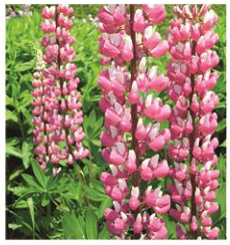
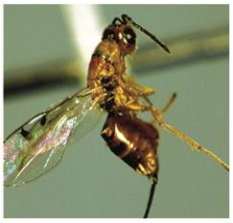


Possibilities for collective decision making for pest control on the Mahia Peninsula: Results from an initial stakeholder analysis



Landcare Research
Manaaki Whenua

Possibilities for collective decision making for pest control on the Mahia Peninsula: results from an initial stakeholder analysis

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Summary

Project and Client

- Hawke's Bay Regional Council has an interest in expanding its current possum control programme to cover a wider area and include a wider range of pest species, if it is cost-effective to do so. The Council is aware of the need for community engagement in the development and implementation of pest management plans. Thus, it contracted Landcare Research to use the Mahia Peninsula community as a case study to identify participatory processes the Council could use to improve stakeholder engagement. This report summarises an initial situational and stakeholder analysis of the Mahia Peninsula that was conducted to help support future participatory processes.

Objectives

- To identify:
    - diverse citizen perspectives about pests and pest control on Mahia Peninsula
    - citizen visions for the future of the peninsula and how these visions may or may not be aided by future pest control efforts
    - key decision-making processes on the peninsula and resources for future stakeholder engagement
    - current best practices for participatory processes in the literature and next steps for a participatory process for making decisions about pest control on Mahia Peninsula.

Methods

- We undertook an initial stakeholder analysis on the Mahia Peninsula using community meetings and semi-structured interviews with diverse community members.
- We also conducted a literature review of best practices for collective decision-making to develop recommendations for next steps for a participatory process in Mahia.

Findings

- The most commonly discussed pests on Mahia were goats and plant pests such as gorse and blackberry. Predators, such as feral cats, stoats, and rats, were also commonly cited as being threats to native biodiversity. While goats and cats were seen as pests by some community members, others saw them as assets.
- Interviewees' visions for the Mahia Peninsula, which include increased ecotourism, restoration of native bush, and the return of native birds, suggest that a coordinated pest control programme, developed through a participatory process, may provide benefits to the community.
- Community members suggested that a future participatory process in Mahia should involve the Whangawehi Catchment Management Group, the 10–12 key landowners on

the peninsula (in terms of land area), and small landowners, bach owners, and other interested community members. Interviewees also suggested that a future process should involve the building of trust with tangata whenua ; this could begin with representatives from the Council or Landcare Research attending monthly marae meetings on the peninsula.

- A review of the literature suggests that any future participatory process:

    1) should have clearly defined goals that can be formulated by the stakeholders themselves,

    2) be inclusive of diverse perspectives and informed by a more in-depth stakeholder analysis,

    3) be run by an impartial and experienced mediator, and

    4) be flexible.

Conclusions

- We recommend three alternative methods for designing and leading such a participatory process for collective decision making in Mahia. Which of these should be followed on Mahia will depend on the results of a more in-depth stakeholder analysis and the goals for the participatory process, which can be defined by community members at future meetings.

Recommendations

- We provide a timeline for Council and Landcare Research staff to proceed towards a participatory process in Mahia. This timeline includes, firstly:
    - sharing this report with the Whangawehi Catchment Management Group, then,
    - conducting a more in-depth stakeholder analysis using Q-methodology, and finally,
    - holding an open meeting, advertised to all interested community members, to share findings and discuss next steps.

1 Introduction

Management of animal and plant pests by national or regional agencies often impacts a wide range of stakeholders that hold a diverse range of values and perspectives. Consequently, pest control can often lead to public dissatisfaction with the management plans and their implementation, especially if multiple values have not been considered in the planning process. Hawke's Bay Regional Council (HBRC) has an interest in expanding its current possum control programme to cover a wider area and include a wider range of pest species, if it is cost-effective to do so. HBRC is aware of the need for community engagement in the development and implementation of pest management plans. Thus, it contracted Landcare Research to use the Mahia Peninsula community as a case study to identify participatory processes it could use to improve stakeholder engagement. This report summarises an initial situational and stakeholder analysis of the Mahia Peninsula that was carried out between 12 and 22 April 2014 to help support future participatory processes. We conducted semi-structured interviews with 16 residents in Mahia with diverse backgrounds and connections to the area, ranging from landowners, farmers and foresters to students, homeowners, and conservationists. In this report, we synthesise findings from these interviews and current literature on participatory processes to suggest future possibilities for collective decision-making for pest control on the Mahia Peninsula.

2 Background

Management of pests typically affects a wide range of citizens with different values (Maguire 2004). Furthermore, the impacts of pests and pest management strategies on ecosystems are often complex and uncertain, allowing for diverse interpretations of facts and risks among stakeholders (Maguire 2004; Green & Rohan 2012). Thus, pest management can often lead to public dissatisfaction with plans if diverse public perspectives and values are not considered in decision making (Green & Rohan 2012). Such public dissatisfaction can reduce the effectiveness of pest management plans in New Zealand, especially if stakeholders refuse to comply with plans, hinder the implementation of plans through protesting, or increase the costs of planning by filing lawsuits or submitting information requests under the Official Information Act.

Stakeholder engagement in decision making, or 'collective decision making', is increasingly recognised in the literature as a method for increasing public support for environmental planning processes (Reed 2008). Stakeholder engagement has been suggested to increase stakeholder trust in the decision-making process, as long as decisions are perceived to be transparent and consider multiple values (Richards et al. 2004). Stakeholder engagement may also lead to social learning, in which stakeholders and wider society develop an increased understanding of the conservation problem and solution through deliberation (Blackstock et al. 2007; Cundill 2010; Reed et al. 2009). Social learning can result in more creative solutions for environmental planning that better consider a variety of perspectives and are thus more likely to meet a wide range of citizen needs (Reed 2008). Stakeholder participation in decision-making has also been suggested to lead to higher quality decisions due to the incorporation of diverse sources of knowledge in planning, which may improve the ability for management plans to prevent negative unexpected outcomes (Newig 2007; Reed 2008).

While the benefits of stakeholder participation in decision making are increasingly recognised in the literature, in planning for pest management in New Zealand, opportunities

for citizens to engage in decision making are currently limited (Green & Rohan 2012; Greenaway et al. in press). Citizens do engage with pest management at other levels, such as conducting control on their own lands or participating in control programmes on public lands, making submissions on pest management plans, attending information sessions, protesting against the use of control techniques or, sometimes, helping to monitor the impacts of various control options on the ecosystem (Greenaway et al. in press). However, citizens are often dissatisfied with their ability to engage at an early stage to develop plans that satisfy the diversity of local values and perspectives.

In response to this need for enhanced collective decision making about pest control in New Zealand, our team of researchers – Alison Greenaway, a social geographer, Bruce Warburton, a wildlife ecologist, and Rebecca Niemiec, a student researcher from the US – is conducting social research through a series of case studies across the country. In this report, we examine possibilities for increasing citizen involvement in decision making on pest control on Mahia Peninsula, Hawke's Bay Region. The Mahia Peninsula and nearby Portland Island have high biodiversity values, particularly in terms of coastal birds, such as the New Zealand dotterel, shore plover, white-fronted terns, and black-winged petrels. Current pest control on the peninsula includes HBRC's Possum Control Area (PCA) programme, which subsidises large landowners for ground control of possums (HBRCb no date), and Mahia Coordinated Management Area Feral Goat Control programme, which seeks to manage feral goat populations across the peninsula over the next five years (Habitat BPM no date). However, a variety of other pest species exist on the peninsula that are currently not being managed through a large-scale coordinated programme, including rats, rabbits, feral cats, stoats, and various plant pests.

