NGĀ TAONGA

MPI 18607 Project Report

Building engagement and social licence: Understanding motivated networks

Prepared for the Ministry for Primary Industries
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July 2019

New Zealand Government

Ministry for Primary Industries
Manatū Ahu Matua

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Executive summary

The problem

In 2017 the Ministry for Primary Industries (MPI) commissioned research into myrtle rust (*Austropuccinia psidii*) to address critical knowledge gaps in social, cultural and scientific knowledge relating to the management of myrtle rust in NZ, as identified by the Strategic Science Advisory Group (SSAG). A priority research theme identified as part of this process was 'building engagement and social licence' (Theme "Building engagement and social licence"). The overall outcome of Theme "Building engagement and social licence" is an improved understanding of the impacts of myrtle rust and response activities to help guide agencies and other decision makers involved in incursion response and long-term management of myrtle rust.

There are four strands of research associated with Theme "Building engagement and social licence": a multi-regional internet survey of interested and impacted individuals (Bayne et al, 2019); a case study including interviews and focus groups with people impacted by the incursion response in Taranaki (Stronge et al, 2019); interviews with people motivated to be involved in the biosecurity operations (this strand); and the development of rubrics as planning and assessment tools for social licence to operate and partnerships (Allen et al, 2019).

This research strand aims to understand constraints and opportunities for motivated people and networks to take active roles in the myrtle rust response and long-term management. The research uses semi-structured telephone interviews with key individuals motivated to be involved in the response to identify how best to support stronger network development and partnerships in response operations.

Research approach and methodology

This strand of research complements the focus on impacts of the response operations by interviewing those motivated to be involved. Theme "Building engagement and social licence" research team were aware of the need to build appreciation of how to work in tandem with those keen to be part of response operations as well as the possible transition towards long term management.

A small qualitative scoping study was designed to elicit some areas for immediate possible action and further investigation (Levac, Colquhoun and O'Brien, 2010). It is not comprehensive in relation to the full set of potential motivations and experiences of those that were part of the response but uses the experiences of participants to ground understanding and make some initial recommendations for further consideration of biosecurity response agencies and their stakeholders. A careful selection of key informants, in this case through the diversity of interests in the response operations, can provide valuable qualitative data where they occupy significant areas or expertise or experience (Porth 2015).

Participants were identified during the research, through attending hui and workshops, and invited to participate in the research via email (N=20). Attention was given to reaching a diversity of organisations and roles to cover a range of perspectives and experiences. Ten people were interviewed for an hour each via telephone.

Key results

Participants were largely motivated as professionals working in plant related industries or the public sector but also with the not-for-profit sector, as private consultants or service contractors and mana whenua.

There were few constraints to become involved as most had the support of their employer or were proactively involved as an impacted entity but most went beyond their professional duties. A genuine concern about managing the risk of myrtle rust spread was evident with all the respondents – as such risk management protocols and knowledge were developed, often in collaboration with others. However, there was a diversity in motivations and interests which led to differences in what were seen as appropriate response actions.

Individuals demonstrated a proactivity in getting involved, seeking support of employers with generally strong support provided but some competing concerns to get on with normal or other work meant that momentum was difficult to maintain. Most had not experienced the intensity of incursion response (although some did have previous experience) but had been involved in conservation, tree propagation or management. A great deal of self-learning took place and considerable learning within peer groups and between organisations and networks of plant-related professionals.

An appreciation of the protocols needed to manage risk was generated through practitioners and there was less information available from the response agency, at least initially, for this. For example, some felt they were providing the guidance. Not all that was contributed by participants was taken up by the response agency, and some questions remained unanswered. There was an interest in being better connected with research and a desire to be connected with what was happening in other places to support learning about what kinds of interventions were effective. Participants observed a waning interest in the impacts of myrtle rust, often because of a perceived minimal or negligible impact on a species of concern to stakeholders but also due to an end to the incursion response operations and decline in media attention.

Capability existed and was further developed as knowledge was sought and learning shared, amongst smaller circles of professional interest, such as arborists, and wider circles across organisations, such as nurseries and public gardens. Some key people within MPI or working with them provided an essential link for brokering knowledge and developing outcomes, for example, between the nursery sector and the response agency. However, there was concern that the wider public did not have the depth of skills and knowledge for plant and disease identification, and that a more measured approach was needed to make good use of their involvement, for example, by looking at species they could identify or where disease was clearly visible. Greater awareness was needed to ensure publics were not unwittingly spreading the disease.

Maintaining knowledge networks and connections, especially about where the disease was being found and rates of spread or potential movement, as well as what actions were being taken and how effective they were, and access to research and influencing research questions were desired for ongoing involvement.

Implications of results for the client

Our research has found several positive examples of motivated individuals and organisations working effectively as partners in the response and management efforts, and examples of networks helping to share information and bridge across sectors, iwi and government. However, we also found several barriers to involvement or areas where agencies did not effectively engage with potential partners, missing out on possible expertise and response support opportunities. To address these issues in ongoing management and prepare for future biosecurity responses, we make the following recommendations.

- Build a more comprehensive map of the partners, stakeholders and networks which are necessary to involve in ongoing myrtle rust management and in different likely future incursion scenarios.
  - Work with them to better understand their different motivations, priorities, capabilities, barriers and information needs for being involved in biosecurity.
  - Actively promote building of shared and agreed-upon aims through facilitated discussion and engagement in ongoing efforts to manage myrtle rust.
- Prioritise engagement with iwi and hapū to strengthen partnerships for biosecurity surveillance, response and management.
  - Understand the resource needs for, and continue to invest in, growing the capacity and capability of current and future kaitiaki within mana whenua
- Build upon existing relationships and cultivate new relationships with key people and organisations in advance of an incursion, for example, through regular personal engagement and face-to-face relationship-building activities.
  - Coordinate with other government agencies at the central and local levels to take advantage of existing relationships and to avoid over-burdening external partners and stakeholders.

- Further develop and expand the National Biosecurity Capability Network (NBCN)[1] to include broader skill sets, particularly skills in engagement and communications and particularly from mana whenua and those in conservation-focused and other non-industry organisations.
- Demonstrate ongoing commitment and work to maintain long-term interest in management, monitoring and surveillance.
    - Shift from acting as the central repository and provider of information to being a facilitator of knowledge exchange.
    - Continue to invest in training local people in surveillance and management.
    - Prioritise resources for creating a surveillance network and hub for gathering and exchanging information.
- When a new incursion response begins, immediately seek out and involve local experts, such as those in industry or local government
    - Leverage these contacts as relationship managers and knowledge brokers to disseminate information to, and solicit active contributions, from their networks or communities.
    - Actively seek out and invite local-level experts from other regions to learn through their participation, reinforce relationships, take lessons back to their home regions and prepare for possible spread.
- Use the social license to operate and cross-sector partnership rubrics to guide and assess the development and effectiveness of actions throughout ongoing management and in future responses.
    - Manage relationship from the start through different stages of their development relating to incursion response, from immediate interactions through incursion response and through longer term management transitions
    - Ensure knowledge needs and contributions of partners are articulated in a way that supports their engagement and commitment to activities, even if they are doing different things

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[1] The NBCN is a joint initiative between MPI and AsureQuality involving many different types of organisations from across New Zealand that bring together a vast range of skills and capacity to respond to a biosecurity incursion (AsureQuality, n.d.).

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1   Project background

To better understand myrtle rust and limit its impact in New Zealand, the Ministry for Primary Industries commissioned a comprehensive research programme in 2017 with more than 20 projects valued at over $3.7 million. Projects in this programme were completed by June 2019.

The projects covered research in the following themes:

- Theme 1 - Understanding the pathogen, hosts, and environmental influence.
- Theme 2 – Building engagement and social licence: Improved understanding of public perceptions and behaviours to allow better decisions about investment, improved design of pathway control strategies and maintain social license for use of management tools.
- Theme 3 – Te Ao Māori: Greater understanding of Te Ao Māori implications of myrtle rust in order to support more effective investments, and improved use of Mātauranga, specific Māori knowledge, and kaupapa Māori approaches in management regimes.
- Theme 4 – Improving management tools and approaches: Improved diagnostic and surveillance speed, accuracy and cost-effectiveness, supporting eradication efforts and enabling scaling up of surveillance efforts for a given resource. More effective treatment toolkits to avoid emergences of MR resistance to treatments and to enable disease control over increasingly large scales that will lead to reduced or avoided impacts.
- Theme 5 - Evaluating impacts and responses: Improved understanding of environmental, economic, social and cultural, impacts to inform risk assessment and management and to communicate implications to decision/makers and stakeholders.

This report is part of the MPI commissioned research under contract MPI18607 which addressed research questions within Theme 2, 4 and 5.

Text in the report may refer to other research programmes carried out under the respective theme titles.

2   Introduction

Following the detection of myrtle rust (*Austropuccinia psidii*) into New Zealand in April 2017, the Ministry for Primary Industries (MPI), the agency responsible for biosecurity incursions, and the Department of Conservation (DOC), with the help of local iwi, the nursery industry, and local authorities, ran a year-long operation to attempt to contain and control myrtle rust and determine the extent of its spread (MPI, 2018). Since mid-May 2017 more than 5,000 myrtle plants have been removed and destroyed, and more than 95,000 myrtle plants inspected (MPI, 2018). However, in April 2018, MPI decided that eradication was not possible and announced that it was moving from incursion response into long-term management.

In October 2017 MPI commissioned research into myrtle rust to address critical knowledge gaps in social, cultural and scientific knowledge relating to the management of myrtle rust in NZ, as identified by the Strategic Science Advisory Group (SSAG) (MPI 2017a). 'Building engagement and social licence' was identified as one of the priority research areas[2]. The intended outcome of this Theme was to improve understanding of the impacts of myrtle rust social licence to operate (SLO) and related engagement activities to help guide agencies and other decision makers involved in incursion response and long-term management of myrtle rust.

The Theme "Building engagement and social licence" research sought to understand stakeholder perceptions and behaviours to allow better decisions about investment, improve the design of pathway control strategies and maintain social license for the use of management tools.

This report presents one of the four research strands within Theme "Building engagement and social licence" specifically aimed at understanding constraints and opportunities for motivated people and networks to take active roles in the myrtle rust response and long-term management. Complementary research strands under this theme comprise:
- A survey concerning public acceptability of possible management options, an investigation of values associated with myrtle rust impact, and social licence considerations related to the response operations (Bayne et al, 2019)
- A case study investigating how the owners of affected properties and other local stakeholders were impacted by myrtle rust and response operations (Stronge et al 2019)
- The development of rubrics as a tool for assessing social license to operate and partnerships through short to long term biosecurity response operations (Allen et al 2019)

2.1   Problem definition and research aim

Myrtle rust is a disease that impacts Myryaceae species and could affect several iconic New Zealand plants such as pōhutukawa, mānuka, rātā, kānuka, swamp maire and ramarama, as well as commercially-grown species such as eucalyptus (MPI, 2018a). Since arriving in New Zealand, it is now known that the fungus causing myrtle rust can reproduce sexually, meaning that it is capable of introducing genetic variability, adapting to new environments and possibly affecting new hosts (MPI, 2018a). As yet, it's not clear how the disease will impact New Zealand species, however overseas the impacts have varied across countries and from species to species (MPI, 2018a).

