BRIDGING INDIGENOUS AND ENVIRONMENTAL SCIENCE: THE ROLE OF MĀTAURANGA MĀORI IN ENVIRONMENTAL MONITORING

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ABSTRACT

The revisions to the National Policy Statement for Freshwater Management in 2020 (NPS-FM) significantly elevated the emphasis on Te Mana o te Wai, a principle that prioritises the health and well-being of water while acknowledging the responsibilities, authority, and obligations of tangata whenua in the preservation, safeguarding, and sustainability of freshwater resources. Our newly elected government has signalled a potential replacement of the NPS-FM that could lead to a change in policy direction at a national level and could become less protective of freshwater values.

Under the current NPS-FM, regional and local councils are tasked with giving effect to Te Mana o te Wai and adopting diverse and holistic approaches towards decision making regarding the health and well-being of our freshwater systems and habitats. Regardless of whether this holistic approach remains in our national policy or not, we acknowledge that an iwi-led, science-informed approach is beneficial in the protection and enhancement of our freshwater resources and wider natural environments.

Boffa Miskell has been working collaboratively with councils and mana whenua across Aotearoa/New Zealand to identify matters of importance in their catchments and are actively involved in environmental monitoring that uses a process that gives equal consideration to mātauranga Māori (indigenous knowledge) and contemporary science.

Currently, mahinga kai is one of the four compulsory values of the NPS-FM and councils are tasked with incorporating freshwater values and attributes into their regional freshwater planning. Cultural health monitoring, or mātauranga Māori monitoring programmes, are approaches that councils will look towards to monitor these values and attributes.

To be better positioned to respond to this requirement, Boffa Miskell has funded an internal research project that looks to identify and trial mātauranga Māori based methods for monitoring indicator species of significance to mana whenua and discuss how this both aligns and differs from contemporary methods.

As lead researcher, Mapihi Martin-Paul (Kaiarataki Te Hīhiri– Strategic Advisor Māori) builds on experience, knowledge and lessons learned from undertaking cultural health monitoring on projects such as Ahuriri Lagoon (Environment Canterbury), the Ararira/LII River (Living Water Partnership), Coes Ford (Environment Canterbury), the Arahura River (Department of Conservation) and Kaitōrete Spit (Project Tāwhaki).

Weaving in the expertise of Boffa Miskell's freshwater ecology team, Mapihi has been further developing a suite of methods and tools for cultural health/environmental monitoring that is strongly driven by mātauranga Māori, and supported by contemporary

science, to create a robust methodology that responds appropriately to various landscape typologies and provides value to tangata whenua.

This presentation will discuss the findings of Mapihi's research project and summarise the considerations and alterations required to ensure future state of the environment monitoring meaningfully considers cultural knowledge and traditions, equally balanced with ecological and social values.

KEYWORDS

Mātauranga Māori, mahinga kai, Te Mana o te Wai, iwi-led science-informed, indigenous knowledge, cultural health monitoring.

INTRODUCTION

The relationship between policy, cultural values, and environmental protection in Aotearoa/New Zealand's freshwater management has been a subject of considerable attention and debate recently. Central to this discussion is the concept of Te Mana o te Wai, a principle embedded within the National Policy Statement Freshwater Management (NPS-FM) since 2014 and further emphasized during its renewal in 2020. Te Mana o te Wai highlights the importance of both cultural and ecological health of waterbodies, acknowledging the traditional knowledge held by tangata whenua (indigenous people of Aotearoa/New Zealand).

A fundamental aspect of freshwater management under the current NPS-FM framework is the compulsory mahinga kai value. Regional councils are now tasked with setting objectives and policies that uphold this value within their respective regions, requiring significant collaboration with tangata whenua.

However, the implementation of these policies hinges on robust monitoring programmes; here lies the challenge, how can regional councils effectively monitor mahinga kai objectives while incorporating indigenous knowledge systems?

Boffa Miskell has been at the forefront of advocating for an iwi-led, science-informed approach to freshwater management. Through collaborative efforts with councils and mana whenua, Boffa Miskell has been involved in developing and implementing monitoring programmes that give equal consideration to mātauranga Māori (traditional knowledge) and scientific methodologies.

