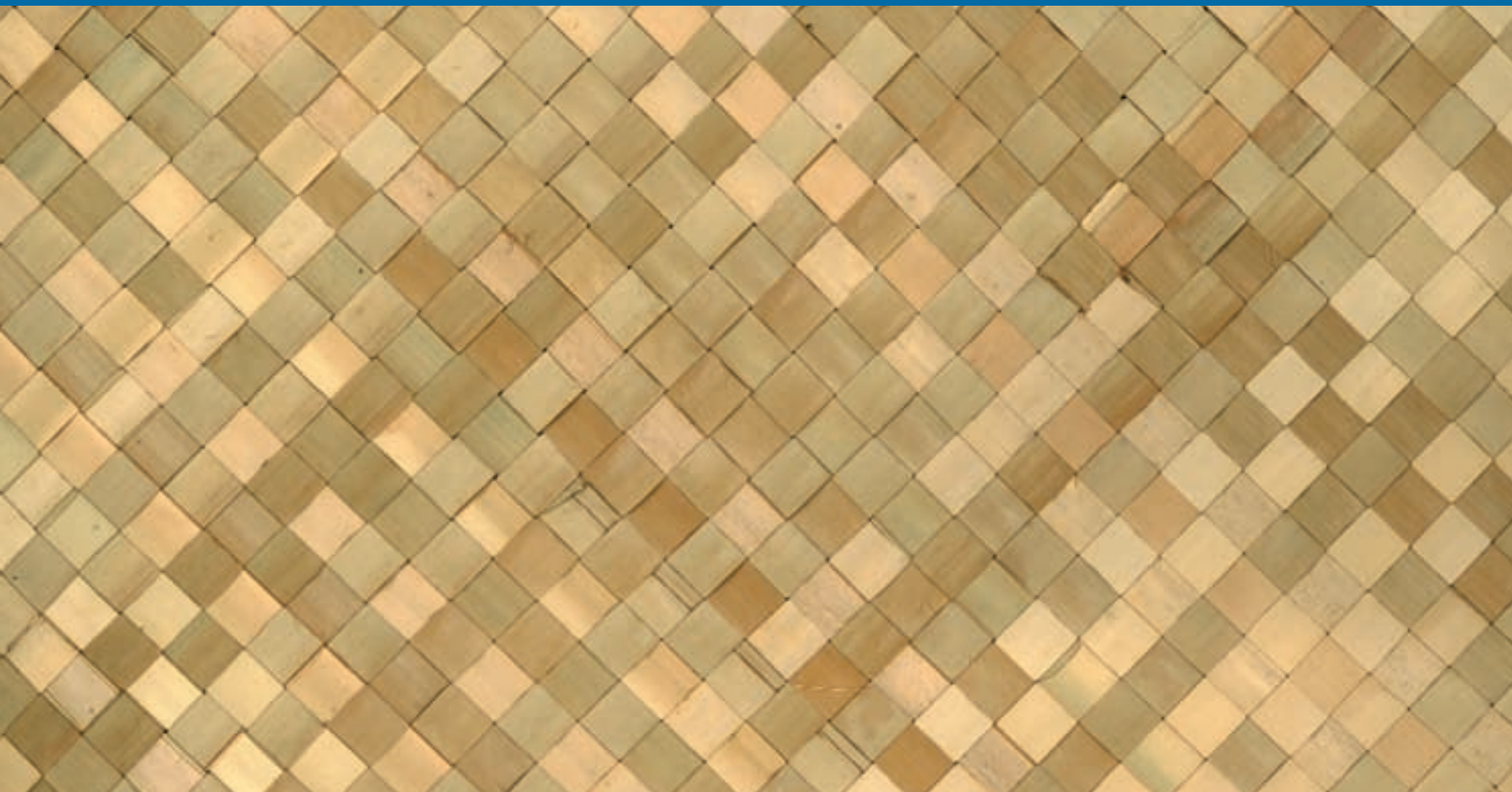
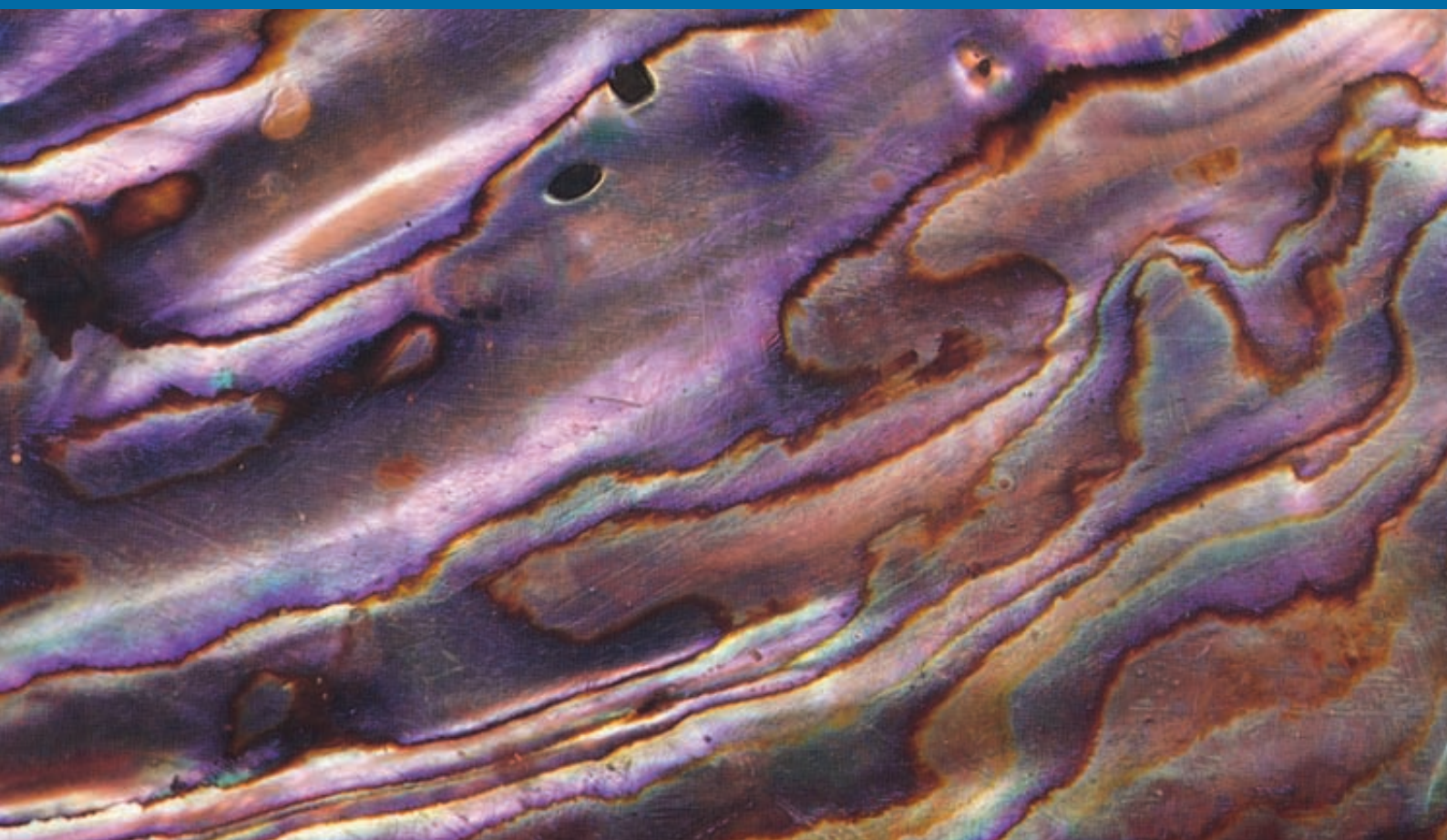


Maori methods and indicators for marine protection



Summary of research findings



GLOSSARY OF MAORI WORDS

awa/river, channel	matauranga/knowledge
hapu/sub-tribe	moana/sea
hapuka/groper	mokopuna/grandchildren
harekeke/flax	Pakeha/non-Maori
hui/meeting	pakeke/customs
ika/fish	parengo/seaweed
iwi/tribe	Pukehapopo/sacred hill of Ngati Konohi
Kahutia Te Rangi/ancestor of Ngati Konohi	pupu/periwinkle
kai/feed, food	rahui/embargo
kaimoana/seafood	rangatahi/modern youth
kaipupuri mana/holders of authority	rohe moana/coastal area
kaitiaki/caretaker, trustee	taiapure/locally managed sea area
kaitiakitanga/sharing guardianship responsibility	tamariki/children
karakia/prayer	Tangaroa/guardian of the sea
kaumatua/elder, wise man	tangata kaitiaki/caretakers of a given area
kina/sea egg, sea urchin	tangata whenua/local people
kohanga/nursery	tikanga/custom
koura/crayfish	tino rangatiratanga/autonomy
kuia/old (wise) woman	tio/oyster
mahi/work, employment	tohu/signs, indicators
makawe parengo/black, sweet seaweed	tohunga/priest
mana/pride, strength, reputation	waananga/learning
manaaki/embracing each other, support	wawataa/aspirations
mango pare/hammerhead shark	whanau/family
manuhiri/visitors	wharekai/eating house, dining room
marae/meeting house	whenua/land
mataitai/reserved sea area for marae use	

Maori methods and indicators for marine protection

Summary of research findings

Carla Wilson, Debbie Freeman, Kerry Hogan and Kati Thompson



Te Poho o Kahungunu

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All photos are courtesy of Department of Conservation, unless otherwise stated beneath the photo, and the maps are by Chris Edkins.

This is a Foundation for Research, Science and Technology funded study.

The views and opinions expressed in this publication are those of the authors and do not necessarily reflect those of the Government or the Minister of Conservation or the Minister for the Environment.

ISBN 978-0-478-14248-8 (hardcopy)

ISBN 978-0-478-14249-5 (web PDF)

Preface

This report has been prepared on behalf of the project manager to inform the Foundation for Research, Science and Technology (FRST) about the achievements of the Maori Methods and Indicators for Marine Protection project and the lessons learnt from the process. The views expressed in this report are those of the authors and do not necessarily reflect those of the New Zealand Government, the Minister of Conservation or the Minister for the Environment.

I wish first to acknowledge all of the people of Ngati Konohi and Ngati Kere who contributed to this project over the last few years. I believe that through working closely together on this project we have made a useful contribution to improving our collective understanding of how we could, through continuing to working together in the future, better manage our marine resources for the benefit of all.

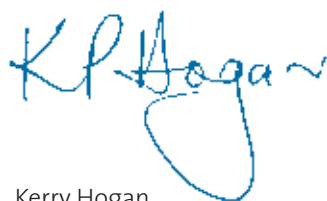
I wish also to acknowledge the contributions of the staff of the Department of Conservation, the Ministry for the Environment and the regional government agencies, and all the contracted technical specialists. Not only were your professional contributions excellent, but your willingness to go beyond this and involve yourselves as individuals was also very important in fostering a good working relationship and understanding with the two local communities.

The aim of this project was to work with two Maori communities to determine whether the marine protection mechanisms provided by the Government could assist them in achieving their community goals for their rohe moana, as well as the Government's own marine protection goals, and to share the findings with others.

The project has demonstrated that the marine protection mechanisms currently available have the potential to be used in an integrated way to achieve both these purposes. However, there are issues that need to be addressed to facilitate the understanding and implementation of the mechanisms by Maori.

While this project has come to an end, the need for Maori and government agencies to work together on protecting our marine environment has not. This report makes some recommendations for both that will enhance an ongoing effective working relationship into the future.

A key aim of this project was to share the findings with others. With this in mind, all of the reports that have arisen from the project can be accessed from a single page on the DOC website: www.doc.govt.nz/maoriandmarinereserves.



Kerry Hogan
PROJECT MANAGER



Kaiora intertidal platform looking to Turihaua Point

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1. Introduction

As stated in the original research proposal for the Maori Methods and Indicators for Marine Protection project that was submitted to the Ministry of Research, Science and Technology, marine reserves meet many conservation objectives but often conflict with iwi/hapu objectives for marine management. There is a need to understand how marine reserves and alternative methods of marine management contribute to meeting iwi/hapu objectives. There is also a need to understand how marine reserves and alternative methods of marine protection contribute to meeting conservation objectives at a range of trophic levels. This knowledge will assist in determining how both iwi/hapu and conservation objectives can be met through either a particular management method or a suite of methods. It will also promote an appreciation and understanding of iwi/hapu interests, values and knowledge associated with marine management.



Sunrise at Paremahu

*Left: Te Poho o Kahungunu
Rongomaraeroa
Right: Ohinemuhu and
Parekoau*



Background



Marine reserves have been established to protect the habitat of marine life and for scientific study. These protected areas are recognised as being of national importance but are often perceived to be in conflict with the needs and interests of local communities, particularly iwi/hapu.

The involvement of Maori in the establishment of marine reserves in New Zealand, and indeed their support for marine reserves, has varied. Concerns have been raised by iwi/hapu about the effect of marine reserves on their mana ki te moana/ancestral waters and access to traditional fishing grounds. For many Maori, their mana depends on their ability to collect kaimoana/seafood (DOC 2000). However, tangata whenua have also raised concerns over the depletion of kaimoana, and marine reserves and other marine protected areas have been established in part to address these concerns.

Internationally, there is increasing recognition that protected areas cannot be separated from the communities that surround them. According to the World Conservation Union:

‘Protected areas will survive only if they are seen to be of value, in the widest sense, to the nation as a whole and to local people in particular.’

(IUCN 2004)

This collaborative study aimed to explore how different marine management systems can meet the goals and aspirations of iwi/hapu in their rohe moana/coastal area as well as wider conservation objectives. The marine management systems referred to in this project include marine reserves, taiapure reserves, mataitai reserves and the appointment of Tangata Kaitiaki to manage customary fishing in an iwi/hapu rohe moana.

It is envisaged that a better understanding of how different methods of marine management meet both iwi/hapu and other management interests will lead to more positive outcomes for the marine environment. It will also promote an appreciation of iwi/hapu interests, values and knowledge with regard to marine management.

The protection, enhancement and restoration of the mauri/life force of taonga/treasures such as the marine environment is considered to be of great importance by Maori on a national scale (MfE 1998). However, despite iwi/hapu having a clear interest in marine management, their objectives for the marine environment in terms of marine protected areas have rarely been identified.



OBJECTIVES



Pou rahui, overlooking Te Tapuae o Rongokako Marine Reserve; it was erected by Ngati Konohi for the opening of the reserve in November 1999

This was a collaborative project between Ngati Kere, Ngati Konohi, the Department of Conservation (DOC) and the Ministry for the Environment (MfE). The project was funded by the Ministry of Research, Science and Technology (MORST) in 2000, planning and preparation took place in 2001, and the project ran for 3 years between 2002 and 2005. The three overall project objectives were:

1. To identify specific iwi/hapu objectives, interests and expectations for marine management
2. To define a process to identify iwi/hapu marine indicators (tohu) of environmental health and pilot their implementation
3. To measure different species assemblages at a range of trophic levels in order to test how marine reserves and controlled areas (including taiapure or mataitai) contribute to meeting iwi/hapu and conservation objectives

The information for objective 1 was collected through social science research that was led by iwi/hapu members. The methodology and findings from this research are outlined in section 2, and the lessons learnt from this process are reflected on in section 5.

Objective 2 aimed to develop a process for iwi/hapu to identify tohu/marine indicators that can be used to monitor and report on the health of the marine environment. This objective related to the Ministry for the Environment's Environmental Performance Indicators (EPI) project (which has since been disestablished). The outcomes of this objective are presented in section 3.

Objective 3 aimed to scientifically measure whether the marine protected areas in the rohe of Ngati Kere and Ngati Konohi were achieving, or contributing to, the objectives identified by the hapu during the social science component of this research project. The ecological science that was undertaken is reported on in section 4.

Another key objective of the project was to share skills and build capacity amongst iwi/hapu in terms of social and ecological field research and the interpretation of results. This is reported on in section 5.

This report summarises the findings from the 'Maori Methods and Indicators for Marine Protection' project and identifies the lessons learnt by the research team. Much of the information in this summary is taken from the original reports for each objective, the full references for which are given in section 8.



