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Sustainable Seas Science Challenge

Final Report

Research Project VM4.1 A Repository of Knowledge – Mātauranga Māori

Prepared by Whetu Consultancy Group

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Executive Summary

'Unlocking the innovation potential of Māori knowledge, resources and people to assist New Zealanders to create a better future'[1] is the mission of the Vision Mātauranga policy framework. It was with this mission in mind that the project was formed. It was considered that to ensure an authentic EBM process is adopted throughout the Challenge, both Māori knowledge, and the external users of that knowledge, needed to work together to enable its use in the science and innovative tools of the Challenge.

With direct relevance to the Challenge's objective to "*enhance the value of New Zealand's marine resources, while providing a healthy marine environment for future generations*", this project acknowledges that Māori communities are inclined to see appropriate measures in place to safeguard the protection, and avoid the inappropriate and secondary use, of their mātauranga Māori.

The information and data gathered for the Challenge is received from a mixture of Māori identified as either iwi representatives, tāngata whenua, Māori businesses, or mātāwaka (Māori not of the area but living there). The idea is to recognise the source of, and rangatiratanga or authority over, the knowledge gathered for the Challenge from respective iwi, hapū, and whānau. It is intended that a storehouse of knowledge will be created, which will support the collection of this knowledge throughout the first phase of the Challenge. It will also work across the Challenge with each programme to capture all relevant data. The result will be a repository of digital data and information that will record its origins and allow future researchers, businesses or anyone of interest, to access the information, receive directions as to its use and identify where it came from to assist with further research.

This is the final report resulting from Stage 1 of Project VM4.1 A repository of knowledge: Mātauranga Māori.

Stage 1 (year one) of the project discovered that establishing a repository for mātauranga Māori required buy in from Māori who would be contributing their individual knowledge (traditional and contemporary) or collective knowledge on behalf of their whānau, hapū, group/organisation, and/or iwi. Broadly, any assumptions that information collected (data) in the research of the Challenge (and wider), whether as mātauranga Māori or otherwise, and irrespective of funder interest in the research, must have the right protocols and measures in place to enable use, and potential reuse.

[1] Ministry of Business, Innovation and Employment – Vision Mātauranga Policy

Additionally, it identified the importance of improving the understanding of, whilst also providing guidance to, the researchers within the Challenge who are/would be sourcing and using mātauranga Māori.

Essentially, Stage 1 sought to understand the freedoms, constraints, and controls within the Challenge (and wider) on the access, use and management of mātauranga Māori gathered within individual research projects and across the Challenge. By doing so, it is the view that the input and participation of Māori in the Challenge, and specifically the development of new innovative and appropriate tools to implement an Aotearoa Eco-System Based Management approach in the marine environment, will be both reflective of, and responsive to, Māori values and interests.

In the short and long-term, this project enables the development of a distinctive body of knowledge at the interface between indigenous knowledge and the research and science of Sustainable Seas. It helps to identify how indigenous knowledge interacts across different domains in an inter-disciplinary and cross-cultural manner.

The report details the findings of the project and results in recommendations from here. The key findings and recommendations include:

- The need to build trust and confidence in the processes undertaken with Sustainable Seas. This can be achieved through continuing the project which will include upskilling of researchers to encourage consistency and build confidence in the challenge.
- The need to build support and confidence in Ecosystem Based Management. This process needs to be authentic and for this to occur, it must include Māori. For this to occur Māori communities must trust the system and processes. The repository and enabling framework provides a platform that Māori can trust.
- The enabling framework will take time to implement and there needs to be an interim process for treating mātauranga Māori shared within projects. Templates have been developed to assist with identifying when mātauranga Māori may be shared within a project and to assist with the collection of this data, alongside the application of the Te Ara Tika Guidelines.
- The enabling framework needs to be socialised with individuals, iwi, hapū, research bodies and institutions, if it was to be a success.
- The system could be applied across the broader National Science Challenge network and to encourage inter-challenge collaboration.
- All of the above could be achieved through the ongoing funding of Stage 2 of Project VM4.1

Our recommendation is to support the second phase of this project to encourage the development of a digital repository for mātauranga Māori to be utilised throughout all National Science Challenges, as currently funded and undertaken in *Te Tāhū o te Pātaka Whakairinga Kōrero: Next Generation Indigenous Knowledge* project.

The project will seek to implement the findings identified in Stage 1 research of Project VM4.1, which sought to protect the use of mātauranga Māori in the Challenge. The core focus is to gain the trust and support for the repository and its management framework by Māori in the Challenge, as well as Challenge wide participants (includes MBIE, research institutes and researchers) and communities external to the Challenge (Māori outside of the focal area, and other Science Challenges).

1.0 Introduction

Sustainable Seas Challenge Project VM4.1: A Repository of Knowledge – Mātauranga Māori is an initial investigation into a digital repository concept. The intent of the project was to investigate a pathway(s) that can appropriately protect, preserve and record the traced history or origin of all information and/or data gathered and identified as being mātauranga Māori throughout the Sustainable Seas Challenge.

The project was funded for one (1) year, with the submission of a subsequent proposal to continue the investigation, pending the achievements of the first year.

1.1 Context

The Sustainable Seas National Science Challenge is one of 11 National Science Challenges that are designed to enable a strategic approach towards the investment in science and seek enduring benefits and answers to questions of national significant to New Zealand.

The objective of the Sustainable Seas Challenge is to enhance the value of New Zealand's marine resources, while providing a healthy marine environment for future generations. The Sustainable Seas Research and Business Plan outlined that "there is growing conflict among the mutliple economic, cultural, spiritual, recreational and conservation values and uses of New Zealand's marine environment, and that these conflicts are beginning to impede development of the marine economy in light of as society concerns"[2]. The issues identified[3] in the Research and Business Plan are:

- Concerns that New Zealand lacks adequate resource management stratregies and systems to prevent serious damage to the marine environment
- Failure to appropriately acknowledge and accommodate Māori and community concerns, vews and values
- A lack of knowledge of, and trust in, science and how it is used in resource management decisions
- Poor understanding of the value of the marine economy to New Zealand, and the societal value of the use of our marine resources.

To achieve the Challenge's objective, it was determined that a new way of managing New Zealand's marine resources was needed so that multiple uses, values and sources of knowledge

[2] *Sustainable Seas Ko ngā moana whakauka National Science Challenge Research and Business Plan*, at p 12.

[3] Supra n 2.

were considered. The 'new way' that is being investigated by the Sustainable Seas Challenge is Ecosystem-Based Management (EBM).

EBM recognises the interactions within ecosystems and with humans. It has the potential to ensure that the marine environment is understood, whilst also enabling the enhanced use of the resources within the marine environment, by balancing the use and conservation of resources. It is considered a holistic and inclusive way to manage the competing uses for, demands on, and ways New Zealanders value the marine environment.

The identfied[4] challenges of investigating and implementing EBM in New Zealand's marine environment include:

1. Engaging with New Zealanders to understand the cultural, spritual, economic and environmental values,
2. Investigating and describing the impacts of natural and human stresses on marine ecosystems
3. Overcoming impediments to enhanced resource use, and
4. Upholding commitments to Te Tiriti o Waitangi and the sharing of information, resources and opportunities, as well as learning, action and shared decision-making

There are five programmes within Sustainable Seas aimed at addressing these identified challenges and to investigate the right tools to implement EBM in New Zealand's marine environment. These programmes are:

- Our Seas
- Valued Seas
- Tangaroa
- Dynamic Seas, and
- Managed Seas

The Vision Mātauranga cross-programme supports and interacts with each of these five programmes.

1.2 Vision Mātauranga - Māori Knowledge, Resources and People

In addition to achieving the objective set for the Challenge, the Vision Mātauranga cross-programme must also set out to achieve the mission set under the Ministry for Business, Innovation and Employment (MBIE) Vision Mātauranga policy framework to; "unlock the innovation potential of Māori knowledge, resources and people to assist New Zealanders to create

[4] http://sustainableseaschallenge.co.nz/challenge

a better future[5]". By collaborating with each programme lead and their respective research teams, the intent is to mutually discover measures and outcomes that achieve MBIE's policy framework.

The Sustainable Seas Research and Business Plan outlines that there is an urgent need for a paradigm shift in the way New Zealand views, governs and manages its marine estate, and will need to merge policy, planning, regulation, science and mātauranga Māori[6]. As the Challenge has taken on the role to facilitate this paradigm shift through the development of EBM by providing new, improved and/or innovative processes, frameworks and tools that can be used to govern and manage New Zealand's marine resources, the Vision Mātauranga cross-programme (VM) is seeking to ensure the use of mātauranga Māori is appropriate and in agreement with local Māori. Accordingly, it was with this key aim in mind that Project VM4.1: A Repository of Knowledge – Mātauranga Māori was conceived. It is important for the Sustainable Seas Challenge to find methods to appropriately use and protect Māori knowledge, from both an integrity and intellectual property perspective. Ensuring that a VM perspective is also applied will ensure the successful implementation of, and innovative outputs arising from, the Challenge.

It is considered that the successful achievement of the Challenge's objective, requires Māori communities to feel confident that their values and perspectives are used in an appropriate and empowering manner.

2.0 Project VM4.1: A Repository of Knowledge – Mātauranga Māori

The Sustainable Seas Research and Business Plan states that mātauranga Māori will be sought, and outlined the following pertaining to its meaning, relevance, prospects, and Challenge management:

- As defined in the Sustainable Seas research and Business Plan - *The indigenous Māori knowledge system of Aotearoa New Zealand including knowledge of language, technology, systems of law and social control, the environment, spirituality, cultural practice, systems of property and value exchange, forms of expression and much more*[7]
- The mission for the Challenge is to transform New Zealand's marine economy through input in resource management processes. An aspect of the investigation is the participation of Māori in marine governance and management, and understanding their aspirations and rights.[8]

[5] Supra n 2.
[6] Ibid.
[7] Supra n 2 at 6.
[8] Supra n 2 at 11.

Māori connection with the ocean permeates many aspects of Māori life (cultural, spiritual, practical and economic). This connection is expressed through a wide range of practices and knowledge embedded in Māori epistemologies[9].

- As one example, the application of mātauranga Māori can potentially inform the development of innovative approaches, whether commercial or non-commercial, that are consistent with kaitiakitanga.

The research project was aimed at investigating a potential solution regarding the appropriate use of mātauranga Māori in the Challenge, especially in the context of achieving the four VM themes, ***indigenous innovation*** *(contributing to economic growth through distinctive research and development),* ***taiao*** *(achieving environmental sustainability through iwi and hapū relationships),* ***hauora*** *(improving health and social wellbeing),* and ***mātauranga*** *(exploring indigenous knowledge and science and innovation)*.

Accessing mātauranga Māori will assist the Challenge with identification of environmental and biological constraints. Similarly, mātauranga Māori may be used to enhance utilisation of our marine resources which will benefit all New Zealanders.

2.1 Repository Concept

In the midst of activities to either commercialise or misappropriate Māori knowledge, Māori culture and Māori people and their resources, counter-activities by Māori groups to reclaim, reconstitute and revitalise their intellectual and cultural traditions have been, and continue to be, carried out[10]. The Waitangi Tribunal Claim 262 and its report is an example of that counter-activity.

The idea of Project VM4.1 is to recognise the source of, and rangatiratanga or authority over, the knowledge gathered for the Challenge from respective iwi, hapū, and whānau. It is proposed that there should be a storehouse of knowledge which will support the collection of knowledge throughout the first phase of the Challenge and will work across the Challenge with each programme to capture all relevant data.

In the context of a digital repository, consideration and investigation into other international approaches and repositories was considered relevant to both benchmark and inform project findings. The World Intellectual Property Organisation (WIPO) occupies a significant space with regard to protection of indigenous knowledge and intellectual property worldwide. WIPO are collating a digital database of indigenous knowledge and working to provide for registration of that knowledge and its protection.[11] There are also multiple individual indigenous groups that

[9] Supra n 2.
[10] Adams, T and Hopa, N, (2005). *Tikanga Rangahau Māatauranga Tuku Iho*, Nga Pae o te Maramatanga.
[11] World Intellectual Property Organisation. http://www.wipo.int/tk/en/.

have created their own portals, databases and repositories of their traditional knowledge, both as a means of sharing and also recording and providing origin for that traditional knowledge. Looking and working towards a similar output (product, process, system and service) for Māori knowledge in potential collaboration with other parties, this project has the potential to contribute to international research and ideas where New Zealand and Māori have advanced by working to create a similar database.

2.2 Project Proposal

The proposal for the project was lodged with the Challenge in 2015 for independent review, alongside other project proposals identified in the Sustainable Seas Research and Business Plan. At lodgement, the project was framed for three years, however after the review and feedback from two independent reviewers, it was decided by the Kāhui Māori and Science Leadership Team that the proposal be reframed to have a one year lifespan so as to accommodate the reviewers' feedback.

Although the proposal and concept was received well, and considered by one reviewer as visionary, the feedback commonly shared by both were on the following matters:

- Little planning and methodology around the collection and care of mātauranga Māori was outlined in the proposal
- Technical skill and expertise required for designing, building and populating a suitable database or catalogue
- Lack of partnership with an established repository, and/or government agencies, in New Zealand

As a result, the following objectives of Project VM4.1 were framed:

1. "to safeguard Māori knowledge (both traditional and contemporary) that has been sought, obtained, collected from tāngata whenua, kaitiaki and Māori, for their future generations"
2. "to explore the development of a digital repository of Māori knowledge" and
3. "to enable the use of Māori knowledge within the Challenge, for the benefit of the Challenge and for all New Zealanders."

Objective 1 was in acknowledgement of the concerns expressed by Māori representatives during the initial stages in the development of Sustainable Seas. These concerns were regarding the fear of Māori knowledge being used in a manner contrary to, and outside of, the scope of individual research projects and the Challenge. In a similar vein, the concerns around the ownership and/or intellectual property of Māori knowledge (or products derived from Māori knowledge) were

expressed. It was considered by the VM lead that there were not sufficient measures within the Challenge that neither investigated nor provided for these concerns.

Objectives 2 and 3 complement Objective 1 but primarily are reflective of two of the four VM themes, specifically indigenous innovation and mātauranga. This was through seeking out a distinctive solution to the appropriate use, ongoing management and accessibility of mātauranga Māori.

It was with these three objectives the areas of focus for the research project was structured:

1. Appropriate measures (whether legal or otherwise) to protect the use of Māori knowledge in the Challenge and into the future,
2. The viability and appropriateness of a repository (digital or otherwise) to protect the use of mātauranga Māori, and
3. The viability and most appropriate method of ownership and ongoing management of a repository within the Challenge and into the future

Table 1 below outlines the intended task the project team were to undertake that conceptually captures the original project proposal, whilst also accommodates the feedback of the reviewers.

Table 1: Project VM4.1 Proposal - Tasks	
Task	Task Detail
1	Ensure ethical approvals and/or considerations are in place.
2	Investigate legal and non-legal measures to both protect and enable the use of mātauranga Māori in the Challenge, and also seek to develop viable and appropriate conceptual methods (products, processes, systems and services) to protect and manage the intellectual property of Māori.
3	Investigate international and New Zealand examples of similar repositories (old, new and proposed) of indigenous knowledge to identify any learnings and concepts that could be applied within this project. Including methods of ownership and management of data and digital methods used.
4	Seek advice and guidance from directly and indirectly engaged advisors on the conceptual challenges of collecting and storing mātauranga Māori, as well as safe guarding and enabling its use within and beyond the Challenge.
5	Investigate various meta data management systems by seeking advice and guidance from Brent Wood (NIWA) around the use and appropriateness of Geonetwork (an existing metadata catalogue used in New Zealand by NIWA, GNS and LINZ), as well as other identified meta data management systems used by local authorities and research institutes that manages data and information.
6	Create templates for use by all researchers involved in the collecting of data, information and mātauranga Māori, the source and origin. The templates will be guided by kaupapa Māori theory and methodology whilst structured and formatted in a manner for easy transfer into metadata catalogue system (in the first instance Geonetwork). Templates will also be guided by directly engaged Legal Advisors on the project, to ensure that the process for gathering and using Māori knowledge is legally sound and aligns with the findings of WAI262 and intellectual property matters. This will include all and any consent required for use of the information within a

	number of parameters including individual projects, across programmes and across the entire Sustainable Seas Challenge.
7	Record the use, application and meshing or integration of Māori knowledge with other sciences within the Challenge.
8	Create opportunities to educate all lead Project Lead's and researchers in the method of data collection for the repository project and the metadata catalogue system being used. Also providing clarity to researchers of the importance and need of data origins.
9	Work with project teams to collate data on a monthly basis, receiving new datasets, information and organising into appropriate and pre-determined data or information sets.
10	Work with Principal Technician – GIS and Spatial Data Management to consider appropriate technical and digital issues in the long term. Discuss options and work with Principal Technician to investigate appropriate method of data storage, considering cloud based or web based, security and access options, should it be considered necessary. Also investigate costs and long-term management issues, to present final recommendations to the Challenge.

3.0 Methodology

The project builds on the values platform of a kaupapa Māori theoretical and methodological approach. Specifically, this approach and the project as a whole, emphasizes the importance and validity of indigenous knowledge and practices. The approach ensures that research is conducted in ways that make meaningful contributions to the communities in which the research is located rather than being merely treated as research subjects.

As the Challenge is focused on the incorporation of mātauranga Māori and Māori values within a proposed EBM framework in New Zealand, it was a natural fit for the principles of kaupapa Māori methodology to be embedded in the project design with a Māori perspective being a central focus.

Indigenous-centred research methodology also validates indigenous knowledge and practices.[12] The idea behind the project seeks to do this, as does the greater Challenge and Vision Mātauranga, in seeking to incorporate mātauranga Māori by identifying the value that sits within it. The project itself needed to include Māori perspective in the design and implementation of the research. Therefore, the inclusion of Māori researchers and advisors has been an important part of the project to ensure that the design is appropriate to Māori and that the recommendations from the project appropriately address Māori needs and concerns as Māori see them.

Applying indigenous-centred methodology also means that participants in the research are not research subjects, but that they are participants in the project process itself.[13] Acknowledging their rights through this process is important to meaningfully include them as participants, and not just subjects, in the research.

3.1 Approach

The project utilised ***Case Study Method/Strategy*** to develop and highlight an understanding of how other international and national indigenous groups resolve this issue. This involved online research

[12] Chilisa, B. (2012). Indigenous research methodologies. Sage Publications. And Smith, L. T. (1999). Decolonizing Methodologies: Research and Indigenous Peoples. Dunedin: Otago University Press.

[13] Supra n 12 and Dunbar, T., & Scrimgeour, M. (2006). 'Ethics in Indigenous research–Connecting with community'. Journal of Bioethical inquiry, 3(3), 179-185.6

and analysis of other indigenous repositories of knowledge and how they developed, managed and recorded their knowledge.

Case study method provided in this instance, a tool for us to examine particular example in context and then consider their application within our context and project.[14]

Semi-structured interviews were used to gather qualitative data. This included talking with individual researchers and advisors. This included key questions that could be adapted to suit the setting and responses as they were provided. It also enabled the project lead to delve further into any unforeseen areas that were raised during interviews or hui.

Group hui and engagement were also used to help socialise the project objectives and seek out input for the project. This enabled participants to be free to contribute as they felt comfortable in a group setting and also provided opportunity to discuss with participants one on one during these hui as and when required. Hui also enabled us to talk to representatives from governance, management, communities and stakeholders (e.g. environmentalists and researchers) within the focal area in a Māori centric approach, kanohi ki te kanohi (face to face).

4.0 Project Challenges and Subsequent Evolution

During the initial phase of the project, it was quickly identified that the intended direction and proposed outputs for Project VM4.1 would be challenging over the course of the duration of the project. One task in particular, restricted a number of the other proposed tasks/outputs that were connected with it shortly after the project began.

This meant that the project's approach needed to be one that was fluid, and more importantly, was responsive to the instructions, directions and guidance given during engagement activities and from project advisors.

The direction and outputs therefore evolved in response to some of the following challenges that the project faced, and will continue to face as the project moves forward. These changes were necessary to ensure a successful outcome that would be supported by Māori but also achieve the aspirations and mission of the Challenge and the intent of this project.

4.1 Trust and Confidence

Trust and confidence in the research and processes of the Challenge is necessary if the Challenge is to achieve the potential outcome of an eco-system based management approach in New Zealand's marine environment, and outputs that will be developed to implement an EBM approach.

Arising from outreach and engagement activities outside of Project VM4.1, Māori participants that are engaged in the Sustainable Seas Challenge are giving feedback and expressing concerns around the use of mātauranga Māori and ownership of information and tools developed/derived

[14] Yin, R. K. (2003). Case study research: Design and methods (Third ed.). United States of America: Sage Publications. And Merriam, S. B. (2002). Qualitative research in practice. San Francisco: Jossey-Bass.

from within the Challenge. Therefore any intent of the Challenge and the research institutes within the Challenge to reuse mātauranga Māori, or establishment of a repository that benefited non-Māori, had to be addressed. Their interest in this project was therefore significant, as was their desire to be part of its development.

4.2 Wai 262 Report - Ko Aotearoa Tēnei

The Waitangi Tribunal's Wai 262 Report- Ko Aotearoa Tēnei specifically addresses some of the issues related to this project. The report was the final product of claims lodged over 20 years ago which raised concerns about use and protection of indigenous flora and fauna and traditional knowledge. The government has not officially responded to the recommendations from the Wai 262 report and there are limitations of the Waitangi Tribunal as an agent of legislative and policy change in New Zealand. The seemingly slow response from the Crown to address or implement the Tribunal's findings, has meant Māori are open to, and have resorted to finding alternative means for Māori to protect themselves, their taonga, their mātauranga. This will be addressed in detail later in the report.

An important matter to note is that Ngāti Koata, who are in the case study area for the Challenge and party to the iwi lead research project in Sustainable Seas *He Poutokomanawa*, were one of the original claimants to the Waitangi Tribunal Claim 262. Therefore, there is a level of familiarity of the Wai 262, within the Challenge focal area and also an expectation on the Crown to uphold its duty to act in good faith in this regard, and agencies of the Crown.

4.3 Ownership vs Kaitiakitanga

Māori do not view their relationship with their tangible and intangible cultural heritage as one of "ownership". The relationship typically does not equate to the bundle of rights usually associated with "property" of title, possession, exclusivity and alienability.

From a Western perspective, many elements of this relationship may seem to be comparable to that of ownership, at least to the extent that ownership implies the ability of the owner to control whether and how property is used or exploited by others or excluded from use by others.

This disjunct between the Western concepts of ownership in comparison with Māori concepts of ownership will be a challenge as a repository and management framework to support it, are developed. Similarly, IP rights are individually/personal held, whereas kaitiaki responsibilities are collective. The project has had to consider this dynamic consistently throughout the project, working within a Western paradigm but for the benefit and to encourage the willing inclusion of Māori.

4.4 Intellectual Property and Mātauranga Māori

Outlined further in the report, the issues that arose surrounding New Zealand's intellectual property regime and its inability to protect mātauranga Māori, provided a challenge. Intellectual Property law is not intended to protect belief systems, cultural worldviews or values, therefore there is no intellectual property in mātauranga Māori as such. However this is not a common understanding as most Māori, whether as researchers in the Challenge or as iwi/tangata whenua, viewed IP and mātauranga Māori as one in the same.

IP law primarily protects "rights" for commercial purposes. While the project was aware the current law does not enable its protection, we did need to ensure that our proposed solutions ran parallel to the existing law, within it or potentially outside of it, but not be in breach of the current systems in place.

4.5 Consent to Use (and Protection of) Mātauranga Māori

When investigating the current status of the Challenge's IP Management Plan, the advice received indicated that the current arrangement to obtain consent or approval from iwi/hapū, does not adequately encourage Māori to share their mātauranga and contribute to the Challenge.

It outlined that as all research data and information generated in the Challenge will be made open to public access and potentially reused. There is provision made for data/information to be excluded from this subject to ethical, privacy or cultural reasons. There is however, no clarity as to what this safeguard might look like, nor what constitutes a "cultural reason" and whether this would enable the protection of information/data to ensure the integrity of the traditional forms of Māori knowledge, as well as the contemporary aspect of Māori knowledge. Consideration of this issue needed to be managed within the project.

4.6 Individual Institutional Ethics Processes

There are ethical protocol and guidelines associated with all Crown Research Institutes (CRIs) institutions and organisations undertaking projects within the Challenge. For smaller entities, most will have identified which ethics protocols they will be aligning to within their projects. These protocols, as a rule, identify fair and ethical processes when dealing with human participants and ensure that procedures are followed to ensure trust, protection and value is given to every participant and their information that is shared as part of a project.

The Sustainable Seas National Science Challenge Research and Business Plan does not make specific reference to any Code of Ethics or guidelines that must be applied in each project, therefore the standard institutional practices apply for those involved.

Although these processes address things such as informed consent, privacy, freedom, confidentiality, and generally would all align with the New Zealand Association of Social Science Research (ASSR) Code's of Ethics, the collaborative nature of the Challenge has unintentionally required researchers who are on projects led by another institute, to adopt unfamiliar processes. This has added to the concerns of trust and confidence. We were mindful that this project may result in another layer of unfamiliar process for many and we wanted to avoid any ad hoc application without the process first being understood and considered in the context or other organisational research practice.

4.7 Connecting with Existing Data Management Research and Initiatives

A number of government led and funded initiatives have investigated the appropriateness of a simplified and communal data management systems, with one in particular seeking social licence to operate to understand their parameters for managing data. Not all of these data management initiatives encouraged a cohesive and balanced approach to data management in New Zealand.

Building relationships with these initiatives is an important aspect of the project with respect to long-term sustainability and stability of a digital repository, and also consistency and appropriateness around the management of mātauranga Māori (data derived from Māori and/or about Māori).

5.0 Legal Investigation

During the development of the project it was important to consider and understand the current legal issues in this arena. Specifically, this included the legal environment in New Zealand surrounding intellectual property and what this included or did not include.

Intellectual Property

There are three types of Intellectual Property (IP):

- Copyright – protection of original works
- Trademarks – symbols, marks, logos
- Patents – granted for an invention

Intellectual Property is a class of "property". The term "property" as described in the Property Law Act 2007, is "everything that is capable of being owned, whether it is real or personal property, and whether it is tangible or intangible property, and includes estate or interest in property."[15]IP is exclusive rights granted by law in relation to creations of the human mind.

It is anticipated that matters of copyright and trademarks may be relevant to Project VM4.1.

[15] Property Law Act 2007 http://www.legislation.govt.nz/act/public/2007/0091/latest/whole.html#DLM968969

Waitangi Tribunal Claim 262

On 2 July 2011, the Waitangi Tribunal released its report on Wai 262[16]. The report was the final product of claims lodged over 20 years ago which raised concerns about indigenous flora and fauna and traditional knowledge.

The original claim was lodged in 1991 by Ngāti Koata, Ngāti Porou, Ngāti Kahungunu, Ngāti Kuri, Ngāti Wai and Te Rarawa and involved the Crown as well as Crown Research Institutes. Hearings began in 1998 and the final report was issued in 2011.

The claim was the first all-of-government inquiry and involved claimants from all around Aotearoa, as well as education, research, science and technology agencies and Crown research institutes. The Tribunal's inquiry was wide-ranging, covering matters such as taonga works, genetic and biological resources, the environment and resource management law, te reo Māori and rongoā Māori, and made detailed and practical recommendations for Crown consideration.

To date the Crown has not officially responded to the Tribunal's reports.

Project VM4.1 needed to consider the Tribunal's report as it resulted in a comprehensive finding that potentially poses a new direction for the Crown in how they could address Māori interests in the use and protection of mātauranga Māori.

The claim was made due to the breach of the Crown's duty under the Treaty of Waitangi, of the core Treaty Principles regarding tino rangatiratanga or chieftainship over resources and taonga. The claim alleged that the Crown had failed in their duty to protect Māori rights and interests in this area. Primarily, the claim was a reflection of the inadequacy of New Zealand's intellectual property regime to protect Māori interests in mātauranga Māori.

The Tribunal identified that there was indeed a failure of New Zealand's IP laws to adequately protect mātauranga Māori as a taonga under the Treaty of Waitangi. The Tribunal had two primary concerns in relation to mātauranga Māori:

1. Misuse and misappropriation of taonga works and mātauranga Māori.
2. Non-kaitiaki were able to acquire rights in taonga works and mātauranga Māori without the consent of or any benefit to kaitiaki.

5.1 Legal Perspectives

5.1.1 The Challenge's Position on IP

Within the Sustainable Seas Challenge Research and Business Plan, it is outlined that "where a project involves Māori traditional knowledge, the appropriate Parties will obtain necessary

[16] Ko Aotearoa Tēnei: A Report into Claims Concerning New Zealand Law and Policy Affecting Māori Culture and Identity. Te Taumata Tuarua.

approvals for its use from the relevant whānau, hapū or iwi"[17]. In addition to this principle it is outlined that:

- All background IP belonging to any Party will remain vested in that Party.
- Ownership of Challenge IP will vest in the Party or Parties that creates the IP.
- Protection and commercialisation of any Challenge IP will be the responsibility of the Party owner(s). In addition, if the knowledge contributes to the development of products or information to be utilised for commercial or pecuniary purposes, agreement must first be reached with the relevant iwi, hapū, whānau.
- Owners of Challenge IP, and background IP where appropriate, will provide a non-exclusive royalty free licence for use of the IP for the purposes of meeting the delivery of the Challenge Objective and Mission.
- All Parties will promote the sharing of information generated by the Challenge and participate in joint initiatives to publish, present and disseminate research results.

It was with this definition in mind that the project sought legal advice and guidance on the project's investigation into identifying the "appropriate measures (whether legal or otherwise) to protect the use of Māori knowledge in the Challenge and into the future", as well as "the viability and most appropriate method of ownership and ongoing management of a repository within the Challenge and into the future".

5.1.2 Legal Opinion- Kensington Swan Lawyers

The project team identified early on that legal support was required for the project, to ensure safety for both the Challenge and our Māori researchers and those contributing mātauranga Māori to the Challenge. Due to their extensive experience and knowledge in IP and Wai 262, the project approached and commissioned Kensington Swan to provide a legal opinion.

The key questions or areas where we sought advice were:

a. recommendations regarding forms and guidelines for protecting mātauranga Māori contributed by individuals or groups within the Challenge; and

b. a legal opinion and recommendations regarding future management of mātauranga Māori within the Challenge, including consideration of an entity or structure within which mātauranga Māori could be managed within the Challenge.

After initial discussion with the legal team the following issues were also identified as needing addressing:

[17] Supra n 2 at section 5.8-5.9.