The myrtle rust response has been a major collaborative undertaking. Though the response began with a small number of representatives from the MPI, DOC and biosecurity contractor AsureQuality, by the time the transition into long term management was decided, the response had included varying levels of involvement by hundreds of people from dozens of agencies, local governments, iwi and hapū, industry groups, environmental or community organisations and businesses (MPI, 2018b). However, while some agencies, organisations and individuals worked together effectively, initial discussions revealed that others were less integrated into the response, less connected with information channels and less able to contribute meaningfully.

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2 The other three priority areas where: i) Te Ao Māori; ii) Improving management tools and approaches; and iii) Evaluating impacts and responses.

With the transition from incursion response and attempted eradication in a few regions into long-term management nationwide, collaboration will need to expand. The myrtle rust programme has initiated a partnership between Biosecurity New Zealand (BNZ) and DOC and included a cross-sector working group between key agencies and stakeholders including MPI, Ministry for Culture and Heritage, regional councils, Project Crimson, and Māori organisations with an interest in biosecurity (MPI, 2018c). As part of the long term planning activities, MPI anticipate "supporting future changes in operational mandates to build social licence by drawing on local resources for handling incursion response and strengthening abilities to partner with communities in effective biosecurity operations" (MPI 2018c).

Theme "Building engagement and social licence" research has mostly focused on achieving and maintaining social license to operate with wider publics as part of incursion response operations. It responds to the broader aims of the New Zealand biosecurity systems to prevent or manage the impacts of biosecurity risks on New Zealand's economic, environmental, social and cultural values (MPI, 2016, 2018b). It also recognises the Biosecurity 2025 Strategy direction statement seeks to "[protect] New Zealanders, our way of life, our natural and production resources and our biodiversity from the harmful effects of pests and diseases" (MPI, 2016, p. 4), including the strategic objective to encourage 4.7 million willing participants to be part of the biosecurity system. This strand complements the activities of the other Theme "Building engagement and social licence" strands and focuses on the experiences of those who were motivated to be involved more actively in the response and management efforts.

The research reported here sought to understand constraints and opportunities for people to become part of the response operation, including those that were linked into the official response operations and those that weren't but still performed an active role in short term response. The overarching aim was to understand how to support stronger network development and partnership in response operations.

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3   Methods

This strand of research was designed to complement the focus on impacts of the response operations to focus on those motivated to be involved. Theme "Building engagement and social licence" research team were aware of the possible transition towards long term management and the need to build appreciation of how to work in tandem with those keen to be part of response operations.

A small scoping study was designed to elicit some areas for immediate possible action or further investigation (Levac, Colquhoun and O'Brien, 2010). It does not represent a comprehensive picture in relation to the full set of potential motivations and experiences of those that were part of the response.

The research data consisted of in-depth semi-structured telephone interviews with key people who were actively involved with the myrtle rust response. Participants were purposefully selected from the pool of participants attending hui and workshops, for their levels of interest and motivation displayed in the incursion response, to represent diversity. A careful selection of key informants can provide valuable qualitative data where they occupy significant areas or expertise or experience (Porth 2015). The number of qualitative research interviews required to generate valid themes is smaller than is often collected (Guest, Bunce and Johnson 2006; Hennink, Kaiser and Marconi, 2016). We rationalised the resources required to collect this important information whilst still fresh in participants minds, to ensure information would be timely for the transition to long term management.

A list of potential participants was identified during the research interactions with other research themes. An email was sent to 20 people inviting them to partake in an interview; 12 responded and 10 agreed to participate (2 could not find suitable times for interview). An even number of males (n=5) and females (n=5) were interviewed. Participants were associated with local and central government (n=3), contract biosecurity operations (n=2), nursery industry (n=1), conservation consultancy (n=1), non-profit organisation (n=1), and mana whenua (n=2). Participants performed a range of roles within these organisations and represent several different professions (Table 1). Some participants were members of the National Biosecurity Capability Network (NBCN).

Table 1: Organisations and roles represented among the research participants

Organisations represented among research participants		
Central, regional and local government	Non-governmental organisations	Iwi/hapū/rūnanga
Public gardens	Private consultancies	Surveillance services
Industry		
Roles held by research participants		
Arborist	Communications manager	Botanist
Conservationist	Landscape gardener	Nursery operator
Biosecurity manager	Plantation manager	

An information sheet was provided to all interviewees prior to each interview (Appendix B). Interviews were recorded[3] with the consent of participants for cross checking notes taken and verifying quotes to illustrate key themes.

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[3] Transcripts were not completed for this part of Theme "Building engagement and social licence" research. Rather notes were taken by the researchers to capture a summary of the interview and to make comparisons between interview data and

The interviews were semi-structured, meaning the researchers prepared a set of interview questions[4] (Appendix A) to guide conversation and ensure key topics were addressed but adapted these as necessary to explore unanticipated points or themes raised by participants.

Notes taken of responses were analysed by two researchers to identify key themes and code frames compared and discussed following a theme analysis and grounded theory approach (Strauss and Corbin, 1999). Interviews were listened back to by one of the researchers and quotes extracted. Themes were generated from the content of interviews and relationships between themes were examined. A thematic analysis was undertaken to generate initial insights that could respond to the following five research question .

1. Are they linked to any groups or individuals interested in responding to myrtle rust? If so who or what kind of group or individual?
2. In what ways are they personally interested in responding to myrtle rust? E.g., Minimising impacts, Observing changes, Avoiding biodiversity losses, Avoiding business losses, Etc
   a. What about other individuals or groups that they know of, in what ways are they interested in responding?
3. How have they been supported in responding to myrtle rust in the region/ locale? E.g., Planning activities, Conducting research, Making observations, Sharing knowledge, Etc
   a. What groups or individuals have been essential to that support?
4. What kinds of constraints have they experienced in responding to myrtle rust? E.g., Lack of knowledge, Lack of funds, Lack of commitment, Lack of time, Lack of coordination, Etc
5. What kinds of opportunities do they see could be further developed to support long term management?

Findings were also compared with those from the other Theme "Building engagement and social licence" research strands. Evidence relating to key criteria within the rubric for effective cross-sector partnerships (Figure 1; Allen et al. 2019) was gathered.

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two sets of researchers notes. Interview recordings were replayed to ensure notes adequately captured the interview content and to extract illustrative quotes.
[4] The interview questions were also shared with personnel from MPI to ensure the would address their concerns and provide information that was useful for response and long term management activities.
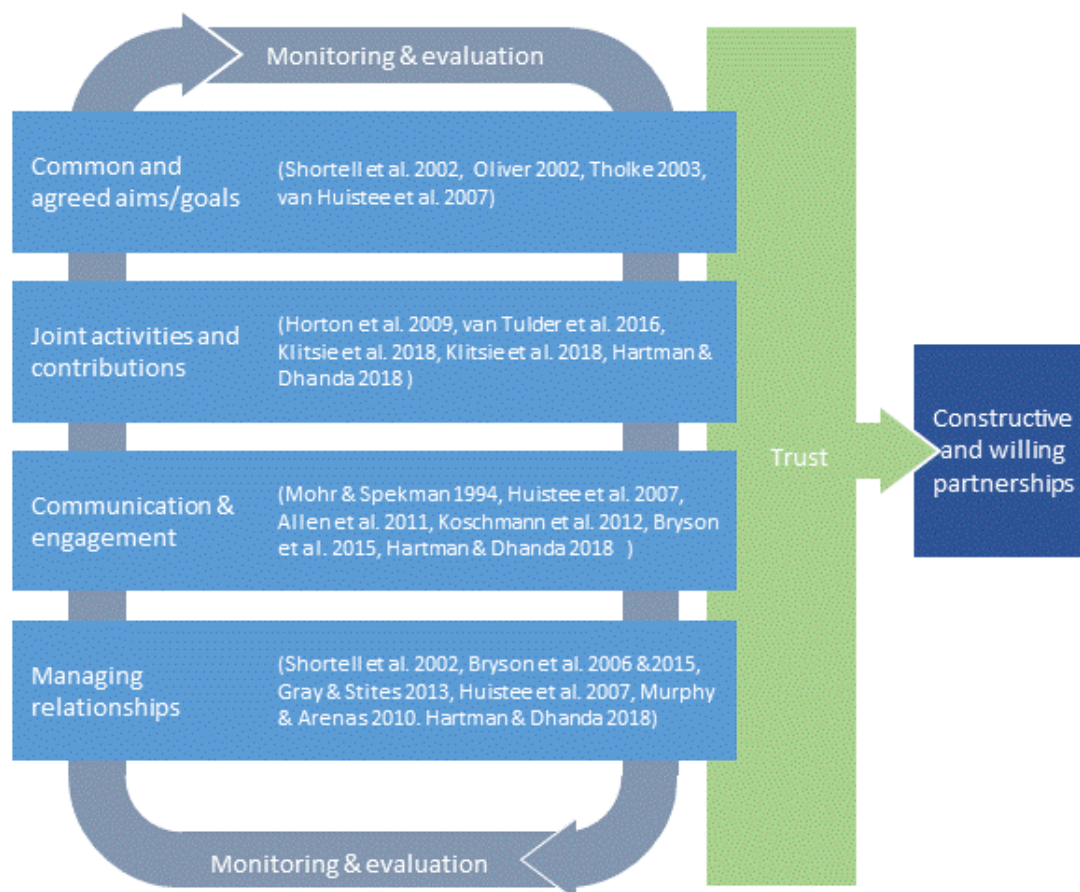
Figure 1: Key partnership performance criteria and referring literature (Source; Allen et al. 2019)

3.1   Limitations

This strand of research is limited by the small number of purposefully selected interviews conducted and needs to be further developed through a more comprehensive study of motivated groups and individuals. Although a relatively small sample size, a careful selection of key informants can provide valuable data (Porth 2015). Because the research was a qualitative study aimed at identifying the range of issues people raised, a representative sample was not necessary. However, diversity in the pool of participants available to the researchers was sampled. The aim was to scope potential issues related to response operations and for further consideration in engaging more widely with motivated groups and individuals, and over a longer term of engagement. These views cannot be considered to be representative of a wider sample, but provide a basis for further testing.

The non-random sampling process may also have introduced an element of bias. By inviting only those who had participated in workshops and hui or who had been recommended as key individuals by people within the response, we may have unintentionally excluded some people or organisations which were motivated but unable to be involved. Therefore, some important themes may not have been identified, particularly those which served as barriers for participation.