Te Kupenga a Te Huki

(Te Huki's net of unity)

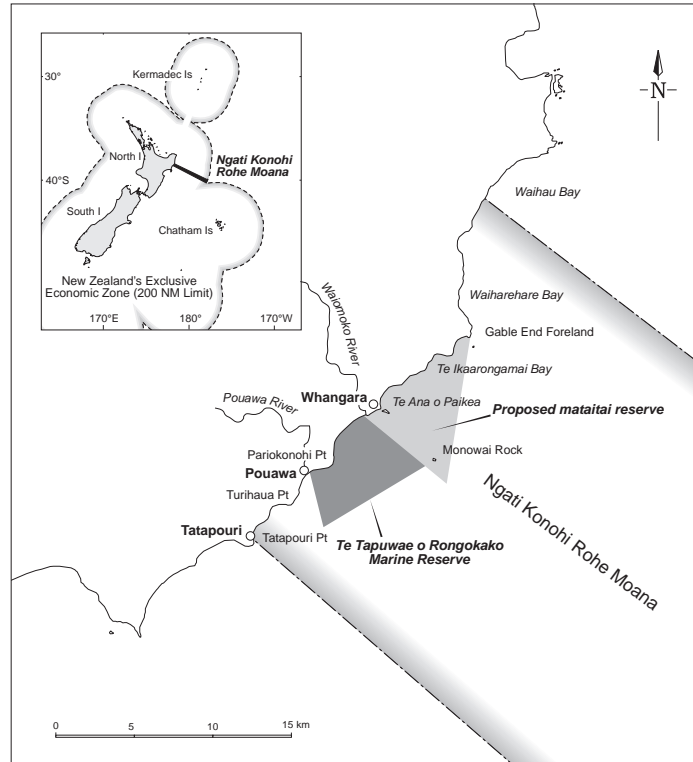
Te Huki controlled the conservation and husbandry of food sources that were so necessary for the well-being of his people. His net is signified by the anchorage of pou/posts, starting at Whangara (Gisborne) in the north to Poroporo (Cape Turnagain) in the south; and uniting all hapu within. Our tipuna Ngarangiwhakaupoko lived at this southernmost point and received mana from the union of nga hapu by arranged marriage to Hineimatekitawhiti. His name flies on our flag at Rongomaraeroa Marae, Porangahau, which depicts this net.

RESEARCH PARTNERS

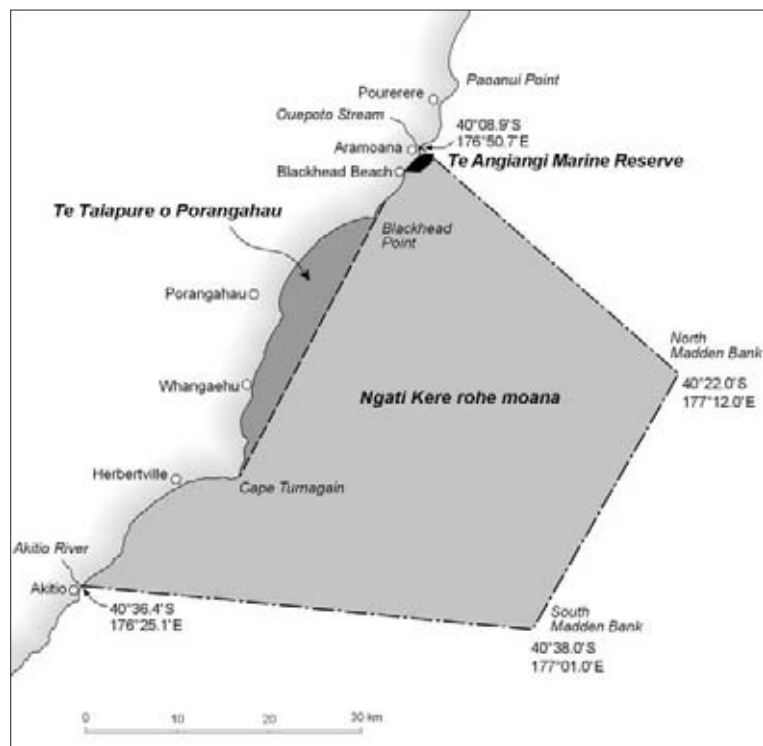
This research was undertaken in the rohe moana of Ngati Kere of Porangahau and Ngati Konohi of Whangara. Figure 1 shows the location of the two case studies and the current and proposed marine management systems in these areas.



Te Kupenga a te Huki



Rohe Moana of Ngati Konohi



Ngati Kere Rohe Moana Boundaries

Figure 1. Location of two case studies and marine management systems.



*Te Tapuwae o Rongokako
Marine Reserve—Kaiora
intertidal area*

NGATI KERE

Ngati Kere is a coastal hapu of Ngati Kahungunu Iwi located at Porangahou on the southern Hawke's Bay coast. An abundance of kaimoana is very important to Ngati Kere, who are renowned for their hospitality. They uphold their mana through the prestige of being able to provide kaimoana for visitors (Wakefield & Walker 2005).

Within the Ngati Kere rohe, Te Angiangi Marine Reserve is located on the central Hawke's Bay coast, between Aramoana and Blackhead Beach. Established in 1997, it protects a 446-ha area and contains habitats that are representative of the central Hawke's Bay coastal and marine environment (DOC 1994).

Te Taonga o Ngati Kere (Porangahau Taiapure) was established in 1992. It covers much of the rohe of Ngati Kere, from Cape Turnagain in the south to Parimahu (Blackhead Point) in the north. Currently, no bylaws have been established for the Taiapure, so that the fisheries regulations for the surrounding area apply.

NGATI KONOHI

Ngati Konohi is a coastal hapu of Ngati Porou Iwi located at Whangara Mai Tawhiti, 16 km north of Gisborne. Ngati Konohi were among the first North Island iwi/hapu to have their rohe moana affirmed and Tangata Kaitiaki appointed under the Kaimoana Customary Fishing Legislation.

Te Tapuwae o Rongokako Marine Reserve was established in November 1999 as a result of a joint application between Ngati Konohi and the Director-General of the Department of Conservation (DOC & Ngati Konohi 1998). It protects 2452 ha of coastal and marine habitats that are representative of the coast between East Cape and Mahia Peninsula, and is located approximately 16 km north of Gisborne, in the rohe moana of Ngati Konohi (Fig. 1).

The remainder of the rohe moana is currently managed under various area-based restrictions implemented by the Ministry of Fisheries (MFish) (Froude & Smith 2004), but applications for both Mataitai and Taiapure Reserves are in process.



Ngati Kere kuia blessing te kete taonga

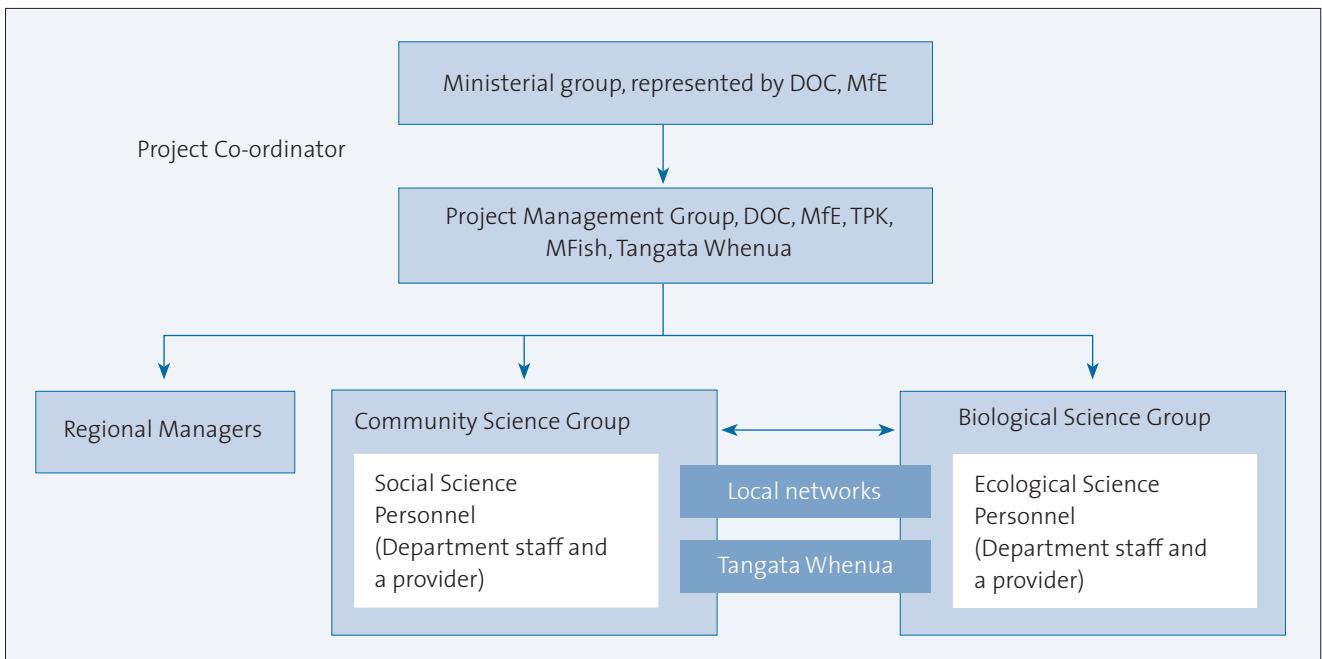


Project leader Alan Wakefield and author Lisa Walker with Ngati Kere report

PROJECT STRUCTURE

This Ngati Kere, Ngati Konohi, DOC and MfE project involved a number of interrelated research teams working on community research and ecological science in the two rohe, as illustrated in Fig. 2. The work of these teams was monitored by a project management group reporting to MORST, which included a range of key stakeholders.

Figure 2. Project management structure.



The project structure was established following discussions with hapu at both sites. In both cases, a kaumatua or senior hapu member attended the project management group meetings. This individual was also a member of the community research team and provided advice, direction and information to other hapu researchers. Section 6 outlines some of the lessons learnt by the project team in its attempt to develop an inclusive collaborative research process.

PROJECT MANAGEMENT GROUP

An overall project management group (Ngati Kere, Ngati Konohi, DOC, MfE and MFish) was established to oversee project development and progress. This group met approximately every 3 months to receive progress updates and discuss any issues, and was facilitated by the project leader (a DOC staff member).

COMMUNITY RESEARCH TEAM

A community research team was established at both sites to plan the implementation of objectives 1 and 2 and to report to the project management group. Ngati Kere and Ngati Konohi developed their own teams to undertake interviews and hui with their hapu. The role of the community research team was to provide support and direction to these local researchers.

ECOLOGICAL SCIENCE TEAM

The ecological research was undertaken by a number of groups, including DOC staff members, hapu members and contracted research providers. Because much of the ecological research was highly specialised, the personnel or organisations who completed the various components of the research relied on technical skills, qualifications and prior experience.

Carla Wilson, Fiona McKay of DOC, Alan and Maureen Wakefield of Ngati Kere, and Hamish Wilson of MfE looking at sites at the beach to implement tohu monitoring at Porangahau



2. Iwi/hapu interests and expectations for marine management

INTRODUCTION

The community research aimed to identify the following:

- The future goals and aspirations of Ngati Kere and Ngati Konohi for their rohe moana
- The key species of importance to Ngati Kere and Ngati Konohi in their rohe moana
- How Ngati Kere and Ngati Konohi would like to use the different management systems in their rohe moana
- The tohu/signs or indicators that have traditionally been used or that are currently used by Ngati Kere and Ngati Konohi to tell them whether the rohe moana is healthy

This section reviews the research process adopted by each hapu, the findings from the research, and the outcomes from objective 1. The last of these points provided background for objective 2 of the project, and is reported on in section 3.

METHODOLOGY

The exact approach taken to recruit researchers and the research methods adopted for each study were decided in discussions between representatives from Ngati Kere/Ngati Konohi, DOC and MfE.

For Ngati Kere, the senior hapu representative on the steering group selected a local assistant to work with him to complete the community research. The senior hapu representative and his assistant, neither of whom had any social research experience, were contracted to undertake the research with the assistance and support of the DOC and MfE members of the community research team. The hapu representative and his assistant then coordinated a Ngati Kere research team and contracted three local people to conduct interviews and review the oral history interviews that had previously been collected as part of an archives project.





Gathering kina (looking south to Paremahu)

For Ngati Konohi, the senior hapu representative on the steering group selected a hapu member with some social research experience who lived outside the area. This person was contracted to be part of the community research team and was responsible for collecting information to be included in the report. The researcher worked alongside the other members of the community research team and held two workshops for hapu members and then carried out a series of interviews with interested members of Ngati Konohi.

Both hapu decided to use qualitative social science research methods, particularly semi-structured interviews and workshops with the hapu. More detailed information on the approaches adopted can be found in the individual reports (DOC et al. 2005; Wakefield & Walker 2005). An evaluation of the research process is included in section 6.

GOALS AND ASPIRATIONS FOR THE ROHE MOANA

Ngati Kere highlighted the importance of the mauri of Tangaroa and described the rohe moana as a spiritual and cultural source of solitude, sustenance and satisfaction (Wakefield & Walker 2005). Similarly, Ngati Konohi stressed the importance of having a holistic approach to taking care of the rohe moana (DOC et al. 2005).

Ngati Kere and Ngati Konohi had several common goals, aspirations and visions for the rohe moana, including that:

- The hapu should have responsibility for managing their rohe moana
- Kaimoana should be managed sustainably and be available in abundance for future generations
- People should be educated about the importance of the rohe moana and tikanga
- There should be opportunities for the hapu to gain employment and revenue

Also mentioned was the need to have:

- A clean and pollution-free environment (Ngati Konohi)
- Access to traditional fishing grounds and places of gathering (Ngati Kere)
- Hapu living close to the rohe, and fishing, caretaking and teaching for the betterment of the hapu (Ngati Kere)

KEY SPECIES OF IMPORTANCE IN THE ROHE MOANA

Both hapu referred to the mana associated with being able to present kaimoana to manuhiri/visitors at the marae—manaakitanga/hospitality. Ngati Kere also mentioned the importance of local flora and fauna for sustenance, maintaining tradition, education, and providing tools for weaving, carving and crafts (Wakefield & Walker 2005). Ngati Konohi referred to species as a source of income and being used for decoration and medicine (DOC et al. 2005).

When asked to identify the key species of importance, Ngati Konohi stressed the importance of recognising that all of Tangaroa's children are important and rely on each other, and that all species are of equal importance (DOC et al. 2005). The Ngati Kere researchers stressed the importance of including river species, as they are an integral part of the connection between moana/sea and whenua/land.

The Ngati Konohi researcher specifically asked people to identify the species that they placed a high value on, whereas the Ngati Kere research team identified the species most commonly talked about in the archive interviews as well as the species used in waiata, stories, weaving, carving and other art work.



*Top: Pouraka—traditional pirita and harakeke pot
Below: Cray pot being hand-set at Parimahu, January 2004*

Pipiri Hononga Mareikura

Found in 1984 at Parimahu (Blackhead 'wreck' beach).

Lying undisturbed beneath 3 m of water, encrusted with sand and shells for perhaps 200–300 years, only a very small part of this pounamu/green stone was showing through the sand. This pounamu revealed itself to the eyes of Alan Tutepourangi Wakefield, as he waited in ambush for a fish to swim by. If the want of a fresh fish on the barbie had not arisen, this stone may have lain for another 300 years. Deep concentration overtook the wanting for a fish, and after what seemed a lifetime, this pounamu was raised to the surface.

This pounamu was given the name Pipiri Hononga Mareikura during a blessing performed by canon Wi Huata and Piri Sciascia, at the commencement of the building of Tamatea Arikinui o te Waka Takitimu; it is a taonga/treasure to nga hapu o Porangahau and signifies connection to the past occupations of our tipuna/ancestors.

Known as a Toki poutangata, research has dated it as far back as c. 1450–1550. Shaped with stone tools and used solely for ceremonial purposes, it originates from south Westland, South Island. Its longest point is 200 mm, its widest point 90 mm, and its thickest part 25 mm; it weighs 700 g.



Pipiri Hononga Mareikura found in 1984 at Parimahu (Blackhead 'wreck' beach)

There were a lot of commonalities between both case studies in the species mentioned as being important. Koura, paua and kina were key species for both hapu. Ngati Konohi interviewees also frequently mentioned pupu and parengo, while other species of significance to Ngati Kere were karengo¹, pipi, tuangi, patiki and kuku. In the Ngati Kere report, there is a detailed discussion of how these and other fauna and flora are used by the hapu, their traditional and current management, and the condition of the species (Wakefield & Walker 2005).

Both hapu discussed traditional management and harvesting practices, often as told by kaumatua or as remembered by grandparents. Using specific examples, both hapu also raised concerns about the decline in the quantity and diversity of many species and the health of the rohe moana (DOC et al. 2005; Wakefield & Walker 2005).

MANAGEMENT SYSTEMS IN THE ROHE MOANA

Both hapu have a number of marine management systems in place in their rohe. Ngati Kere referred to Te Angiangi Marine Reserve, Te Taiapure o Porangahau and Tangata Kaitiaki (appointed during the project) (Wakefield & Walker 2005). Ngati Konohi also referred to their appointed Kaitiaki, Te Tapuwae o Rongokako Marine Reserve, and proposed mataitai and taiapure reserves (DOC et al. 2005).

Both hapu acknowledged that these systems could help them to take responsibility for managing the rohe moana. However, it was felt that many hapu members did not have sufficient knowledge about the different management systems to comment on how these systems could be used.