This paper explores the experiences and insights learned from Boffa Miskell's endeavours in weaving together mātauranga Māori with contemporary science to monitor and safeguard the health of our freshwater ecosystems. Drawing on project examples such as the Whakaora Te Ahuriri project, this paper highlights the importance of integrating indigenous knowledge systems into environmental monitoring practices for more holistic outcomes.

DISCUSSION

Te Mana o te Wai has been a part of the National Policy Statement Freshwater Management (NPS-FM) since 2014 and was elevated with the policy's renewal in 2020. Te Mana o te Wai is a concept that puts the cultural and ecological health of our waterbodies above all else and acknowledges that tangata whenua carry important mātauranga Māori. With our recent change in government, we have seen our new coalition signal a potential replacement of the NPS-FM; this could lead to a change in policy direction at a national level and could become less protective of freshwater values.

Less protection of freshwater values will certainly have a subsequent effect on the protection of cultural values as they relate to our wai (water) and whenua (land). A Te Ao

Māori worldview denotes that all living creatures and natural resources have their own mauri (life essence), when mauri is degraded, its improvement is critical in ensuring the ongoing relationship between the natural world and the people who have come to rely on it.

Mahinga kai (the knowledge and values associated with customary food gathering places, practices, and natural resources) is one of the four compulsory values of the NPS-FM. Under the current NPS-FM, regional councils are tasked with setting objectives and policies regarding this compulsory value in their respective regional plans. These objectives and policies need to ensure that within Freshwater Management Units (FMU's), or in parts of FMU's that are valued for providing mahinga kai, customary resources are available for use, customary practices can be exercised to the extent desired by mana whenua, and tikanga (protocol) and kawa (customs) are able to be practised.

Setting these objectives and policies, in partnership with tangata whenua, is a difficult task but how are regional councils going to monitor the implementation of the objectives and policies they set in their regional freshwater planning? It is entirely logical that the methodologies or programmes for monitoring the compulsory mahinga kai value look to incorporate indigenous knowledge systems.

Irrespective of the direction the NPS-FM may take in the future, Boffa Miskell will continue to consider that an iwi-led, science-informed approach is beneficial in protecting and enhancing our freshwater resources and the wider natural environment. A collective, collaborative, and balanced approach is what Boffa Miskell strives for.

I joined Boffa Miskell in 2017 after completing my Bachelor of Landscape Architecture at Lincoln University; as I neared the end of my undergraduate degree, I started to ask myself how could I best serve my people? What can I contribute to my whānau, rūnanga and iwi? Will Landscape Architecture provide me with the platform to do this?

The decision to join Boffa Miskell's Te Hīhiri team helped me plant my feet firmly in Te Ao Māori and gave me the space to navigate what my contribution to te taiao (the natural world) would be. There is a whakataukī (proverb) commonly referred to amongst Ngāi Tahu whānui – mō tātou, ā, mō ngā uri ā muri ake nei, for us, and the generations to come – that captures well the inter-generational connection tangata whenua have with the environment and the consideration we give to our presence and effect on the natural world.

Boffa Miskell has been working collaboratively with councils and mana whenua across Aotearoa/New Zealand to identify matters of importance in their catchments and how to best monitor the success of any efforts made. In 2018, a project opportunity arose that saw Boffa Miskell become actively involved in environmental monitoring but with a process that gave equal consideration for mātauranga Māori and contemporary science.

Boffa Miskell was contracted by Environment Canterbury to deliver a mātauranga Māori monitoring programme for the Whakaora Te Ahuriri project; the purpose of which was to measure the cultural outcomes of a re-constructed wetland that aimed to improve water quality, biodiversity and mahinga kai values.

Through centuries of observation and the continued practice of mahinga kai customs, mana whenua have built a unique body of experience and knowledge that is important for understanding and managing the environment, its natural resources and indigenous flora, fauna, and their habitats. This knowledge is critical in maintaining the ongoing

health and wellbeing of our environment, and in guiding restoration, enhancement, protection, and conservation efforts.

As referred to above, the Māori worldview denotes that all living creatures and natural resources have their own mauri. Developing tools and frameworks to measure, assess and express mauri has been a major endeavour for iwi and hapū. As a result, a range of mātauranga monitoring tools have been created and are being used across Aotearoa/New Zealand.

