

Phase II Research Proposal

A. PROJECT TITLE	3.1 Perceptions of risk and uncertainty
“SHORT” TITLE	Perceptions of risk and uncertainty
B. THEME / PROGRAMME	Theme 3: Addressing risk and uncertainty

C. PROJECT KEY RESEARCHERS (CVs for all listed to be provided in SharePoint container using template provided in SharePoint)			
Role	Name	Institution / company	Email
Project Leader	Paula Blackett	NIWA	Paula.blackett@niwa.co.nz
Project Leader	Shaun Awatere	Manaaki Whenua Landcare Research	awateres@landcareresearch.co.nz
Researcher	Nikki Harcourt	Manaaki Whenua Landcare Research	
Researcher	Erena Le Heron	Le Heron Leigh Consulting Limited	
Researcher	Richard Le Heron	Le Heron Leigh Consulting Limited	
Researcher	Regan Fairlie	Manaaki Te Awanui	

D. CO-DEVELOPED WITH			
Name	Role	Organisation / company / agency	Level of partnership
Robin Britton	director/consultant	Resource management consultant	Co-developer through face to face discussion of the ideas and proposed research steps
Richard Saunders	Senior Analyst	Ministry of Primary industries	Co-developer through phone discussion of the ideas and proposed research steps
Eric Jorgensen		Ocean Bay Farms	Co-developer through phone discussion of the ideas and proposed research steps
Erica Gregory	Senior Analyst	Environmental Protection Agency	Co-developer through phone discussion of the ideas and proposed research steps
Michelle Cherrington	Senior Manager	Moana NZ	Co-developer through phone discussion of the ideas and proposed research steps
Regan Fairlie	Researcher	Manaaki Te Awanui Trust	Co-developer through phone discussion of the ideas and proposed research steps. Co-development has led to inclusion in the research team.
Joanne Ellis *	3.2 Project lead	Waikato University	Joint meetings and project planning sessions
<u>Fabrice Stephenson*</u>	3.2 Project lead	NIWA	Joint meetings and project planning sessions

*Interaction with 3.1 project leads has enabled us to connect with the co-development partners associated that project. Although they are not listed here directly.

E. ABSTRACT
<p>The different ways that people understand and react to risks and uncertainty in the marine environment can be a source of conflict and difference of opinion. This is mainly because how people interpret risk and uncertainty, influences what actions they believe should be taken, by whom, when and why. Given the diversity of mātauranga (knowledge), values, and preferences for action it isn't surprising that some decisions regarding marine resources are contested. However, there is very little knowledge on the degree to which sectoral, personal and cultural perceptions of risk differ and how this affects decisions. Yet this understanding is crucial to building consensus around decisions, or at least appreciating why specific decisions have been made. We will take a grounded (case study) approach to the research, which recognises that risk perception is underpinned by a mosaic of ways of understanding and interpreting risk of which Mātauranga Māori is a critical and central element. Through exposing what is similar and different about the ways of perceiving risk and uncertainty, we will be able to inform tools, policies, practices and processes that reflect the diverse ways of perceiving risk and determining action. The end goal is to further enable Ecosystem Based Management principles in practice through illuminating further possibilities to collectively explore alternative options and actions in a way that is attentive to Mātauranga Māori, multiple perspective and incorporates relevant (existing and new) knowledge.</p>

F. RELEVANCE TO CHALLENGE OBJECTIVE
<p>This project supports the Challenge's objective to enhance utilisation of our marine resources within environmental and biological constraints by:</p> <ul style="list-style-type: none"> Identifying tools/ frameworks and processes that will aid decision-making practices that are more inclusive of Māori and community perspectives alongside biophysical modelling information to address multi-sectorial priorities and accommodate diverse and cumulative impacts to marine resources

- Identifying tools/ frameworks and processes that explicitly address both risk and knowledge uncertainty in a way that reduces risks to ecological, social, cultural and economic wellbeing derived from marine resources.
- Promoting Māori rights, interests and values in tools/ frameworks and processes for addressing risk and uncertainty with respect to utilising marine resources.