To understand the diversity of stakeholder perspectives concerning pests and HBRC's current control programmes, as well as to examine future possibilities for public participation in pest control decision making in Mahia, we undertook an initial stakeholder analysis. To do this we used community meetings and semi-structured interviews with a variety of community members. On 10 April 2014, we met with the Whangawehi Catchment Management Group at its monthly meeting at Tuahuru Marae in Mahia. The group, which is made up of landowners, tangata whenua, and agency members, was formed in response to community concerns about a proposed wastewater treatment facility for Mahia Beach and a Memorandum of Understanding was signed in 2011. Recently, the group has been working to restore the Whangawehi catchment and improve water quality through riparian plantings. On 11 April, we held a community meeting at Kaiuku Marae to discuss local perspectives on pests and visions for Mahia; 16 community members, including landowners and tangata whenua, attended. From 11 to 22 April we completed 11 semi-structured interviews with 16 community members identified from those meetings. Interviews lasted between one and four hours, and interviewees were chosen from a variety of backgrounds and connections with the peninsula. They included tangata whenua, a Department of Conservation employee, owners of largestations, small landholders, environmental activists/community leaders, a retired teacher, a student, and a forester. In the semi-structured interviews, citizens were asked to speak about their connection to Mahia, what they believed were pests on the peninsula and why, their view on pest control practices, how decisions were made or could be made in the future on Mahia, and their vision for the Mahia Peninsula.

In this report, we synthesise findings from these meetings and interviews, as well as from the literature, to suggest possibilities for collective decision making for pest management on Mahia. We begin in section 3 by discussing stakeholder perspectives on pests and past and

present pest control on the peninsula; the relevant organisations and decision-making processes; and citizen visions for Mahia gathered from the meetings and interviews. Then (section 4) we discuss examples of participatory processes for decision making from the literature and suggest options for Mahia. After our conclusions (section 5) we provide recommendations (section 6) for a future process for the peninsula.

3 Situation and stakeholder analysis for Mahia Peninsula

3.1 Land ownership and use on the peninsula

Mahia Peninsula is an isthmus of about 22 × 11 km (Figure 1) in Hawke Bay, situated between Napier and Gisborne on the East Coast of Hawke's Bay Region. In 2006 it had a permanent population of 849 (Pollock 2012). It has a wide range of land ownership types and use, including farm stations, forestry plots, multiple-ownership Māori land, seasonal baches (holiday homes), and the Mahia Peninsula Scenic Reserve, which protects 374 ha of tawa (*Beilschmiedia tawa*) and kohekohe (*Dysoxylum spectabile*) coastal forest. The peninsula was an important area of Māori settlement in pre-colonial times, being the tribal area of Ngāti Rongomaiwahine, and in 2006, 64% of residents identified as Māori (Pollock 2012). The peninsula was also a site of early settlement for whalers, who founded a whaling station on nearby Waikawa, or Portland Island, in the 1840s (Pollock 2012).

The peninsula is approached via Nūhaka, a small settlement to the north-west. There are two main settlements on the peninsula itself: Mahia Beach, on the west, and Mahia, on the east; both consist of a mix of permanent residences and holiday homes. The populations of these two settlements increase significantly during summer months, when tourists visit for surfing, diving, and enjoying the beaches. Sheep and beef farming is common and 11 stations cover the majority of the land area. While most of these farms are privately owned, Onenui Station at the southern tip of the peninsula is multiple-ownership Māori land (Pollock 2012).

The diversity of land use and ownership on the Mahia Peninsula was often mentioned in interviews. Some community members felt the diversity of land owners and lifestyles made it difficult to make decisions or move forward on community projects. One interviewee described the Mahia Peninsula as 'not having a lot of like-minded people' and many interviewees expressed concern or frustration over the alternative ways in which other landowners were managing their land. Topics of concern among the community ranged from the forestry blocks causing damage to water quality to absentee landowners not being present to actively manage land.

However, despite the great diversity of land use practices and lifestyles, almost every interviewee expressed a strong connection with the natural environment and history of the peninsula. In interviews, people talked about how they have noticed the flora and fauna, climate, and seas change in recent decades. Interviewees shared books on the history of the local Wairoa District Council and told stories about Moko, a bottlenose dolphin at Mahia Beach that led trapped pygmy whales out to sea, and the *S.S. Tasmania*, a ship that sank off the coast of Mahia in 1897. Many interviewees had been born and raised in Mahia and had returned to their family land after travelling and working elsewhere. Several of them spoke of being raised in Mahia learning to live off the land and sea, and one interviewee said: 'Mahia is paradise.'

3.2 Pests on the peninsula

When asked what they thought were pests on the Mahia Peninsula, interviewees provided responses that often varied depending on their relationship to and use of the land. Plant pests, particularly gorse, were mentioned often because this species was believed to encroach on native forest and farmland and was difficult to control. Goats were also mentioned often by interviewees, although in some cases goats were seen as assets rather than pests. Rats, stoats, hares, and feral cats were also discussed, but often only after we specifically asked interviewees about them. Interviewees generally felt that possums were well controlled on Mahia because of HBRC's Possum Control Area programme. Other pests mentioned were blackberry, wilding pines, blackbirds, cockroaches, spiders, mosquitoes, and wasps.

When speaking about goats, interviewees often mentioned 'the two schools of thought' about goats that existed on the peninsula. Some community members felt that goats were a pest that should be eradicated, while others thought that, as one interviewee put it, 'goats aren't pests, they are money.' Many of those who regarded goats as a pest had been involved in plantings of native bush or gardens. These interviewees described how goats could decimate new plantings and gardens in a day by finding a low point in the fence where erosion has occurred or a wire is lose. While it was possible to keep goats out of plantings by 'double fencing' or using an electric fence, interviewees claimed that these options were very expensive. Goats were also mentioned in terms of being a road safety hazard, giving foot rot and worms to sheep, causing erosion especially around coastal areas, and getting caught in fences then dying and rotting. One interviewee even told a story of being 'chased' by a goat at night-time.

However, several large landowners on the peninsula currently make an income from either hiring a professional to muster goats or mustering goats themselves. Thus, these landowners wanted to sustainably harvest the goats, instead of eradicate them, to continue to use them as a source of income. In addition, some landowners use goats for weed control. However, several interviewees noted that more efficient options for weed control, which involve spraying herbicides from a helicopter, are now becoming cost-effective for landowners.

Some interviewees spoke about other animals, such as rats, stoats, possums, and hares, as being pests on Mahia, but these animals were not mentioned as frequently as goats or plant species such as gorse and blackberry. Two reasons why interviewees believed rats were pests were because they got into hay for livestock and threatened native biodiversity; however, several people said they did not think rats were any more of a problem on Mahia than elsewhere in New Zealand. Many interviewees felt stoats were pests because they ate native birds; one interviewee called them 'nasty animals'. Hares were seen to be a pest because they ate saplings, garden plants, and pasture land. Possums were acknowledged as a pest because they ate native vegetation and, if uncontrolled, could spread bovine tuberculosis. However, it was generally believed among interviewees that HBRC's PCA programme successfully controlled possum populations, and one interviewee did not understand why the programme was still happening given that she had not seen possums for years. There were questions among some interviewees, however, about whether or not possums were being adequately controlled in forestry blocks and concerns that possum numbers were growing in those areas and would spread to nearby farms.

Interviewees expressed mixed perceptions about whether or not feral cats were pests. Some believed that feral cats were a pest because they preyed on native birds. Interviewees expressed concern that cats in the more highly populated area of Mahia Beach would threaten

native bird species in the Mahia Scenic Reserve. One station owner also mentioned how feral cats are pests because they transfer toxoplasmosis to sheep, which can cause the sheep to abort. However, others spoke about how feral cats are useful for killing rats and can be companions. One interviewee picked up a feral cat that she had been feeding and began petting it when asked about her view on feral cats as pests. Many interviewees mentioned how a feral cat control programme would be unlikely to be accepted by the community, especially because traps for feral cats might kill people's pet cats. However, one interviewee felt that all cats should be spayed and neutered to prevent their population from increasing.