For the Whakaora Te Ahuriri project, the mātauranga Māori monitoring programme utilised the State of the Takiwā and Cultural Health Index tools. Originally developed by Te Rūnanga o Ngāi Tahu, the State of the Takiwā Tool uses a form based on those developed for the Cultural Health Index (CHI), Forest Monitoring and Assessment Kit (FORMAK), Stream Health Monitoring and Assessment Kit (SHMAK), Kaimoana Guidelines, and Wetland Indicators. The Takiwā form records the observations and assessments of mana whenua for a particular site, at a particular time.

The form attempts to capture cultural information and values about the site to turn what is more commonly described as 'anecdotal evidence' into something more defendable. The form includes general visit and site details, indicators of site significance and an overall 'state of the environment' assessment, which includes indicators of:

- Levels of modification/change at a site.
- Suitability for harvesting mahinga kai.
- Access issues; and
- Abundance and diversity for taonga bird, plant, and fish species; other resources and pest or weed species.

The CHI form records observations and assessments that are specific to the cultural and biological health of running waterways and includes indicators such as:

- The status of the site (whether it is traditional or not and whether mana whenua would return to the site or not).
- Mahinga kai values, including:
    - Identification of mahinga kai species present at the site.
    - Comparison between the species present today and traditional mahinga kai sourced from the site.
    - Assessment of access to the site.
    - Assessment of whether mana whenua would return to the site in the future as they did in the past.
- Stream health, including:
    - Catchment land use.
    - Riparian vegetation.
    - Use of the riparian margin.
    - Riverbed condition/sediment.
    - Channel modification.
    - Flow and habitat variety.
    - Water clarity.
    - Water quality.

When State of the Takiwā and the CHI was first developed, it involved participants completing their assessments on paper forms and data was then entered manually later. In 2019, Boffa Miskell developed an electronic version of the form using Survey123, an ArcGIS hosted platform. Participants now complete their assessments on an iPad or mobile phone.

To compliment the mātauranga Māori based methods, other environmental monitoring methods are undertaken, including water quality and habitat surveys, macroinvertebrate sampling as well as wetland plant success surveys. The combination of these methods provides for a holistic view of the state of the environment at Ahuriri Lagoon and the on-going restoration of mauri at what was once a significant mahinga kai for Ngāi Tahu Papatipu Rūnanga.

Over the course of six years, we have undertaken ten state of the environment monitoring assessments at Ahuriri Lagoon. Other regional and local councils, as well as government agencies, such as the Department of Conservation, became aware of the mātauranga Māori programme being undertaken at Ahuriri Lagoon and the necessity to be able to tangibly measure mauri gained significant traction.

To be better positioned to respond to both iwi and client requests, Boffa Miskell funded an internal research project to identify and trial mātauranga Māori based methods for monitoring indicator species of significance to mana whenua and discuss how this both aligns and differs from contemporary methods.

As lead researcher, I undertook comprehensive desktop research and a literature review to better understand the suite of tools various iwi, hapū and rūnanga across Aotearoa/New Zealand are using to assess the cultural health of their takiwā (territory or region).

By compiling a long list of the indicators monitored using the various tools, a review against Boffa Miskell's current mātauranga Māori monitoring methodology was undertaken. Gaps in our methodology were identified and our State of the Takiwā and Cultural Health Index forms were further developed to better capture a broader range of values associated with the mauri and cultural health of our environments. The methodology is now strongly driven by indigenous knowledge systems and supported by contemporary science; it is robust and responds appropriately to various landscape typologies.

The following section summarises the key considerations and lessons learned from the research project that ultimately ensures the methodology for future state of the environment monitoring meaningfully considers indigenous knowledge systems, equally balanced with ecological and social values. They key considerations and lessons learned are provided – for readability purposes – in a non-hierarchical summary:

- **Collaboration** between Boffa Miskell's Te Hīhiri (Cultural Advisory) and Ecology disciplines was vital in ensuring the methodology was holistic and had equal consideration for mātauranga Māori and contemporary science. We had gained experience in mātauranga Māori/cultural health assessments by working on projects such as Ahuriri Lagoon (Environment Canterbury), the Ararira/LII River (Living Water), Waikēkēwai (Te Taumutu Rūnanga) and Kaitōrete Spit (Project Tāwhaki), all of which sit within the Te Waihora/Lake Ellesmere catchment. Except for Kaitorete, our project experience was typically in freshwater catchments; this research project better informed the methodology to be able to **respond to different landscape typologies.**

For example, a component of the State of the Takiwā methodology is identification of mahinga kai species present at a site. As a result of this research project, the pre-populated list of species was developed further to better capture terrestrial plants as well as native insects and lizards. This change was a direct result of responding to different environments being assessed by mana whenua.