G. OUTPUTS	This project will produce the following Outputs:	Linked to which Theory of Change Outputs:	Explain briefly your plan to ensure uptake by iwi and stakeholders:
<i>Please note that 3.1 will contribute towards outputs in 3.2, as such this is a list of the outputs led by 3.1, not those led by 3.2. Outputs led by 3.2 are listed and described in their proposal and will not be repeated here.</i>			
	Output 1: Discussion document to be disseminated between Sustainable Sea project lead and co-development partners and key agencies. To overview Mātauranga Māori and multiple ways for understanding risk for marine management.	Mātauranga Māori that supports EBM is captured/understood /recognised Decision-making guidelines that recognise risk and uncertainty evaluated, developed, demonstrated and made available for Māori and stakeholders	We will provide a discussion document that overviews the key insights from our two reviews. This will be shared within the Sustainable Seas project teams and with co-development partners and will provide an opportunity to share and socialise our thinking, receive feedback and lay the foundations for output 2 and 3.
	Output 2: Conference Presentation detailing Mātauranga Māori and multiple ways for understanding risk for marine management.	As above	We will test and socialise our thinking in a NZ based forum that includes Māori and stakeholders. this will seed the ideas and lay the foundations for future discussions and uptake.
	Output 3: Peer reviewed Publication submitted (e.g. book chapter or paper) on perceptions of risk and uncertainty within the marine environment and how this relates to decision- making	As above	This legitimises the research through publication in a reputable publication. Although publication on its own will not facilitate uptake, it will provide a citable reference for Māori and stakeholders to use within a formal process. Thereby, making the ideas tools processes and practices more credible and useable.
	Output 4: Popular article submitted. This will be A summary of the above peered review paper tailored to decision-makers	As above	A broadly distributed popular article will make the ideas accessible to a wider audience, for example (but not limited to) Planning Quarterly or New Zealand Geographic
	Output 5: Short communication on the framework/guidance prepared and shared via the Sustainable Seas website and key partners and stakeholders' networks	Decision-making guidelines that recognise risk and uncertainty evaluated, developed, demonstrated and made available for Māori and stakeholders	Output 5 and 6 will be produced concurrently and along-side project 3.2. Prior to the release of output 4 and 5 the framework/guidance will be thoroughly developed, tested, reviewed and socialised with partners and stakeholders (milestone 3.3). This will include the case study participants (research step 2) Mātauranga Māori experts (research step 1 and 2). Environmental Protection Authority (EPA) (Erica Gregory), Moana NZ (Michelle Cherrington), Manaaki Te Awanui (Regan Fairlie), Ian Ruru (Te Aitanga a Māhaki) and Maru Samuels (ICP). It will be specifically designed to be relevant, useful and used and those involved in the review (milestone 3.3 and the case studies) will be asked to assist the knowledge sharing process.
	Output6: Framework/guidance	Decision-making guidelines that recognise risk and uncertainty	As above

	document on how to consider and include different ways to approach risk and uncertainty.	evaluated, developed, demonstrated and made available for Māori and stakeholders	
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H. OUTCOMES	This project will contribute to the following Theory of Change Outcomes:		
	<ul style="list-style-type: none"> Improved decision-making using an EBM approach Increased involvement of tikanga and mātauranga Māori 		

I. INTRODUCTION

Perception of risk is of keen interest to policy and decision makers because of the role it plays in the support of, or opposition, to various environmental choices, outcomes or technologies (Sjoberg 2000; Wilson et. al, 2019). Such differences can lead to conflict because variations in perception of risk lead to alternative, and potentially incompatible, preferences about whether to undertake a course of action or not. However, there is very little knowledge on the degree to which sectoral, personal and cultural perceptions of risk and uncertainty differ across objects of value (e.g. a species a place and ecosystem) and how this affects decisions. Yet this understanding is crucial to building consensus around decisions, or at least appreciating why specific decisions have been made.

The question of “why do people perceive risk and uncertainty as they do?” is a complex proposition (Wilson et. al, 2019), that is considered from a range of perspectives within several disciplines. Overall, three traditions (clusters of similar thinking) exist each presenting a slightly different position:

- *The techno-scientific perspective* where risk perception is informed by scientific knowledge and data, causality and uncertainty are important (Taarup-Esbensen, 2019). A risk assessment is an example of a method from this tradition.
- *The cognitive perspective* where risk perception is viewed as more subjective phenomenon that is modified by human behaviour, culture, social norms and values. A conceptual or numerical model that explains why individuals may or may not engage in riparian planting or prepare for an earthquake is an example of this tradition.
- *More qualitative social science perspectives* where risk perception is viewed as more of a situated sense making process that accounts for social, cultural, economic, and political contexts. Here, a more qualitative subjective perspective on risk is presented, that links risk perception with culture, histories and narratives, power and politics (Taarup-Esbensen, 2019; Douglas, 1992; Beck, 1992).

