

Ihirangaranga: interwoven tapestry of connection through vibration and frequencies

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AlterNative

2026, Vol. 22(1) 99–110

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DOI: 10.1177/11771801251406142

journals.sagepub.com/home/aln



Abstract

This research investigates how the soundscape of Native forests reflects forest health and how it may signal early signs of Kauri Mate (*Phytophthora agathidicida*; dieback) infection. Grounded in mātauranga Māori (Māori [the Indigenous peoples of New Zealand] knowledge) from Te Rarawa (a tribe in the northern North Island, New Zealand), the study combines Indigenous knowledge with modern technology to develop a sonic-based method for ecological restoration. Recorded soundscapes from healthy kauri (a coniferous tree, northern New Zealand; *Agathis australis*) are layered with taonga puoro (traditional Māori instruments), karakia (chants), and parāoa (sperm whale) calls, blended with the 528 Hz healing frequency to create immersive environments aligned with the forest's mauri (life force). This methodology acknowledges the interconnectedness of all living entities and aims to restore ecosystems through vibration and sound. Findings recommend community-led, culturally grounded soundscape interventions to support forest health, while strengthening spiritual and emotional connections between people, place, and environment.

Keywords

healing, ihirangaranga, kauri, mauri, oro, vibrations

Introduction

Knowledge holders and kaitiaki (environmental protectors) of Te Rarawa (a tribe in the northern North Island, New Zealand), Warawara Whakaora Ake Komiti (the Whakaora Ake Committee), Te Aho Tū Roa (environmental regenerative programme), Kauri Ora (Kauri Wellness) teams and broader North Hokianga—a locality in northern North Island, hapū (sub-tribes) including Te Uri o Tai (a sub-tribe of Pawarenga, North Hokianga, North Island, New Zealand), Ngāti Haua (a sub-tribe of Whangapē, North Hokianga, North Island, New Zealand), Te Tāwhiu (a sub-tribe of Whangapē, North Hokianga, North Island, New Zealand) and Te Rangī (a sub-tribe of Mitimiti, North Hokianga, North Island, New Zealand), Hokokeha (a sub-tribe of Mitimiti, North Hokianga, North Island, New Zealand) and Te Tao Maui (a sub-tribe of Mitimiti, North Hokianga, North Island, New Zealand) partnered with the National Science Challenge Ngā Rākau Taketake programme, Oranga (RA2), to jointly lead a research project. This project employs methods rooted in traditional mātauranga tuku iho (Māori [the Indigenous peoples of New Zealand] knowledge handed down) to provide solutions for the treatment, mitigation, and prevention of Kauri Mate (*Phytophthora agathidicida*; dieback) infection, or kauri (a coniferous tree, northern New Zealand; *Agathis australis*) dieback disease. The research focus of the project, known as Te Mauri o te Kauri (The Health of Kauri), uses rongoā Māori (traditional Māori healing

practices) with a specific focus on oro (sound) healing, centred on exploring how the soundscape of healthy Native forests imbedded with the sonic vocalisations of karakia (chants), karanga (the ceremonial call), takutaku (traditional Māori ritual chant for healing) and taonga puoro (traditional Māori instruments) can be harnessed to aid in the healing of kauri affected by Kauri Mate.

The Mauri o te Kauri project acknowledges the spiritual connection within the realm of Tāne Mahuta (male entity of the forest) and Hinewao (female entity of the forest), the eternal balance of our ngahere from where the connected origins of the tohorā (whale) and the kauri hail. It is an ancient pūrākau (story) known and acknowledged by many iwi (tribes), it is our recount of absolute knowing and understanding that collapses all time, that reveals and honours the interwoven tapestry of connectedness. Ngā tohu o te rangi, ngā tohu o te whenua, ngā tohu o te moana—connections of the celestial bodies, of the land and sea that guide and influence all. To understand and honour this connection, reclamation of the taonga tohorā (the revered

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whale) through *karakia* from the realms of Tangaroa (male entity of the sea) and Hinemoana (female entity of the sea) back to the realms of Tāne Mahuta and Hinewao is offered to help restore the delicate balance needed to heal our *rākau rangatira* (ancestor tree) of *kauri*:

Whakahokia mai te mauri tapu o tō tātou nei rākau rangatira;
whakahokia mai te mauri o te kauri!

Bring back the sacred essence of this our noble tree;
bring back the essence of the *kauri*

The relationship between the brothers, Tohorā and Kauri is a *pūrākau* told by Ngāti Wai (a tribe of the east coast of the Northland Region, New Zealand) and Ngāti Hine (tribe of the central and east coast of the Northland Region, New Zealand). When Tohorā went to explore the moana (ocean, sea), he decided he wanted to stay there, and he asked his tuakana (older brother) to join him. Kauri, however, wanted to stay on the land, and so Tohorā gifted his brother his skin, to wrap around Kauri and protect him. In exchange, Kauri gave Tohorā his oil to enable him to form a protective layer of blubber. This *pūrākau* was drawn upon when the tangata whenua (people of the land) of Ngāti Wai and Ngāti Hine were searching for a remedy for the pathogen, Kauri Mate, which cuts nutrients and water off to the *kauri*, essentially starving it to death.

Sound ecology practices

Sound ecology is a discipline that studies the relationships mediated through sound between human beings and their environments. Soundscapes are composed of the anthrophony, geophony and biophony of a particular environment specific to location. Biophony is the study of sounds emerging from animal sources, like birdsong and insects. Geophony can be defined as the sounds originating from the Earth's natural processes, such as the blowing of wind or the movement of waves. Anthrophony is the soundscape defined by man-made sources, like speech or road noise (Farina, 2014). The promotion of *mauri ora* (life energy) for ecosystems takes into account the nature and quality of the interaction between people and the surrounding environment and necessitates the balance between biophonies, geophonies and anthrophonies. Western soundscape methodologies, traditionally used to understand and manage acoustic environments, have evolved to encompass a variety of techniques for assessing both natural and built environments. These methodologies focus on measuring and analysing the physical characteristics of sound, including sound pressure levels, frequency ranges, and temporal dynamics (Farina et al., 2011). In addition, subjective assessments such as surveys, interviews, and participatory listening experiences are used to understand people's perception of sound. According to Brown and Baker (2011), these methods provide valuable insights into environmental noise, urban soundscapes, and public space design. Schroeder (2007) also discusses how soundscapes can be linked to human well-being, however much of the focus has been on Western acoustic practices of

data gathering and analysis that has not taken into consideration cultural Indigenous models which include traditional knowledge systems of sound, life essence and the nature of the unseen.

