Phase II Research Proposal

A. PROJECT TITLE	He Kāinga Taurikura o Tangitū: Treasured Coastal Environment
"SHORT" TITLE	He Kāinga Taurikura o Tangitū
B. THEME / PROGRAMME	Tangaroa

C. PROJECT KEY RESEARCHERS (CVs for all listed to be provided in SharePoint container using template provided in container)

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D. CO-DEVELOPED WITH

Name	Role	Organisation / company / agency	Level of partnership
Tania Hopmans	MTT Toihau, Chair; tangata whenua representative for MTT (and the hapū it represents) on the Regional Planning Committee of the Hawke's Bay Regional Council, 2012-current	Maungaharuru-Tangitū Trust / Maungaharuru-Tangitū Charitable Trust (MTT)	Co-development partner
Lee Grace	MTT Kaiwhakahaere Matua, Chief Executive Officer	Maungaharuru-Tangitū Trust / Maungaharuru-Tangitū Charitable Trust (MTT)	Co-development partner
Erica Williams	Pou Whakarae – Te Hiringa Taiao	NIWA	Proposal co-development coordinator and NIWA project team mentor (CV also provided). Input to the project will be supported by co-funding from NIWA

E. ABSTRACT

He Kāinga Taurikura o Tangitū is co-designed to deliver research that recognises and provides for Maungaharuru-Tangitū hapū rights and interests. Hapū have distinct cultural knowledge, values, and perspectives that establish their identity, responsibilities, and rights to manage and use natural resources. However, the current lack of recognition of hapū/iwi values and interests in the marine coastal environment is a core weakness of current decision-making processes. It is recognised that there is enormous potential for the use of mātauranga Māori to improve decision-making, particularly through more holistic and integrated planning and policy, in order to achieve desired eco-cultural goals and improved outcomes for Aotearoa-New Zealand's marine estate.

Coastal hapū require access to high-quality information produced by the latest technological advances deployed at culturally appropriate temporal and spatial scales to inform their own debates, decision making and research strategies, and to assist them to assess the effects of regional and national government policies and programmes relating to Māori. It is widely accepted that the multiple dimensions of cultural values, beliefs and practices are interrelated in complex ways which are difficult to capture using biophysical monitoring approaches alone. Therefore, this research is centred around understanding the current state and drivers/pressures on a case study taonga species - kuku (green lipped mussels) populations - within their rohe moana. Maungaharuru-Tangitū hapū mātauranga will be revitalised and repackaged alongside new datasets provided by the latest scientific technologies/tools to populate a Cultural Assessment Framework to inform local and regional decision-making processes, ki uta ki tai.

F. RELEVANCE TO CHALLENGE OBJECTIVE

In line with the Tangaroa programme, this project is co-designed to deliver research that recognises and provides for Maungaharuru-Tangitū hapū interests.

This project aims to contribute to the realisation of the following Challenge success measures:

- Challenge research being incorporated into policy frameworks to support EBM (in this case hapū policy frameworks in the first instance),
- Tools and knowledge developed for use in marine environment decision-making (for the benefit of the outcomes sought by hapū in the first instance), and
- Maungaharuru-Tangitū hapū knowledge, rights, interests and values underpinning project outcomes and outputs.

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:
O1	Introductory project brief		To distribute to Maungahauru-Tangitū whānau via MTT communication pathways
O2	Draft conceptual map		To guide semi-facilitated group exercises during wānanga (#1) with Maungahauru-Tangitū hapū kaitiaki
O3	Revised conceptual map/framework		Collation and visualisation of results gained through semi-facilitated group exercises during wānanga (#1) with Maungahauru-Tangitū hapū kaitiaki
O4	Supplementary information brief for hapū kaitiaki outlining each technology being assessed		To guide semi-facilitated group exercises during wānanga (#2) with Maungahauru-Tangitū hapū kaitiaki
O5	Collaborative tool/technology Implementation Plan (to guide fieldwork)		Co-designed and agreed implementation plan (to guide collaborative fieldwork) for technologies prioritised by Maungahauru-Tangitū hapū kaitiaki
O6	Seafloor maps		Visualisations of selected datasets to guide analysis and interpretation by Maungahauru-Tangitū hapū kaitiaki
O7	Final report on all phases of the research project for MTT		Final report for MTT that collates all of the approaches and information gathered during this project centred around the development of an inaugural Cultural Assessment Framework focusing on kuku. The datasets/knowledge collated can be repackaged from this "master" report for use by MTT in numerous fora, including: their Hapū Environmental Management Plan; and MTT input to the (a) Mana Whenua Steering Group (Port of Napier), (b) governance and community panels developing the Coastal Hazards Strategy, (c) governance roles on the Regional Planning Committee of the Hawkes Bay Regional Council, (d) governance roles on the Pan Pac Environment Trust, (e) in support of tangata kaitiaki (authorisers of customary fishing permits), and (f) as participants in the Mai Paritu Tai Atu ki Turakirae Fisheries Forum.

H. OUTCOMES	This project will contribute to the following Theory of Change Outcomes:
3	Knowledge from the Challenge (science, including mātauranga) is used in decision making to improve ecological

	health and influences Aotearoa New Zealand's marine management practice and policy
4	The complementarity of local expressions of Kaitiakitanga and EBM are well understood and enabled
8	Researchers and iwi and stakeholders involved during the life of the Challenge continue to actively promote, research in, and use knowledge from the Challenge

I. INTRODUCTION

Maungaharuru-Tangitū Trust (MTT) is a northern Hawke's Bay post settlement governance entity established in 2012 to represent a collective of hapū including Ngāti Marangatūhetaua, Ngāti Kurumōkihi, Ngāti Whakaari, Ngāi Tauira, Ngāi Te Ruruku and Ngāi Tahu. The main activities of the Trust include strategic governance and management and acting as a representative body in all matters to foster cultural, environmental, social, spiritual, and economic wellbeing and advancement.

