<i>Thryptomene calycina</i>	
<i>Tristaniopsis laurina</i>	

\* confirmed<sup>13</sup> as at 29/03/2019

<sup>13</sup> Ho W, Toome-Heller M, Quinn B, Ganley B, Alexander B. Myrtle rust in New Zealand. (manuscript in preparation)

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July 2019



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