- What are the issues in terms of how the IP principles apply to mātauranga Māori within the Challenge?
- Is the collection of mātauranga Māori governed adequately by these principles or should it be part of a different IP Management Plan and process in the Project with specific rules and guidelines tailored to mātauranga Māori?
- How can adequate protection be offered for mātauranga Māori within the Challenge?
- How can we ensure processes that incentivise Māori to provide their knowledge to contribute to the Project?
- What are ways that the Project could deal with (govern/manage) mātauranga Māori in the Project going forward?

Integral to this process was understanding how the law in New Zealand lies as far as intellectual property is concerned and why mātauranga Māori does not fit within this.

5.2 Templates

One of the outputs that was intended for the project was the creation of templates for use by all researchers involved in the collecting of data or information that might be identified as mātauranga Māori, including its source and origin. It was intended that the templates be structured and formatted in a manner that allowed for easy transfer of information or data into a repository. The templates were drafted and produced under the guidance of our project Legal Advisors to ensure that the process for gathering and using Māori knowledge is legally sound and aligns with the findings of WAI262 and intellectual property matters. It was intended that the templates would include all and any consent required for use of the information within a number of parameters including individual projects, across programmes and across the entire Sustainable Seas Challenge.

It was identified early on in the project, that the templates and consents would be inextricably linked to the investigation of the ongoing management framework for the repository ie: what would contributors be consenting/agreeing to happen with their information and who were they agreeing/consenting to manage and/or store it.

After completing the comparative research and receiving the full legal opinion from our legal advisors, it was identified that distribution of these templates would be premature, until consideration of the repository and how it would be managed, was completed. The templates have therefore remained in draft form and it is recommended that instead, an interim approach is considered, alongside the pursuit of the above enabling framework as an endpoint.

To ensure that the information shared and currently being collected is accurately recorded, for the benefit of Māori contributors, the Challenge and to enable its future use, there is some key

information that needs to be collected following an interview or collection of data that includes mātauranga Māori.

We have developed a process attached as APPENDIX B below with a data collection template for researchers within projects to utilise to ensure they capture all the information needed to support the project and the Challenge's commitment to the protection of mātauranga Māori.

6.0 Research

6.1 Repositories of Indigenous Knowledge

The project undertook an investigation of international and New Zealand examples of similar repositories (old, new and proposed) of indigenous knowledge to identify any learnings and concepts that could be applied within this project. This was to include methods of ownership and management of data and digital methods used.

This research was undertaken and resulted in a report that detailed the key findings around other similar indigenous knowledge repositories around the world. The full report is attached as APPENDIX C.

The investigation found various international examples and a New Zealand example of indigenous knowledge repositories or databases. A recurring theme which came through all examples was the importance of securing ownership for the traditional knowledge. Although traditional knowledge does not encompass all mātauranga Māori, mātauranga Māori does encompass all traditional knowledge, therefore it is a good comparison for this project.

The report compares a New Zealand example, the State of the Takiwā, a project that records, collects and maintains data/ mātauranga Māori provided within a project from Māori, in a database. Comparing the database with others from India, Venezuela and Canada, the examples contrast the difference of rights and ownership. The clear owners of the knowledge within the Takiwā example are the iwi, they also have control over who uses the information and how it is collected. Within the Biozulua Venezuela database there are concerns regarding the extent prior informed consent was obtained before collection of knowledge and also that the database does not authorise rights in support of communities.

The Ulwazi Indian database showcased the significant role that local community members can play in the collection of traditional knowledge and the advantages this brings. This was a key factor in the creation and success of this database. Community participation was also significant in the Inuit and TPD databases investigated.

The differing types of accessibility to each database was specific to the goal of the example. For the Honey Bee Network all information was publicly available on the internet, this was due to the

goal of the database being to collect information and documentation to prevent exploitation by outsiders. Therefore, by placing the collected information on the Honey Bee Network Website along with who owned the information created protection for the local people. The Inuit database was a 'closed' system (not available to public) as the information is regarded as confidential between Inuit and the government.

These examples provided valuable learnings which can assist with the creation of a Mātauranga Māori digital repository.

The research included the review of a key report produced by Alexander et al from the United Nations University Institute of Advanced Studies. The report is titled 'The Role of Registers and Databases in the Protection of Traditional Knowledge: A Comparative Analysis. It includes a concise list to guide anyone creating an indigenous database in the context of traditional knowledge. The key elements of this report are discussed in the Findings section below.

6.1.1 Findings

The key learnings from this research included the following:

1. *Gain Consent-* As a basic guiding principle, there is a need to ensure that all reasonable efforts are made to obtain prior informed consent from the relevant indigenous peoples as a condition for placing information in a database, whether that traditional knowledge is in the public domain or not.

2. *State terms of use-* Databases, registers, publications, scientific papers, or other means through which Traditional Knowledge is made available to the public should incorporate initial advisory notes which explicitly state, as a minimum, that:

    - the authors fully recognise the rights of indigenous people over their Traditional Knowledge, including any intellectual property or sui generis property rights
    - prior informed consent was obtained for the use of the Traditional Knowledge
    - the use of Traditional Knowledge for commercial or other ends must be appropriately recognised
    - the need for the sharing of benefits derived from the use of Traditional Knowledge with indigenous peoples.

    This practice should be promoted at all levels and target, for example, publishing houses, editorials, research institutions and individual researchers. Although the effectiveness, practicality, and enforceability of these advisory notes may be questioned, they are an important starting point to raise awareness, guide and orient users' conduct, and promote respect and sound ethical and professional practices. The establishment of such standard advisory notes will demonstrate an immediate level of

awareness of the sensitivity of indigenous peoples' regarding protection of their Traditional Knowledge and help build confidence and the basis for better partnerships between research institutions, the private sector and indigenous peoples.

3. *Access only after acceptance of terms-* Access to databases and registers should require acceptance of the rights of indigenous peoples over their Traditional Knowledge as well as any protocol or terms of use, as a precondition for access, and as a means to ensuring appropriate use of Traditional Knowledge. To this end, the proprietors and managers of databases and registers should establish protocols governing access to and use of Traditional Knowledge. Access to database files either electronically or otherwise should involve a step including acceptance of the conditions of the protocol.

4. *Governments should seek to protect-* National governments and responsible international organisations should consider the possibilities of adopting interim measures which reduce pressure on indigenous peoples and their knowledge systems by creating obligations for users to demonstrate prior informed consent as a condition for scientific and commercial use of Traditional Knowledge.

5. *Legitimise through creating a database/repository-* In development of national sui generis Traditional Knowledge regimes, consideration may be given to establishing a system which recognises and incorporates local community and indigenous peoples' databases and registers whether documented or orally maintained within a national network of registers of Traditional Knowledge. This practice may serve to extend the remit of national registration and evidence of prior art, as well as generating wider respect for the national system of registration and for the value of Traditional Knowledge.

6. *Fund the creation of database/repositories-* International organisations, multilateral, bilateral and other funding agencies should consider the provision of support for initiatives to develop database trusts, whether through modification of the operation and management processes including, as appropriate, the governance structures of existing databases and registers, as well as through the funding of local community and indigenous peoples' initiatives in this area.

7. ***Rights exist with or without a repository-*** Protection of rights over traditional knowledge should not be made conditional upon registration of Traditional Knowledge. Such a precondition for the granting of protection would run counter to current practice.[18]

Further, Alexander et al comment that governments need to secure increased participation for indigenous peoples in international processes for the development of law and policy relating to the protection of Traditional Knowledge. National governments should include indigenous representation on national delegations and international bodies such as WIPO, who in turn need to develop mechanisms to ensure increased indigenous participation in decision making processes. Additionally, international organisations, governments and other bodies should carry out further investigation into the potential, complexities and limitations of developing international standardised specification data for the registration of Traditional Knowledge. These guidelines have helped to guide this project and also align closely with the other key recommendations and guidance given by our other project advisors throughout the project.

6.2 Creative Commons and Indigenous Knowledge Licences

Creative Commons

As part of this project we have considered how Creative Commons and attribution rights could impact on this project's development. Although Creative Commons operates in the area of copyright, it was important to understand how any end product from the Challenge (publicly funded) might be impacted by Creative Commons licencing and any subsequent restrictions on knowledge imposed by the repository. The Creative Commons website defines the use of their licences:

"Creative Commons licences make it easy for you to share your copyright works. The six Creative Commons licences ensure that others can copy and distribute your work, provided they give you credit — and only on the conditions you specify."[19]

These conditions of use are what are relevant to Project VM4.1.

As mentioned above, mātauranga Māori in and of itself has no intellectual property, equally the rules of copyright are not necessarily appropriate for use in this instance either. The end product that may have utilised or incorporated elements of mātauranga Māori may hold both IP and copyright, but for the mātauranga Māori element that is contained therein, neither apply. The element that has been of interest during this research however, is that Creative Commons also

[18] Alexander, M., Chamundeeswari, K., Kambu, A., Ruiz, M., Tobin, B., 2003. The Role of Registers and Databases in the Protection of Traditional Knowledge A Comparative Analysis, United Nations University Institute of Advanced Studies. Pp35-40.

[19] http://creativecommons.org.nz/licences/licences-explained/

freely acknowledge that the issue of indigenous knowledge is left unresolved.[20] The organisation that monitors Creative Commons licencing has been undertaking consultation around this issue for several years but as yet, there is no outcome. They also clearly state that a new legal took for licencing needs to be developed due to the Wai 262 findings.

Indigenous Knowledge Licences

In respect of indigenous knowledge and also attribution rights and terms of use, the Creative Commons website does refer to a link to an organisation that has developed indigenous knowledge use and attribution logos and protocol[21]. It has not yet reached formal legal application but follows more of a respect and trust model. Alongside the protocols they have developed, they hope that this will see indigenous knowledge protected from misuse.

The traditional knowledge licences were developed by the company 'Local Contexts' as part of an Australian project and piloted within the project 'Mira Canning Stock Route Project Archives'.[22] The licencing has been utilised to help protect the art, stories, music shared within the project.[23] These protocol and potential licences would be well worth developing for application within the repository.

6.2.1 Findings

Their protocols have a number of key elements. The two most relevant include:

1. Indicating that upon agreeing to contribute their knowledge to the database/repository, they are licencing the information to the website owners to manage, and that they then have the right to negotiate sub-licencing on to anyone else who applies to use it for their own purpose.
2. Should anyone apply to sub-licence and use any of the work/knowledge, then they will need to apply under one of the 4 available licences and on the basis that they will comply with the terms of use, attribution rights, potential royalties etc detailed in the protocol.

Although at this point, the biggest obstacle appears to be reaching agreement around who would manage any resulting repository and hold the right to negotiate on the contributors behalf, once this is identified, and in fact while this is being identified, a similar protocols for use and specific licencing/categorisation of use regime could be developed for application to any mātauranga Māori identified within the Challenge.

[20] http://creativecommons.org.nz/indigenous-knowledge/
[21] http://www.localcontexts.org/tk-licenses/
[22] http://mira.canningstockrouteproject.com/node/3037
[23] http://mira.canningstockrouteproject.com/licences

6.3 National Comparatives and Considerations

6.3.1 Findings

Data Futures Partnership

Data Futures Partnership is undertaking work to help strengthen the data-use ecosystem and public trust, that their data will be kept safe. The Iwi Leaders Forum are active participants in the Partnerships work and we will work with those iwi leaders to seek input into the ongoing development of the digital repository. The Tuhono report[24] that has recently been released as part of the Data Futures Partnership will be of particular interest going forward. This survey and report was undertaken utilising Māori engagement around data use. Another full report has been released from the Data Futures Partnership; A Path to Social Licence: Guidelines for Trusted Data Use[25] following intensive engagement with the New Zealand community around data use, feedback and issues around this area. Both reports will assist with the work being undertaken in the ongoing project around expectations for guidelines for data management.

Te Mana Raraunga - Māori Data Sovereignty Network

Te Mana Raraunga is a network of advocates to advance Māori rights and interests in relation to data, whilst ensuring that data for and about Māori is safeguarded and protected. This network supports the international forum for Indigenous Data Sovereignty, which focuses on indigenous control of data about native peoples. We will continue to work with their representative throughout the remainder of this project. Their representative was also included within the development phase of the Enabling Framework to ensure alignment with the Network.

National Research Information Systems (NRIS)

The Ministry of Business Innovation and Employment's National Research Information Systems (NRIS) – This project is currently under development, and intends to provide information and data all in one place on New Zealand's innovation sector. The NRIS will be an online portal with information on what research is being done, who worked on particular research projects, how these were funded and the research outputs. Some engagement with Māori has been undertaken as part of the NRIS development which will be utilised to further inform the development of the repository itself alongside data collection. The NRIS and its relevance to this project is discussed further in the 'Applied Examples of Digital Repositories' section below.

[24] http://datafutures.co.nz/assets/Uploads/Tuhono-Report-9-June-2017.pdf
[25] https://trusteddata.co.nz/wp-content/uploads/2017/08/Summary-Guidelines.pdf

6.4 Guidelines for Interim Collection of Data, Ethics and Protocol

6.4.1 Findings

Interim Data Collection

Although we identified that there was no immediate way to create a repository due to the management issues identified, in the meantime there does need to be a way to capture all information that is being identified as including mātauranga Māori, ready for incorporation in the repository when it eventuates. To do so requires the following of certain guidelines to ensure that the right information is being captured at the time, by the researcher albeit that the consent to vest it in a repository cannot yet be given.

Māori Research Ethics within the Challenge

There are ethical protocol and guidelines associated with all CRI's and Institutions undertaking projects within the Challenge, and for smaller entities, most will have identified which ethics protocol and approvals they will be following within their projects. These protocol as a rule, identify fair and ethical processes when dealing with human participants and ensure that procedures are followed to ensure trust, protection and value is given to every participant and their information that is shared as part of a project. The Sustainable Seas National Science Challenge Research and Business Plan, does not make specific reference to any Challenge specific Code of Ethics or guidelines of this nature, therefore the standard institutional practices apply.

As a rule, these processes address things such as informed consent, privacy, freedom, confidentiality etc. and generally these would align with the New Zealand Association of Social Science Research (ASSR) Code's of Ethics. Most institutes would also include in their ethics applications, questions around research involving Māori participants, and how these should be addressed. These will not and should not change.

Additionally, Te Ara Tika: Guidelines for Māori Research Ethics[26], provides a sound framework for consideration by and for the education of researchers in this space. Some communication has recently occurred from Sustainable Seas to its project teams, indicating that Te Ara Tika is a great resource, it is our recommendation that this framework is formally adopted as part of the Challenge and its commitment to Vision Mātauranga. This will help to ensure researchers and scientists within projects have considered these perspectives when including Māori within their research and to help them to understand and consider the rationale for the following process.

[26] Pūtaiora Writing Group, *TE ARA TIKA Guidelines for Māori Research Ethics: A framework for researchers and ethics committee members*, February 2010.

This will serve to assist in managing how mātauranga Māori is collected across the Challenge on an interim basis.

Collection and Treatment of Mātauranga Māori shared within Projects

As part of the Mātauranga Māori Repository of Knowledge project, it has been identified that there may need to be some additional steps introduced, in addition to the consideration of the above Guidelines for Māori Ethics, by Project teams and their researchers, when dealing with information that has been identified to include elements of mātauranga Māori.

To ensure that the information shared is adequately protected and recorded, for the benefit of Māori contributors, the Challenge and to enable its future use, there is some key information that needs to be collected during and following an interview or collection of data that includes mātauranga Māori.

We have developed a process flowchart and a template attached as APPENDIX C for researchers within projects to utilise and ensure they capture all the information needed to support the project and the Challenge's commitment to the protection of mātauranga Māori.

6.5 Case Study Research - Digital Repository Platforms

6.5.1 Findings on Applied Examples of Digital Repositories

As part of the background research undertaken within the project, we investigated some applied examples of digital repositories identified within New Zealand. These were researched purely from a functionality perspective, usability and for comparative research.

Case Study 1: Waikato District Council - GIS

After our primary digital expert Brent Wood, becoming unavailable due to work commitments, he identified that a key contact would be Anton Marais who is GIS team leader at the Waikato District Council (WDC).

WDC was in the midst of a large digital development and transition, during the project timeframe. We have met with Mr Marais on several occasions to watch the development of their online platforms, which included discussion around their use of open source software, metadata, licensing and more.

WDC are this month launching a full suite of public access platforms that contain a large amount of information. The Council's district plan is now all available digitally online, including the ability to zoom in and out and reveal layers of data connected with different areas or sites of significance. This was the primary reason we wished to discuss their platforms, as this had been identified as a suitable method of sorting and categorising the data within our project.

They have done this through utilising a number of different platforms including GIS and GEONetwork which are both open source, to create a lot of data that they then pull into their 'Koordinates' site which is more user friendly and visually more attractive.

Metadata and Licencing

The other key learning from this investigation was surrounding the importance of Metadata for this project. One of the primary objectives of this project was to ensure the source of any mātauranga is appropriately recorded and tracked, to ensure appropriate use and attribution into the future. The purpose of metadata is to ensure exactly that, for all data that is held on a site. The metadata behind each piece of mātauranga to be held within the repository will include all the information about the mātauranga (who provided it, when, where, why, contact details etc). This can also record the purpose for which the data is allowed to be used and also link to licencing information.

Case Study 2: Auckland Council – Māori Cultural Heritage Project

The Māori Cultural Heritage Project was investigated as a case study for Project VM4.1 in large due to the project's focus after three years of activity, on efforts towards becoming a private knowledge repository for mana whenua.

Initially the Māori Heritage unit within the Cultural Heritage Department of the Auckland Council were tasked to improve understanding and appreciation of Auckland's heritage by combining its GIS technology with Māori cultural values as an innovative approach to planning and to support its role in its heritage assessments and resource management decisions.

The Māori Cultural Heritage Project is a 10 year project that it is collaborating with the iwi/mana whenua of Auckland to integrate mana whenua knowledge (mātauranga Māori) and mana whenua values into Auckland Council's heritage database.

In the project's first year, each mana whenua were supported with capacity investment and were given access to a personalised website for recording individual and collective mātauranga. The website sets out the assessment methodology and spatial (GIS) aspects in relation to each site that they had individually selected.

The intention was to use these "pilot" sites to test the assessment and recording of Māori cultural heritage values and determine the mechanisms for the management and protection of these values.

Case Study 3: Science for Technological Innovation Science Challenge - Te Tāhū o te Pātaka Whakairinga Kōrero: Next Generation Indigenous Knowledge Project

Subsequent to this project being approved for funding, the project team became aware that another project centred around the creation of a digital repository for mātauranga Māori had also been approved for funding. The Science for Technological Innovation Science Challenge has a project running concurrently with VM4.1 called Te Tāhū o te Pātaka Whakairinga Kōrero: Next Generation Indigenous Knowledge project.

The focus for the Te Tāhū o te Pātaka Whakairinga Kōrero project is predominantly on the creation of the digital platform itself. After meeting and engaging directly with one of the project team members, we have developed a clear understanding of their project, and they ours, which has enabled the development of some synergies between the projects. They are extremely interested in the enabling management framework under development, as they have not included this within their project brief, but as with our team, have since identified that this is an integral element of the development of a repository. Te Tāhū o te Pātaka Whakairinga Kōrero project team have agreed to work with us, and vice versa, to enhance both projects moving forward, to ensure greater value for money for MBIE and minimal duplication.

Ultimately, our project will result in a final framework to be implemented in support of and to manage the digital repository developed and established through the Next Generation Indigenous Knowledge Project. The legal framework will be developed as proposed by our legal advisors and as workshopped throughout this project.

Although the above research into digital platforms was undertaken and highlighted some helpful elements, it was clear that utilising the Te Tāhū o te Pātaka Whakairinga Kōrero project made sense within the Science Challenge network as opposed to reinventing the wheel or starting from scratch to build a repository similar to the Waikato District Council and Auckland Council repositories.

Case Study 4: National Research Information Systems (NRIS)

As detailed above, the development of the Ministry of Business Innovation and Employment's National Research Information System (NRIS) is currently under way.[27] The NRIS seeks to collate all research data undertaken through the Ministry's funding arms into one portal. It seeks to provide information about institutes, researchers, projects and outputs together and to allow public access to this publicly funded data.

[27] http://www.mbie.govt.nz/info-services/science-innovation/research-and-data

Although the project is still under way it is relevant as it poses an opportunity to connect with the portal or operate within it to flag any outputs or projects that contain or have utilised mātauranga Māori. Being able to work to connect both projects will ensure a cohesive and streamlined approach is considered and prevent silos around Māori data management.[28]

Some Māori engagement has taken place and the project also has a Māori advisory group. The feedback report is now available and will be taken into account alongside the continuing engagement feedback acquired as the project proceeds. Consultation with the projects Māori advisory group will also be undertaken to connect both projects moving forward.

7.0 Summary of Findings

The following is a summary table of the applicable findings from the research undertaken during this project. The summary table groups the findings as they relate to the projects key aims:

1. Appropriate measures (whether legal or otherwise) to protect the use of Māori knowledge in the Challenge and into the future.	
Identified Measures	**Comments**
International Indigenous Comparable(s)	Consider and apply the learnings from overseas: • Gain consent • State terms of use • Access only after acceptance of terms • Governments should seek to protect • Legitimise through creating a database/repository • Fund the creation of database/repository • Rights exist with or without a repository
Indigenous Knowledge Licencing	While the issue of management of any repository is being resolved, it is suggested that protocol are developed alongside traditional knowledge licencing categories and use rights to be applied to any MM identified within the Challenge.
Connect with other national digital repositories	Connecting with the identified national repository projects, indigenous and otherwise will assist with cohesion around the Māori data space. • Te Tāhū o te Pātaka Whakairinga Kōrero: Next Generation Indigenous Knowledge project • National Research Information System
Ethics and Guidelines for interim collection of mātauranga Māori	Utilise resources already available to enhance data collection experiences for Māori and researchers. Adopt Te Ara Tika Guidelines, and use data collection templates provided by this project, to ensure appropriate data is being captured on an interim basis.

[28] http://www.mbie.govt.nz/info-services/science-innovation/research-and-data/pdf-library/rsi-data-conceptual-model-consultation-draft-march-2017.pdf

2. The viability and appropriateness of a repository (digital or otherwise) to protect the use of mātauranga Māori.	
Identified Measures	Comments
Connect with other national digital repositories	Connecting with the identified national repository projects, indigenous and otherwise will assist with cohesion around the Māori data space. • Te Tāhū o te Pātaka Whakairinga Kōrero: Next Generation Indigenous Knowledge project • National Research Information System
Investigate further the Case Study of Mira Canning Stock Route Project	• Learn from indigenous licencing system and online management

3. The viability and most appropriate method of ownership and ongoing management of a repository within the Challenge and into the future.	
Identified Measures	Comments
Connect with other digital repositories or Māori data groups	• Te Tāhū o te Pātaka Whakairinga Kōrero: Next Generation Indigenous Knowledge project • National Research Information System • Te Mana Raraunga • Data Futures Partnership
Enabling Framework	Engage with advisors and iwi Māori to ascertain support for the enabling framework to support and manage the creation of a digital repository.
Develop protocol to assist with gaining trust and confidence in any repository going forward	Invest in protocol development for stage 2 of the project to socialise with Māori in engagement phase.
Investigate further the Case Study of Mira Canning Stock Route Project	• Learn from indigenous licencing system and online management • Investigate similarities between proposed Enabling Management Framework and this system of management used.

8.0 Enabling Framework for the Digital Repository

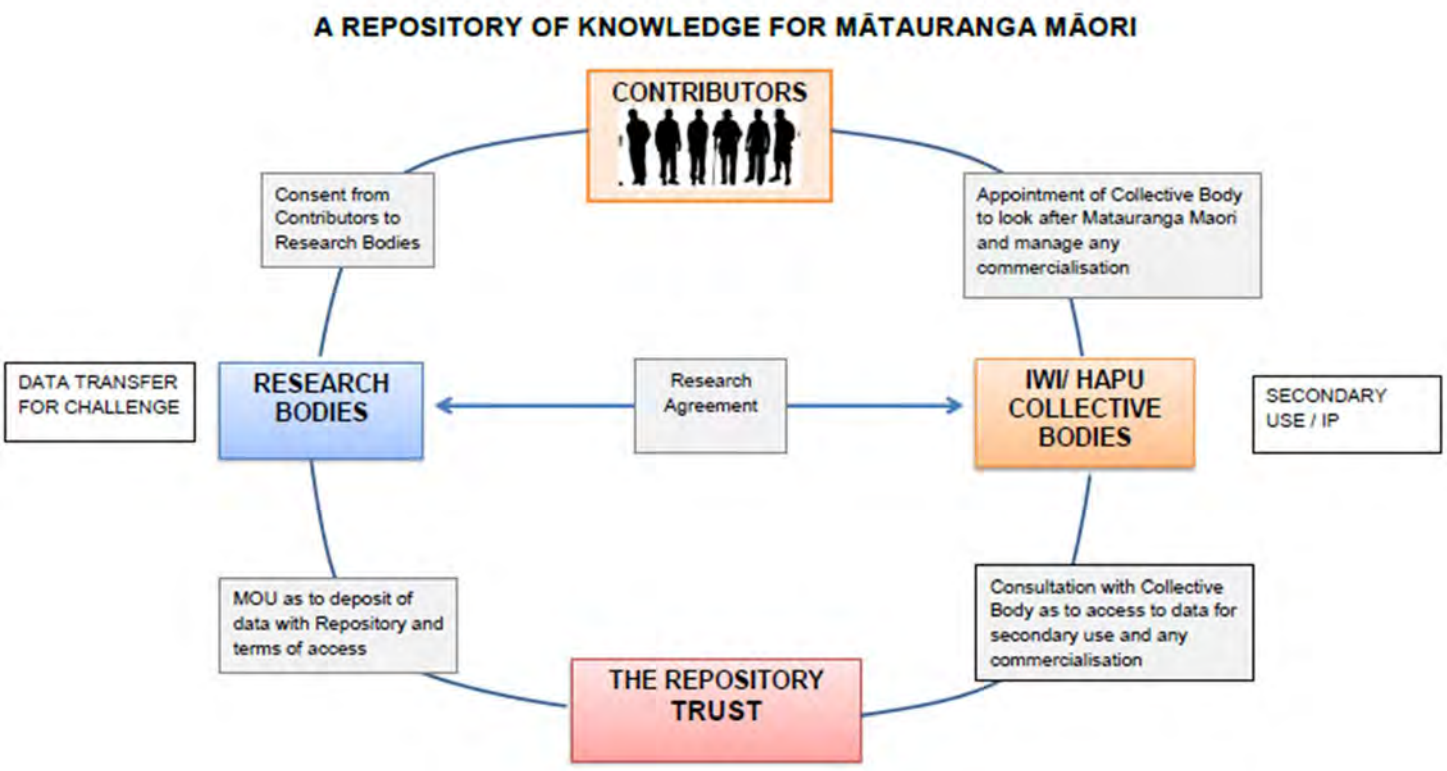
8.1 An Approach: Enabling Framework for the Repository

There were a variety of options discussed and canvased during the legal research phase of the project and included consideration of a number of instruments, consents and entities to enable and implement an effective system for the Challenge and more specifically for the Repository concept. It was identified that the management framework or system that supported the use and

management of the repository, needed to allow for collective representation and decision making, but also work with individuals, iwi, hapū, research bodies and institutions, if it was to be a success.

The following 'Enabling Framework' was considered the best approach to propose and discuss during engagement, that would address all of the concerns raised within the development of the project.

8.1.1 The Repository Enabling Framework



The final proposed solution includes the following elements:

<u>Individual Participants – the 'Contributors'</u>

The individual participants are the source of the information. The structure of the Challenge requires that these individuals provide mātauranga Māori (primary data) to Research Bodies on the basis of consent.

<u>Iwi or Hapū 'Collective Bodies'</u>

The role of the iwi or hapū collective bodies will be to act as an agent or nominee for Contributors/Individual Participants for negotiating consent for and enforcing agreements for secondary uses of primary data by third parties. It is contemplated that these iwi could be included as a beneficiary of the Repository Trust that is established. The iwi or hapū collective bodies, it is

anticipated, are legal entities and can therefore enter into agreements on behalf of a collective group.

'Research Bodies' within the Challenge

The role of the research bodies would include to:

- engage with and obtains consent from individual participants use mātauranga Māori for primary research purposes within the Challenge.
- obtain consent from individual participants to store mātauranga Māori in the Repository;
- enter into a research agreement with iwi or a collective iwi entity. The research agreement would set out terms of negotiation for secondary use of primary data or commercialisation of information to ensure accountability and transparency.
- enter into a memorandum of understanding with other Research Bodies and the Repository around the use of the Repository for deposit and access to mātauranga Māori. Ensures accountability and transparency.

The 'Repository Trust'

The legal entity would be established to hold and manage access to mātauranga Māori for future research purposes; and to retain the mātauranga Māori for benefit of future generations. It is contemplated that the legal entity would be necessary to enter into agreements with third parties and Research Bodies and to provide an independent body that can protect mātauranga Māori on behalf of individual contributors.

The trust would also hold records of all consents, source Contributors, and terms of Consent for access and terms for secondary uses and ensures confidence in the security of the Repository. A crucial element of developing trust and confidence in the Repository Trust will be in the detail and development of the Protocol for managing the mātauranga Māori. This will be a key piece of work to assist with buy in to any future repository.

The Trust would also:

- act as an agent or nominee for individual participants for negotiating consent for and enforcing agreements for secondary uses of primary data by third parties;
- provide options to individual participants in terms of who to negotiate terms for secondary use of primary data.
- ensure engagement and involvement to the hapū and iwi or other collective.

- enter into MOU with Research Bodies around the use of mātauranga Māori. Ensures accountability and transparency.

In summary, the following proposed legal and non-legal instruments would be utilised within the proposed enabling framework for the repository:

No	Document	Parties	Objective	Purpose
#1	Consent Form	Between Individual Participants / Contributors and Research Bodies	To obtain consent of Individual Participants / Contributors to access mātauranga Māori for Challenge purposes	Provides greater protection and recognition of importance of mātauranga Māori
#2	Memorandum of Understanding	Between Repository and Research Bodies	To set out the basis of use of Repository for deposit and access to mātauranga Māori	Sets out clear parameters on ethical use and access to data in the Repository
#3	Research Agreement	Between Iwi or Hapū Collective Bodies and Research Bodies	To set out terms of negotiation for secondary use of data or commercialisation of data	Ensures accountability and transparency
#4	Protocols of Storage and Use of Mātauranga Māori	Repository	To set out protocols for storage and use of mātauranga Māori in the repository	Ensures accountability and transparency, and so contributors can have confidence their data / mātauranga will be secure
#5	Trust Deed	Between Settlors and Initial Trustees	To establish a legal structure to make decision about and manage the Repository in accordance with Protocols of Storage and Use of Mātauranga Māori and other relevant documentation	To ensure accountability and transparency of management and decision-making

9.0 Conclusion

The first year of Project VM4.1 investigated the appropriateness of a digital repository concept for mātauranga Māori. The intent was to find a pathway and outcome to protect, preserve and record the whakapapa of all information and/or data gathered and identified as being mātauranga Māori throughout the Sustainable Seas Challenge. A summary of the outputs of Project VM4.1 is outlined in APPENDIX A, with subsequent documents (reports, articles, legal opinion etc) included within respective appendices of this report.