During the last two decades Maungaharuru-Tangitū hapū have become more vocal in seeking greater recognition of their cultural beliefs, values and practices, including recognition of their role as kaitiaki in various legislation. For example, in 2017 an application was made to the High Court by MTT for orders recognising protected customary rights and customary marine title under Section 100(1) of the Marine and Coastal Area (Takutai Moana) Act 2011 (MACA), in relation to an Application Area in the Hawke's Bay region. To support this process, a baseline of existing scientific knowledge was collated as one of the multiple lines of evidence used to support MTT's application [1,2]. While this preliminary analysis identified multiple synergies between mātauranga-a-hapū and science, it also identified that the coarse scale of available scientific information was a limiting factor when considering this information alongside the mātauranga of Kaumātua and Rangatahi which was able to be contextualised within personal experience and often at a finer scales (e.g., a particular reef) [1,2].

Hapū have distinct cultural knowledge, values, and perspectives that establish their identity, responsibilities, and rights to manage and use natural resources. However, the current lack of recognition of hapū/iwi values and interests in the marine coastal environment is a core weakness of current decision-making processes. It is recognised that there is enormous potential for the use of mātauranga Māori to improve decision-making, particularly through more holistic and integrated planning and policy, in order to achieve desired eco-cultural goals and improved outcomes for Aotearoa-New Zealand's marine estate [e.g., 3].

Coastal hapū require access to high-quality information produced by the latest technological advances deployed at culturally appropriate temporal and spatial scales to inform their own debates, decision making and research strategies, and to assist them to assess the effects of regional and national government policies and programmes relating to Māori [e.g., 3-5]. It is widely accepted that the multiple dimensions of cultural values, beliefs and practices are interrelated in complex ways which are difficult to capture using biophysical monitoring approaches alone. Therefore, mātauranga Māori and other complementary datasets must be provided and interpreted by whānau experts often within the unique context/place within which the knowledge was/is being generated. These complexities mean that conceptual frameworks that integrate cultural and ecosystem components need to be developed to overcome the artificial divides between humans and the environment, to be cognisant of the tikanga and context underpinning the knowledge provided by Mana Whenua, and to reinforce the need for collaboration between mātauranga Māori and other sciences [6].

J. AIMS

This project will explore three progressive research questions:

RA1. How do we utilise both mātauranga Māori- and science-informed attributes and indicators of coastal ecosystem health and wellbeing to determine state and trends for coastal cultural values/taonga species and influence decision-making processes to reduce anthropogenic impacts on He Kāinga Taurikura?

RA2: What robust and accessible tools and technologies do hapū need to support kaitiaki in their assessments of coastal ecosystem health and wellbeing?

RA3: How do we generate ecosystem-based management opportunities to move from theory to practice whilst empowering hapū knowledge systems and kaitiaki capacity within a Treaty-based coastal management context?

K. PROPOSED RESEARCH

This 18-month project will co-develop a Cultural Assessment Framework (CAF) that draws mātauranga Māori and ecological datasets together in structured ways to support kaitiakitanga and inform local decision-making, thus taking EBM from theory into practice within a Hawkes Bay Treaty-based coastal management context (Figure 1).

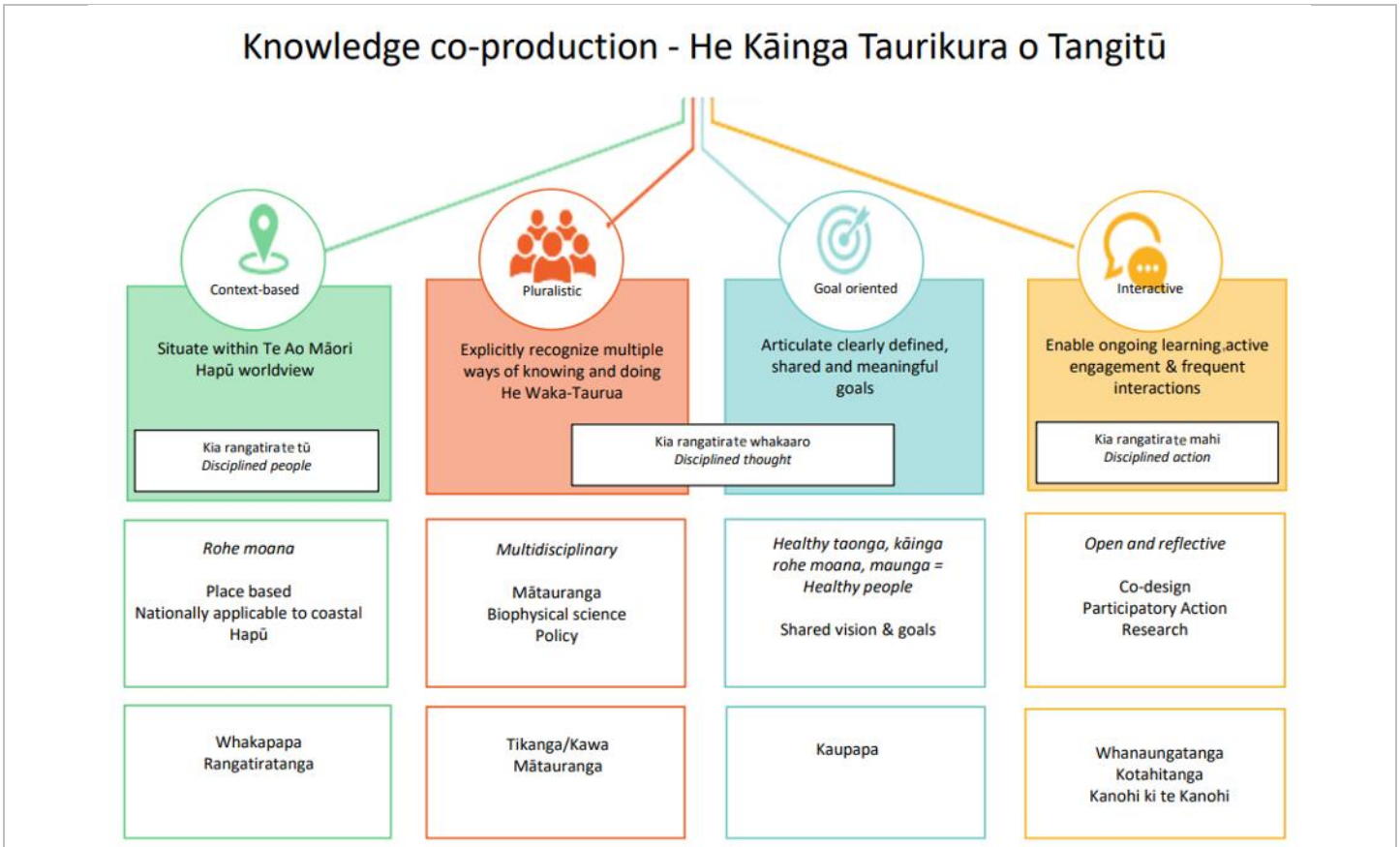

Figure 1: *Overarching framework to guide knowledge co-production for the He Kāinga Taurikura ō Tangitū project as guided by Maungaharuru-Tangitū hapū principles and transcendental Māori values (adapted from Norström et al. 2020 and MTT 2020 [7,8]).*

This project is co-designed to respond to a strategic need of the Maungahauru-Tangitū Trust [8,9]. It is situated within the cultural/spatial context of the Tangitū rohe moana, focusing on a taonga species of importance to the health and wellbeing of the Hapū (Figure 2) which is under threat due to anthropogenic pressures and the impacts of fragmented management.

