Knowledge Cultures 11(1), 2023
pp. 34–54, ISSN 2327-5731, eISSN 2375-6527

‘Pūrākau o te Ngahere’: Indigenous Māori Interpretations, Expressions and Connection to Taonga Species and Biosecurity Issues

Bevan Erueti
B.Erueti@massey.ac.nz
School of Health Sciences,
Te Kunenga ki Pūrehuroa|Massey University
Aotearoa|New Zealand
Natasha Tassell-Matamua
N.A.Tassell-Matamua@massey.ac.nz
Centre for Indigenous Psychologies,
School of Psychology,
Te Kunenga ki Pūrehuroa|Massey University
Aotearoa|New Zealand
Pikihuia Pomare
P.Pomare@massey.ac.nz
School of Psychology,
Te Kunenga ki Pūrehuroa|Massey University,
Aotearoa|New Zealand
Bridgette Masters-Awatere
bridgette.masters-awatere@waikato.ac.nz
School of Psychology,
Te Whare Wānanga o Waikato|University of Waikato
Aotearoa|New Zealand
Kiri Dell
k.dell@auckland.ac.nz
Management and International Business,
Waipapa Taumata Rau|University of Auckland
Aotearoa|New Zealand
Mariana Te Rangi
mterangi29@gmail.com
Te Arawa Lakes Trust
Aotearoa|New Zealand
Nicole Lindsay
N.Lindsay1@massey.ac.nz
Centre for Indigenous Psychologies,
School of Psychology,
Te Kunenga ki Pūrehuroa|Massey University
Aotearoa|New Zealand

ABSTRACT. The utility of mātauranga Māori (Māori knowledges) in Aotearoa|New Zealand Forest conservation is not particularly visible in research and policy. Indeed, current forest biosecurity processes are largely constructed from Western principles, values and scientific knowledge that are often devoid of Māori beliefs and values. While the interface between mātauranga Māori and mainstream science is still problematic, we argue that traditional Māori frameworks, ethics, and principles that capture local interests, perspectives, realities, and aspirations of Māori are mandatory to articulate modern solutions to taonga species and biosecurity issues. A mātauranga Māori approach draws upon physical, spiritual, and metaphysical values, providing a unique knowledge base in which to improve environmental management, including protection of biological heritage. By employing a pūrākau (storying) method that endorses personal lived realities as a means of knowledge transfer, we were able to elicit the meaning and value our participants give to te taiao (the environment), ngahere (forests) and taonga (heritage) species. We conclude that mātauranga Māori is a necessary discourse if the longer-term biosecurity strategic goals of Māori and the government are to effectively and efficiently result in collaborative priorities in forest health.

Keywords: Māori knowledge systems; pūrākau; taonga species; biosecurity; forest health

How to cite: Erueti, B., Tassell-Matamua, N., Pomare, P., Masters-Awatere, B., Dell, K., Te Rangi, M., and Lindsay, N. (2023). 'Pūrākau o te Ngahere': Indigenous Māori Interpretations, Expressions and Connection to Taonga Species and Biosecurity Issues. *Knowledge Cultures*, *11*(1), 34–54. https://doi.org/10.22381/kc11120233

Received 5 November 2022 • Received in revised form 7 February 2023
Accepted 13 February 2023 • Available online 1 April 2023

Introduction

> The important thing to do is not to see te taiao in reservations ... but to see it in everyday life. That's where it'll strengthen us [Māori]. (Tā Mason Durie)[1]

The most critical health issue facing humans today is the state of the environment. Worldwide, resource exploitation, depletion and scarcity, increased consumption patterns and rates, and increased waste production are increasingly recognised as rapidly approaching the limits of tolerance for healthy, sustainable life on earth (Intergovernmental Panel on Climate Change, 2018; McCoy et al., 2014; Patz et al., 2005). The environmental crises experienced currently are decades or even centuries in the making, yet in the latter 20th century and early 21st century, there has been a proliferation of challenges deeply rooted in anthropogenic causes. The inability to adequately conceptualise and operationalise appropriate strategies and implement solutions threatens the survival of fragile ecosystems, human populations, and interdependent societies (McMichael et al., 2006; Ministry for the Environment, 2018). The current state of these environmental indicators has

radically altered human interactions, yet evidence suggests (see Durie, 2003; Mark & Lyons, 2010) that interconnections founded in Indigenous concepts and approaches can directly contribute to forest (and human) health gains.

Tā Mason's statement above that begins this article is one example collated from eight different case studies rendered for this project. The interpretation that he shares describes the pluralistic position Māori (Indigenous People of Aotearoa|New Zealand) have with te taiao (the environment), revealing that it can heal and be healing. However, what this inter-relativity means in our current and changing world and the impact this connection and relationship has in regard to taonga species and biosecurity issues requires further clarification. This article adds to current understandings supporting the expressions of the inseparability of Māori and te taiao relationships (Royal, 2003) by focusing on the dialogic association between geographical locations of significance and the health and wellbeing of individuals and collectives (Kimmerer, 2013; Schultz et al., 2016; Simpson, 2017).

The narrative and evidence promoting the utility of Indigenous Knowledge (IK) (Lambert et al., 2018) or Traditional Ecological Knowledge (TEK) (McAllister et al., 2019) references the intimate experiences that are acquired through the extensive and long-term coexistence that Indigenous peoples maintain with the environment. This coexistence is not generally conveyed in biosecurity terms, yet the relevancy of how IK and TEK could be incorporated across the biosecurity system requires further investigation (Lambert et al., 2018; Lambert & Mark-Shadbolt, 2021; Maclean et al., 2021; McAllister et al., 2019). Much of this knowledge is intergenerational observation of people, places and species that serves to encourage the longevity of ecosystem functions, govern and manage practices and regulate the appropriate distribution of environmental resources. In regard to an Aotearoa|New Zealand te ao Māori (Māori world) perspective, these observations are transmitted and passed down through generations via pūrākau, i.e., narratives and histories that acknowledge the continued expression of interconnectedness and maintenance of (in)visible and (in)tangible cultural practices (McGregor, 2002; Ramstad et al., 2007). In this respect, pūrākau and the oral traditions of storytelling are deliberately constructed to encapsulate the realities of te ao Māori (the Māori world). These sustain culture, history, and knowledge of specific mita-o-te-reo Māori (Māori language dialectical varieties) and representations such as pepeha (tribal idioms), waiata (songs), whakataukī (proverbial colloquialisms) and many other forms of expression that give insight on past ecological states. Indeed, pūrākau embody growth, learning, and development (Henare, 2001; Hikuroa, 2017; Ware et al., 2018). By employing pūrākau as a method and building on the foundations of a strengths-based approach, we explicate the diverse interpretations of our participants and the meaning they create in their dialogic relationship with taonga species, te taiao and forestscapes, concluding that such meaning is necessary for the development of co-innovation approaches to improve and advance forest health, biosecurity systems and practices.