Ngati Kere suggested that a preferred approach would be to work with authorities to identify how traditional management systems could be used and promoted within the rohe moana, as these modern systems have often been developed independently of the hapu. They acknowledged that many people within Ngati Kere lack a detailed understanding of modern management regulations, but stated that there is also a lack of understanding of the Ngati Kere traditional management practices amongst authorities. Two-way discussions and information sharing are needed within Ngati Kere and also between Ngati Kere and resource management authorities (Wakefield & Walker 2005).

¹ Karengo and parengo are the same species; this is a difference in dialect.

The issue of a lack of knowledge on both sides is discussed further in section 5. In particular, this highlights the recent appointment of Pou Hononga (Iwi liaison) and Pou Takawaenga (Extension service) by MFish to help increase the knowledge and understanding of marine management tools.

As well as considering how these different management systems work separately, Ngati Konohi noted that it is also important to consider how these systems can work together in the rohe moana, which led to the development of a concept of marine management known as the 'Tangaroa Suite'. Following the interviews with Ngati Konohi, the community research team developed a proposal for an integrated management system for the Ngati Konohi rohe moana, as outlined in Fig. 3. This suggests how Ngati Konohi's vision 'to honour and sustain the bounty of Tangaroa for present and future generations' could be addressed with the assistance of modern management systems.

A similar proposal was developed with Ngati Kere to link their vision and goals to potential marine management systems (Fig. 4).

OVER-ARCHING PRINCIPLE

'Ngati Kere strive to sustain the mauri of the rohe moana through Tikanga Maori practices.'

VISION STATEMENT

*'Kua kai tatau i nga kai o te mara, i tiria e o tatau tipuna
Me tiri ano hoki tatau, kia whai hua ai etahi oranga
mo nga whakatipuranga e heke mai nei'*

We have partaken of the food garden, sown by our ancestors.

It is time for us to re-sow,

to ensure sustenance for the generations to come.

The late Ngarangiwhakaupoko (Rangatira/Chief of Ngati Manuhiri, Ngati Kere) stated this vision for the people.

GOALS

- To arrest the overall depletion of marine life in the Ngati Kere rohe moana.
- To place the prime responsibility for management of the rohe moana back into the hands of the community Ngati Kere.
- To encourage sustainable use of those resources for the benefit of all New Zealanders.

Figure 3. Ngati Konohi vision statement.

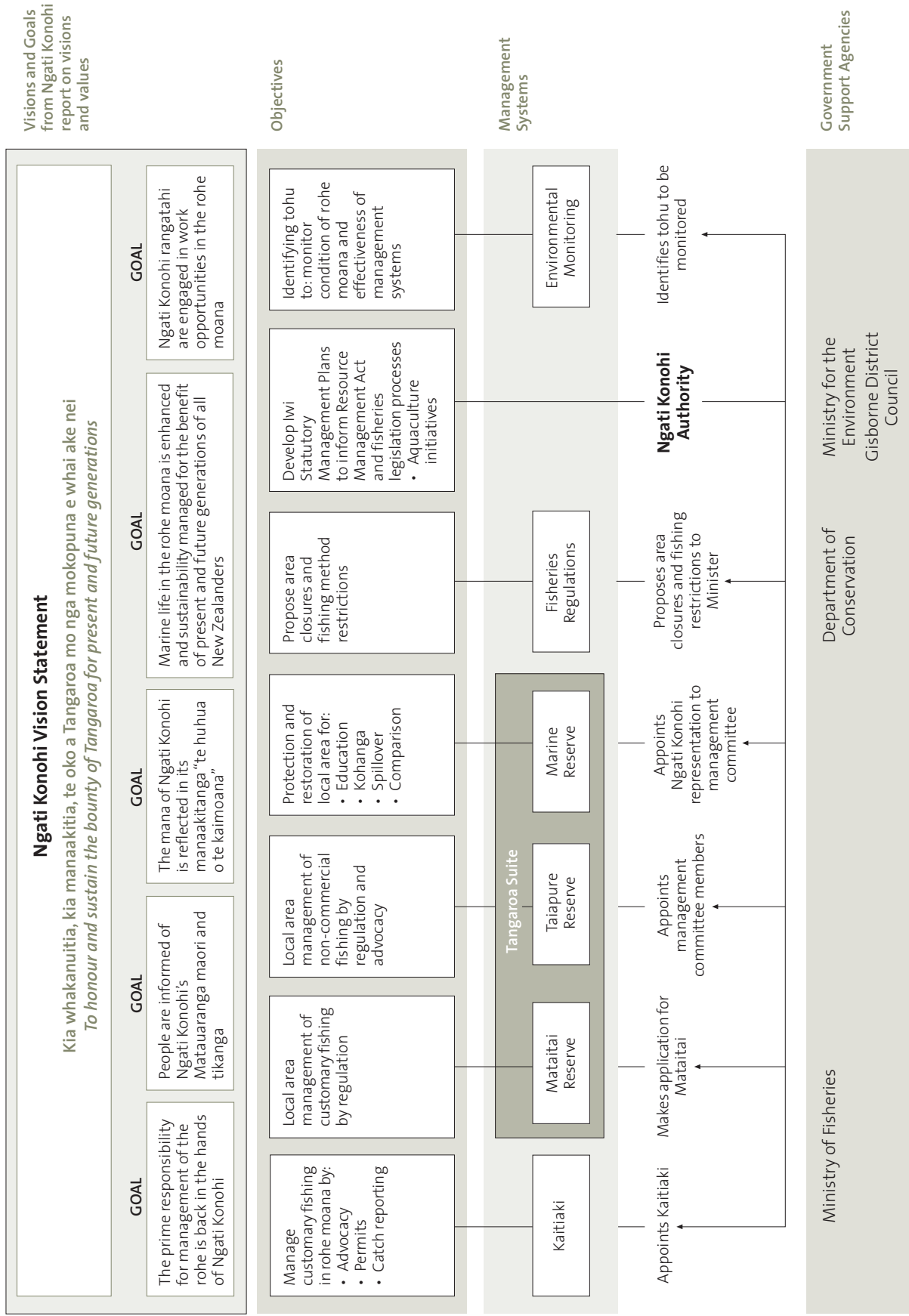
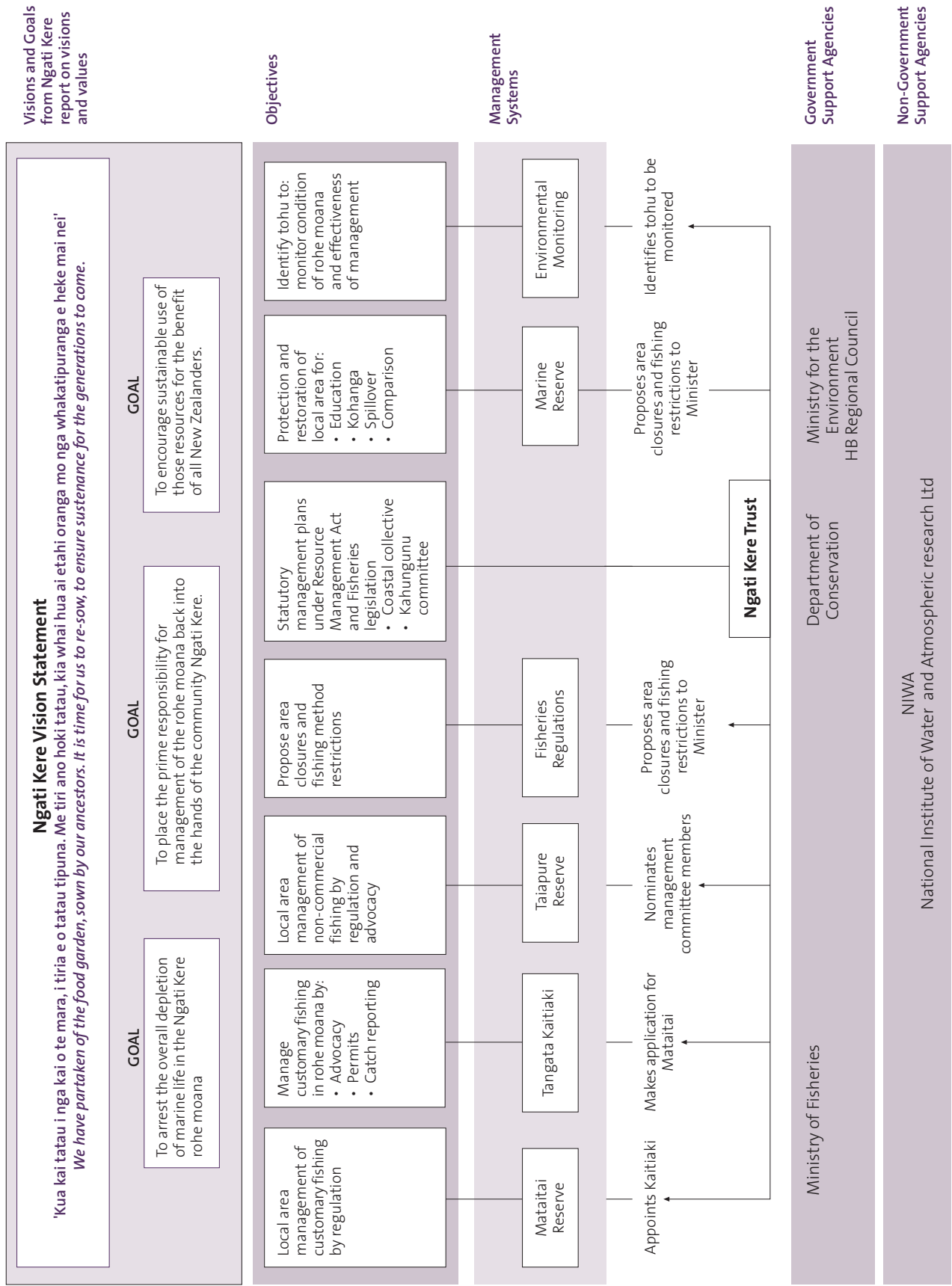


Figure 4. Ngati Kere vision and management systems.





Lisa Walker, author of Ngati Kere report



Hone Taumanu receives Ngati Konohi report

CONCLUSIONS

The visions of both hapu clearly indicate the importance of the rohe moana to them and the need for effective management:

'To strive to sustain the mauri of the rohe moana through tikanga Maori'
(Ngati Kere)

'To honour and sustain the bounty of Tangaroa for present and future generations'
(Ngati Konohi)

Kaimoana is connected to mana, particularly with regard to being able to provide kai for visitors and manaakitanga/hospitality. As well as providing kaimoana, local flora and fauna are important for sustenance, tradition, education, and providing tools and inspiration for weaving, carving and crafts. They can be a source of income and can also be used for medicine and decoration.

Both hapu raised serious concerns about the decline in the quantity and diversity of many species and the health of the rohe moana, and thus the ability to sustain traditional use and maintain the mauri of the rohe.

While both hapu were clear that they wanted to manage their own rohe and have a greater role in policy, rules, monitoring and enforcement, there was a common view that many people within the hapu were not clear about how modern management systems worked and how they could be integrated to meet their vision and goals. However, there is also a lack of knowledge about traditional management systems amongst authorities and Ngati Kere particularly stressed the need for agencies to work alongside hapu to develop management systems together, rather than working in isolation and simply presenting conclusions to the hapu.



Ngati Kere waiata—Pop Wakefield, Lisa Walker and Marina Scia Scia

Both hapu highlighted the need for further discussion within the hapu on marine management systems, and Ngati Kere stressed the need for the hapu to have clear, transparent and coordinated decision-making processes if they are to achieve their marine management goals.

This social research initiative has been useful for identifying the vision and goals of each hapu and to begin discussions about how best to achieve them. As concluded in the Ngati Kere report:

'By achieving goals, communities can develop a sense of ownership that will be rewarding to all and to future generations.'

(Wakefield & Walker 2005: 48)

While the research did identify the goals and key species, further work is required to progress the implementation of marine management systems. This is discussed further in section 5.

3. Maori marine indicators

INTRODUCTION

Objective 2 set out to develop and document a process that identified and monitored tohu/signs or indicators that Maori could use to measure the health of the marine environment. The tohu would also assess the success of management systems for the marine environment (including marine reserves, taiapure, mataitai and Tangata Kaitiaki).

This section presents the main outcomes of work by Ngati Kere (DOC et al. 2007) and Ngati Konohi (Gibson 2006) towards this objective, and reflects on the contribution that tohu could make to marine management practices in New Zealand.

BACKGROUND

Tohu are indicators that are measured regularly to show trends or changes in the health of an environment. Simply, they are signs that show whether things are getting better or worse. Tohu can encompass what exists in the marine environment itself and how management processes are affecting marine species. Indicators can relate directly to the size, condition and availability of individual species, or they can be more holistic and ecosystem or process-based. For example, flowering of the kowhai and/or pohutukawa tree is used to indicate when kina are ripe and ready for harvesting; and the frequency of observations of seasonal feeding patterns, 'boil ups' of baitfish, and the presence of predator fish, dolphins and seabirds are recognised as important indicators of productivity and the health of the food chain.

When used alongside western scientific monitoring methods, tohu can help to draw a fuller, more holistic picture of the marine environment and thus highlight the management practices best suited to a specific marine area. Since tohu are developed and used on a continuous basis, they can provide communities with management information that can help them to work towards their vision for their local environment.

The use of established tohu for monitoring can enable traditional information about the health of the environment to be communicated to groups or individuals who make decisions on the management of natural resources. Tohu can be used to integrate iwi and hapu values and customary practices into the resource management system. They can also be used to develop effective working relationships with western science monitoring measures.



Pohutukawa in flower is a tohu/sign for harvesting ripe kina



Butterfly perch



Scarlet wrasse



Crayfish



The Te Tapawae o Rongokako Marine Reserve has become a popular place for educational and recreational visits, to explore the marine environment

METHODOLOGY

This project aimed to explore how tohu were developed and used to assess the health of marine areas. How did Ngati Kere and Ngati Konohi decide which tohu to use (traditional or not)? How were methods to measure the tohu determined (traditional or western)? How would tohu be tested to ensure that reliable information about the health of the marine environment was produced? What was learnt by the two hapu in the process of monitoring the tohu they developed?

To develop and document the process of identifying and monitoring tohu that relate to marine health, the Ngati Kere project team:

- Identified the tohu that Ngati Kere believe signify the health of the values they want managed in their marine environment (identified in objective 1 of the project).
- Determined how to measure tohu in order to detect changes over time (for monitoring purposes, the tohu needed to be consistent and repeatable to create robust information).
- Measured these tohu to determine the health or state of the marine environment (this meant establishing criteria against which they could measure health).
- Developed ways to communicate the health of their rohe to other agencies (for example, summary statements that could feed into regional council reports on the state of the environment with respect to tangata whenua values).

This process of tohu development was carried out by the project focus group and included the gathering of information from the wider community at the hui a hapu.

GIANT FOOTSTEPS OF RONGOKAKO

The footprint of Rongokako (Te Tapuwae o Rongokako), an ancestor of East Coast tradition, is embedded in one of the rocky structures of the marine reserve, close to shore.

Many traditions abound regarding Rongokako. There is general agreement that he was a man of immense athletic prowess and dexterity; a giant who could stride enormous distances. His origins are unclear. Some say he was the father of the famous Tamatea and came from Hawaiki in the Takitimu canoe. Others say he came in the Horouta canoe. Another version suggests that his arrival was as mysterious as his departure.

Local tradition suggests that Rongokako was sent by Kiwa to investigate the late arrival of the Horouta waka to Turanganui-a-Kiwa. On his arrival at Ohiwa, a disagreement arose between Rongokako and Paoa and they engaged in a titanic struggle. This culminated in a chase by Paoa of his fleet-footed adversary down the East Coast shoreline.

Paoa was no match for him.

To help overtake Rongokako, he had set a large rat trap to snare the giant's pet, an enormous kiwi. The wily Rongokako sprang the trap, which flew inland forming Mount Arowhana. The site of the trap became Tawhiti, an area of land between Te Puia and Tokomaru Bay.

In this epic encounter, Rongokako left footprints in the flat rocks as he strode down the eastern seaboard of the North Island. The first of these tapuwae (footprints) is at Wharekahika (Hicks Bay). The second is at Kaiora, south of Whangara mai tawhiti, from which is derived the name of this marine reserve, Te Tapuwae o Rongokako. The next footprint is located at Turanga, and another is at Nukutaurua, on Mahia Peninsula.

Rongokako then stepped over to Te Matau-a-Maui (Cape Kidnappers), then to the shores of Raukawa (Cook Strait). He crossed the Strait and was gone.

Kaiora, the settlement that overlooks the marine reserve, was a well-populated papa kainga (village). The famous East Coast chief, Porourangi, lived here and is buried close by.

Konohi, the local chief, also inhabited the district. He had three sons—Marukauiti, Te Riwai and Wahakapi—from whom the present tribe of Whangara mai tawhiti claims descent.