He Kāinga Taurikura ō Tangitū: Treasured Coastal Environment		
Strategic Drivers	**Focus Area Ki Uta Ki Tai**	**Focus Taonga Species**
Maungaharuru-Tangitū Strategic Plan 2020-2024: He Kāinga Taurikura, Caring for and protecting our environment – Kaitiakitanga – building our understanding, connectedness and involvement with our environment Outcomes sought: understanding and monitoring our environment; having a plan in place to manage our environment; and environmental authorities and agencies understanding our aspirations and concerns for our environment	> Te Ngarue/Pākuratahi catchment > Moremore mātaitai reserve > Tangitū rohe moana > Te Matau-ā-Maui (Hawke's Bay)	Kuku, green lipped mussel (*Perna canaliculus*) Inclusive of: > Hapū/cultural practices and knowledge systems that are dependent on kuku > Tangitū rohe moana ecosystem health interdependencies (e.g., biodiversity)

Figure 2: *Strategic, spatial and taonga species context underpinning the design of the He Kāinga Taurikura o Tangitū project.*

The project will explore the three research questions via four interconnecting and progressive phases which are explained in more detail below: (1) Identify attributes, indicators and targets; (2) Identify new tools and technologies to complement mātauranga-a-hapū (3) Application and evaluation of technology effectiveness and cultural acceptability; and (4) Cultural Assessment Framework and adaptive management. This will be delivered by a team from Maungaharuru-Tangitū hapū, MTT and NIWA – bringing together the complementary skillsets required, including mātauranga and tikanga Māori, kaupapa Māori research, marine ecology, remote-sensing techniques, cultural assessment frameworks, knowledge/data analysis and visualisation, communication and outreach, and planning and policy.

Phase 1: Identify attributes, indicators and targets – He Waka Hourua

We will draw on the He Waka Hourua metaphorical framework (Figure 3) to facilitate the identification of attributes, indicators and targets, incorporating Maungaharuru-Tangitū hapū ways of assessing and communicating state (e.g., Mauri Mate, Mauri Moe, Mauri Oho, Mauri Ora, [10]), trends, and pressures/drivers on mussel populations and associated cultural practices within the Tangoio rohe moana.

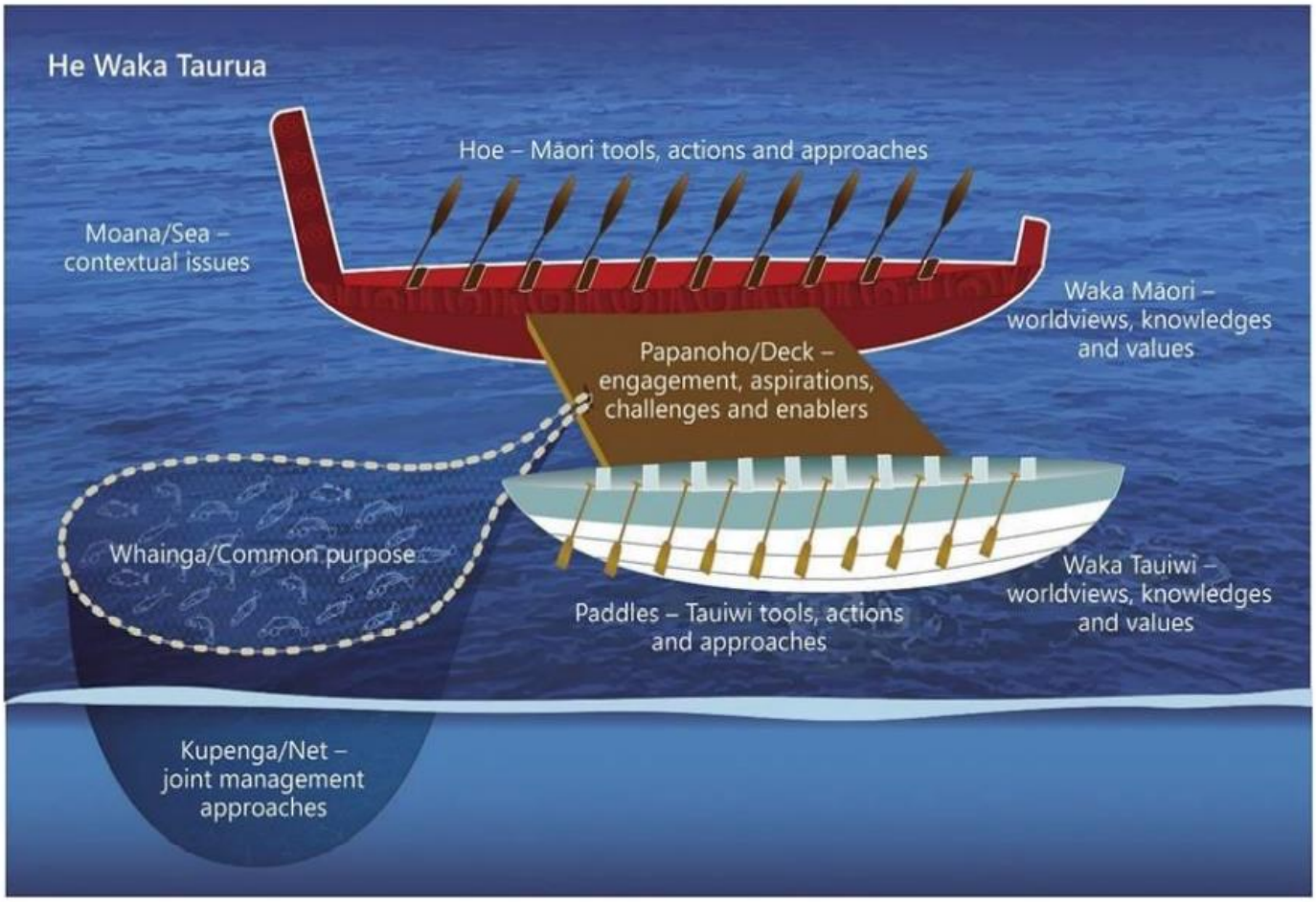

Figure 3. *He Waka Hourua metaphorical framework which recognises Indigenous worldviews, tools and approaches equitably alongside international initiatives such as EBM (adapted from Maxwell et al. 2020 [11]).*