An important aspect of the project was the recognition of the WAI 262 claim and report, where by one of the recommendations of the report was to implement new guidelines for management

and access to mātauranga Māori and to support mātauranga Māori in science funding. However, to unlock the potential of mātauranga Māori, as pursued under the Vision Mātauranga policy framework and as envisaged in WAI 262, there must be an incentive to share it.

Another key aspect was the early identification in the project that the templates and consents would be inextricably linked to the investigation of the ongoing management framework for the repository and therefore the distribution of these templates would be premature, until consideration of the repository and how it would be managed, was completed.

Current feedback from within this project has suggested that Māori may not freely share mātauranga if their concerns about the protection and use of mātauranga Māori are not addressed.

The following recommendations result from the above key findings applicable to the project and the Challenge and are deemed to be key actions to implementing the projects findings and the protection of mātauranga Māori moving forward. All of these will be achieved through funding the second phase of this project.

9.1 Recommendations

9.1.1 Build Trust and Confidence in the Processes Undertaken with Sustainable Seas

Enabling the continuance of this project will work towards providing clarity and certainty for Māori. They can feel confident that they can maintain/retain ownership and uphold their role as kaitaiki over how their mātauranga Māori is being used. In turn this will ensure that Māori knowledge, people and resources are sourced, considered and applied so that potential new tools and knowledge is developed in the Challenge.

Additionally, leadership and guidance will be provided to researchers in the Challenge who are tasked with sourcing and/or considering mātauranga Māori. This will help to improve consistency and integrity of Challenge processes and its research/outcomes/outputs.

9.1.2 Build Support and Confidence in Ecosystem Based Management

The Challenge has chosen to apply an EBM approach. This provides an opportunity for an authentic process which needs to include Māori knowledge/mātauranga Māori. The only way this can be achieved is through, Māori communities trusting the system and processes within the Sustainable Seas Challenge. The repository and enabling framework provides a platform that Māori can trust and encourage their involvement in the EBM process and increase knowledge contributions.

9.1.3 Interim Treatment of Mātauranga Māori Shared Within Projects

Ensuring that the mātauranga Māori shared on an interim basis, is adequately protected and recorded, is key. This is or the benefit of Māori contributors, the Challenge and to enable its future use, there is some key information that needs to be collected following an interview or collection of data that includes mātauranga Māori. Templates have been developed to assist with identifying when mātauranga Māori may be shared within a project and to assist with the collection of this data. It is recommended that these be used going forward, alongside the application of the Te Ara Tika Guidelines.

9.1.4 Socialise the Enabling Framework – Management Concept for Repository

The research and legal investigation identified that any management framework or system that supported the use and management of the repository, needed to allow for collective representation and decision making, but also work with individuals, iwi, hapū, research bodies and institutions, if it was to be a success.

The 'Enabling Framework' as recommended in this report will support MBIE (as funders and holders of Vision Mātauranga policy framework) in its response to WAI 262 as well as its responsibility under the Treaty of Waitangi and integrity with Māori communities in its application of Vision Mātauranga. Due to its collective nature this must be socialised and engagement must take place to gain support for the management framework proposed.

9.1.5 Inter-National Science Challenge Collaboration

Accessing mātauranga Māori, and applying it to inform and/or frame new and innovative tools is not just a Sustainable Seas Challenge requirement, but also a requirement for other National Science Challenges and MBIE funded research.

The next phase of Project VM4.1 will have a strong linkage with the University of Waikato seed project in the Science for Technological Innovation National Science Challenge, *Te Tāhū o te Pātaka Whakairinga Kōrero: Next Generation Indigenous Knowledge a*nd will seek to foster already established connections with Te Mana Raraunga and Data Futures Partnership, as well as build connections for MBIE's NRIS project.

Our recommendation is to support the second phase of this project to encourage the development of a digital repository for mātauranga Māori to be utilised throughout all National Science Challenges, as currently funded and undertaken in *Te Tāhū o te Pātaka Whakairinga Kōrero: Next Generation Indigenous Knowledge* project.

9.2 Stage 2 of Project VM4.1

It is intended that Stage 2 of the project will accommodate the recommendations identified in the report so that the challenges as identified in the first year can be addressed.

The review of applied examples, research and investigations into contract and IP law, as well as linkage with other indigenous data management research and initiatives, has set a platform for Project VM.4.1 as it prepares for Stage Two.

Stage 2 of Project VM4.1 will involve the socialisation and evaluation of a proof of concept. It is focused on seeking trust and confidence in the existing and future management frameworks within the Challenge and beyond regarding the access and use of mātauranga Māori. This will include the proposed management framework (concept) for the repository as well as the development of the repository itself.

The project will seek to implement the findings identified in Stage 1 research of Project VM4.1, which sought to protect the use of mātauranga Māori in the Challenge. However the core focus is to gain the trust and support for the repository and its management framework by Māori in the Challenge, as well as Challenge wide participants (includes MBIE, research institutes and researchers) and communities external to the Challenge (Māori outside of the focal area, and other Science Challenges).

The continuance of this research project will also support the development of a digital repository for mātauranga Māori to be utilised throughout all National Science Challenges, as currently funded and undertaken in the Science for Technological Innovation Science Challenge, specifically the Te Tāhū o te Pātaka Whakairinga Kōrero: Next Generation Indigenous Knowledge project.

There will be three areas for Stage 2 of the research project:

1. *Through engagement,* ***seek, build and establish trust, confidence and support for the development of the repository's management framework and digital platform***
2. *Supported and guided by our advisors and feedback garnered from engagement,* ***develop the repository's management framework***
3. *Work collaboratively with the University of Waikato and NIWA in the* ***development of the digital platform for a repository***

With direct relevance to the Challenge's objective to "enhance the value of New Zealand's marine resources, while providing a healthy marine environment for future generations", this acknowledges that Māori communities want to see appropriate measures in place to safeguard the protection of, and avoid the inappropriate use of their mātauranga Māori. This concern has been expressed by Māori in the case study area, the focal area (Taranaki iwi), and by Māori researchers.

To identify and understand "values" of New Zealand marine resources, Māori communities need to trust and have confidence in any methods employed within the Challenge when their knowledge is being sourced and applied within it before sharing their values and perspectives.

Also, as the repository project is working with each research project in the Challenge, inherently this project is aligned with the Challenge objective. It seeks to ensure that a wholehearted EBM approach is enabled throughout the Challenge by ensuring Māori knowledge and mātauranga Māori are offered and incorporated throughout the Challenge and protected whilst doing so.

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http://creativecommons.org.nz/licences/licences-explained/
http://creativecommons.org.nz/indigenous-knowledge/

Local Contexts
http://www.localcontexts.org/tk-licenses/
http://mira.canningstockrouteproject.com/node/3037
http://mira.canningstockrouteproject.com/licences

Data Futures
http://datafutures.co.nz/assets/Uploads/Tuhono-Report-9-June-2017.pdf

https://trusteddata.co.nz/wp-content/uploads/2017/08/Summary-Guidelines.pdf

Property Law Act 2007
http://www.legislation.govt.nz/act/public/2007/0091/latest/whole.html#DLM968969

National Research Information System
http://www.mbie.govt.nz/info-services/science-innovation/research-and-data
http://www.mbie.govt.nz/info-services/science-innovation/research-and-data/pdf-library/rsi-data-conceptual-model-consultation-draft-march-2017.pdf

Appendix A Summary of Outputs of Project VM4.1

I - Interim Treatment of Mātauranga Māori

We have developed a process referred to in 9.1.1. Recommendations, attached as APPENDIX B below with a template for researchers within projects to utilise to ensure they capture all the information needed to support the project and the Challenge's commitment to the protection of mātauranga Māori.

II - Streamlined Environmental Comparative Repository Research

The second task for the project included the investigation of international and New Zealand examples of similar repositories (old, new and proposed) of indigenous knowledge to identify any learnings and concepts that could be applied within this project. This was to include methods of ownership and management of data and digital methods used.

This research was undertaken and resulted in a report that detailed the key findings around other similar indigenous knowledge repositories around the world. The full report is attached as APPENDIX C.

III - Journal Article – New Zealand Intellectual Property Journal

This article has been drafted, and reviewed and is currently under final consideration for publishing with the New Zealand Intellectual Property Journal. This is a peer reviewed legal publication and was considered the most appropriate by the project team, for discussing some of the key issues that have arisen during the development of the project. A copy of the draft publication is attached as APPENDIX D

IV - Presentation at Ngā Pae o Te Maramatanga Conference

The Ngā Pae o te Maramatanga Conference took place in November 2016. Project Lead James Whetu presented on the project as part of a panel and was available for questions following. The presentation was a great chance to promote and educate about the project in front of a predominantly indigenous audience. The presentation is attached as APPENDIX E.

V - Presentation and Posters at the Sustainable Seas Conference

Project Lead James Whetu also presented on the project at the Sustainable Seas Science Challenge Annual Conference. One of our legal Advisors, Tai Ahu, intended to present alongside James but was unable to attend at the last minute, but provided James with a presentation for the event. This presentation is attached as APPENDIX F. This was another great opportunity to educate and inform about the project in front of both national and international academics. This resulted in some great informal discussion with some skilled international researchers that attended the conference and some valuable feedback.

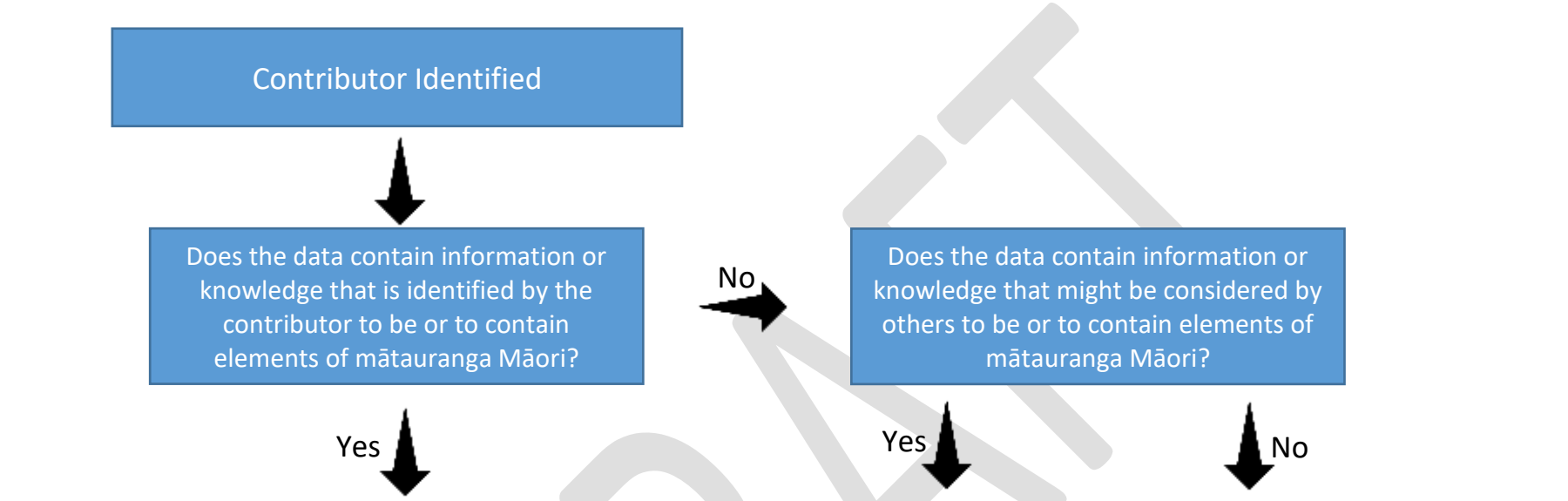
James was also present alongside a poster display during the conference, as an opportunity for those attending the conference to come and chat about the project, think about its purpose and prompt questioning. A copy of the poster on display is attached as APPENDIX G.

VI - Intellectual Property Presentation for Engagement

A presentation was prepared for presenting to attendees at engagement hui. This was used to inform about the background for the project and the current IP regime within New Zealand. The presentation is attached as APPENDIX H.

Appendix B Process for Interim Treatment of Mātauranga Māori

Process for treatment of Mātauranga Māori shared within projects.



Take the following steps prior to receiving the information:

	Tick
Record the contributor's iwi and hapū affiliations if known.	
Identify which element of the data/information/story is MM.	
Identify whether the MM identified is associated with a particular iwi/ hapū, if so, which one/s.	
If the contributor is not the original source of the information/data, do they know where it originally came from ie: hapū kaumātua.	
Utilise the contributor information form supplied.	

Mātauranga Māori Repository Contributor Information

This form is to be completed by the researcher alongside the contributor at the conclusion of the interview/data gathering.

1. Name of Contributor:
2. Project Name:
3. Iwi:
4. Hapū:
5. Marae:
6. Audio File Number:
7. What applications of this knowledge were considered appropriate during the giving of the information?
   - O This project only
   - O Any project within the Challenge
8. What application of this knowledge would be deemed inappropriate or not allowed?
9. Has the contributor read or had explained to them, the Mātauranga Māori Repository Information Sheet?
   YES or NO *(delete one*)
10. Has the contributor signed the Mātauranga Māori Repository Consent Form?
    YES or NO *(delete one*)

This section of the form is to be completed by the researcher and project team when discussing application of the interview information.

11. What keywords, topics or datasets are covered within this interview/data? *(have te reo words alongside all of these. Terms need to be completed after consideration with some scientist, MM experts and meta data experts)*

ecosystems		marine							
EBM		mammals							

Appendix C Streamlined Environmental Comparative Repository Research

Mātauranga Māori Digital Repository Research

www.streamlined.co.nz

Action	Name	Date
Draft prepared by	Ashlee Dunsmuir	13 August 2016
Reviewed by	Ngaire Phillips	16 August 2016
Final prepared	Ashlee Dunsmuir	18 August 2016

Report WHE1601–1
Prepared for Whetu Consultancy Group
August

Dunsmuir, A. (2016) Mātauranga Māori Digital Repository Research. WHE1601–1, Streamlined Environmental, Hamilton, 32 pp.

Streamlined Environmental Ltd
Hamilton, New Zealand
www.streamlined.co.nz info@streamlined.co.nz

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1. Introduction

The following report contains international and New Zealand examples of indigenous knowledge repositories and databases. The purpose of this report is to identify learnings and concepts from these examples which could be applied to the development of a Mātauranga Māori digital repository. The goal of this repository is protecting, preserving and recording all information gathered and identified as being mātauranga Māori throughout the Sustainable Seas Challenge.

2. Methods

The project brief included several links to examples of databases which provided information which allowed me to grasp the aim of this report. On face value these databases looked very promising such as http://ip.aaas.org/tekindex.nsf and http://www.nativeknowledge.org/login.asp. However, locating reports which outlined the process of creating these databases was difficult. As a consequence, these examples do not feature in this report.

After investigating these links, I then moved on to using key word searches in Google. Examples of indigenous knowledge repositories and databases were investigated and their suitability for inclusion in this report was assessed.

Key word searches included:

Indigenous knowledge databases/repositories; traditional knowledge database; New Zealand Māori knowledge database; local knowledge database; online database; case studies of indigenous knowledge.

Based on the brief provided, key questions that needed to be addressed for each of the examples were identified and are included below:

- How was the database formed? (Procedures undertaken)
    - What worked well and what did not? How were the knowledge holders engaged?
- Who has ownership over the knowledge?
    - How is that shown in the database?
- Who can access the knowledge and how?

The following sections detail our findings.

3. Database Examples

3.1 The Role of Registers and Databases in the Protection of Traditional Knowledge: A Comparative Analysis (2003)

The United Nations University: Institute of Advanced Studies (UNU-IAS) compared a range of existing registers and databases with the goal of recognising strengths and limitations for protection of traditional knowledge (TK) (Alexander et al., 2003). Across the seven case studies presented in this report there is a large range of backgrounds, objectives, procedures and protection methods.

Of the seven case studies included in the report, the Traditional Knowledge Database of Inuit of Nunavik, BioZulua Database of Venezula, and the Honey Bee Network were considered most relevant to the Mātauranga Māori repository project and are discussed further.

3.1.1 Traditional Knowledge Database of Inuit of Nunavik, Canada

Background

Within Canada there are 46,000 Inuit who live in four different regions. A "modern day treaty" was signed in 1975 between the Inuit of Nunavik and the Quebec and Canadian Governments (the James Bay and Northern Quebec Land Claims Agreement (JBNQA)) (Alexander et al., 2003). As a result of this treaty Makivik Corporation was formed which would "guide their political and economic development". This corporation developed a Research Department with the goal to "develop a database and expertise within Makivik Corporation which could be used to inform decision makers, help in the formulation of policies and programmes, and assist Inuit communities and their organisations" (Alexander et al., 2003).

Objective

The goal of the project was to "develop a database on Inuit ecological and environmental knowledge, along with a long–term programme to apply it to resource management, planning, environmental impact assessment and economic development" (Alexander et al., 2003).

Procedure and Administration

The database was developed in three stages, the first involving the collection of knowledge across the regions. This was obtained from interviews with Inuit from each of the communities from Nunavik (Alexander et al., 2003). These interviews were carried out over thousands of hours and the data obtained was organised and inputted into a computerised database. Community consultation was used to produce a comprehensive manual on how to undertake the field research, which was then used to guide the interviews. The Nunavik database also included map analysis which was performed by Geographic Information Systems (GIS). Individual interviews were used to obtain knowledge on land use, while group interviews were used to attain information about Inuit traditional knowledge. The use of maps was a key tool in reporting the collected data, which was assisted by audio recording of the interview and written text (Alexander et al., 2003).

The second stage was the analysis of collected data by validating it with the community. The third stage, which at the time of the report was still in progress, was the ongoing updating of data for the use in specific projects and for the needs of communities and organisations of Nunavik (Alexander et al., 2003).

The data was processed via a "computer mapping system using an Oracle database and a MicroStation GIS/CAD program". The setup was capable of plotting maps on a large scale using GIS and can create completed maps with cartography software(Alexander et al., 2003).

This database was not available for public use as the main purpose was of "promotion and preservation of Inuit ecological and environmental knowledge". The paper did report that Inuit of Nunavik were working on a model for benefit-sharing, but had not yet reached any agreements on the use of traditional knowledge in regards to bioprospecting.

Protection

As a result of this database it was expected that the information it contains would be used to influence the review process of planning and assessment within the region which would guide the Inuit future visions, priorities and needs (Alexander et al., 2003). Inuit developed a code of ethics which outlines rules and procedures for how governments, scientists, academics and private parties interact with Inuit. However, Inuit do not have authority over access to the collected data or the process of research (Alexander et al., 2003).

One of the motives for making the database 'closed' was due to the Canadian intellectual property regime at the time of the report, which does not form any rights over the traditional knowledge it holds. This is because Canada's Intellectual Property Rights (IPR) regimes does not regard the data as being "original". However, the actual database itself is likely to be covered by copyright (Alexander et al., 2003).

Further investigation into continued development of issues relating to the Inuit database found a press release by Makivik Corporation in 2010, which announced that "Canadian Government showed their support on strengthening their relationship with Canadian Aboriginals by endorsing the United Nations Declaration on the Rights of Indigenous Peoples" (Makvik Corporation, 2010). In May 2016 the Minister of Indigenous and Northern Affairs announced "Canada is now a full supporter, without qualification, of the declaration" (Government of Canada, 2016). The declaration includes the rights of aboriginal individuals and groups worldwide on a range of issues. The declaration states that "Indigenous peoples have the right to maintain, control, protect and develop their cultural heritage, traditional knowledge and traditional cultural expressions… They also have the right to maintain, control, protect and develop their intellectual property over such cultural heritage, traditional knowledge, and traditional cultural expressions" (United Nations, 2008).

Summary:

Example	Objective of the database?	How did they form the database	Who has ownership/rights and how is it shown?	How is it accessed?	Advantages and disadvantages
Inuit of Nunavik Canada TK database	Collect TK from Inuit and store within a database to inform decision makers	Interviews with Inuit from each community Analysis of collected information Ongoing updating of data	Inuit do not have authority regarding over collected data and process of research. Data not considered as original under Canadian PPR regimes. Database itself is likely to be covered by copy right.	It is a 'closed' system (not available to public), information is regarded as confidential between Inuit and the government.	**Adv.** Close consultation with the community. Use of maps, audio and video to assist reporting. Protected by United Nations Declaration on the rights of indigenous people. **Disadv.** No authority over access to the collected data or the process of research.

3.1.1 BioZulua Database in Venezuela

Background

The BioZulua Database comprises information regarding indigenous communities which was created by Fundación para el Desarrollo de las Ciencias Físicas y Naturales (Fudeci) from Venezuela (Alexander et al., 2003). This scientific/academic database covers ancestral technology, traditional medicine, and traditional knowledge on agriculture and nutrition. The National Academy of Science holds the database by Fudeci (Alexander et al., 2003).

Objective

To protect traditional knowledge and allow access to information on medicinal plants to outside researchers, with the goal of developing new pharmaceuticals (Alexander et al., 2003).

Procedures and Administration

The information includes medicinal food crops and plants from right across the ethnic villages in the Amazon jungle. The information was obtained by field researchers and uploaded to a searchable repository (Lakshmi Poorna et al., 2014). BioZulua is only permitted to be used on a case-by-case basis, predominantly in the field of scientific research (Alexander et al., 2003). At the time of the report it was noted that Fudeci was working on producing confidentiality agreements between individuals who are involved with information stored in the database, as a precaution to protect the interests of the indigenous people (Alexander et al., 2003). Such agreements would also protect the commercial value of the data. Fudeci noted the range of advantages to running a database in this manner which included “maintenance and safeguarding sensitive information (TK), adding value to TK through its organisation and systemizing, and an opportunity for biotrade and biobusinesses” (Alexander et al., 2003). Fudeci also acknowledged the disadvantages of “potential biopiracy, difficult access to preserved information by communities, and lack of protection of the information and data held” (Alexander et al., 2003)

Protection

The BioZulua database is unable to authorize rights over traditional knowledge in support of local communities or indigenous people. Fudeci administrators noted that TK which had not been recorded within a public domain is protected and remains confidential until a “positive *sui generis* (unique) system of protection” is created (Alexander et al., 2003).

At the time of the report there were still several areas of concern regarding the BioZulua database. One area surrounds prior informed consent (PIC) and the uncertainty surrounding the degree to which PIC was obtained before indigenous knowledge was added to the database. Indigenous communities have the legal right to decline the use of their knowledge derived from within their territories (Alexander et al., 2003).

The second concern involves the use of copyright protection of the database. The Government of Venezuela had stated that the database itself is protected whereas the knowledge it contains is not. This has caused questions to be asked regarding the intellectual rights the indigenous communities have over the knowledge within the database (Alexander et al., 2003).

The above concerns have resulted in indigenous organisations stopping further gathering of information and for the "database to be held by indigenous people". Fudeci's lawyers then came back with the statement: "the title to the database vests in the State, and the knowledge contained in the database belongs to the indigenous communities" (Alexander et al., 2003).

A more recent report published in 2014 stated that information within the database is IP of the indigenous communities (Lakshmi Poorna et al., 2014). This promotes private organisations and individuals to obtain "informed consent and broader engagement with the TK holders". The Venezuelan government is investigating raising money for indigenous communities by charging international pharmaceuticals access to the database (Lakshmi Poorna et al., 2014).

Summary

Example	Objective of the database?	How did they form the database	Who has ownership/rights and how is it shown?	How is it accessed?	Advantages and disadvantages
BioZulua Database in Venezuela	Protection of TK and assist researchers to develop pharmaceuticals	Process of formation was not included in report	Local communities do not have authorized rights over TK, it is owned by the state. Database itself is protected by copyright.	Only allowed access on a case-by -case basis. Predominately for scientific research.	**Adv**. Maintains and safeguards information which adds value to TK Investigating using database to raise money **Disadv**. Database does not authorize rights in support of communities. Uncertainty of extent PIC was obtained before collection of knowledge.

3.1.2 Honey Bee Network

Background

The Society for Research Initiatives for Sustainable Technologies (an Indian NGO) initiated the Honey Bee Network, which collates TK and community innovations in a database (Alexander et al., 2003). Contributors to this network include NGOs, innovators, scientists, students, academics, researchers and homemakers who reside in and outside of India. At the time of the report, the National Innovation Foundation (NIF) administered the database, with cooperating institutions managing separate registers in different regions of India as well as some outside of India (Alexander et al., 2003). By collecting information and documenting TK and grassroots innovations the network has prevented exploitation of this resource by outsiders.

Objective

The key goals of the Network are to: "forge lateral linkage among knowledge providers and innovators in the spirit of mutual help and cooperation; overcome anonymity (that is, every knowledge provider as well as collectors are acknowledged); and ensure fair distribution of benefits among all stakeholders including communities" (Alexander et al., 2003).

Procedures and Administration

Information for the Honey Bee Network is obtained through field trips and surveys as well as members and collaborators who send in traditional knowledge and innovations (Alexander et al., 2003). The gathered knowledge is translated into several different languages and is loaded into the appropriate databases on their website (http://www.sristi.org/hbnew/index.php) or reported in the Honey Bee newsletter (http://www.sristi.org/hbnew/publication.php). On the website there are several searchable databases including low cost practises, medicinal plant databases and SRISTI library database to allow easy access of information. There is also a section called "seeking solutions" which outlines a problem which needs to be solved and a "post a solution" option. A Prior Informed Consent (PIC) system was developed by NIF of India, which principally ensures that permission from the sources of traditional knowledge and innovators for documentation is obtained. This increases the value of the data within the Honey Bee Network. The PIC system stores a range of information on the innovators and TK holders which includes name, address, communities which are the source of the information, the distribution of knowledge via publications and sharing of benefits as a result of commercial use of the knowledge (Alexander et al., 2003).

As a result of PIC system being in place, it allowed NIF to represent the innovators and TK holders and negotiate on their behalf with possible entrepreneurs and investors. NIF also supports the innovators and TK holders by providing legal support in the event of a disagreement in the handover of technologies to the third parties (Alexander et al., 2003).

The report noted that "One possible disadvantage with this form of registration is that by placing traditional knowledge in the database, communities may be deemed to be placing it in the public domain, and thereby may lose any rights over such information" (Alexander et al., 2003).

Findings

The Honey Bee Network is one of the oldest traditional knowledge databases in the world, which can provide valuable learnings from its experiences. The database has the goals of protecting tradition knowledge and adding value to the information by commercialising the data, with the ideal outcome of reducing poverty (Alexander et al., 2003). However, attracting potential investment can be difficult, which in turn may not produce high returns. At the time of the report, UNU-IAS reported that "commercialisation of innovations has not yet generated much success" (Alexander et al., 2003).

A report published in 2014 illustrated how successful the Honey Bee Network has become. One story explains how a "tinkerer" was asked by a local farmer to find a solution for tilling fields. He then invented a ploughing machine using a motor bike which resulted in a US patent (Maurya et al., 2014). There are many examples like this which demonstrates the success of the Honey Bee Program.

Summary

Example	Objective of the database?	How did they form the database	Who has ownership/rights and how is it shown?	How is it accessed?	Advantages and disadvantages
Honey Bee Network	To collect information and documentations to prevent exploitation by outsiders.	Obtained information by fieldtrips, surveys and by people sending in information. It is then translated and added to database.	NIF represents innovators and TK holders and it allows them to negotiate on their behalf and also provides legal support.	Published in the Honey Bee Newsletter along with the information in the owner of the knowledge.	**Adv**. Adds value to the knowledge by commercialising the data Protects information Supported by NIF **Disadv**. Initial difficulty in engaging potential investors

3.1.3 Recommendations of the review

The ten recommendations below were made by UNU-IAS after comparing the seven case studies. They provide guidance on key points to consider for registers and databases in regards to the protection of traditional knowledge.

" 1. As a basic guiding principle, there is a need to ensure that all reasonable efforts are made to obtain prior informed consent from the relevant indigenous peoples as a condition for placing information in a database, whether that TK is in the public domain or not. Explicit institutional policies need to be developed by museums, botanical gardens, universities, companies and all entities working with biological materials and related TK

2. Databases, registers, publications, scientific papers, or other means through which TK is made available to the public should incorporate initial advisory notes which explicitly state, as a minimum, that:

- the authors fully recognise the rights of indigenous people over their TK, including any intellectual property or *sui generis* property rights
- PIC was obtained for the use of the TK
- the use of TK for commercial or other ends must be appropriately recognised
- the need for the sharing of benefits derived from the use of TK with indigenous peoples.

This practice should be promoted at all levels and target, for example, publishing houses, editorials, research institutions and individual researchers. Although the effectiveness, practicality, and enforceability of these advisory notes may be questioned, they are an important starting point to raise awareness, guide and orient users' conduct, and promote respect and sound ethical and professional practices. The establishment of such standard advisory notes will demonstrate an immediate level of awareness of the sensitivity of indigenous

peoples' regarding protection of their TK and help build confidence and the basis for better partnerships between research institutions, the private sector and indigenous peoples.

3. Access to databases and registers should require acceptance of the rights of indigenous peoples over their TK as a precondition for access, as a means to ensuring appropriate use of TK. To this end, the proprietors and managers of databases and registers should establish protocols governing access to and use of TK. Access to database files either electronically or otherwise should involve a step including acceptance of the conditions of the protocol.

4. National governments and international organisations should review existing law and policy with a view to the development of more sensitive and directed search procedures designed to enable patent authorities to access a wider range of sources of prior art*, including local community and indigenous peoples' databases and registers, confidential registers and oral registers. Consideration should be given to the potential merits of requiring disclosure of origin and source of TK in patent applications as a mechanism for assisting patent authorities to carry out more directed searches of prior art. The sources of prior art should be expanded to include oral, visual and other manifestations of prior art."

[*Note: prior art is evidence that an invention is already know]

5. "National governments and responsible international organisations should consider the possibilities of adopting interim measures which reduce pressure on indigenous peoples and their knowledge systems by creating obligations for users to demonstrate prior informed consent as a condition for scientific and commercial use of TK. Particular attention should be given to the ongoing discussions on user measures within the framework of the Convention on Biological Diversity (CBD), and to proposals for the inclusion of requirements for disclosure of origin and/or legal provenance of TK in IPR applications procedures.

6. In development of national *sui generis* TK regimes, consideration may be given to establishing a system which recognises and incorporates local community and indigenous peoples' databases and registers whether documented or orally maintained within a national network of registers of TK. This practice may serve to extend the remit of national registration and evidence of prior art, as well as generating wider respect for the national system of registration and for the value of TK.