Wasps, mosquitoes, and cockroaches were mentioned as being household nuisances. In addition, the wilding pines around the sand dunes by Oraka at the neck of the peninsula were mentioned several times as posing a risk to the unique coastal sand dune ecosystem there.

When asked about potential pest control strategies, several interviewees spoke about how they felt it was important to consider the humaneness of control options when killing animal pests. One interviewee spoke of the importance of killing and disposing of pest animals in a respectful way so that animal carcasses were not just left to rot. Several community members mentioned that if any aerial spraying of toxins was to occur, there should be scientific evidence that the toxins do not have harmful effects on the environment and native bush. While several interviewees discussed how they had read about the effectiveness of aerial 1080 as a tool for pest control, others talked about how this tool would not be acceptable under any circumstances on Mahia.

When asked about a potential future management programme, one interviewee expressed concern that certain large landowners will be forced to pay a great amount for pest management despite not reaping the benefits of control. Other interviewees spoke about their concern that small landowners, people trying to restore native bush, and foresters were currently experiencing and paying for all the negative impacts from pests that were migrating to their property from adjacent unmanaged land.

3.3 Current and past pest control on the peninsula

Current coordinated, wide-scale pest control programmes on the peninsula include HBRC's Possum Control Area programme, which targets possums on farmland, and the Mahia Coordinated Action Feral Goat Control programme. There are no current wide-scale pest programmes on the peninsula aimed specifically at controlling rats, stoats, feral cats, and plant pests, although control does happen in the Mahia Peninsula Scenic Reserve through the Department of Conservation. However, some coordinated, large-scale predator control has occurred in the past on three stations with the goal of releasing game birds. In addition, ECO-ED, a conservation organisation, sought to establish a predator-proof fence across the isthmus six years ago but encountered considerable community opposition.

Possum Control Area (PCA) Programme

The Possum Control Area (PCA) programme is a subsidised 'self-help' programme run by HBRC under its Regional Pest Management Strategy (Greer 2006). Around 500 000 ha are managed under this programme in the Hawke's Bay Region (HBRCa no date). The programme provides subsidies to reduce costs of possum control for landowners once 75% of

landowners (in terms of area) have agreed to participate (HBRCb no date). Once an area is deemed to be under the PCA programme, HBRC conducts initial knockdown control. Landowners within the area are then bound to the conditions of the programme, which means they must continue to do control to maintain possum levels down to a Residual Trap-Catch of <5% (HBRCb no date). The programme is generally supported by landowners because of the known risks that possums pose to farmers' livelihoods due to possums being vectors of bovine TB and feeding on pasture land (Greer 2006). While the majority of landowners interviewed on Mahia Peninsula greatly appreciated the PCA programme, one interviewee felt that there were no longer possums in the area and did not want to keep paying for continued maintenance control.

Mahia Coordinated Management Area Feral Goat Control Programme

Current goat control practices on the peninsula include mustering done by landowners or hired professionals, ground control (shooting) done by foresters and individual landowners, and shooting and heli shooting of goats done by the Department of Conservation in Mahia Peninsula Scenic Reserve (Habitat BPM no date). However, high numbers of goats in areas surrounding the reserve and forestry plots mean that without a strategic peninsula-wide plan for goat control, DOC and foresters will have to continue to apply current levels of control indefinitely (Habitat BPMno date). In addition, current goat populations may put the Whangawehi Catchment Management Group's proposed riparian plantings at risk. Thus, HBRC has hired the consultant firm Habitat BPM (http://www.habitatbpm.co.nz/) to develop a five-year coordinated management area feral goat control programme. The programme aims to achieve more cost-effective control by implementing a peninsula-wide strategic approach carried out by a single contractor (Habitat BPM no date). The programme will begin by focusing control efforts around the Whangawehi catchment and then expand out across the peninsula. The programme leader is planning to begin working with landowners who have requested goat control in winter 2014 (Habitat BPM no date).

Red-legged partridge release

Several interviewees spoke about a coordinated predator control effort that was carried out on three large stations. The predator control was inspired by a German gamekeeper, who came to Mahia Peninsula because he saw it as a good place to introduce game species, particularly the red-legged partridge, for hunting. He worked with three current station owners who were interested in the partridge release for game hunting, and together they conducted ground control of mustelids and feral cats throughout their properties so they could release the partridge in a predator-free environment. However, once released, the partridges all perished due to the harsh climate. Some interviewees noted that one landowner with a property in between the three carrying out predator control would not conduct any control. The interviewees mentioned that for the following two years after starting predator control, the landowners saw a vast increase in numbers of rats and rabbits on their farms due to the decreases in cats and stoats achieved by the control. Because of this, several interviewees spoke of the need for a strategic pest management plan on Mahia that would control multiple species at once, instead of just stoats and feral cats.

ECO-ED and a predator-proof fence

Community members also spoke about how six to seven years ago, ECO-ED, a conservation organisation based in the Hawke's Bay (http://www.ecoed.org.nz/) proposed to build a predator-proof fence across the western portion of the peninsula. Interviewees believed that the organisation was planning on establishing a sanctuary for kiwi on the peninsula after the fence was built. However, interviews thought that the proposal for the fence called for management of cats and dogs across the peninsula, which caused a significant amount of outrage from several people who highly valued their pets. In addition, some interviewees felt that the organisation did not actively engage the community in planning or decision making, and one community member felt 'they were being told what to do in their own backyards.' The proposal was subsequently dropped; however, interviewees spoke about how there still remains a great deal of resentment among certain community members towards outside organisations coming into Mahia with ideas for pest control and conservation initiatives. When asked about ECO-ED's experience in Mahia, Wendy Rakete-Stones, general manager of ECO-ED, provided the following statement:

> *"Representatives of ECOED have taken part in at least 2 public meetings and various informal discussions in Mahia over the past 8 years to discuss the concept of a pest free Mahia. As a peninsula, Mahia would be a relatively easy area to defend against predators with positive results to biodiversity. ECOED's intent has been to float the idea and support a local driven project. Local response has been varied, with some very keen and others wary or opposed. ECOED has always believed the success of a project such as this lies in local buy in and ownership of the project and that our previous experience could add some value and support to the project."*

3.4 Key interests, organisations, and decision-making processes

Several interviewees spoke of the challenges to community decision making posed by the diversity of land use, ownership, and lifestyles present on the Mahia Peninsula and discussed ways in which decisions could be made. Interviewees noted there are 10–12 key landowners who own and manage the majority of the land on the peninsula and should be involved in any decisions that involve management practices across the entire peninsula. However, interviewees also spoke about how several of these are absentee owners and thus are difficult to get to community meetings.

Community members emphasised that proper involvement and consultation with tangata whenua is key to decision making on the peninsula. Interviewees spoke about how, several times in the past, agencies had talked to one or two tangata whenua and considered such interaction 'consultation with Māori', which interviewees said was 'inappropriate'. They suggested that proper consultation and decision making should involve the slow building of trust between agencies and tangata whenua, which can begin with an agency or research representative attending monthly marae meetings.

Interviewees also mentioned the challenge of making decisions for management of Māori multiple-ownership land and land that is under trusts. Before a decision can be reached about such land, proposals must first be discussed with all landowners or trust members, which can be time-consuming and resource intensive, as landowners may not even live locally.

Despite these challenges one community-led process that has successfully set up collaboration between landowners, tangata whenua and agencies on the Mahia Peninsula involves the Whangawehi Catchment Management Group. In July 2010, the community of Whangawehi was concerned about the impact of the proposed Mahia Beach Community Waste Water System on water quality in the Whangawehi River, the sacred river of the Rongomaiwahine Iwi o Te Mahia mai Tawhiti (Whangawehi Catchment Newsletter 2013). There was also concern over the negative impacts the wastewater system and other land use practices could have on sacred ocean fishing grounds and mahinga kai shellfish beds at the mouth of the Whangawehi River.