Within this project, soundscapes play a critical role in ecosystem restoration, whereby sound healing can help restore the natural acoustic environment. By reintroducing natural sounds like bird calls, flowing water, and wind rustling through trees, it is possible to encourage wildlife return and reduce the stress placed on animals by the overwhelming presence of human-made noise. This has been illustrated in marine studies, particularly that of Professor Steven Simpson's research in acoustic enrichment and how this can be utilised to enhance fish community development on degraded coral reef habitats (Gordon et al., 2019). In addition to benefitting wildlife, these healing sounds contribute to the overall restoration of the ecosystem, fostering biodiversity and a more balanced environment (Gergen et al., 2018).

Mātauranga Māori (Māori knowledge) and *kōrero tuku iho* (traditional Māori oral knowledge and understandings) acknowledge that *ihirangaranga* (vibrations) and *oro* have an important role to contribute to shifting the states of the ecosystems from *mauri mate* (a state of unwellness) to *mauri ora* (a state of wellness). Traditional Māori knowledge of *oro* and *ihirangaranga* emphasises the deep connection between sound, the *mauri* (life force) of the land and the spiritual world, and sonic practices often involve *karakia*, *taonga puoro* and *karanga* aimed at restoring balance and harmony to the environment. By integrating these sacred sound traditions into contemporary soundscape design, we can create spaces that honour both cultural heritage and environmental healing (McFarlane, 2016).

Sound ecology and sound healing share a connection rooted in the understanding of the intricate relationship between sound and the environment. Sound ecology emphasises the importance of maintaining balanced acoustic environments for the well-being of ecosystems and all living beings within them. Similarly, sound healing harnesses the power of sound vibrations to restore harmony and promote healing on many levels. In exploring environmental sound healing, sound is viewed not only as an auditory experience but as a powerful tool for fostering well-being and ecological health (Gergen et al., 2018). Sound healing practices, though traditionally focused on the individual, can also be applied to environmental contexts, offering a means of restoring balance and harmony within ecosystems and urban spaces (Shih & Chang, 2019). These practices aim to mitigate the effects of noise pollution, promote ecological restoration, and create healing soundscapes that benefit both the environment and the people inhabiting it. In environmental sound healing, sound is not only an auditory experience but also a powerful tool for fostering well-being and ecological health.

One prominent approach to environmental sound healing is the use of binaural beats and frequency modulation. Binaural beats are a form of sound therapy where two slightly different frequencies are presented to

each ear, creating the perception of a third, unique tone that influences brainwave patterns. Frequencies such as 528 Hz, often referred to as the love frequency, are believed to promote healing and positive energy. In urban and natural environments, these frequencies can be introduced to encourage mental relaxation and stress reduction. The vibrations produced by these sounds are thought to resonate with natural elements, helping to restore balance and harmony within a space (Hodgson, 2014).

In ecological restoration efforts, sound is used to facilitate the recovery of disrupted ecosystems by reintroducing Native soundscapes that encourage wildlife to return and thrive (Znidarsic & Watson, 2022). Vibrational therapies and the careful modulation of frequencies can be employed to reduce stress in animals and promote a balanced ecosystem (Gerber, 2001). These sound interventions foster an interconnected, harmonious environment where both human and ecological health can flourish. However, many methodologies are rooted in Western acoustic principles which do not fully capture the cultural importance of sound in different societies. McFarlane (2016) advocates for a more inclusive approach that integrates Indigenous knowledge systems, such as Māori understandings of sound and vibration, to create more culturally sensitive methodologies.

Kaupapa Māori (Māori-led research methodology), when rooted in the concepts of *ihirangaranga* and *oro*, explores the potential for sound to heal and restore the health of *kauri* affected by *Kauri Mate*. Just as an ecosystem flourishes when its soundscapes are diverse and balanced, this approach examines how therapeutic sounds, resonating with the natural rhythms of the *kauri*, can support their recovery. By integrating *mātauranga Māori*, *kōrero tuku iho*, sound ecology and sound healing practices, this project fosters a deeper awareness of how sound impacts the environment of the *kauri*, ultimately promoting *mauri ora* and vitality of both the trees and the surrounding ecosystem. This methodology emphasises the interconnectedness of all living beings and the importance of maintaining harmony between sound, *mauri*, and ecological health.

A Māori worldview

A Māori worldview provides fundamental and distinctive epistemological and ontological understandings that have informed the *Mauri o te Kauri* project. This section discusses some of the relevant principles that underpin this study.

Mauri

Māori spiritual knowledge and understandings are primarily conveyed through Māori cosmology and our creation stories. *Mauri* is the life principle of an object, individual or ecosystem, and its essence or force defines *mauri* as originating in *Io-taketake* (The Creator). Significantly, the narrative of our primaeval parents *Ranginui* (Sky Father) and *Papatūānuku* (Earth Mother) reveals the genesis of humankind and the linkages to the gods, goddesses and the heavens. *Ranginui* is also known as *Rangi-nui* or *Rangi*—there are

several names in different genealogies. These names relate to those of *Rangi-nui-a-Tamaku* (the first 12 heavens), but which is often referred to as *Rangi-nui-e-tū-nei* (the great sky standing above) and *Papatūānuku* below.

Marsden (2003) explains that *mauri* also has a *whakapapa* (genealogy) that can be traced to Māori cosmological creation stories. He defines *mauri* as “that force that interpenetrates all things to bind and knit them together” (Marsden, 2003, p. 46). M. Durie (2004) examines concepts of *mauri* in relation to health and well-being. Within this, he makes a number of informed connections to the states of *mauri*, including aligning *Mauri Ora* with well-being and good health. Within this research project, our understanding of *mauri* is linked to understanding this life force of the *kauri* and how it is being affected by *Kauri Mate*, which has led to many *kauri* transgressing into a state of *mauri mate*. *Mauri ora* is difficult to achieve when the environmental ecosystem of the *kauri* is contaminated. The promotion of *mauri ora* for the *kauri* must take into account the nature and quality of the interaction between people and the surrounding environment. Through utilising *mātauranga Māori* and *kōrero tuku iho*, we understand that *ihirangaranga* and *oro* have an important role to contribute to moving the states of the *kauri* from *mauri mate* towards *mauri ora*.