- As mentioned earlier, the original State of the Takiwā tool was developed by Te Rūnanga o Ngāi Tahu in 2004. The pilot project involved specific paper based, hard copy forms for data collection. This information was then manually loaded into a database, which is then used to analyse and create catchment reports to understand the overall 'state' of the takiwā or cultural health of a catchment. As we began gaining further experience working collaboratively with Ngāi Tahu Papatipu Rūnanga on various freshwater restoration projects, the manual, lengthy way data was collected provided a challenge to develop a more **efficient, innovative, and user-friendly method** to assess the cultural health and mauri of an environment. We then developed a **digitised version** of the forms that enabled Papatipu Rūnanga representatives to complete their cultural health assessments on iPads or mobile devices. Being able to have a handheld device, as opposed to completing six different paper forms, has notably enhanced efficiency and uptake by a range of mana whenua representatives, from kaumatua (elders) to rangatahi (youth). Having a user-friendly, intuitive interface enhances the opportunity for mana whenua to better connect to their environment and reflect, at their own pace, on the cultural state of their takiwā. Mana whenua aren't distracted by a handful of paper forms and can instead be present as they make their observations.
- A Te Ao Māori worldview recognises the connection between tangata (people) and whenua (land). Through this research project, it became evident that we were advancing our monitoring methodology in a way that had equal consideration for cultural and ecological values, but we weren't capturing **social values.** Hosted on the same Survey123 platform, we developed an additional form to tangibly capture data relating to the connection people have to place.
- Lastly, the most critical component to ensuring a mātauranga Māori monitoring methodology is truly effective, relies on **trustworthy and meaningful relationships with mana whenua**. The traditional knowledge held by mana whenua is critical in maintaining the ongoing health and wellbeing of our environment. **Remunerating** mana whenua for their time is an important way to recognise that the expertise and inter-generational knowledge they contribute to any cultural health monitoring programme is a true taonga (gift).

In closing, the tools used in science and mātauranga Māori are similar in many ways. The synergies suggest that maybe scientific tools can give a representation of an environment's wellbeing and mātauranga Māori can indicate the level of mauri or life essence. Together, these two knowledge systems encompass the primary obligation of Te Mana o te Wai.

CONCLUSION

In conclusion, the journey towards integrating mātauranga Māori into freshwater management practices has been an educational endeavour for Boffa Miskell, underpinned by collaboration, innovation, and a deep respect for indigenous knowledge systems.

The synergies between mātauranga Māori and scientific approaches have not only enhanced our understanding of freshwater ecosystems but have also enriched our appreciation for the interconnectedness of culture, environment, and society.

As we navigate the evolving conversation regarding freshwater management in Aotearoa/New Zealand, it is important that we remain committed to honoring the principles of Te Mana o te Wai and upholding the rights and responsibilities of tangata whenua. By continuing to foster collaborative relationships, embracing innovative methodologies, and valuing indigenous knowledge, we can collectively work towards sustainable freshwater management practices that safeguard both cultural and ecology.

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I also want to acknowledge those who have previously been involved in upholding the mana of our whenua, including the tūpuna who fought for their rights to their treasured mahinga kai.

Nei rā te mihi uruhau ki a koutou, mō ōu koutou tautoko i tēnei kaupapa, i tēnei taonga hoki.

Kā nui te mihi aroha ki ngā tūpuna kua wheturangitia, a kei te mihi atu ki a rātou mā i tō rātou mahi hei tiaki i tō tātou taonga o te taiao.

Kei te mihi atu, kei te tangi atu. Rātou ki a rātou, tātou ki a tātou. Nō reira, tēnā tātou katoa.