As researchers tend to follow one tradition or another, depending on their discipline, the different ways of considering how risk and uncertainty is perceived are rarely explored together. We suggest that considering all the traditions when exploring the perception of risk and uncertainty in the marine environment could provide considerably more explanatory power than a single disciplinary lens. How risks are perceived and what risks are acceptable are often contested because of the range of views expressed associated with experience, world views, culture and place. Such contestations play out through collaborative processes and resource management decisions across multiple scales often privileging one perspective over another. Further, where multiple users/decision makers/kaitiaki make choices based on their perception of risk it may create conflict with others because the choice is viewed through a different lens, based on different perceptions and experiences. This is particularly evident where the choices made by one iwi/hapū/Māori/user/group affects the values and interest of others. An exploration of the underpinning differences in risk perception, grounded in culture, Mātauranga Māori, social norms, and world views as a contributor to this conflict, could be a strong starting point for navigating differences. As such, there is an urgent need to explore the range of ways risk and uncertainty is perceived in the marine environment to underpin and support novel ways to explore risk collectively and support deliberations and actions regarding EBM.

J. AIMS

The aims of this project are to:

- Identify tools/frameworks and processes that will aid decision-making practices that are more inclusive of Māori and community perspectives alongside biophysical modelling information to address multi-sectorial priorities and accommodate diverse and cumulative impacts to marine resources
- Identify tools/frameworks and processes that explicitly address both risk and knowledge uncertainty in a way that reduces risks to ecological, social, cultural and economic wellbeing derived from marine resources.
- Promote Māori rights, interests and values in tools/ frameworks and processes for addressing risk and uncertainty with respect to utilising marine resources.

K. PROPOSED RESEARCH

We will take a grounded approach to the research, which recognises that perception of risk and uncertainty is underpinned by a mosaic of ways of understanding and interpreting risk of which Mātauranga Māori is a critical and central element (Figure 1).

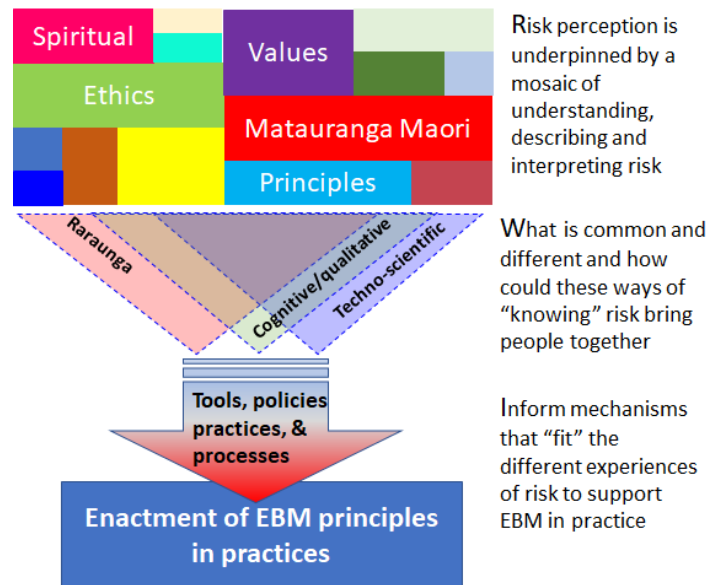


Figure 1: Conceptual model underpinning the proposed research

Through exposing the commonality and differences between the ways of perceiving risk and uncertainty, we will be able to inform tools, policies, practices and processes that further reflect the diverse ways of perceiving risk and determining action. The end goal is to further enable the enactment of EBM principles in practice through illuminating further possibilities to collectively explore alternatives, options and actions in a way that is attentive to Mātauranga Māori, multiple perspective and incorporates relevant (existing and new) knowledge and is flexible in changing social and climatic conditions.

The proposed research will occur alongside 3.2 Communicating risk and uncertainty to aid decision-making.

We will achieve this result though a multi-strand three step series of research activities (Figure 2).