Māori Indigenous Knowledge Systems: Mātauranga Māori and the Biosecurity Interface

> There's only a handful of scientists who have faith in what Māori do, part of that cultural and traditional practice that we had way back in the day. (Kaumātua)

Māori oral traditions describe the discovery of Aotearoa|New Zealand in 750CE by the Polynesian explorer Kupe. Kupe was later followed by Toi and Whātonga, who arrived in 1000–1100CE and over the course of generations, the subsequent voyages and arrival of many waka (canoes) in 1350CE (Howe, 2003; Simmons, 1976). Survival was difficult for our tīpuna (ancestors) on a land that contained foreign flora and fauna and where extreme weather patterns made it tough to grow the produce from the warmer climes of their origin (Kirch, 2000). However, a process of adaptation quickly ensued, founded upon the construction of a new set of knowledge through a lens of kinship with nature that has continued throughout the generations. For instance, the naming and categorisation of thousands of new varieties of flora and fauna resulted in the evolution of te reo Māori (the Māori language). New artforms emerged from the immersive specification and investigation of plants, animals, and landforms. Advancements in technology for housing and ocean voyaging transportation followed, as new encounters with a variety of woods led to the production of innovative tools and carving techniques. This newly formed knowledge has been referred to as Indigenous Knowledge (IK) or Traditional Ecological Knowledge (TEK), but here we employ the term mātauranga Māori (Māori knowledge) to describe this intimate link and kinship bond.

In the context of taonga species and biosecurity issues, mātauranga Māori is a large body of knowledge that details the successful and harmonious philosophy of preserving and conserving local environmental knowledge gained through 'experience-based understanding' (Harmsworth & Warmenhoven, 2002, p. 9). This interconnected understanding transcends observed and learned concrete conceptions of the environment and incorporates wisdom that embraces traditional insights into cosmology, deity, spirituality and contemporary biodiversity ethics. While the term mātauranga Māori can be (and has been) employed to reflect a wide variety of knowledge, values, concepts, principles and practices that have been homogeneously accumulated by Māori, it is more suitable to consider mātauranga Māori discreetly within its distinct social group experiences, localised to specific iwi (tribes), hapū (sub-tribes), marae (communal sites of origin) and whānau (families) history and aspirations (Lambert & Mark-Shadbolt, 2021). Mātauranga Māori, therefore, becomes a knowledge system that binds people together through whakapapa (ancestry) and ahikāroa (ancestral occupation) connections. In this sense, specific iwi, hapū, marae, and whānau are seen as being acutely positioned to restore stability to intimately known regional sites via locally determined knowledge systems and approaches (Forster, 2019). Understanding the

interconnectedness of the knowledge held with respect to its cultural and spiritual significance provides intergenerational benefit and the progression of kaitiakitanga (stewardship) (Kennedy, 2017). Consequently, the potential exists for intergenerational knowledge preservation and ecological conservation aspirations to be fulfilled. Kaitiakitanga is an act of expressing the interdependency and reciprocity of all living things conveyed as 'manaaki whenua, manaaki tangata' – caring for the land results in caring for the people (Harmsworth & Awatere, 2013). This is exemplified in the ideology of a well-known whakataukī (proverb), a form of pūrākau, declaring:

> Te takahi i te tapu o Papatūanuku,
> Te takahi i te tapu o te Tangata.
> (If the sacredness of our Earth Mother is trampled,
> then the sacredness of people is also adversely affected.) (Wakefield et al., 2006)

These pūrākau reinforce the belief that Māori cannot be separated from nature; but are, instead, direct descendants of Papatūānuku (Mother Earth) interacting to harmoniously exist as inextricable parts of the fabric of life (Henare, 2001; Harmsworth & Awatere, 2013).

The notion of kaitiakitanga is a principle that describes the protection and preservation of ancestral lands and waters so that subsequent generations will have the capability and capacity to properly manage local taonga species and te taiao (Kennedy, 2017). Through this practical philosophy of environmental stewardship, iwi and hapū maintain a unique knowledge base that is often incorporated into storytelling and oral histories, referred to as pūrākau. These historical narratives are unique to each iwi and hapū and, when applied to biosecurity issues, add value to contemporary science practices and methodologies. Mātauranga Māori, and, more specifically, the comprehension of pūrākau, can enhance the production of new knowledge resulting in practices and outcomes that are relevant to taonga species and forest health when incorporated across the ecosystem (Lambert & Mark-Shadbolt, 2021; Maclean et al., 2021). This was aptly defined as the 'interface' by Sir Mason Durie, who coined the term to describe two bodies of knowledge coming together (see Royal, cited in Rauika Mangai, 2020, p. 19). He attested:

> You can't understand science through the tools of mātauranga Māori, and you can't understand mātauranga Māori through the tools of science. They're different bodies of knowledge, and if you try to see one through the eyes of the other, you mess it up. They might be aiming at the same thing but going there in different directions. (Royal, cited in Rauika Mangai, 2020, pp. 26–27)

He further explained that this interface of research and the new knowledge created by this convergence is contingent on the following:

- Delivered by and relevant to Māori
- Imperative that Māori scientists help shape science policy
- Linked to Māori leadership, that builds capacity and sustainability
- Addresses Māori priorities and aspirations that consider the past, present and future.
- The criticality to move away from silos to cross-disciplinary integration frameworks, guided by Māori communities through active collaborations to lead to multiple knowledge pathways. (Durie, cited in Rauika Mangai, 2020, pp. 26–27)

These points serve to identify that when fulfilling the aspirations of Māori in regard to biosecurity knowledge and, in particular, kauri dieback and myrtle rust, the 'interface' necessitates a Māori-centric approach to the creation, development, and implementation of contemporary solutions for te taiao and forest health.

Kauri Dieback and Myrtle Rust

Kauri dieback is a disease caused by a microscopic organism, *Phytophthora agathidicida*. It infects kauri roots and damages the tissues that carry nutrients and water, consequently starving the tree to death. The fungi-like organism responsible for the disease resembles water mould or oomycetes belonging to the eukaryote supergroup Chromalveolata (Balm, 2017, p. 9). Myrtle Rust is a disease of plants in the *Myrtaceae* species caused by the pathogen *Puccinia psidii*. In Aotearoa|New Zealand, a number of plant species from the *Myrtaceae* have been explicitly identified as taonga species (e.g., Department of Conservation, 2006; Waitangi Tribunal, 2011), in particular, the importance of Pōhutukawa and Mānuka (the WAI 262 claim, Waitangi Tribunal, 2011) and other species that are considered nationally critical. However, all myrtaceous species (introduced and Indigenous) found in Aotearoa|New Zealand are considered to be potential hosts for myrtle rust (Balm, 2017).