In the first instance we will complete a desk-top based exercise to leverage the existing literature and knowledge available through previous MTT research projects, to reanalyse and revitalise mātauranga-a-hapū to collate a list of potential attributes and indicators that kaitiaki and whānau harvesters have used to describe their past and present experiences, associations and targets for the future of their rohe moana and associated kuku populations. We will visualise this as a draft conceptual map that reflects what is known, felt and understood by whānau (i.e., their mātauranga) in a way that helps to communicate their stories. This approach will enable us to carry forward the intentions, knowledge and aspirations of whānau who are no longer with us into the future.

Through a wānanga with hapū kaitiaki, we use this conceptual map to facilitate discussions around the current state of their rohe moana and kuku populations, and how we could assess this over time. We will use techniques such as mind maps and post-it noting to capture these discussions and visualise how hapū kaitiaki conceptualise attributes (e.g., harvest preferences, health, ecosystem interdependencies), indicators (e.g., harvest effort indices, density, condition index) and the goals or targets they are seeking. This leads into Phase 2 where we will identify and interrogate the tools/technologies hapū kaitiaki need to populate their CAF (Phase 4).

Phase 2: Identify new tools and technologies to complement mātauranga-a-hapū

Through a wānanga with hapū kaitiaki, we will discuss the utility of multiple leading-edge technologies for increasing the evidence base within He Kāinga Taurikura. From these discussions we will advise on a long-term plan for these subtidal habitats that will: a) establish quality baseline information about the habitats present and their distribution; b) set-up key processes, protocols and interfaces that will enable Maungaharuru-Tangitū hapū to complete ongoing monitoring; and c) provide a pathway to integrating additional evidence (e.g., eDNA) into assessments of degradation and the causes of degradation.

With hapū kaitiaki we will review a range of key monitoring technologies and techniques and help to design an appropriate set of monitoring tools that will provide actionable evidence to aid Kaitiakitanga. The tools discussed will include:

1. Low-resolution (0.5-4 km) satellite imagery (key water quality information),
2. Moderate resolution (10-100 m) satellite imagery (possible broad-scale habitat metrics),
3. High resolution (< 1 m) commercially available satellite imagery (small scale habitat metrics possible),
4. eDNA methods,
5. Ship-based acoustic mapping, and
6. Drone and ROV technologies.

Depending on the outcomes of the review and prioritisation exercise in Phase 2, we will implement a fieldwork campaign in Phase 3 that will deploy direct and indirect methods to assess the health of coastal reef habitats. We will utilise mātauranga-a-hapū, and local knowledge and experiences to inform the implementation of tools (e.g., where, when, what and how) to quantify the coverage of key habitats (mussel beds). Overtime this will enable assessments of the relationships between broad scale processes (e.g., temperature) and local scale (e.g., land-use changes) processes. We will help/provide hapū with the tools and procedures they need to provide timely information, but also provide mechanisms for more advanced interpretation as related to broad-scale datasets.

Phase 3: Application and evaluation of technology effectiveness and cultural acceptability

Whilst not wanting to pre-empt the outcomes from Phase 2 (i.e., hapū prioritisation of new technologies they want to test), we also want to provide the Challenge with confidence that we have plan in place to explore RA2. Here we expand on two potential technologies that have not been used by and for the benefit of Maungaharuru-Tangitū hapū and the realisation of their rohe moana management goals.

(Technology option 1) BoxFish ROV and drop cameras

Following co-development of a monitoring strategy, we will collaboratively perform an in situ monitoring campaign that will use new state-of-the-art technology (i.e., Boxfish ROV), as well as more readily attainable imaging tools (i.e., drop cameras) to provide information on mussel bed health and biodiversity [12]. These tools will allow Maungaharuru-Tangitū hapū to directly view these environments without the risks, hazards, and capability limitations associated with, for example, SCUBA diving. Where applicable (as per "Phase 2"), these direct imaging tools will enable the cross-calibration of "indirect" tools (i.e., eDNA).

We will provide broad-scale "maps" of mussel beds using photogrammetric techniques [13]. For example, previous work has shown that small scale (c. 10 m^2; Figure 4) and large-scale (c. >500 m^2; Figure 5) areas can be mapped and reproduced using ROVs. Because these areas can be accurately scaled, multiple metrics such as population size structure and total biogenic habitat extent can be quantified. These maps will provide a baseline reference to compare and contrast with hapū-led monitoring.