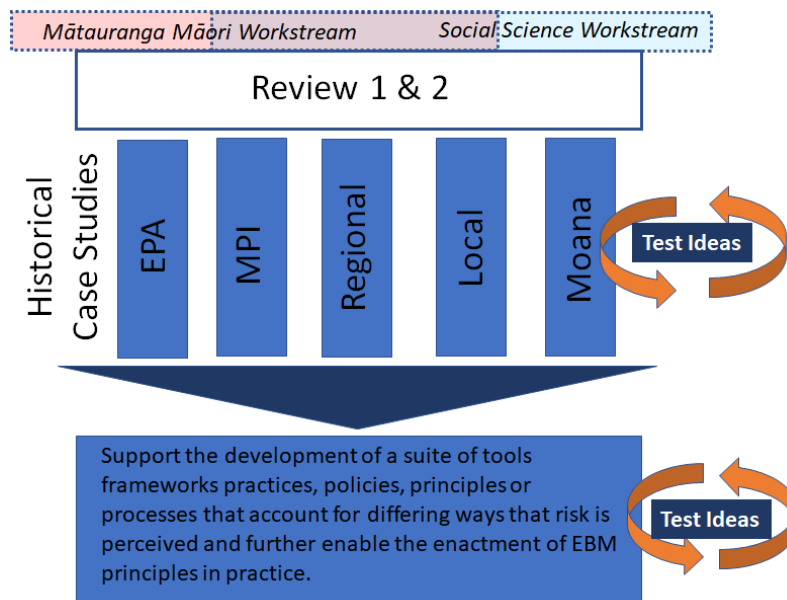


Figure 2: The proposed 3 step research process

Step 1: What can be learnt regarding perception of risk and uncertainty from existing knowledge? Mātauranga Maori, cognitive perspectives, social science perspectives and western scientific disciplines?

This step consists of two closely linked reviews that will occur concurrently and involve a small overlapping research team. It should be noted that these reviews will also occur in conjunction and co-ordination with the literature review in 3.2.

Review 1: Mātauranga Māori Workstream

We will adapt the work that has been done to date in Tranche 1 of Sustainable Seas including: *Hui-te-ana-nui: Understanding kaitiakitanga in our marine environment*, *Tūhonohono: tikanga Māori me te Ture Pākehā ki Takutai Moana*, *Whai Rawa, Whai Mana*,

Whai Oranga: Creating a world-leading indigenous blue economy and Mauri Moana, Mauri Tangata, Mauri Ora. Outputs from these Tranche One projects will inform our review of understanding risk perception from a kaupapa Māori perspective.

Additionally, work by Māori academics and consultants will help inform our understanding of risk perception (Hudson et al., 2016; Hutchings & Reynolds, 2005; Oldham, 2017; Oldham, 2018; Roberts et al., 2004; Satterfield & Roberts, 2008). Mātauranga Māori or expert Māori environmental knowledge that has been developed over hundreds of years through close association between Māori and the natural environment (Harmsworth & Awatere, 2013; Marsden, Henare, & Royal, 2003; Mead, 2003; Minhinnick, 1989; Roberts et al., 2004) can help inform marine management. Whakapapa – the connectivity between people and place, is essential for understanding Māori ontological approaches (both biophysical and spiritual) to resource management (Roberts, 2013) Additionally, Mātauranga Māori can help resource managers: understand potential vulnerability of keystone species to external threats like land-use effects and ocean acidification; with additional supporting evidence for bio-physical models; as well as raising community awareness of risk and vulnerability (Awatere, Harmsworth, & Pauling, 2013; Harmsworth & Awatere, 2013; King & Goff, 2006). Policy has also been developed by central government including He Whetu Mārama (Environmental Protection Authority, 2016) by the Environmental Protection Authority along with He Arotakenga Huringa Āhuarangi - A Framework for National Climate Change Risk Assessment for Aotearoa New Zealand (Ministry for the Environment, 2019) and the National Disaster Resilience Strategy (Ministry of Civil Defence & Emergency Management, 2018) for example. A review of mainstream tools, policies, processes and approaches and their alignment to Māori principles and ethics will be carried out in step 3. Findings from this review will also inform Project 3.2. Quarterly hui with 3.2 will identify how Mātauranga Māori informed policy approaches are suitable for communicating risk and uncertainty within the context of a Treaty of Waitangi partnership approach for managing marine ecosystems. Furthermore, the review will identify Mātauranga Māori understandings of risk and issues of significance and consequence to Māori partners. Quarterly hui with Project 3.2 will also provide insights into how the scenarios/tools developed by 3.2 RA3 and 3.2 RA4 can be informed by Mātauranga Māori and also how the scenarios/tools may be aligned to the needs of Māori partners.