The Whangawehi Catchment Management Group was started by Kathleen Mato, who believed the best way to address community concerns about the wastewater system and improve water quality in the Whangawehi catchment would be to work alongside agencies instead of against them. Kathleen went door-to-door speaking with people about her ideas and attended numerous meetings to promote a collaborative process for addressing community concerns. By 2011, a Memorandum of Understanding was signed between three marae, Hawke's Bay Regional Council and Wairoa District Council. In 2012, a second signing was done by the Department of Conservation, a forestry company, a farmer, and the Mahia Māori Committee. Shortly after this, the community developed a catchment management plan to coordinate restoration and education projects (which was released in July 2012; Whangawehi Catchment Newsletter 2013). Two of the projects currently run by the Catchment Management Group are a community-based water monitoring programme, which uses a cultural health index framework for evaluating stream health and prioritising restoration of streams of high cultural significance, and a riparian planting programme, which has funded the building of fences on farmland and is planned to result in the planting of 6000 native trees this winter (Whangawehi Catchment Newsletter 2013).

The riparian plantings and habitat restoration happening through the Whangawehi Catchment Management Group tie in closely with Habitat's five-year goat control programme and other potential future pest control on the peninsula. Many of the Catchment Group members we interviewed discussed how it will be necessary to undertake widespread goat control in order to protect riparian plantings. Group members felt that a widespread pest control programme would be much more effective and much less costly than continually building and maintaining fences to protect plantings.

In addition to improving water quality, interviewees mentioned the possibility of the riparian plantings also bringing back habitat for native birds. Many mentioned how future predator management of stoats and rats could help aid in the return and survival of these native birds.

3.5 Visions for Mahia Peninsula

When asked about their visions for the future of the Mahia Peninsula, interviewees provided diverse but often overlapping perspectives. One landowner, Janice Edwards, shared a poem she had written for a Māori language class and which she felt strongly-related to her vision for Mahia (see box). Other interviewees' visions for Mahia included:

- Pest-free Mahia
- Increased eco-tourism and people coming to enjoy the natural beauty of the peninsula
- More native bush retired on farmlands
- Return of native birds, especially kiwi
- More plantings of native bush, especially in the Whangawehi catchment
- Decreased erosion – improved water quality
- Preservation of farmland but some steep unusable land converted to forestry or native bush
- Return of native trees that can be used for weaving and rongoa Māori, or medicinal purposes
- Better protection of coastal sand dune habitat and nesting birds, especially from encroaching wilding pines
- Creation of a Mahia brand of beef, in which cattle can be advertised as being raised on farmland supporting rich native biodiversity
- Better management and sustainable use of mahinga kai and traditional fishing waters
- Education and involvement of local schools in environmental issues

During interviews, several community members described their visions for Mahia as relating to specific areas on the peninsula. In Figure 1, we show examples of some of these spatially-explicit visions.

HE MANAKO / GOAL

Ko tōku manako

My goal

ki te noho i waenga i ngā hua o te taiao,

is to be surrounded by the fruits of nature

hei whāngaia tōku whānau, me ngā manu o Tāne Mahuta.

so that I may care for/feed my family, and the birds of Tane Mahuta.

Ko te pūtake o tēnei manako

The purpose of this dream

ki te whāngai i te waiora me te wairua o āku tamariki, me āku mokopuna.

is to care for/feed the body and the spirit of my children, and my mokopuna.

Ka taea e au te tutuki i tōku manako

I will reach my goal

mā te pukumahi, mā ngā ringa raupo,

by way of hard work, by way of calloused hands,

mā te werawera o tōku mata,

by way of a hot, sweaty face,

waihoki, mā te aroha.

as well, by way of love.

- Janice Edwards 2013

Figure 1 Some of the visions for specific areas on Mahia expressed by interviewees. The examples shown are not comprehensive of all visions expressed and were not shared by every interviewee.

4 Proposal for collective decision making

Some of the interviewee's visions for the Mahia Peninsula –increased ecotourism, restoration of native bush, and the return of native birds – suggest that a coordinated pest control programme may provide benefits to the community. However, the community members interviewed had varying and diverse perspectives on what were pests on the peninsula and who should pay for pest management. So, although many interviewees agreed that the current PCA programme on the peninsula has been successful, expanding such a programme to include other pests mentioned, such as stoats, rats, cats and gorse, will be a challenge given that many community members do not currently see all of these pests as threats.

Therefore, a participatory process for decision making is needed that can engage community members in dialogue, and also with scientists, to begin to explore the different perspectives on pests and potential future alternative control options. Such a participatory process could encourage the community of Mahia to engage in deliberation and negotiation with the goal of working towards a mutual vision for the future of the peninsula's pests. A participatory process for collective decision making would be especially timely, given the proposed five-year goat control plan under HBRC and the proposed restoration projects happening with the Whangawehi Catchment Management group.

What would a process for collective decision making for pest control look like for Mahia? In this section we review the literature on participatory processes for decision making and examine examples from New Zealand and elsewhere. We then outline three options for Mahia, and make recommendations for leading a successful process. Finally, in the appendix, we offer a template and research methods for a Q-methodology study, which can help inform a future collective decision making process for Mahia.

4.1 Collective decision making in the literature

The call for increased stakeholder involvement in decision making has been driven by both 'top- down' (institutions and policies) and 'bottom-up' (citizens) pressures, which advocate for a more just, inclusive, democratic society (Brechin et al. 2002; Richards et al. 2004). In addition, public participation in decision making has been advocated for as a method for increasing the quality and sustainability of decisions by allowing for diverse perspectives and sources of knowledge to be considered (Reed 2008). Public participation in decision making has been increasingly used in environmental management issues in particular because often cooperation among stakeholders is necessary to achieve management objectives (Richards et al. 2004).

A variety of methodologies exist for facilitating stakeholder involvement in decision making, including focus groups, structured workshops, citizen juries, and consensus conferences (Reed 2008). Crucial to all of these methodologies is that they shift the nature of public involvement processes away from consultation and towards local empowerment (Richards et al. 2004). Thus, such collective-decision-making processes allow for environmental management decisions to be made by a group of relevant local stakeholders instead of just government agencies. Such a shift often must involve a 'negotiated transformation in rules and power dynamics' among participants (Rist et al. 2007) that results from a deliberative approach that promotes debate and compromise among stakeholders (Brechin et al. 2002).

Most participatory decision making processes use a variety of techniques and a skilled mediator to facilitate dialogue and negotiation, or 'collective action and reflection', among a diverse group of stakeholders (Keen et al. 2005; Rist et al. 2007). Participatory processes can also use scientific tools, such as models and decision support systems, to aid the process of negotiation and reflection about various management options (Allen et al. 2001; Borsuk et al. 2001). Such decision making processes may take several months or several years of relationship building across agencies and stakeholders using a variety of techniques for interacting that accommodate multiple interests, learning styles and ways of communicating.

There are several agreed-upon 'best practices' for collective decision making processes outlined in the literature. First, it is generally agreed that for a collective decision making process to yield positive outcomes, such as increased public acceptance of management plans, a wide diversity of existing stakeholder interests and perspectives should be identified and included in the process (Reed 2008). This is typically is done through a stakeholder analysis. Reed (2008) defines stakeholder analysis in natural resource management as a process that identifies systems, individuals, and groups that may be affected by a decision, and prioritises individuals or representative individuals for involvement in a participatory process. Potential affected social and natural systems and individuals (stakeholders) may be identified through a variety of methods, including focus groups or semi-structured interviews, as was done in this study. Stakeholders can then be prioritised for involvement in decision

making through methods such as social network analysis, which identifies relationships between stakeholders, and Q-methodology, which can categorise stakeholders and identify differences and overlaps in stakeholder perspectives (Reed et al. 2009).