7. To secure increased participation of indigenous peoples in international processes for the development of law and policy relating to the protection of TK, national governments should include indigenous representation on national delegations. International bodies such as the Workld Intellectual Property Organisation (WIPO) and the Work Trade Organisation (WTO) need to develop mechanisms to ensure increased indigenous participation in decision making processes through the development of participatory processes, for diffusion of information to local and indigenous communities, consideration of options for protection of TK and the transmission of the results of such consultative processes through independent indigenous representation at relevant meetings.

8. International organisations, governments and other bodies should carry out further investigation into the potential, complexities and limitations of developing international standardised specification data for the registration of TK for defensive and protective purposes. Consideration should be given to the possibilities of adopting a two–track approach to the development of classification systems for TK, making a clear distinction between systems of codified systems of knowledge, which have been widely published and which are freely available in the public domain, and other TK systems.

9. International organisations, multilateral, bilateral and other funding agencies should consider the provision of support for initiatives to develop database trusts, whether through modification of the operation and management processes including, as appropriate, the governance structures of existing databases and registers, as well as through the funding of local community and indigenous peoples' initiatives in this area.

10. Protection of rights over traditional knowledge should not be made conditional upon registration of TK. Such a precondition for the granting of protection would run counter to current practice in intellectual property regimes, and would impose an extra burden on indigenous and local communities".

3.2 How to Build an Indigenous Digital Library Through Community Participation: The Case Study of the Ulwazi Programme (2012)

Background

The Ulwazi Programme (http://ulwazi.org/index.php/Main_Page) is a tool that was developed for the public library and information services within the Thekwini Municipal Area (EMA), in the province of KwaZulu-Natal in South Africa (Greyling and McNulty, 2012). It is an online database which holds local and indigenous knowledge, which was collected by the community. (Greyling and McNulty, 2012) outlined the process involved with developing this type of database and interactions between the community, library and technologies.

Objective

To develop an online resource of local knowledge. Achieving this goal in turn builds skills in ICT and literacy. By improving the education of individuals in the community it can then help reduce poverty.

Methodology

The programme was carried out in three components: the community, the public library and the technology.

The Community

This programme was carried out using a 'bottom-up philosophy', which meant that the community were the most important contributors to the programme (Greyling and McNulty, 2012). An advantage of this approach was the ability of local individuals to communicate with other community members which enhanced social networks and hence engagement in the project (Greyling and McNulty, 2012).

Fieldworkers

Fieldworkers were selected from the local communities and were generally younger individuals who had the willingness to gain a new skill (Greyling and McNulty, 2012). These individuals often already had experience with computers and mobile devices. Being locals, the field workers were already in a valuable position within the community with existing relationships with the elders. The fieldworker's role was to collect knowledge via interviews, where the older generation would share stories and indigenous information. By carrying out video and audio recordings this overcame the problem of illiteracy. Prior to being sent out into the community to obtain information, the fieldworkers were educated in oral history recording procedures, ICT and media production. Post interviews, the fieldworkers then had to pass on the information to the central office. These had to be in the form of short reports and the oral histories and stories were in the form of audio or video files.

The files were then uploaded to a website to be incorporated into the online database. These files could also be sent via email from mobiles. Fieldworkers were given financial support in the form of phone airtime and stipends to ensure the programme ran smoothly (Greyling and McNulty, 2012).

Community Members

Predominate members of the community from a range of target groups were also interviewed, either individually or within groups (Greyling and McNulty, 2012). The groups targeted included the elderly, youth, artists, crafters, professionals and technologists. The interviews were conducted by other community members while programme staff carried out the videography. The information obtained included knowledge on living conditions, past environments, customary practises, community history etc. Those who shared knowledge signed an agreement which allowed the information to be used for educational purposes only, without surrendering copyright. The articles were then published online via a Creative Commons Licence which ensures entire acknowledgement of the source of the information (Greyling and McNulty, 2012).

Schools

The Ulwazi Programme was tested at schools where computers were already present, which allowed the younger members of the community to learn the importance of cultural awareness (Greyling and McNulty, 2012). Youth also gained computer skills and media literacy. This was carried out over an eight-week period for students aged from 15-18, under the guidance of a mentor who introduced the Ulwazi Programme. This included teaching students how the online database works and teaching skills to assist with interviewing, story-writing, taking photographs and online research. Students were required to produced four stories supported by photos over the eight weeks. After completing the eight weeks' students then had to complete a test using the Ulwazi Community Memory database. Participants then received Competency Certificates on completion (Greyling and McNulty, 2012).

The Library

The public library held a valuable role in the community as well as the government, which was responsible for its establishment. The library permitted free and equal access to information, along with access to the skills of the librarians who worked there (Greyling and McNulty, 2012).

Supporting data collection and managing data

The public library was the central hub for the programme, where the data management, training and other key tasks were carried out (Greyling and McNulty, 2012). Programme staff met monthly to evaluate submissions to the database. Received information was stored in the online database, which the content manager had to proofread, edit, translate and categorise. The data was characterised using electronic tags (Greyling and McNulty, 2012).

Reviewing the program

To evaluate the success of the Ulwazi Programme a regular review was undertaken which was monitored by evaluating the following indicators:

- "number of database entries in the various knowledge categories
- number of pictorial material and video streams

- number of times the site is visited
- number of people registering on the site to add information
- amount of information collected from communities
- amount of information collected from established resources, i.e. local cultural and natural history museums, the botanic gardens and indigenous nurseries, and other local institutions
- number of people contributing to the website
- number of people involved in collecting of information
- number of people trained to moderate content
- number of community workers trained to collect and capture stories and information
- number of community members trained to capture information
- community surveys and opinion polls" (Greyling and McNulty, 2012).

The Technology

The technology used to operate the Ulwazi Programme was a web portal which was run by "open-source social software technologies". This social web technology had the advantage of being user friendly and available in all languages (Greyling and McNulty, 2012).

Open Source

From the beginning of the project the goal was to use open-source software as much as possible (Greyling and McNulty, 2012). By operating under a Creative Commons Share and Share Alike licence it enabled the programme to be accessed freely by the public. The reasoning behind operating using an open-source software was to allow sharing and collaboration and also because it was more economic (Greyling and McNulty, 2012).

The Programme operates on four common open-source software systems, namely Linux, Apache, MySQL and Php (LAMP) (Greyling and McNulty, 2012). By integrating software systems, it enabled several content-management frameworks to operate and perform multiple tasks. The main website is operated by Joomla!, linked from this is the Community Memory run by MediaWiki and the programme blog created by WordPress (http://blog.ulwazi.org/) (Greyling and McNulty, 2012).

The Ulwazi Programme is also connected to social media sites including Facebook, Twitter, Flickr and Vimeo. By utilising websites which the majority of the target audience are already using, it permits additional communication (Greyling and McNulty, 2012).

Going Mobile

A key success to this programme was the use of mobile phones. Statistics in 2008 showed that only 10.9% of the population in Africa was using the internet, whereas almost 70% of Africa were using mobile phones (Greyling and McNulty, 2012). Therefore, the program was adapted for both PC and mobile. The interface was modified for use on mobile phones by using plain HTML, removing images, video and social media links and other extra components, leaving just the main functionality (Greyling and McNulty, 2012).

Once the programme was available on mobile it then allowed the introduction of the mobile field-worker (Greyling and McNulty, 2012). Community members were able to sign up and receive an information pack informing them on how to collect indigenous knowledge, which included instructions on how to capture pictures and videos using their mobile phone. The collected files were then sent to a unique email. In return

for the published articles, the field-workers received airtime on their phones on top of the airtime they received with the starter pack (Greyling and McNulty, 2012).

Google Analytics showed that 5.4% of users were accessing the programme using mobiles. Since 2010 there has been a small but constant growth of mobile usage on the portal (Greyling and McNulty, 2012).

Results

The Ulwazi Programme achieved its objective of making indigenous knowledge available digitally. The report noted that the database included 681 articles and between July 2010 and July 2011 there were 62,000 visits (Greyling and McNulty, 2012). The use of mobile phones showed the potential of it becoming a useful tool in collecting and uploading information. The programme also achieved growth in the availability of ICT in public libraries and encouraged the interest and respect of indigenous knowledge (Greyling and McNulty, 2012).

Findings

This method of developing a digital database found there was a high turnover of fieldworkers (Greyling and McNulty, 2012). This was due to most of the workers being unemployed, therefore when a job opportunity was available they left the programme. By providing incentives, it encouraged interest in the programme. Greater incentives could entice more field-workers to stay within the programme (Greyling and McNulty, 2012).

Due to the database being multilingual it required selective translation which meant the content managers needed to have reasonable knowledge of the different languages (Greyling and McNulty, 2012).

Developing the Ulwazi Programme was found to be labour intensive with slow progress. Managing of incoming content took a significant amount of time and required people who had significant knowledge and skills in this area. The programme found that mobile phone skills were obtained much faster than computer skills (Greyling and McNulty, 2012).

When training individuals it was found to be important to remember that a single session would not provide enough time and information to set up workers appropriately. Working in small groups or individually was found to be much more productive, however, this did require more time (Greyling and McNulty, 2012).

It was found that maintaining communication with field-workers was a problem due to lack of air time. This was overcome by the introduction of airtime incentives (Greyling and McNulty, 2012).

The programme found that members of the community were often interested in contributing their information and knowledge. By contributing they felt they were a part of “bigger information society” and allowed them to have a voice (Greyling and McNulty, 2012).

Summary

Example	Objective of the database?	How did they form the database	Who has ownership/rights and how is it shown?	How is it accessed?	Advantages and disadvantages
Ulwazi Programme	To develop an online resource of local knowledge.	Information collected by fieldworkers through interviews and then sent to the central hub. Target groups were also interviewed to gain further information. Data was then evaluated edited, translated, tagged and added to the database.	Those who shared TK signed an agreement which permits the knowledge to be used for education only without surrendering copyright. Can then be published online using a Creative Commons Licence which allows entire acknowledgement to the source of information.	Is publicly available on their website. They have a private policy in place to protect information.	**Adv**. Community is the main driver of the program. Allows community members to have a voice Use of audio and video to overcome illiteracy **Disadv**. High turnover of field workers Requires individuals capable of translating. Labour intensive, and slow process.

3.3 Plants for People: Case Study Report (2010)

Background

The Plants for People project originated from discussions with Aboriginal elders of the Titjikala community, 130 kilometres south of Alice Springs, Australia (Evans et al., 2010). The project itself was initiated by the Desert Knowledge Cooperative Research Centre but was driven by discussions from the locals. Elders from the community had expressed concerns regarding the lack of traditional knowledge being passed on to younger generations. Traditional knowledge on bush craft, plants, animals and dreaming stories was remaining with the elders, as the younger generation were more interested in Western entertainment. Retaining traditional knowledge is of great significance to the elders as it responsible for the cultural identity of the community (Evans et al., 2010).

Objectives

The overall goal of the project was to protect and ensure continuity of the traditional knowledge of the community. One objective of the Titjikala in the Northern Territory was to develop a database containing information on Aboriginal plants (Evans et al., 2010).

Procedures and Best Practises

To ensure that the project belonged to the involved communities and to develop appropriate procedures relating to how work was to be carried out, community workshops were held (Evans et al., 2010). These workshops resulted in the formation of the Plants for People Council of Elders, who organised the activities

which were to be carried out to achieve the objectives of the project. Fieldtrips were then carried out to collect information on culturally significant plants. To encourage interest and commitment from the community, food-gathering activities were used. Numerous community members contributed information which was stored in the database called the Tapatjatjaka Plants Database (TPD). This database can only be access via a protected internet site. The TPD contains the "Aboriginal people's intellectual property" on plant species which are of substantial cultural importance. Information on 53 plant species is stored on the database as text, images and videos in both English and Pitjantjatjara. Having video and audio files to document the indigenous knowledge is a great advantage, as many community members lack literacy skills. Also, tradition knowledge had never previously been recorded in a text format, as it is usually passed on verbally. The database is able to be used as an educational resource, but information still requires editing and revision (Evans et al., 2010).

Freeware software was used for the database as it has the advantages of being available at more than one location without having to have multiple software licences and it has no cost (Evans et al., 2010). Freeware was used to produce a video model which incorporated a stationary image of the plant with audio from an elder in the background and also subtitles (Evans et al., 2010).

The video prototype incorporating audio, imagery and text was used to trial the technology and was found to be successful (Evans et al., 2010). Further progress on the prototype would create a valuable tool for transferring knowledge as well as developing literacy skills (Evans et al., 2010).

In order for the multimedia to be effective, the engagement of community members was key, especially the incorporation of children as they enjoy seeing themselves on videos. The greater the involvement and interest the more usage, which results in more knowledge being transferred (Evans et al., 2010).

Training Manuals

To ensure a consistent method was applied to teaching, two training manuals were produced, titled 'From Field to Website' and 'Video Modification Document'. These manuals provide information on work methodology to assist new researchers involved in the project, thus also decreases time wasting (Evans et al., 2010).

Training Activities

The Plants for People project team undertook numerous training sessions with the objective of developing skills within the community to enable the project to continue without assistance from outside the community (Evans et al., 2010). Another goal was to develop the knowledge surrounding the use of traditional plants. These sessions had varied results. The lack of training time meant that the aims were not always achievable. Nevertheless, there were some individuals who gained valuable skills in photography and sound recording (Evans et al., 2010).

Training sessions were also carried out on word processing, spreadsheets and Internet. These sessions initially attracted a few attendees, but subsequent sessions were poorly attended (Evans et al., 2010). The project found that learning computer skills were not relevant to the community members compared with the likes of field work. To cater to this, the project attempted to train community members informally in the field. The training sessions involved children between 10 and 13, who were required to use a camera and cassette recorder to record plant knowledge. They found that the children enjoyed taking pictures, but were more interested in taking photos of themselves. Community members in their late teens were also encouraged to take part in field trips, but they either were not interested in the project or were involved with Community

Development Employment Projects, so were unavailable (Evans et al., 2010). Community Development Employment Projects was an initiative by the Federal Government for Aboriginal and Torres Strait Islanders, which allows indigenous communities or organisations to combine the unemployment benefits from individuals and distribute this as "direct wages" to those who choose to participate (Australian Bureau of Statistics, 2012).

The training aspect of the project indicated that the community seemed to have minimal interest in being trained in data collection and documentation. However, when training was incorporated with skills the community was already proficient in, such as gathering witchetty grubs, the involvement level was significantly increased (Evans et al., 2010).

Intellectual property and ethics guidelines

Members of the Titjikala community are able to access the TPD and its information freely or "as dictated by cultural protocols" (Evans et al., 2010). Continued work is needed to determine availability levels, fees for outside use, controls over distribution of information from the TPD and "affiliated research into the public domain are secured before information can be released".

Titjikala are represented by the Central Land Council (CLC) in regards to intellectual property (IP) along with the Desert Knowledge Cooperative Research Centre (DKCRC) and other research groups (Evans et al., 2010). Protocols have been developed by CLC and DKCRC to ensure that the IP owned by the indigenous Aboriginal people is promoted and protected (Evans et al., 2010).

Guidelines were developed by Tapatjatjaka Community Government Council (TCGC) and Curtain University of Technology which includes "principles of ethical research, application of those principles, ethics and legislation, informed consent, confidentiality, traditional knowledge, community benefit and participation, appeals or complaints and intellectual property, and use of research materials" (Evans et al., 2010). These guidelines ensure that participants know about the research methodology as well as the proposed use of the information produced.

Future Directions

Expanding the TPD

At the time of the report the TPD only contained information on traditional plant uses at Titjikala, whereas the database could easily be developed to integrate other elements of traditional knowledge at Titjikala including food, dreaming stories, ceremonies etc. (Evans et al., 2010).

Training

At the time of the report, the overall success of the project had been hindered by irregular work timetables of the project research officer located in Titjikala (Evans et al., 2010). To increase the development of the database community members with the interest in being trained for data collection and prior knowledge of cultural relationships would be key. After the training is completed the community members would be able to carry out collection without supervision (Evans et al., 2010).

Security of the TPD

A password is required to access the information in the TPD however, the homepage is within the public domain. By having a public domain, it creates a risk of an unwanted outside sources retrieving the information. Therefore, a more secure system is needed to eliminate the threat (Evans et al., 2010).

Current State of the TPD

A Google search of the TPD did not return any additional information to this report. This is either due to the database not existing anymore or it is no longer publicly available.

Summary

Example	Objective of the database?	How did they form the database	Who has ownership/rights and how is it shown?	How is it accessed?	Advantages and disadvantages
Plants for People	To protect and ensure continuity of TK of the Titjikala community.	Workshops were carried out to develop appropriate procedures on how to carry out work. Formed the Plants for People Council of Elders who organised activities. Fieldtrips were carried out to collect information on plants.	Titjikala are represented by CLC in regards to IP along with the DKCRC and other research groups. Protocols have been developed by CLC and DKCRC to ensure that the IP owned the indigenous Aboriginal people is promoted and protected.	Titjikala community members can access the TPD freely. Continued work is needed to determine availability use, fees for outside usage and controls over distribution of information.	**Adv**. Allowed protection of 53 plant species Community had a large influence in the process Can be esily adapted to include further TK. **Disadv**. More work is needed to determine access of information by people outside of the community. Training members of the community was somewhat unsuccessful

3.4 State of the Takiwā: Cultural Monitoring and Reporting on the Health of our Environment (2008-2016)

Background

The State of the Takiwā (SoT) was developed by Te Rūnanga o Ngāi Tahu in conjunction with their 'Ki Uta Ki Tai- Mountains to the Sea Natural Resource Management', framework set out in the iwi vision of Ngai Tahu 2025 (Te Rūnanga o Ngāi Tahu, 2008). Data collection for the SoT incorporates "field assessments measured against cultural criteria, and collection of supporting information on culturally relevant features of monitoring sites" (Lang, M et al., 2012). This collection of assessments attempts to identify important cultural values and indicators regarding environmental health, in particular those which relate to mahinga kai as well as other cultural activities. By having this information in a simple and user friendly system, it provides guidance for

tāngata whenua on how to manage the environment. It combines the western science approach of 'State of the Environment Reporting' and Māori cultural values and beliefs. A driving force behind the SoT was due to Māori environmental knowledge not being formally recorded as it generally oral information. As a result of being of an oral nature it is challenging for it to be utilised in a modern situation such as resource consent hearings, as it is perceived as being "anecdotal" rather than objective evidence (Te Rūnanga o Ngāi Tahu, 2008).

Objectives

The goal of the State of the Takiwā is to "integrate Māori cultural values and western science measures in the gathering and reporting of information about the health of environment and to understand changes over time" (Te Rūnanga o Ngāi Tahu, 2008).

Method and Application

The Takiwā database is a key tool used to produce the SoT reports. The aim of the database is to collate the monitoring information, which enables tāngata whenua to determine the current quality of the environment at a site and identify any trends at that respective site. It also enables tāngata whenua to know where to go and collect additional information (Te Rūnanga o Ngāi Tahu, 2008).

Database Specifics

The Takiwā database is split into two modules. One contains the reference data corresponding to the monitoring tools, standards and reports. The second module houses the collected data from each monitored site.

The Takiwā database was originally created in Microsoft Access 2002 (Te Rūnanga o Ngāi Tahu, 2008). The database is accessible as a Runtime application and is connected to a "physically separated database". To access the information in the database application a password is needed and the contributed information is stamped with the initials of the person who created it and who last amended it. The database produces backup copies to ensure information is safe and not at risk of being lost. Information is presented in both English and Māori, and an easy to operate Helpfile is also available (Te Rūnanga o Ngāi Tahu, 2008).

As mentioned above the database has two main modules. The module which contains the reference data is known as the 'resource finder' (Te Rūnanga o Ngāi Tahu, 2008). It is a repository for existing information on the environment of interest to tāngata whenua. Websites and organisations which contain the relevant information are able to be identified (Te Rūnanga o Ngāi Tahu, 2008).

This purpose of this module is find answers to question such as:

- "What are likely to be the key issues with this sort of site?
- What is important to measure here?
- Are there recognised standards or guidelines?" (Te Rūnanga o Ngāi Tahu, 2008)

The second module of the database contains information on 'site evaluation' which is obtained through monitoring of environmental and Mātauranga Māori parameters. The procedures involved with this data collection are outlined below.

Data Collection Methodology

Data collection involved five types of assessments.

1. Takiwā Site Assessment
2. Cultural Health Index- Waterway Assessments
3. E. coli Water Testing
4. Stream Health Monitoring (SHMAK) Assessments
5. Electric Fishing Surveys

The procedure undertaken at each of the sites is listed below:

- Gathering of the monitoring team for mihi, karakia or kōrero
- Site Definition and Visit Details forms, shown in **Appendix A**, were completed by the team which includes the GPS location and photographs of the site
- Individual team members each completed a Takiwā site assessment form, shown in **Appendix A,** and water samples for E. coli testing were collected
- The team collectively completed the Cultural Health Index water quality form, shown in **Appendix A**, testing involved with the SHMAK kit and then electric fishing surveys
- To conclude a general korero was carried out regarding the site visit before continuing to the next location.

Takiwā Site Assessment

The assessment of each site was carried out using three Takiwā Site Assessment forms, which are shown in **Appendix A.** Each form relates to a step of this assessment.

The first form is Site Definition, it collects information on the site name (both traditional and current names), the location, legal protection issues, and the traditional significance and condition of the site. GPS coordinates detailing the exact location is also included in this form (Lang, M et al., 2012).

The second form collected information regarding visit details, including the individuals involved, the date, time, weather conditions, photographic records and other information relevant to the visit. The first two forms are completed by the group all together to ensure consistency (Lang, M et al., 2012).

The third form is completed by each individual in the team. This form requires the rating of several characteristics using a 1 to 5 scale with 5 being the worst score. These characteristics are listed below:

- Overall state/health of the site
- Levels of modification/change at the site,
- Suitably for harvesting mahinga kai,
- Amount of pressure from external factors,
- Access issues; and
- Willingness to return to the site for harvesting kai (this is simply a yes or no answer)

The rating of these aspects results in an index score to determine the overall site health. The next part of form includes observing the abundance and diversity of taonga bird, plant and fish species, other resources (such as stone, bone or driftwood) as well as pest and weed species. The species are identified and a relative abundance is also recorded (Lang, M et al., 2012).

Cultural Health Index (CHI)- Waterway Assessment

This assessment has very similar aspects to the Takiwā site assessment which was outlined above. The CHI is a form which includes ranking questions as well as identifying bird, plant and fish species, is attached in **Appendix A**. The point of difference is that the CHI is based on a specific site, not the entire site. The CHI also excludes pests and weeds from its assessment (Te Rūnanga o Ngāi Tahu, 2008).

This assessment calculates an index for each particular site, the process is as follows. The CHI involves three components these are traditional association, mahinga kai and stream health.

"Component 1: Stream sites are classified according to traditional association and intention to use in the future.

- Is there a traditional association between tangata whenua & the site? Sites of traditional significance are assigned an 'A'. Sites that do not have a traditional association are assigned a 'B'.
- Would Māori come to the site in the future? Whether the tangata whenua would return to the site or not is also recorded. If the tangata whenua would return, the site is awarded a 1, and if not, a 0.

Component 2: Sites are evaluated for the following mahinga kai features. Each feature is rated 1-5 and the mahinga kai score is the average of the four 1-5 ratings (1 is poor and 5 is the highest mahinga kai rating).

- How many mahinga kai species are present? This requires identifying the mahinga kai species that are present now.
- Are the mahinga kai species that were gathered in the past still here? This enables a comparison between the mahinga species that were gathered historically with the species that are present now.
- Are the mahinga species accessible for gathering? Accessibility includes physical access and legal access.
- Would Māori come to the site in the future? This component is the same as the second part of component 1 above. If the tangata whenua would return, the site is awarded a 5, and if not, a 1.

Component 3: Sites are evaluated for cultural stream health, based on a set of five indicators that effectively encapsulates overall stream health (as outlined on the recording form). The average score for all included indicators provides the cultural stream health measure (1 is poor and 5 is the highest cultural stream health rating).

Overall index: The overall three-part Cultural Health Index is expressed as shown in terms of the three components. For example, a stream may be given an index of:

A-0 / 2.1 / 4.2

Where:

- A identifies the site as traditional (rather than a B for non-traditional)
- 0 indicates that Māori would not return to this site in the future (1 indicates they would return)
- 2.1 is the mahinga kai score (score of 1-5)
- 4.2 is the overall evaluation of stream health (score of 1-5)" (Te Rūnanga o Ngāi Tahu, 2008)."

E. coli Water Testing

The method for this component is outlined in the original report as it only includes the technical procedure and reasons for testing.

Stream Health Monitoring (SHMAK) Assessment

The Stream Health Monitoring and Assessment Kit (SHMAK), shown in **Appendix A,** is able to measure the water flow/velocity, pH, temperature, conductivity, clarity, streambed composition, riparian vegetation, invertebrates, periphyton and catchment activity through the use of a number of monitoring instruments and the recording of data onto forms (Lang, M et al., 2012). The information obtained is ranked via a scoring system to determine how healthy the stream is and how it is changing over time.

Electric Fishing

The method for this component is outlined in the original report as it only covers the technical procedure.

Reports are then able to be easily produced and printed by a special function. These reports can also be exported to Word or Excel if preferred (Te Rūnanga o Ngāi Tahu, 2008). The produced reports are made publicly available on the State of the Takiwā website (https://www.takiwa.org.nz/pages/reports.html).

Current State of the Takiwā

The database and toolkit described above (Takiwā 2.0) was the initial stage of the SoT. Use of this database can be obtained via a request to Te Rūnanga o Ngāi Tahu. Due to the quality and quantity of information within the database, it is utilised by various iwi and non-iwi groups (Te Rūnanga o Ngāi Tahu, 2016).

The next phase is Takiwā 3.0, which is future-proofing the toolkit and ensuring the continuation of the SoT. This includes "redevelopment of the Takiwā toolkit", starting with a "web-based redevelopment of the Marine Cultural Health Index MCHI tool" (Te Rūnanga o Ngāi Tahu, 2016).

Summary

Example	Objective of the database?	How did they form the database	Who has ownership/rights and how is it shown?	How is it accessed?	Advantages and disadvantages
State of the Takiwa	Utilised a database to integrate Māori cultural values and western science measures in the gathering and reporting of information about the health of environment and to understand changes over time	Created as an Access database The database contains reference and monitoring data to allow reports to be published	The website clearly displays that software and report are copyright of Te Rūnanga o Ngāi Tahu and the knowledge belongs to those who originally collects or possess it.	Database can be access by request to Te Rūnanga o Ngāi Tahu Reports which utilise the database are publically available on their website	**Adv**. Allows reports to be produced easily and incorporates Māori values. Is supported by various organisation and under copyright of the iwi. Contains a wealth of information **Disadv**. None evident

4. Summary

This investigation found various international and New Zealand examples of indigenous knowledge repositories or databases. A recurring theme which came through all examples was the importance of securing ownership for the TK. Comparing the State of the Takiwā database with the Biozulua example, contrasts the difference of rights. The clear owners of the knowledge within the Takiwā example is the iwi, they also have control over who uses the information and how it is collected. Within the Biozulua database there are concerns regarding the extent PIC was obtained before collection of knowledge and the database does not authorize rights in support of communities

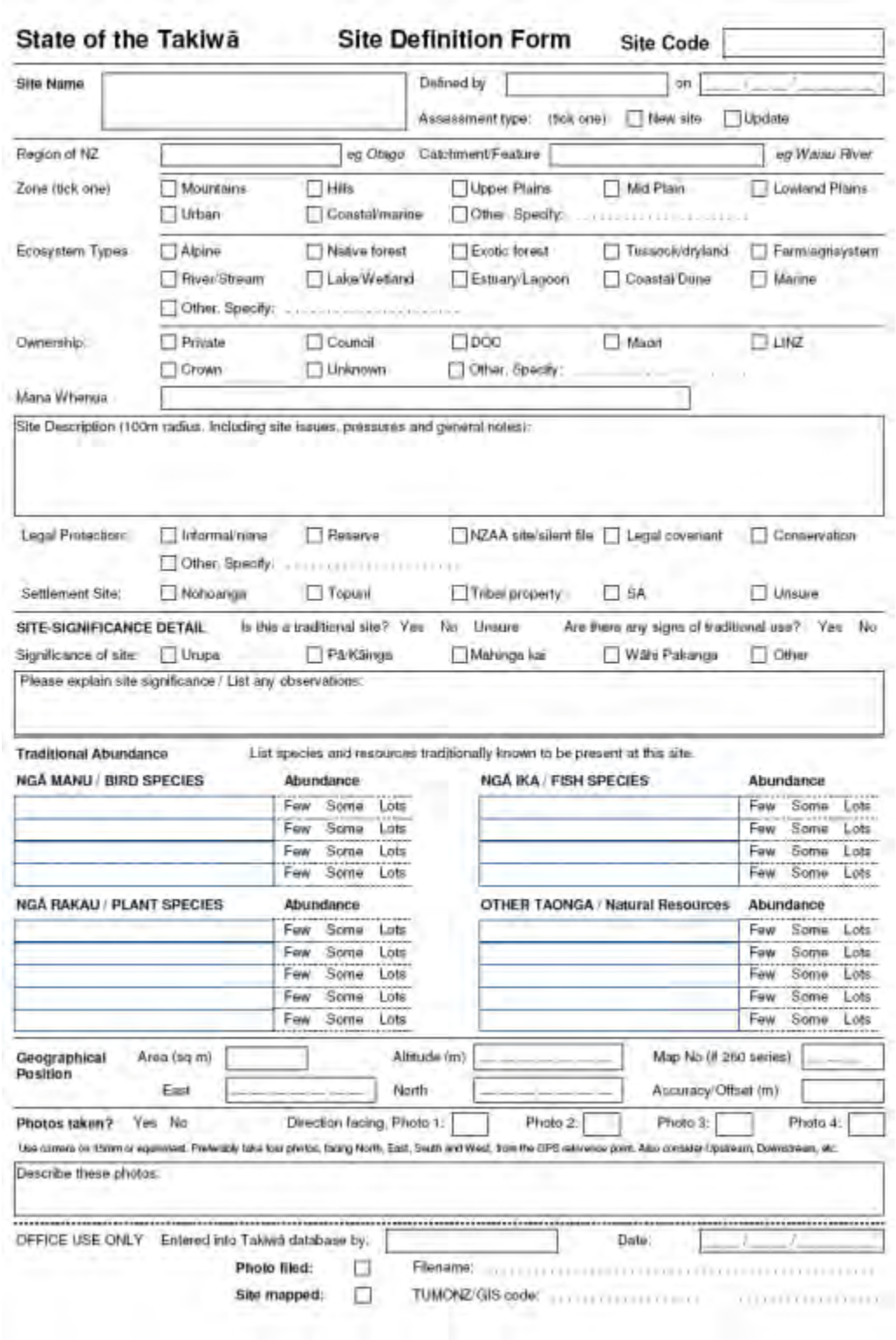
The Ulwazi database showcased the significant role that local community members can play in the collection of traditional knowledge and the advantages this brings. This was a key factor in the creation and success of this database. Community participation was also significant in the Inuit and TPD databases.