A study conducted by Ropata (2015) aimed to understand the knowledge and incursion response Māori consigned to kauri dieback and myrtle rust and its potential impact on taonga species. A culturally responsive approach to ascertaining how tangata whenua (local people) were actively responding to both pathogens was utilised. The participant Māori authorities and iwi organisations called for the priority establishment of a tāngata whenua identification rōpu (group) with the strategic approach to employ mātauranga Māori for managing any kauri dieback and myrtle rust invasions. Ropata (2015) concluded that:

> An early engagement approach to establish ongoing interactions between practitioners of kaitiakitanga (environmental stewards, guardians) and tāngata whenua [Indigenous] groups, land managers and research scientists should be initiated. This approach would enable the implementation of mahi (work) to survey, catalogue and monitor sentinel plants for their growth and health status. Tāngata whenua are very familiar with their land and any taonga species plants that are present in

> their rohe (area) and can provide the local knowledge and expertise…. (p. 71)

An example that considers the findings of Ropata's work is the Kauri Dieback Management Programme (KDMP), which was established to combat the disease in a collaborative venture that involves the Ministry of Primary Industries (MPI); Department of Conservation (DOC); Tāngata whenua from the region where kauri grows; and councils from the same region: Auckland Council, Northland Regional Council, Waikato Regional Council and Bay of Plenty Regional Council (Balm, 2017, p. 11). To assist in mobilising the KDMP strategy, *Kia Toitū he Kauri|Keep Kauri Standing*, was formulated to manage the disease. The goals of the strategy are that, by 2024,

- The mauri and integrity of kauri forests are sustained in the presence of kauri dieback.
- Tāngata whenua, communities and stakeholders are all active in the management of Kauri dieback. (Balm, 2017, p. 11)

The concept of mauri (indicated in bullet point 1) illustrates that the efficacy of kauri (and taonga species, plant or animal) is dependent on their physical and spiritual wellbeing. The inclusion and guidance of tāngata whenua, communities, and stakeholders (as indicated in bullet point 2) confirms the interdependence that Māori are responsible for that mauri. The responsibility referenced gives substance to the mauri connection required for flourishing to be achieved. For instance, the iwi of Te Roroa, who are kaitiaki of the Waipoua forest located in Northland, personify the trunk structures of kauri as the legs of the forest deity Tāne Mahuta, who was responsible for the separation of the primordial parents of humankind, Papatūānuku (Earth Mother) and Ranginui (Sky Father). This conviction symbolises that humans and flora have a common origin and that an acknowledgement of that personalised bond, permeated with mātauranga Māori – traditional rituals associated with gathering, use, longevity and eventual permanence, assist in maintaining the balance of mauri between Māori and taonga species.

Tāngata whenua stakeholder analyses led to the supplementary monitoring of other species within the kauri forest, such as the environmental conditions for bordering waterscapes, assessments of sunlight intensities, behaviour modification of human activities and subsequent tree condition and forest health (Lambert et al., 2018; Lambert & Mark-Shadbolt, 2021). In a collaborative co-innovation intervention with contemporary scientists, kaitiaki trialled whale oil made from ground whalebone and spermaceti as a potentially effective method for the healing of contaminated kauri trees based on the traditional relationship between tohorā (whales) and kauri (Harrison, 2018; Lawrence et al., 2019; Smith & Mark-Shadbolt, 2020). This method is based on the pūrākau knowledge that originates

from the iwi of Ngāti Wai and Ngāti Hine (Northland) and speaks of kauri and tohorā as brothers, and children of Tāne Mahuta (forest deity). Kaumatua (elders) of those iwi have observed significant similarities in the whale coat and kauri bark. The rongoa-based whale ointment has shown less gum leakage on trunks and improved bark growth (pers. comm., Ashby, 2020). Supplementary traditional practices include rāhui: restrictive access management protocols that allow the recovery of land and means to increase mauri; tohu: signs that are attributed to behaviour changes of the environment as indications of health; Rongoa: traditional wellbeing therapies; and barrier protection in the form of companion planting and elimination of (pathogen) carrier plants (Lambert et al., 2018; Bradshaw et al., 2020; Lambert & Mark-Shadbolt, 2021).

Similarly, co-design and co-innovation techniques of mātauranga Māori have been used in response to myrtle rust. Lambert et al. (2018) reported that during the incursion of regional surveillance of myrtle rust, iwi involvement initiated effective and widespread management techniques that included the monitoring of taonga species highly vulnerable to myrtle rust. The surveillance involved the training of Māori technicians and resulted in the complete tangata whenua control of the monitoring of large areas of forest. Monitoring included mātauranga Māori conceptions consisting of weather patterns, bird behaviour (timing population, presence) and flowering that indicated issues of food reserves and time of harvest of culturally connected resources (Lambert et al., 2018), complemented by the enactment of rāhui previously mentioned.

The interface of mātauranga Māori and science describes the potential of a co-innovative approach that can enhance the value and diversity of contemporary science while holistically empowering the realisation of kaitiaki priorities concerning forest biosecurity practices and strategies. However, we vehemently support that the greater the effects of the proposed scientific exploration or impact on the kaitiaki relationship, the greater the involvement of tangata whenua as kaitaiki, to ensure that mauri (life force) for forest health to be maintained. If mauri can be sustained through appropriate mātauranga Māori integration, there is an increased and improved range of attributes in its applicability to iwi, hapū, marae, and whānau (Scion, 2017; Biological Heritage, 2018).

Methodology and Participants

Our quest to establish our participants' interpretation of their tangible and intangible connections to taonga species and forestscapes necessitated the employment of Kaupapa Māori research, affording the most functional paradigm that acknowledges the multifaceted and diverse interpretations our participants contained of te taiao. Kaupapa Māori research takes for granted 'what it means to be Māori' and therefore is the best way in which to seek an understanding of local customary beliefs, values and experiences, specific and relevant to iwi, hapū, marae, and whānau aspirations (Smith, 1997). To reveal these experiences, the qualitative method of pūrākau (oral histories and narratives) was utilised. Through

a case study design, interviews were conducted to ascertain the pūrākau of invited individuals and groups to determine their ways of knowing and being regarding taonga species and biosecurity issues.

Our participant selection process was framed by the kinship ties and principle of whakapapa; that is, each researcher conducted a set of interviews with participants based on familial affiliations and shared biosecurity interests. This methodology leveraged the principle of whanaungatanga, or the relationships established through kin and/or communal benefits, providing an avenue to access communities, knowledge and perspectives familiar to us. The definition of whakapapa as the 'genealogical descent of all living things from the gods to the present time' (Barlow & Wineti, 2009, p. 173) expresses the juncture of these components of our methodology and establishes the basis for nurturing relationships between the researcher, the researched, and the research itself (Smith, 1997).