Another important component of successful participatory processes for decision making is the use of an impartial, skilled mediator to guide discussions (Richards et al. 2004). A mediator should be able to encourage participants to question their own assumptions as well as effectively manage group dynamics (Richards et al. 2004; Reed 2008). In addition, a mediator must have no stake in the decision being made and be seen by participants as respectful and open (Richards et al. 2004).

There are many examples of collective decision making processes for environmental management that have been implemented in New Zealand and elsewhere. Such processes have addressed diverse environmental management topics ranging from sustainable soil and water management to wolf management (Allen et al. 2001; Todd 2002; Rist et al. 2007). Below, we describe some examples. For each, we outline how participants were chosen, why a participatory process for decision making was needed, and what techniques were used to facilitate dialogue and decision making among stakeholders.

Integrated systems for knowledge management for possum management for TB control in North Canterbury, New Zealand

Allen et al. (2001) describe a participatory process for decision making headed by Landcare Research and the former Animal Health Board for possum management to reduce risks of bovine tuberculosis (TB) in North Canterbury. The researchers used the 'integrated systems for knowledge management' (ISKM) approach for stakeholder engagement in decision-making, which they describe as an iterative participatory approach for planning and implementation that integrates scientific and local knowledge and perspectives to develop new resource management practices. The project was initiated because individual farmers needed to be involved in possum management if regional-scale efforts at eradicating TB were to be effective; however, there was a great diversity among farmers of perceptions on optimal management practices. In addition, knowledge about the effectiveness of various pest management techniques was fragmented among researchers and agencies. Thus, researchers began a participatory process to aid in the collection of knowledge and involvement of farmers in developing a management plan. Researchers began the process by contacting a representative advisory group in the region –the North Canterbury TB Management Committee – to organise meetings between farmers and pest control scientists. Researchers then ran facilitated workshops with key stakeholders focused on the sharing of understanding and knowledge between local land managers and scientists. Community dialogue in workshops covered the social, economic, and ecological contexts of particular pieces of information. Computer-based decision-support systems (DSS), or decision tree programs, were used to guide participants in the workshops in problem solving and knowledge sharing and searching.

Community dialogue for pest control in Hawke's Bay, New Zealand, 2003–2004

Hayes et al. (2008) discuss another participatory process developed by Landcare Research scientists, this time to include community representatives in dialogue about future pest control in the Hawke's Bay Region. Run in September 2003 and April 2004, the process was developed to test the community dialogue process as a future means for decision making for the development of a regional pest control plan for the Hawke's Bay. Researchers recruited a wide range of stakeholders to participate in a series of facilitated workshops, including Māori, government departments, pest control agencies, the Environmental Risk Management Authority, and scientists and industry groups. Four workshops were run, at a marae and a winery, with 16 to 31 participants in each, to begin dialogue on (a) biological control of weeds and (b) 1080 use for mammalian pests. Later, a similar process was used to aid in the development of a pest control strategy for the region. In the workshops, a skilled facilitator ran exercises in which participants were asked to present the perspectives of other participants – to encourage active listening and respectful participation. For several of the workshops, participants stayed overnight on the marae, to encourage informal social interactions and building of trust. In a final meeting in May 2004, the larger group of participants was divided into smaller groups to use their new-found understandings of participants' perspectives to examine and discuss potential outcomes of various future management scenarios.

Integrating stakeholder engagement, ecosystem service mapping, and scenario analysis in Albemarle-Pamlico Basin, Virginia, USA

Angermeier and Villamagma (2013) describe how researchers at Virginia Tech and the U.S. Geological Survey used a series of facilitated workshops to involve stakeholders in conservation planning in the Albermarle-Pamlico Watershed Basin. Researchers recruited 27 representatives of conservation-oriented organisations, including state and federal representatives, to participate in a series of workshops that integrated scientific mapping and modelling with facilitated discussions. In workshops, trained facilitators helped stakeholders co-develop conceptual models of environmental issues associated with catchment management, including relevant ecosystem services. Stakeholders expressed hopes and fears for management, co-developed key factors to consider in management, and then co-developed several alternative possible management scenarios for the basin. Researchers then gathered local biophysical and social data to model the effects on ecosystem services and various other factors of potential management scenarios suggested by stakeholders, which they then presented in workshops to further facilitate stakeholder dialogue about management options.

Stakeholder engagement for the Greater Heretaunga and Ahuriri catchment plans, Hawke's Bay, New Zealand

Cradock-Henry et al. (2013) outline how HBRC, with the help of Landcare Research, developed a collaborative process to guide changes in the Greater Heretaunga and Ahuriri Catchment Plan in 2012. The stakeholder group involved in collective decision making, called TANK, for the Tutaekuri, Ahuriri, Naruroro and Karamu river catchments, was made up of 30 representative individuals impacted by the catchment plan, including people from agriculture, horticulture, environmental groups, and tangata whenua. The initial group of representatives was recruited by HBRC from key

organisations, and those representatives were asked who else needed to be present in the group to ensure that diverse interests were represented. High standing members of tangata whenua were involved in the process from the start, and representatives of organisations were asked if their organisations would formally support any consensus reached in TANK. Workshops were run by a hired mediator who was unaffiliated with HBRC, and regional councillors were included as participants to represent the interests of HBRC (Berkett & Sinner 2013). Through facilitated workshops, participants were asked to identify objectives and assess the potential effects of various management options on objectives. Council members were used as technical experts, who provided information on the social, environmental, and economic implications of various management options when needed (Berkett & Sinner 2013). Stakeholders were given an interim report of the process and encouraged to continue to communicate with their organisations and networks (Cradock-Henry et al. 2013). Survey evaluations were used throughout the process to assess social learning and identify any potential stakeholder concerns (Cradock-Henry 2013).

4.2 Participants and resources for collective decision making in Mahia

There are several resources and key individuals and groups that can aid in a collective decision making process for Mahia in the future. The Whangawehi Catchment Management Group will be a key interest group that should be involved in such a process because it has already set up a successful collaboration among a wide range of stakeholders and agencies on the peninsula, including farmers, a forester, HBRC, DOC, and the Wairoa District Council. In addition, because of their proposed riparian plantings for this upcoming winter and beyond, they have an interest in pest management on the peninsula in the future. The Catchment Management Group has monthly meetings, which could provide an avenue for beginning a collaborative process.

The 10–12 major station owners on the peninsula will also be important to involve in a future collective-decision-making process. Many community members interviewed discussed how they believed the success of a future process would depend greatly on whether or not all of these major landowners were involved because if a management plan was agreed upon but several large station owners refused to comply, their properties could act as refuges for pest populations.

Other important interest groups that should be represented in a collaborative decision making process in Mahia include foresters, tangata whenua, bach owners, and local government and conservation agencies, such as HBRC, DOC, and the Wairoa District Council. Interviewees suggested that to engage tangata whenua in a potential future planning process, researchers should begin by attending monthly marae meetings at Kaiuku Marae and bringing up the idea of a collaborative process for decision making about pest management on the peninsula. Aaryn Walker, daughter of Leon Symes who is manager of Kaiuku Marae, said she would be interested in helping to organise researchers' attendance at these meetings and accompany researchers to them.

Finally, many community members indicated that Landcare Research scientists should participate in a future process, to provide the scientific 'perspective' and expertise needed to answer technical questions about pests on the peninsula and potential pest management strategies.