Ihirangaranga and oro

A quote from *Ngāi Tahu* (a tribe of the South Island, New Zealand) *tupuna* (ancestor) *Matiaha Tiramōrehu* (1849) refers to the *whakapapa* of *oro* as

“Kei a te po te timatatanga o te waiatatanga mai a te atua. Ko te ao, ko te ao marama, ko te ao tūroa—It was in the night, that the gods sang the world into existence. From the world of light, into the world of music” (as cited in Flintoff, 2004, p. 12).

Māori cosmological accounts tell us that sound, vibrations and vitality originated when the universe first came into being (Royal, 2003; Te Hurinui Jones, 2013). The Māori cosmos started with a burst of primal energy when *Ranginui* and *Papatūānuku* were first separated (Henare, 2001). *Papatūānuku* communicates to us through the landscape, mostly enshrouded in exquisite beauty, but sometimes sombre—the landscape scarred as her body is wantonly pillaged, exposing her vulnerability. In song and sound the same power to communicate the intangible is revealed (Pouwhare, 2016).

Within *te ao Māori* (the Māori world), *ihirangaranga* is acknowledged as vibrational power that can be understood as energetic forces. Moreover, *ihirangaranga* is also understood as the unseen and the unheard vibrational forces that include the recognition of *mauri* and the connection to *wairua* (spirit, soul). Traditional Māori understandings of the human world do not separate the spiritual and secular worlds, explained by Reverend Māori Marsden (2003, p. 47) as “*Wairua* (spirit) or *hau* (the breath of the divine spirit) is the source of existent being and life.” Thus, *wairua* may be aligned with the concept of the non-physical spirit or soul of a person that is distinct

from the body and the mauri because it transcends death. This claim is affirmed by Linda Tuiwai Smith (1992), who notes, “spiritual discourse, which centres the notion of wairua in our analysis, is a means of understanding dimensions that reach beyond the material and physical” (p. 98). Jenkins (1988, p. 493) states that wairua, “penetrates and permeates through the whole of life, supporting, nurturing and guiding the natural order.”

In an interview with Rereata Makiha tohunga (expert practitioner), renowned for his knowledge on maramataka Māori (the traditional Māori lunar calendar based on the phases of the moon) in Hokianga—a region of Northland, (personal communication, July 28, 2023), he discusses the attributes of vibration and frequencies as relating to atua wāhine (female gods):

Āe. Atua wāhine. Koia ērā ngā mea, o tātou māreikura. Āe. I reira ka kitea koe te ihi rangaranga. Kua tīmata te huri nē.

Yes. Female gods. Those are our female celestial beings. Yes, there you will find the essence of vibration and frequency. The turning has begun.

—Translation by Valance Smith

The atua wāhine make themselves known through song and sound as celestial gifts found deep with the consciousness of mana wahine (maternal strength and prestige). Whakapapa binds Māori women to atua wāhine. From the celestial female pathway of the heavens Papatūānuku emerged and then came Hine-ahu-one (female entity from the earth) and Hine-tītama (daughter of Hine-ahu-one).

Importantly, there are multiple exemplars of where ihirangaranga can be seen, heard, sensed and understood within te taiao (the natural world), which connects us to our relationships to Papatūānuku and Ranginui and their children. This is explained by Rereata Makiha (personal communication, July 28, 2023):

Rawa au e mōhio ana i te takenga mai, te hōhonutanga o tērā kupu te “ihi rangaranga”. Engari i tupu ai mātou mō te āta rongu te hononga o tēnei mea o te ao wairua, ngā matangaro, ngā mata e kore e taea te kite nē. Nā, ka taea e koe te kī, “ā kei konei tētahi mea” nā roto i ngā ōro e rongu ake nei koe nē. He pērā me te hau, he matangaro hoki te hau nē. E kore e taea e koe te kite te hau. Engari e mōhio ana koe pēhea te kaha, pēnā he hau kōmirimiri. Kua kitea e koe i runga i te wai e kōmirimiri ana i ngā awa. Ngā kare o ngā wai, ērā momo kupu nē. He pai kia whakaorangia mai anō nē. Ngā hau tukituki, ngā hau pūkerikeri, ngā momo hau katoa nē. Āta noho roto i te taiao kia rongu ai koe. Ka mōhio koe “ū e mara, he mea kei te haere mai nē.

I understand the origin and depth of the term “ihirangaranga”. However, we were brought up to carefully sense the connection of this aspect of the spiritual world, the hidden, the unseen, the things you can’t physically see. But you can say, “there is something here” through the sounds you perceive. It’s like the wind, which is an invisible and elusive force. You cannot see the wind, but you know its strength, like a gusty wind. You can see it above the water when it ripples in the rivers. The murmuring waters, those kinds of words. It’s good to be reconnected to them. The pounding winds, the howling winds, all sorts of winds. Stay quietly in nature to feel it. You’ll know, Ah, something is approaching.

—Translation by Valance Smith

Within te ao Māori, ihirangaranga has the potential to be utilised for healing through sound vibrations. Sound healing has long been a traditional Māori practice that draws on various forms such as karakia, karanga, takutaku and the use of taonga puoro. In the larger network of whakapapa there are also the connections to animals, plants and environmental phenomena (Shearer, 2018). Sound healing operates on the principle of whakapapa, that all things are connected through relation to Io (The Divine Being), Papatūānuku, Ranginui and the numerous atua (gods and goddesses). These connections and relationships draw on traditional mātauranga Māori that recognises the profound whakapapa link of ihirangaranga that produces oro with the innate consciousness of mauri and wairua for healing purposes. The healing oro practices of ihirangaranga seek to restore balance and harmony by introducing specific frequencies, rhythms and vibrations and resonance. Nunns (2014) states that it was apparent within te ao Māori that sounds such as bird life, insect life and wind life were an integral part of seasonal indicators, such as planting and harvesting, but also that as well as incorporating the human voice, the sounds of taonga puoro were also regarded as te reo wairua (spiritual language) which were conduits of spiritual messages.

Taonga puoro

Taonga puoro historically held many functions in everyday Māori life, from childbirth to tangihanga, the sounds of taonga puoro were heard and utilised in many practices. The understanding of taonga puoro as a collective word for Māori singing treasures translates to taonga as tangible and intangible things that are valued and treasured (Cashell, 2021) and puoro (music relating to music, sound, or to sing; Ryan, 2012). Traditional mātauranga Māori and understandings of taonga puoro are connected to Māori cosmology and the relationships to the atua, each of whom hold whakapapa and connection to Papatūānuku and Ranginui (Oro Rua Haumanu Collective, 2024a, 2024b). Flintoff (2004) in his learnings with Hirini Melbourne and Richard Nunns, also known as Haumanu, dedicated decades to the rediscovery and renaissance of these taonga puoro. In his book, *Taonga Puoro Singing Treasures*, Flintoff (2004) characterises the rhythms of taonga puoro as coming from the heartbeat of Papatūānuku and the rangi (tunes) belonging to Ranginui. Together their descendants interlace rhythm and tune.