4   Results and discussion

The content of interviews was captured through a set of notes outlining the participations initial involvement, previous experience, linkages with key people or organizations, motives for getting involved, supports and opportunities, barriers and constraints; and capacities and capabilities for involvement of other groups. An initial set of themes generated through comparisons across the set of interviews were aligned into four broad areas of comparison (discussed below) that related to the objectives of the strand to understand participants experiences, the barriers and opportunities to get involved and any concerns they had about the initial and ongoing response operations.

Our presentation and discussion of these results looks at i) motivation, purpose and goals for getting involved; ii) opportunities and barriers to getting involved; iii) networks, connections and relationships; iv) engagement and communications; and v) opportunities for supporting long term management.

4.1   Motivations, purpose and goals

Most of the interview participants initially became involved in the response effort through formal professional or volunteer roles (e.g., being a member of the national biosecurity capability network (NBCN), working in conservation or in relevant plant-based industries or services), but some went above and beyond their professional duties. Participants showed a general common concern for protecting plants from myrtle rust infection and many were motivated out of personal desire to protect native species and ecosystems. Even those who became involved in the response through their normal professional roles had often sought those roles because of their underlying personal interests in nature, conservation and/or native species restoration.

In general, there was a sense of responsibility to ensure that individual actions would not put others or the natural estate at risk. Motivation seem to be driven by professional reputation or duty of care. At a high level, these motives were relatively consistent among the participants. For example, on becoming aware of the arrival of myrtle rust, one participant involved in conservation of native plants immediately activated their network of nursery contacts, reaching out to them and other public subscribers. Another who was proactive in providing expertise noted that there was a gap in coordination for seeking expertise within their own and other organisations, that they then attempted to fill.

Despite these common goals in a broad sense, the specific motives underlying involvement did not necessarily align seamlessly with the myrtle rust response or endure over time. For example, not all felt that myrtle rust was eradicable but nonetheless felt that action needed to be taken. For some taking plants out of circulation impinged on their business or conservation activities. A desire to come up with effective solutions that were practical was an underlying concern, such as enacting biosecurity protocols to prevent the movement of myrtle rust into or out of plant handling operations. All expressed concern about the possible negative impacts of the disease and were motivated to address it, but myrtle rust was typically not their only—or even primary—concern. For many, it was one of several concerns being dealt with, which reflected the activities of the organsiations they worked for. For example, one who was involved in establishing plantations introduced myrtle rust monitoring into their existing monitoring activities to become part of the fieldwork protocols.

4.1.1   Diversity in achieving common goals

Existing work activities may have shaped how people and organisations chose to respond; whilst sharing the same overall goals, they expressed different ways of achieving it. For example, while some saw the need to use 'sentinel' plants (showing more susceptibility) as a means of public education and alertness, others suggested taking certain plants out of circulation if they carried a risk of high inoculum loads (produced a lot of spores for potential infection of other plants).

> *"We're plants people; we're also business people We have a close attachment to the flora of New Zealand be it native or exotic. Also, quite practical people.*

We have the equipment; we have the knowledge. We just need to know specific [actions required to manage the risk]" (Int 008~41:00)

"Retail don't want to stock Myrtaceae because [they] don't want to be shut down. [It's] slowly coming back. [They needed an] expedient way of getting rid of risk. [They] can sell alternatives easily enough. [There's a] fair amount of wiggle room" (Int 008~1:11:00)

Others were concerned about revegetation programmes and whether they would be adding risk to those areas by planting Myrtaceae species. There were some indications that those involved in regeneration planting were looking to other more reliable and less riskier investment to perform the same ecosystem function without the risk of myrtle rust. Furthermore, as an advocate for planting Myrtaceae species one felt obliged to be on top of the issue, and while they started to advise people not to plant those species at all, they later focused on how to adapt to myrtle rust.

4.1.2   Concerns across impact areas

However, there was also some skepticism about the motives or level of commitment shown by others; one expressed concern about an industry operator, who seemed to be looking after their own interests above the risks to others. However, we did not experience that in the rest of the interview set, with a great sense of responsibility to support management of risk and business reputation. Even those that had a commercial interest were concerned about avoiding recommending a bad investment to people. One had a concern about the recent growth in the manuka honey industry, with many new beekeepers and the potential economic threat that posed to livelihoods.

Out of the set of concerns people had, the most prominent was environmental impacts either through loss of biodiversity, impacts on coastal or gully erosion or amenity values. However, some were also driven by concerns about economic and cultural values, for example, where inadequate risk management could impact on investments or reputation. Culturally important species or specimens were also of interest to some and considered an important vehicle for gaining public awareness. One other key area of concern to people and the reason for involvement was having access to the right information, to ensure steps could be taken to mitigate risk of myrtle rust spreading.

4.1.3   Concern about declining interests

Several interviewees reported that their interest and involvement had faded after it appeared that the species they were primarily concerned about did not seem to be severely affected. Some agency and local government individuals who were key during the initial response reported that they were no longer involved or up to date with myrtle rust following the transition to long-term management. In contrast, within our small sample at least, concerns from others more oriented towards conservation remained higher. They tended to expressed the desire to continue with active monitoring to protect the natural estate and avoid biodiversity loss.

People outside the response raised concerns about the apparent drop in motivation as the initial impact alarm fell and the government pulled back from eradication. At least one was worried that the drop of interest was a disincentive for the wider public to get involved or to stay vigilant.

While motivations to be involved in the initial response were generally strong and followed similar reasoning and interests at a high level, participants had different ways of achieving goals. It may not be accurate to describe the participants as having common and agreed aims, as noted, differences in priorities were apparent when deciding on actions. More than couple expressed a concern that once the disease had arrived it was inevitable that it would spread and not be able to be eradicated.

'Wasn't quite sure why… you know, they were removing big pōhutukawa straight away. I suppose at that stage you don't know how far and wide the pathogen has spread, so you have to look at it as if it is within a narrow zone, I suppose. But still it was inevitable that the eradication process would halt." (Int 003, ~8:00)

Integration with other strands

Having motivations to get involved but finding differences on what actions or priorities to take was also evident in the findings from the Theme "Building engagement and social licence" survey and case study, where shared values and aims are strongly expressed in the abstract at a national scale, but tensions appeared when addressing practical realities and personal impacts at the local scale (Stronge et al. 2019; Bayne et al. 2019).

During the initial response at least, there appeared to be an implicit assumption of agreement without having engaged in sufficient explicit discussion or processes for developing shared purpose. It is not necessary—or sometimes even possible—to form perfect agreement among all parties, but an active dialogue about motives, priorities and potential conflicts is important for building and maintaining effective and enduring partnerships (Allen et al. 2019).

Implications

Developing common and agreed aims and a shared sense of purpose is a key element for building and maintaining successful partnerships (see full discussion in Allen et al., 2019). This seems to have been achieved at an abstract level, but some issues arose when translating motives into action and as the response transitioned into long-term management.

Work needs to be done to develop **common and agreed aims** – whilst there were some implicit commonalities – prevent the spread of myrtle rust or its impacts, there was a variety of ways people might be achieving that. For example, some were focused on managing risk through communication and engagement (e.g., plantation and revegetation interests), whilst others were developing protocols to intervene on risk (e.g. spraying of fungicides or taking Myrtaceae of high risk out of circulation).

Recommendations 1
- Build a more comprehensive map of the partners, stakeholders and networks which are necessary to involve in ongoing myrtle rust management and in different likely future incursion scenarios.
  - Work with them to better understand their different motivations, priorities, capabilities, barriers and information needs for being involved in biosecurity.
  - Actively promote building of shared and agreed-upon aims through facilitated discussion and engagement in ongoing efforts to manage myrtle rust.

4.2   Opportunities and barriers to getting involved

Even though many were involved in conservation practices with pest control or tree health, many said they had not experienced any like this before. That included people that had been previously involved in biosecurity operations but that had less of the urgency associated with an incursion response operation. Many had been aware of the risk of myrtle rust arriving years prior and some had made plans, but nothing seemed to be coordinated across the different spaces people were working within. Once it arrived people did pursue connections and knowledge on how to respond. One, however, noted that they had very limited access to resources to do more, and felt somewhat letdown that the national communications could have been stronger.

However, participants generally indicated they were well-resourced with support from their own organisations. Some indicated they were the ones to initiate that rather than having the organisation step forward. Although there were some different views on how accessible and useful resources from the lead response agencies were. For those who had initiated planning efforts in advance of the myrtle rust incursion (for some since it had arrived in Australia in 2010), there were some concerns about the lack of preparation and advice on actions from the lead agency.

Nevertheless, there were still constraints. Without ongoing national surveillance, some participants did not know how bad the issue had become. One noted that they lacked the ability to go onto pubic property to look themselves and the biosecurity response team who had the authority did not have this as their main priority. Otherwise surveillance was being shared by word of mouth, e.g., from other people looking in the field, but not specifically for myrtle rust, as they were monitoring generally for other pests. Not knowing where the disease had spread to limited the ability to plan for and prioritise actions, e.g., for key tree specimens like taonga.

"Knowing where the disease is. They have no information. Reports from hotline are not passed on. Don't need to know exact site, but at least general area. Need to know where to prioritise." (Int 003, summarised quote)

'Have formulated a flow chart for how to deal with infected plants within [managed] land. Probably only remove whole tree if in decline anyway but hasn't been common yet. Mostly street trees and park areas, not bush. Not sure what is happening there.' (Int 003, summarised quote)

4.2.1   Self-initiated involvement

Support and opportunities to get involved were often created by the individuals themselves. In some cases, a person's involvement was inevitable due to their role in an agency or through the NBCN. However, for those not already connected into the biosecurity response agencies, some indicated that there was little effort from agencies (including their own) to reach out and seek their involvement or advice. For one in particular its seemed like a missed opportunity to bring people with a horticultural or botanical background into the response operations. Training opportunities did not seem to be advertised or necessarily reach those who were interested. For example, one who did get training only became aware because of someone they happened to know, and they had to approach them.

"It's interesting because no one asked us to come. No one said we should get training." (Int 003~14:10)

"When we went in, the guy who was in charge of it was really really good, and he told us things and he kept us up to date, and he was good, but we did have to actually make the effort to actually go in." (Int 009~3:30)

'They weren't supported at all in the initial stages. Not informed about what their practices should be. Information came from industry rather than MPI (about spray regimes).' (Int 005, summarised quote)

'Updates still missing key information (i.e., specific species, location), so not enough to make informed decisions on. Not clear who /where to go for more info. Tried following up through contacts within MPI to get but not given; also not collecting the right information to answer the questions in the first place.' (Int 005, summarised quote)

4.2.2   Gathering and sharing knowledge

Of those not automatically included, some demonstrated high levels of initiative to find opportunities to learn and act, for example by seeking out training or joining in eradication efforts in other regions before their own area was affected. Initially training was not offered to one, but they did manage to get support from their organisation to attend training, as well as support for attending other kinds of information sessions. People who proactively offered their expertise to the response agencies reported mixed responses. Some were welcomed or supported to participate actively in the response effort, but not all felt that their inputs were used wisely or followed up on. There were limitations, however, in being able to get involved in response operations, even when expertise was offered.