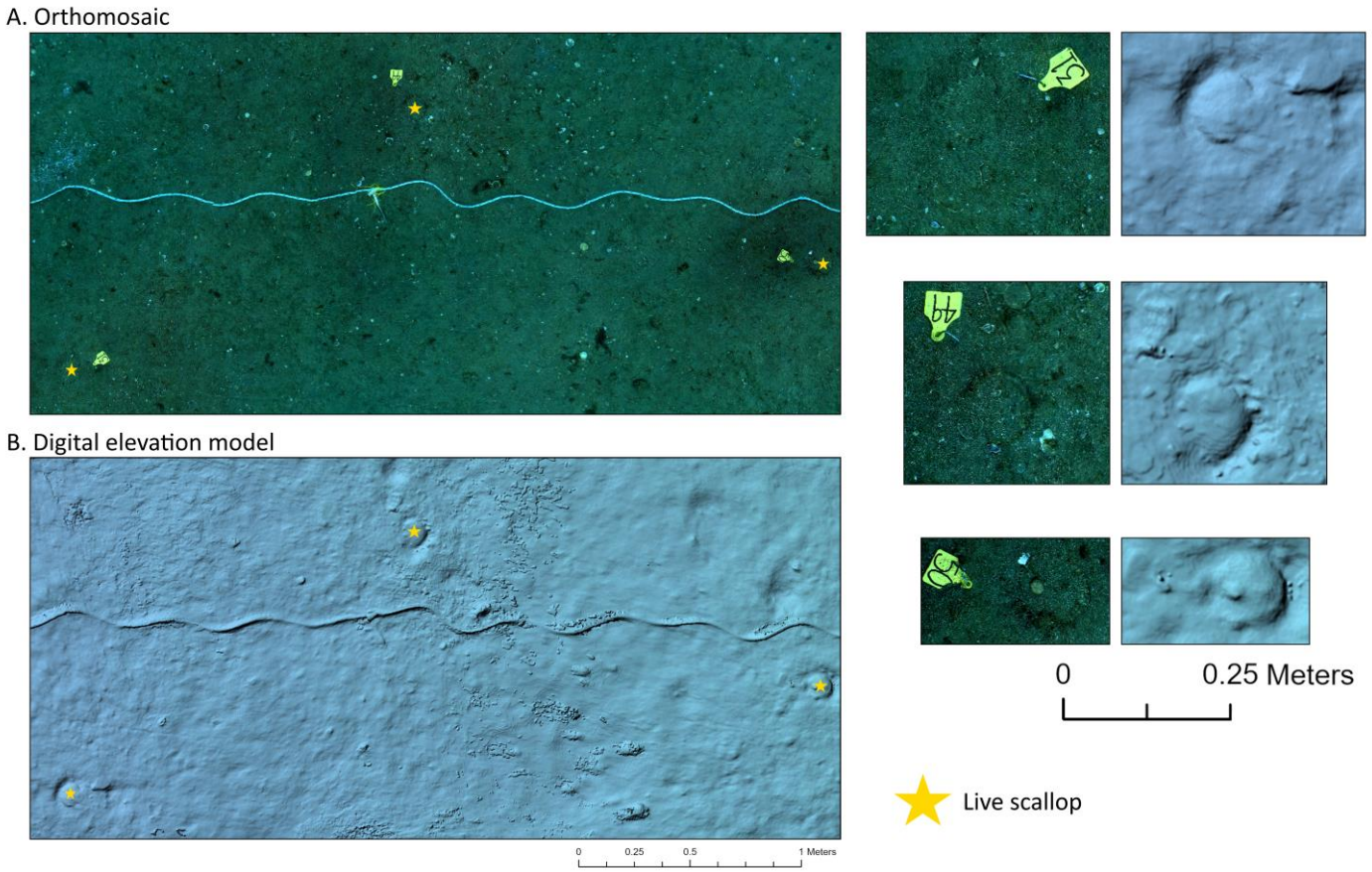

Figure 4. *Example ROV imagery recreation for delimiting and sizing scallops. Two key products, an 2D orthoimage (A) and a digital elevation model (B) can provide multiple views of the same benthic environment.*

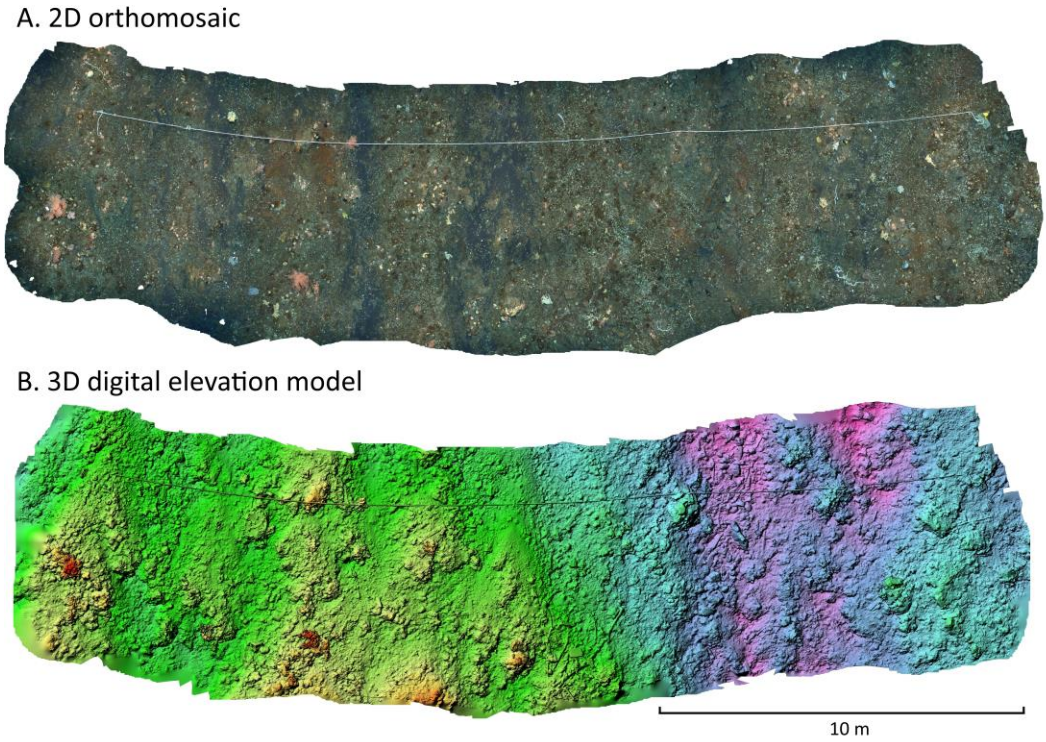

Figure 5. *Broad scale reconstruction of benthic habitats shown as by an 2D orthoimage (A) and a digital elevation model (B) can provide multiple views of the same benthic environment.*

(Technology option 2) eDNA for ecosystem biodiversity assessments

Alongside ROV and drop camera sampling we will also take water samples for calibration of eDNA methods. DNA metabarcoding provides a cheap (and getting cheaper), practical, and accessible method for marine sampling and the simplicity of the sampling method is ideal for facilitating community engagement [14]. DNA metabarcoding provides a powerful and rapid method for identification of organisms within sediment and seawater to obtain marine biota data from all trophic levels [15,16]. Environmental DNA can provide presence information on the target species (i.e., mussels), but also information on species present in the wider ecosystem, informing knowledge of ecosystem structure, food webs, and biodiversity of the habitat [17]. This is particularly important for MTT.