In conversation with tohunga Tohe Ashby (personal communication, August 11, 2023), he discusses how taonga puoro are deeply important for connection to the self as physical and spiritual manifestations but how they also shape the players of them:

Kei roto kē te orooro. Kei roto kē ngā taonga, ngā taonga puoro e kōrerohia nei. Ko te āhua i tonotonongia koe. Mea atu au, kia tika tō pupuhi i tēnei taonga. Ētahi wā, kore ko te puta kia kore e tika te puta. E ōrite ana pēnei i a tātou nei. Kāua e whati tō karakia. Pēnei anō tēnei. Practice makes perfect nē?

It’s deeply ingrained. The musical instruments, the discussed instruments, are deeply connected to you. You are shaped by them. I would say that playing this instrument correctly is

important. Sometimes, if not played correctly, it may not sound right. It's similar to us. Don't break your connection. It's like this. Practice makes perfect, right?

—Translation by Valance Smith

To make musical sounds is to sound shape, to play taonga puoro is an interweaving of *ihirangaranga* that if played with the right intention and ability, carries energetic forces that can be heard and felt and have the power to heal, to transform and to reinstate a state of *noa* (readdressing a state of balance) by addressing the balance of energies, by shifting energies and by opening portals to connect with the *atua* and one's own link to *wairua* and *mauri* (M. H. Durie, 1998; Keelan, 2013; Kerr, 2003).

Nunns (2014) refers to the sounds of the taonga puoro as conduits and connections to memory and experience, that is intimately related to the *whenua* (land) itself. The taonga puoro utilised in the soundscape design of this project integrated the sonic frequencies and vibrations of *māoriori* (pure resonance) *pūtātara* (conch shell instrument), *pūtōrino* (wind instrument), *kōauau* (wind flute) and *pūrerehua* (bull roarer).

In conversation with Kelly Kahukiwa (Ngāti Io—tribe of the North Island, New Zealand, Ngāti Whakauae, tribe of the North Island, New Zealand, Ngai Tūhoe tribe of the North Island, New Zealand and Te Aitanga-a-Māhaki, tribe of the North Island, New Zealand) (personal communication, October 5, 2023) he reveals the purpose of *māoriori* as being an understanding of a person's *whumanawa* (seat of emotions) and connection to *wairua*. By making sounds through *māoriori*, using his *hau* (breath) and holding his intention of *mauri ora*, Kelly plays to surrounding *kauri* in various places in the *ngahere*, understanding that pure resonance of these sounds are healing for sick *kauri* as it connects to the pure resonance that lives inside all living things that comes from *Io*. We were able to record *māoriori* binaurally in the *ngahere* near Mair Park at the base of *Parihaka*, *Whangārei*—a city in Northland, New Zealand, as it was played to the *kauri* there and these sounds have been utilised in the *Kauri Ora* soundscape.

Other taonga puoro such as the *pūtōrino* are referred to by Melbourne and Nunns (1999) in *Te Ku Te Whe* as the embodiment of *Hineraukatauri* (female gods of sound and music). The legend is referred to explicitly and they describe the deity as:

Her voice (a spiritual phenomenon) is pure and is replicated by the sound of the *pūtōrino* (large traditional Māori flute). The *pūtōrino* is the mechanism, which opens a portal to the spirit world so we can hear the voice of *Hineraukatauri*" (p. 6).

According to Meremaihi Aloua (as cited in Flintoff, 2004), with translation by Brian Flintoff:

Mānu ana te mauri a Hineraukatauri
e hihiko ana te wairua ki te rongu atu.
He urutapu ataahua, ko tōna tangi
he mea whakakini i te rongu o te tāne.

The mauri of Hineraukatauri floats
As the spirit quickens she can be heard.

Her song pure and ethereal.
Alluring and seductive.

(as cited in Flintoff, 2004, p. 73)

The *pūtōrino* also is unique to Aotearoa New Zealand. Its multifaceted qualities extend to expressing both a *kokiri* a te *tāne* (male voice) that produces a trumpet sound from the top of the *pūtōrino* and a quieter "waiata a te wahine [female flute voice]" (Nunns, 2014, p. 67). Having both voices within the *Mauri o te Kauri* soundscape offers connection to *atua wahine* but also aligns with the balance of both male and female voices as the *pūtōrino* has identities of both male and female resonate elements.

The *kōauau* was used in traditional Māori society for various functions and can produce an effective range of sounds that are rich and complex. *Kōauau* are linked to such occasions such as childbirth and the application of *tā moko* (traditional Māori tattoo) because the vibrations and frequencies produce healing and calming sounds (Nunns, 2014). For this purpose, the *kōauau* was utilised in the soundscape as another healing vibration.

There are many variations for the use of the *pūrerehua*. This taonga puoro is connected to *Tāwhirimātea* (god of winds) who is acknowledged as a child of *Ranginui* and *Papatūānuku*. Its special sounds come when the winds make it swirl and spin and at other times the *pūrerehua* evokes the players *wairua* as it travels up the cord to create sound, which then travels to the winds to take the intentions of the player with it (Flintoff, 2004). The sounds of the *pūrerehua* and of the connection to the winds are acknowledged within te ao Māori as messages to the spirit world (Flintoff, 2004).

The mere *pounamu* (greenstone club) belonging to and played by Selena Bercic, a Māori composer, musician, and *kaikaranga* (female caller) of *Te Rarawa* and *Te Uri o Hau*, was recorded at *Mitimiti*, a small coastal settlement located in the Northland Region of New Zealand's North Island, near the *Hokianga Harbour*. The *iwi* associated with *Mitimiti* are primarily *Ngāti Kahu ki Whangaroa* (a tribe of the *Hokianga*, North Island, New Zealand) and *Ngāpuhi* (tribe of the wider Northland area, North Island, New Zealand) also have historical connections in the wider Northland area, but *Mitimiti* itself is closely linked to *Ngāti Kahu ki Whangaroa hapū*.