The differing types of accessibility to each database was specific to the goal of the example. For the Honey Bee Network all information was publicly available on the internet, this was due to the goal of the database being to collect information and documentation to prevent exploitation by outsiders. Therefore, by placing the collected information on the Honey Bee Network Website along with who owned the information created protection for the local people. The Inuit database was a 'closed' system (not available to public) as the information is regarded as confidential between Inuit and the government.

These examples provided valuable learnings which can assist with the creation of a Mātauranga Māori digital repository.

5. Appendices

5.1 Appendix A: Takiwā Monitoring Forms



State of the Takiwā **Site Definition Form** **Site Code** ____

Site Name ____ Defined by ____ on ____

Assessment type: (tick one) ☐ New site ☐ Update

Region of NZ ____ eg *Otago* Catchment/Feature ____ *eg Waiau River*

Zone (tick one) ☐ Mountains ☐ Hills ☐ Upper Plains ☐ Mid Plain ☐ Lowland Plains
☐ Urban ☐ Coastal/marine ☐ Other. Specify: ....

Ecosystem Types ☐ Alpine ☐ Native forest ☐ Exotic forest ☐ Tussock/dryland ☐ Farm/agrisystem
☐ River/Stream ☐ Lake/Wetland ☐ Estuary/Lagoon ☐ Coastal Dune ☐ Marine
☐ Other. Specify: ....

Ownership: ☐ Private ☐ Council ☐ DOC ☐ Maori ☐ LINZ
☐ Crown ☐ Unknown ☐ Other. Specify: ....

Mana Whenua ____

Site Description (100m radius. Including site issues, pressures and general notes):

Legal Protection: ☐ Informal/none ☐ Reserve ☐ NZAA site/silent file ☐ Legal covenant ☐ Conservation
☐ Other. Specify: ....

Settlement Site: ☐ Nohoanga ☐ Topuni ☐ Tribal property ☐ SA ☐ Unsure

SITE-SIGNIFICANCE DETAIL Is this a traditional site? Yes No Unsure Are there any signs of traditional use? Yes No

Significance of site: ☐ Urupa ☐ Pā/Kāinga ☐ Mahinga kai ☐ Wāhi Pakanga ☐ Other

Please explain site significance / List any observations:

Traditional Abundance List species and resources traditionally known to be present at this site.

NGĀ MANU / BIRD SPECIES	Abundance	NGĀ IKA / FISH SPECIES	Abundance
	Few Some Lots		Few Some Lots
	Few Some Lots		Few Some Lots
	Few Some Lots		Few Some Lots
	Few Some Lots		Few Some Lots

NGĀ RAKAU / PLANT SPECIES	Abundance	OTHER TAONGA / Natural Resources	Abundance
	Few Some Lots		Few Some Lots
	Few Some Lots		Few Some Lots
	Few Some Lots		Few Some Lots
	Few Some Lots		Few Some Lots
	Few Some Lots		Few Some Lots

Geographical Position Area (sq m) ____ Altitude (m) ____ Map No (if 260 series) ____
East ____ North ____ Accuracy/Offset (m) ____

Photos taken? Yes No Direction facing, Photo 1: ____ Photo 2: ____ Photo 3: ____ Photo 4: ____

Use camera on 15mm or equivalent. Preferably take four photos, facing North, East, South and West, from the GPS reference point. Also consider Upstream, Downstream, etc.

Describe these photos:

OFFICE USE ONLY Entered into Takiwā database by: ____ Date: ____

Photo filed: ☐ Filename: ....

Site mapped: ☐ TUMONZ/GIS code: ....

State of the Takiwā — Visit Form

Site Code

Use a separate form for Questionnaire — Visit Code

VISIT DETAILS Site Name: | No. in Group:

Visit date: ___/___/_____ Time: ___:___ am / pm | Hours at Site:

Visitor Name: ☐ First visit here? ☐ First evaluation here?

Visitors from: | Visit Purpose:

Weather Centre

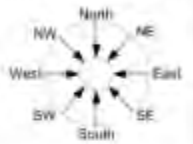
1. Temperature:
Enter °C here ___ °C
or
indicate approximately on scale below

Hot	25°C or more
Warm	20
Mild	15
Cool	10
Cold	5
Freezing	0°C or less

2. Cloudiness (circle one)
Clear sky
Mainly clear
Streaky
Partly cloudy
Heavy
Breaking
Overcast

3. Precipitation (circle one)
None
Mist or fog
Drizzle
Light
Moderate
Heavy
Hail
Snow

4. Wind — If wind, circle its direction
(circle one)
None
Minimal
Light
Stiff or breezy
Gusty
Strong



5. Moon: Circle the shape or tick if not applicable: ☐

6. Tide: Draw a circle on the sea-level curve, or tick if not applicable: ☐

7. Extra comment on weather:

Heritage/Archeological Details — Are there any signs of traditional use? Yes No

Describe signs / list observations

Site Issues or Pressures

Site Actions or Responses

Recent Flow Conditions

Circle the number best describing the past 6 weeks:

5 Stable flow
4 Brief flooding (less than 2 days)
3 Several brief floods
2 Prolonged flooding (5 days +)
1 Prolonged low flows

Recent Land Use Conditions (Up to 1 km upstream and within 500m of banks.)

List any disturbances to the stream that are noticed or known (last 6 weeks), eg stock in channel, wastes, chemicals, stormwater, weed clearance, earthworks, etc.

Photos taken? Yes No — Direction facing, Photo 1: ___ Photo 2: ___ Photo 3: ___ Photo 4: ___

Use camera on 35mm or equivalent. Preferably take four photos, facing North, East, South and West, from the GPS reference point. Also consider Upstream, Downstream and of any s

Describe these photos:

OFFICE USE ONLY — Entered into Takiwā database by: | Date: ___/___/_____

Site previously mapped : ☐ — **Photo filed:** ☐ Filename: ..... — **Site mapped:** ☐ TUMONZ/GIS code: .....

State of the Takiwā — Site Assessment - General

Site Code: ____

A Visit form is also needed — Assessment Code: ____ — Visit Code: ____

ENTRY DETAILS Site Name: ____ Visit date: ___/___/_____

Visitor Name: ____ Number of people represented: ___

A. SITE ASSESSMENT DETAILS For each question, please circle the appropriate number, then explain it in the box following.

1. How would you describe the pressure on this site? Immense pressure 1 2 3 4 5 Minimal pressure

Details (including recreational access, surrounding landuse, discharges, etc.):

2. What is the degree of modification/change at this site? Extreme modification 1 2 3 4 5 Low modification

Details (including drainage, burning, discharges, abstractions, developments):

Questions 3, 4, 5 and 6 consider suitability for harvesting mahinga kai

3. IDo you consider access to this site is sufficient to harvest mahinga kai? Not able to gather 1 2 3 4 5 No restrictions

Details:

4. Would you harvest mahinga kai at this site? Definitely no 1 2 3 4 5 Definitely yes

Details:

5. Tick if site is wahi tapu: ☐

6. Would you return to this site in the future? Yes No

Details:

7. What actions are required to improve the health of this site? Tick relevant boxes.

- ☐ Better management by landowner, council, etc.
- ☐ Consideration of ownership/purchase by tribe/rūnanga.
- ☐ Protection / Access arrangement for significant sites with landowner
- ☐ Interpretation / Signage
- ☐ Restoration of native species
- ☐ Pest / weed control
- ☐ Other — Specify:

7. How would you describe the overall health of this site? Very unhealthy 1 2 3 4 5 Very healthy

Details (including any problems, pressures, issues, smells etc. noticed):

Next page for Abundance questions ...

B. ASSESSMENT OF ABUNDANCE For each question, please list the species that you can see or hear, and circle their abundance. If they are mahinga kai species, please tick the MK box. List more on blank paper if necessary.

1. NGĀ RAKAU MĀORI / NATIVE PLANT SPECIES	Abundance	MK	Notes (condition, habits, etc.)
	Few Some Lots	☐	
	Few Some Lots	☐	
	Few Some Lots	☐	
	Few Some Lots	☐	
	Few Some Lots	☐	
	Few Some Lots	☐	
	Few Some Lots	☐	
	Few Some Lots	☐	
	Few Some Lots	☐	
	Few Some Lots	☐	

1a. What % of the total site area is covered by native plant species? (within 100m radius)	0%	a little	25%	50%	75%	most	100%

2. NGĀ MANU MĀORI / NATIVE BIRD SPECIES	Abundance	MK	Notes (condition, habits, etc.)
	Few Some Lots	☐	
	Few Some Lots	☐	
	Few Some Lots	☐	
	Few Some Lots	☐	
	Few Some Lots	☐	
	Few Some Lots	☐	
	Few Some Lots	☐	
	Few Some Lots	☐	

3. NGĀ IKA MĀORI / NATIVE FISH SPECIE	Abundance	MK	Notes (condition, habits, etc.)
	Few Some Lots	☐	
	Few Some Lots	☐	
	Few Some Lots	☐	
	Few Some Lots	☐	
	Few Some Lots	☐	
	Few Some Lots	☐	

4. NGĀ TAONGA MĀORI / Other Natural Resources	Abundance	MK	Notes (condition, etc.)
	Few Some Lots	☐	
	Few Some Lots	☐	
	Few Some Lots	☐	
	Few Some Lots	☐	

5. INTRODUCED PLANTS AND ANIMALS	Abundance	MK	Notes (condition, controls, signs, etc.)
	Few Some Lots	☐	
	Few Some Lots	☐	
	Few Some Lots	☐	
	Few Some Lots	☐	
	Few Some Lots	☐	
	Few Some Lots	☐	
	Few Some Lots	☐	
	Few Some Lots	☐	
	Few Some Lots	☐	
	Few Some Lots	☐	

OFFICE USE ONLY Entered into Takiwa database by: _____ Date: ___/___/_____

State of the Takiwa **CHI: Cultural Stream Assessment** **Site Code** _____

Use general assessment code if have one >> **Assessment Code** _____ **Visit Code** _____

ENTRY DETAILS Site Name: _____ Visit date: ___/___/_____

Visitor Name: _____ Number of people represented: ___

A. Cultural Stream Health Assessment For each question, please circle a number.

	Unhealthy						Healthy
1. Catchment Land Use	Land heavily modified Wetlands and marshes lost	1	2	3	4	5	Appears unmodified
2. Vegetation - banks & margins (100m either side)	Little or no vegetation – neither exotic nor indigenious	1	2	3	4	5	Complete cover of vegetation - mostly indigenious
3. Use of the river banks & margins (100m either side)	Margins heavily modified	1	2	3	4	5	Margins unmodified
4. Riverbed conditions (sediment)	Covered by mud, sand, slime or weed	1	2	3	4	5	Clear of mud, sand, slime and weed
5. Changes to river channel	Evidence of modification, eg stopbanks, straightening, gravel removal, shingle build-up	1	2	3	4	5	Appears unmodified
6. Water Quality, eg foams, oils, slime, weeds, etc.	Appears polluted	1	2	3	4	5	No pollution evident
7. Water clarity	Water badly discoloured	1	2	3	4	5	Water is clear
8. A variety of habitats	Little or no current, uniform depth and limited variety of flow related habitats	1	2	3	4	5	Current and depth varies, creating a variety of flow related habitats
9. Overall health of the river at this site	Very unhealthy	1	2	3	4	5	Very healthy

Please explain your answer:

B. MAHINGA KAI SPECIES For each question, please list the species that you can see or hear, and circle their abundance. You can use a blank page to list more if necessary.

BIRDS: Please list the mahinga kai bird species that you can see at this site

1.	2.	4.	3.
5.	6.	7.	8.

PLANTS: Please list the mahinga kai plant species that you can see at this site

1.	2.	4.	3.
5.	6.	7.	8.

C. SITE ACCESS FOR HARVESTING MAHINGA KAI

Do you consider access to this site is sufficient to harvest mahinga kai?

Not able to gather at this site 1 2 3 4 5 Able to gather - no restrictions

Please explain your answer:

Would you return to this site in the future? Yes No

OFFICE USE ONLY Entered into Takiwa database by: _____ Date: ___/___/_____

State of the Takiwa SHMAK Assessment

Site Code: ____

Use general assessment code if have one >> **Assessment Code** ____ **Visit Code** ____

ENTRY DETAILS Site Name: ____ Visit date: ___ / ___ / ______

Visitor Name: ____ Number of people represented: ____

A. STREAM HABITAT

Please enter answers in boxes. You can do the calculations and circle the scores if you want, or leave that task to be done automatically later in the database.

A1 Habitat Quality

Flow velocity Time an object travelling down the centre of the stream (do 3 times): ____ ____ ____ seconds

Distance travelled: ____ metres. Divide distance by the average time of ____ seconds

... to get an average velocity of ____ m/sec

eg. For 10m in 38s
Velocity = 0.26 m/s
Score = 8

From velocity:	less	0.1	0.3	0.7	1.0	more
Circle the Score:	1	8	10	5	3	

Water pH ____

From the pH:	less	5.5	6.5	8	9.5	more
Circle the Score:	-5	5	10	5	-5	

Water temperature ____ °C

Time of day: ____

Temp:	less	5	10	15	20	25	30	more
Score:	5	8	10	8	5	1	-5	

Water conductivity ____ uS/cm

Cond:	less	50	150	250	400	more
Score:	20	16	10	6	1	

Water clarity (Take 3 readings): ____ ____ ____ cm Calculate average clarity: ____ cm

Note: for ease of use, scale is in opposite order to that in SHMAK doc.

Clarity:	less	35	55	70	100	more
Score:	1	3	5	8	10	

A2 Composition of the Stream Bed *

Estimate materials making up the stream bottom (to nearest 10%).

		Enter %	Score
Bedrock			-10
Boulders	> 25 cm		10
Large cobbles	12 - 25		20
Small cobbles	6 - 12		10
Gravels	0.2 - 6		0
Sand			-10
Mud or silt			-20
Man-made, eg concrete			-20
Woody debris			0
Water plants, rooted in stream bed			0
Check you have 100%			

A3 Bank Vegetation *

True left = left bank looking downstream

Estimate vegetation within 5 metres of the banks (to nearest 10%)

	% true left	%, true right	Score
Native trees			10
Wetland vegetation			10
Tall tussock grassland, not improved			8
Introduced trees (willow, poplar)			8
Other introduced trees (conifers)			5
Scrub			5
Rock, gravels			5
Short tussock grassland, improved			3
Pasture grasses and weeds			-10
Bare ground, roads, buildings			-10
Check you have 100%			

A4 Deposits

Tick best estimation of loose deposited material on the stream bed

			Score
None noticed		☐	10
Fine, mainly by edge	thickness < 1 mm	☐	5
Moderate, edge & elsewhere	1 - 3 mm	☐	0
Moderate to thick, patchy, most of bed	3 - 5 mm	☐	-5
Thick, most horizontal surfaces	> 5 mm	☐	-10

* NOTE: For A2 and A3 the relative scores are shown but percentage-weighted calculations can't be calculated here.
Use the database to automatically do this and get an overall score for each.

B. STREAM-BED LIFE

B1 Invertebrates

For each of 5 stone, sediment or water plant samples, tick a box if you can see any of these.

	1	2	3	4	5	Score
Worms (eg thin brown/red)						1
Flatworms, leeches						3
Freshwater crustaceans (amphipods, water fleas)						5
Small bivalves (up to 4 mm across)						3
Snails (4-5 mm across, rounded)						3
Snails (1-3 mm across, pointed)						4
Limpet-like molluscs (Latia, up to 8 mm wide)						7
"Axehead" caddis (Oxyethira, 2-3 mm long)						3
Midge larvae (3-7 mm long, white - red)						2
Damselfly larvae						4
Cranefly larvae						5
Beetle larvae and adults						6
Caddisfly larvae (rough stony cases, or of sticks & free living)						6
Smooth-cased caddisfly larvae (Olinga, to 10 mm, chestnut-brown)						9
Spiral caddis (Helicopsyche, to 3 mm wide)						10
Mayfly larvae (2-15 mm long)						9
Stonefly larvae (large species, to 20 mm)						10

B2 Periphyton (on exposed surfaces)

Using the same 5 samples, tick a box if you can see any of these.

			1	2	3	4	5	Score
Thin mat/film	Under 0.5 mm thick	Green						7
		Light brown						10
		Black or dark brown						10
Medium mat	0.5 - 3 mm thick	Green						5
		Light brown						7
		Black or dark brown						9
Thick mat	Over 3 mm thick	Green or light brown						4
		Black or dark brown						7
Filaments, short	Under 2 cm long	Green						5
		Brown or reddish						5
Filaments, long	Over 2 cm long	Green						1
		Brown or reddish						4

OFFICE USE ONLY Entered into Takiwa database by: _____ Date: ____/____/_____

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Appendix D Journal Article – New Zealand Intellectual Property Journal

Mātauranga Māori and New Zealand's Intellectual Property Regime – Challenges and Opportunities since Wai 262

Tai Ahu,* Amy Whetu** and James Whetu***

Abstract:

On 2 July 2011, the Waitangi Tribunal issued its report on Wai 262: A Report into Claims Concerning New Zealand Law and Policy Affecting Māori Culture and Identity'. The report responded to claimants concerns about the inadequacy of New Zealand intellectual property law at protecting mātauranga Māori and suggested wide-ranging options for reform of New Zealand's intellectual property regime. This inadequacy has caused Māori to rely on alternative and impractical legal mechanisms to protect mātauranga Māori in certain contexts. By using an example from the Sustainable Seas National Science Challenge, this article argues that in certain situations the law can provide creative solutions for the protection of mātauranga Māori for certain purposes. In particular, this article argues that contract law, in conjunction with existing intellectual property mechanisms, could address some Māori concerns about the use and exploitation of traditional knowledge.

Introduction

On 2 July 2011, the Waitangi Tribunal released its report on Wai 262. The report was the final product of claims lodged over 20 years ago which raised concerns about indigenous flora and fauna and traditional knowledge.[1] Even around the time the claim was lodged, its significance was understood. One academic at the time describing it as "the most important claim that the Tribunal is ever going to hear".[2] The claim was the first all-of-government inquiry and involved claimants from all around Aotearoa, as well as education, research, science and technology agencies and Crown research institutes. The Tribunal's inquiry was wide-ranging, covering matters such as taonga works, genetic and biological resources, the environment and resource management law, te reo Māori and rongoā Māori, and made detailed and practical recommendations for Crown consideration. To date the Crown has not officially responded to the Tribunal's reports, despite repeated calls from both Māori and non-

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1 The original claim was lodged in 1991 by Ngāti Koata, Ngāti Porou,Ngāti Kahungunu, Ngāti Kuri, Ngāti Wai and Te Rarawa and involved the Crown as well as Crown Research Institutes. Te Waka Kai Ora also joined the Inquiry. Hearings begun in 1998 and the final report was issued in 2011.

2 Dr David Williams "*Wai 262*" Documentary, 2006, available at <https://www.nzonscreen.com/title/wai-262>.

Māori for the Crown to address the recommendations in the report.[3] This article explores the Tribunal's recommendations in more detail, and argues that the lack of reform has caused Māori to rely on impractical and unorthodox means to protect mātauranga Māori in certain contexts, including relying on special statutes. By using an example from the Sustainable Seas National Science Challenge, this article argues that in certain situations the law could provide creative solutions for the protection of mātauranga Māori for certain purposes. In particular, contractual obligations, , in conjunction with existing intellectual property mechanisms, can provide assistance in addressing some Māori concerns about the use and exploitation of traditional knowledge for specific purposes. We also make some modest suggestions for Māori to consider by utilising the existing legal mechanisms in a different way to mitigate the concerns raised in Wai 262, thus recognising the need for broader, more fundamental change.

The Waitangi Tribunal Report

The Tribunal's report resulted in a comprehensive finding that potentially poses a new direction for the Crown in how they could address Māori interests in the use and protection of mātauranga Māori. The claim was made due to the breach of the Crown's duty under the Treaty of Waitangi, of the core Treaty Principles regarding tino rangatiratanga or chieftainship over resources and taonga. The claim alleged that the Crown had failed in their duty to protect Māori rights and interests in this area.

Primarily, the claim was a reflection of the inadequacy of New Zealand's intellectual property regime to protect Māori interests in mātauranga Māori. The Tribunal found that the failure of New Zealand's IP laws to adequately protect mātauranga Māori as a taonga under the Treaty, was evidenced and further entrenched by New Zealand's IP regime. The Tribunal, upon hearing claimant evidence, highlighted that the inquiry "…demonstrate[s] the dissonance between the kaitiakitanga of Māori communities and the Pākehā system of IP rights".[4] The key to the Tribunal's reasoning is the kaitiaki relationship inherent in Māori cultural works and expressions. Importantly, the Tribunal stated that "neither actively prevents third parties from exploiting mātauranga Māori for their own ends, nor permits Māori to benefit from their traditional knowledge should they wish to do so."[5] The Tribunal had two primary concerns in relation to mātauranga Māori:

1. Misuse and misappropriation of taonga works and mātauranga Māori
2. Non-kaitiaki able to acquire rights in taonga works and mātauranga Māori without the consent of or any benefit to kaitiaki.

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3 Te Rarawa have publicly criticised the Government's slow response. See "*Wai 262 response disappointing – Te Rarawa*" (Radio New Zealand, 2013) available at <www.radionz.co.nz>. Some have criticised the Government's ongoing participation in international fora on intellectual property issues without first dealing with the Waitangi Tribunal's report. See Owen J Morgan "The Priority Should Be the Wai 262 Report – Not the WIPO-IGCC", (SSRN, 2013), available at < https://papers.ssrn.com/sol3/papers2.cfm?abstract_id=2267219>.

4 Wai 262, above n 1, 55 at [1.7].

5 Wai 262, above n 1, at 191; see also at 65 and 178-180; and Ministry of Economic Development, above n 3. Wai 262, above n 1, at 128-131 and 134-136 respectively.

The report proposed a number of means in which the Crown could assist Māori to protect, preserve and access their rights to taonga, including mātauranga Māori. These included establishing a special purpose commission that would develop best practice guidelines and be the starting point for anyone wishing to utilise elements of Māori culture to assist them to do so in an appropriate way and supporting Māori in their kaitiaki role.[6] The commission's role would also include other elements, such as education, developing a code of ethics and a register of kaitiaki and the works and mātauranga Māori that they have an interest in, making acknowledgement for users easier as well as purporting to add credibility to their claim as kaitiaki.[7]

Incompatibility: Western property rights and kaitiakitanga responsibilities

One of the most challenging elements of the Wai 262 claim was the significant disjunct between the Western concepts of ownership in comparison with Māori concepts of ownership. The primary difference, in the Tribunal's opinion, was that: [8]

> Māori, do not view their relationship with their tangible and intangible cultural heritage as one of "ownership". In other words, their relationship usually does not equate to the bundle of rights usually associated with "property" of title, possession, exclusivity and alienability.

From a Western perspective, many elements of this relationship may seem to be comparable to that of ownership, at least to the extent that ownership implies the ability of the owner to control whether and how property is used or exploited by others or excluded from use by others.[9] The Waitangi Tribunal, in hearing evidence from claimants in the National Freshwater Geothermal Resource Claim stated:[10]

> …it is not that English-style property rights are offensive to Māori or unknown to Māori, but rather it is offensive that Māori rights should not be considered to have given rise at the very least to English-style property rights. This is because the obligations imposed on Māori as part of their reciprocal relationships with their taonga require them to care for those taonga (manaakitanga and kaitiakitanga).

However, it is generally considered inaccurate to describe the relationship between Māori people and their culture as a property interest as such. Kaitiakitanga, generally considered the key principle, is better expressed as an obligation that places duties on kaitiaki, rather than a right that entitles the owner to exploit or profit from his or her property for self-interest. This better reflects the Māori worldview whereby Māori see their role as an intergenerational one, protection in honour and respect of their tupuna, and on behalf of their future tamariki,

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6 J C Lai, *Indigenous Cultural Heritage and Intellectual Property Rights Learning from the New Zealand Experience?* (Springer International Publishing, Switzerland, 2014) at 254.

7 Above n 6.

8 Lai, above n 6 at 223.

9 See Wai 262, above n 1, 31 at [1.1.4]: "We acknowledge that for all their differences in perspective, there was a good deal of good-will among the parties. Perhaps that is because all of them recognised that both IP law and tikanga Māori share a common interest in the growth of culture and identity. The guiding principles of kaitiakitanga on the one hand and property on the other can be seen as different ways of thinking about the same issue…"

10 Wai 2358, at [2.2.2(1)].

and mokopuna, their future generations. A further disconnect means that the kaitiakitanga duty may and often does exist over that which a kaitiaki does not strictly own, nor have any Western legal property right over. For example, the descendants of the infamous Mātātua and Tūhoe composer Mihi-ki-te-kapua would be considered kaitiaki of her most widely known mōteatea 'Taku rākau e' and would be under a tikanga obligation as regards the use of that mōteatea despite the fact that her descendants were not the original composers.[11]

This example demonstrates a further disconnect; the concept of collectivity. The obligations of kaitiakitanga are collectively held and enforced on behalf of a community (although it is fair to say that traditionally certain individuals – such as tohunga or rangatira – may have played a role in enforcing the obligation),[12] whereas property rights are typically held by a specified individual or legal person.

Māori culture and identity

The jurisprudential incompatibility of strict Western notions of property and kaitiakitanga are amplified in relation to the protection of Māori culture and identity. For Māori, there exists the issue of how to protect mātauranga Māori within or surrounding taonga under the current IP regime in New Zealand. This was the principal issue which the Tribunal grappled with in its *Ko Aotearoa Tēnei* report:[13]

> As the term implies, IP rights use a classic Western legal technique to express the interest of the creator in the creation – that is, by vesting in the creator a right of property over the creation. As we have said, this may be contrasted with the kaitiakitanga right which tikanga Māori bestows on the kin group having obligations towards the creation. The word 'property', whether applied to real or personal property, automatically evokes certain understandings in Western legal systems. It means that the owner can exclude others from it, sell it, and allocate more limited rights in it either spatially (such as a subdivision if it is land) or in time (such as by renting). These understandings apply equally to intellectual property…

The Tribunal further concluded that: [14]

> The foregoing descriptions of the various elements of the IP regime make it clear that IP law protects the kaitiaki interest in taonga works or mātauranga Māori only to a very limited extent. It does so only when those things fall within and meet specific requirements of certain categories of IP law.…

The Tribunal effectively found that mātauranga Māori was not adequately protected by IP law. The Tribunal pointed out that copyright law provides no protection of the mātauranga Māori embodied in an artistic work, only the work itself. Copyright does not protect the misappropriation of that unprotected mātauranga, nor oral traditions, whakapapa, kōrero or mōteatea that are not in written form.[15] The law also fails to recognise the

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11 The authors note that this mōteatea is widely sung by Māori and that Māori generally could be considered kaitiaki.

12 Lai, above n 6.

13 *Ko Aotearoa Tēnei : A Report into Claims Concerning New Zealand Law and Policy Affecting Māori Culture and Identity*. Te Taumata Tuarua. Para 1.3.2, pages 48-9.

14 Above, Para 1.4.9, at 63-4.

14 Above, Para 1.4.9, at 63-4.

perpetual nature of the kaitiaki relationship which clearly does not have an expiry date, as these rights would, should they be protected at law.[16]

At first sight there is a fundamental disjunction between mātauranga Māori and contemporary views on the protection of mātauranga Māori as a taonga, based on Treaty principles and also in international treaties. This poses a complex problem for the Crown and Māori under Crown policy such as Vision Mātauranga, in the Research, Science and Innovation sector, where the purpose of such policy is "to unlock the innovation potential of Māori knowledge, resources and people to assist New Zealanders to create a better future."[17] Important questions arise. How can this vision be achieved under the current regime and offer any protection or surety for Māori, that their mātauranga will be both protected from misuse, but also offer any reward should it be integral to the development of new products or services based on any mātauranga shared? If mātauranga Māori is not protected by IP law per se, what reason or incentive would Māori have to share it?

The Tribunal's resulting findings provided some guidance and innovative ideas around how the Crown might deal with these issues moving forward. The nature of the Tribunal finding however, relies on the Crown to take action. Action that is long awaited and does not appear to be forthcoming. There have been some attempts at channelling the outcomes of Wai 262 into policy, or at least indicate some directive action in creating a Crown stance on Wai 262 but a comprehensive and unified approach from the Crown is lacking.

Given the mainstream legal landscape in New Zealand is ultimately monocultural, there is much that the Crown could do to reshape this landscape into one more befitting of the bi-cultural nature that exists in New Zealand by virtue of the Treaty. IP law specifically does not require considerations to be in accordance with the Treaty and fails to meet the needs of Māori culturally or otherwise. [18] It was envisaged that the Tribunal findings in this regard may be a catalyst for change in the IP landscape for Māori and their ability to protect from the inappropriate exploitation of Māori IP and also somehow enhance their ability to utilise their own IP themselves.[19] However, the time period suggests that any reform of IP law will not be forthcoming.

Wai 262 demonstrates the limitations of the Waitangi Tribunal as an agent of legislative and policy change in New Zealand. The long awaited outcomes of the Wai 262 inquiry, and the seemingly slow response from the Crown to address or implement the Tribunal's findings, has forced Māori to seek alternative and largely impractical means to protect themselves, their taonga, their mātauranga. These are discussed in more detail below.

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16 Above, Para 1.4.9, at 63-4.

17 Vision Mātauranga Policy Document, Ministry of Research, Science and Technology, New Zealand Government.

18 Above n 6 at 20.

19 *Wai 262*, above n 1, at 191; see also at 65 and 178-180; *Information Sheet: Treaty of Waitangi Claim Wai 262* (Ministry of Economic Development, February 2007).

The struggle to find adequate protection of culture and identity

Despite the inability of New Zealand's current IP regime to protect mātauranga Māori, and the fact that reform of IP law is not forthcoming, Māori have sought alternative ways to protect against the exploitation of mātauranga Māori. For many Māori it would be fair to say this has been a struggle given the conceptual limitations of using a Western intellectual property framework to protect culture and identity. However this has not deterred many Māori from seeking sui generis protection of certain iconic aspects of Māori culture. One key way in which Māori have sought to do this is by way of negotiating cultural redress through Deeds of Settlement with the Crown.