Review 2 - Social Science workstream:

Perception of risk and perceived risk are all commonly used terms across a wide range of disciplines, each subtle nuances of meaning. This workstream will understand:

- How is perception of risk expressed and explored within cognitive perspectives, social science perspectives and western scientific disciplines?
- What can we learn about the differences in risk perceptions across different groups (Māori partners, government agencies, NGO's etc) from existing sources of literature and knowledge?
- Do different ways of perceiving risk and uncertainty apply differently to different objects of value and what implications might this have for different decisions at various scales, in particular the application of the precautionary principle.
- What tools, policies, processes and approaches for addressing risk and uncertainty already exist that have potential for application in marine management?
- How might these ways of thinking combine with and compliment research in other Sustainable Seas projects, particularly 3.2 Addressing risk and uncertainty.

The review will inform the cases study investigation and combine with the Mātauranga Māori review to interface with Te Ao Māori in a meaningful way. Also, the review, and subsequent discussion with other project teams (for example 3.2 Addressing risk and uncertainty, Tangaroa and enacting EBM projects) will inform case study selection for the social science stream to ensure pertinent elements are considered. We are hesitant to pre-select case studies because the outcomes of the reviews will influence the characteristics of the example we focus on. It should be noted that the case studies in the Mātauranga Māori research stream have been selected based around co-development partners.

To reiterate, the two reviews (Mātauranga Māori and social science) will occur concurrently and be carried out by a small research team who will ensure the production of a comprehensive integrated review document.

Step 2: How does perception of risk and uncertainty play out in decision making processes/collaborative processes in the multi-use marine environment?

This step will explore how perception of risk and uncertainty plays out in past and present decision making in New Zealand. For simplicity the two streams are described separately, but in practice the research will overlap and be undertaken by a connected group of researchers. Our intent is that case studies will represent a range of range of decision-making scales (national to local) from different perspectives (EPA to small local groups, kaitiaki and business to regulators).

Mātauranga Māori Workstream

This step involves interviewing Mātauranga Māori experts on their perception of risk and uncertainty within decision-making processes. Three case studies have been chosen, one with a central government authority tasked with promoting the consideration of Mātauranga Māori perspectives in the management of the EEZ, a second case study with the largest Māori owned seafood company – Moana NZ and a third case study with iwi/hapū kaitiaki via of Manaaki Te Awanui.

Interviews

We will also gather secondary data from the three case studies along with Mātauranga Māori/Māori environmental experts, including some experts who have been actively involved in the genetically modified organisms debate.

Research participants include:

- Mātauranga Māori experts – James Doherty (Ngāi Tuhoē), Kevin Prime (Ngāti Hine), Miria Pomare (Wai Māori Trust), Haupai Puke (Waikato), Rick Witana (Te Aupouri), Mahanga Maru (Ngāti Porou), Mānuka Henare (Auckland University), Jessica Hutchings (Tīaho Ltd), Mere Roberts (Auckland University), Dan Hikuroa (Auckland University), Simon Lambert (University of Saskatchewan), Darren King (NIWA), Garth Harmsworth (Manaaki Whenua), Tai Black (Te Whare Wānanga o Awanuiarangi), Wendy Saunders (GNS), Maui Hudson (University of Waikato), Kepa Morgan (Ngāti Makino Iwi Authority), Jamie Ataria (Lincoln University), Melanie Shadbolt-Black (MFE), Nick Waipara (Plant & Food), Aroha Mead (Ngāti Awa, Ngāti Porou), Mahanga Maru (Ngā Kaihautū Tikanga Taiao), Lisa Te Heu (Ngā Kaihautū Tikanga Taiao), and Kelly May (Ngā Kaihautū Tikanga Taiao).