In a freshwater, Wood et al. (2020 and 2021) [18,19] found sampling midstream at every 400 m is sufficient to detect a single fish at low velocity, but sampling efforts need to be increased at higher water velocity (every 100 m in the systems surveyed in their study). A marine study was able to pick up small spatial scale (<5 km) differences in fish (16S rRNA gene), crustacean (16S rRNA gene) and eukaryotic (cytochrome oxidase subunit 1) diversity in areas with tidal and along-shore water flows, indicating limited dispersal of DNA between habitats and the ability to distinguish communities between habitats [20]. Thomsen et al. (2012) [21] found that DNA fragments degraded within days in seawater, indicating that positive eDNA signals indicate recent species presence. Oka et al. (2021) [22] applied eDNA metabarcoding on a fish community with remarkably high species richness in a marine coral reef lagoon in Okinawa, Japan. DNA metabarcoding detected a larger number of species than traditional sampling methodologies and was also able to distinguish a difference in the fish communities between the reef's edge and the shore-side seagrass bed even in a small lagoon – indicating that this technique can pick-up small-scale habitat differences in marine biodiversity.

We propose collecting eDNA via two methods: 1) water samples near and away from key subtidal reef habitats, and 2) utilising the integrated filtering of material by the mussels to extract eDNA samples. An individual mussel can filter in excess of 500 litres of seawater a day [23], making it a perfect natural eDNA sampler. The use of filter-feeding sponges as eDNA sources has provided integrated samples which include DNA from micro-organisms to marine mammals [24]. The success of such a method would obviate the need for specialised equipment and dedicated sampling (e.g., "sampling" would be an outcome from any kai moana harvesting). Furthermore, by combining kai moana gathering with novel eDNA assessments (i.e., setting aside a small proportion of a catch to be sent away for analysis) we can directly tie perceived and quantified overall mussel bed health metrics with changes in the eDNA profiles within the mussels themselves. In this way we can begin to develop empirical relationships between eDNA profiles, mussel bed health, and possible stressor sources which we anticipate will be important to the Maungaharuru-Tangitū hapū.

By simultaneously understanding the size of subtidal mussel stocks and eDNA profiles it may be possible to attribute degradation of mussel beds to particular eDNA profiles, for example, accumulation of DNA of terrestrial origin within mussels may signal increasing influence of land-based run-off. If this is coupled with declining stocks then Maungaharuru-Tangitū hapū will have evidence to complement their observations and in depth understanding of their rohe moana.

Phase 4: Cultural Assessment Framework and adaptive management

In the context of this project the term Cultural Assessment Framework (CAF) refers to a framework that is derived from Maungaharuru-Tangitū hapū values, incorporating Maungaharuru-Tangitū hapū ways of assessing state, which is inclusive of assessment tools and approaches that are based on mātauranga-a-hapū, community and scientific knowledge (Figure 6). This leans heavily on work completed in the cultural indicators space such as the Cultural Health Index [25,26], the Murihiku Cultural Water Classification System [27], and other eco-cultural frameworks developed specifically to support the environmental management aspirations of Māori [e.g., 28 and references therein].

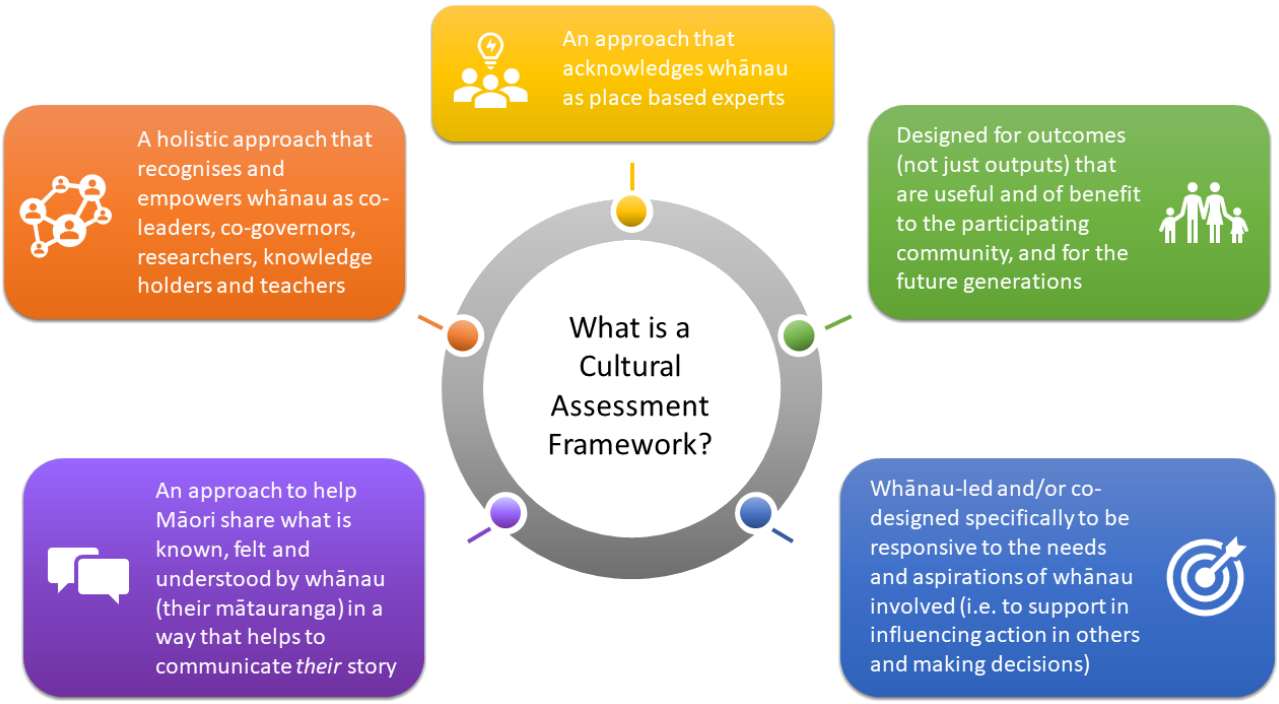

Figure 6. *Common components underpinning the design of Cultural Assessment Frameworks (Source: Ratana et al. 2020)* [29].