The circular meditative movements of the mere *pounamu* symbolise cycles of renewal and regeneration, and represent harmony, equilibrium, and the interconnected balance and sacred spaces between the corridors of *Mitimiti* and *Te Au Warawara Forest*, which helps to reinforce the connection of the homes, *ngahere* and *moana*, of both *Kauri* and *Tohorā*. Sounds from *kohatu* (stones) were also used for healing purposes by *tohunga* with accompanying *karakia*. Nunns (2014) indicates the use of *kohatu* as "traditional healing knowledge that parallels bio-electric points and acupuncture meridians, and ultrasound treatment" (p. 61). Collectively, the vibration and frequencies of the taonga puoro utilised in the soundscape draw on traditional *mātauranga Māori* of *rongoā* (medicine and were purposely chosen, recorded and arranged to support a return to *mauri ora* for the *kauri*).

Methodology and methods

The research project is guided by the foundational principles of Kaupapa Māori, which advocate for the centrality of mātauranga Māori systems, cultural values and ways of being, in shaping the project's direction. Rooted in the pursuit of tino rangatiratanga (self-determination), Kaupapa Māori seeks to liberate mātauranga Māori holders from the constraints imposed by Western scientific norms. Thus, the project is firmly situated within a Kaupapa Māori framework, which prioritises te reo Māori me ōna tikanga—encompassing Māori language, culture, beliefs, values, and practices (Hudson et al., 2010).

Our research position privileges kōrero tuku iho over Western science, and from that position holds the key belief that karakia, taonga puoro and sound healing together do connect to the mauri of all living things and as such have the power to heal. Prayer and spiritual healing are a significant part of the medical system in many non-Western countries but their relevance in environmental management has not been fully explored. This project gives credence to karakia as a legitimate practice to enhance the mauri of all living things and advances this assumption by exploring how karakia, and other traditional soundscapes promote the health and vitality of kauri infected with kauri dieback.

Moreover, the research methodology acknowledges and addresses any potential conflicts of interest by recognising the majority of the research team and participants' connections to the Northern tribes of Ngāpuhi, particularly Te Rarawa, through ancestral whakapapa ties. Utilising research approaches, such as wānanga (knowledge gatherings, workshops, group work, self-reflection, critique, feedback sessions, and traditional waiata (traditional Māori songs)), the study delves into and informs the research process. Methods like narrative inquiry, conversational method, life history method, and consultation are deemed suitable for data collection (Walker, 2006). Through the integration of Kaupapa Māori principles with qualitative research methodologies, the project ensures a culturally appropriate and safe approach. Furthermore, Kaupapa Māori emphasises a collaborative ethos—by Māori, for Māori, with Māori—while also allowing for engagement with tauwi (non-Māori) within parameters set by Māori. This inclusive approach permits the integration of Western science into the research, albeit in a supportive role, without allowing it to dictate, shape, or validate the research agenda.

From the outset, it was of utmost importance that the communities in which this research is located be at the heart of this research project, working together, power sharing in a relationship of equals, co-designing and co-determining research opportunities where the impact of research meets the needs of the tangata whenua of Pawarenga.

As such . . . the RA2 research project—te reo o te waonui a Tāne (the voice of Tāne) was co-designed with the Pawarenga and North Hokianga communities, ensuring appropriate control and protection throughout the entirety of the project. Building trusting relationships with the Pawarenga community was integral as whanaungatanga

(relationship building, sharing of genealogy) demands the relationship outlast the project. The project involved many members of the community who were meaningfully involved in all parts of the research. The key objective is to build sustainable and lasting mana (dignity), enhancing relationships with all involved.

Furthermore, RA2 was guided by the tohunga and knowledge holders from the area. It was made clear from the beginning that all kōrero tuku iho shared was under the control of and belonged to the knowledge holders who shared it, to protect all involved and the knowledge itself. As such, data sovereignty was discussed at the very beginning of the collaboration, guided by a shared data management plan that would ensure cultural data was managed appropriately, protected and shared in accordance with tikanga (protocols and customs). In this way, interviewees and kōrero tuku iho holders and knowledge shared were valued beyond Western narratives, with research excellence being measured in outcomes that support efforts to rejuvenate kauri in the Te Au Warawara Forest affected by kauri dieback.

Results

Over the years, a variety of wānanga were held in Pawarenga, some were wānanga rongoā (Māori healing gathering)—looking at preparing rongoā. We were guided by various tohunga and mātanga (experts) in the fields of rongoā Māori, maramataka (the traditional Māori lunar calendar based on the phases of the moon) and tiroiro (careful observations).

Rereata Makiha is a graduate of the Hokianga whare wānanga (traditional house of higher learning), and we were privileged to have a relationship in which he is willing to share much of his kōrero tuku iho with us for this project.

He shared how our tūpuna (ancestors) were careful observers of nature, or tiroiro, which relates to the whakatauki (proverb) “tohu o te rangi, tohu o te moana, tohu o te whenua, ka rongo te pō, ka rongo te ao” which means, the signs of the celestial bodies, signs of the sea and signs of the land, what is felt by the night, is felt by the world. This reflects the triangulation of various environmental indicators that help to guide maramataka Māori activities optimising energy levels and outputs for various activities or periods of rest. Our tūpuna Indigenous knowledge is valid and does not require Western science to validate its authenticity (Royal, 2003). Tūpuna were scientists in their own right. Our tūpuna spent generations observing, analysing, trialling, recording and sharing their findings. Our ability to “aro pū ki te taiao [be in sync with the natural environment]” is our Indigenous ways of seeing and interacting with the world, it encourages us to follow what our environment is telling us.

(R. Makiha, personal communication, April 17, 2023).

We were guided by these understandings of tiroiro and advised as to the optimum days to carry out sonic samples in Te Au Warawara Forest, when the forest is at its quietest, when we could hear the natural rhythms of the ngahere and

the optimum days to carry out rongoā treatments, when the ngahere is most receptive to receiving healing.

Sound technologies

The capture of sonic environments surrounding one specific healthy kauri located in Te Au Warawara Forest utilised two types of microphones, the 3Dio binaural microphone and a geophone. The 3Dio binaural microphone supports the transference of sound as two-channel sound that enters a listener's left and right ears at the same time (Roginska & Geluso, 2018). Binaural sound capture has been filtered by a combination of time, intensity and spectral cues and is intended to mimic human localisation perceptions. Binaural sound is generally reproduced and experienced through headphones, but can also be simulated through speaker systems. Geophones are seismic devices that detect acoustic vibrations within the earth. The sensors are utilised to collect rich data sets that provide information about the subsurface. We utilised what is known as a vertical geophone for capturing refraction and surface waves and because they act similarly to a stethoscope that can pick up on beats and vibrations within the earth. They also have the ability to pick up on wind-swaying trees whose roots move the soil. In particular, we utilised the geophone to experiment with capturing seismic vibrations of the kauri root system by placing the geophone into the ground close to the kauri.