Case Studies

We will work with the Environmental Protection Authority (EPA) (Erica Gregory), Moana NZ (Michelle Cherrington), Manaaki Te Awanui (Regan Fairlie) to develop risk assessment policy that considers Mātauranga Māori in a meaningful way. The EPA has a strategic framework for guiding EPA operations including the consideration of Mātauranga Māori (He Whetu Mārama) within resource consents for the EEZ. The opportunity is for our project to provide advice on how applicants meaningfully consider risk from a Māori perspective. Moana NZ have risk assessment approaches but are interested in developing tools for risk assessment that are informed by their core principles like kaitiakitanga and manaakitanga. Manaaki Te Awanui have been actively developing tools with the support of Sustainable Seas and other agencies to assist Tauranga Moana hapū and kaitiaki improve the ability to carry out their kaitiaki responsibilities. Utilising the learnings from the Tāhuhu Matatau Te Ao Tangaroa project, we will explore how Project 3.1 and 3.2 can support Tauranga Moana kaitiaki in risk assessment. Another desktop-based case study will identify how Mātauranga Māori was incorporated into public policy including the National Climate Change Risk Assessment for Aotearoa New Zealand and the National Disaster Resilience Strategy. These case studies will identify Mātauranga Māori definitions of risk and issues of significance and consequence to Māori partners and will be included as a co-output for Project 3.2 RA1b. Furthermore, findings from the case studies will help shape the content of the scenario development in Project 3.2 RA3. Through quarterly hui with Project 3.2 we will co-design the scenarios in order to ensure alignment with Māori partner priorities. Additionally, findings from the case studies will help shape the content, variables and outputs for the tool development in Project 3.2 RA4. Through quarterly hui with Project 3.2 we will co-design the tools in order to ensure alignment with Māori partner priorities. We will also support a national case study led by 3.2 that will identify tools for assessing risk that support the values and priorities of Māori partners.

Key Questions

- How do/can existing Mātauranga Māori tools policies, processes and approaches be applied to addressing risk and uncertainty in marine management?
- How is risk experienced, understood and expressed by Māori?
- How is Mātauranga Māori expressed in the submissions/evidence?
- How is Mātauranga Māori expressed in policies?

Social Science research stream:

Similar to the Mātauranga Māori research stream, we will undertake grounded research based in 3-5 case study examples. The case studies will be selected in consultation with co-development partners, key challenge partners (Ministry of Primary Industries, Ministry for the Environment, Environmental Protection Agency, Department of Conservation and local government) the challenge leadership and other project leads (especially Tangaroa projects, 3.2 Addressing risk and uncertainty and 1.1 Understanding ecological responses to cumulative effects) as well as shaped by the emerging results of the reviews in step 1.

Each case study will combine an exploration of relevant documents (submissions, EIA's etc) with in-depth interviews/hui/discussions to understand what role risk and uncertainty played and how each party understood and expressed risk and why? Key questions will be refined by the reviews but will likely include:

- How is risk experienced, understood and expressed by the key groups involved? Is one perspective privileged over others?
- How is risk expressed in the submissions/evidence?
- What were the key points of agreement and conflict regarding risk perception?
- Are some actions or activities considered too “risky” to engage in?
- What role did perceptions risk and uncertainty play in the decision? And how?
- Do different risk perceptions fuel contestation in multiuse/r spaces with multiple decision-makers each acting in their own?

- How have models and scientific data been applied within the process, what were the advantages and disadvantages of the tools used?

Participants will include Communities, Māori partners, Non-Government Organisations, Ministry of Primary Industries, Ministry for the Environment, Environmental Protection Agency, Department of Conservation and local government where appropriate for each case study.

Step 3: Looking for commonality and working with difference

We will use a thematic analysis (after Flick et. al., 2009) to draw together the common threads in how risk and uncertainty is perceived experienced and understood by Māori partners, stakeholders and management agencies. As such, we will acquire new knowledge regarding how typologies of risk perception exist and if variation in risk perception and subsequent preferences/choices/actions affects contestation in the multi-user marine environment. We will focus on two key aspects:

1. Looking for commonality in ways of approaching risk in order to in support tools policies, processes and approaches to decision-making where risk perception is likely to generate disagreement.
2. But also, looking for, and working with difference, where different tools speak to groups in a way that works for them, but not necessarily others. Mātauranga Māori tools, policies, processes and approaches may fit into either group.

As the analysis proceeds, information of direct relevance to other to other projects, in particular 1.1 Understanding ecological responses to cumulative effects, Theme 4 projects, Tangaroa projects, Blue Economy and Innovation projects (as are they are funded) will be discussed with lead researchers.

In combination, the three steps across the two interfacing research streams will frame what types of processes, tools and practices could provide mechanisms to jointly explore risk and uncertainty in a way that suits the diversity of ways in which risk is understood and experienced. In particular, approaches situated within Māori principles and ethics will be favoured.