Values-based CAF which focus on the unique cultural values and practises of hapū/iwi have been developed, for example, by Ngāi Tahu ki Murihiku [27] and Ngāti Maniapoto [29]. This approach typically includes a combination of indicators that support whānau assessments of current state, including key pressures/drivers and sometimes governance, policy and restoration actions. Each CAF is uniquely shaped by mana whenua, and guided by the targets or outcomes they are seeking, however, commonalities in the benefits and outcomes sought are evident, including recognising whānau/kaitiaki as leaders, experts, designers, deliverers and communicators of their CAF [29].

We have chosen the CAF approach for this project because it also aligns with freshwater restoration projects Maungaharuru-Tangitū are currently delivering in their takiwā [e.g., 30] – and is an approach that can be adapted, ki uta ki tai [e.g., 31]. We will use the knowledge and datasets generated in Phases 1-3 to populate a draft CAF for kuku and ground-truth this with hapū kaitiaki through a wānanga. The outcomes from this project will be compiled into a report for MTT within which we also will demonstrate how the key principles of EBM [e.g., 32] align with a hapū-driven CAF approach.

L. LINKS TO PHASE I RESEARCH

The proposed project links to the following Phase I workstreams:

- 1.1.1 Testing EBM-supportive participatory processes for marine management
- 2.1.2 Mauri moana, mauri tangata, mauri ora – Documenting social values
- 3.1.1 Hui-te-ana-nui: Understanding kaitiakitanga in our marine environment
- 3.1.2 He Poutokomanawa: Kaitiakitanga in Practice
- 3.1.3 Tāhuhu Matatau Te Ao Tangaroa: Empowering kaitiaki
- 3.2.1 Whai Rawa, Whai Mana, Whai Oranga
- 3.3.2 Whaia te Mana Māori Whakahaere Tōtika ki Tangaroa: In pursuit of Māori governance jurisdiction models over marine resources

M. LINKS TO & INTERDEPENDENCIES WITH PHASE II RESEARCH PROJECTS

The proposed project links to the following Phase II workstreams:

- 1.1 Understanding ecological responses to cumulative effects
- 1.2 Tools for incorporating ecological responses to cumulative effects into management action
- 3.1 Perceptions of risk and uncertainty
- 3.2 Communicating risk and uncertainty to aid decision-making
- 4.1 Treaty relationships and EBM
- 4.3 EBM and Kaitiakitanga

- 4.4 Science and Mātauranga working together
- 4.5 Enabling EBM at different scales
- T4 Te Tāhuhu Matatau o Tangaroa

N. VISION MĀTAURANGA (VM)

The environment is a foundation of Maungaharuru-Tangitū identity, as is protecting, enhancing, utilising and maintaining the environment. For Hapū, the takiwā was once an abundant and essential source of sustenance. The resources available on the coast combined with those inland meant that the Hapū were able to sustain themselves year-round without leaving their takiwā. However, Treaty breaches over the years have meant the Hapū have suffered the loss of virtually all of their lands, and the degradation of their taonga, including the coast, through the actions or inactions of the Crown [33]. This project addresses VM policy themes of Indigenous Innovation, Taiao, Hauora/Oranga and Mātauranga. It's centred around a case study taonga species - kuku (green lipped mussels) populations - within their rohe moana. Maungaharuru-Tangitū hapū mātauranga will be revitalised and repackaged alongside new datasets provided by the latest scientific technologies/tools to populate a CAF that will influence local area decision-making processes.

Vision Mātauranga Deliverables

Partnerships:

VM P1. *Evidence of effectively leveraged existing partnerships and/or relationships with iwi, hapū and/or Māori entities*

MTT and NIWA have an established track record of collaborative research design and project delivery including customary fisheries (e.g., Mātauranga Māori and Sustainable Management of New Zealand Fisheries), Te Waiū o Tūtira [e.g., 34] and Tūtira Mauri Ora [e.g., 30]. While the project will be operationally led by NIWA, research design and delivery will be co-led by the MTT-NIWA project team strengthening our joint track records for the benefit of securing future longer term funding initiatives (e.g., MBIE Endeavour).

Distinctive Contribution:

VM D1. *A clear programme for the delivery of activities and/or outputs specifically for Māori partners*

The project provides MTT with the resourcing needed to progress one of their strategic priorities, leverage aligned/past research experiences/outputs to increase accessibility/applicability for themselves and their stakeholders as required, and bring whānau and hapū together to share knowledge and experiences. As has been our experience in previous MTT-NIWA projects, this research will increase the capacity and capability of hapū kaitiaki, MTT and NIWA researchers through the co-delivery of wānanga, hui, fieldwork programmes, project communications, educational resources, and co-authored project outputs

Meaningful Outcomes:

VM M1. *Evidence of alignment to the long-term aspirations of Māori partners and/or end users*

The following strategic focus area of MTTs long-term strategic plan underpins the project research aims and activities: He Kāinga Taurikura (A Treasured Environment): Caring for and protecting our environment – Kaitiakitanga – building our understanding, connectedness and involvement with our environment [8]. The outcomes sought by He Kāinga Taurikura include understanding and monitoring our environment; having a plan in place to manage our environment; and environmental authorities and agencies understanding our aspirations and concerns for our environment [9].

O. ENGAGEMENT REQUIRED WITH IWI AND STAKEHOLDERS

MTT have established relationships, agreements and engagement processes with *their* key partners and stakeholders, such as Hawkes Bay Regional Council, Fisheries NZ/MPI, MfE, DOC, NIWA etc as well as Ngāti Kahungunu Iwi Incorporated. This project is directed by the long term vision and core purpose of their Strategic Plan (Figure 7) and provides a practical opportunity to support the outcomes sought by hapū, including: Pūmau te Wairua (spiritually strong), Whai Hua (progressive), Tuakiri Motuhake (strong identity), Oranga Ngākau (wellbeing), Whanaungatanga (family) and Te Piri Ngātahi (unity) [8].