The 3Dio binaural microphone was also utilised to capture ambient sound recordings of karakia, karanga and taonga puoro within the cave at Morewa in Mitimiti. This environmental material also included the natural sounds such as wind, ocean, water, insects and bird life. This audio material contributes to the sonic palettes of mauri in the vibrations and frequencies of these audio materials that are used to emphasise connections to whenua and whakapapa and to the sounds of mauri ora.

All sonic material gathered was recorded with the Zoom H4 field recorder as both mono and stereo .wav files at 48 kHz at a 24-bit rate. Logic Pro X 10.7.9 digital audio workstation in the sound design had the ability to create multiple tracks of audio that allowed various arranging and editing options (Apple, n.d.).

Discussion

In Indigenous and other non-Western traditions, prayer and healing practices are intrinsically tied to ecological and environmental well-being. These practices emphasise the spiritual connection between humans and the natural world, highlighting the importance of balance and respect for nature. Whether through Indigenous prayers, African rituals, or Hindu and Buddhist practices, the act of prayer is seen as a way to seek harmony, restore health, and ensure the continuity of the relationship between the earth and its inhabitants. An example in some Native American traditions, there are ceremonies and prayers to honour the earth, water, and animals, and to ask for healing or protection for the land. These rituals often recognise the sacredness of nature, and the idea that humans have a responsibility to care for the

earth in return for its resources. As an example within the Native American Hopi and Navajo cultures, prayer is often part of the ritual process to restore balance in nature, particularly in relation to agricultural cycles. Rituals like the blessing ceremonies that contribute to nourishing crops and the land, gives an example of symbiotic relationships between humans and the earth (Deloria, 1999).

Understanding that te ao Māori integrates ancient knowledge and understandings of mauri, oro and ihrangaranga, this was woven into the healing soundscape as a symphony of oro and ihrangaranga that featured the vibrant sonic samples of a thriving kauri and its environment, captured within the unique sound signature of Te Au Warawara Forest. Harmonising within this auditory tapestry are the enchanting melodies of locally recorded parāoa (sperm whale) songs, the resonant notes of taonga puoro played at the therapeutic healing frequency of 528 Hz, layered with local takutaku, karakia and karanga. The various layers of the soundscape have been led and performed by whānau (families) from within Te Rarawa. These are not mere elements but rather essential strata of ancient wisdom and knowledge that are deeply interwoven into this sonic tapestry. Seeking to restore the life essence and vitality of the kauri, our soundscape responds to ancient wisdom of kōrero tuku iho and profound wisdom of the hapū knowledge of the maramataka Māori and the nuanced understanding of ngā kaupeka (seasons, phases of summer and winter). These tools stand as additional manifestations of mātauranga Māori, employed by mana whenua (people who have assertion over a region), as both remedies and management instruments for nurturing Kauri Ora. Ihrangaranga encompasses the frequencies and vibrations resonating within the ngahere. Serving as an inseparable part of takutaku and karakia, this enduring connection continues to hold a key role in sacred sound healing aimed at the transformation and positive shift of mauri, the life force, of all living entities.

The design of the soundscape

The Mauri o te Kauri sound design created a symphony of natural healthy sonic vibrations and frequencies of the Te Au Warawara Forest into a tapestry of wellness that includes gentle winds whispering through the trees, their wild yet soothing melody mingling with the rustle of kauri branches above. Below the surface, geophones capture the subtle vibrations of the earth, adding a grounding rhythm to the ensemble. The hum of flies and insects harmonises with the chorus of birds, while the gentle flow of water from Mitimiti adds its serene cadence. Traditional Māori instruments, such as the kauri pūkāea (trumpet and pūtōrino), alongside the kōauau and pūrerehua, resonate with ancient melodies, guided by the sacred circles of mere pounamu. The rituals of karakia led by Joanne Murray and Kawiti Waetford of Ngāti Wai, Ngātihine, Ngāpuhi, and Te Rarawa, and the soul-stirring karanga by Selena Bercic and Te Atawhai Kumar of Te Rarawa, Ngāpuhi, and Te Aupouri (a tribe in the North Island, New Zealand) infuse the air with wairua essence. Amid it all,

the 528 Hz frequency, known for its healing properties, permeates the soundscape, enhanced by the sacred vibrations of taonga puoro. As if in affirmation, the majestic song of the parāoa rings out. These whale recordings were captured during their migration past Hokianga on the West coast of the Far North, sourced from Jaycee Tipene-Thomas of Ngāti Hine and Ngāpuhi. Their clicks echo in the distance, completing this symphony of sound that nourishes the kauri and the surrounding ecosystem by encouraging and promoting mauri ora. The soundscape was 10 minutes and 37 seconds in duration.

Mauri o te Kauri soundscape file

The Mauri o te Kauri soundscape does not include the vocalisations of karakia, takutaku and the karanga as they remain a tapu part of the soundscape reserved for the healing treatment of the kauri (Sheehan, 2024).

Our project highlights the profound impact of oro and ihirangaranga in restoring balance and promoting health within ecological contexts. By emphasising the therapeutic potential of sound to heal affected environments, such as kauri ecosystems ravaged by *Kauri Mate*, by offering a unique cultural lens that extends the scope of soundscapes from Western environmental acoustic practices to a culturally impactful ecological and spiritual healing practice. This Kaupapa Māori and hapū approach brings together mātauranga Māori and kōrero tuku iho knowledge and understandings with modern sound ecology technologies, to foster an interdisciplinary approach to environmental restoration.

Theoretically, it challenges conventional views of Western acoustic sound practices by positioning oro and ihirangaranga within mātauranga Māori and kōrero tuku iho as an active worldview and approach capable of a deeper sense of interconnectedness between the environment, people and the spiritual world. It aims to heal and restore balance through these sonic practices. Practically, this methodology offers a framework for incorporating sound into environmental management and restoration efforts, paving the way for more holistic, sustainable approaches to conservation. The strengths of this project lie in its ability to bridge hapū knowledge and modern scientific technological approaches to sound healing, offering a dynamic catalyst for Kauri Ora restoration.