A total of 73 participants were interviewed, with only one participant abstaining from anonymity. Table 1 below provides a very general description of the contributors who provided their pūrākau for this project.

Table 1

Participant Description

PARTICIPANTS	**LOCATION**
1. Tā Mason Durie (n=1)	Rangitāne, Ngāti Kauwhata, Ngāti Raukawa.
2. Kānuka (n=3, siblings)	Whareponga, Tūranga Nui a Kiwa (Gisborne)
3. Te Mauri o te Kauri me te Ngahere (n=10)	Hokianga (Waipoua forest), Te Hiku o Te Ika (Far North).
4. Kaumātua (elders) (n=12)	Muaūpoko.
5. Rangatahi (youth) (n=30). Conducted in collaboration with UNICEF.	*NA*
6. Māori Emerging Scholars (MES) (n=7) Massey University.	*NA*
7. Rongoā (Māori medicine) Practitioners and Kaitiaki (n=6)	Te Rohe Pōtae o Tawhiao (King Country)
8. Taranaki *Toa Taiao*[2] (n=4)	Taranaki

Note. Table outlining participants and associated details.

The interviews were conducted kanohi-ki-te-kanohi (face-to-face) imperative in exhibiting the process of whanaungatanga – the building and maintaining of relationships. This traditional transmission of knowledge was central to capturing the views and opinions of our selected experts and key informants and deepening the contribution of the research to meet the aspirations of our participants. Additionally, we were cognisant that the knowledge shared by some of our participants was likely to have been disseminated through multiple generations,

heightening our sensitivity towards upholding the integrity of and the intent with which that knowledge is shared and, most importantly, disseminated. This knowledge becomes communally maintained and guarded (Walker et al., 2006) and adds additional layers of social responsibility that require the acknowledgement, respect, and maintenance of the mana of our participants and their communities. For example, it is evident that two groups are geographically identified as not-applicable (NA). This was deemed more appropriate to protect those participants from feelings of being perceived as speaking on behalf of their specific hapū (sub-tribe) and/or iwi (tribe). Hence, gathering localised data or iwi-specific information was managed and protected in a way consistent with Kaupapa Māori research processes and guidelines of ethicality (Smith, 2015). Via these mechanisms of transparency, manaakitanga and considerations for iwi variations, we were able to ensure that mātauranga pertaining to our participants' traditional beliefs were protected as taonga.

Results

The pūrākau were collated from multiple individuals and focus group sources; hence, it was imperative that a robust method of analysis be adopted. This involved a wānanga (discussion) by the researchers and contributors to deliberate on the dataset collated (interview transcripts). This gave a more comprehensive and nuanced understanding of the captured narratives, while being able to enact a vigorous process of reflection that carefully navigated researcher bias. Although we recognise that our familial intimacy with the participants has the potential to create concerns regarding partiality, we unapologetically and vehemently support that whakapapa (ancestral), or kinship links were a vital factor in obtaining each of the respective pūrākau. Indeed, the validation of our findings was achieved through the theoretical assumptions based on our levels of whanaungatanga (engagement and relationships) with our respective and specific participant groups. That is, at a very intimate level, we were able to ensure that the pūrākau and experiences captured 'would be very difficult to imagine out of thin air' (Houkamau, 2006, p. 118). Complemented with the specific literature in this field and our combined experience and expertise as Māori qualitative researchers, we were confident in our abilities to identify and organise the narratives into a set of agreed Māori concepts. These final themes are presented in this section.

Ūkaipō/connecting to home

> If you become the taiao, the taiao will become you. (Te Mauri o te Kauri me te Ngahere)

This quote is useful in introducing the participants' perceptions and their experiences of forestscapes as being critical in maintaining both a tangible and intangible connection to the natural world that directly influenced their personal interpretations of identity. For example,

> There are many ways of being Māori, yet connection to te taiao remains. All Māori, because of whakapapa are connected to te taiao. (Kanuka)

This comment is reflective of the concept ūkaipō, which has an etymological description as 'to be fed by the breast at night' that expresses 'the spiritual, emotional and physical nourishment that is given through the comfort and intimate relationship between the mother and child' (see Dell, 2016). Symbolically, it illustrates how 'land and people are viewed as carrying the same relationship, where land is the ūkaipō' (Dell, 2016). Participant excerpts illustrate this notion:

> When you go out into the bush, you're connecting back to Papatūānuku [the Earth Mother]…. It's just a calm, peaceful environment where you find yourself. (Rangatahi)

> You feel a presence not only with our tīpuna, but you can feel the ngahere like the trees and that. I'm like talking to the trees, and, you know, you're in there, you're connecting … 'cause [trees] have their own spirit, they're their own beings, you know…. It's real, aye! (Taranaki)

> You know when you go back to a familiar person, and you're like, 'oh, I've missed you,' but I didn't realise how much I had I missed you. (MES)

Additionally, a participant from Taranaki who is working in the ngahere articulated that their work in Australia, while secure and financially attractive 'just didn't fill the void anymore.' When they were asked to clarify their pūrākau, they responded:

> Yeah, the void … of not being home, you know … just being amongst it all now, the environment. Now that I'm back, I'm in awe, really … yeah, within the presence of all the rākau, plants and everything. (Taranaki)

These pūrākau illustrate a commonality to describe forestscapes in ways that were informed by incorporeal concepts and indicators, as one Kaumātua exemplified:

> Sensing the mauri [life force] of the ngahere needs to guide interactions with the bush. (Kaumātua)

Sensing endorses a perspective that when Māori acquire an intimate connection with the natural world, this relationship can be recognised in a variety of metaphysical encounters. One participant described ngahere degradation as a direct corruption of mauri resulting in a 'loss of taonga' and continued that 'a part of ourselves is also lost' (Rongoa). The word taonga implies both material (land, trees, flora) and immaterial entities such as mātauranga Māori information and knowledge – knowledge that may hold promising solutions to today's problems.

This indicates the significance of having Kaupapa Māori based answers such as rāhui (ritual prohibition), which is inferred in the following pūrākau:

> If [the ngahere] is vibrant, its vibrance is beautiful, and when it's a bit sad you can feel when it's a bit sad … when I feel those times, I won't spend a lot of time there, because for me that's the time that the ngahere wants to be in its own state. (Rongoa)

In this respect, when 'the ngahere wants to be in its own state,' a rāhui is the manifestation of a Māori principle that encourages the belief that the ngahere can heal itself. Certainly, community-based indicators can offer evidence to monitor the natural environment in a spiritual way that Māori comprehend, relate to and can interpret, and be realised tangibly. The monitoring of biodiversity, increasingly with indicators such as rāhui, offers the potential for engaging local Māori communities in the effort to protect and restore biodiversity and, consequently, contribute to the protection of Kauri and myrtle species extinction.