Our thinking will be tested with participants, co-development partners and Mātauranga Māori experts, other challenge researchers as it emerges at key points in the project evolution. Key partners will be involved in the framework development at multiple stages of the project. Iterative processes will be utilised to ensure outputs are consistent with stakeholder/partner priorities. Reviews will be evaluated by partners/stakeholders and their feedback incorporated. Similar processes will be utilised for the framework development. We will employ a two-way approach for the framework to ensure that genuine co-development is carried out. In particular, close links will be formed with 3.2 Addressing Risk and Uncertainty to facilitate the exchange of ideas and thinking on enhancing practices for addressing risk and uncertainty in the marine environment. This may include the addition of cognitive, social and cultural elements to existing tools or using narratives, however, the types of mechanism will depend on the outcome of this research. Ultimately, this research will enable a more nuanced understanding of how risk and uncertainty affect the range of views and preferences expressed in marine management. As such, resource managers/decision makers/kaitiaki will be better equipped to apply mechanisms (tool processes and practices) that work with commonality, yet are cognisant of difference, but overall, further enable negotiation surrounding enactment of EBM in practice.

L. LINKS TO PHASE I RESEARCH

We will adapt the work that has been done to date in Tranche One of the Tangaroa programme including: *Hui-te-ana-nui: Understanding kaitiakitanga in our marine environment*, *Tūhonohono: tikanga Māori me te Ture Pākehā ki Takutai Moana*, *Whai Rawa*, *Whai Mana*, *Whai Oranga: Creating a world-leading indigenous blue economy* and the Valuable Seas project *Mauri Moana*, *Mauri Tangata*, *Mauri Ora*. Outputs from these Tranche One projects will inform our review of understanding risk perception from a kaupapa Māori perspective. Similarly, *Frameworks for achieving and maintaining social licence*, *Navigating marine socio-ecological systems*, *Tipping points in ecosystems structure function and services* and *Novel risk assessment tools for EBM* will provide relevant insights and knowledge regarding how risk and uncertainty is perceived, described, understood, and acted on. Our initial tasks will include reviewing the outputs from tranche one projects.

M. LINKS TO & INTERDEPENDENCIES WITH PHASE II RESEARCH PROJECTS

The strongest interdependency is with 3.2 where the information regarding different ways of perceiving risk will be interfaced with work grounded in techno-science perspectives and practice on risk and uncertainty. We will work closely with 3.2 to identify opportunities to integrate a more nuanced concept of risk and uncertainty based on the risk perception framework and principles informed by Mātauranga Māori and multiple ways for understanding risk. The proposed research section outlines in detail the linkages with 3.2. The primary role for 3.1 is to help inform the suitability of diverse tools and approaches with respect to the end-users that are engaged and identify the contexts that the tools can be usefully applied. Other links that will crystallise over time include:

- 1.1 Understanding ecological responses to cumulative effects links with the research on “How does ecological degradation and recovery affect what people value and how do these values vary with time across Māori, stakeholders and society?”
- 1.2 Tools for incorporating ecological responses to cumulative effects into management action
- 3.3 Risks to businesses from investment and environmental uncertainty (once underway)

- 4.5 Enabling EBM at different scales
- T1 Awhi Mai Awhi Atu: Enacting a kaitiakitanga-based approach to EBM
- T2 Huataukina o hapū e!
- T3 Ngā Tohu o te Ao
- T5 He Kāinga Taurikura ō Tangitū: Treasured Coastal Environment

The exact nature of these links will be clarified once the initial reviews are well underway and the emerging results have been discussed with the relevant project leaders. This conversation will also include discussion of suitable case studies.

N. VISION MĀTAURANGA (VM)

We recognise that a co-developed approach provides more useful outcomes for Māori than a standard desktop analysis or the rollout of a spreadsheet or GIS application because the research becomes more aligned to Māori aspirations and needs. Interacting with kaitiaki, planners and policy analysts using kaupapa Māori research practices of whanaungatanga and kanohi ki te kanohi are therefore essential parts of our research approach. This research will contribute to three Vision Mātauranga themes:

- Taiao: by a) working with Mātauranga Māori experts, Māori planners and policy analysts and drawing on relationships with Te Taiao, to understand potential vulnerability of keystone species to external threats like land-use effects and ocean acidification from a kaupapa Māori perspective. We will identify tools/processes and frameworks to define risk and uncertainty to marine resources with various mātauranga Māori experts from universities, whare wānanga, central government agencies and iwi/hapū/Māori.
- Hauora/Oranga: by improving wellbeing through a greater understanding of the definition of risk and uncertainty from a kaupapa Māori perspective can be developed to ensure kaupapa Māori responses are utilised to address cumulative impacts to marine resources.
- Mātauranga: by a) utilising local knowledge and mātauranga to help inform pathways to implementation such as tools/processes and frameworks, and b) by helping to empower iwi/hapū/Māori decision makers in resource management to actively rediscover, share and implement kaupapa Māori based solutions for marine planning.