However, limitations exist, including challenges in measuring the direct impacts of sound on ecosystems, particularly when dealing with complex and variable environmental factors like *Phytophthora* infection. The subjective nature of sound perception also complicates the development of universal methods for sound healing, as responses may vary based on cultural, personal, or environmental contexts. Despite these challenges, the project opens up new avenues for research and application, offering innovative solutions for environmental and ecological health that are deeply rooted in both cultural heritage and scientific inquiry.

Conclusion

This project expands the field of Indigenous knowledge of contemporary sound practices within sound ecology studies and offers practical cultural sonic contributions to Kauri Ora restoration. As research continues and practical applications evolve, this methodology may serve as a valuable model for promoting sustainability, ecological health, and the well-being of both the environment and its inhabitants.

The sonic healing soundscapes will be used in Te Au Warawara Forest as part of the kauri treatments being carried out on kauri that have been identified by the Te Rarawa Kauri Ora (Te Rarawa kauri healing team) as having Kauri Mate. A sonic station has been custom built to play these sonic healing soundscapes for long periods of time. It is 2 m high pole, elevated above the ground, and supports a sleeve containing four solar panels, evenly spaced at 90° angles, each generating 10 watts of power. This arrangement provides a total power output of 40 watts at 12 volts, intentionally designed to accommodate diffused or low light levels caused by overcast weather conditions. The system is connected to a solar controller responsible for charging a high-performance 12-volt battery. The controller manages the battery's discharge at a low rate to prolong its lifespan and prevent overcharging.

Using universal serial bus (USB) cables and insulated terminals, the solar controller supplies power to two devices: a boom box with a frequency range of 40 Hz to 20 kHz and a Samsung phone preloaded with these sonic healing soundscapes. These devices play the soundscapes at varying but scheduled intervals throughout the day. The entire setup is enclosed within a durable steel casing, accessible through a hinged door secured with a magnetic clasp. The housing has dimensions of 400 mm in length, 150 mm in width, and 150 mm in depth. Directly beneath it, there is a 400 mm cradle designed to securely support the boom box.

Rongoā collected and prepared with oro

Once karakia is completed, there is open space for the rongoā Māori applications to begin. These rongoā have also been collected and prepared using healing frequencies of 528 Hz sounds and karakia carried out through all stages of its preparation and application to the kauri. During treatment applications and sonic sampling, we will carry out tiroiro or careful observations and recordings, noting the day and time on the maramataka Māori, the seven phases of summer or six phases of winter, tide times, using energy of outgoing tide during treatment applications, take photos of kauri, before treatments and during treatments, also filming treatment applications and sonic samplings as an additional way to monitor the progress of this research project and for later use to share this story as a potential documentary. Utilising tiroiro of the maramataka Māori and ngā kaupeka emphasises the interconnection between the Ranginui (skyfather), moana and whenua. These observations of environmental indicators including what we hear, see, feel and smell, heightening our ability to deeply engage and listen to the mauri of the ngahere. In doing so it enables us to synchronise ourselves to the rhythms of the ngahere and

record what we notice within these environments, such as birds, trees or flowers are in bloom, seeding, bearing fruit, what birds are around, weather for the day, wind and cloud patterns. These observations serve as tools to later help analyse the audio recordings and to guide and inform planning of optimum treatment times and sonic sampling days for promoting Kauri Ora.

In addition, as part of our ongoing monitoring and tracking of wellness progress by capturing and analysing sonic samples of both healthy and unhealthy rākau kauri, we will use global positioning satellite (GPS) location readings of these rākau receiving treatment and having sonic samples taken. By recording and analysing findings of sonic samples of our Native forest, this will help inform us of the health and vitality of both unwell kauri, healthy kauri and the surrounding forest.

Longitudinal study

The intergenerational sharing of knowledge throughout this project offered an opportunity for this to be a legacy project as it was always intended to be a longitudinal study. As a result, part of our succession plan was to work with kura (schools) and tamariki (children) in and around the local communities, who have a vested interest to foster their duty of care for our ngahere. It also provided an opportunity to identify students who showed a key interest in learning how to use the sonic recording equipment, giving them opportunities to gain fieldwork experience. The intention is that there will always be someone who knows how to use the sonic equipment, to capture and analyse sonic samples, as it returns the mauri of wellness back to our rākau kauri.

Predicted results

Despite all efforts, Western science still has not been able to find a cure for Kauri Mate, this research proposes the answer lies in kōrero tuku iho of mātauranga rongoā Māori (Māori healing knowledge), though unlocking the healing potential of ihirangaranga and frequencies. We envision this will help to restore the vitality of our kauri. This rangahau (research) provides a kōrero tuku iho, mātauranga Māori ecological sonic approach towards finding solutions that contribute to mauri ora for our kauri. Preliminary insights suggest that rongoā Māori approaches of ihirangaranga will contribute towards mauri ora for Kauri.

Authors' note

Maree Alicia Hiria Sheehan (Ngāti Maniapoto, Waikato, Ngāti Tuwharetoa, Clan Sheehan, Clan Marshall) (PhD) is Kairangahau Matua at Te Manawahoukura, Te Wānanga o Aotearoa, where she leads innovative research at the intersection of sound ecology, creative practice, and Indigenous knowledge systems. A sound ecologist, music composer, and creative practice researcher, Maree brings over 20 years of experience in the music and composition industry to her academic work. With 15 years in academia and leadership, she has contributed to the revitalisation and global visibility of Māori sonic arts and research of wāhine Māori in music. Maree's research focuses on integrating mātauranga Māori and sonic practices to explore relationships between people, place, and environment. As a contributing

member of her hapū, her work is grounded in whakapapa, tikanga, and a commitment to intergenerational knowledge transmission. Maree continues to bridge artistic innovation and Kaupapa Māori research to foster transformative outcomes for communities and the wider creative sector.

Joanne Murray (Te Rarawa, Ngāti Hine, Ngāpuhi) descends from Ngāti Haua and Te Tāwhui (Whangapē), and Te Orewai (Pipiwai). She brings over 35 years of leadership across education, environmental, and health sectors; including senior roles as kaupapa Māori science and environmental educator, Tumuaki (principal), Ministry of Education facilitator, Rongoā Māori practitioner / Collective Lead and regional researcher. Joanne was raised alongside her great-grandmother, and rongoā Māori and maramataka were integral parts of daily life. Her understanding was further deepened through the guidance of esteemed knowledge holders, whose willingness to share has helped ensure the intergenerational transmission of kōrero tuku iho. Joanne is currently completing a Master's of Māori Indigenous Leadership, with a focus on ihirangaranga (vibration & frequency), sound healing and rongoā Māori as part of this Mauri o Te Kauri project. She works nationally with Te Aho Tū Roa for Toimata Foundation, leading iwi and hapū-driven environmental research initiatives for over 14 years, advocating for Indigenous-led research futures.