Cultural Redress in legislation

Perhaps the most recent example is the Ka Mate Attribution Act 2015, which recognises and affirms the status of the internationally renowned haka 'Ka Mate' as a taonga of Ngāti Toa Rangatira. The stated purpose of the Act is to "give effect to certain provisions of the deed of settlement that settles the historical claims of Ngati Toa Rangatira". Recognition of this nationally significant haka was negotiated as part of Ngāti Toa Rangatira's Deed of Settlement in 2012. The Act recognises:

a. the significance of the haka as a taonga of Ngāti Toa Rangatira and that the haka is integral to the history, culture and identity of Ngāti Toa Rangatira (s 8(1) of the Act);
b. the association of Ngāti Toa Rangatira with Ka Mate as kaitiaki; (s 8(2)(c) of the Act) and
c. the values of the iwi concerning the use and performance of the haka (s 8(2(d)) of the Act);

In terms of substantive rights, Ngāti Toa have a "right of attribution", which, in respect of certain specified uses, must include a statement attributing composition of 'Ka Mate' to Te Rauparaha and a chief of Ngāti Toa (s 9 of the Act). The Act sets out extensive whakapapa and history related to the creation of the haka from the Ngāti Toa Rangatira Deed of Settlement. The Ministry of Business, Innovation and Employment has also released formal guidelines on the use of the haka and compliance with the Act, which are available on their website.

This example could be said to demonstrate the unavailability of a more traditional form of IP protection (such as a trademark) over the haka, forcing Māori to pursue sui generis redress. To give effect to the Deed of Settlement, an Act of Parliament was required to statutorily grant the right of attribution. Firstly, this was a form of cultural redress that was negotiated and agreed at a particular point in time and for that reason is not a practical option available to Māori generally. There remain unsettled iwi who, in the absence of a platform of engagement with the Crown, will not have this option available to them. Certainly smaller individuals and whānau groups are not likely to be able to utilise this approach. Secondly, it is likely that the Crown were influenced in their decision to support such redress because of the national significance and mana of the haka. The Crown might be less likely, for example, to grant a statutory right of attribution to an unsettled iwi in respect of haka or mōteatea that was not nationally significant or was only known by members of that particular iwi, which would include the majority of Māori artistic works and cultural expressions.

Kawenata through Deeds of Settlement:

Another recent example is the Deed of Settlement signed between Te Kōpere o te iwi o Hineuru Trust, a post settlement governance entity representing the iwi of Hineuru based in the Napier Taupō region, and the Crown in 2015. The Deed of Settlement includes as cultural redress a kawenata between the trustees of Te Kōpere o te iwi o Hineuru Trust, the Minister of Conservation and the Department of Conservation. The kawenata acknowledges that Hineuru are "entitled to the recognition of the full ownership, control and protection of their taonga, including their intellectual property". It also acknowledges that Hineuru have "rights and interests in their taonga within their Rohe, including their rights to ownership, protection and custody of Iwi Information" and that the Department "engages with the Governance Entity, and keeps it fully informed about the Department's use of Iwi Information".[20] Although these are broad principles, the Kawenata also places a number of specific positive obligations on the Department, including as follows:

> 21.3 The Department will not, without the Governance Entity giving Notice of their prior informed consent:
>
> 21.3.1 use Iwi Information or permit it to be used by any other person;
>
> 21.3.2 knowingly undertake any collection of Iwi Information or approach individual Hineuru members in an effort to obtain Iwi Information; or
>
> 21.3.3 disclose Iwi Information or information about Hineuru to a third party (including any Crown agency), or use Iwi Information for any purpose other than for which it was provided, except as:
>
> (a) required by law; or
>
> (b) is independently acquired other than in breach of Te Kawenata.

In a positive light this example demonstrates that limited protection for certain purposes can be achieved by way of private agreement between two parties (in this case Hineuru and the Minister of Conservation) before an intellectual property interest might arise.

Indeed, it might be considered unfair to criticise New Zealand's IP system for providing no protection over iwi information given that information is not something which IP law has ever sought to protect. The orthodox position is that there is no copyright in information per se but only copyright in the physical expression or form of that information, and even then only when certain criteria in the Copyright Act 1994 are met. Even so, such approaches could lead to inconsistency and unfairness between iwi: some iwi will be able to obtain sui generis protection as part of the highly political process of negotiating Treaty settlements while some iwi, for want of resources or otherwise, will not. Overall, while limited protection can be obtained, these specific examples demonstrate the precarious, unprincipled and inconsistent approach to the protection of taonga works and mātauranga Māori today.

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[20] Kawenata, principle 21, Documents Schedule of *Hineuru Deed of Settlement*.

International Law: More rights, still no action

Māori have, as a way to buttress arguments for greater protection of mātauranga Māori, sought to use international law as a platform. New Zealand has multiple international declarations and instruments that New Zealand is a party to, which entrench the findings and outcomes of Wai 262, or at least are consistent with them. Most recently there has shift at international IP law that emphasises the importance of protecting indigenous knowledge and helping to increase the international profile of the need to protect indigenous knowledge, for example the United Nations Declaration on the Rights of Indigenous Peoples ('**UNDRIP**'), discussed below. However, there has not, to date, been a comprehensive international legal framework developed to address these concerns, nor meet the needs of indigenous peoples. As Seamus Woods states:[21]

> Indigenous IP is an area that has received significant attention internationally in the context of protecting the so-called traditional knowledge ("TK") of indigenous peoples, where the focus tends to be on the conflicting worldviews governing such knowledge and Western IP.

The limitations of both New Zealand and international IP law show the need for the development of some specific legal mechanisms to provide some protection but not inhibit use of this knowledge by indigenous groups themselves.

In 2010, New Zealand adopted UNDRIP. Article 31 of UNDRIP provides that:

> Indigenous peoples have the right to maintain, control, protect and develop their cultural heritage, traditional knowledge and traditional cultural expressions, as well as the manifestations of their sciences, technologies and cultures, including human and genetic resources, seeds, medicines, knowledge of the properties of fauna and flora, oral traditions, literatures, designs, sports and traditional games and vision and performing arts. They also have the right to maintain, control, protect and develop their intellectual property over such cultural heritage, traditional knowledge, and traditional cultural expressions.

Furthermore, article 11 specifically recognises the right of indigenous people to "practice and revitalize their cultural traditions and customs" and includes the right to "maintain, protect and develop the past, present and future manifestations of their cultures, such as…artefacts, designs, ceremonies, technologies and visual and performing arts and literature". Similar language is used for associated rights in articles 12, 13 and 15.

A number of factors arguably diminish the legal effect of article 31(1) and UNDRIP generally. Firstly, UNDRIP's legal status is technically non-binding. The orthodox legal position, as Valmaine Toki points out, is that the article is 'soft law' and is not binding unless incorporated into domestic law.[22] Secondly, it could be argued that insofar as it places positive obligations on states, Article 31 is a negative right. It merely affirms the right of indigenous people to maintain and develop their traditional knowledge. However, this view is perhaps too narrow and

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21 Seamus Woods, "*Patents, Pvrs And Pragmatism: Giving Effect To Wai 262*" (2013) 97, 19 Canterbury L. Rev.

22 *Tavita v Minister of Immigration* [1994] 2 NZLR 257 and *Zaoui v Attorney-General* [2004] 2 NZLR 339.

simplistic in New Zealand's context. It is generally accepted that, as a signatory, UNDRIP should have persuasive legal and moral force in New Zealand.[23] In the context of mātauranga Māori the Waitangi Tribunal noted that article 31(1) was "of particular relevance"[24] and argued that UNDRIP "reflect[s] in many ways the spirit of the principles of the Treaty of Waitangi".[25] The Tribunal also opined that although UNDRIP is "non-binding…[it] carries moral and political force, and will in time – it is expected – form the basis of a new body of customary international law on the subject of indigenous rights".[26] Furthermore, as Valmaine Toki has argued, tools of administrative law (the principles of permissible and mandatory relevant considerations) could give UNDRIP greater weight in New Zealand on the basis of the rationale in *Tavita v Minister of Immigration* and the *Zaoui* case. [27]

Furthermore, although there is no positive obligation for member states to protect indigenous knowledge in art 31(1) itself, the United Nations Permanent Forum on Indigenous Issues has requested that WIPO and States "take effective measures and establish mechanisms to recognize the right of indigenous peoples to protect their intellectual property, including their cultural heritage, traditional knowledge and traditional cultural expressions…"[28]

Internationally there have been considerable efforts made by both collectives and individual countries, to implement or support a stronger stance under international law. These have included a number of innovative methods for creating an IP regime that is flexible yet strong enough to support indigenous rights in cultural property. Concepts such as the consideration of applying a valuation model 'that recognises yet retains the integrity of the indigenous cultural property as a holistic functioning system"[29] being one such method alongside other *sui generis* protocols and legislation in South and Southern Africa.[30] Furthermore, the World Intellectual Property Organisation's ('WIPO') Intergovernmental Committee on Intellectual Property and Genetic Resources, Traditional Knowledge and Folklore (IGC) is currently negotiating a legislative mechanism of WIPO's member states, which includes New Zealand, to ensure protection of traditional knowledge. Although the website does not set out in detail progress made on this mechanism, negotiations are scheduled to conclude in September 2017 and may provide a catalyst for reform of IP law. However, any such legislative instrument or mechanism would need to become incorporated into the domestic legal framework for it to have any real impact.

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23 Lai, above n 6 295.

24 Wai 262, above n 1, 43 at [1.4].

25 Wai 262, above n 1, 43 at [1.4].

26 Wai 262, above n 1, 233 at [8.1.1]. Interestingly this is contrary to the position of the US, who supported UNDRIP on the understanding that it did not form part of customary international law.

27 Valmaine Toki "*Indigenous Rights – Hollow Rights?"* (2011) Vol 19, Issue 2, Waikato Law Review, 38.

28 United Nations Permanent Forum on Indigenous Issues, 11th Session, recommendation 53.

29 Brian Burfitt and Marion Heathcote, *"Valuing footsteps—towards a valuation model of indigenous knowledge and cultural expression for the sustainability of indigenous people's culture."* (2014) Vol. 9, No. 5, Journal of Intellectual Property Law & Practice, 383.

30 Andre van der Merwe, "*South and Southern Africa—recent developments in the legal protection of traditional knowledge and traditional cultural expressions*." (2014) Vol. 9, No. 5, Journal of Intellectual Property Law & Practice, 411.

Action by indigenous groups

In the absence of IP reform in New Zealand, and a comprehensive set of rights to guarantee protection of traditional knowledge, Māori have no choice but to consider alternative mechanisms in our existing legal framework.

However before any such comprehensive protection by the Western legal system could take place, there is a critical prerequisite. The subject information, that is, the mātauranga that Māori are seeking to protect in any given instance, needs to be clearly identifiable. If the mātauranga is not recorded, or is cast in the most general terms, its subject matter becomes too elusive and difficult for the Western legal system to make clear determinations as to the extent of rights and obligations of various parties. Therefore this article argues that mātauranga Māori must, as a prerequisite, be sufficiently described and recorded in order for Māori to be able to use the tools of the legal system (whatever tools Māori may seek to employ)to protect it.

The emergence of the repository concept:

Internationally, there are examples where indigenous groups have created their own portals, databases and repositories of their traditional knowledge, as a means of sharing, registering, protecting and recording the origin of that traditional knowledge. Examples of these include: -

- http://catalog.northslope.org/catalogs/11479 - Sources of Documented Yukon North Slope Traditional Knowledge;
- http://www.nativeknowledge.org - Alaska Traditional Knowledge and Native Foods Database; This project was funded by the Environmental Protection Agency and the National Science Foundation in Canada.
- http://herb.umd.umich.edu/- Native American Ethnobotany Database compiled by the University of Michigan-Dearborn; and
- http://ip.aaas.org/tekindex.nsf - TEKPAD (Traditional Ecological Knowledge Prior Art Database).

WIPO are also collating a digital database of indigenous knowledge and working to provide for registration of that knowledge and its protection.[31]

Furthermore UNESCO has also developed a code of practice for use of indigenous knowledge. Their policy and the database created has the intention of tracing projects where indigenous knowledge has been used to create a sustainable and effective business case or model. The World Bank Group also undertakes activities in terms of utilising and recording indigenous knowledge for the benefit of local and global communities. This includes databases, registrations, and portals.

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31 WIPO, http://www.wipo.int/tk/en/

The purpose of these repositories is to provide a forum and a digital database for storing and recording traditional knowledge for the benefit of indigenous people or groups. These all vary in the ways in which they work inside and outside their individual country's intellectual property regimes, and include practical as well as legal components for management and protection of traditional knowledge. A review by the United Nations University Institute of Advanced Studies of a number of case studies around the world has provided some key points for guidance on developing mechanisms for the protection of traditional knowledge.[32] These key points from a legal perspective include the necessity for gaining prior informed consent from all relevant indigenous groups whether the information is in the public domain or not. Of note was the recommendation that databases, registers, publications, scientific papers, or other means through which traditional knowledge is made available to the public, should incorporate advisory notes which explicitly state, as a minimum, that:[33]

- the authors fully recognise the rights of indigenous people over their traditional knowledge, including any intellectual property or sui generis property rights
- that prior informed consent be obtained for the use of the traditional knowledge
- the use of traditional knowledge for commercial or other ends must be appropriately recognised
- there is a need for the sharing of benefits derived from the use of traditional knowledge with indigenous peoples.

These key points are largely consistent with the thrust of the Wai 262 report in obtaining consent from kaitiaki for use of taonga works where appropriate. They also recommend that access to such knowledge repositories should only be given once acceptance of indigenous peoples' rights over that knowledge has been given. Also, that national governments and international organisations should review existing law and policy to enable patent authorities to access local community and indigenous peoples' databases and registers, confidential registers and oral registers providing greater access to crosschecking ownership.[34]

Consultation and engagement is another key component recommended to legitimise any policy and regulatory development:

> To secure increased participation of indigenous peoples in international processes for the development of law and policy relating to the protection of TK, national governments should include indigenous representation on national delegations and the need to develop mechanisms to ensure increased indigenous participation in decision making processes through the development of participatory processes, for diffusion of information to local and indigenous communities, consideration of options for protection of TK and the transmission of the results of such consultative processes through independent indigenous representation at relevant meetings.

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32 Alexander, M., Chamundeeswari, K., Kambu, A., Ruiz, M., Tobin, B., *The Role of Registers and Databases in the Protection of Traditional Knowledge A Comparative Analysis*, (United Nations University Institute of Advanced Studies, Canada, 2003).

33 Above at 39.

34 Above at 36.

Finally, they recommend that international organisations and agencies should provide support for initiatives to develop database trusts, including the governance structures of existing databases and registers, as well as through the funding of initiatives in this area.[35] The key rationale for this of course was so as to reduce any undue pressure or onus on indigenous groups of compliance.

If we consider some of these measures and initiatives taken internationally, alongside the obligations at international law and under Wai 262, it can be argued that the Crown is under a legal duty to take reasonable steps to protect mātauranga Māori. However, given the lack of imminent reform, the next section suggests some approaches within the existing legal framework that could provide limited protection of mātauranga Māori. The section below uses the example of an approach under investigation as part of the Sustainable Seas National Science Challenge.

The Sustainable Seas National Science Challenge and the Mātauranga Māori Digital Repository Project

The context within which this article has arisen follows the writers' involvement in one of the New Zealand Government's National Science Research Challenges - Sustainable Seas. Such research within this Challenge and undertaken by or funded by the government is, amongst other things, expected to give effect to the Vision Mātauranga policy.

Vision Mātauranga and Sustainable Seas

Vision Mātauranga was created before *Ko Aotearoa Tēnei* was released, specifically to provide strategic direction for research of relevance to Māori, funded through the government's Vote Research, Science and Technology.[36] Vision Mātauranga is a policy framework that's mission is "to unlock the innovation potential of Māori knowledge, resources and people to assist New Zealanders to create a better future."

The catchphrase alone does raise some questions as to whether the intent of the policy is in fact for the benefit of Māori, given that it proposes to unlock the potential for the benefit of 'all New Zealanders'. The policy at a glance seems to directly efface the ability for Māori to retain their knowledge, resources and people solely for their own benefit.

The Sustainable Seas Challenge includes five individual research programmes: Our Seas, Valuable Seas, Tangaroa, Dynamic Seas and Managed Seas, as well as an interwoven research cross-programme which is also called Vision Mātauranga. The Challenge has appointed a Lead individual to assist with the implementation of the Vision Mātauranga policy across the Challenge. The interpretation of Vision Mātauranga has been one that is inclusive and has incorporated elements of the greater Challenges' intent to support and protect Māori knowledge whilst fulfilling this policy. The Challenge identifies that there needs to be a new way of managing

[35] Above at 40.
[36] Vision Mātauranga Policy Document, Ministry of Research, Science and Technology, New Zealand Government, at 2.

New Zealand's marine resources that considers multiple uses, values and sources of knowledge, and combines the needs of Māori, wider communities, and industry, with new evidence from scientific research. Ecosystem Based Management (EBM) has been identified as the approach to be applied Challenge-wide, as it recognises interactions within ecosystems and with humans, and balances the use and conservation of resources.[37]

A repository of knowledge: Mātauranga Māori Project

It was with the Vision Mātauranga mission in mind, and the Challenge's mission to balance the aspirations and rights of Māori, that a new project was proposed within the Challenge. It was seen as imperative that both Māori knowledge, and the users of that knowledge, work together throughout the EBM approach. The resulting research project created and approved for funding, is titled VM4.1 A repository of knowledge: Mātauranga Māori.

This project is an initial investigation into a digital repository concept that intends to protect, preserve and record the whakapapa of all information and/or data gathered and identified as being mātauranga Māori throughout the Sustainable Seas Challenge as a whole. Inspired by the other international repository examples detailed above, the project seeks to consider the application of such a repository for recording mātauranga Māori within the Challenge. The idea is to recognise the source of, and rangatiratanga or authority over, the knowledge gathered for the Challenge from respective iwi, hapū, and whānau.[38] Perhaps most importantly, the critical first step discussed above – the recording and describing of mātauranga in a repository, has been undertaken as part of this project.

The project was initially intended to investigate the creation of a storehouse of knowledge to be collated throughout the first phase of the Challenge and will work across the Challenge with each programme to assist researchers to capture all relevant data. The project intended that the digital repository will be the source for recording and accessing the origins of any identified mātauranga Māori that has been contributed to the Challenge and allow future researchers, businesses or anyone of interest, to access the information and identify where it came from to assist with further research. The short duration of the project is reflective of the need to create trust and confidence in the repository as a concept with local Māori prior to any further investment into the development of a digital repository itself.

Outlined in the Sustainable Seas Research Plan[39], mātauranga Māori is the indigenous Māori knowledge system of Aotearoa New Zealand. It includes knowledge of language, technology, systems of law and social control, the environment, spirituality, cultural practice, systems of property and value exchange, forms of expression, and much more. Sourcing this knowledge in all its forms, and then applying it in the Challenge requires:

- positive relationships between Challenge programmes and local Māori;

[37] http://sustainableseaschallenge.co.nz/challenge

[38] VM4.1 A repository of knowledge: Mātauranga Māori, Project Application, (2016) at 2.

[39] Sustainable Seas Ko ngā moana whakauka, National Science Challenge Research and Business Plan (2015) at 6.

- trust and confidence by Māori in the information gathering process;
- trust and acknowledgement regarding the intended use of that knowledge;
- integrity of the report writing and report writer; and
- appropriate recognition of Māori knowledge ownership/authority/rangatiratanga.

It is also presupposed by the idea that all Māori know and have the same understanding of what mātauranga Māori is and would provide similar definitions of this.

The Challenge is undertaking its research within a focal area. From the Southern Taranaki Bight, in a south-east direction encompassing Wellington, Cook Strait, top of the South Island, Kaikoura, and Chatham rise. It is approximated that there are 30 iwi in this focal area, with nine iwi identified in the case study area (Marlborough Sounds/Tasman Bay) where the initial trial of the research findings will be performed. Within those iwi are smaller groups functioning as hapū and/or whānau, and in their capacity, perform the role as tāngata whenua. The information and data gathered for the Challenge will be received from a mixture of iwi representatives and tāngata whenua from these groups and beyond. Appropriately attributing and connecting this knowledge, information and data to the correct groups is important. This will identify and provide both the broader Māori perspective and mātauranga and the locality specific perspective and mātauranga, which will also include the values that will be identified over the course of the Challenge.

It was intended that the project will help to identify where any knowledge has been utilised within the Challenge and to trace its origins. It was identified that transparency is integral to the collection of this knowledge, and its use within the Challenge.

The legal issues and obligations within the Challenge

The project also identifies that it is equally important that the retention, use and access to traditional knowledge respects the rights of the indigenous people and any cultural sensitivities in respect of this knowledge. An important aspect identified in 'Ko Aotearoa Tēnei' was the loss of control of traditional knowledge by Māori and lack of protection of Māori rights to control and manage access to such knowledge. The Tribunal specifically considered the question of access to mātauranga Māori in archives, libraries and databases. One of the recommendations was to implement new guidelines for management and access to mātauranga Māori and to support mātauranga Māori in science funding.[40] In addition to New Zealand's obligations under the Treaty, as indicated above, it is also party to a number of international treaties which require New Zealand to respect, maintain and preserve mātauranga Māori and respect the rights of indigenous people.

[40] Ko Aotearoa Tenei, above n 12 at para 6.4.5.

The purpose of the Repository Project

Consequently, the goals of the repository project are attempting to assist the Challenge to remain consistent with the above principles, whilst also considering how the law could provide creative solutions for the protection of mātauranga Māori within the Challenge, given the current remedies available under New Zealand IP law offer little protection.

There are three areas that the research project is considering:

1. Appropriate measures (whether legal or otherwise) to protect the use of Māori knowledge in the Challenge and into the future,
2. The viability and appropriateness of a repository (digital or otherwise) to protect the use of mātauranga Māori, and
3. The viability and most appropriate method of ownership and ongoing management of a repository within the Challenge and into the future.

The research is in one part aimed at finding solutions to alleviate the fear of iwi and tāngata whenua that Māori knowledge will be used contrary to, and outside of, the scope of individual research projects and the Challenge as a whole. Simultaneously, the project seeks to identify an appropriate mechanism and model of ownership to enable the Challenge to use Māori knowledge in its research and outputs developed along the way.

Critically, it is envisaged that by creating a repository, it will help identify where mātauranga Māori has been sourced and then used to both support research to understand and clarify perspectives, as well as its integration with other knowledge frameworks, where it may have contributed to any distinctive product(s), process(es), system(s) and service(s) developed in the Challenge, thus resulting in IP.

Similarly, having in place a forum to manage the repository, in a form supported by iwi, will ensure the protection of Māori knowledge and prevent issues with iwi and tāngata whenua over its use and management within the Challenge and into the future, which will support the Challenge's objective. In turn, this will promote, enable and encourage Māori to contribute mātauranga Māori within Challenge projects and to the EBM process.

This resulted in an overall project goal of investigating legal and non-legal measures to both protect and enable the use of mātauranga Māori in the Challenge, and also seek to develop viable and appropriate conceptual methods (products, processes, systems and services) to protect and manage the intellectual property of Māori.

Addressing the legal issues: IP and mātauranga Māori within the Challenge

The Sustainable Seas Challenge has acknowledged their intent to give effect to Vision Mātauranga policy, whilst upholding their commitment to Te Tiriti, and meeting the goals of the greater Challenge.

The Challenge Research and Business Plan (in accordance with which the projects must be carried out) indicates:

a. that the Challenge is committed to the principles of open access to publicly funded research data and information. Subject to ethical, privacy or cultural reasons, or issues of commercial sensitivity, publicly funded research data from the Challenge will be made open for public access and re-use. Projects undertaken in the Challenge that generate data and/or information will be required to give effect to the application of open access principles;
b. that the management, ownership and commercialisation of Intellectual Property (IP) associated with the Challenge is defined within the Collaboration Agreement between the Parties. These encompass the following principles:
    1. All background IP belonging to any Party will remain vested in that Party.
    2. Ownership of Challenge IP will vest in the Party or Parties that creates the IP.
    3. Where a project involves Māori traditional knowledge, the appropriate Parties will obtain necessary approvals for its use from the relevant whānau, hapū or iwi.
    4. Protection and commercialisation of any Challenge IP will be the responsibility of the Party owner(s). In addition, if the knowledge contributes to the development of products or information to be utilised for commercial or pecuniary purposes, agreement must first be reached with the relevant iwi, hapū, whānau.
    5. Owners of Challenge IP, and background IP where appropriate, will provide a non-exclusive royalty free licence for use of the IP for the purposes of meeting the delivery of the Challenge Objective and Mission.
    6. All Parties will promote the sharing of information generated by the Challenge and participate in joint initiatives to publish, present and disseminate research results.

The principles recognise that Māori have an interest in Māori traditional knowledge that needs to be recognised and provided for by agreement but it does not specify or include mātauranga Māori as defined in the plan.

The Challenge's Intellectual Property Management Plan also sets out intellectual property management principles governing individual projects that form part of the Challenge as well as the Challenge as a whole. These principles comprise the current intellectual property IP Management Plan of the Challenge, and bind all projects and contractors as part of the Challenge. It is attached to each of the Challenge contracts binding those researchers that are collecting data within the Challenge, including those that will encounter contributors of mātauranga Māori.

The IP Management Plan focuses on intellectual property in its narrower sense of property rights as restricted by New Zealand law. Although the intention may have been for the Challenge to protect mātauranga Māori, in its current form, the IP Management Plan does not take into account the issues surrounding mātauranga Māori and its protection. It was identified this would result in difficulties as:

a) There are difficulties around conflicting understandings and aspirations of what constitutes ownership for Māori. If Māori are deemed to own mātauranga Māori, what does this actually mean and is this acceptable to them?

b) It provides inadequate protection of mātauranga Māori and its use and therefore poses a risk that it will dis-incentivise Māori sharing their knowledge with projects or with the Challenge.
c) Participants who contribute mātauranga Māori are not likely to benefit from the protection that the IP Management Plan provides. This is because there is no IP in mātauranga Māori per se.
d) The IP Management Plan does not adequately address Māori concerns about sharing information for Challenge purposes. Māori will likely be concerned about access to and use of mātauranga Māori. If IP is developed using mātauranga Māori, the IP Management Plan provides no protection or constraint on the dissemination or use of that knowledge, and does not allow Māori to share in any ongoing commercial benefit in the use of any developed IP.
e) Some of the requirements in the IP Management Plan, such as requiring participants to obtain consent or approval of hapū or iwi, will not encourage Māori to share their mātauranga and contribute to the Project.

The writers found that this proposed a Challenge for the Repository Project. A solution needed to be found to work outside of the IP Management Plan. This could mean the creation of a separate set of protocols governing the use of mātauranga Māori in the Challenge (potentially as allowed as a 'cultural' exception to the IP plan) and/or the creation of legal arrangements and structures to control and assist with management, data use and benefits. Regardless of the treatment or method of protecting mātauranga Māori within the Challenge, the merits of maintaining one source collating the mātauranga Māori, its origins and sources remains essential, to assist with its protection into the future.

A further difficulty that needs to be addressed is the question of benefit sharing. The Challenge does contemplate that new intellectual property may be created through the Challenge or thereafter. As the Tribunal noted third parties can use works and knowledge that are the creations of Māori culture and acquire IP rights in those uses – 'free-riding' on Māori culture by acquiring private rights in it.[41] These new right holders may even, in turn, exclude kaitiaki from some uses of the IP protected work, such as making a copy of that work, without permission of the IP right holder.[42]

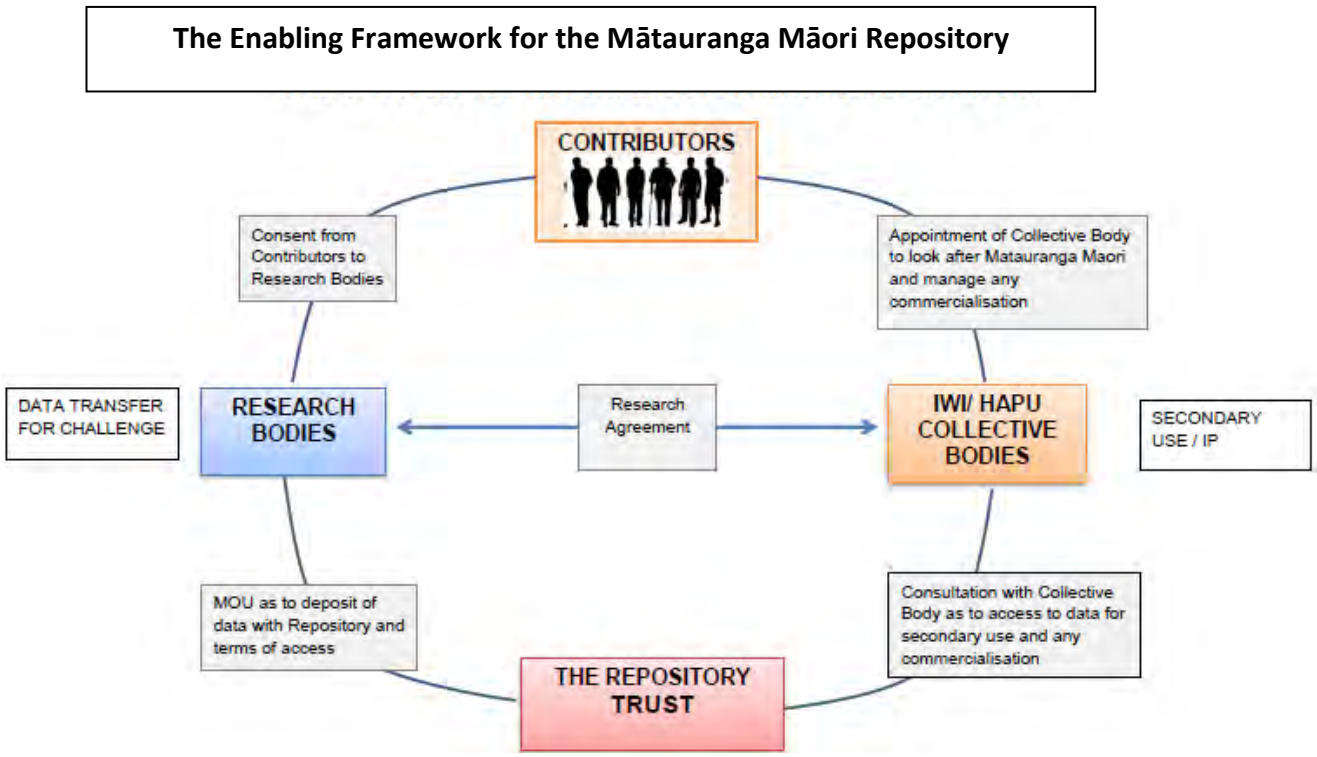
Solutions: An Enabling Framework for the Repository

There were a variety of options discussed and canvased during the legal research phase of the project and included consideration of a number of instruments, consents and entities to enable and implement an effective system for the Challenge and more specifically for the Repository concept. It was identified that the management framework or system that supported the use and management of the repository, needed to allow for collective representation and decision making, but also work with individuals, iwi, hapū, research bodies and institutions, if it was to be a success.