"MPI very closed to assistance from nursery owners—both affected or not. Very hesitant to let nurseries do the spraying. Insisted on using external independent contractors, who often misused chemicals/equipment and caused damage. Seen as very controlling." (Int 008~43:00)

The ability to direct research to help them manage their own risks, to shape decision-making or to jointly plan actions was reportedly more limited. Furthermore, others wanted continuity of engagement with research. They felt like they didn't have the answers they needed. Whilst some had made connections with researchers, better links with research activities were needed. One discussed how they shared advice and ideas when there was a lack of information from the response agencies that later became available to others. However, they and others were not necessarily acknowledged for providing that advice or supported for developing practical

management actions. Furthermore, others wanted continuity of engagement with research. They felt like they didn't have the answers they needed and indicated that better links with research were needed.

4.2.3   Flexibility for mobilising resources

How much people were able to contribute was frequently related to their line of work and key responsibilities they already had regarding their professional practice. For example, one participant had a high level of autonomy in being able to use resources for training and developing response plans and actions but noted how people in other parts of their organisation were limited in being able to contribute time or resource.

> [When]… a couple of minions say that everyone…that other parts of [the organisation] have to go off and do training, it's perhaps not listened to. But it is more difficult for certain sections, you know, in terms of budget and, you know, flexibility. Yeah, we were able to have upper…well, upper management within our group anyway to agree to funding it as soon as we asked really." (Int 003~14:00)

Another identified concern that the response was too slow to engage with mana whenua and lacked sufficient liaison staff. There was some indication from others that this was a concern, e.g. that government had not done the groundwork with indigenous communities and was not well coordinated to involve them in the response.

> "I've been on emergency response teams for biosecurity, and it's like being in the army for the first weeks. It's quite dramatic, you know." (Int 010)

> "It was quite difficult because they were just rushing around like headless chooks, and I think that's why some of the other iwi had trouble because they [the response agencies] didn't have the time or the resources to actually turn up and talk to people there." (Int 009~4:00)

This fed into other concerns that it was no longer clear who was looking after the response and that mana whenua needed to be engaged. They need time to engage so that they could sort out where the boundaries lie between whanau with responsibilities for different rohe or whether iwi or hapū ought to lead engagement on the issue. Some support had been given through the national Maori biosecurity networks, Te Tira Whakamataki to get things started with Maori involvement in biosecurity but this needed following up.

4.2.4   Engaging mana whenua

Although later engagement and training was greatly appreciated as a significant step, slow and under-resourced engagement at the start limited the effectiveness of Maori relationship development during the earlier stages of response. Organisational support was given for some to attend training in Taranaki, and MPI also committed resources to training mana whenua in surveillance. Those who did become involved found support and help from MPI and DOC for seed collection and working to propagate from uninfected pōhutukawa plants with local nurseries. One also noted further investments were made by Te Tira Whakamataki for training kaitiaki in seed collection.

> "Because we were doing all those things, I think we might have had a bit of a different experience from some of the other hapū and iwi who sort of didn't know what was going on more. They [MPI] were quite secret about where it was, but if you went into iwi briefings they just showed you exactly where it was, who had it, who didn't have it, where it was, and what they were doing about it." (Int 009~8:50)

Training mana whenua was a significant initiative from MPI that was well received. This has contributed to a ready and able workforce to support early detection in sites where myrtle rust has not yet appeared. However not all had the time to get involved, and had competing priorities.

> "When something happens, everyone will get together that's going to get together and help with this." (Int 010, ~8:30)

Other resources were needed to enable people to effectively monitor sites, including having access to the right vehicles to get into remote areas, and the right skills and hygiene knowledge to prevent the spread of the disease.

> *"You can't just send people out" (Int 010)*

Integration with other strands
Multiple people mentioned the need for better and more active inclusion of existing specialist expertise from outside organisations—e.g. industry, public gardens, conservation organisations, etc.—who they did not believe had been well utilised during the initial response. Similar sentiments were expressed in the Taranaki case study research, which indicated a lack of constructive engagement of local industry in actively contributing to the response (Stronge et al., 2019). Resources that were offered were not taken up. Though some of those who were not part of the initial response reported that they had been included later on, other motivated and highly skilled stakeholders still did not feel well connected with the research and planning and would like to be more linked in.

Implications
Participating in joint activities and feeling that one's contributions are valued are key elements of building and maintaining effective partnerships (Allen et al. 2019). That these otherwise motivated individuals may have felt their contributions were not valued undermined goodwill and at least partly dissuaded them from further initiative or efforts to participate. However not all experienced the same negative responses, and some welcomed the opportunities to work with the response agencies. It seems important that working collaboratively has an opportunity to develop in advance of response operations.

Recommendation 2
- Prioritise engagement with iwi and hapū to strengthen partnerships for biosecurity surveillance, response and management.
    - Understand the resource needs for, and continue to invest in, growing the capacity and capability of current and future kaitiaki within mana whenua

Recommendation 3
- Build upon existing relationships and cultivate new relationships with key people and organisations in advance of an incursion through regular personal engagement and face-to-face relationship-building activities.
    - Coordinate with other government agencies at the central and local levels to take advantage of existing relationships and to avoid over-burdening external partners and stakeholders.
    - Further develop and expand the NBCN to include broader skill sets, particularly skills in engagement and communications and particularly from mana whenua and those in conservation-focused and other non-industry organisations.

4.2.5   Capability and capacity

There was a generally high level of knowledge and capability among the people interviewed. Many of those involved in surveillance particularly felt well equipped to identify and manage the disease, and this level of knowledge about the potential impacts maintained their level of motivation and activity even after the response phase had ended.

> *By the time it came to region, felt that MPI would close programme. Just given authority to use resources to deal with issues—removals, treatments, etc. People straight away who were really good and fastidious about how they dealt with it. Had the expertise and an appreciation of importance.' (Int 003, summarised quote)*

> *'MPI were happy for them to come work with AsureQuality. Simple process. Tree council always promoting healthy vegetation and had talked about myrtle rust before.' (Int 003, summarised quote)*

'Still very interested. Initiated several projects to deal with myrtle rust, but all self-driven—no one has asked either within organisation or from MPI. E.g., hold [myrtle] species in collections, so monitor regularly.' (Int 005, summarised quote)

However, some felt that expertise may be lacking more generally among people involved in the response. Basic skills can be taught quickly to those with some existing background knowledge, but it takes time to develop the more advanced specialist knowledge that is often required for identifying plants and diseases. Many participants argued the need to involve more people with existing expertise from organisations or sectors outside of the response agencies, e.g., where preparations for the arrival of myrtle rust had been underway for some years, since the arrival in Australia.

'Lophomyrtus bullata – common name ramarama used but not actually the threatened species, was actually garden cultivar called red dragon. Cultivar a clone, so no variation. But if they'd asked a botanist it would have been easy to tell. People in surveillance didn't necessarily have the knowledge or capability to get that detail.' (Int 005, summarised quote)

"The importance of it is realised. And I suppose having contact with it. If I just looked at photos all the time… you can't really get an idea of how cryptic it can be and what the impacts can be." (Int 003, ~15:00)

One felt particularly connected as a caretaker of Myrtaceae to be looking out for myrtle rust well in advance of its arrival. They did not particularly see any other organisations taking an active role in preparing for myrtle rust, who they expected might have taken more initiative. Once it arrived however they become pivotal to connecting through other organisations and gaining the support of their own.

4.2.6   Capacity limitations

Nearly all commented on capacity limitations in some manner, such as an ability to remain involved, but how much this was a barrier varied considerably. Participants recognised it was difficult for those with expertise to leave their other work behind and devote time to myrtle rust. Those in non-governmental roles who had competing priorities or those who were acting on a voluntary basis faced more constraints here. However, some within the public sector had higher degrees of autonomy on how they accessed resources or were supported to act, as part of their usual capacities.

Those for whom myrtle rust was most closely aligned with their professional roles, particularly those in central or local government, found the most opportunities for getting involved. In contrast, those with less role alignment or less autonomy over how they allocated their time found it harder. A few mentioned themselves or others being limited by competing priorities or not being given permission from their superiors to invest time and/or resources.

"Really – they couldn't do it without us, you need a lot of people to respond to it – massive not everyone can drop their jobs and go and do response work – I'm lucky I am flexile … also now I'm on a second response – yeah I feel like I am building on skills – doing training that will be ongoing for – see myself as an asset for survey response work." (Int 002, 0:33:15)

However, not everyone engaged with believed their various players within the sector had the capacity or interest to be more involved. One, for example believed that people within their industry were constrained by other priorities with the focus on competition and increasing production or other threats. There was also a concern that not everyone had the capacity to get involved in monitoring and keeping records of their observations. A couple mentioned the capacity within consultancy groups in conservation or forestry that would have more interest and be better positioned to support surveillance.

"For me having the plant knowledge – I was immediately way ahead of other people – but they learnt – but it just took time – I think fitness is one -whether you've got energy or not" (Int 002, 0:51:18)

4.2.7 Ongoing capacity, beyond incursion

Resourcing was an issue for people beyond the incursion response. There was a sense of having ample access to resources in the initial phase of the response but this did not continue beyond the transition. Many indicated that they were not clear on what or how surveillance might continue, although some also volunteered some of the work towards checking on plants they knew were vulnerable. In this sense it wasn't an official requirement or one resourced by their organisations but one that they felt important to do for personal reasons. For some it was to manage risk and reputation but for others it was a general curiosity about how plants might survive in different locations, and how they could learn from that.

> *'Some trustees wanted to be able to run experiments (e.g. planting different species and varieties and monitoring) but no funding. But not really in line with eco-sourcing principles, did not have resources and did not feel it was their role. Felt like too little too late. Experiments should have been done a decade before.' (Int007, summarised quote)*

It's worth noting a sense of distrust of some of those offering help, to better resource the operations from local initiative. This connected to a historical sense of suspicion between agency and industry, when an incursion was being responded to.

> *Innate distrust of industry when MPI is trying to stem a response (~48:30) "When they're under pressure… those old feelings come out again." (Int 008)*

> *"The attitude was we don't trust you at all; these claims could be bogus." (Int 008~1:18:00)*

> *"MPI were struggling to get people on the ground. They were rotating people in and out. Industry offered a list of people who could be in a team or even lead a team. MPI didn't even contact them. Nothing happened. He had asked people in advance before putting names on list. Not botanists but are plants people so can identify most native plants. Can certainly spot disease." (Int 008~1:19:00)*

Integration with other strands

People with untapped capacity and capability seemed to be frustrated by a perceived disinterest from the response agencies. Concerns about having adequate expertise to identify plants and diseases were similarly expressed in the Taranaki case study research, where people in who felt their expertise was excluded from the official response became vocal critics, particularly if they believed expertise was lacking among official personnel and contractors (Stronge et al. 2019). The response operation itself was seen to have an abundance of resources; however, some questioned whether these were spent efficiently, a question that was also raised by a couple of survey respondents (Bayne et al 2019). Some suggested that this could be used more productively by engaging private contractors or people with expertise to do some of the specialist work, e.g., monitoring and surveillance.