4.3 Options for a participatory process for collective decision making on Mahia

On the basis of our situational and stakeholder analysis in Mahia, as well as a review of current literature, we propose three options for leading a participatory process on the peninsula. For all three options, we first recommend that a more robust stakeholder analysis using Q-methodology be conducted to inform the participatory process. Such a Q-methodology study will identify the variety of social discourses [the ways people articulate their rationale for their perspectives] that exist in the community around pest management on Mahia (Reed et al. 2009), which can help researchers better understand the differences and overlaps between those discourses and identify who should be involved in a process. In Appendix 1, we list statements that could be used in a Q-methodology study for Mahia in the future. We also recommend, following interviewees' requests, that a community-wide meeting advertised to everyone on the peninsula be held to discuss the idea of a participatory process for pest management planning, before a more in-depth process is begun. We recommend such a meeting because many community members interviewed felt strongly that given that Mahia is such a small community and everyone may be affected by pest control, everyone should be informed and given the option to provide feedback to a future participatory process.

The three options we provide for a future participatory process vary in the techniques they use to facilitate dialogue and negotiation among stakeholders and the way in which scientific information is integrated into the discussion. We assume that all three processes have the goal of encouraging diverse community members to arrive at a shared understanding of Mahia and each other's interests and aspirations for the future of Mahia's pests. However, the way in which knowledge and visions might be shared and become manifest will be guided by the community participants themselves at the beginning of the process. Of course, the costs of various options should be taken into consideration, but managing a budget should be a part of the participatory process, not something that is predetermined by agencies. Thus, when initiating a participatory process, HBRC should provide participants with information on what resources are available for the process so as to facilitate a discussion about the best uses of those resources.

The participatory process may have various desired outcomes, which should be determined by participants themselves and which may include a shared vision to be outlined in a document of community needs and concerns delivered to HBRC or a more detailed funding proposal to be delivered to conservation agencies or philanthropists. Definition of clear and specific goals for the process will be a fundamental first step, as these goals may greatly impact which of the three options below may be the most effective way to proceed. However, it is also likely that goals for the process will change throughout the process as stakeholders gather more information or begin to better understand differing perspectives and needs. Thus, any process should be flexible, as after several workshops there may be a need to change the methodology that is followed, given changing stakeholder goals and needs (Reed 2008).

Option 1: Integrating stakeholder engagement with scenario building

A first option for a future participatory process in Mahia could involve facilitated community meetings, in which landowners, Māori, Landcare Research scientists, HBRC, DOC, and other interested community members co-develop and analyse potential future pest control scenarios. This option would involve first inviting major

station landowners as well as representatives of the Whangawehi Catchment Management Group, tangata whenua, and smaller landowners to a facilitated community meeting. In this first community meeting, Landcare Research staff would present findings of key hopes, fears, and questions raised in interviews in Mahia and ask for community feedback on these. Then, Landcare Research staff could present answers to as many of the community questions as they could (see Appendix 2 for a list of community questions developed from interviews) and present various control/management options available, as well as examples of pest control in other areas. Finally, Landcare research staff could ask participants if all interests in Mahia were adequately represented at the meeting and who should be included in a more in-depth participatory process.

The next step in this process would involve conducting a Q-methodology study of 20–40 Mahia residents, to help guide subsequent meetings. Then, two to three additional facilitated workshops could be run with stakeholders identified from the first meeting and the Q-methodology. In these workshops, stakeholders would first be asked to define goals for the process. Stakeholders would then be asked to co-develop objectives for future pest control on the peninsula as well as three or four possible different management scenarios for the peninsula.

Outside of meetings, Landcare Research scientists would then model the outcomes of different management scenarios for stakeholder-defined objectives. Such scenario modelling could involve ecological economics modelling to identify ecological and socio-economic impacts of various management options, and/or 3-D visualisations of the landscape. After Landcare Research scientists complete modelling, one to two other facilitated workshops would be held with community members to discuss results of scenario modelling. In these workshops, stakeholders would engage in a co-analysis of various management options based on scenario results and potentially arrive at a set of agreed-upon management guidelines for the peninsula.

This scenario-building approach can be useful to decision making because the results of the modelling, which can come in the form of graphs of replanted vegetation or the distributions of pest populations across the landscape, for example, can help stakeholders visualise the future of the peninsula in a concrete, nuanced way. This may thus aid stakeholders in moving away from deeply entrenched views of the present towards a common vision for the future (Peterson et al. 2003). However, such an approach will be resource intensive, as it will not only require a significant time investment from a facilitator but also from Landcare Research scientists who can do the modelling work and attend meetings.

Option 2: Using integrated systems of knowledge management (ISKM) for collaborative planning

A second approach for moving forward towards collaborative pest management planning in Mahia would involve facilitated workshops using the iterative ISKM approach, in which stakeholders share information through in-person and Internet-based platforms. Like the previous approach, this would first involve a community meeting in which key questions, hopes, and concerns gathered from the community are reported back for feedback, and additional stakeholders are identified. The meeting would then also be followed by a Q-methodology study. However, unlike the scenario-

building option (which will involve more formal scientific modelling in which stakeholders define the scenarios that will be examined by scientists), through the ISKM approach, subsequent facilitated meetings will involve more informal sharing of information between scientists and stakeholders about pest management options and potential outcomes.

In this approach, after the Q-methodology study, a series of facilitated workshops will be held in which stakeholders will be asked to formulate objectives for pest management and share information and questions about various control options. An online wiki could be created for the greater Mahia community to share information and concerns to inform workshops. In workshops, the facilitator and/or Landcare Research scientists could use a decision-support system (DSSto help guide the problem-solving and information-gathering process. One DSS that could be used is Excel's PrecisionTree, which allows facilitators to easily enter in probability distributions for the relationships between variables, on the basis of diverse forms of existing knowledge among stakeholders and scientists. The DSS can then be used to assess the impact of various decisions on objectives based on those probability distributions and conduct sensitivity analyses with different forms of information. Such a tool can thus help stakeholders arrive at an understanding of the potential impacts of various control options given high levels of uncertainty or diverse forms of knowledge.

The ISKM approach may not provide as accurate, detailed, or nuanced scientific information or visualisations of future scenarios as the scenario-building option. However, unlike the scenario-building option, it will allow for stakeholders to be involved in data collection and for the analysis of various management options to take place through an iterative, flexible process led by community members (Allen et al. 2001). Thus, stakeholders, with help from the DSS, may begin to arrive at a mutual vision through the process of asking questions, searching for answers, and reassessing the potential outcomes of various control options themselves. Such a process may be especially useful if the next community meeting and Q-methodology study reveals that there are diverse forms of understanding around management implications and/or distrust among citizens of the scientific community. In addition, this method may be useful if stakeholder-defined goals for the process do not necessitate a highly detailed understanding of the ecological or socio-economic implications of various management plans.

Option 3: Structured dialogue through community workshops

A third option for how to proceed could be a series of facilitated community workshops for promoting dialogue between scientists and diverse interested and representative stakeholders. As in the previous options, an initial community meeting and Q-methodology study analysing the various stakeholder perspectives and groups can be used to inform the workshop design. Such workshops, which would be highly structured and guided by a skilled facilitator, could involve techniques such as a 'pared-down process' (Hayes et al. 2008), in which participants are paired and have to report their partner's perspective back to the group. Such techniques can be used to encourage a culture of listening and respect before moving into discussions of specific management options.

In subsequent workshops, participants could be asked to discuss and define objectives, performance measures, various possible management strategies, and the impacts of various management strategies on performance measures. Joint fact finding, in which stakeholders divide into smaller groups of participants to answer questions brought up by the group (Todd 2002), could be used to gain a better understanding of how various management strategies may affect performance measures. Landcare Research scientists, DOC, and HBRC council members could be involved as stakeholders in the process. Additional scientific specialists could be brought to workshops or contacted for support during the joint-fact-finding phase.