Ohinemuhu and parekouau

FINDINGS

Ngati Kere

The Ngati Kere project produced a range of defined outcomes and deliverable products:

- A kete tohu/indicator tool box for monitoring the state of and changes in the rohe moana
- Proposed methods for monitoring (a monitoring programme)
- A survey method and results that assess the level of hapu knowledge and perceptions about the state of the rohe moana
- Some key findings about the development of tohu and monitoring programmes
- A reported process for developing tohu and implementing a monitoring programme

In the process of creating the overall kete/basket of tohu, Ngati Kere asked five questions for each tohu:

1. Which stated goal of Ngati Kere has been addressed by the tohu?
e.g. arresting the depletion of marine life
2. What aspect of the goal will the tohu specifically address?
e.g. prevent a decline in koura
3. What will the tohu measure?
e.g. number or size of koura
4. How will the tohu be applied in the field?
e.g. counting koura in knee-deep water
5. Does the tohu tell us what we need to know?

The following is the final list of tohu that resulted. Together they form the kete tohu.

Tohu tuatahi	Number and size of koura/crayfish in shallow water
Tohu tuarua	Number and size of hapuka/groper close to the coast
Tohu tuatoru	Level of Ohinemuhu rock above sand and abundance of pipi
Tohu tuawha	Level of involvement in marine management
Tohu tuarima	Availability of native plant resources, e.g. pingao
Tohu tuaono	Number and type of customary take permits issued
Tohu tuawhitu	Number, size and distribution of no-take areas
Tohu tuawaru	Number of prosecutions for illegal catches and take
Tohu tuaiwa	Level of knowledge about the rohe moana within the hapu and community

For each tohu, a range of monitoring options was discussed and progressed. The following is an example of monitoring methods for koura, paua, kina and pipi:

What is our goal?	What do we want to achieve?	Tohu—what will be measured?	How will we do it?	What do we need to know?
Arrest depletion of marine life	<ol style="list-style-type: none"> 1. Prevent the decline in crayfish numbers 2. Have crayfish present in knee-deep water (hapuka come closer to shore) 3. Prevent decline in paua, kina and pipi <p>Be able to go back to the time when you just went to moana to get a kai for your whanau</p>	<p>Number of crayfish</p> <p>Size of crayfish (small/medium/large)</p> <p>Number of paua (potential for counting paua at the same time as crayfish, using similar methods)</p>	<p>Crayfish counts:</p> <ul style="list-style-type: none"> • Random transects • Fixed holes • Pots <p>Criteria:</p> <ul style="list-style-type: none"> • Only count individuals above a certain size <p>Timing:</p> <ul style="list-style-type: none"> • Twice yearly? • Times to be determined <p>Record the weather and visibility (> 5 m, < 5 m)</p>	<p>Should we count paua at the same time? (Yes)</p> <p>Agreed counting methods, e.g. where do we count?</p> <p>What should we measure and how should we group them?</p> <p>What time of year should we count? (Once or twice a season; when they are at their fattest)</p> <p>How can we be consistent? (Roster)</p> <p>Do we want to collect other information, e.g. weather, rock type? (Yes; seaweed)</p>

Ngati Konohi

In developing indicators for their rohe moana, Ngati Konohi identified a number of purposes for tohu. When used as environmental signs to indicate the health of the marine environment, and consequently when and where to fish and gather kaimoana, tohu can be used to:

- Measure change in an environment
- Lead the hapu in sustaining their vision for the environment
- Promote better relationships between Maori and non-Maori when managing their environment
- Gauge the success of environmental management systems

Tohu also help to place a ‘line in the sand’, so that Ngati Konohi can compare what they have now with what they had in the past, and compare one area with another.

Ngati Konohi members identified a number of indicators that they felt signalled that the marine environment was in good health. These were then grouped into primary tohu and secondary tohu.

Primary tohu are observations of the health of the kaimoana and of the natural processes that denote the health of the marine environment. Secondary tohu are scientific measurements of the kaimoana present and other things that denote the health of the marine environment.

Primary tohu and monitoring methods

1. The mana of Ngati Konohi is reflected in its manaakitanga:
Te huhua o te kaimoana—the abundance of seafood.

Species tohu monitor the availability, accessibility, abundance and quality of key species identified by Ngati Konohi as underpinning manaakitanga—koura, kina, pupu, parengo and ika, these being the species that are ‘put on the table’ for the manuhiri.

SPECIES-FOCUSED TOHU	MONITORING METHOD
Availability: Can kaimoana be readily harvested, in season, to provide for customary needs?	Information collected from customary fishing permit holders is collected and reported back to tangata whenua and Mfish by Kaitiaki twice per year
Accessibility: Can kaimoana be harvested easily (in shallow water) in season?	
Abundance: Can sufficient quantities of kaimoana be harvested, in season, to meet reasonable customary needs?	
Quality: Is the appearance, size, colour, smell and taste of kaimoana ‘right’ in season?	

2. Marine life in the rohe moana is enhanced and sustainably managed for the benefit of present and future generations of all New Zealanders.

Process tohu monitor the condition and presence of processes that are indicative of a healthy marine environment and reflect the Ngati Konohi holistic view of the moana.

PROCESS-FOCUSED TOHU	MONITORING METHOD
A series of land-based signs (kowhai bloom, pohutukawa flowering, karaka berry colour, and ti kouka flowering) can be used to indicate kina ripeness and readiness for harvesting	Information collected from customary fishing permit holders is collected and reported back to tangata whenua and Mfish by Kaitiaki twice per year
The presence of a natural and diverse range of marine species	
The presence of a natural diversity of marine species in intertidal areas including seashore birdlife	
The seasonal observation of feeding aggregations of 'bait fish' (kahawai, trevally and tarakihi) together with predators, such as tuna, marine mammals, and sea birds	
Harvesting success is positively linked to lunar phases, as identified in the Maori fishing calendar (Maramataka)	

Secondary tohu and monitoring methods:

Baseline measurements for secondary tohu are established and re-measured as and when required over time.

SECONDARY TOHU	MONITORING METHOD
A series of plots are established at various locations in the rohe moana to quantify the quantity, size and location of key indicator species: koura, kina, paua, pupu, parengo and ika	A baseline survey and database is established by hapu members or other agencies, and future measurements are completed when necessary
Gisborne District Council marine environmental monitoring data is utilised to monitor water quality, shellfish health, beach bathing standards, etc.	Data obtained from the council as required

THE CHALLENGE OF IMPLEMENTATION

Once the tohu were developed, both Ngati Kere and Ngati Konohi faced significant challenges in implementing them. Establishing a monitoring programme using confirmed monitoring techniques and producing robust information about their marine environments remains a challenge.

Not only is it difficult to monitor regularly over time using consistent parameters and techniques, but monitoring also requires a significant level of capacity, resourcing and organisation, and a whole-of-hapu mandate. The need to work with a wide range of parties is a further challenge.

Presently, Ngati Kere are at a point where tohu have been developed and tested in a small-scale monitoring trial. The next stage for Ngati Kere is to use the kete tohu, test the usefulness of the tohu in practice and produce specific information against the tohu on the health of the Ngati Kere rohe moana. It is likely that in fully testing the tohu in the field, some refinement of the tohu and their specific monitoring techniques will be required.

Ngati Konohi felt that the majority of monitoring information would come from the issue of customary fishing permits by the Tangata Kaitiaki. The newly appointed Tangata Kaitiaki are still in the process of settling into their role as managers of customary fishing for the rohe. The development of a process and capability to collect, collate, analyse and report against the tohu is still in progress.

Few customary fishing permits were issued by the Tangata Kaitiaki during the period of the project and thus little monitoring or implementation of the tohu was possible within the timeframe of this project. Given that Ngati Konohi are relying on one source of information, it is possible that they may only be able to obtain a limited picture of their marine environment using the tohu.

Ngati Konohi acknowledged that more information is needed to provide a detailed picture of the quality of the marine environment, particularly with regard to the abundance of the most sought after species, their accessibility, and the quality or condition of the resource gathered. To produce this information, data collected from customary users by the Tangata Kaitiaki may need to be supplemented by information from other sources.

Other sources of monitoring information suggested by the project team and Ngati Konohi participants included:

- Monitoring information collected by the Gisborne District Council on marine (bathing) water quality, shellfish health (as a measure of water quality) and the chemical composition of freshwater entering the marine environment.
- Ecological and biological monitoring through a baseline survey that identifies the extent and distribution of the key marine species adjacent to Whangara Island. This could be developed and implemented by Ngati Konohi or other agencies, and repeated at a series of sites throughout the Whangara rohe moana. The information from such surveys could be used to identify and quantify changes in the marine environment that have been signalled by the primary tohu.
- Monitoring of commercial catches of crayfish and other marine species carried out by MFish. This would provide information about the quantities and locations of fish taken.
- Monitoring of changes within the Te Tapuwae o Rongokako Marine Reserve by DOC.

The Tangata Kaitiaki were identified by both hapu as being the key people involved in managing the marine environment and utilising environmental tohu (as well as scientific data). It was recognised that the more detailed, specific information they have access to, the more appropriate their decisions are likely to be on behalf of the hapu. With Tangata Kaitiaki leadership, both hapu can be involved in the range of possibilities that they identified to progress the implementation of their tohu for the marine environment.

CONCLUSIONS

The tohu development processes used by Ngati Kere and Ngati Konohi offer useful insights into how tohu can be used to assess and manage the marine environment. While these tohu have been developed within the rohe moana and management systems of the two hapu, it is anticipated that they could also be useful for other hapu and iwi. The tohu and their implementation methods can be adapted, adjusted and modified to suit other marine environments in different locations throughout the motu/country.

However, although many of the key lessons that were learnt from the case studies of these two hapu may be transferable, we cannot assume that this process will be the same for all tangata whenua. Just as management techniques are often locally specific, so too are the many and varied processes involved in the development of tohu to assess the health of specific marine areas. It is important that tohu are developed alongside the management goals and specific contexts of those who will use the tohu.

These projects are two of a small handful of examples where tangata whenua, in relationship with other agencies, have developed, used and documented indicators to assess the health of their marine areas and the management processes that govern them.

As leading case studies, the Ngati Kere and Ngati Konohi projects also indicate areas where further work could be done to support the development and use of tohu as important environmental monitoring and management tools in New Zealand.

Large crayfish readily observable in shallow water—a tohu of a healthy ecosystem



4. Meeting the objectives of marine management systems—an ecological assessment

INTRODUCTION

The aim of this component of the research project was to measure different species assemblages at a range of ecological levels in order to understand how marine reserves, taiapure, mataitai and open fished areas contribute to meeting iwi/hapu and conservation objectives.

Iwi/hapu objectives for the management systems within the two rohe of interest (Ngati Kere and Ngati Konohi) are identified in the application documents for the particular areas, in policy documents and in social science reports produced in fulfilment of the concurrent social science research component of this project.

In terms of its general marine conservation objectives, the New Zealand Government seeks to ‘protect a full range of natural marine habitats and ecosystems to effectively conserve marine biodiversity, using a range of appropriate mechanisms, including legal protection’ (DOC & MfE 2000). In relation to existing marine reserves, Section 3 of the Marine Reserves Act 1971 states that:

- ‘(a) They shall be preserved as far as possible in their natural state:
- ‘(b) The marine life of the reserves shall as far as possible be protected and preserved:
- ‘(c) The value of the marine reserves as the natural habitat of marine life shall as far as possible be maintained.’

More specific objectives for the two marine reserves in the rohe moana of Ngati Konohi and Ngati Kere are stated in the reserve application documents. The objective identified in the application for Te Tapuwae o Rongokako Marine Reserve was:

‘To preserve in their natural state for the scientific study of marine life a range of marine habitats that are so typical of those found on the east coast of North Island between Mahia Peninsula and East Cape that their preservation is in the national interest.’
(DOC & Ngati Konohi 1998)

The three principal objectives identified in the application for Te Angiangi Marine Reserve were:

- *‘To give effect to the purposes and principles of the Marine Reserves Act 1971.*
- *‘To contribute to the Department of Conservation’s function to conserve and protect the natural character and quality of New Zealand’s coastal and marine environments, and the establishment of a nationwide network of marine reserves that is representative of these.*
- *‘To provide educational and recreational opportunities for non-extractive users of the Hawke’s Bay coast.’ (DOC 1994)*

Both Ngati Konohi and Ngati Kere have identified measurable objectives for the marine protected areas in their rohe. Ngati Konohi defined the following objective relating to Te Tapuwae o Rongokako Marine Reserve:

'Protection and restoration of the local area for education, as a kohanga (nursery for marine life), for spillover and a comparison.' (DOC et al. 2007)

A key goal identified by Ngati Kere for their rohe moana was:

'To arrest the overall depletion of marine life in the Ngati Kere rohe moana.'
(Wakefield & Walker 2005)

Ngati Kere considered that one way in which the existing marine management tools in their rohe could help achieve this goal is if Te Angiangi Marine Reserve could act as a kohanga or nursery, by providing a source of larvae of species such as paua (Wakefield & Walker 2005). Although a taiapure has also been established in the rohe of Ngati Kere (Te Taiapure o Porangahau), no bylaws have been established for the Taiapure, so that the regulations for the surrounding area apply.

Therefore, the two coastal hapu involved in this research project have identified two key objectives for two of the marine protected areas in their rohe moana. The first objective, which coincides with the broad objectives of the New Zealand Government, relates to the **protection and restoration of marine life**. The second objective relates to the perceived ability of marine reserves to **supplement harvest** through the spillover of adults and larvae from the reserves to adjacent fished areas.

The ability of marine protected areas to achieve their objectives is dependent on a number of factors, including the design and management of the marine protected areas and the interactions between species within the protected areas. This research aimed to establish whether the marine protected areas that are currently in place within the rohe of Ngati Konohi and Ngati Kere, in particular Te Tapuwae o Rongokako and Te Angiangi Marine Reserves, were fulfilling or had the potential to fulfil not only the preservation objectives of DOC, but also the restoration, enhancement and sustainability objectives of the two hapu.

METHODOLOGY

Protection and restoration of marine life

Habitat mapping

The rohe moana of Ngati Konohi and Ngati Kere were mapped in order to describe the nature and extent of marine habitats within them. Several methods were employed to achieve this, including sidescan sonar (University of Waikato 2002; Funnell et al. 2005), bathymetry mapping (BTW Hydrographic Limited 2003; Funnell et al. 2005) and remote video surveying (ASR 2003; Funnell et al. 2005). In addition, qualitative data on habitat distribution were collected over several years by DOC divers during species monitoring work (D.J. Freeman, DOC, Gisborne, unpubl. data).

Species' responses to protection

Reef fish, lobsters, and intertidal paua and kina populations were monitored over several years at both Te Tapuwae o Rongokako and Te Angiangi Marine Reserves. Reserve and non-reserve sites were surveyed. Reef fish were surveyed using underwater visual census (Freeman & Duffy 2003; Freeman 2005), with divers recording species diversity, abundance and size. At both locations, lobsters were surveyed using divers; commercial pots were also used at Gisborne (D.J. Freeman, DOC, pers. comm.). At both locations, monitoring of paua and kina focused on populations in channels and pools in intertidal reef platforms (Freeman 2006).

Trophic interactions

Studies of the trophic interactions among species within the rohe of Ngati Konohi included lobster diet analysis and stable isotope analysis (D.J. Freeman, DOC, pers. comm.). This component of the research culminated in the development of an ecosystem model for Te Tapuwae o Rongokako Marine Reserve and the surrounding environment (Lundquist et al. 2006).

Enhancing harvest

Movement and dispersal patterns of key species

Two studies into the movement patterns of key species of interest to the hapu were conducted. A lobster tagging study was initiated in 2003, which involved tagging over 7000 lobsters both within Te Tapuwae o Rongokako Marine Reserve and in the area surrounding it, and conducting pot surveys every 3 months to obtain tag recaptures and thus data on the growth rates and movement patterns of the lobsters (D.J. Freeman, DOC, pers. comm.). A second study involved tagging a variety of reef fish species within Te Angiangi Marine Reserve and in the area around it, and subsequently completing gillnet surveys of the area to obtain information about the movement patterns of these species (C. Duffy, DOC, unpubl. data).

The dispersal patterns of the larvae of some key species of importance to Ngati Kere and Ngati Konohi were modelled using hydrodynamic modelling (Stephens et al. 2004; Oldman et al. 2006). Following the development and calibration of the models, larval dispersal from known populations of adults of the species was simulated for a range of sea states.

RESULTS AND DISCUSSION

Protection and restoration of marine life

Remote video, sidescan and bathymetric surveys of the central Hawke's Bay coast revealed that five distinct habitats were present: sand, *Ecklonia radiata* (kelp) forest, encrusting invertebrate/sponge flats, mixed algae and shallow *Carpophyllum*. All of these habitats were represented within Te Angiangi Marine Reserve, although only a small area of encrusting invertebrate/sponge flats was protected. The reserve boundaries enclosed a single reef system between Blackhead Beach and Aramoana, although the northern boundary of the reserve was demonstrated to cross this reef system through the mixed algal habitat at the northern end of the reef (Fig. 5).