Implications

Whilst this gives an indication of **joint activities and contributions** there are clearly areas for improvement – for connecting up with the expertise available on the ground for tree health and conservation activities, and building capacity for knowledge exchange and engagement. There is a need to increase opportunities to get involved, within the constraints of activities and risks of having people involved. Not adequately engaging people with expertise and resources can undermine potential partnerships because people must believe that their partners have the skills and capacities to carry out their work competently to make partnership worthwhile (Allen et al. 2019)

Recommendation 5
- When a new incursion response begins, immediately seek out and involve local experts, such as those in industry or local government
  - Leverage these contacts as relationship managers and knowledge brokers to disseminate information to, and solicit active contributions, from their networks or communities.
  - Actively seek out and invite local-level experts from other regions to learn through their participation, reinforce relationships, take lessons back to their home regions and prepare for possible spread.

4.3   Networks, connections and relationships

Some groups have been pivotal in sharing knowledge such as the those involved in tree health and propagation. There have also been some key people identified as important bridging links or conduits providing information and brokering knowledge between, e.g., government and industry and government and iwi and within professional and practitioner circles. There was mention of both small group interactions as part of professional engagement circles as arborists or conservation ecologists, and wider organisation engagement between industry and local government and park and landscape restoration organisations.

Most participants were connected with networks through their professional practice, involvement in the NBCN or shared interests. The NBCN is a useful structure for bringing people into response operations, however there is evidence that a wider net can be cast to bring in more professionals from conservation or plant health industries. While formal organisations and networks played important roles, many of the networks raised were informal, comprising personal relationships among people who went to university together, previously worked together or had otherwise build relationships through their shared interests.

> "When you're in that community, everybody's talking about it and people are kind of following closely. It's just part of being a biologist really." (Int 005)

Some networks were connected to the source of information from MPI and others were gathering and sharing knowledge independently. People did seek and spread information through these networks, at times instead of official communications streams that did not fulfill some of their information needs.

> 'Others came to them for advice; but not well informed themselves. DOC and MPI asking about tree care and advice—re what to say to the public, what public should do, individual management advice for landowners. Much of the info put out late in the programme came from them.' (Int 005, summarised quote)

Some felt that they lacked access to the latest scientific information and wanted better relationships with researchers. However, others valued the information available through official channels and gratefully shared that through their own networks. Increasing awareness of publics was a concern for others, without an adequate level of knowledge about spread risk.

> 'Working group with DOC and MPI did well managing coms. What they did was great, but it was too little too late.
> Nurseries would be best place to disseminate information but not well utilised or involved.' (Int 007, summarised quote)

For another there was a sense of reliance on others, such as the nursery industry who were having to decide and act on their feet, developing protocols and processes to manage their risk. However, this decision making did not happen in isolation. There were links between organisations on the ground who were sharing information on what knowledge they had and what interventions they were working with. Some of these links also extended upwards to the level of decision making in key agencies. For some respondents this was because information was not readily available at a time when it was needed, however others worked constructively with MPI to both produce and disseminate such information. Resources and planning decision were facilitated by some key individuals that provided links between industry and the public sector.

> 'Been in contact with several researchers wanting to use collections for research. Met researchers directly who were doing the biophysical work, invited to join and feed into research project ideas.' (Int 005, summarised quote)

> 'Nursery industry was very proactive with regular/weekly updates and info about what nurseries could do. Most of their plants are Myrtaceae species, so enabled them to continue working rather than shut down.' (Int 005, summarised quote)

4.3.1 Leveraging community networks

Nevertheless, some key individuals within MPI and the response operations were valued for the efforts taken to directly contact people, and to provide information when it was requested. Interviewees highlighted the importance of leveraging key individuals, such as local government personnel or industry associations, who already have those connections and can provide access to existing networks. One indicated that leveraging with ordinary members of the community was also important.

> *"You get involved in an incursion and you're very focused on the tangible: I've got to kill this, and I've got to remove that plant, and I've got to stop this stuff moving, and I've got to move people around. And you sort of think 'Oh, we'll sort out this communication stuff later and this getting on side of the society or the community and so on. We'll deal with that later in time'. When in actual fact, we need to do more of it at the front end. But—and it's a big 'but'—we have to do it rapidly. We can't sort of sit there and think 'Oh, we'll take two months to develop a comms plan and how we're going to implement it.' You've got 24 hours, and then it's got to go live. (Int 004, ~1:03:30)*

Another example of a networking opportunity involved some hundreds of people coming into an infected region to release kōkako. This activity had been planned for a couple of years prior to the incursion. People attending came from many different areas and were briefed in hygiene, those involved in surveillance of myrtle rust were required to bring separate sets of clothing not used during surveillance and to clean vehicles prior to gaining access to the release areas. There was an expression of gratitude to see this take place, and central government personnel and their contractors were valued for supporting the event.

> *'DOC, TRC and MPI helped them with kokako releases, helped arrange cleaning for attendees, etc. Figured out ways to accommodate. DOC and TRC staff had to spray down all vehicles and gear and to wear clothes they hadn't worn before in the response because they were high risk. Again praised man in charge of MPI response' (Int 090, summarised quote)*

Furthermore, the level of interest shown by people impacted or in impacted areas whilst surveillance was underway was significant according to one participant. They noted that the opportunity to engage more with the community, and particularly with Maori was not well developed, or not as well as it could have been.

> *'People would often come up and say – a lot of people received brochure – been looking in garden – bring out a plant that wasn't a myrtle … also with the marae – whole special area – couldn't go onto the marae – had to go through the challenge of getting onto the marae – they also were – not sure – did some training of their own people, iwi – they were very interested – they could have been brought into the picture and involved and educated a lot earlier than perhaps they were' (Int002, 0:18:21)*

Interactions with other strands
Additional work is needed to better appreciate the breadth and depth of opportunities to partner with various organisations and support engagement with New Zealanders through their networks. The Taranaki case study shows how more participatory approaches are worth considering for incursion response that can build SLO and share resources by creating local capacity and capability or supplementing it with professional services (Stronge et al 2019). This work shows that people do self-organisation and make plans for incursions, when they are aware of the risks in another country that could find their way over to New Zealand. This is something that MPI had not invested in and could draw on, at least, during the initial stage of incursion response, but also for building stronger relationships for handling long term management if eradication fails.

Implications
Pre-existing individual personal relationships proved especially important for bridging between the various sectors and interests. Some participants referenced key individuals who, because of their existing relationships, were able to prevent or resolve conflicts and facilitate collaboration across sectors and the government. The abilities to negotiate between parties and manage conflicts are an important part of building partnerships. These kinds of connections are key to **maintaining quality relationships** – a key criterion for cross-sector partnerships.

> Recommendation 2
> - Prioritise engagement with iwi and hapū to strengthen partnerships for biosecurity surveillance, response and management.
>   - Understand the resource needs for, and continue to invest in, growing the capacity and capability of current and future kaitiaki within mana whenua
>
> Recommendation 4
> - Demonstrate ongoing commitment and work to maintain long-term interest in management, monitoring and surveillance.
>   - Shift from acting as the central repository and provider of information to being a facilitator of knowledge exchange.
>   - Continue to invest in training local people in surveillance and management.
>   - Prioritise resources for creating a surveillance network and hub for gathering and exchanging information.

4.4 Accessible engagement and communications

Effective communication and engagement is an essential part of building an effective response. Participants were eager for more and accessible communication, particularly for ongoing surveillance and information sharing to support their own management. This did not flow through earlier enough during the response phase. The people we interviewed were all aware of several formal lines of communication established by response agencies and several had been distributing this information through their networks.

> *'Communications were effective. Hard to miss myrtle rust at the point in terms of information spread in the media. But less so after media moved on. (Int 001, summarised quote)*

> *'Trustees did a lot of work; they drafted communications. Collaborative effort within organisation, led by trustees.' (Int 007, summarised quote)*

However, there was a perception that the response agencies were not being transparent or sharing information widely enough. The militaristic response was alarming for some and an issue that meant engagement lacked some of the finesse required when dealing with people's livelihoods. People acting as intermediaries had to step in to reassure people that they would be compensated for any losses incurred. As one reported, those directly impacted were unclear about what their obligations and rights were in relation to response operations.

> *"I suppose it goes back to having leaders within MPI who are willing to provide information as quickly as they can—or leaders within central government and our research organisations. They seem to be… I don't quite understand why they do it, but they seem to withhold information a hell of a lot when there doesn't really seem to be negative basis… you know as to why they withhold the information. So the more that's discussed in the open, the better." (Int 003~48:40)*

> *"It's important for us always to remember: we get very emotionally engaged in these things, and it's the centre of our life for whatever period of time, and it's really important to us. But to the guy that lives next to me, fixing his car is actually the centre of his life and myrtle rust isn't that… never heard of it. So we've got to understand that, while it's important to us, it's not important to a lot of other people. We need to understand that distinction. That it doesn't matter what you say, they're unlikely to get engaged." (int 004~0:58:00)*

4.4.1 Informed communities

There was some concern that information was not getting out to communities quickly enough, for example, on what to look for, how to find it and what actions could be undertaken. There was too much delay from the perspective of some participants. However, others felt better informed and were happy with the level of information provided through the monthly updates from MPI.

'Education around plants not really a priority, so low level of general understanding among public. People are interested, but harder to get messages across. People concerned when they hear pōhutukawa might disappear.' (Int 003, summarised quote)

'Not a lot of dialogue about how they should actually manage or how to control. Whether or not to use systemic fungicides, which to use, etc. Raised how someone mentioned hairspray as alternative to concrete sealant but not sure.' (Int 003, summarised quote)

Some complained about missing, incomplete or inaccurate information coming through official channels, whilst others were much happier with what they received. For example, one participant spoke of confusion when ramarama was regularly described as being devastated by myrtle rust in official information without clarifying that it was particular commercial cultivars most affected rather than natural populations.

'Type of information, eg. only saying what genus myrtle rust had been found on or only using common names—not giving species or enough detail to inform their own decisions. Reportedly not in skill set of those doing surveillance. Had to make generalised decisions that weren't accurate, could have avoided some work.' (Int 005, summarised quote)

'Not knowing what channels to approach. One threatened species' common name was being mis-applied to other species, so they became concerned (unnecessarily) about the threatened species.' (Int 005 m, summarised quote)

Some also felt that MPI was being overly cautious about privacy protection in not disclosing even approximate locations of infection sites, which limited their ability to detect early or engage with communities. Moreover, the communication that people described was largely one-way. Several participants felt they had few opportunities to contribute information of their own or gain access to the information they need.