This approach would be the least scientifically technical of the three options, as no scenario modelling or DSS would be involved. Thus, dissemination of scientific information will occur through more informal interactions between scientists and stakeholders. Like ISKM, this method will be very useful if there is community distrust in scientists and if stakeholder goals for the process do not require highly detailed understanding of the potential impacts of various management options on the peninsula. In addition, unlike scenario building or ISKM, this approach will be useful if there are highly variable levels of scientific understanding among participating stakeholders, and a more technical approach involving modelling or DSS could risk silencing some participants who do not feel comfortable with these modes of information sharing.

4.4 Risks of a collective process

While participatory processes may result in a variety of positive outcomes, it is also possible that such processes may not lead to consensus or can even exacerbate conflicts. It is possible that collaborative decision making processes can reinforce existing power dynamics within a community, which can prevent the diversity of stakeholder concerns and perspectives from being adequately considered in decision making (Nelson & Wright 1995). In addition, certain stakeholders with non-negotiable perspectives may stall or prevent the process from moving forward, preventing any sort of consensus (Reed 2008).

In addition, participatory processes can take a lot of time and resources as participants work through diverse perspectives, seek information, and reshape goals of the process as learning takes place (Allen et al. 2001). If the participatory process is not properly managed, this can lead to stakeholder ‘fatigue’ or frustration with the process (Reed 2008) in which stakeholders feel that their involvement has been time intensive but has not produced any results that benefit them (Burton et al. 2004). This can lead to increased distrust in the researchers or government agencies running the process.

These risks can be mitigated by clearly outlining expectations and goals for the participatory process from the outset, and by careful mediation of workshops and community meetings by a skilled mediator who is perceived by the group to be impartial (Reed 2008). In fact, the success of participatory processes has often been more dependent on the mediation and the way in which a process is run than the actual tools or processes that are used (Richards et al. 2004).

4.5 Key issues to be considered

In summary, we recommend that any future participatory process should: (1) have clearly defined goals that may be formulated by the stakeholders themselves, (2) be inclusive of diverse perspectives and informed by a more in-depth stakeholder analysis, (3) be run by an impartial and experienced mediator, and (4) be flexible. Below, we provide further key issues to be considered in a future process.

1. Cradock-Henry et al. (2013) discussed how the Treaty of Waitangi provides tangata whenua with the standing of a direct treaty partner with the Crown, which raises issues on how tangata whenua can be included in the participatory process given their unique role beyond just a representative stakeholder group. Thus, when developing a participatory process, building a relationship with tangata whenua to define goals and expectations for the process is crucial (Cradock-Henry et al. 2013). In our interviews on Mahia, we found that several tangata whenua reinforced this point by expressing that involving one or two community members does not constitute a Māori consultation because, as one interviewee said, 'one or two people do not speak for the entire community.' They suggested that engaging tangata whenua in the participatory process will have to involve time, patience, and relationship building with the tangata whenua community. They suggested that the concept of a new pest management plan will have to be introduced several times to the monthly marae meetings before having the first community meeting for the whole peninsula. They also suggested that if a participatory process for pest management were to be introduced by a Landcare Research/Regional Council representative, he/she should be accompanied by a local community member.

2. As discussed earlier, measurable stakeholder goals for the participatory process should be defined early on the process. Goals for the process may include specific products that will come out of the process (i.e. a document of recommendations or a funding proposal) or less concrete objectives, such as ensuring all perspectives are represented and listened to. Goals should be evaluated throughout the participatory process by interviews or surveys to identify stakeholder concerns early on and allow for improvements and adjustments throughout the process (Cradock-Henry 2013). For example, in the TANK process, surveys of participants early on in collaboration identified the need for stakeholder access to more extensive scientific information, so experts were quickly brought in to answer questions. Such flexibility to alter methods or rules of engagement with changing contexts is essential to ensuring stakeholder needs are met (Richards et al. 2004).

5 Conclusions

Our stakeholder analysis identified that community members on Mahia have diverse but often overlapping visions for the future of the peninsula. These visions include increased areas of restored native bush, reduced erosion, improved water quality and fishing grounds, more opportunities to harvest traditional medicinal plants, or Rongoa Māori, and green marketing for cattle and increased ecotourism. Many community members already linked potential future pest management planning with their visions for Mahia. However, participants' perspectives on pests and what pests should be managed were often varying, and some pests, particularly feral cats and goats, were seen as pests by some people and assets by others. Thus, there is a need for a participatory process for decision making on Mahia that can allow

community members to engage with scientists and each other to share diverse perspectives and values. Such a process has the potential to allow for community members to converge on a mutual vision for the future of pest management on the peninsula.

We recommend three different methods for designing and leading such a participatory process for collective decision making on Mahia. The method of these three that should be followed on Mahia will depend on findings from the Q-methodology study as well as the goals for the participatory process, which can be defined by community members in future meetings. However, we note that the outcomes and success of participatory processes are not as dependent on the 'toolkit' approach (Richards et al. 2004), or the type of participatory process that is followed, but instead on the use of skilled facilitation, the definition of clear goals for the participatory process from the outset, and the flexibility and inclusiveness of the process.

6 Recommendations

To progress the ideas developed in this report in a timely manner we recommend the following next steps for HBRC, which are also outlined in the timeline in Figure 2 (overleaf):

1. Campbell Leckie to present this report to the Whangawehi Catchment Group by August 2014.

2. Landcare Research staff to compile a document answering as many as possible of the key questions raised in interviews (see Appendix 2), to send out to the Whangawehi Catchment Group, interviewees, and other interested groups or people on the peninsula by September 2014.

3. Landcare Research staff to complete a Q-sort with 30 citizens in Mahia, based on the Q-statements outlined in Appendix 1 (representatives from ECO-ED should be included in the Q-sort). Landcare Research to share findings back to HBRC by December 2014.

4. Representative(s) from HBRC or Landcare Research to attend a monthly marae meeting with Aaryn Walker by November 2014, to introduce the concept of a participatory process for decision-making and to answer questions.

5. Landcare Research and HBRC to host a community meeting, advertised widely throughout the Mahia Peninsula, to discuss next steps and present research findings by December 2014. In this community meeting, we recommend that the following should happen:

    1) Landcare Research staff will present findings from the Q-sort.

    2) Landcare Research scientists will present answers to questions raised by community members in interviews.

    3) Landcare Research and HBRC staff will present the three options outlined in this report for proceeding forward with a participatory process, and potential resources available for the process.

    4) Landcare Research staff will facilitate a discussion on next steps and the potential outcomes that could be generated from such participatory processes.