Whakapapa kōrero/intergenerational knowledge dissemination

> It is important the next generation come home, [and] spend time at home, so they maintain connection with our particular ngahere and rākau. (Kaumātua)

Many of our participants talked about the prolific nature of marae-based initiatives that encouraged discussions where whakapapa (genealogical connections) and maintaining tikanga (traditional practices), karakia (incantations), and kawa (rituals) are openly shared. These have also become common spaces that encourage and support intergenerational revitalisation efforts of localised knowledge systems and raise awareness regarding taonga species protection and biodiversity. As one kaumātua stated, 'as I've gotten older[, …] environmental perspectives and issues have become more important for our rangatahi' (Kaumātua).

Environmental issues are one of the top four determinants affecting the mental health of rangatahi, alongside social media (technology), peer (and associated societal) pressure, and at-risk behaviour. Indeed, this was highlighted by a Massey Emerging Scholar who interpreted the weight of the current climate crisis by voicing, 'I know it depends on me not to mess it up!' Yet, a participant from the Kanuka rōpū (group) offered a more reassuring approach that suggested rangatahi have access to leadership and mentoring, and several groups expressed this with encouragement and optimism.

> We're not thinking of us; we're thinking of the future generations, 'cause it's about leaving something for them, and if we can leave this beautiful taonga with a beautiful canopy that is a mixture of ngahere and historical

> value, then that's the end goal, you know. We share that, and they're a part of that journey. (Taranaki)

Participants from the Rongoa and Kanuka rōpū added:

> We take them to those places where we harvest from on the maunga and tell them the stories of the maunga, then. It gives them the validation because they can connect … because this is [their] tupuna. (Rongoa)

> At Whareponga School, the teachers used to take us in the bush, in the ngahere, for our science. (Kanuka)

Mokopuna, tamariki and rangtahi all serve as strong motivators for pākeke (adults) and kaumātua to action processes that encourage the protection of taonga species and intergenerational transfer of knowledge. A kaumātua pūrākau reflected as follows:

> What can I do for my mokopuna? Well, I can give them the strength to be able to combat whatever it is they're going to face, because I don't know what kind of world it is going to be like for them. But, if I can instil in them some wairua stuff so that when they meet situations, they can deal with it well. (Kaumātua)

These initiatives (re)affirm that to be immersed in nature creates an intimate connection with te taiao critical to child and youth mental health and wellbeing. Indeed, it was considered that the ngahere can facilitate 'healing – it's genuine healing [and] you see their change. So, to me, the answer's in te taiao, like, I wholeheartedly, hand on heart, reckon that's where it's at' (Taranaki). Such immersive educational experiences were described as an important antidote to the documented narrative that describes the difference between these generations in regard to informal opportunities to connect with nature. Thus, the 'older generation' of the participants viewed themselves as part of restoring this crucial aspect of reconnecting with te taiao as pertinent to intergenerational knowledge exchange and the broader wellbeing agenda for youth. As a Taranaki participant explains:

> I think, in today's society, we've got to go back to some of those teachings of our old people. It's the ngahere providing them a space in that, you know, the ngahere to help [rangatahi] grow. It's reclaiming and regenerating their identity: our language comes from te taiao, from the sound of the ocean, the water, the birds, the trees. And, in Taranaki, our mita [dialect] is derived from that. (Taranaki)

This provides a confident segue into our final theme of wairuatanga (spiritual wellbeing).

Wairuatanga/spiritual wellbeing

> If we're intimately linked to the environment, which I think we are, then anything that denudes or degenerates that environment has an impact on the spirit of the people. For some people, watching the sun come up lifts the spirit. Watching the sun go down lifts the spirit. Seeing some stars shine at night lifts the spirit. Wairua is fed by the environment. (Tā Mason Durie)

As has been argued throughout, science provides another way of understanding the natural world, yet the utility of mātauranga Māori and an understanding of the traditional principle of interconnectedness remains central to the solution of responding to the protection of taonga species and biodiversity. As a major component of this, wairuatanga must be considered essential to the interconnectedness between te taiao, ngahere, taonga species and human wellbeing, as described by Tā Mason's pūrākau. This is explicitly supported by a kaumātua participant saying, 'above all else, wairuatanga is the most important consideration for environmental sustainability' (Kaumātua). Tā Mason Durie's well-known model of hauora (health and wellbeing), Te Whare Tapa Wha (Durie, 1994), is a useful explanation by which to interpret this theme.

Briefly, taha wairua (spiritual health) is one component of Te Whare Tapa Wha model of hauora: a Māori concept of holistic health that involves the balance of four interconnected components of wellbeing: taha wairua (spiritual health), taha tinana (physical health), taha hinengaro (mental and emotional health), and taha whānau (family and social health). The four components, in their entirety, are likened to that of a 'whare' (house), with each wall (tapa wha) representing an aspect of wellbeing. Wellbeing cannot be achieved through just one aspect but rather by considering the interconnectedness and balance of all four. It is being applied here, as te taiao underpins each of the four dimensions of Te Whare Tapa Whā, that is, what affects the ngahere directly impacts human wellbeing. Indeed, 'when we get the oranga ki te whenua [health of the land], then we'll be better; we'll be healthy' (Taranaki). The testimonies of participants describe this phenomenon of spiritual wellbeing:

> What I get from working in the ngahere…. It's just helped me get my soul back to where it needs to be … a lot in terms of spirituality and connection to things. (Taranaki)

> We get to come home. We get to go into the bush and do some mahi … That's really, like, it's hugely massively soothing – you need it, and so there's a balance. It's just a reset: realignment. (Te Mauri o te Kauri me te Ngahere)

> I draw my spirituality and cultural identity from Papatūānuku. (Rangatahi)

> The ngahere is a place of sustenance and renewal. (Te Mauri o te Kauri me te Ngahere)

> Rangatahi and adults, they've all experienced the same thing. They're left feeling inspired and invigorated; wairua's lifted. (Taranaki)

> Since I've been in this te taiao space, I've, I've seen genuine change in myself, which has assisted my family, and the whole wairua in and around my whare [home] is totally different. I don't drink any more, and, for those that know me well, I was probably one of the bigger drinkers around, you know. It's [this work's] calmed me … calmed me right down. (Taranaki)

The pūrākau shared indicate that the intimate connection that participants have with forestscapes encompasses the spiritual and emotional relationship between a mother feeding their baby (ūkaipō) and symbolic of the intrinsic connection to Papatūānuku (the earth mother), providing both a source of sustenance and a sense of belonging for whānau, hapū and iwi (Moewaka-Barnes et al., 2018). For instance, ūkaipō as an expression of the intangible *connection* to ngahere could also be interpreted as an example of Taha Wairua. In addition, the intergenerational exchange of knowledge could also be categorised as an act of taha wairua, as the interactions required to sustain specific local traditions, rituals and practices are a direct encouragement of wairuatanga.