Te Tapuwae o Rongokako Marine Reserve was demonstrated to contain representatives of most of the habitats identified in the remote video, diver, bathymetric and sidescan sonar surveys. Six distinct habitats were identified in the reserve: shallow *Carpophyllum*, coralline algal-covered reef, mixed algae, *Ecklonia radiata* (kelp) forest, sponge garden and sand (Fig. 6).

The structurally complex deep cobble habitat surrounding the two pinnacles comprising Monowai Reef, which is located to the northeast of the marine reserve, and indeed Monowai Reef itself, are habitats that are not well represented in the reserve. The deep cobble habitat is potentially biologically diverse and may be an important area not only for foraging but also as a nursery habitat for juvenile fish.

Habitat mapping also showed that Te Tapuwae o Rongokako Marine Reserve is large enough to completely enclose the intertidal and subtidal reef systems that extend from Pariokonohi Point. However, the northern boundary of the reserve crosses the reef system to the north of this main reef system and the southern boundary of the reserve also crosses an area of patchy reef.

Although both marine reserves have been designed for the purpose of protecting the marine life within their boundaries, the habitat mapping studies demonstrated that there is the potential for species utilising the reef systems within the reserves to cross the marine reserve boundaries. Whether or not this is viewed as potentially compromising the protection of marine life within the reserves, or providing an opportunity for species to spillover from the reserve into areas where they can be harvested, is debatable, but probably depends on the size of the marine reserve and its ability to remain viable despite significant spillover. The small size of Te Angiangi Marine Reserve (446 ha) may make it vulnerable to being compromised by such design features.

In terms of the restoration of marine life, monitoring of previously harvested species demonstrated that both marine reserves have been successful in increasing the biomass of some species. Lobsters in particular have shown a rapid and marked response to protection within both Te Angiangi and Te Tapuwae o Rongokako Marine Reserves (D.J. Freeman, pers. comm.). Lobsters were shown to be larger and more abundant within both reserves than in

Habitats in the Te Angiangi Marine Reserve area

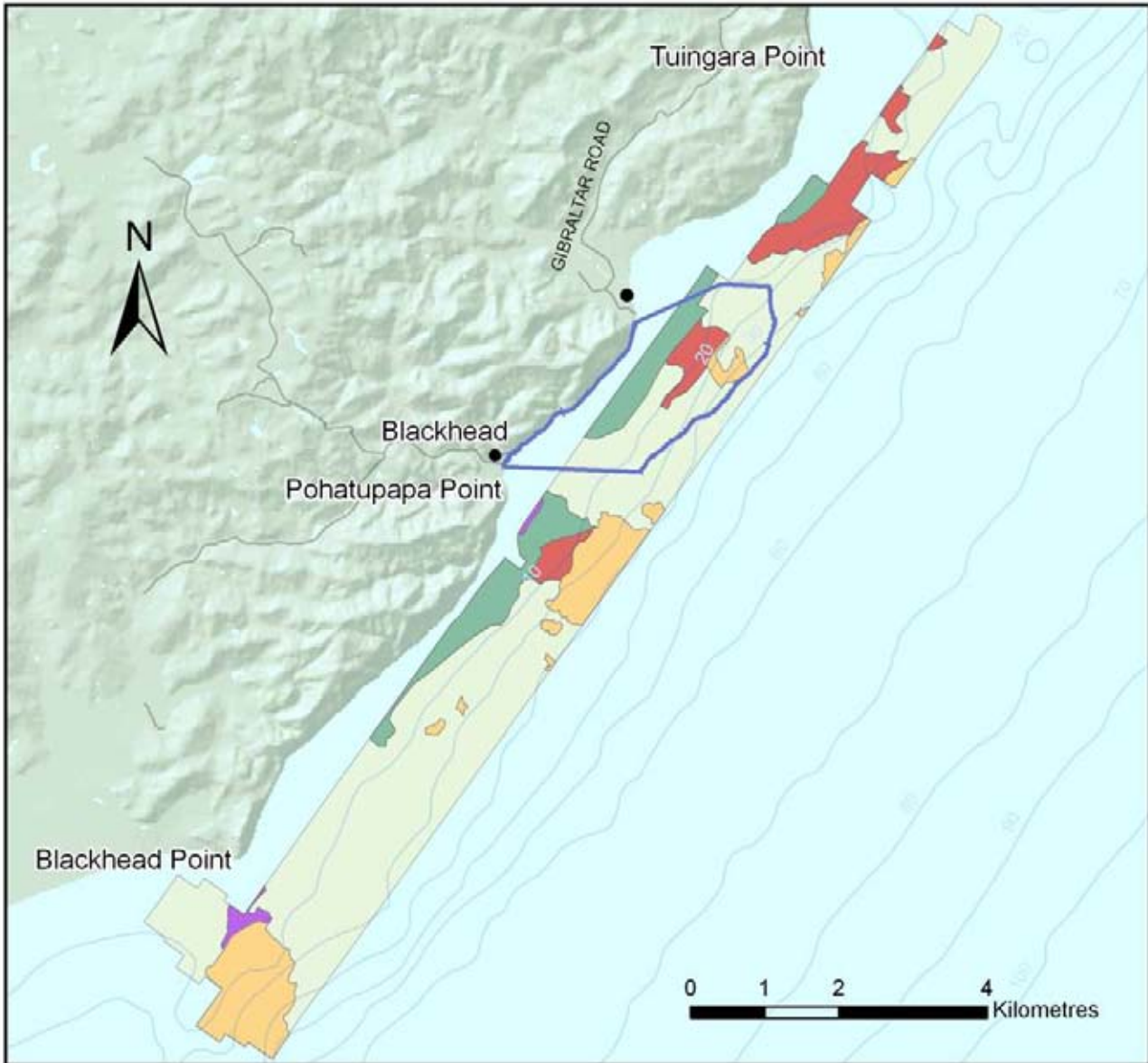


Figure 5. Habitat map of part of the rohe of Ngati Kere, showing the boundary of Te Angiangi Marine Reserve. This area was mapped using sidescan sonar and remote video surveys.

Habitats in the Te Tapuwae o Rongokako Marine Reserve area

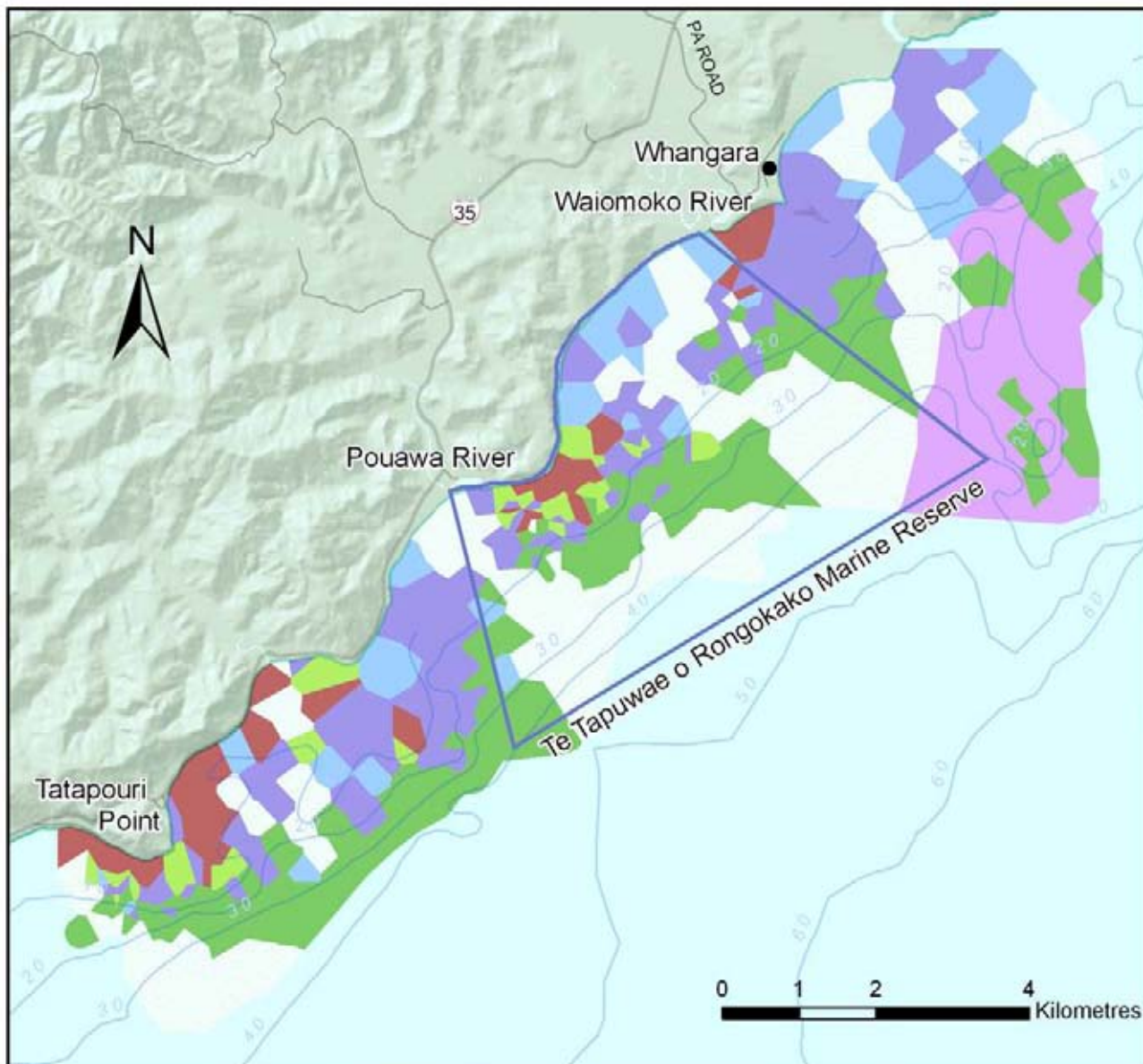
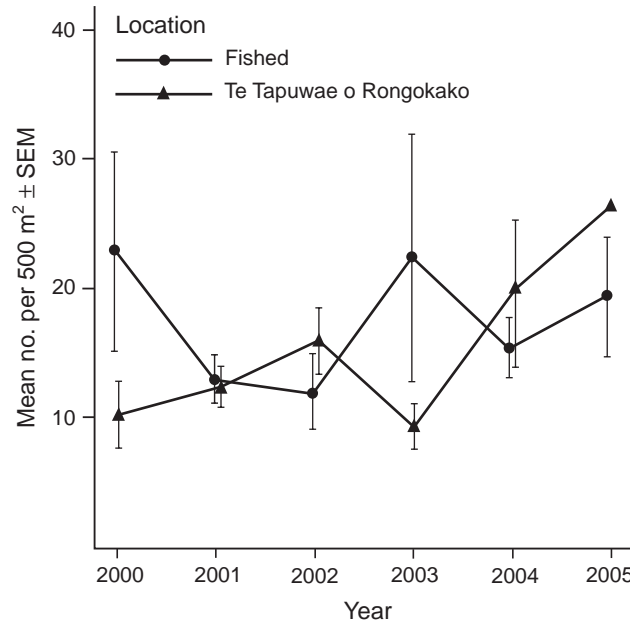


Figure 6. Habitat map of part of the rohe of Ngati Konohi, showing the boundary of Te Tapuwae o Rongokako Marine Reserve. This area was mapped using diver, sidescan sonar and remote video surveys.

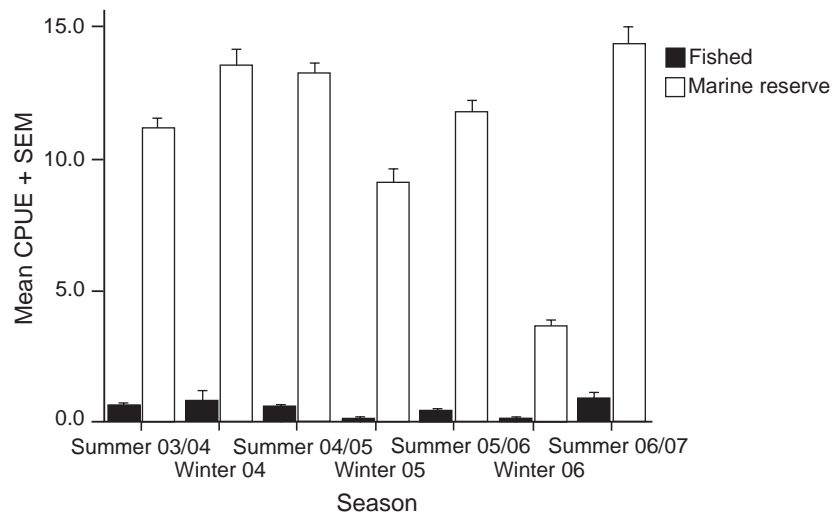
their respective non-reserve sites and these changes occurred soon after the establishment of the reserves. For example, diver underwater visual censuses showed that between 2000 and 2005, the mean density of lobsters within Te Tapuwae o Rongokako Marine Reserve increased from 10 to 26 individuals per 500 m² (Fig. 7).

Figure 7. Average density of lobsters (from diver surveys) within and outside Te Tapuwae o Rongokako Marine Reserve, between 2000 and 2005.



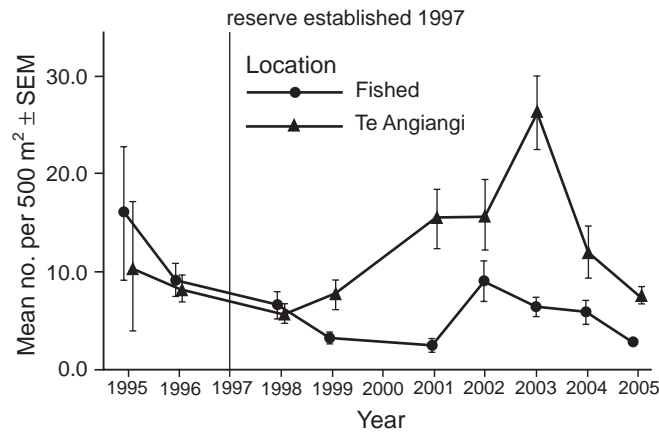
Pot surveys demonstrated that between November 2003 and November 2004, the mean catch per unit effort (CPUE), measured as the weight of legal-sized lobsters per pot, increased from 11 to 14.1 kg per pot lift within the reserve. A year later, in November 2005, the mean CPUE was 15.4 kg per pot lift within the reserve. In contrast, outside the reserve, the mean CPUE ranged between 0.1 kg per pot lift (May 2006) and 1.1 kg per pot lift (November 2003) (Fig. 8). In the last survey (November 2006), the mean CPUE within the reserve was 15 times higher than that outside the reserve.

Figure 8. Average catch per unit effort (kg legal-sized lobsters per pot) within and outside Te Tapuwae o Rongokako Marine Reserve between November 2003 and November 2006.



Diver surveys showed that in 2005, lobsters were over twice as abundant within Te Angiangi Marine Reserve than at the adjacent non-reserve location at Pourerere (Fig. 9).

Figure 9. Average density of lobsters (from diver surveys) within and outside Te Angiangi Marine Reserve between 1995 and 2005.



In contrast to lobsters, the response of populations of previously harvested reef fish species to reserve protection has been minimal to absent. In Te Angiangi Marine Reserve, the densities of blue moki, red moki and banded wrasse (the latter two being gillnet bycatch species) increased slightly following the reserve's establishment, but densities still remained low (Freeman & Duffy 2003). Similarly, densities of reef fish within Te Tapuwae o Rongokako Marine Reserve have remained low since the reserve's establishment (Freeman 2005). Possible explanations for this lack of response to protection include reserve age (both reserves are relatively young), reserve design (for example, Te Angiangi Marine Reserve is a comparatively small reserve), experimental design (for example, only reef habitat at a depth of 8–12 m was surveyed at Te Angiangi Marine Reserve), monitoring method (underwater visual census may underestimate the abundance of diver-negative species), illegal fishing, and overriding environmental factors such as sedimentation or other factors influencing fish recruitment (Freeman & Duffy 2003; Freeman 2005). These factors need to be explored further before any definitive statement can be made regarding the restoration of reef fish populations within East Coast marine reserves.

Within both Te Angiangi and Te Tapuwae o Rongokako Marine Reserves, the densities of intertidal kina were low compared with their respective non-reserve sites, but a wider size range of kina was present within the reserves (Freeman 2006). Paua were more abundant within both reserves than at their respective non-reserve sites, and paua within the reserves were also larger on average. In 2003, paua within Te Angiangi Marine Reserve were on average 15 mm larger (shell length) than those outside the reserve.