'Lack of coordination was a serious issue. Not being able to feed ideas to the response; had potential to contribute via collections resource but there was no one to tell, they had difficulty getting any interest.' (Int 005, summarised quote)

4.4.2   Brokering and sharing knowledge

Communication during the response phase was almost an action that those motivated initiated, with certain individuals and organizations playing a key role of knowledge broker or intermediary (see Appendix C). If there was not the information available or an opportunity to learn about the latest developments, they would reach out to find out. This proactive aspect was important, as not all new information was generated from official sources. Some had long advanced their thinking about what to do when myrtle rust arrived and developed protocols to ensure that they were not held liable for spreading the disease. This was a matter of building confidence that risk had been managed and that occurred through engaging with others who were also interested in taking precautions to prevent the disease from further spreading. In other words, participants were educating themselves and sharing that knowledge with others.

When undergoing the transition to long term management there was a lack of information and some felt the need to step up to support communities by answering some common questions. it didn't appear that others were willing to put in the time or resources to help people and perhaps some were less confident in providing answers to people's questions. This ability to handle uncertainty and yet still provide guidance seemed to be a skill that was needed more broadly, as part of the transition from incursion response to long term management. The removal of resources and leaving communities to their own devices was perhaps something that could be manged better.

'They weren't willing to put in the time/ resources and maybe were less confident/ experienced to offer answers' (Int 005, summarised quote)

Others also indicated that they were publicising awareness and giving options on what could be done. Managing risks of business operations was an important part of that as well as updating their networks on what was happening each month. Some also demonstrated considerable influence by

halting field days during the response operations to minimise the risk of spread between sites. Opportunities to debate the issues as conferences and workshops were also taken up as impassioned people took initiative to inform and engage others. However not everyone responded to their initiative positively.

> *'Large debate within conference forum about how real the threat was. Got some flak for that.' (008, summarised quote)*

> *Anyone with professional interest would have been connected and well aware but not community groups or others' (Int 008, summarised quote)*

However, it seems not all sectors were equally engaged and the networks were not necessarily linked together well. Some of the connection spoken of by our participants were through small circles of interaction, across different organizational settings and not necessarily influential on people outside of their closed network interactions. For example, we can only say information shared among an informal group of ecologists or botanists reached people that might be working within disparate organisations across government, industry or conservation. However, the extent of that network may not connect with people in other specialist fields or in mana whenua networks. This meant that not everyone we spoke with felt well informed.

> *"It became apparent at this meeting I was in last week—the stakeholder meeting—that the flow of information from the people who know more about MR to the people who don't… there is a bit of a break in the system there. Yeah, so it's difficult to answer because there really isn't that much information." (Int 006, ~16:10)*

4.4.3 Proactively managing uncertainty

While access to information was a barrier, some were able to overcome this through investment of their own resources in research and knowledge gathering. Participants also indicated that they were proactively sharing information and activities within their networks, whether on control practices, or on monitoring plants going into plantation or revegetation sites. There were also preparations made based on the experiences in Australia, however uncertainty still remained on what the impacts would be locally. Participants indicated that practical actions were being developed, as more knowledge became available.

Here some examples include the research that went into knowing what fungicides to apply and when or how often. Practices within the nursery industry soon became adopted in public gardens to protect key specimens. Engagement with MPI were facilitated around this time and the actions proposed were taken up and promoted. However not all felt confident with the action suggested and were reluctant to apply fungicides, e.g., without definite knowledge that it would work, especially for iconic plants or taonga specimens.

> *"At one stage we thought we'd got on top if it worked so hard there wasn't any rust and then after Xmas – didn't know when the weather period would be … it would suddenly take off and it did so it was a bit disappointing … everyone was working at the end knowing that we weren't going to be able to contain it but we were working like we were going to be able to contain it" (Int 002, 0:34:58)*

> *"A few months later they say they can't contain it or maybe a week later people are allowed to keep all their plants that had myrtle rust – having plants ripped out of a garden or a business even worse … in the field you don't know what they are thinking the management – it would have been good to know more - more about what they were thinking, even though it might be confidential (Int 002, 0:38:39)*

The degree of confidence in MPI recommendations and direction varied. Whilst some thought eradication attempt was futile, others supported the effort taken and accepted the changes in practice as new information was released from the central agency. This included advice initially of not circulating Myrtaceae to circulating Myrtaceae plants. Some were very uncomfortable with this advice, whilst others welcomed it. Those that did welcome the change in practice were involved in moving or planting Myrtaceae for various reasons. However, they did indicate they were active in

creating of a sense of vigilance with people who they sent plants to for revegetating sites and establishing a type of monitoring network by doing so.

Others noted how the changes increased doubt and led to a lack of confidence of people who witnessed the response. For one there was a sense that myrtle rust was unfamiliar risk and the lack of knowledge on what was going to be effective or changes in approaches from one week to the next caused confusion.

> *"In the beginning – the fruit fly - they had a lot of fruit fly response over the years – it's pretty well-oiled how they run it but with myrtle rust things often changed- they did different things in different areas and sometimes it was hard to get a consistency of dos and don'ts … and it would change over time -suddenly you had to wear overall for every property" (Int 002, 0:21:36)*

Interactions with other strands
It was clear in these responses as well as the other research strands that an ability to manage communication through change is needed – many here expected that the eradication effort would be futile, yet there was little advanced in terms of awareness and preparation. This reinforces the importance of having relationships with communities and key local actors that can help manage the response through uncertainty – and build in a greater tolerance of changes in tack (Stronge et l 2019). Even though there is good intention and desire for doing everything possible initially, the militaristic response comes like a wave into people's lives and livelihoods but leaves with the same level of disruption, giving people little to build relationships with. Furthermore, the confusion that arises from missing information or information that contradicts previous advice is an issue for response agencies (Bayne et al 2019). Survey responses also indicated that people were left with limited knowledge on what actions they could take.

Implications
Comments in this section highlighted the need for knowledge management – how to link the knowledge generated in different parts of the response and management system together better. **Communication and engagement** has been good in some instances but the linking between different parts of these individuals is not clear – some are and some not. Evidence shows that communication from central agencies may lack in these relationships that had not been initiated prior to myrtle rust arriving or that they were not being maintained or serviced beyond the response operations. Wider outreach to communities is something that does show potential and whilst some efforts were initiated, e.g., re-distributing communication, others, appropriate actions for containment, were not clearly being supported at this stage. While people did not necessarily have access to the information they needed, some constructive facilitations happened with key individuals – both through outreach and in knowledge brokering to enable appropriate actions on the ground.

Recommendation 4
- Demonstrate ongoing commitment and work to maintain long-term interest in management, monitoring and surveillance.
  - Shift from acting as the central repository and provider of information to being a facilitator of knowledge exchange.
  - Continue to invest in training local people in surveillance and management.
  - Prioritise resources for creating a surveillance network and hub for gathering and exchanging information.

4.5 Opportunities for supporting long term management

It is clear that some participants had long anticipated the arrival of myrtle rust and had been making plans and preparations, at least mentally, prior to its arrival. There was also evidence that people were connecting with others that had information that could help them act, even when the response agencies may not yet have been clear on what was the best course of action. However, the divergence in protocols for managing risk and what were preferred treatment options indicated that there was some need for facilitated engagement to help align different priorities. The plans of action and thinking that was undertaken was clearly useful, however some participants felt they needed to be better connected with research activities and understand what actions were being

effective in other context or settings. Others felt they lacked influence over the response agencies even though they had demonstrated capacity to act.

> '*When transitioning to long term management, involved in discussions with councils, land managers, etc. re what types of questions were coming in, wrote answers to common questions. Others less willing to contribute content, so they felt they had to step up. They weren't willing to put in the time/resource and maybe were less confident/experienced to offer answers.' (Int 005, summarised quote)*

> '*Well aware of MR as threat since appeared in Australia. Was involved in some discussions about hypothetical response. Had been very concerned about the manuka honey industry— didn't know how it might be affected at that stage. Had real concerns about what it might do to manuka.' (Int004, summarised quote)*

Some of the constructive things that were indicated were to build on the influence of key people acting as intermediaries that saw the constraints of different organisations and their ways of acting. For example, the limited ability to engage beekeepers in surveillance, versus the landowners and investors developing plantations of forestry consultants suggested that some private interests were better than others for targeting ongoing surveillance efforts. The ability to influence the decisions and actions of others is a key aspect of who is best suited to play the role if intermediaries between what might be conflicting priorities or different or competing interests observing impacts of myrtle rust.

Many participants demonstrated a capacity to build relationships with others and share knowledge resources. Building on the existing relationships seems to be a sound way of keeping interest and knowledge flowing on the impacts and responses to myrtle rust over a longer term. Furthermore, as knowledge continues to be generated both through research and practical action, its seems that supports for a more open community of knowledge exchange and potentially a hub for gathering and sharing resources would be valued.

> "*Damaged relationships for future. Took so long to pay out when livelihoods destroyed. Give initial pay-out and then sort out minor details later. Created ill will among people who were trying to be helpful. Should have paid out a percentage immediately.*" (Int 008~1:13:00)

> '*There is capacity out there, but volunteer community/local community very interested. Not as capable, but with the right training and motivation they could. If training were more widely offered/advertised. Promoted the app through social media, but up to user to follow through and variable knowledge.' (Int 005, summarised quote)*

> "*…Inevitably you're impacting on individual people, families, homes and so on, and they've got a big personal investment in that—not only financially but emotionally. If you get off side with them, it's almost impossible to do your job. So that acceptance by the community of what you're doing is, in my view, absolutely crucial.*" (int 004, ~37:30)

However, supporting the ability to exchange ideas and experiences to better develop best practical thinking under conditions of uncertainty also has its limitations. There are issues related to spread risk as well as whether or not myrtle rust will have better or worse impacts in different locations. Sharing information is one part of this but also deciding on what works best, where and having the flexibility to try different things, without losing control over managing across different sets of values – economic, social, cultural and environmental – is important. Having spaces for careful discussion of these management options and risks seems important.

> '*NZ needs much more data earlier on to be able to predict problems and respond appropriately when things go wrong. Now geotagging all the trees they plant—will help with future mapping by species.' (Int007, summarised quote)*

> '*Concerns very low in commercial sense. MR not on the commercial radar; minimal if any concern within the industry now. Have to persuade people that it is still an issue. Still concerned about the potential impact of planting Manuka everywhere.' (Int 006, sumamrised quote)*

'Not really understanding variable impacts across regions. More general information. Don't really know more than what they learned in first few weeks, in terms of how it behaves in environment and how different species are affected' (Int 005, summarised quote)

Furthermore, training the next generation of biosecurity guardians or kaitiaki for this and future disease threats to the native estate is needed. Training provided to date has been valuable and participants expressed how important that was, whether self-initiated or supported by external agencies, being able to identify plants affected and the presence of disease is important. At the moment the emphasis was on monitoring but there were limits in expecting communities to do this work on their own, especially in areas where it had not yet shown up.