[41] Above, para 1.5.1, at 71.
[42] Above, para 1.5.1, at 70.

Many of the practical models proposed in the earlier section of the article were considered for this project, but ultimately the following 'Enabling Framework' was considered the best approach to propose and discuss during engagement, that would address all of the concerns raised within the development of the project.

The final proposed solution included the following elements:



Individual Participants – the 'Contributors'

The individual participates are the source of the information. The structure of the Challenge requires that these individuals provide mātauranga Māori (primary data) to Research Bodies on basis of consent. Such consent, it is envisaged, will be given on the following terms:

a) the participant consents to the use mātauranga Māori for the primary research purposes of the Challenge;
b) where the knowledge is used within the Challenge there will be an acknowledgement of source;
c) there will be no publication of primary data without prior informed consent of the participant;
d) use of mātauranga Māori for Challenge purposes must be in an ethical manner (that is in an appropriate manner that is not culturally offensive);
e) the mātauranga will be held on confidential basis and according to an agreed set of protocols;
f) where mātauranga is used individual participants will be acknowledged;
g) the mātauranga will be transferred by Research Bodies to the Repository to be held according to protocols;

h) the relevant iwi or collective body, or other nominee, will be permitted to act on the participants' behalf to enforce terms of consent;
i) consent must be obtained for any secondary use of data (that is by Research Bodies for another use);
j) outlines process for obtaining consent for secondary research purposes of primary data and from whom (options could include Contributors, Collective bodies or Repository

Iwi or Hapū 'Collective Bodies'

The role of the iwi or hapū collective bodies will be to act as an agent or nominee for Contributors/Individual Participants for negotiating consent for and enforcing agreements for secondary uses of primary data by third parties. It is contemplated that these iwi could be included as a beneficiary of the Repository Trust that is established. The Iwi or Hapū collective bodies, it is anticipated, are legal entities and can therefore enter into agreements on behalf of a collective group. Their role would include:

- providing options to individual participants in terms of who to negotiate terms for secondary use of primary data.
- ensuring engagement / involvement to the hapū and iwi or other collective.
- ensuring that iwi and Māori Collectives are engaged in the management of the Repository

'Research Bodies' within the Challenge

The role of the research bodies would include to:

- engage with and obtains consent from individual participants use mātauranga Māori for primary research purposes within the Challenge.
- obtain consent from individual participants to store mātauranga Māori in the Repository;
- enter into a research agreement with iwi or a collective iwi entity. The research agreement would set out terms of negotiation for secondary use of primary data or commercialisation of information to ensure accountability and transparency.
- enter into a memorandum of understanding with other Research Bodies and the Repository around the use of the Repository for deposit and access to mātauranga Māori. Ensures accountability and transparency.

The memorandum of understanding would include following terms:

a) Research bodies would use the Repository and to deposit data with it consistent with the consent and research agreement;
b) no publication of primary data without prior informed consent;
c) ethical use of mātauranga Māori for Challenge purposes;
d) mātauranga to be held on confidential basis;
e) rights of acknowledgement for individual participants;
f) data to be held by Repository

- Iwi or Collective Entity, or other nominee, can act on their behalf to enforce terms of consent.

The 'Repository Trust'

The legal entity would be established for the following purposes, to:

a) hold and manage access to mātauranga Māori for future research purposes;
b) retain the mātauranga Māori for benefit of future generations;

It is contemplated that the legal entity would be necessary to enter into agreements with third parties and Research Bodies and to provide an independent body that can protect mātauranga Māori on behalf of individual contributors. The legal entity would also:

- store mātauranga Māori provided to the Repository under the consent forms. Protocols of Storage and Use of Mātauranga Māori. Trust holds records of all consents, source Contributors, and terms of Consent for access terms for secondary uses. Ensures confidence in the security of the Repository.
- act as an agent or nominee for individual participants for negotiating consent for and enforcing agreements for secondary uses of primary data by third parties;
- provide options to individual participants in terms of who to negotiate terms for secondary use of primary data.
- ensure engagement and involvement to the hapū and iwi or other collective.
- enter into MOU with Research Bodies around the use of mātauranga Māori. Ensures accountability and transparency. The MOU would include the following terms:

  a) there will be no publication of primary data without prior informed consent;
  b) there will be ethical use of mātauranga Māori for Challenge purposes;
  c) mātauranga will be held on confidential basis;
  d) where mātauranga is used there will be rights of acknowledgement for individual participants;
  e) data is to be held by Repository

In summary, the following proposed legal and non-legal instruments would be utilised within the proposed enabling framework for the repository:

No	Document	Parties	Objective	Purpose
#1	Consent Form	Between Individual Participants / Contributors and Research Bodies	To obtain consent of Individual Participants / Contributors to access mātauranga Māori for Challenge purposes	Provides greater protection and recognition of importance of mātauranga Māori
#2	Memorandum of Understanding	Between Repository and Research Bodies	To set out the basis of use of Repository for deposit and access to mātauranga Māori	Sets out clear parameters on ethical

				use and access to data in the Repository
#3	Research Agreement	Between Iwi or Hapū Collective Bodies and Research Bodies	To set out terms of negotiation for secondary use of data or commercialisation of data	Ensures accountability and transparency
#4	Protocols of Storage and Use of Mātauranga Māori	Repository	To set out protocols for storage and use of mātauranga Māori in the repository	Ensures accountability and transparency, and so contributors can have confidence their data / mātauranga will be secure
#5	Trust Deed	Between Settlors and Initial Trustees	To establish a legal structure to make decision about and manage the Repository in accordance with Protocols of Storage and Use of Mātauranga Māori and other relevant documentation	To ensure accountability and transparency of management and decision-making

Socialising the Solutions

The next step given the scale and background for the project is clearly the need to socialise the proposed 'Enabling Framework' amongst Māori and seek support for the concept of a repository. This approach requires buy-in from both the Challenge at large, as well as Māori within the Challenge. In addition to the consultation and engagement, there will also need to be consideration of the application of any feedback within the framework. Ultimately, the proposed approach will offer protection for Māori, from the inappropriate use of mātauranga, and will also seek to provide clarity for organisations within the Challenge, (Research Institutes, individuals and the Crown) from using mātauranga inappropriately.

Another key point and connect with Wai 262 findings, is the need for discussion around the differences of opinion that Māori may have around how they view their relationship with their tangible and intangible cultural heritage alongside ownership, [43] particularly in a post-settlement environment.

[43] Lai, above n 6 at 223.

The project and the framework development included input from a variety of advisors, including Maui Hudson, a key member of the Te Mana Raraunga Māori Data Sovereignty network. It was established at the outset of the project that any proposed approach would ideally align with the kaupapa of Te Mana Raraunga and their primary objectives for their network.[44] In working with one of their key network members, it has been assured that this enabling framework aligns with their key objectives and the purpose of the network, to ensure Māori data is made available to and owned by Māori.

In aligning with Te Mana Raraunga the 'Enabling Framework' and the repository can also offer other potential uses including collection of mātauranga Māori from other research challenges, or even projects outside of National Science Challenges.

Importantly, the mechanisms used by this project to protect mātauranga Māori – primary contract law - is outside of the traditional forms of intellectual property protection available under statute or common law.

Conclusion

This article goes some way in exploring the Waitangi Tribunal's recommendations from Wai 262, and has argued that the lack of subsequent reform since those recommendations, have proffered no real practical means for Māori to protect mātauranga Māori. This article uses an example from the Sustainable Seas National Science Challenge, which is being considered and intended to be socialised with Māori. . It argues that there may be ways to utilise those legal instruments currently available, to provide creative solutions for the protection of mātauranga Māori in certain situations. In particular, contract law in conjunction with existing intellectual property mechanisms, have been discussed and can perhaps adequately address some Māori concerns about the use and exploitation of traditional knowledge. The framework discussed attempts to address issues surrounding benefit sharing, participatory decision making and kaitiakitanga, as well as protection of and rights of use and access to mātauranga Māori and the notion of collectivity. Whether the framework is eventually adopted within the Challenge or not, ultimately there is the need for broader, more fundamental change in this legal and ethical landscape, for both Māori, individuals and organisations, and it is hoped that the Crown will in time action the recommendations of Wai 262 in an attempt to address this unresolved issue.

[44] Te Mana Raraunga- Maori Data Sovereignty Network Charter, at 1.

Appendix E Presentation Ngā Pae o Te Maramatanga Conference

Sustainable Seas

Ko ngā moana whakauka

National Science Challenge

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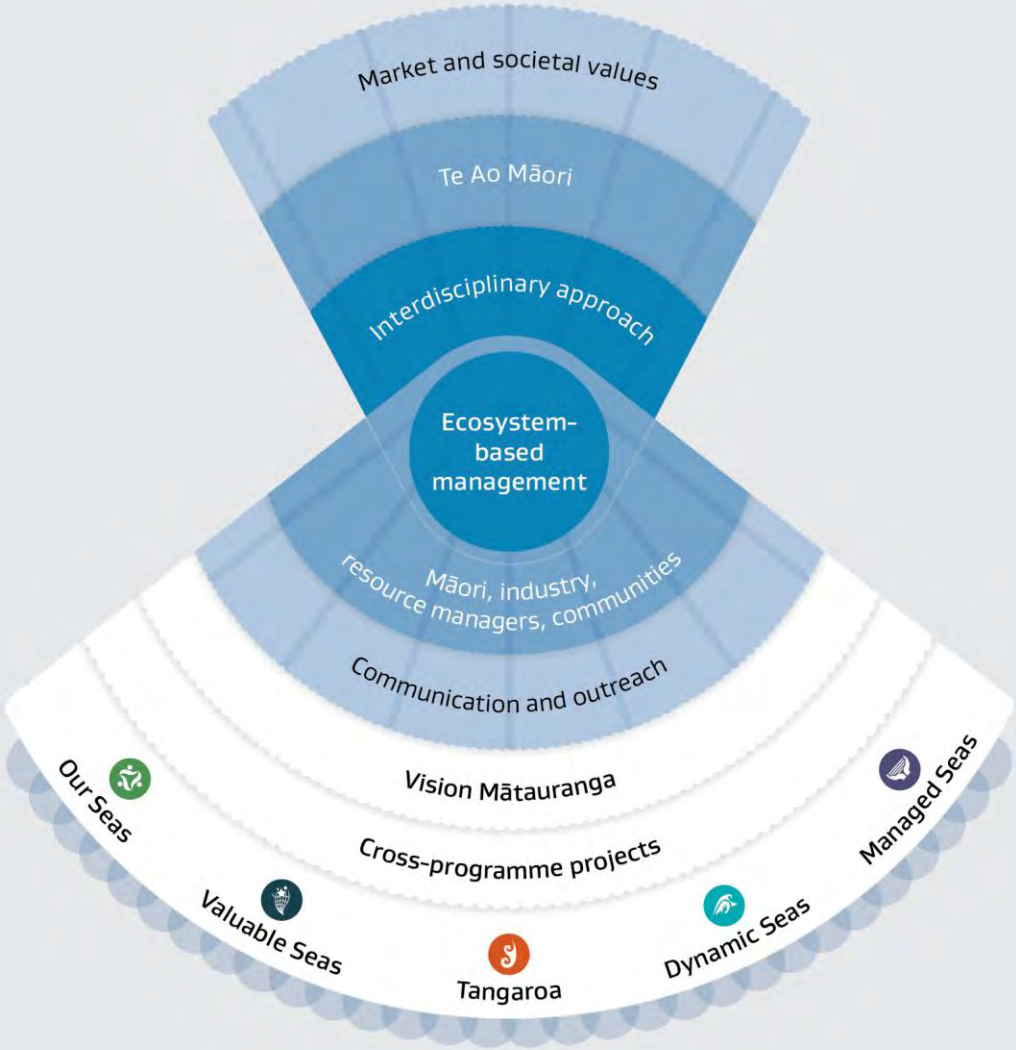
Investigating the creation of a repository for Mātauranga Māori within the Sustainable Seas National Science Challenge

Ngā Pae o Te Māramatanga Conference 2016
16 November 2016
Auckland

James Whetu
Vision Mātauranga Cross-Programme Lead
Project Lead on VM4.1 A Repository of Knowledge: Mātauranga Māori

National Science Challenges | SUSTAINABLE SEAS | Ko ngā moana whakauka

Objective:
Enhance utilisation of our marine resources within environmental and biological constraints



Vision Mātauranga MBIE Policy Framework

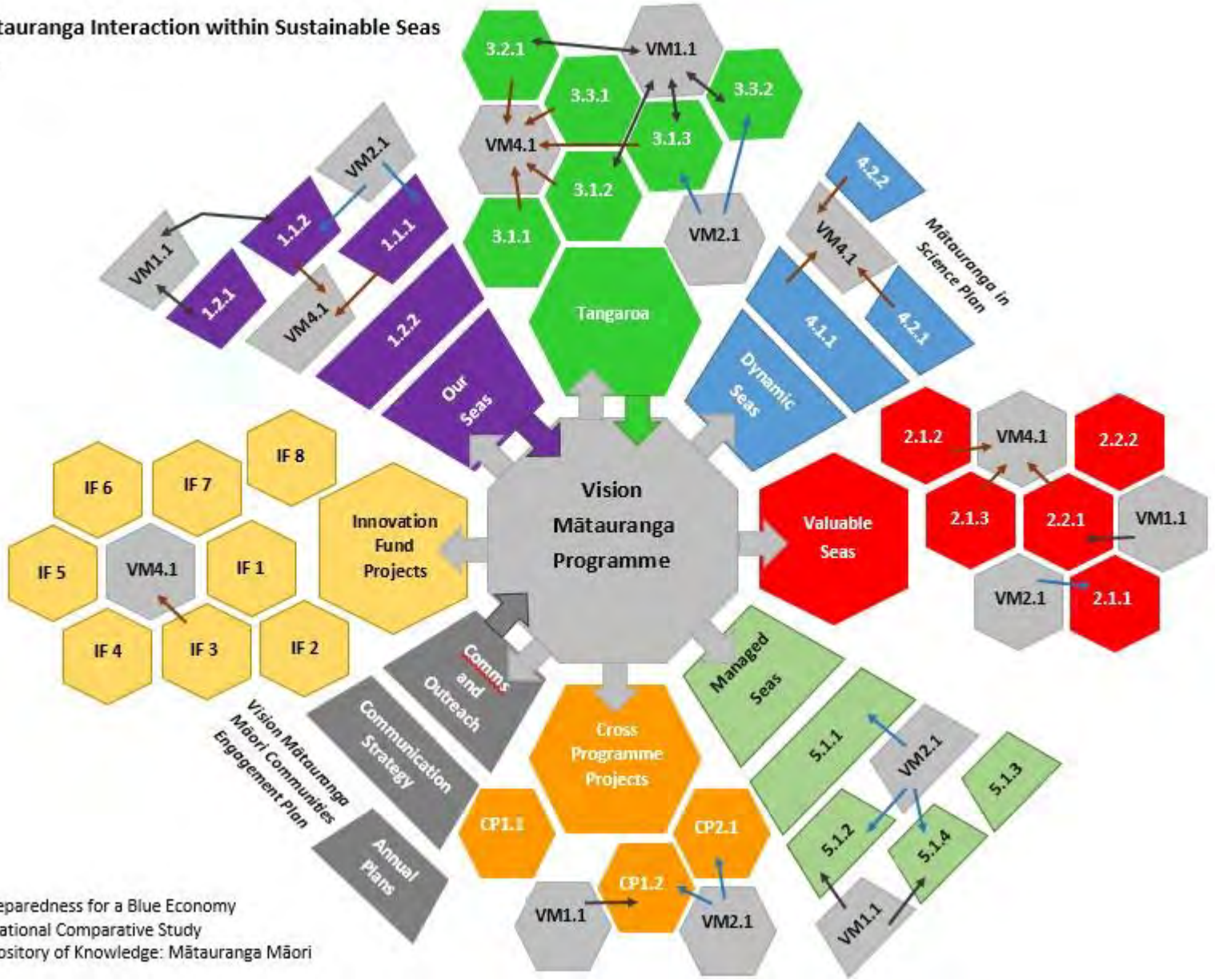
Mission

"unlock the innovation potential of Māori knowledge, resources and people to assist New Zealanders to create a better future"

Themes

1. Indigenous Innovation
2. Te Taiao
3. Hauora/Oranga
4. Mātauranga

Vision Mātauranga Interaction within Sustainable Seas Challenge



Key:

— VM1.1 Iwi Preparedness for a Blue Economy
— VM2.1 International Comparative Study
— VM4.1 A Repository of Knowledge: Mātauranga Māori

National Science Challenges | SUSTAINABLE SEAS | Ko ngā moana whakauka

Research Project VM4.1 A Repository of Knowledge: Mātauranga Māori

- Findings in WAI262 “Ko Aotearoa Tēnei”
  - Loss of control of traditional knowledge by Māori and
  - Lack of protection of Māori rights to control and manage access to such knowledge, incl databases
- For Māori communities to feel confident that their values and perspectives are used in an appropriate manner

Aim of research

- Find methods to appropriately use and protect Māori knowledge in the Challenge and into the future
- The viability and appropriateness of a repository (digital or otherwise) to protect the use of Māori knowledge
- The viability and most appropriate method of ownership and ongoing management of a repository within the Challenge and into the future

Research Project VM4.1 A Repository of Knowledge: Mātauranga Māori

Aspects of the Repository

- Storage - *of Māori knowledge*
  - *particular focus on digital*
  - *What is out there (existing)?*
- Management - *of Māori knowledge*
  - *ownership and/or stewardship?*
- Protection - *of Māori knowledge*
  - *consenting and ethical process*
  - *Intellectual Property*
  - *What is mātauranga Māori?*

Research Project VM4.1 A Repository of Knowledge: Mātauranga Māori

Investigation

- Storage - *of Māori knowledge*

  - Platform to digitally manage and distribute Māori knowledge

  - GEONetwork

  - Auckland Council Maori Cultural Heritage Inventory

  - International models

  - Te Tāhū o te Pātaka Whakairinga Kōrero (Science for Technology Innovation National Science Challenge)

Research Project VM4.1 A Repository of Knowledge: Mātauranga Māori

Investigation

- Management - *of Māori knowledge*
  - *Data management (control, use and protection)*
  - *Ownership model vrs Stewardship approach*
  - *Legal parameters to enable (or understand constraints to have) ownership*
  - *Research institutes frameworks/management*
  - *Commercialisation of Māori knowledge*
  - *Māori/Indigenous Data Sovereignty*

Research Project VM4.1 A Repository of Knowledge: Mātauranga Māori

Investigation

- Protection - *of Māori knowledge*

  - In its application and development of a product

  - Who owns Māori knowledge? Iwi Trust Boards? Marae? No parties own Māori knowledge?

  - Potential for commercial outcomes to arise; in response, seeking legal guidance on consenting and ethical process in Challenge

  - Distinguishing the data (ie kaitiaki/tāngata whenua knowledge vrs iwi commercial/business)

Any Questions?

Appendix F Presentation at the Sustainable Seas Conference

Vision Mātauranga

Programme Leader: James Whetu

Waikato-Tainui College for Research and Development and Kensington Swan

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Bringing Vision Mātauranga to life:

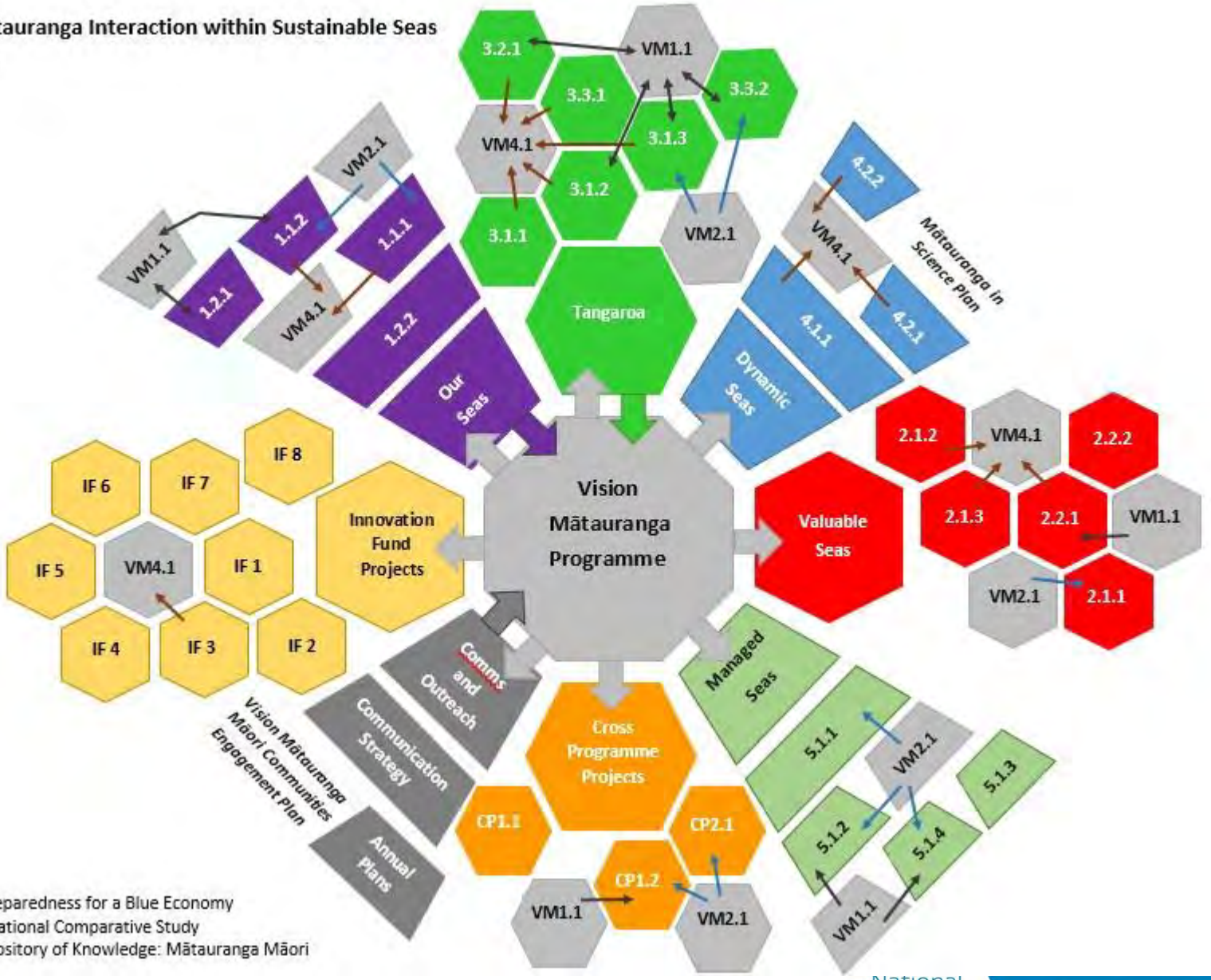
- Investing in **Māori-relevant science and innovation**
- Developing **Māori science and innovation capability**
- Fostering connections to **grow opportunities for Māori science and innovation**.
- Supporting the development of **iwi-led research and development strategies**.
- Collaborating with other agencies to develop whole-of-government approaches.
- Partnering with the Regional Business Partners to improve collaboration between Māori, researchers and firms to **enhance knowledge transfer and business success**.

National Science Challenges
SUSTAINABLE SEAS
Ko ngā moana whakauka

Vision Mātauranga

The Sustainable Seas Challenge will respond to the MBIE's policy framework to mutually discover measures and outcomes that "unlock the innovation potential of Māori knowledge, resources and people to assist New Zealanders to create a better future".

Vision Mātauranga Interaction within Sustainable Seas Challenge



Key:

— VM1.1 Iwi Preparedness for a Blue Economy
— VM2.1 International Comparative Study
— VM4.1 A Repository of Knowledge: Mātauranga Māori

National Science Challenges | SUSTAINABLE SEAS | Ko ngā moana whakauka

Vision Mātauranga Programme

- **Vision Mātauranga Implementation Plan**
  - Outline a pathway for VM interaction - consistency and succession
  - Manage interaction expectations, and also research findings
  - Demonstrate programme actions

- **Mātauranga in Science**
  - An attempt to bridge between kaupapa Maaori methodology and mātauranga (knowledge system) and biophysical science

- **Engagement Plan**
  - Targeted approach to engage with our Maaori communities
  - Working with Communication and Outreach

Opportunities for Māori Communities

National SCIENCE Challenges | SUSTAINABLE SEAS | Ko ngā moana whakauka

Our Seas

Enhanced participation of Māori in management processes and decision-making

Valuable Seas

Māori values informing non-monetary values, and
Support Māori economic aspirations in the marine environment

Dynamic Seas

Mātauranga informing science – mātauranga incorporated within investigation

Managed Seas

Mātauranga incorporated within management tools, and
Tools to support the application of mātauranga

National SCIENCE Challenges | SUSTAINABLE SEAS | Ko ngā moana whakauka

Vision Maatauranga Research Projects

Project VM2.1: International Comparative Study: Incorporation of indigenous approaches to guardianship and stewardship in Canada's resource management policy framework

To be presented by Jonathan Kilgour - Waikato-Tainui College for Research and Development

Project VM4.1: Preserving mātauranga Māori gathered by Sustainable Seas

To be presented by Tai Ahu - Kensington Swan Lawyers

VM2.1: Incorporation of indigenous approaches to guardianship and stewardship

Waikato-Tainui College for Research and Development

National
Science
Challenges
SUSTAINABLE
SEAS
Ko ngā moana
whakauka


Metlakatla
Old Massett
Haisla
Skidegate
Gitga'at
Kitasoo/Xaixais
Heiltsuk
Wuikinuxv
Xwémalhkwu

Case Study

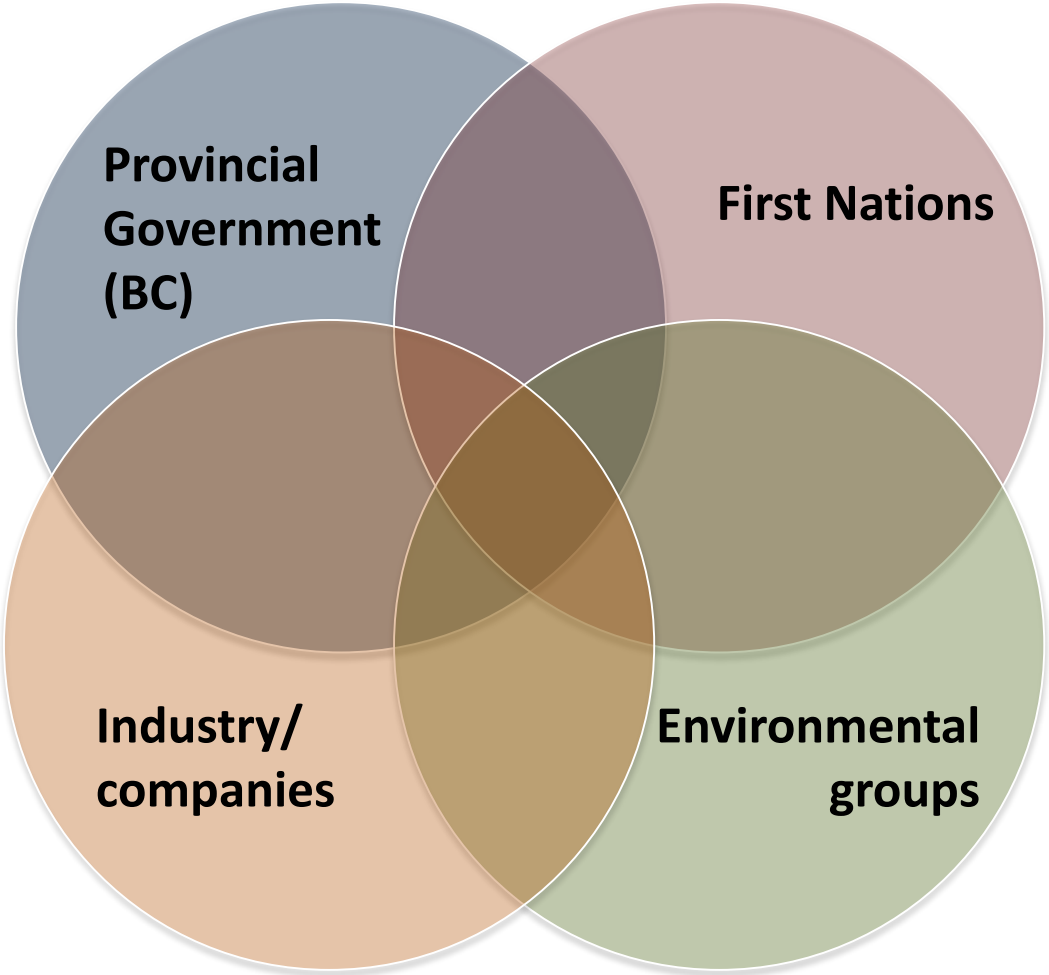
Marine Plan Partnership for the Pacific North Coast