One key aim of this research was to investigate trophic interactions among species and the potential for trophic cascade effects within marine protected areas following changes in the biomass of predator species. Studies of the diet of lobsters within Te Tapuwae o Rongokako Marine Reserve showed that they were feeding predominantly on coralline turf algae and turf-dwelling invertebrates (D.J. Freeman, DOC, pers. comm.). Thus, given the large increase in lobster biomass within the reserve, there existed the potential for change in some components of this community; ecosystem modelling confirmed this (Lundquist et al. 2006). It is clear that the interactions between species need to be taken into consideration when assessing the response of particular species and communities to protection, as protection may not always result in an increase in species abundance or biomass. In

addition, the ecosystem modelling approach is useful for informing management decisions, such as the appropriate level of harvesting and species composition of the harvest in areas being managed for sustainable fishing. It would ensure that the linkages between species are taken into consideration, providing a more holistic ecosystem approach to protection and fisheries management.

Enhancing harvest

The incidental benefits of marine reserves to fisheries were highlighted as a key objective by hapu when supporting the establishment of both Te Angiangi and Te Tapuwae o Rongokako Marine Reserves.

The lobster tagging study revealed clear seasonal migrations of male lobsters, in particular medium-sized males with a tail width of 50–65 mm (D.J. Freeman, DOC, pers. comm.). These animals demonstrated distinct movements inshore for winter and offshore to deep (30–40 m) reef areas for summer. In contrast, females and large males tended to be more sedentary, moving only short distances between recaptures and demonstrating no significant seasonal movements. Some movement between reef systems was recorded, but most lobsters located on the main reef system around Pariokonohi Point tended to remain on that reef system. Only a small proportion of tagged lobsters moved across the soft sediment habitat between reef systems.

Movements of tagged lobsters occurred across both the southern and northern boundaries of Te Tapuwae o Rongokako Marine Reserve (Fig. 10). Movements across the marine reserve boundary took place more commonly where the boundary crossed rocky reef habitat, with particularly significant movement of lobsters across the northern boundary of the reserve, which bisects a large area of rocky reef habitat. This finding was supported anecdotally by commercial fishermen, who reported unusually high catches of large lobsters in some areas of reef habitat within 200 m of the marine reserve boundary. On occasion, tagged lobsters that were proven to have originated from within the reserve boundaries were recorded among these catches. Estimates of lobster movement across the boundaries are affected by a number of factors, including tag loss, tag non-reporting, the distribution and intensity of sampling and fishing effort, and the effects of catchability on tag recaptures. However, it was evident that lobsters from the marine reserve were moving across the reserve boundaries, serving to supplement the catches of fishermen.

Preliminary results from the reef fish tagging study did not shed any light on whether fish actually crossed the boundary of Te Angiangi Marine Reserve. However, the distance travelled by tagged butterflyfish (in the order of several hundreds of metres) suggest that this species at least has the potential to cross the reserve boundary as it moves around the reef system within the reserve.

Male Lobster Movement

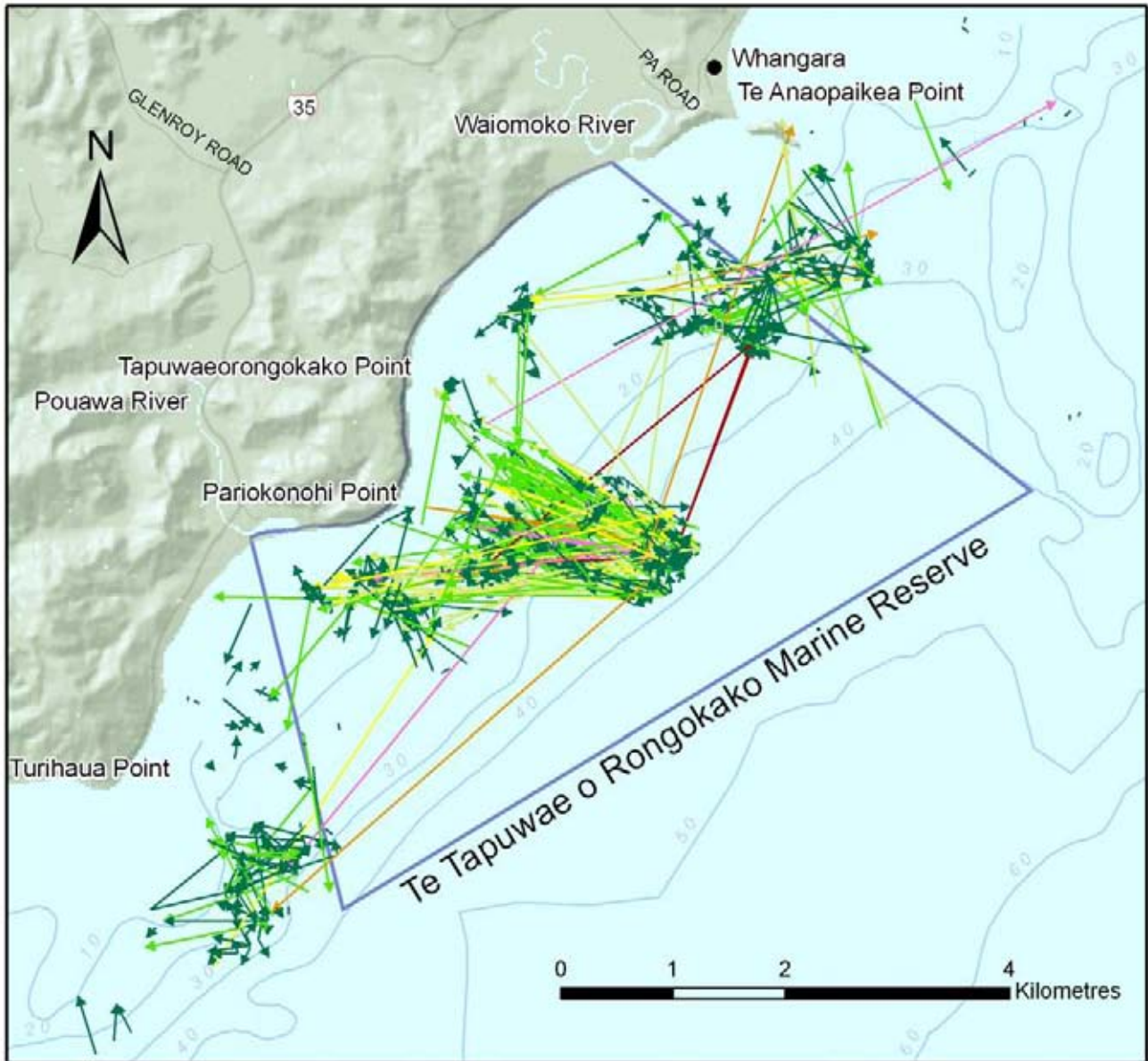


Figure 10. Map showing the movement of tagged lobsters within Te Tapuwae o Rongokako Marine Reserve and in the surrounding area.

At both sites, larval dispersal modelling demonstrated that the larvae of some species of cultural interest have the potential to disperse from the marine reserves into the surrounding marine environment (Stephens et al. 2004; Oldman et al. 2006). This potential was dependent not only on hydrodynamics, but also on features of the species, such as larval longevity, size and mobility. Long-lived larvae, such as kina, were able to disperse very widely from populations of adults within the marine reserves (Fig. 11), whereas species with large, short-lived propagules, such as bull kelp, were more restricted in their ability to disperse from the reserves (Fig. 12). Dispersal within Te Taonga o Ngati Kere (Porangahau Taiapure) and in the surrounding area was also simulated. It was established that there are potentially areas within the Taiapure that are largely dependent on self-recruitment, due to local hydrodynamics. These findings will have significant implications for any management change within the Taiapure and, in particular, may guide the future development of bylaws for the Taiapure.

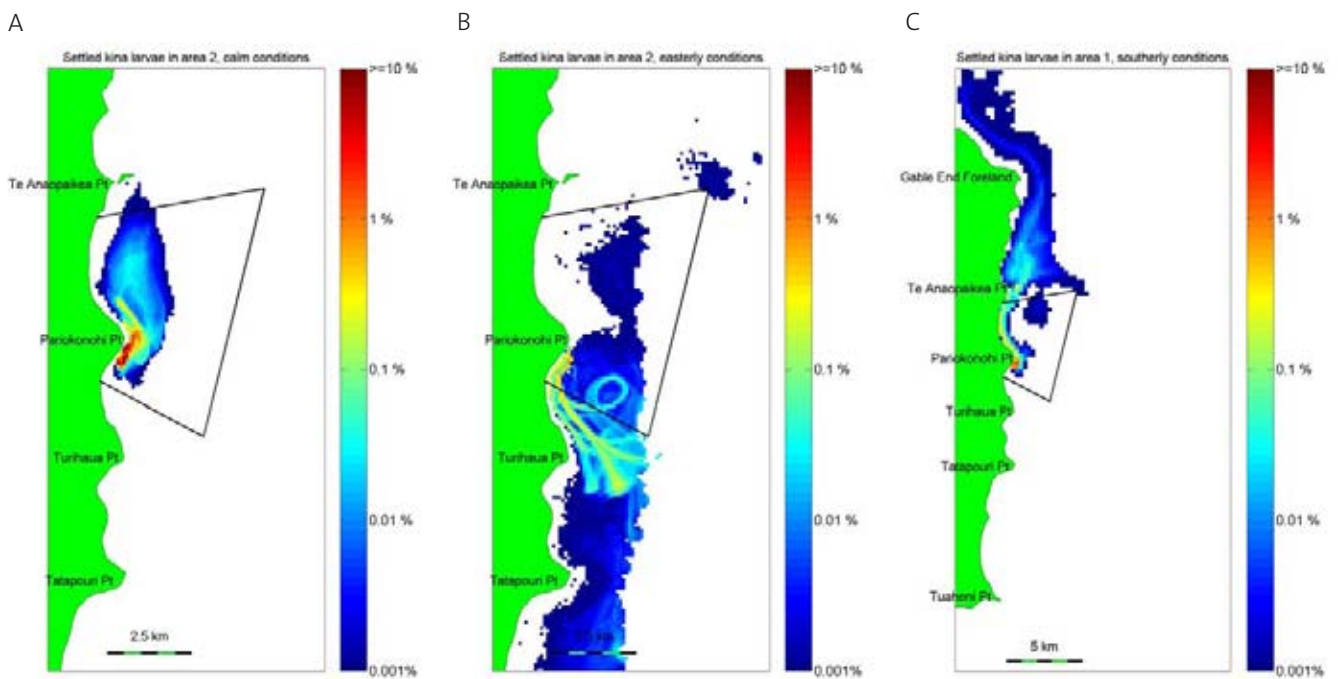
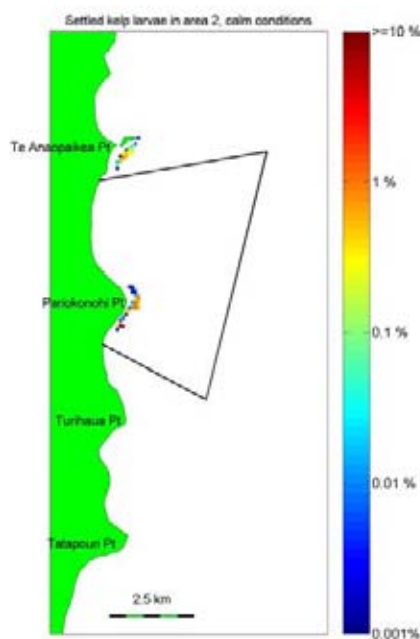


Figure 11. Modelled dispersal patterns of kina larvae released at Pariakonohi Point within Te Tapuwae o Rongokako Marine Reserve under A. calm conditions, B. easterly conditions and C. southerly conditions.

Figure 12. Modelled dispersal patterns of bull kelp spores released at Pariokonohi Point within Te Tapuwae o Rongokako Marine Reserve and just to the north of the marine reserve under calm conditions.



CONCLUSIONS

The ecological research that was undertaken as part of the Maori Methods and Indicators for Marine Protection project has gone some way to establishing whether the marine protected areas that are in place within the rohe of Ngati Kere and Ngati Konohi are fulfilling the identified objectives. A range of ecological research was completed, from habitat mapping, species monitoring and studies of the movement patterns of key species of interest to hapu, to studies of the trophic interactions among species. The research culminated in the development of an ecosystem model for Te Tapuwae o Rongokako Marine Reserve, which enabled exploration of the trophic interactions between species within and outside marine protected areas on the North Island's East Coast.

This study has highlighted the importance of identifying the objectives of marine protected areas and obtaining basic ecological data from the area prior to their establishment, to ensure that the design and management regime is appropriate, and thus that their potential to fulfil these objectives is maximised. Monitoring at Te Angiangi Marine Reserve has demonstrated that some species within the reserve, in particular lobsters, have responded to protection. It is unclear to what extent the reserve's design, in terms of the size and location of the boundaries, is affecting the response of other species to the area's protection. Larval dispersal modelling showed that there is the potential for larvae produced within the reserve to disperse out of the reserve and supplement other populations. It remains unknown whether the adults of species within the reserve are crossing the reserve's boundary, although some cross-boundary movement is possible, particularly across the northern boundary, which bisects a reef system. To what extent this opportunity for cross-boundary migration should be seen as a threat to the integrity of the reserve is unclear, but warrants further investigation, particularly because of the reserve's small size.

Species within Te Tapuwae o Rongokako Marine Reserve have also responded to protection in a way that is consistent with restoration towards a more 'natural' state. The ability of this reserve to protect marine life may be greater than that of Te Angiangi Marine Reserve, due to its larger size and the fact that it completely encloses a reef system. Te Tapuwae o Rongokako Marine Reserve also has boundaries that cross reef systems, which appears to provide an opportunity for the cross-boundary movement of reef-dwelling species such as lobsters. Therefore, it appears that this reserve may be better placed to provide incidental benefits to fisheries without compromising the ecological integrity of the reserve.

The key to successful marine protection is to have clearly defined objectives for the marine environment and use the appropriate tool or combination of tools to achieve those objectives. Ngati Konohi have developed the concept of a 'Tangaroa Suite', where a marine reserve works in conjunction with mataitai and taiapure to protect and restore marine life, while providing for sustainable fishing via export from the reserve and appropriate management of the surrounding area. Similarly, Ngati Kere have recognised that a marine reserve could be used as a nursery to support the surrounding fishery. Such a combination of protection and management tools may be the most appropriate way to ensure that the objectives of both the Government and the local community for the marine environment are met.

5. Key project findings

As outlined in the Introduction, the three overall project objectives were:

1. To identify specific iwi/hapu objectives, interests and expectations for marine management
2. To define a process to identify iwi/hapu marine indicators of environmental performance and pilot their implementation
3. To measure different species assemblages at a range of trophic levels in order to test how marine reserves and controlled areas (including some manipulations, taiapure or mataitai) contribute to meeting iwi/hapu and conservation objectives

The previous three sections of the report have discussed in detail whether this project has met these individual objectives. This section documents the key findings from the project across these three objectives and the additional capacity-building objective.

This section and section 6 include information and quotes from 12 follow-up interviews with key people from Ngati Kere, Ngati Konohi, DOC and MfE who were involved in the project ('the interviewees'). The purpose of the interviews was to discuss the key findings as identified by the main people involved in the project and to reflect on the process used to establish the research and the lessons learnt².