"Even if we did get an outbreak, we'd be hard pressed getting resources to help us. Where do go for those sorts of things?"

"How do we deal with it at a hapū level? Who do we talk to?" (Int 010~28:30)

Acknowledging, the limitations of expertise required to identify both plants and pathogens, some suggested that professional services need to be enlisted. However, others suggested that wider publics with less expertise can still be involved, albeit with tasks better related to their level of skills and familiarity.

The scale of response needed, if the disease did show up in areas where it had not yet been witnessed or only in limited way was concerning for local capacity. There was a perceived need for runanga or council to get involved to provide teams that can be readily activated if it shows up. However, as noted by one, people will need to have the time and information needed to get involved, and to know that there is something they can do. An appreciation that they have other priorities is also important, recognising that other commitments also need to be addressed.

4.5.1   Wider public education and awareness

The need for wider public education and awareness of the potential to spread the disease was another priority. Since the end of the incursion response the media attention had dropped as well, and people were concerned that this needed re-igniting. In general, the lack of plans for engaging communities in response operations was a concern, something that not all agreed on the level of contribution that untrained citizens could make. However, the agencies and their key partners and stakeholders could be better prepared, not just for myrtle rust but the next biosecurity incursion.

"I think people were really interested, and also you had all these people going around in white suits and climbing around your gardens and all that sort of thing. So yeah… and a lot of reporting from the public in Taranaki, but since MPI have gone, you know, there's nothing to keep people interested in it or keep it in the front of their minds. And there's no group that has taken over the response. When MPI left, we were under the understanding that the district council and Taranaki Regional Council would take over the response such as it was but no one's been very vocal about that." (Int 009~27:00)

"MPI talks about a team of 4.5 million but don't action that" (Int 008~1:25:15)

"So winning the hearts and minds is really crucial, and that's something I really have learnt. You've got to put a lot of effort into it and a lot of it is—you can do letterbox drops and radio ads and tv ads and whatever else, but they want to see a face and a name and believe that this person is genuinely trying to do the right thing for them, for their community, for the country. And I can't understate how important that is." (Int 004~37:30)

'People can understand insects but have a harder time trying to understand these less visible threats, so harder to get response. Less emotional response. The community at large is unaware of fungal threats, etc. Unresolved how to deal with these kinds of threats.' (Int 004, summarised quote)

Further engagement and analysis should be undertaken, such as understanding who has developed response plans, how they have been or could be coordinated, and what resources and

allocations could be or have been made to gain most benefit from existing activities and investments.

> *'Noted that MPI is focussed on primary industries and the impact of MR on primary industries not major compared to others.'*

> *'Raised challenge of getting all the appropriate expertise together on demand quickly.' (Int 003, need to look up quote)*

> *'Council tries to educate but mostly small projects with small groups and volunteers.'*

> *If no major damage in first few years, then will disappear from people's concern. No other suggestions how to overcome that. (Int 003, need to look up quote)*

Respondents offered different perspectives around involving the community. There was a broad perception that education and awareness of the wider community was lacking. Many wanted to see suitable training initiatives for the wider public in identifying host and pathogen and increasing awareness generally on what to do to manage the risk. Specific training for kaitiaki in monitoring and surveillance in wilderness areas was key for Māori participants.

> *"In terms of education, it's really difficult unless the organisation that's leading actually wants to put effort and time into doing education and communication. And it appears that MPI don't want to do that."*

> *'Beekeepers time poor and low capacity—can't even get them to keep records let alone undertake any additional work. But maybe some more capacity within forestry consultancy groups.' (Int 006, summarised quote)*

On the other hand, others expressed concerns about trying to involve the community when capability was limited. They questioned whether it was feasible to educate people to the level needed to work effectively. Many noted the risk of unskilled people becoming involved if they waste time and resources by mis-identifying the pathogen or host species, or if they unwittingly spread the disease. Participants also felt that greater engagement needed to consider the abilities of regular publics to support effective detection of plants or disease.

> *"You can't educate people in that stuff overnight. It's just not possible. It takes people years to learn those plants, and so, yeah, it's good to have people involved out in the public but maybe you want to target that to certain species. Because everybody knows what pōhutukawa looks like and probably you could teach everybody ramarama, so maybe if they're your indicator species, just educate people on those." (Int 001~43:30)*

This more strategic approach to using and developing resources within the public as 'eyes and ears' of biosecurity made sense for engaging the public in a more pragmatic and efficient way. Using the skills and interests that people have, rather than assuming a role for them beyond their capabilities seems sensible.

> *'More using myrtle rust as an example rather than how to deal with myrtle rust itself – as a means to demonstrate greater biosecurity picture and future threats' (Int 003, summarized quote)*

4.5.2 Maintaining momentum

Since the incursion response phase has ended, many interviewees felt that the action and engagement by the lead agencies has stopped. For some the initially motivated response had faded because the damage was not yet evident.

This is concerning as the impacts have not been fully realised as yet. Only the impacts of the response operations are lingering in many people's memory. Now people feel that they do lack information on where the disease has spread to, as well as a reduced commitment to taking any action on myrtle rust. Participants wanted to know where the disease had spread to and what was

happening in other regions, or whether there were any lessons or techniques they could apply in their own locations.

> *'Need to look at the issue more seriously. Keeping an eye on things but being aware that more could happen' (Int 010, summarised quote)*

Most people reported that they no longer had the level of involvement in myrtle rust that they had during the incursion response**.** They implicated a need and desire for setting up coordinated monitoring and surveillance across areas, and also gain an understanding of what people are doing in other areas.

> *"It just seems since they've decided not to keep pulling the trees out, it's just all stopped. I doubt whether anyone's looking; I don't think they've collected any seeds. I'm not sure." (Int 009~29:00)*

> *'Know it's here to stay. Probably feeling of relief that the species hasn't been as affected. Hope that it may not be as bad as it could have been.' (Int 007, summarised quote)*

> *'General lack of momentum. It was big news and then it kind of fell out of the news cycle and it kind of falls down people's priority lists as well. Hasn't really affected Manuka, so keep tabs on what is happening but not a priority. Hasn't hit anyone's pocket books around Manuka yet.' (Int 006, summarised quote)*

Many believed that the issue had lost the interest of the broader public since the incursion response operation led by MPI was drawn down. Some indicated developing monitoring and surveillance networks to re-ignite the attention to movement and spread risk, focusing the attention on awareness of where the disease is present and not present.

> *"We got really good up-to-date information to start with but I don't know that we are anymore." (Int 009~43:45)*

For some there was a sense of frustration that eradication was not achievable and that relationship for longer term management should have been developing earlier. A need for ongoing involvement was a concern, where most reported that they no longer had the level of involvement in myrtle rust that they had during the incursion response. Many believed that the issue had lost the interest of the broader public since the incursion response operation led by MPI was drawn down.

> *"There's nothing to do now. You can report that you've seen myrtle rust, but no one's going to do anything about it, so what is the point? You haven't convinced people that there's a connection between them looking and finding it and something happening. Whereas for that whole first three or four months, if you reported it, boy you got descended upon by people and MPI in little white suits and they whipped the tree out, you see? I don't know that you can expect people to keep motivated and looking when nothing happens when they do." (Int 009~34:45)*

However, with respect to broader efforts in biosecurity, myrtle rust represented an opportunity to see how things could be done differently.

> *'We're a lot better at it. With small scale, relatively easy to deal with small group of people, visit and hold meetings. Much harder with larger scale to reach out. Becomes exponentially difficult. Need to adapt communication processes to that. But also goalposts moving: expectations are higher, media technology changing/evolving continuously. PAM was mostly landline with some text messaging. Now no landlines and mobile not connected to any region. Social media dominates but doesn't reach all. Challenge to identify the right media to use and how. Understanding where people go to get facts." (Int 004, summarised quote)*

Integration with other research strands

There is a need to see commitment to maintain constructive relationships (Allen et al. 2019). For example, there was a lack of engagement perceived on the part of MPI, the lead response agency; after the response phase ended all participants indicated a loss of interest, not only from the public but from any activity related to surveillance or monitoring the spread of myrtle rust or effectiveness of actions. Survey responses reinforced this level of concern in maintaining efforts to prevent the

spread of the disease (Bayne et al 2019). For some this left a sense of a lack of confidence in the response effort and some criticisms about how it was handled (Bayne et al 2019; Stronge et al 2019)

Implications

Managing relationships is a key criteria for effective partnerships identified from the literature, and area that would need attention. Many of those motivated are clearly involved in connecting with each other, and the key intermediaries are an important link between organisations. Furthermore the continuity of addressing knowledge needs and linking practitioners with research is missing or not yet joined up. To support a continuity from incursion through to long term management, requires development of relationships and attention to the resource needs to maintain effective partnerships with communities and the network of interest in mitigating the impacts of myrtle rust.

Recommendation 2
- Prioritise engagement with iwi and hapū to strengthen partnerships for biosecurity surveillance, response and management.
  - Understand the resource needs for, and continue to invest in, growing the capacity and capability of current and future kaitiaki within mana whenua.

Recommendation 6
- Use the social license to operate and cross-sector partnership rubrics to guide and assess the development and effectiveness of actions throughout ongoing management and in future responses.
  - Manage relationship from the start through different stages of their development relating to incursion response, from immediate interactions through incursion response and through longer term management transitions
  - Ensure knowledge needs and contributions of partners are articulated in a way that supports their engagement and commitment to activities, even if they are doing different things

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6   Conclusions

Participants were largely motivated as professionals working in plant related industries or the public sector but also with the not-for-profit sector, as private consultants or service contractors and mana whenua.

There were few constraints to become involved as most had the support of their employer or were proactively involved as an impacted entity but most went beyond their professional duties. A genuine concern about managing the risk of myrtle rust spread was evident with all the respondents – as such risk management protocols and knowledge were developed, often in collaboration with others. However, there was a diversity in motivations and interests which led to differences in what were seen as appropriate response actions.

Individuals demonstrated a proactivity in getting involved, seeking support of employers with generally strong support provided but some competing concerns to get on with normal or other work meant that momentum was difficult to maintain. Most had not experienced the intensity of incursion response (although some did have previous experience) but had been involved in conservation, tree propagation or management. A great deal of self-learning took place and considerable learning within peer groups and between organisations and networks of plant-related professionals.

An appreciation of the protocols needed to manage risk was generated through practitioners and there was less information available from the response agency, at least initially, for this, e.g., many felt they were providing the guidance. Not all that was contributed by participants was taken up by the response agency, and some questions remained unanswered. There was an interest in being better connected with research and a desire to be connected with what was happening in other places to support learning about what kinds of interventions were effective. Participants observed a waning interest in the impacts of myrtle rust, often because of a perceived minimal or negligible impact on a species of concern to stakeholders but also due to an end to the incursion response operations and decline in media attention.