Discussion

> We don't just focus on the kauri; we focus on the whole thing … so we have a whole forest approach to our thinking. (Kaumātua)

As a result of the ongoing effect of colonisation, mass dispossession of whenua and deforestation, Māori have experienced a spiritual disconnect with the environment. To strengthen the link between understanding traditional relationships with forestscapes requires a multifaceted approach that acknowledges the wealth of Māori knowledge about the ecology and management of kauri dieback and myrtle rust, while recognising scientific method, that is, a holistic approach to looking after the ngahere that enables all forms of life, big and small, to be cared for. This requires a respectful dialogue between, and acknowledgement that, mātauranga Māori and western science are both important, and necessitates researchers who have knowledge of both, who understand the relevance of mātauranga Māori and who know when to use it (and not), which will contribute to best outcomes for Māori and others (Durie, in Rauika Māngai, 2020, pp. 26–27).

The spiritual (re)connection the pūrākau have identified demonstrates a multifaceted interdependence that Māori maintain with te taiao and locations of geographical significance, contextualised within specific 'place-based customary responsibilities and practices of Māori whose genealogical history connects them to

land, based on principles of reciprocity and the desire to maintain these relationships for future generations' (McAllister et al., 2019, p. 3). Being in the ngahere and 'connecting with the places of our tupuna' highlighted the deep reverence, respect, and connection between the role and responsibilities of Māori and taonga species has (re)invigorated Traditional Ecological Knowledge (TEK), which fosters Māori belief systems and values, ensuring that conservation efforts are culturally sustaining and effective. Consequently, the specific response is always commensurate to the change of 'their' (our) known ngahere and forestscapes. Additionally, taonga species and biosecurity issues have provided a means for geographically distant whānau to navigate safely feelings of alienation and disconnect, resulting in an increased sense of identity security and reaffirmation via an interpretation of Te Whare Tapa Wha model of hauora and holistic wellbeing (Durie, 1994). That is, any impact on the environment also impacts human beings, exemplifying the integrated nature of human and environmental health and wellbeing.

Any immediate action that is needed has stimulated an approach where Māori have a strong sense of identifying 'what is best' for their whānau, marae, hapū and iwi, and are therefore situated to help raise awareness of the importance of conserving kauri and the dangers posed by kauri dieback and myrtle rust. Although we have emphasised ūkaipō, whakapapa kōrero, and wairuatanga as key principles, it is evident that these concepts may vary considerably between hapū and iwi because they are dependent on the nature of the taonga species and the history of the intimate relationships that each rohe maintains with their whenua. Regardless, mana whenua (the Māori with territorial rights) are best positioned to inform safe and sustainable resource development, illuminating opportunities for iwi leadership, and most notably to enact change that recognises the vital investment of mokopuna-, tamariki-, rangatahi- and taiohi-led initiatives. If western science can see benefits from early and ongoing involvement in incursion response or long-term management of ngahere and pathogens in the form of reinforcements of cultural values (Wehi & Lord, 2017), this will undoubtedly result in an inspired common-sense 'conservation ethic' (Ngata-Aerengamate, 2020, p. 57).

Conclusion

> My Koro would say [the ngahere] is the entrance of Tāne Māhuta, and this is where all humankind begins…. They had a lot of love and respect. (Kaumātua)

The privilege that we felt in gathering the pūrākau from our participants highlights the relevance and intimate relationships that whānau, marae, hapū, and iwi have with their taonga species. By providing an insight into this symbiotic relationship, we hope to advance its role in strengthening the scientific comprehension and understanding of the existence and distribution of hostile pathogens. To assist in this process requires understanding of the opposition faced by Māori, as

summarised by the participants of Te Mauri o te Kauri me te Ngahere, who identified several major obstructions in context of kauri dieback and myrtle rust behavioural change campaigns:

- the ongoing threat and negative impact of introduced weed species, pests and predators on forest health
- the general public's sense of entitlement to recreation vs Māori perspectives of rāhui (protection and conservation)
- lack of co-governance structures, policy and acknowledgement of Te Tiriti agreements.

These are general concerns, however. The adoption of mātauranga Māori practices and the empowerment of values such as ūkaipō, whakapapa kōrerō and wairuatanga can result in meaningful community involvement and a greater chance for long-term success. For instance, in 2014, Te Urewera ceased to be a national park managed by the Department of Conservation but became a 'legal entity with all the rights, powers, duties and liabilities of a legal person' (Te Urewera Act, 2014). Additionally, in 2017, the New Zealand parliament granted the Whanganui River legal personhood, thereby recognising the river as 'an indivisible and living whole comprising the Whanganui River from the mountains to the sea' (Te Awa Tupua: Whanganui River Claims Settlement Act, 2017). These examples demonstrate the tangible link between Māori and te taiao; hence, it is mana whenua who will determine the priorities.

Mātauranga Māori is not something for the Crown to manage but should be seen as relevant in light of the WAI 262 claim and the work that has occurred across government organisations in advancing the 'interface' between mātauranga Māori and science. Our claim is not about whether mātauranga Māori should be regarded as science, but instead that relationships, and the mātauranga Māori associated with taonga species and biosecurity issues, be prioritised over the interests of research science and commerce. WAI 262 simply confirms mātauranga Māori as the symbiotic construct between people (alive and deceased), land, sea, wind, other environmental elements, flora and fauna, and the spiritual world.

Kiri Dell, https://orcid.org/0000-0003-0383-162X
Bevan Erueti, https://orcid.org/0000-0003-0891-2891
Bridgette Masters-Awatere, https://orcid.org/0000-0002-7684-5080
Nicole Lindsay, https://orcid.org/0000-0003-1176-8448
Pikihuia Pomare, https://orcid.org/0000-0002-6621-9748
Natasha Tassell-Matamua, https://orcid.org/0000-0002-1644-3821

Acknowledgements
This work is funded by the Ministry of Business, Innovation and Employment (Mobilising for Action theme of the Ngā Rākau Taketake programme of the Biological Heritage National Science Challenge in Aotearoa/New Zealand C09X1817).

Author contributions
All authors listed have made a substantial, direct and intellectual contribution to the work, and approved it for publication.

Conflict of interest statement
The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Notes

1. Emeritus Professor Sir Mason Durie (KNZM, ONZ, FRSNZ FRANZCP) is his full given title, however for this article we use the term *Tā Mason Durie – Tā*, translated as sir, knight.