Integrated/ marine use planning

Great Bear Initiative

Land use planning

Parties involved



Economic development

Access to resources

Local economies

Aboriginal rights and title

Decision-making

First Nations knowledge and existence

Concern at extractive industries

Sustainable development

Result

EBM

Protected and development zones

Local development stimulus

Coast Opportunity Funds

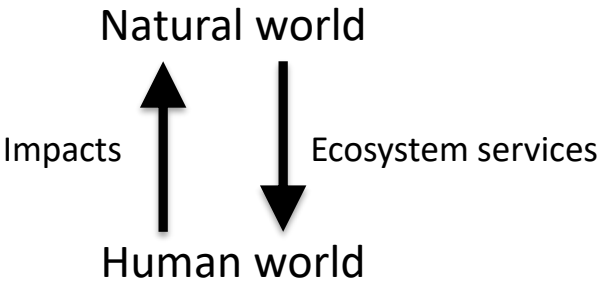
Government-to-government

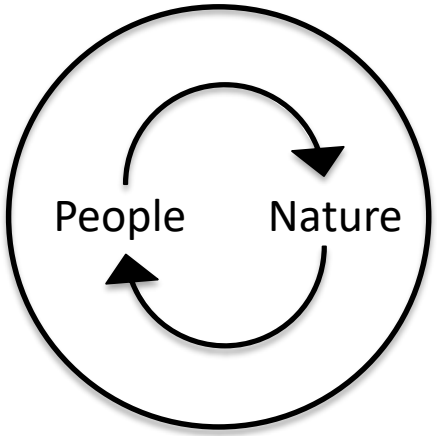
Co-governance

Ecosystem-based management

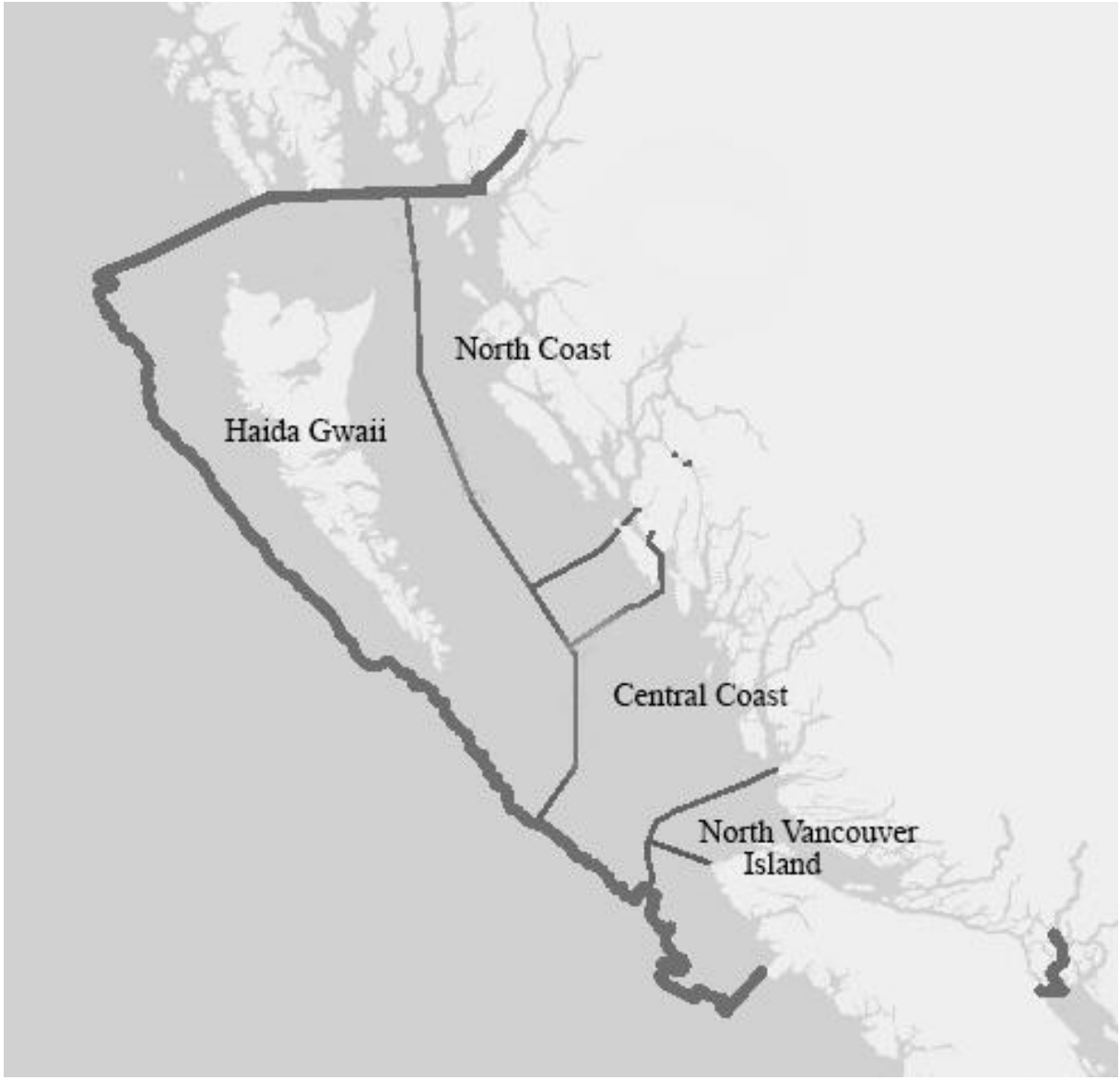
- Ecological integrity
- Human wellbeing
- Governance and collaborative management

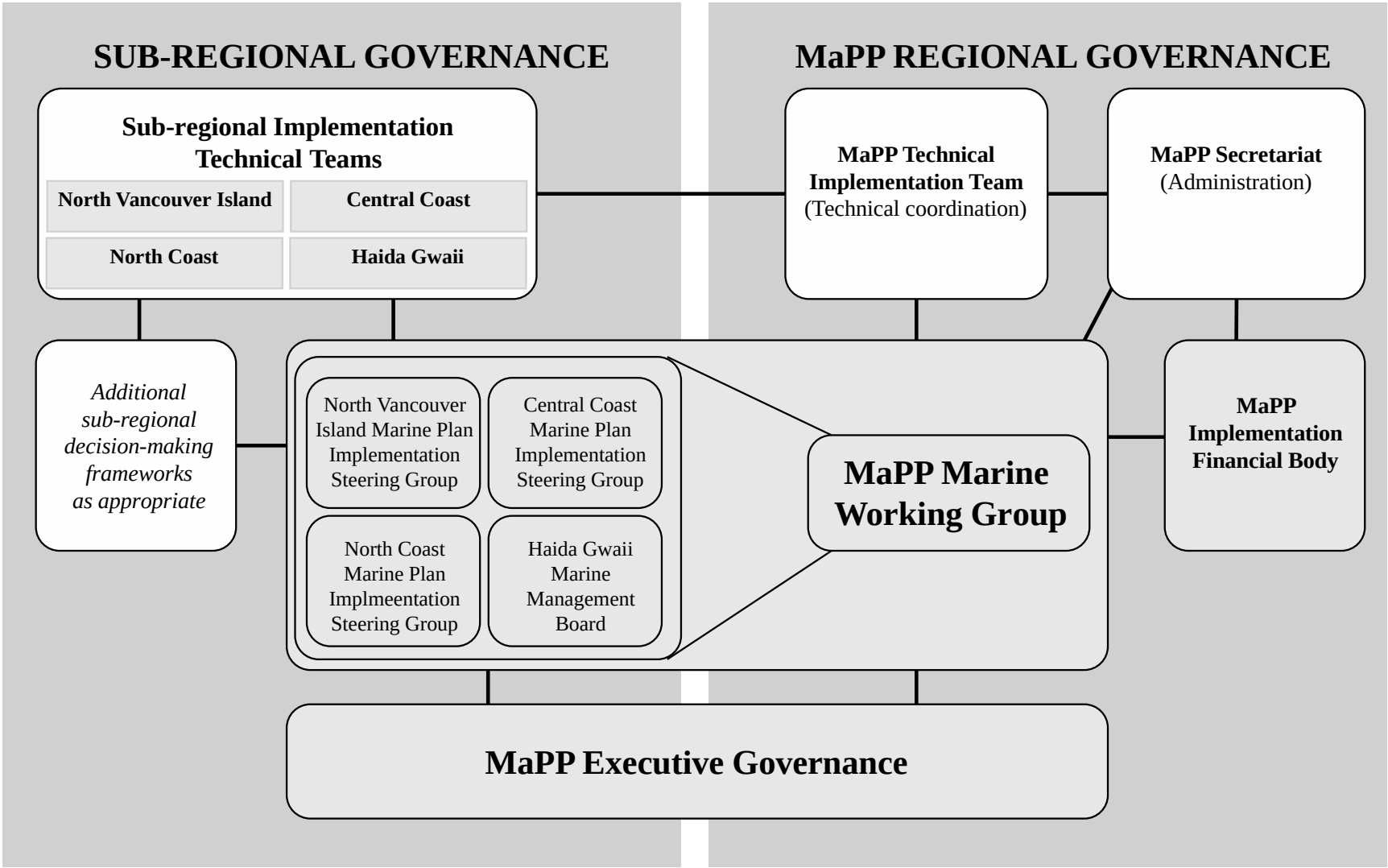
Perspective

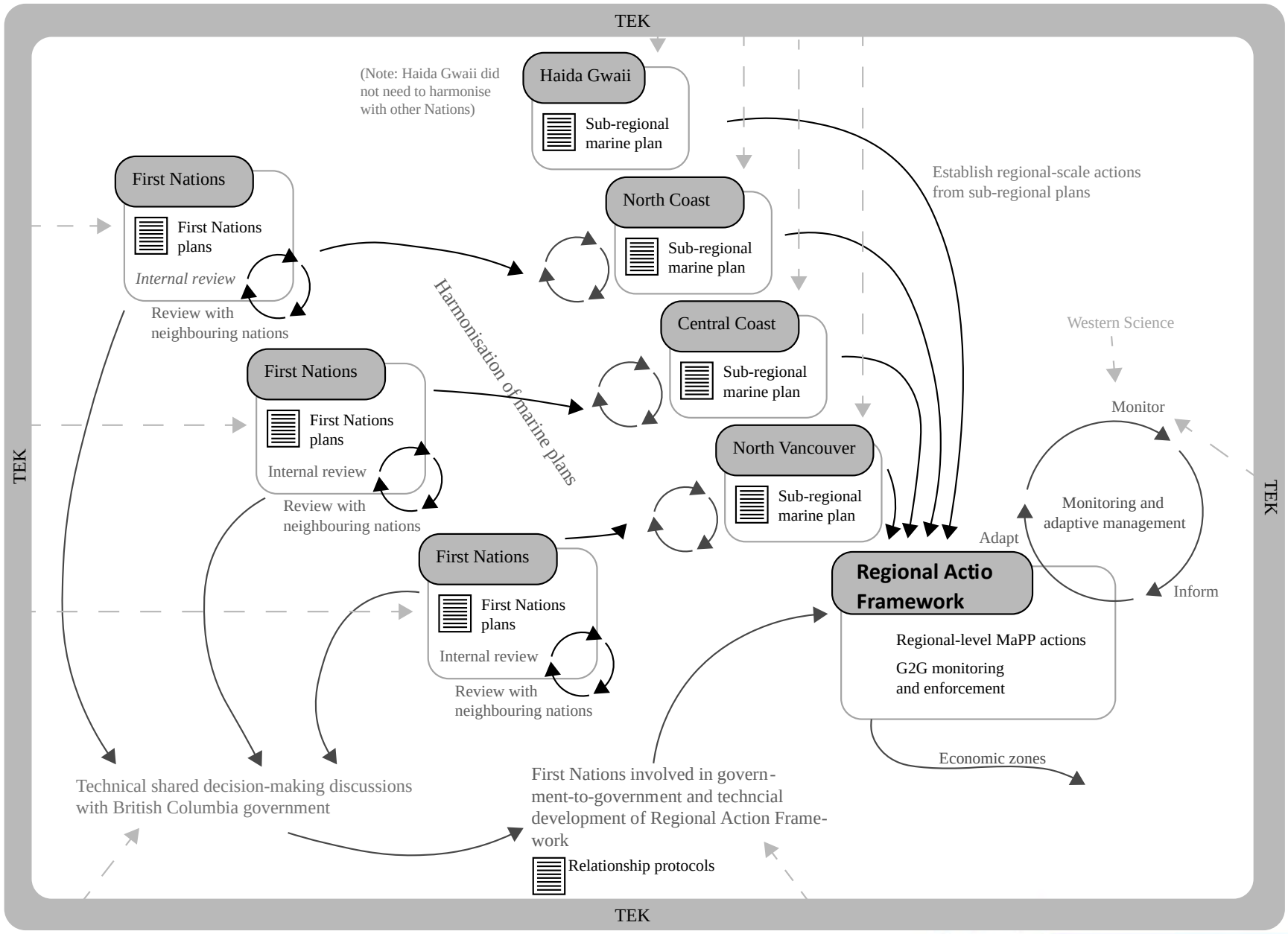




- EBM is synonymous with traditional laws
- “We have been practicing EBM for over 10,000 years”
- “It is our way of life”


North Coast
Haida Gwaii
Central Coast
North Vancouver
Island





Mechanisms

- Planning, monitoring and governance
- Spatial mapping – inform protected and development zones
- Guardian Watchman Programme (indigenous stewards)
- Central Coast Indigenous Research Alliance (CCIRA)
- Supporting Emerging Aboriginal Stewards (SEAS)

Lessons about EBM and stewardship

Challenge aim: *to enhance the use of NZ's vast marine resources, while ensuring that our marine environment is understood, cared for, and used wisely for the benefit of all, now and in the future*

- EBM is synonymous with kaitiakitanga **and** it fits within Māori aspirations in governing our wai/ whenua

- Using Mātauranga Māori to enhance our understanding of our environment(s)
  - Not as citizen science, but alongside Western science as indigenous science (observation and adaptation)
  - Unlock knowledge potential through scientific collaboration for governance and monitoring purposes

- For the benefit of all, now and into the future:
  - Agency (bottom-up)
  - Adaptive
  - Collaborative

VM4.1: Repository of Knowledge: Mātauranga Māori

Whetu Consultancy Group and Kensington Swan

Research Project VM4.1 A Repository of Knowledge: Mātauranga Māori

- Findings in WAI262 “Ko Aotearoa Tēnei”
  - Loss of control of traditional knowledge by Māori and
  - Lack of protection of Māori rights to control and manage access to such knowledge, incl databases
- For Māori communities to feel confident that their values and perspectives are used in an appropriate manner

Aim of research

- Find methods to appropriately use and protect Māori knowledge in the Challenge and into the future
- The viability and appropriateness of a repository (digital or otherwise) to protect the use of Māori knowledge
- The viability and most appropriate method of ownership and ongoing management of a repository within the Challenge and into the future

Research Project VM4.1 A Repository of Knowledge: Mātauranga Māori

Aspects of the Repository

- Storage - *of Māori knowledge*
  - *particular focus on digital*
  - *What is out there (existing)?*
- Management - *of Māori knowledge*
  - *ownership and/or stewardship?*
- Protection - *of Māori knowledge*
  - *consenting and ethical process*
  - *Intellectual Property*
  - *What is mātauranga Māori?*

Research Project VM4.1 A Repository of Knowledge: Mātauranga Māori

Investigation

- Storage - *of Māori knowledge*

  - Platform to digitally manage and distribute Māori knowledge

  - GEONetwork

  - Auckland Council Maori Cultural Heritage Inventory

  - International models

  - Te Tāhū o te Pātaka Whakairinga Kōrero (Science for Technology Innovation National Science Challenge)

Research Project VM4.1 A Repository of Knowledge: Mātauranga Māori

Investigation

- Management - *of Māori knowledge*
  - *Data management (control, use and protection)*
  - *Ownership model vrs Stewardship approach*
  - *Legal parameters to enable (or understand constraints to have) ownership*
  - *Research institutes frameworks/management*
  - *Commercialisation of Māori knowledge*
  - *Māori/Indigenous Data Sovereignty*

Research Project VM4.1 A Repository of Knowledge: Mātauranga Māori

Investigation

- Protection - *of Māori knowledge*

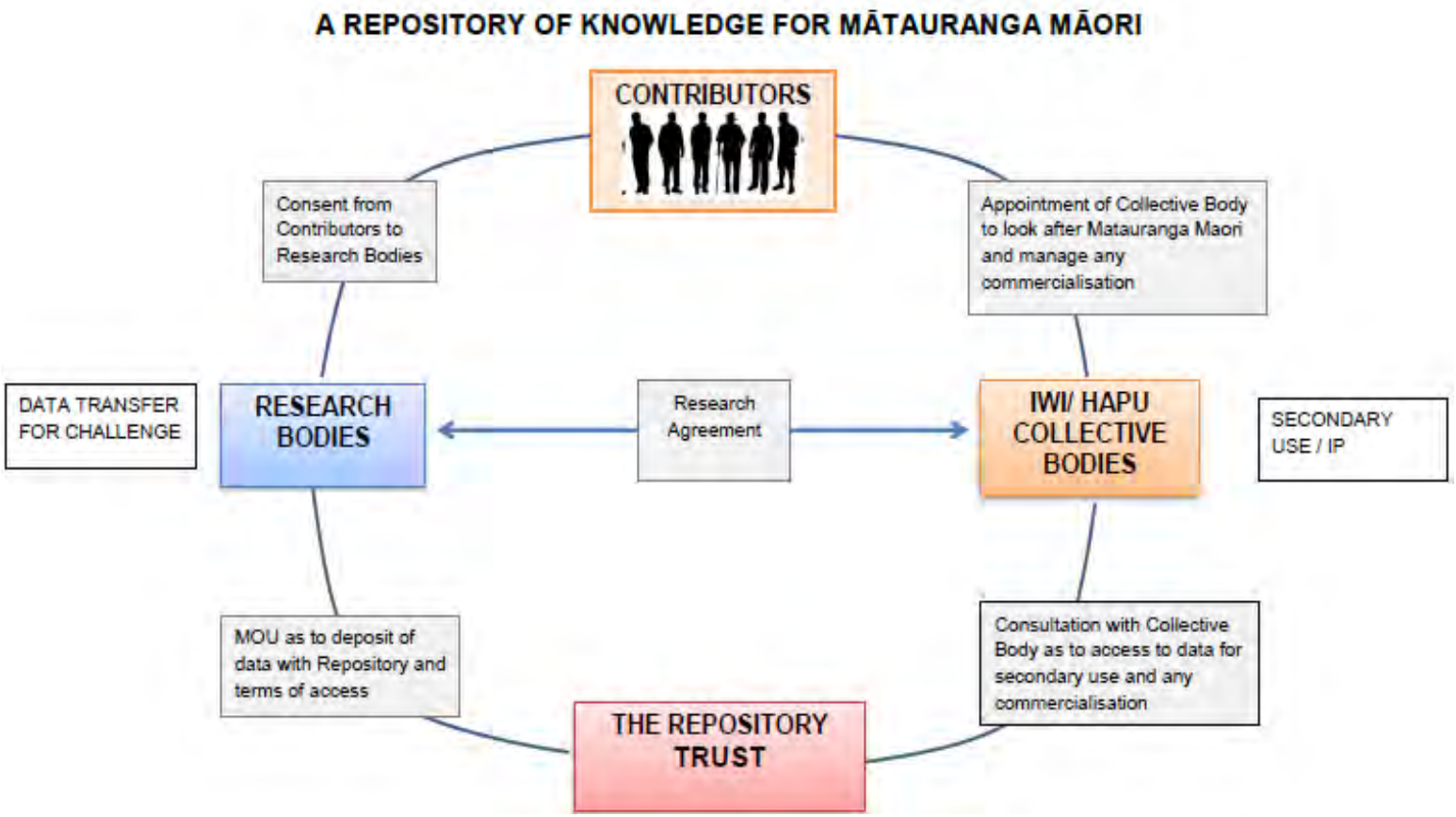
  - In its application and development of a product

  - Who owns Māori knowledge? Iwi Trust Boards? Marae? No parties own Māori knowledge?

  - Potential for commercial outcomes to arise; in response, seeking legal guidance on consenting and ethical process in Challenge

  - Distinguishing the data (ie kaitiaki/tāngata whenua knowledge vrs iwi commercial/business)

A digital repository of mātauranga Māori



A digital repository of mātauranga Māori

No	Document	Parties	Objective	Purposed
#1	Consent Form	Between Individual Participants / Contributors and Research Bodies	To obtain consent of Individual Participants / Contributors to access mātauranga Māori for Challenge purposes	Provides greater protection and recognition of importance of mātauranga Māori
#2	Memorandum of Understanding	Between Repository and Research Bodies	To set out the basis of use of Repository for deposit and access to mātauranga Māori	Sets out clear parameters on ethical use and access to data in the Repository
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#4	Protocols of Storage and Use of Mātauranga Māori	Repository	To set out protocols for storage and use of mātauranga Māori in the repository	Ensures accountability and transparency, and so contributors can have confidence their data / mātauranga will be secure
#5	Trust Deed	Between Settlors and Initial Trustees	To establish a legal structure to make decision about and manage the Repository in accordance with Protocols of Storage and Use of Mātauranga Māori and other relevant documentation	To ensure accountability and transparency of management and decision-making

Any Questions?

Appendix G Posters from Sustainable Seas Conference

VM 4.1 Mātauranga Māori Repository

Key Project Aims: - For all mātauranga Māori to be accurately captured

- To establish guidelines for its collection and use - To increase understanding -

positive relationships	trust	transparency	credibility	quality

How do we safeguard Māori knowledge, both traditional and contemporary?

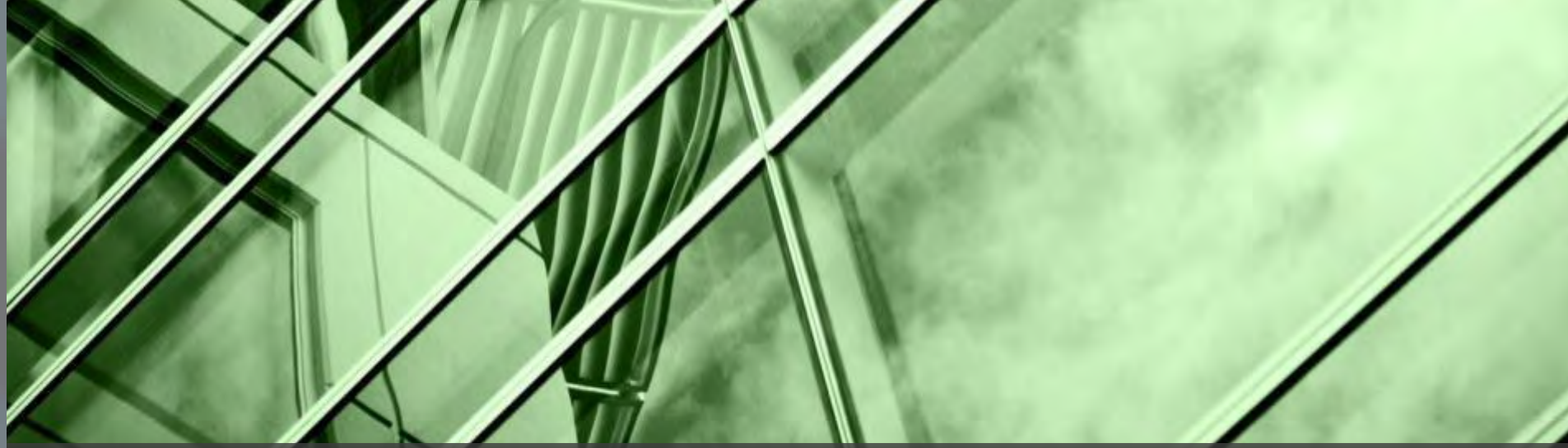
How can we enable use of that knowledge within the Sustainable Seas Challenge?

How should we store that knowledge or information?

WHETU Consultancy Group
planning | collaboration | governance | policy

National Science Challenges SUSTAINABLE SEAS
Ko ngā moana whakauka

Appendix H Intellectual Property Presentation for Engagement



Mātauranga Māori and New Zealand's Intellectual Property Regime –

A digital repository of matauranga Maori

Tai Ahu
(LLM(Distinction), BA (History and Maori Studies)

15 June 2017

Outline

1. Intellectual property and matauranga Maori
    1. Overview
    2. Copyrights and trademarks
2. Theoretical justifications
3. Wai 262: 'Ko Aotearoa Tenei'
4. Disjunctions between IP and matauranga Maori
5. Confronting (some of) the issues: a digital repository of matauranga Maori

Intellectual property – general description

- A class of 'property'
- Exclusive rights granted by law in relation to creations of the human mind
- Three types of intellectual property:
  - Copyright – protection of original works
  - Trademarks – symbols, marks, logos
  - Patents – granted for an invention

IP continued – Copyright interests

- Does not have to be registered for the right or interest to exist
- Vests in the author as soon as created, but must fall within:
  - category of copyright work in s 14 of the Copyright Act;
  - is original;
  - is written, recorded or fixed in some material form
- Provides protection of 20 years – controls uses, publishing and copying but subject to some permitted uses
- Protects expression of facts, information and ideas, but not these things themselves

Trademarks

Trademarks Act 2002

- Protects sorks, logos, symbols and shapes that are distinguishable (not merely descriptive or general)
- Eg. Air NZ pitau or koru

Can be registered indefinitely

Trademarks

- Cannot be registered if Commissioner of Trade Marks determines:
  - its use would be likely to deceive or cause confusion ; or
  - its use is contrary to New Zealand law ; or
  - its use or registration would, in the opinion of the commissioner, be *likely to offend a significant section of the* ***community, including Māori***.

Trademarks

In practice:

- referred to the Maori Trademarks Advisory Committee for consideration
- BUT only if:
  - the applicant indicates that it is a Maori trademark; or
  - there is a 'Maori word'
  - an obvious 'Maori image'

Trademarks


CODY'S PALE ALE
TIKI
JOE CODY, TAIHAPE BREWERY


NATIVE SAUCE Co
NATIVE
BRAND
WELLINGTON


LOYAL'S
CIGARETTES

Theoretical justifications for IP

- Public good:
  - Private interest:
    - provide limited rights for exclusive use to incentivize innovation and ingenuity (ie for commercial gain)
    - to encourage individual creativity and innovation
  - Public interest:
    - to make innovative and original ideas in the public domain
- BUT, no intellectual property in 'information', 'knowledge' or 'matauranga' per se, only in expressions or manifestations

Wai 262: Ko Aotearoa Tenei - Overview

- Asserting exclusive and comprehensive rights to Indigenous flora and fauna, cultural knowledge and property as taonga protected by Article Two of te Tiriti o Waitangi.

- Four areas to the claim
  a) Tino rangatiratanga
  b) Mātauranga Māori
  c) Māori cultural property
  d) Māori intellectual and cultural property rights

Wai 262: Ko Aotearoa Tenei – Key Principles

- The protection of mātauranga Māori is a shared responsibility
- Kaitiakitanga relationship with taonga must be protected
- Crown has responsibility to protect, Māori as kaitiaki must provide the leadership
- The key principles that the Tribunal suggests ought to guide the management of mātauranga Māori are:
  - Crown co-ordination
  - appropriate prioritization
  - sufficient resourcing, and
  - shared objective setting.

Disjunctions between IP and matauranga Maori

1. IP law protects rights of authors or creators, not kaitiaki

   eg 'Taku rakau e'
2. IP law protects "right" to commercial exploitation whereas kaitiaki have a "responsibility" to uphold and protect mana of works
3. IP rights are individually / personally held, kaitiaki responsibilities are collectively owed

Other Issues:

- IP law not intended to protect belief systems, cultural worldviews or values
- No IP in matauranga Maori per se

BUT

- To unlock the potential of matauranga Maori there must be an incentive to share it
- Maori will not share matauranga if their concerns about its protection and use are not addressed

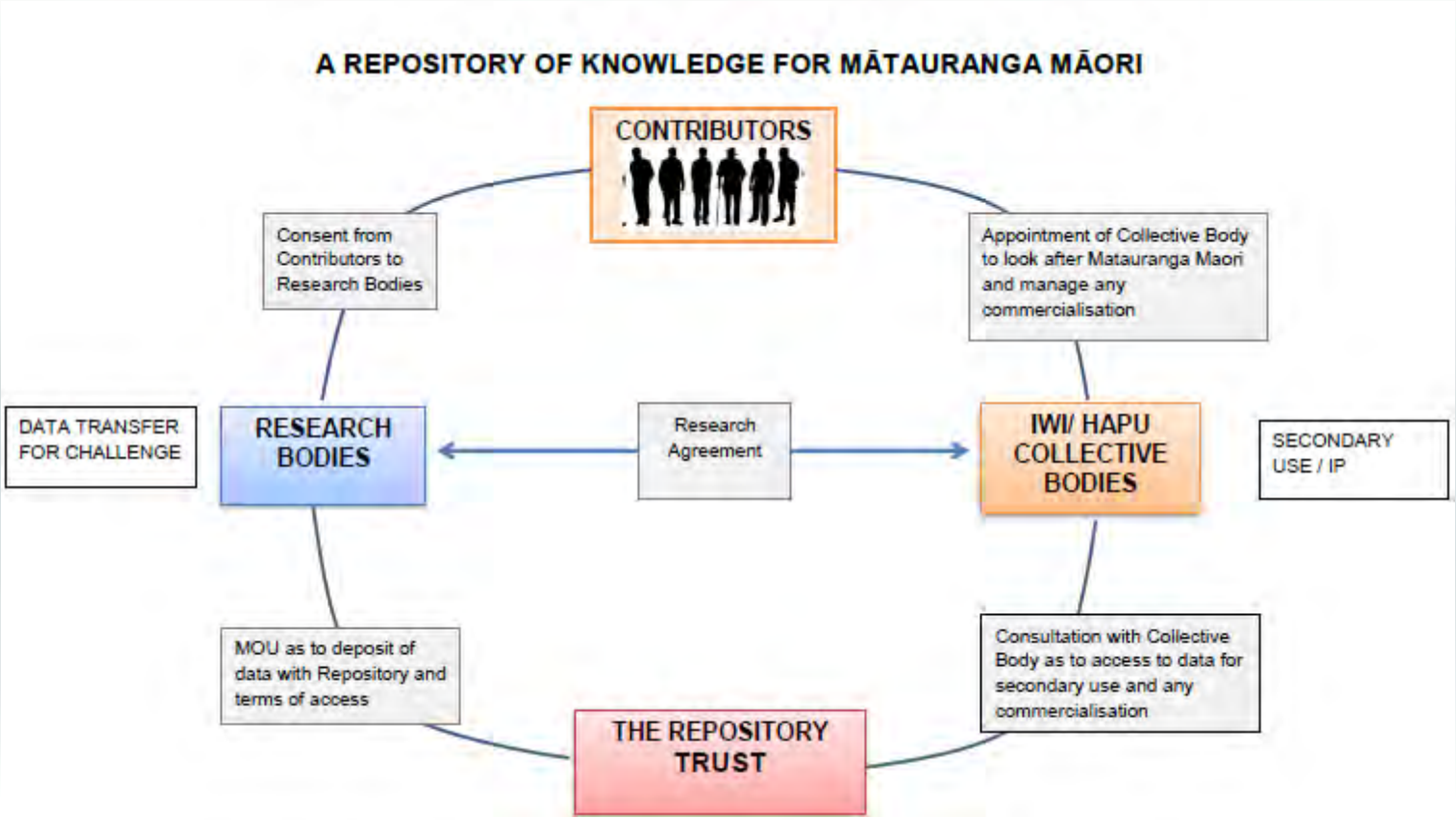
Developments

1. Maori are increasingly being required to think of creative ways to protect their matauranga within the IP system
   - Haka Ka Mate Attribution Act 2014

A digital repository of matauranga Maori

- Basic idea:
  - A storehouse or repository of matauranga Maori collated used throughout the Challenge by consent of individuals
  - Consent will deal with:
    - primary use (ie within the Challenge)
    - secondary use (beyond the Challenge
- Key features:
  - Provides limited recognition / protection where IP law would not
  - Operates not through IP law but through a process of informed consent and agreement
- Does not solve all of these issues

A digital repository of matauranga Maori



A digital repository of matauranga Maori

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Questions

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