Knowledge from this project will inform MTTs Hapū Environmental Management Plan which will assist Hapū to engage with consent applicants (coastal and inland activities), local/central government and prioritise restoration actions [8,9]. It will also inform MTT input to the (a) Mana Whenua Steering Group (Port of Napier), (b) governance and community panels developing the Coastal Hazards Strategy, (c) governance roles on the Regional Planning Committee of the Hawkes Bay Regional Council, (d) governance roles on the Pan Pac Environment Trust, (e) in support of tangata kaitiaki (as authorisers of customary fishing permits), and (f) as participants in the Mai Paritu Tai Atu ki Turakirae Fisheries Forum.

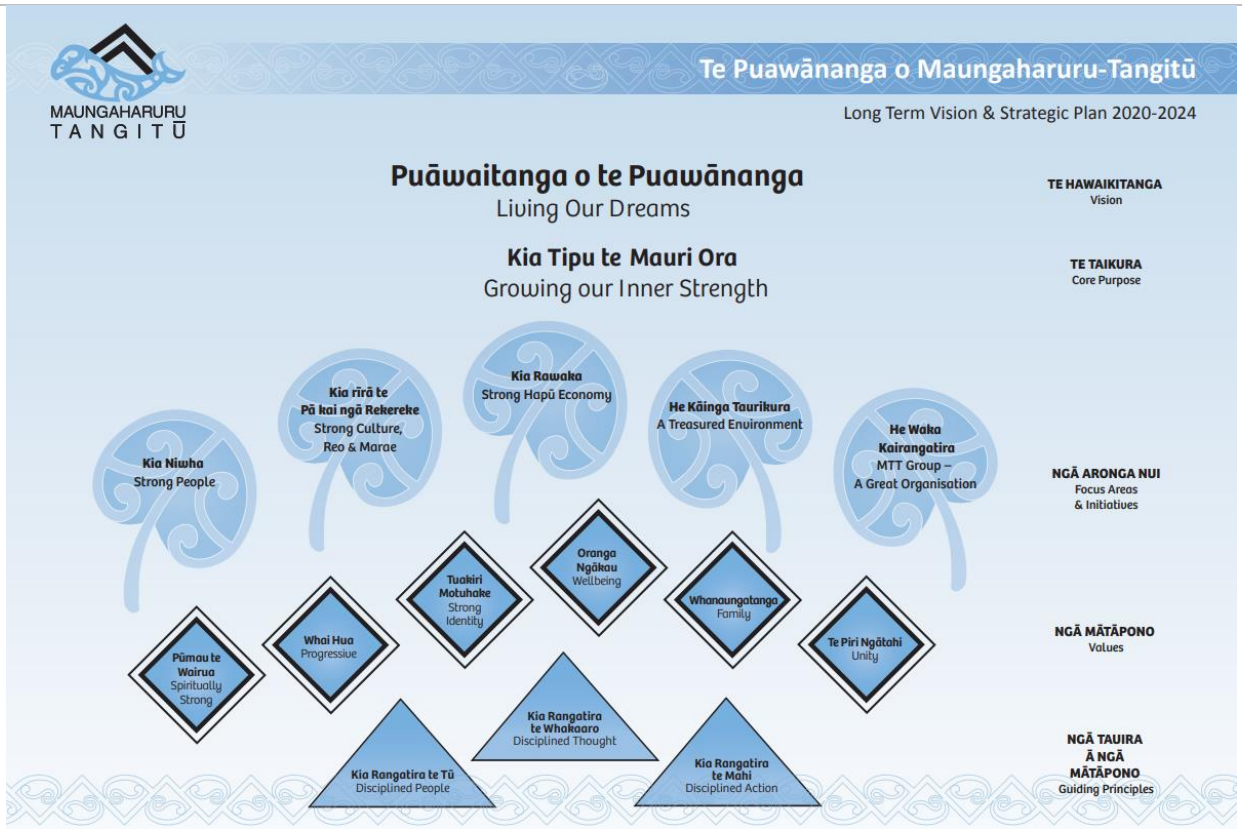

Figure 7: *Te Puawānanga o Maungaharuru-Tangitū Vision and Strategic Plan, 2020-2024 (Source: MTT 2020)* [(8)].

P. PROJECT COMMUNICATIONS

MTT's registration database currently contains 5,977 members [(8)]. MTT has established communication approaches (e.g., hui-ā-tau, wānanga, site visits) and a range of knowledge transfer pathways (e.g., pānui/newsletters, Facebook, website) to communicate with hapū.

MTT have established roles and approaches to engage agencies/stakeholders to raise awareness of the outcomes hapū are seeking from decision-making processes. The MTT-NIWA project team is experienced in the co-development of a wide variety of outreach formats that engage and raise cross-cultural understandings for the benefit of hapū [(e.g., 8, 30, 34-36)].

MTT will use the knowledge generated during this project to inform the conceptual design of an interactive IPou (i.e., augmented reality technology) – similar to examples in the Waikato River catchment to engage whānau and the public alike (e.g., https://www.tarit.co.nz/ipou) – to promote the significance of kuku and the Tangitū rohe moana and the work to protect and restore them.

Q. RISK & MITIGATION

Potential Risks	*Mitigation Plans*
Inadequate resourcing for partnerships	MTT have determined the project resourcing they need to support their capability and capacity. NIWA has also committed a minimum of $50k (and a maximum of $100k) in SSIF co-funding to deliver this project
Loss of key personnel or failure to recruit	This project is co-led, with MTT and NIWA jointly accountable for research delivery and the provision of appropriate capacity and capability.
Implementation barriers	The outcomes sought are of interest to a broad range of end-users who have coastal management roles and responsibilities. In the marine domain these roles and responsibilities are spread across a wide range of agencies (including hapū/iwi, DoC, MPI, MfE, regional councils). The project will support our partner's established agreements and implementation pathways to influence these local, regional and national agencies.

Technologies are undergoing rapid development	We will keep abreast and take advantage of such advances through NIWA's national networks.

R. CONSENTS & APPROVAL required to undertake research	• The project team will adhere to the tikanga and kawa of the Maungaharuru-Tangitū hapū, as directed by them. • A resource consent may be required to implement the IPou. • To increase efficiencies the project builds on the past/present work programmes of MTT to leverage existing local datasets/knowledge and learnings from complementary approaches (e.g., MACA, Moremore customary fisheries project, Tūtira Mai Ngā Iwi, Te Waiū). Where required, MTT will seek permissions from the relevant whānau members and agencies to leverage existing structured and unstructured local datasets (including mātauranga Māori)

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