2. Toa Taiao, a contemporary conjoint term made up of two words: 1. toa: (adjective) be brave, bold, victorious, experienced, accomplished, adept, competent, skilful, and 2. taiao: (noun) world, earth, natural world, environment, nature, country. Combined, they describe a group of environmental champions or warriors.

References

Ashby, T. (2020). Personal commentary. In N. Ngatae (Director), *Loading docs 2020: Te wao nui (Season 7)* [Documentary film]. Te Māngai Pāho and the New Zealand Film Commission: NZ On Air. https://www.rnz.co.nz/programmes/loading-docs-2020/story/2018758466/loading-docs-2020-te-wao-nui

Awatere, S., & Harmsworth, G. 2014). Ngā aroturukitanga tika mō ngā kaitiaki: Summary review of mātauranga Māori frameworks, approaches, and culturally appropriate monitoring tools for management of mahinga kai. *Landcare Research contract report LC1774*. Landcare Research. https://www.waikatoregion.govt.nz/assets/PageFiles/29535/Maori%20frameworks%20approaches%20and%20culturally%20appropriate%20monitoring%20tools%20for%20management%20of%20mahinga%20kai.pdf

Balm, R. (2017). Kauri dieback. *NZ Journal of Forestry, 62*(2), 9–12. http://www.nzjf.org.nz/free_issues/NZJF62_2_2017/743296BA-412F-469a-8A72-1534C60B2423.pdf

Barlow, C. (1993). *Tikanga whakaaro: Key concepts in Māori culture*. Oxford University Press.

Barlow, C., & Wineti, E. (2009). *Tikanga whakaaro: Key concepts in Māori culture*. Royal New Zealand Foundation of the Blind.

Biological Heritage. (2018). *Conserving seeds to fight plant extinction.* https://bioheritage.nz/seed-bank/

Bradshaw, R. E., Bellgard, S. E., Black, A., Burns, B. R., Gerth, M. L., McDougal, R. L, & Winkworth, R. C. (2020). *Phytophthora agathidicida*: Research progress, cultural perspectives and knowledge gaps in the control and management of kauri dieback in New Zealand. *Plant Pathology,* 69(1), 3–16. https://doi.org/10.1111/ppa.13104

Dell, K. (2016). *Whenua ūkaipō: Returning to the mother.* https://kupumamae.com/2016/07/05/whenua-ukaipo-returning-to-the-mother/

Department of Conservation. (2006). *Ngāi Tahu taonga plant species.* http://www.doc.govt.nz/documents/about-doc/concessionsand-permits/conservation-revealed/ngaitahu-taonga-plants-lowres.pdf

Durie, M. (1994). *Whaiora: Māori health development.* Oxford University Press.

Durie, M. (1998). *Te mana te kawanatanga*. Oxford University Press.

Durie, M. (2003). *Ngā kahui pou: Launching Māori futures*. Huia Publishers.

Forster, M. (2019). He tātai whenua: Environmental genealogies. *Genealogy*, 3(3), 42. https://doi.org/10.3390/genealogy3030042

Harmsworth, G., & Warmenhoven T. (2002). The Waiapu project: Maori community goals for enhancing ecosystem health. *Broadsheet, New Zealand Association of Resource Management (NZARM).* http://www.landcareresearch.co.nz/research/social/indigenous_index

Harmsworth, G. R., & Awatere, S. (2013). Indigenous Māori knowledge and perspectives of ecosystems. In J. R. Dymond (Ed.), *Ecosystem services in New Zealand: Conditions and trends* (pp. 274–286). Manaaki Whenua Press. https://www.landcareresearch.co.nz/assets/Publications/Ecosystem-services-in-New-Zealand/2_1_Harmsworth.pdf

Harrison, R. (2018). Potential whakapapa Māori solution for kauri dieback outbreak. *Te Ao Māori News.* https://www.teaomaori.news/potential-whakapapa-maori-solution-kauri-dieback-outbreak

Henare, M. (2001). Tapu, mana, mauri, hau, wairua: A Māori philosophy of vitalism and cosmos. In J. Grim (Ed.), *Indigenous traditions and ecology: The interbeing of cosmology and community* (pp. 197–221). Harvard University Press.

Hikuroa, D. (2017). Mātauranga Māori: The ūkaipō of knowledge in New Zealand. *Journal of the Royal Society of New Zealand, 47*(1), 5–10. https://doi.org/10.1080/03036758.2016.1252407

Houkamau, C. A. (2006). *Identity and socio-historical context: Transformations and change among Māori women.* [Doctoral thesis, University of Auckland]. https://researchspace.auckland.ac.nz/bitstream/handle/2292/404/02whole.pdf

Howe, K. (2003). *The quest for origins.* Penguin.

Intergovernmental Panel on Climate Change. (2018). *Global warming of 1.5°: Summary for policymakers.* https://library.wmo.int/doc_num.php?explnum_id=9954

Kennedy, N. C. K. (2017). *Kaitiakitanga o te taiao: Reconciling legislative provisions and outcomes for Māori* [Doctoral thesis, University of Waikato]. https://researchcommons.waikato.ac.nz/handle/10289/11121

Kimmerer, R. (2013). *Braiding sweetgrass: Indigenous wisdom, scientific knowledge and the teachings of plants.* Penguin.

Kirch, P. (2000). *On the road of the winds: An archaeological history of the Pacific islands before European contact.* University of California Press.

Lambert, S., Waipara, N., Black, A., Mark-Shadbolt, M., & Wood, W. (2018). Indigenous biosecurity: Māori responses to kauri dieback and myrtle rust in Aotearoa New Zealand. In J. Urquhart, M. Marzano, & C. Potter (Eds.), *The human dimensions of forest and tree health* (pp. 109–137). Springer. https://doi.org/10.1007/978-3-319-76956-1_5

Lambert, S., & Mark-Shadbolt, M. (2021). Indigenous knowledges of forest and biodiversity management: How the watchfulness of Māori complements and contributes to disaster risk reduction. *AlterNative: An International Journal of Indigenous Peoples,* 17(3), 368–377. https://doi.org/10.1177/11771801211038760

Lawrence, S. A., Burgess, E. J., Pairama, C., Black, A., Patrick, W. M., Mitchell, I., et al. (2019). Mātauranga-guided screening of New Zealand native plants reveals flavonoids from kānuka (*Kunzea robusta*) with anti-*Phytophthora* activity. *Journal of the Royal Society of New Zealand, 49*, 137–154. https://doi.org/10.1080/03036758.2019.1648303

Maclean, K., Robinson, C., Bock, E., & Rist, P. (2021). Reconciling risk and responsibility on Indigenous country: Bridging the boundaries to guide knowledge sharing for cross-cultural biosecurity risk management in northern Australia. *Journal of Cultural Geography, 39*(1), 32–54. https://doi.org/10.1080/08873631.2021.1911078

Mark, G. T., & Lyons, A. C. (2010). Māori healers' views on wellbeing: The importance of mind, body, spirit, family and land. *Social Science & Medicine, 70*(11), 1756–1764. https://doi.org/10.1016/j.socscimed.2010.02.001

Marsden, M. (1988). *The natural world and natural resources. Māori value systems and perspectives. Resource management law reform working paper 29: Part A.* Ministry for the Environment.