INTEGRATED MARINE MANAGEMENT

This research has provided an example of how various marine management systems could work together to address iwi/hapu and conservation objectives. In particular, the Tangaroa Suite provides a clear example of how goals and aspirations can be linked to management systems. According to one Ngati Konohi representative interviewed:

The marine reserve is part of a total kaupapa or total proposal that we have in the back of our heads. We have out there the rohe moana ... towards the middle of it is the marine reserve. At the moment we are proposing a mataitai ... a place where people from Whangara accept laws made by the people, carried out by the Kaitiaki, to fish within the mataitai reserve. And finally we hope to be able to get Ngati Konohi and other stakeholders involved in the management regime of the taiapure ... The whole of this particular plan is called 'te oko a tangaroa', or 'the Tangaroa Suite'. 'Te oko' means the container of food of tangaroa. (Figs 13 & 14)

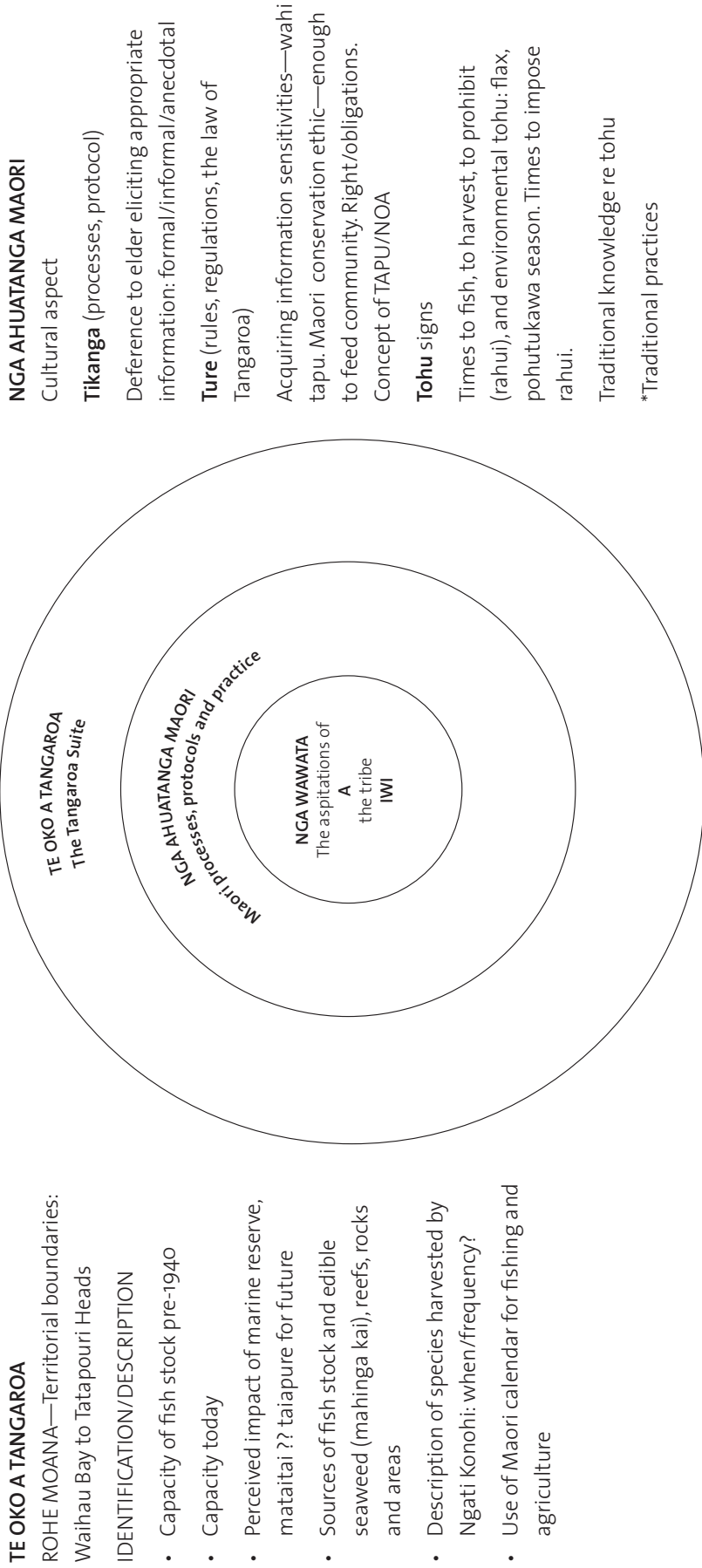
² These qualitative interviews were conducted by Carla Wilson. The interviews were semi-structured and face to face. All interviews were between 30 and 120 minutes long, and participants were assured anonymity in the final report.

Figure 13. Te Oko a Tangaroa.

<p>TANGATA KAITIAKI</p> <p>On 3 December 1999, Kaitiaki were appointed by the Minister of Fisheries to manage customary fishing in the rohe moana of Ngati Konohi, being an area between Tatapouri Point and Waihau Beach.</p> <p>Kaitiaki authorise people to take fisheries resources for customary food-gathering purposes.</p>	<p>ROHE MOANA OF NGATI KONOHI</p> 	<p>ENVIRONMENTAL TOHU</p> <p>Environmental tohu are signs or indicators identified by Ngati Konohi that can be measured to show trends in the health of the rohe moana and measure the effectiveness of the management systems put in place to achieve Ngati Konohi's goals for the rohe moana.</p> <p>For example:</p> <p>Is the kaimoana abundant enough and of good enough size and condition to support manaakitanga?</p>
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<p>TE OKO A TANGAROA/THE TANGAROA SUITE</p>		
<p>MATAITAI RESERVE</p> <p>Proposed to be established in the vicinity of Whangara Bay & Whangara Island.</p> <p>Purpose:</p> <ul style="list-style-type: none"> • To restore and maintain the local fishery to ensure its sustainability and support manaakitanga • To manage non-commercial fishing by using bylaws that apply to all individuals 	<p>TAPUI TAIMOANA/MARINE RESERVE</p> <p>Te Tapuwae O Rongokako Marine Reserve established on 11 November 1999.</p> <p>Purpose:</p> <ul style="list-style-type: none"> • To preserve an area in its natural state as the habitat of marine life • To be a kohanga for marine life, which provides for larval and adult spillover to support adjacent fishing areas • To enable marine life to be studied and better understood and enjoyed in its natural state 	<p>TAIAPURE RESERVE</p> <p>Proposed to be established in the remainder of the Ngati Konohi rohe moana.</p> <p>Purpose:</p> <ul style="list-style-type: none"> • To provide for wider community input into the sustainable management of local fisheries for the benefit of present and future generations • To manage fishing by using bylaws that apply to all individuals

Figure 14. Te Ao Maori.



KEY CONCEPTS RE TOHU MAORI (Maori perceptions: traditional, contemporary, life experiences, anecdotal commentary)

- That all aspirations of Ngati Konohi are realised
- That communication links between Ngati Konohi and Crown agencies are robust
- That the integrity and mana of Ngati Konohi be maintained

TANGAROA SUITE (impact of the three systems):

- That a management regime sustains the aspirations of Ngati Konohi

This Ngati Konohi representative also referred to the concept of 'te ira' to explain the intrinsic value of the moana and the importance of handing something back to tangaroa:

Te ira a Tangaroa [is the] DNA, the beginnings, and the imprint of life itself, for the ocean. We [give something back] on land, but we don't [do the same thing] for the sea ... today, nobody thinks about giving anything back—the life-giving substance of tangaroa—they take and hope that they will [continue to] get the same return, but it doesn't happen. Look after the treasures of tangaroa and tangaroa will look after you.

Within this philosophy, a marine reserve can become a place where the hapu 'hands something back to tangaroa'.

KNOWLEDGE OF MARINE MANAGEMENT PRACTICES

This project has highlighted the need to increase the knowledge and understanding of government agencies and iwi/hapu about various marine management practices.

Many iwi/hapu members were still in the process of learning about government marine management systems and therefore were not ready to engage in detailed discussions about how different systems could be adopted to meet their goals. There is already a lot of information available on modern management systems, but the next challenge is to identify creative and effective ways of sharing this information and knowledge with groups.

According to one hapu member interviewed:

People get a bit frightened about management systems ... so we always have the same people turn up [for meetings] every time ... People are a wee bit frightened of the unknown and what it's all about ... you mention science and people run away ... it would maybe be easier [to progress] if a wider group from the community were [involved].

Staff in government agencies also need to take the time to learn about traditional management practices and work alongside iwi/hapu to look at how these systems can work together. Many of the government representatives had limited knowledge of traditional management systems, which impacted on their ability to participate in these discussions.

Learning is a two-way process and since most participants only had a limited knowledge of the whole picture of marine management (e.g. matauranga Maori, ecosystem management and government marine management systems), it was often difficult for the research team to come up with specific and relevant goals within the short timeframe of the project.

Towards the end of the project, MFish appointed Pou Hononga and Pou Takawaenga to assist iwi/hapu in understanding the fisheries management tools available to them. In each region, Pou Hononga and Pou Takawaenga are employed to assist iwi/hapu to achieve their fisheries management objectives. This is a significant development to help increase the knowledge and understanding of the various marine management options.

In addition, a joint MFish and DOC 'Marine Protected Areas Policy and Implementation Plan' was released during the life of the project (DOC & MFish 2005). In this document, it is clearly stated that government departments need to work together with the community to achieve marine conservation goals. It is also recognised that management tools can work together to achieve protection. Such an integration of process and the tools themselves were clear recommendations from participants in this research project.

It is also apparent that some of the marine protection mechanisms need to be reviewed and updated to become more relevant to Maori and to facilitate their uptake by Maori. A review of the Marine Reserves Act, which aims to update and broaden its objectives and regulations, making the legislation more relevant to Maori, has not progressed through the legislative process. There also appears to be an unresolved tension between Maori perceptions of what is seen as the required scale for effective Mātaihai Reserves, and the potential and cumulative undue effect that reserves of such a scale would have on commercial fishing interests, particularly rock lobster fisheries.

RESOURCING

To make this type of project work effectively, iwi/hapu need to have the time and resources to develop, implement and monitor marine management systems. This includes resources to implement government requirements as well as resources to develop and implement their own initiatives.

It became evident through the project that government agencies regularly introduce new projects, tools and packages for iwi/hapu to adopt. However, these small communities often do not have people 'on the ground' with the time and resources to learn about and implement these various initiatives. People within these communities are busy, and while they are often interested, there needs to be support in terms of financial resources and knowledge sharing in order to build up community capacity.

Within Ngati Kere and Ngati Konohi, a number of hapu members are interested in developing community marine monitoring programmes and furthering the tohu work now that this project has put a process in place. There is also interest from Ngati Konohi in further developing and implementing the Tangaroa Suite. While there are opportunities and ideas that would create employment for iwi/hapu, without adequate resourcing they are difficult to progress.

These resources do not necessarily need to come directly from the Government. One suggestion has been that the management of customary fishing within the rohe could be funded in part by iwi from the commercial fishing returns that come to them through the Treaty settlement processes.

ROLE OF KAITIAKI

It became clear through this project that the Kaitiaki appointed under the Kaimoana Customary Fishing Regulations 1998 are the best group within the hapu to oversee the implementation of integrated marine management within the rohe moana. Kaitiaki would, however, need to broaden their role to include all aspects of managing the rohe moana (e.g. marine reserves and marine mammals) alongside customary fisheries management.

Kaitiaki would also need to have the required skills, time and resources to carry out this work. For example, the implementation of a tohu monitoring system would require Kaitiaki to have the capacity and capability to collect data and report on changes. As discussed above, it is a 'big ask' to expect iwi/hapu to respond and participate in the development of marine management processes without adequate resourcing.

The issue of iwi involvement in fisheries compliance was often raised, and it was evident that views were quite polarised. Some people wanted to be empowered to be actively involved in compliance, while others considered that it was more appropriately a matter for the government agencies involved to employ professional compliance officers. There

was a common recognition throughout that effective compliance would be essential to the success of utilising the marine protection mechanisms and that the level of compliance currently in practice would be inadequate for that purpose.

SHARING TIKANGA

Although this project focused on the long-term management of the rohe moana, there have been immediate benefits from it. The publication of reports authored by the hapu has provided a taonga for current and future generations and something tangible for the researchers and hapu members to share with others. There has been value in going through the process of collating information and agreeing on goals and aspirations.

According to one of the hapu researchers interviewed:

[The stories] are now all in one document and marae committees and community groups can pick it up. This document gives you an insight into a hapu. One committee chair said 'here it is! I've been trying to figure out [our goals] for ages' ... this report gives people a voice, an opinion, these are the thoughts of a whole hapu.

The reports have also been popular with schools and hapu members, many of whom are keen to put a few copies away for future generations. As an interviewee from Ngati Kere commented:

The younger generation can read it quite easily and learn something about themselves and their own connections.

It has also been suggested that the reports are a way for others in the wider community to learn about tikanga Maori. One of the Ngati Kere researchers appeared with the report in the local newspaper and has been asked to give a number of presentations to the local community on the research.

According to two hapu researchers interviewed:

There have been a lot of enquiries after an article [about the project] in the local rag. I don't know if the wider community appreciates someone else's values ... but teachers would be able to grab a lot of information from this and use it.

It's a good way to build a relationship between the hapu, the rest of the community and beyond.

More widely, these reports have been shared with iwi/hapu around New Zealand as well as other groups in the Pacific. Some of the hapu researchers have also initiated discussions with other iwi/hapu about this work. According to one researcher interviewed:

It's been a way of introducing us to other hapu, where we feel the document could assist them to have a guideline to tell their stories. I've also shared it with local fishermen in the Wairarapa. You can show people another perspective. Some people like to fish but don't know anything about management systems.

The two hapu have also been able to share tikanga with the government agencies involved and further develop relationships. According to one hapu member interviewed:

Even though a goal was set and we have an end product, what happened during the project was that relationships were built.

CAPACITY BUILDING

Another key objective of the project was to share skills and build capacity amongst iwi/hapu in terms of social and ecological science. In both case studies, local people who had not undertaken any previous social research took a lead in designing the research, undertaking the interviews and writing the report with the support and guidance of the government staff members involved. One of the researchers commented that they would be able to use these new skills to undertake other research projects with the hapu and wider community. One of the Ngati Kere researchers presented a joint paper with DOC at an international marine protected areas conference in Australia in 2005.

Opportunities were provided for hapu members to be involved in the ecological research, particularly species monitoring. However, much of the ecological research was highly specialised, requiring technical skills and equipment that needed to be sourced from outside the region. The project did help to raise awareness and understanding amongst many local people of ecological research and its value, and also the processes and mechanisms of local and central government for research contracting.

The process of hapu involvement in the project is discussed further as part of the process evaluation in section 6.

For the government representatives involved, the project provided an opportunity to learn more about matauranga Maori and effective ways of working across government agencies and with different groups.

IDENTIFICATION OF OBJECTIVES

A key finding from an ecological perspective was that the objectives of marine protected areas need to be realistic and scientifically measurable. This is particularly relevant now that the new Marine Protected Areas Policy and Implementation Plan has been released, in which it is stated that the effectiveness of marine protected areas in achieving their biodiversity objectives will be monitored (DOC & MFish 2005).

The identification of clear objectives, preferably prior to the establishment of a marine protected area, will ensure that the area is designed and managed in a manner that will maximise its potential to fulfil its objectives—this applies not only to the objectives of the local community, but also government departments. This project has provided some insight into the appropriate design and management of marine protected areas, but there remain large gaps in our knowledge that need to be filled to ensure that marine protected areas remain useful.

It is clear from this research project that there remain some misconceptions, both at a hapu and government level, about what marine protected areas will be able to achieve in terms of restoration and protection. For example, the restoration of the marine environment to the 'way it used to be' was frequently stated as a goal during the social research component of this project, with the idea being to restore the marine environment to the state that it was in at some specified date in the past. However, there is a growing realisation that this may not be achievable when the biomass of some keystone species in the broader ecosystem outside the protected area is severely reduced or absent altogether as a result of harvesting activities. Perhaps the best that can be hoped for is that the trajectory for recovery to a more natural state in a protected area will be aided by the presence of a fuller complement of native species and natural processes.

6. Process evaluation

This section documents the key findings of Ngati Kere, Ngati Konohi, DOC and MfE in the development and implementation of the project.

ESTABLISHING THE PROJECT

It is preferable to have all project partners involved in the development of a research proposal before it receives funding. However, in this case the hapu and individuals who had initially been involved in the research proposal could no longer participate in the project. DOC and MfE had initially discussed the project idea with two potential hapu partners and gained their support and input before submitting a research proposal for funding. However, because of the time delays in getting the research approved, receiving the funding and commencing the project, one of the hapu and the key contact from the second hapu could no longer be involved due to a change in circumstances.

Consequently, upon receiving the funding, the government departments had to start again and approach potential hapu to seek 'buy in' and support for the already funded research. There were concerns that this could be interpreted as the Government setting the agenda for the research as opposed to the cooperative 'partnership' research with local ownership that had been intended. While this situation was not ideal, it was important that all partners were up front about the origins and purpose of the research and the potential limitations of the research partnership.

At one site, a special hui was organised at the start of this project, where approximately ten government officials presented information about the project. All interviewees who attended this meeting agreed that this was not the best approach. Too much technical information was presented, it was very confusing, and it was not a cooperative partnership approach and lacked any overall strategic purpose. When setting up a similar project in the future, it would be better to have a couple of government representatives attend a regular hapu meeting and have an agenda item to present the research proposal.

MANAGING THE PROJECT

A key to the success of this project has been to have a committed project leader 'on the ground'. External contractors who lived in another region were initially contracted to lead the project and a series of different faces turned up to various hui. However, it became evident early in the project that someone who lived in the area and knew the hapu was needed. The project leader was a staff member working for DOC in the East Coast/Hawke's Bay area and was easily accessible to both hapu. It was also important to have a permanent staff member as project leader, so that the benefits in terms of relationship building with hapu could extend beyond the life of the project. The project leader had also been involved in the original proposal, had a vision for the project and was committed to the outcomes. In conducting these evaluation interviews, the project leader was frequently identified as someone who was trusted by all the groups involved and who was a leader, not just a manager.

STAFF INVOLVEMENT

As well as the project leader, there were several other key staff involved in leading parts of the project. DOC and MfE staff met regularly with the hapu researchers. Those interviewed for this report all stressed the importance of ‘kanohi ki te kanohi’ (face-to-face) meetings rather than relying on emails or the telephone. It was important for the team to spend a lot of time together in order to build supportive and trusting relationships.