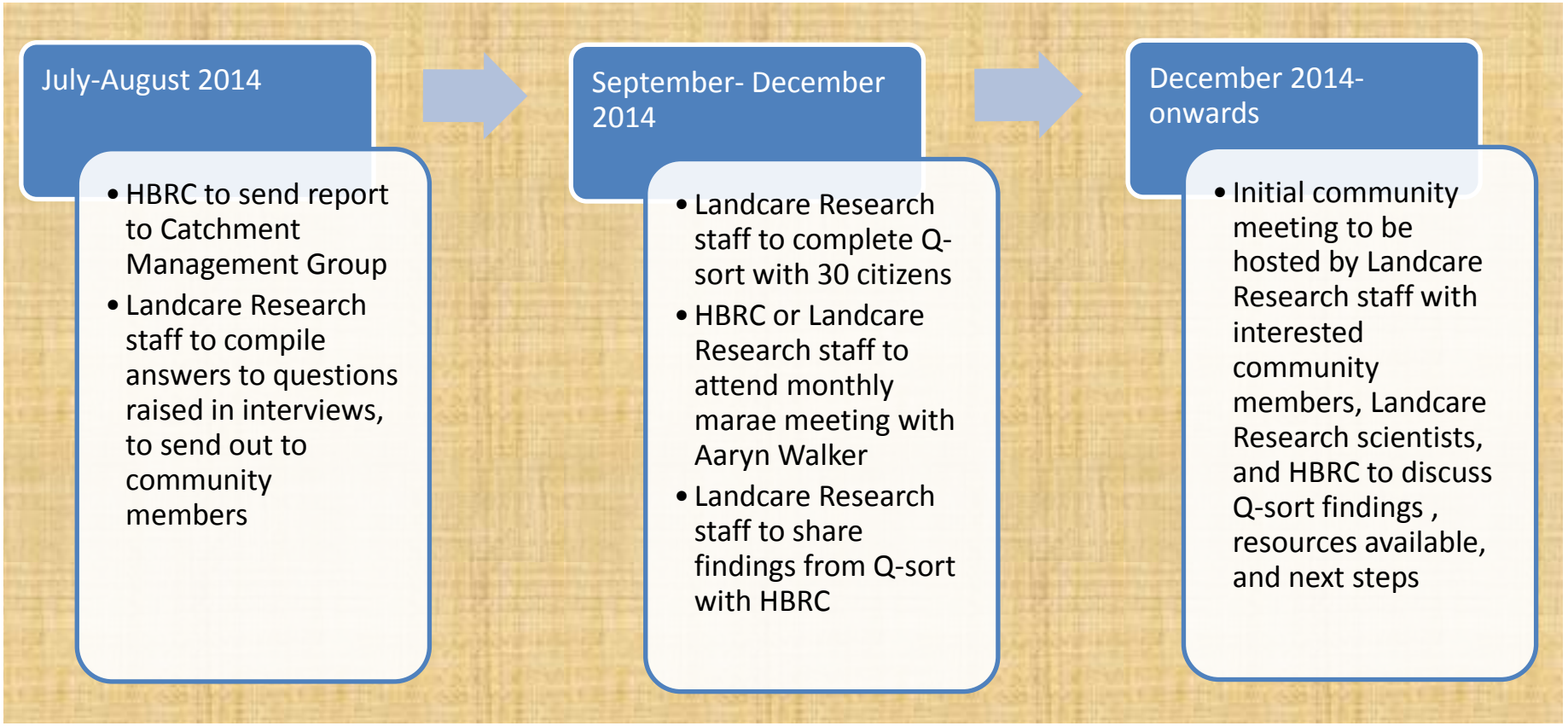

Figure 2 A timeline of recommended next steps for HBRC and Landcare Research staff to proceed towards a participatory process for pest management decision making in Mahia.

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Appendix 1 – Statements for Q-methodology study

Q-methodology

Q-methodology is a technique used in stakeholder analysis for identifying various discourses around a topic and categorising stakeholders on the basis of those discourses (Reed et al. 2009). Typically, researchers construct a set of over 40 'Q-statements' that cover a wide range of perceptions on an issue (Van Exel & de Graaf 2005). Researchers then ask study subjects to participate in a 'Q-sort', in which they sort the set of statements on a template board in terms of how much they agree or disagree with each. Researchers may then use factor analysis to identify key groups of stakeholders using participants' agreement or disagreement with particular statements. We provide a set of 40 statements below that can be used in a Q-sort for Mahia:

Q-statements

Visions for Mahia

Controlling pests on the Mahia Peninsula can result in economic benefits to the community.

The ecosystems of the Mahia Peninsula 'will be very difficult, if not impossible, to return to some "more natural" state in terms of time, effort and money'

The Mahia community should strive to eradicate all non-native animal pests on the peninsula.

Increased eco-tourism on the Mahia Peninsula would be beneficial to the local community.

Replanting native bush will improve local water quality.

I am concerned that future conservation efforts to bring back native birds on Mahia will threaten the livelihoods of local farmers.

Future restoration efforts to bring back native bush and birds should only happen if they are not too costly.

Any restoration of native bush that happens on the peninsula should primarily be focused on steep slopes and other areas of land that are otherwise unsuitable for farming.

The Mahia community would benefit from plantings of Rongoa Māori, or plants used traditionally for medicine and weaving.

Restoration of native bush could provide beneficial educational opportunities for local schools.

Large-scale restoration efforts should happen on the Mahia Peninsula to bring back native birds and bush.

What are pests and why?

'What defines a pest depends as much on one's perspective and on economic opportunities as on the ecology of a given species.'

The success of future planting and native bush restoration efforts will be influenced by the effectiveness of pest control programmes on the peninsula.

Any overly abundant animal species that negatively affects native biodiversity in New Zealand, regardless of its economic impacts, is a pest.

The Mahia Peninsula does not have any plants and animals that negatively affect people on the peninsula.

Goats are pests because they feed on native plants and gardens and cause erosion.

Goats are an important source of income for some people on the peninsula.

The pests that are most problematic on the peninsula are plant pests such as gorse and blackberry.

Control of feral cat populations would be of concern to me because cats kill rats.

Rats, mustelids, and feral cats are a significant threat to native birds and/or other wildlife on the peninsula.

The spread of pests from properties where these pests are not managed to my own property is often of concern to me.

Control strategies

All animal life is sacred and should be valued.

Spaying and neutering dogs and cats would reduce their long-term negative impacts on native biodiversity.

Some non-native animal species in New Zealand should have the same levels of protection as native species.

I am concerned that a management plan focused on one or two species will 'upset the balance' of the current ecosystem in Mahia.

Helicopter sowing of herbicides to control gorse and other weeds is less of a threat to the environment than goats are.

The risks to the environment and native biodiversity posed by rats and stoats are greater than risks posed to the environment by toxins used in bait stations for ground control of animal pests.

I am concerned about native birds and animals being harmed by toxins used in ground control for pest management.

Aerial use of 1080 in Mahia is unacceptable under all circumstances.

Implementation

Regional pest control plans are necessary to enforce the 'Good Neighbour Rule' under the Biosecurity Act of 1993, which states that landowners should have to manage the 'impacts of pest spread onto adjacent land occupiers'.

I am concerned that any future pest management scheme for the peninsula would result in individual landowners paying for management of pests that are not directly affecting them.

If the majority of large landowners and community members in Mahia can agree on a future pest control scheme for the peninsula, all landowners should have to comply with the pest control scheme.

Regional pest control programmes should only focus on areas where pest populations are directly causing economic harm to landowners.

I am concerned that a pest control scheme will result in reductions of populations of animals that I find economically valuable.

Government agencies, such as the regional or district councils, should not be involved in pest management on private property.

Regional or peninsula-wide intervention by councils is necessary to effectively control pest species like rabbits and stoats that can disperse far distances.

Any regional pest control intervention on Mahia should include weeds such as blackberry and gorse in addition to animal pests.

Managing multiple pest species simultaneously will create a more effective pest control programme.

Pests are a problem that affects the larger Mahia community, not just large landowners.

Process

The Mahia community has not been properly consulted in the past regarding proposed conservation or pest control programmes on the peninsula.

Making decisions is often difficult in the Mahia community.

Mahia does not have a lot of like-minded people.

Controlling pests on the Mahia Peninsula should ideally be a collaborative process, with the variety of interests and types of landowners being involved in decision making.

Only large landowners should be able to have a say in future pest control planning on the peninsula.

Appendix 2– Community questions about pest control

Key questions raised in interviews

- Are there examples of other areas in New Zealand where native biodiversity was able to return and flourish after a coordinated pest management effort occurred? What lessons were learned from those previous efforts? What do those areas look like now?
- What pest control strategies will most effectively cause a decrease in pest populations?
- Will pest control strategies cause an increase in native birds and other species?
- What control strategies are cost-effective and how much are they going to cost?
- Do the control strategies damage the environment in any way?
- Do the control strategies kill humanely and what sort of other animals might be killed?
- After initial pest control efforts, how could more pests be prevented from coming into Mahia?
- Can pest animals be disposed of in a respectful way after control efforts?
- How many pests (particularly goats, stoats, and rats) are there on the peninsula? Where are pest populations most prevalent?