McAllister, T., Beggs, J., Ogilvie, S., Kirikiri, R., Black, A., & Wehi, P. (2019). Kua takoto te mānuka: Mātauranga Māori in New Zealand ecology. *New Zealand Journal of Ecology, 43*(3), 3393. https://dx.doi.org/10.20417/nzjecol.43.41

McCoy, D., Montgomerie, H., Arulkumaran, S., & Godlee, F. (2014). Climate change and human survival. *British Medical Journal, 348*, 2351–2352. https://doi.org/10.1136/bmj.g2351

McGregor, D. (2002). Indigenous knowledge in sustainable forest management: Community-based approaches achieve greater success. *Chronicle, 78*, 833–836. https://doi.org/10.5558/tfc78833-6

McMichael A., Woodruff, R., & Hales, S. (2006). Climate change and human health: Present and future risks. *Lancet, 367*(9513), 859–869. https://doi.org/10.1016/S0140-6736(06)68079-3

Ministry for the Environment and Statistics New Zealand. (2018). *New Zealand's environmental reporting series: Our land 2018*. https://environment.govt.nz/assets/Publications/Files/Our-land-201-final.pdf

Moewaka Barnes, H., Eich, E., & Yessilth, S. (2018). Colonisation, whenua and capitalism: Experiences from Aotearoa New Zealand. *Journal of Media & Cultural Studies, 32*(6), 685–697. https://doi.org/10.1080/10304312.2018.1525918

Ngata-Aerengamate, T. A. (2020). *Mātauranga Māori and anti-microbials: Searching for new tools to control the spread of kauri dieback* [Master of Science thesis, Victoria University of Wellington]. http://hdl.handle.net/10063/9458

Patz, J., Campbell-Lendrum, D., Holloway, T., & Foley, D. (2005). Impact of regional climate change on human health. *Nature, 438*, 310–317. https://doi.org/10.1038/nature04188

Ramstad, K. M., Nelson, N., Paine, G., Beech, D., Paul, A., Paul, P., et al. (2007). Species and cultural conservation in New Zealand: Māori traditional ecological knowledge of tuatara. *Conservation Biology, 21*, 455–464. https://doi.org/10.1111/j.1523-1739.2006.00620.x

Rauika Mangai (2020). *A guide to Vision Mātauranga: Lessons from Māori voices in the New Zealand science sector*. Rauika Māngai. https://www.maramatanga.co.nz/news-events/news/vision-m-tauranga-lessons-m-ori-voices

Ropata, H. (2015). *The threat of myrtle rust on Māori taonga plant species and their use*. Plant & Food Research Internal Report. SPTS (11156). Plant & Food Research. https://doi.org/10.30843/nzpp.2015.68.5869

Royal, T. A. C. (Ed.). (2003). *The woven universe: Selected writings of Rev. Māori Marsden.* Estate of Rev. Māori Marsden.

Schultz, K., Walters, K. L., Beltran, R., Stroud, S., & Johnson-Jennings, M. (2016). 'I'm stronger than I thought': Native women reconnecting to body, health, and place. *Health Place, 40*, 21–28. https://doi.org/10.1016/j.healthplace.2016.05.001

Scion. (2017). *Myrtle rust reporter app now available.* https://www.scionresearch.com/about-us/news-and-events/news/2017/myrtle-rust-reporter-app-now-available

Simmons, D. R. (1976). *The great New Zealand myth: A study of the discovery and origin traditions of the Māori.* A. H. & A. W. Reed.

Simpson, L. (2017). *As we have always done: Indigenous freedom through radical resistance (Indigenous Americas).* University of Minnesota Press.

Smith, G. H. (1997). *The development of kaupapa Māori: Theory and praxis* [PhD thesis, University of Auckland]. https://researchspace.auckland.ac.nz/handle/2292/623

Smith, L. T. (2015) Imagining our own approaches. *Cataloguing & Classification Quarterly, 53*(5–6), 473–474. https://doi.org/10.1080/01639374.2015.1027982

Smith, V., & Mark-Shadbolt, M. (2020). *Oranga (wellbeing): Mātauranga Māori-based solutions for kauri dieback and myrtle rust.* https://bioheritage.nz/research/oranga/

Te Awa Tupua: Whanganui River Claims Settlement Act. (2017). https://www.legislation.govt.nz/act/public/2017/0007/latest/whole.html

Te Urewera Act. (2014) https://www.legislation.govt.nz/act/public/2014/0051/latest/DLM6183601.html

Waitangi Tribunal. (2011). *Ko Aotearoa tēnei: A report into claims concerning New Zealand law and policy affecting Māori culture and identity: Te taumata tuarua*. Waitangi Tribunal Report. Legislation Direct. https://forms.justice.govt.nz/search/Documents/WT/wt_DOC_68356054/KoAotearoaTeneiTT1W.pdf

Wakefield, B., Stirling, T., & Kahu, M. (2006). Haumanu taiao ihumanea. In J. S. Te Rito (Ed.), *Mātauranga taketake: Traditional knowledge Indigenous indicators of wellbeing: Perspectives, practices, solutions 2006* (pp. 173–176). Ngā Pae o te Māramatanga. www.maramatanga.co.nz/sites/default/files/TKC-2006.pdf

Walker, S., Eketone, A., & Gibbs, A. (2006). An exploration of kaupapa Māori research, its principles, processes and applications. *International Journal of Social Research Methodology, 9*(4), 331–334. https://doi.org/10.1080/13645570600916049

Walker, D., Ataria, J., Hughey, K., & Lambert S. (2013). *Developing a culturally-based environmental monitoring and assessment tool for New Zealand Indigenous forests* [Paper presentation]. 19th International Symposium on Society and Resource Management, Estes Park, CO, USA. https://researcharchive.lincoln.ac.nz/handle/10182/5087

Ware, F., Breheny, M., & Forster, M. (2018). Kaupapa kōrero: A Māori cultural approach to narrative inquiry. *AlterNative: An International Journal of Indigenous Peoples, 14*, 45–53. https://doi.org/10.1177/1177180117744810

Wehi, P. M., & Lord, J. M. (2017). Importance of including cultural practices in ecological restoration. *Conservation Biology, 31*, 1109–1118. https://doi.org/10.1111/cobi.12915