Vision Mātauranga Deliverables

Partnerships:

VM P1. Research partners with mātauranga Māori, Māori business and decision-making expertise are clearly identified and involved at key milestone and output points throughout the project. In particular Environmental Protection Agency (Erica Gregory), Moana NZ (Michelle Cherrington) and Manaaki Te Awanui Trust (Regan Fairlie)

Distinctive Contribution:

VM D1. A Māori business perspective on risk and knowledge of the challenges Māori business face in the utilisation of marine resources is captured and addressed in tool development

VM D2. Local level Māori knowledge and practical experience has informed the refinement of tools, practices and process.

Meaningful Outcomes:

VM M1. Applicants to the EPA, for consents within the EEZ, have clear guidance on how to meaningfully consider risk from a Māori perspective.

VM M2. The development of risk assessment tools, practices and processes for Māori businesses that are informed by their core principles like kaitiakitanga and manaakitanga (Moana NZ)

VM M3. Tauranga Moana hapū and kaitiaki have an improved ability to carry out their kaitiaki responsibilities through support in risk assessment processes practices and tools (Manaaki Te Awanui)

O. ENGAGEMENT REQUIRED WITH IWI AND STAKEHOLDERS

- Engagement will occur through-out the 3 different research steps in both the Mātauranga Māori and social research streams.
- Our primary point of contact in the Mātauranga Māori stream will be with representatives of the EPAs Kaupapa Kura Taiao team. This team is essential for socialising and promoting the uptake of Māori perspectives of risk with respect to applicants for marine consents within the Exclusive Economic Zone. We will also be working with Michelle Cherrington from Moana NZ to apply to their investment strategies. Our primary iwi/hapū representative is Regan Fairlie of Manaaki Te Awanui. Regan has been allocated resource to ensure an iwi perspective helps inform the risk framework. At the same time, we will be engaging with a number of Mātauranga Māori experts to inform the principles for a risk framework.
- Case studies in the social science stream Step 2 will require interaction with locally relevant communities, Iwi/hapū, Non-Government Organisations, Ministry of Primary Industries, Ministry for the Environment, Environmental Protection Agency, Department of Conservation and Local Government.

- Our thinking regarding the framework/guidance will be tested and refined with participants, co-development partners and Mātauranga Māori experts, and challenge researchers.
- Engagement activity will be distributed, small scale, fit for purpose discussion and hui. However, in the spirit of co-development a large workshop towards the end of the project can be accommodated if the partners feel it's important.

P. PROJECT COMMUNICATIONS

Our audience is broad because we are seeking to broaden the framing of risk and uncertainty to include the many ways that risk is perceived, experienced and understood. Therefore, our audience is iwi/hapū/kaitiaki/Māori, Non-Government Organisations, Ministry of Primary Industries, Ministry for the Environment, Environmental Protection Agency, and Department of Conservation, Local Government and Scientist. They will be reached through research activities (case studies, interviews hui), conference presentations, participation in sustainable seas events, publications, and popular articles. The primary means of communication will be face to face with key partners which will facilitate access to our partners networks.

Q. RISK & MITIGATION

The main risks to this project a potential failure to engage participants in the project or secure the documentation required to confidently undertake the research and present robust findings This will be mitigated by careful selection of case studies drawing on the co-leaders networks and connections as well as the knowledge of the co-development partners and the connections in the wider challenge. We have agreement in principle to assist with final case study selection from MPI, and EPA. A further risk is timeline slippage due to the institutional demands on the co-leaders time (both are team leaders), this has been mitigated through compiling a very strong team of researchers who able to carry on regardless!

R. CONSENTS & APPROVAL required to undertake research

Human ethics approval will be sought through the NIWA and/or MWLCR human ethics process. Both processes operate in accordance with the international social science research standards and practices. Given the low risk of harm as a result of this research it is unlikely an application will be declined. Approval processes for NIWA and MWLCR ethics applications are rapid as they are processed as required rather than based around monthly committee meetings.

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