Capability existed and was further developed as knowledge was sought and learning shared, amongst smaller circles of professional interest, e.g., arborists and wider circles across organisations, e.g., nurseries and public gardens. Some key people within MPI or working with them provided an essential link for brokering knowledge and developing outcomes, e.g., between the nursery sector and the response agency. However, there was concern that the wider public did not have the depth of skills and knowledge for plant and disease identification, and that a more measured approach was needed to make good use of their involvement, e.g., by looking at species they could identify or where disease was clearly visible. Greater awareness was needed to ensure publics were not unwittingly spreading the disease.

Maintaining knowledge networks and connections, especially about where the disease was being found and rates of spread or potential movement, as well as what actions were being taken and how effective they were, as well as access to research and influencing research questions were desired for ongoing involvement.

7 Recommendations

Our research has found several positive examples of motivated individuals and organisations working effectively as partners in the response and management efforts, and examples of networks helping to share information and bridge across sectors. However, we also found several barriers to involvement or areas where agencies did not effectively engage with potential partners, missing out on possible expertise and opportunities. To address these issues in ongoing management and prepare for future biosecurity responses, we make the following recommendations.

Recommendation 1
- Build a more comprehensive map of the partners, stakeholders and networks which are necessary to involve in ongoing myrtle rust management and in different likely future incursion scenarios.
  - Work with them to better understand their different motivations, priorities, capabilities, barriers and information needs for being involved in biosecurity.
  - Actively promote building of shared and agreed-upon aims through facilitated discussion and engagement in ongoing efforts to manage myrtle rust.

Recommendation 2
- Prioritise engagement with iwi and hapū to strengthen partnerships for biosecurity surveillance, response and management.
  - Understand the resource needs for, and continue to invest in, growing the capacity and capability of current and future kaitiaki within mana whenua.

Recommendation 3
- Build upon existing relationships and cultivate new relationships with key people and organisations in advance of an incursion through regular personal engagement and face-to-face relationship-building activities.
  - Coordinate with other government agencies at the central and local levels to take advantage of existing relationships and to avoid over-burdening external partners and stakeholders.
  - Further develop and expand the NBCN to include broader skill sets, particularly skills in engagement and communications and particularly from mana whenua and those in conservation-focused and other non-industry organisations.

Recommendation 4
- Demonstrate ongoing commitment and work to maintain long-term interest in management, monitoring and surveillance.
  - Shift from acting as the central repository and provider of information to being a facilitator of knowledge exchange.
  - Continue to invest in training local people in surveillance and management.
  - Prioritise resources for creating a surveillance network and hub for gathering and exchanging information.

Recommendation 5
- When a new incursion response begins, immediately seek out and involve local experts, such as those in industry or local government
  - Leverage these contacts as relationship managers and knowledge brokers to disseminate information to, and solicit active contributions, from their networks or communities.
  - Actively seek out and invite local-level experts from other regions to learn through their participation, reinforce relationships, take lessons back to their home regions and prepare for possible spread.

Recommendation 6
- Use the social license to operate and cross-sector partnership rubrics to guide and assess the development and effectiveness of actions throughout ongoing management and in future responses.
  - Manage relationship from the start through different stages of their development relating to incursion response, from immediate interactions through incursion response and through longer term management transitions
  - Ensure knowledge needs and contributions of partners are articulated in a way that supports their engagement and commitment to activities, even if they are doing different things

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Appendix A. Semi-structured interview questions

1. How did you first get involved in the response?
   a. Did you volunteer or put yourself forward in some way?
2. Have you been involved in anything like this before?
   a. If so, what was it and how was it similar?
3. Are you linked to any groups or individuals interested in responding to myrtle rust?
   a. If so how would you describe them?
4. In what ways are you personally interested in responding to myrtle rust?
   a. What are your main motivations for being involved?
   b. What potential impacts or risks concerned you at the start (whether from the disease or the control efforts)?
   c. What do you think motivates other people or groups?
5. How were you personally supported in responding to myrtle rust in the region/ locale?
   a. What opportunities did you have to become more involved (or to go beyond what was required)?
   b. Have any groups or individuals been essential to developing constructive interactions or enabling people to be involved?
   c. How do you feel about your level of involvement now?
6. How effective or important do you think your individual/group contribution has been?
   a. What kinds of constraints or barriers have you personally experienced that limited your involvement or effectiveness [e.g., lack of knowledge, lack of funds, lack of commitment, lack of time, lack of coordination, etc.]
   b. How have you attempted to overcome these barriers?
   c. What could have helped you to be more effective?
7. How have you engaged with other people, teams or organisations to encourage their own involvement, to spread information or to drive a stronger response?
   a. Who did/do you connect with? Why them?
   b. What strategies have you tried?
   c. How effective do you think you were?
8. What capacity and capability do other groups have to be involved that you are aware of?
   a. What resources do the people you are trying to reach out to have to act/ respond?
   b. What other support or engagement do you believe would enable people to be involved in the long term management?

Appendix B. Participant Information Sheet – Interview

Project title: Motivated Individuals and Networks
Researchers: Andrea Grant, Simon Wegner
Researcher Contact: andrea.grant@scionresearch.com

THE WIDER RESEARCH CONTEXT This research project is part of Ministry of Primary Industries' (MPI) response to the arrival of myrtle rust in New Zealand in 2017. MPI have identified critical gaps in social, cultural and scientific knowledge relating to the management of myrtle rust in NZ. A joint Scion, Manaaki Whenua – Landcare Research, and Plant and Food Research myrtle rust research project was commissioned by MPI to address these gaps.

THIS RESEARCH PROJECT These interviews are designed under the social science component of this project and address the topic of 'Engaging Motivated Individuals and Networks'. This research seeks to understand those people who were motivated to be involved in the myrtle rust response with focus on the opportunities and barriers that they faced.

THE RESEARCH PROCESS Your participation will consist of a single telephone interview, which is expected to take between 30 minutes and one hour.

CONFIDENTIALITY AND ANONYMITY We will endeavour to ensure information collected from interviews is presented in a way so that data are non-traceable to individuals. Your name and other personal information will not connected to the data; instead, generic descriptions will be used to identify individuals and groups.

THE RIGHT TO WITHDRAW Participation in this research is voluntary, and you have the right to refuse to participate or decline to answer any individual questions. You have the right to withdraw from the research at any time without giving a reason. You may remove your consent to use any associated data for a period of up to four weeks after the interview, after which it may be difficult to extract content you provided from the analysis.

DATA USAGE AND RESEARCH OUTPUTS The data collected during this research will contribute to a range of research and management outcomes, including conference presentations and academic publications, public communications and outreach. Themes identified in the research will be used to develop recommendations to agencies on how to improve ongoing myrtle rust management and future incursion responses.

DATA STORAGE AND PRIVACY Data collected during this research project will be kept in storage in a locked cabinet at Scion for six years and will then be destroyed. In the case of electronic data such as audio recordings, data will initially be safeguarded by passwords on hard drives and/or cloud-based storage spaces and then deleted from all storage spaces after six years. Summaries and other hard copies of data will be shredded after six years.

SOCIAL RESEARCH ETHICS INFORMATION The human ethics protocol and processes underpinning the research have been reviewed by two independent senior social science researchers. We expect that ethical considerations discussed in the protocol are adequate to deal with any concerns that may arise during or as a result of the project. However, if any unanticipated ethical issues do arise the research team will meet as early as possible to discuss, and seek to resolve the issue. If you wish to see a copy of our ethics protocol please contact Andrea Grant.

CONTACT INFORMATION If you have any questions or concerns you would like to raise with the research team, please contact: Andrea Grant, Social Scientist, Scion: andrea.grant@scionresearch.com; Phone: (03) 363-0917
If you have any concerns about this research that you do not want to discuss directly with the research team, you may contact: Katrin Webb, Project Co-ordinator, Scion: katrin.webb@scionresearch.com; Phone: (07) 343 5423

Appendix C. A schematic map of participants' networks

Based on the interview discussions one of our researchers drew a map of the connections they discussed. This was not a formal development of networks analysis but provides a baseline to capture some of the types of interactions that people described.
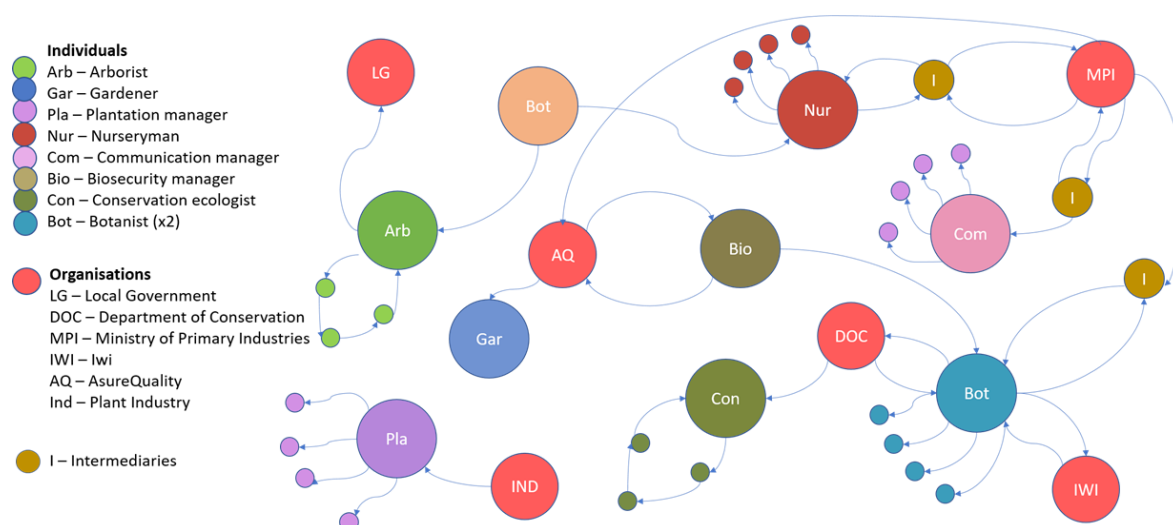
Figure 2: An illustration of interview participants and their networks of engagement on myrtle rust

Figure 2 illustrates the networks and relationships among the myrtle rust response participants. This is not intended to be a complete map based on a comprehensive network analysis but an illustration of the networks discussed qualitatively by participants. The map itself shows some of the different kinds of connections and relationship between people. It is a snapshot in time based on discussions covered by the people we interviewed and limited to the experiences the shared during the interview.

There are outreach opportunities where a vast connection of individuals through a core group was evident, circles of interaction where knowledge was gathered and shared and tools were tested for managing risks in a practical way, and key intermediaries who provided exchanges between organisations and supported understanding of differences in perspectives to facilitate response outcomes, such as industry movement and hygiene protocols. This map represents some of the interactions and engagements identified during our interviews between:
- Professionals in practice;
- Local government and industry
- Local government and community
- Local government and services (public gardens and landscape services)
- Central government and iwi
- Central government and NGO/ NfP (charitable organisations)
- Central government and services (response contractors and consultancy surveillance).