Ideally, the same staff will be involved throughout a project in order to build relationships and make sure people see the same faces at hui. To a large extent, this happened throughout this project, particularly with staff in the local office, who had already formed relationships with many of the hapu members. However, for one stream of work there were several staff changes and an external contractor had to be brought in to manage this particular work programme. This was not an ideal situation and the project was much more effective when a permanent staff member had the opportunity to work closely with the hapu and develop or build on a relationship that would extend beyond the life of the project. As one interviewee commented:

It's good to have someone within DOC leading the work, as they have more ownership and are a benefactor, while an outside contractor is just a service provider.

STEERING GROUP STRUCTURE

When the project was initiated, a formal steering group was established that was made up of government officials from DOC, MfE and MfFish, as well as one representative from each hapu. These meetings were initially held in Wellington. Some interviewees commented that this formal steering group was not the most effective way to manage the project. With only one representative from each hapu attending, numbers were weighted in favour of the government agencies and the meeting was also attended by some senior officials who had little to do with the day-to-day project.

During the course of this project, this group evolved into something more informal, where everyone who was involved in the day-to-day running of the project, from hapu to the government agencies, met, often in the East Coast/Hawkes's Bay area, to freely discuss project progress. These meetings, which took place outside Wellington, were described as being more homely, comfortable and welcoming, where everyone felt free to talk. Some interviewees suggested that it would have also been to good to have another committee with more representatives from each hapu to ensure greater ownership of, and communication about, the project within the hapu.

HAPU INVOLVEMENT

It was originally intended that hapu members would lead and participate in each stream of the project. The philosophy of the project was to contract local hapu members and then work alongside them and upskill them where necessary to undertake the social research and ecological monitoring. This worked very successfully for some streams of the work. A key finding from the social research process was that it worked best when a local person was contracted who had a good standing in the community, knowledge of the area, the people and the key issues, and enthusiasm for the project, even though they may not have had any social research experience. When locals undertaking the work did not have a social research background, the government official involved provided them with advice and support to do the work as part of a collaborative team. This approach worked very well.

However, a number of the hapu researchers recalled their nervousness and uncertainty when they first got involved:

We didn't have a plan or anything and wondered how big this was going to be. It took a bit of courage. [I think] it was a brave step.

You can't always create confidence [as an interviewer] because you are emotionally attached [to the subject]. I found it difficult to approach whanau [for information]. I'd keep getting defensive and stubborn because people kept asking questions [about the purpose of the research].

Much of the ecological research was highly specialised and required skills and experience above that available locally. However, resources and opportunities were provided for hapu members to be upskilled and be involved in some aspects of the research and monitoring work. Because much of this work was weather dependent, it proved difficult to work around hapu members' other time commitments. However, in two cases, hapu members who had the required skills and a keen interest in the marine environment and research became key members of the ecological research team. As with the social research, local participation worked best when someone was interested and committed to the purpose of the project, as the project was often not able to provide regular work.

RECRUITING PARTICIPANTS

Much of the material collected from each hapu for this project was obtained from hui. However, in some cases the attendance at hui was very low. These hui were often on weekends or evenings, and people appeared to be reluctant to give up their time. At each hui, it was often necessary to reiterate the purpose of the project for some hapu members and justify why the project was happening.

A more successful way of collecting information from people was through visiting and chatting to them one on one and leaving them with some written material to read, or by going for an informal walk on the beach with them. Some people interviewed for this evaluation also suggested that it would have been better to run all the project meetings as agenda items at existing hapu meetings and committees as opposed to expecting people to come along to additional meetings. This would be a less intrusive and more 'low key' approach. One suggestion from an interviewee was to have 'a fish and chip night with a korero'.

COMMUNICATION

For projects of this nature, an effective communication plan is needed to keep all parties informed and involved. Although there may be limited uptake or interest generated by regular publicity of the project, it is important that as many people within the hapu as possible are made aware of the project and have access to information if they need it. For example, one research team provided the key hapu committees with monthly updates and produced a monthly email newsletter for the hapu. It was clear that a variety of methods were needed to keep everyone informed and 'in the loop', as no one method suited everyone and for some a face-to-face hui was the preferred approach.

One interviewee commented on their success in increasing interest by using the local media to raise awareness of the project with stories and photos from hui. It is also useful to have a good Powerpoint presentation and a website explaining the purpose of the project.

Regular communications with key external agencies, such as local government, is also a key to raising awareness of the project.

WORKING TOGETHER

This project helped to build relationships between government agencies and hapu. According to one hapu researcher:

Even though we had an overall goal for the project, what happened during the project was that relationships were built between government agencies and the hapu.

As one DOC staff member who was involved stated:

There were a lot of changes in people ... the staff learnt a lot. I was really proud of the way we communicated ... the relationship was really warm. The part that each person played was very important.

This project also aimed to build relationships between government departments. A number of interviewees commented that the lack of a relationship between the agencies was apparent to the hapu at various hui. Specific marine management issues would be defined in terms of being a 'Conservation' or 'Environment' or 'Fisheries' issue. For example, it was said that it would appear that DOC would hold a hui one weekend and MFish the next, both talking about similar issues with the hapu in the middle.

As one hapu researcher stated:

Different departments [come along] and pay for different hui. The Ministry of Fisheries and DOC both come and hold a hui to talk about marine management. This [approach] will drive listeners away.

To make these projects work, effort needs to be put into building these relationships across central and local government agencies. One interviewee commented that there needed to be a build up of trust between agencies and it was often difficult for officials to think about the 'big picture' and look outside their specific areas.

ROLE CLARITY

While the hapu sometimes found it difficult to work with government agencies, the government representatives involved were often unclear about the roles and responsibilities of different committees within the hapu (e.g. taiapure committee, Kaitiaki and hapu authority). The lack of clarity over roles within the hapu often slowed up the project and created confusion. Ngati Kere representatives recognised the need for the hapu to have clear, transparent and coordinated decision-making processes if they are to achieve their goals (Wakefield & Walker 2005).

INTELLECTUAL PROPERTY

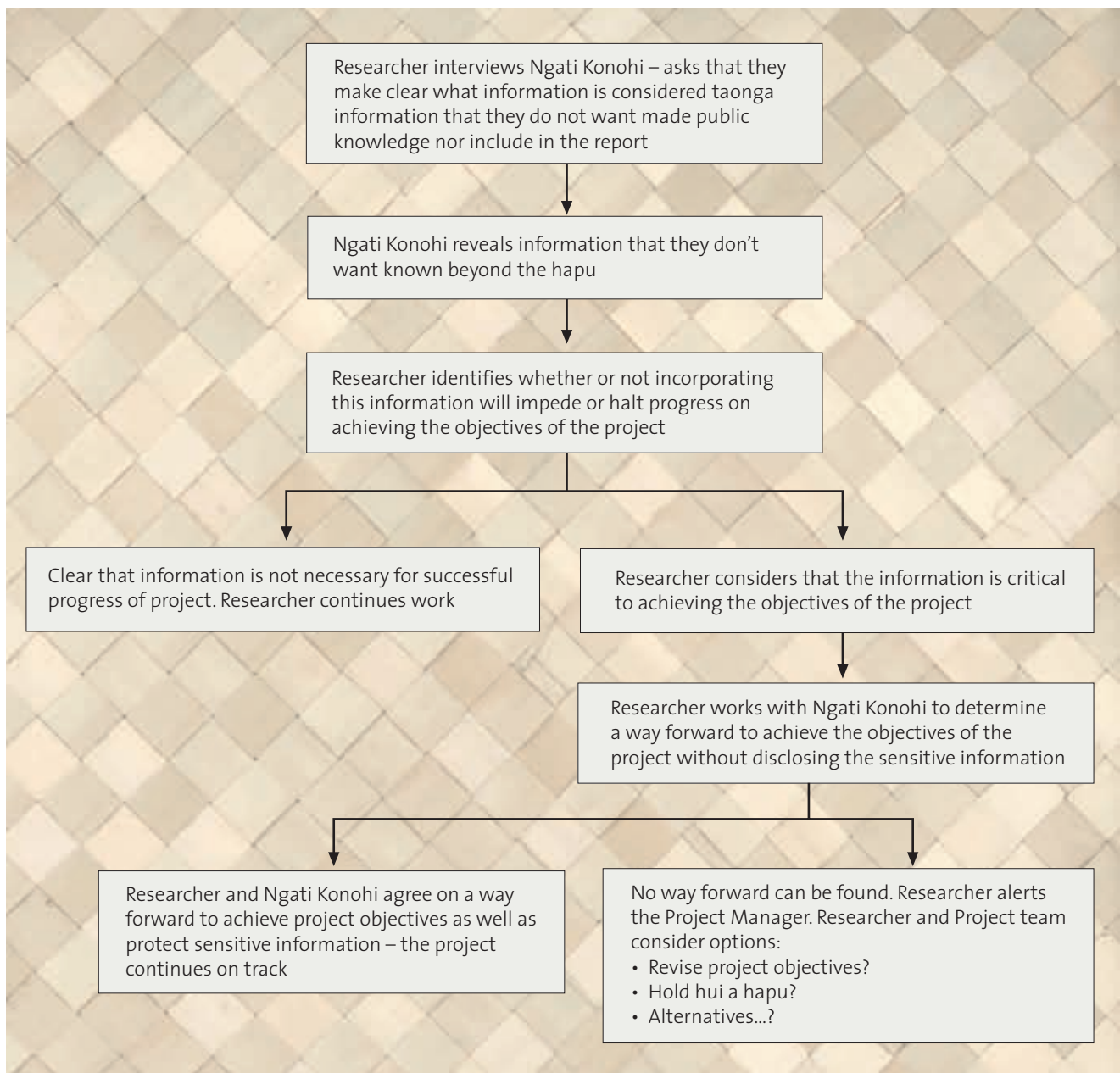
Before commencing work on the two case studies, an intellectual property protocol was established with each hapu. Members of Ngati Kere and Ngati Konohi both raised concerns at the start of the project about who owned the information collected and how the information would be used.

The government agencies involved recognised that the customary and traditional knowledge used in the project would remain the property of the hapu and wanted to ensure that hapu interests in the information were protected.

With this in mind, it was agreed that the researchers from each hapu would act as gatekeepers to ensure that any sensitive information they had identified as not wishing to be made public would be protected. Therefore, the appointed researcher(s) had to have the confidence of the hapu to identify and appropriately manage sensitive information.

Figure 15 illustrates the process used by the interview gatekeeper to manage sensitive information in the Ngati Konohi case study.

Figure 15. Process for managing sensitive information with Ngati Konohi.



It was also agreed that the three project partners in each case study (hapu, DOC and MfE) would all have joint copyright over the final reports, with each having the right to use the reports without prior consultation with the others.

7. Where to from here? Project recommendations

To further progress this work on developing integrated marine management systems for iwi/hapu, several recommendations have been made by project members for government agencies and iwi/hapu.

GOVERNMENT AGENCIES

It is recommended that government agencies:

1. Work together and collaborate in order to present a consistent, clear and united face to hapu, both at a national and regional level.
2. Develop and maintain ongoing working relationships at the hapu level, particularly the key agencies such as DOC, MFish and regional councils.
3. Support the development of iwi/hapu knowledge about government marine protection mechanisms and proactively facilitate their implementation through the actions of MFish's Pou Hononga and Pou Takawaenga and DOC's Pou Kura Taiao and all other staff.
4. Identify and remedy the shortcomings in the marine protection mechanism legislation that could impede uptake of the mechanisms by Maori.
5. Provide for an increase in fisheries compliance capacity that is in keeping with the rate of uptake of marine protection mechanisms by Maori.
6. Increase knowledge and understanding of matauranga Maori and tikanga in order to better appreciate how traditional and government marine management mechanisms can best work together to achieve integrated marine management.
7. Work with iwi/hapu to identify resources that could be accessed to increase capacity and capability, and to provide employment for the development and implementation of marine management systems.
8. Continue and develop ecological research, in consultation with local communities, to further explore how marine protected areas could fulfil the objectives of local communities.

IWI/HAPU

It is recommended that iwi/hapu:

1. Implement inclusive processes to identify their objectives, interests and expectations for marine management (as illustrated in the reports from Ngati Kere and Ngati Konohi, including the Tangaroa Suite (DOC et al. 2005; Wakefield & Walker 2005).
2. Increase their knowledge of government marine management mechanisms and their implementation through working with regional and national government agencies.
3. Establish and agree on an organisational structure for marine management, with clear lines of responsibility and accountability.
4. Appoint Kaitiaki (under the Kaimoana Customary Fishing Regulations 1998) and broaden their role to include all aspects of managing resources in the rohe moana.

5. Work with key agencies to identify resources that could be accessed to increase capacity, capability and provide employment for the development and implementation of marine management systems. Explore the option of utilising commercial fishing returns from Treaty settlements as a means of resourcing local management of the rohe moana, including customary fishing.

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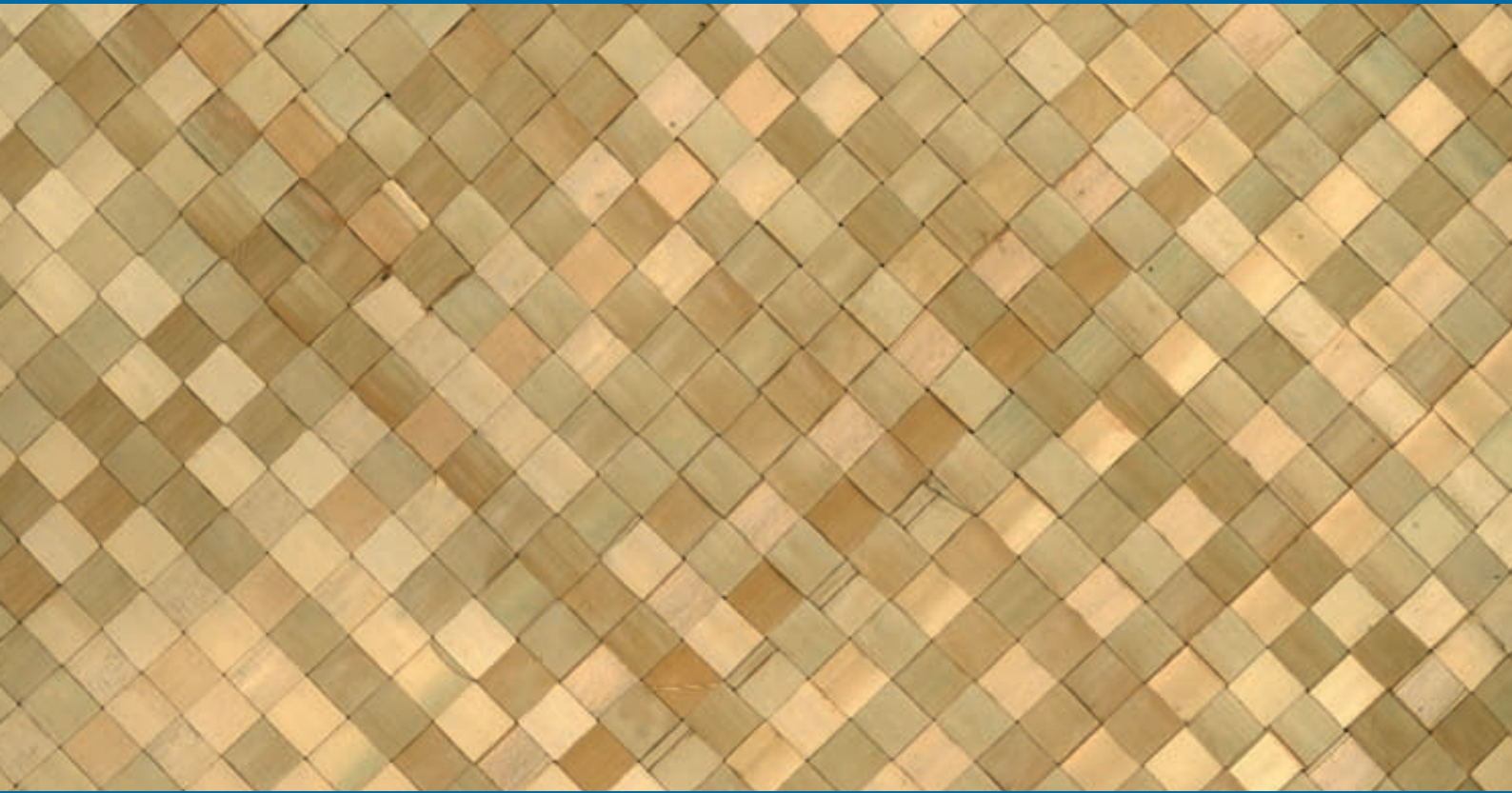
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I a Kere te ngahuru, ka nga huru noa atu
It is always harvest time with Ngati Kere *Ngati Kere*

Kia whakanuitia, kia manaakitia, te oko a Tangaroa mo nga mokopuna e whai ake nei
To honour and sustain the bounty of Tangaroa for present and future generations *Ngati Konohi*