Valance Smith (Ngāti Mahuta, Te Parawhau, Te Uriroi, Te Mahureure ki Whatitiri) (PhD) is of Māori, English, and Chinese descent. He is the Kaihautū Tiriti—Tiriti Strategist at AUT, providing strategic, academic, and cultural leadership with a focus on the implementation of Te Tiriti o Waitangi, transformational change, and culturally grounded development. Valance is solutions-focused and process-oriented, with a strong commitment to bringing people with him on the journey. At the heart of his work is a relational approach grounded in the building of meaningful relationships, which enables effective collaboration in shaping organisational strategies, goals, and business plans that honour Te Tiriti and uplift all communities.

Valance's relational approach also underpins his commitment to community-led and iwi-led research, recognising these as vital to sustainable, intergenerational succession. His current research interests include mātauranga Māori solutions to kauri dieback, the connections between maramataka and physical activity, and wāhi ako and innovative learning environments (ILEs) that reflect and respond to Māori ways of knowing, being, and learning.

Acknowledgements

He maimai aroha ki aku pāpā, ki aku tohunga whatukura a Frank Herbert me Hēmi Waiwai, e kore te aroha e mutu, haere kōrua, hoatu, okioki atu ai.

—With love, we farewell papa Frank and papa Hēmi

We acknowledge with deep gratitude the hapū of Te Uri o Tai o Pawarenga, Ngāti Haua of Whangapē, Te Tāwhiu of Whangapē and Te Rangī, and Hokokeha and Te Tao Maui of Mitimiti and Te Runanga o Te Rarawa. In particular, we extend our heartfelt thanks to Te Ōhāki Marae in Pawarenga for their manaaki and steadfast support throughout this kaupapa, the Te Rarawa Kauri Ora rōpū, the Manu Taupunga rōpū, the Kauri Ora Mātauranga Rongoā rōpū, Te Aho Tū Roa (Toimata Foundation), and to the many kuia, kaumātua, and mokopuna—we are deeply humbled by your generosity of spirit in welcoming us into your rohe, caring for us, and most importantly, sharing your kōrero tuku iho and lived experiences. We also acknowledge the support of Te Tira Whakamātaki, AUT, Ngā Rākau Taketake and the National Science Challenge. This kaupapa stands firmly on the principle that research must be community-led and iwi-led, with mātauranga and aspirations determined by the people of the whenua. Our role

is to walk alongside and support these aspirations—to listen, uplift, and contribute where appropriate, ensuring that the knowledge, values, and priorities of whānau, hapū, and iwi remain at the centre of the work.

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Funding

The authors disclosed receipt of the following financial support for the research, authorship and publication of this article: Research funded by the Ministry of Business, Innovation and Employment, New Zealand Biological Heritage National Science Challenge, Strategic Science Investment Fund – Ngā Rākau Taketake C09X1817.

Declaration of conflicting interests

The authors declared no potential conflicts of interest with respect to the research, authorship and publication of this article.

Glossary

aro pū ki te taiao	be in sync with the natural environment
atua wahine	female gods
atua	gods and goddesses
hapū	sub-tribes
hau	the breath of the divine spirit; breath
Hine-ahu-one	female entity from the earth
Hinemoana	female entity of the sea
Hineraukatauri	female gods of sound and music
Hine-ītama	daughter of Hine-ahu-one
Hinewao	female entity of the forest
Hokokeha	a sub-tribe of Mitimiti, North Hokianga, North Island, New Zealand
ihirangaranga	vibrations
Io	The Divine Being
Io-Taketake	The Creator
iwi	tribes
kaikaranga	female caller
kaitiaki	environmental protectors
karakia	chants
karanga	the ceremonial call
Kaupapa Māori	Māori-led research methodology
kauri	a coniferous tree, northern New Zealand; <i>Agathis australis</i>
Kauri Mate	<i>Phytophthora agathidicida</i> ; dieback
Kauri Ora	Kauri Wellness
kōauau	wind flute
kohatu	stones
kokiri a te tāne	male voice
kōrero tuku iho	traditional Māori oral knowledge and understandings
kura	schools
mana	pride, dignity, credence
mana wahine	maternal strength and prestige
mana whenua	people who have assertion over a region
Māori	the Indigenous peoples of New Zealand
māoriōri	pure resonance
maramataka Māori;	the traditional Māori lunar calendar based on the phases of the moon
mātanga	experts

mātauranga Māori	Māori knowledge
mātauranga rongoā	Māori healing knowledge
Māori	
mātauranga tuku iho	Māori knowledge handed down
mauri	life force
mauri mate	a state of unwellness
mauri ora	life energy; a state of wellness
mere pounamu	greenstone club
moana	ocean, sea
ngā kaupeka	seasons, phases of summer and winter
ngahere	forest
Ngai Tūhoe	a tribe of the North Island, New Zealand
Ngāpuhi	a tribe of the wider Northland area, North Island, New Zealand
Ngāti Hau	a sub-tribe of Whangapē, North Hokianga, North Island, New Zealand
Ngāti Hine	a tribe of the central and east coast of the Northland Region, New Zealand
Ngāti Io	a tribe of New Zealand
Ngāti Kahu ki Whangaroa	a tribe of the Hokianga, North Island, New Zealand
Ngāti Wai	a tribe of the east coast of the Northland Region, New Zealand
Ngāti Whakaue	a tribe of the North Island, New Zealand
Ngāi Tahu	a tribe of the South Island, New Zealand
noa	readdressing a state of balance
oro	sound
Papatūānuku	Earth Mother
pūkāea	trumpet
parāoa	sperm whale
pūrākau	story
pūoro	music
pūrerehua	bull roarer
pūtātara	conch shell instrument
pūtōrino	wind instrument
rākau rangatira	ancestor tree
rangahau	research
rangi	tunes, sky
Rangi; Ranginui;	Sky Father
Rangi-nui	
Rangi-nui-a-Tamaku	the first 12 heavens
Rangi-nui-e-tū-nei	the great sky standing above
te reo wairua	spiritual language
rongoā	medicine
rongoā Māori	traditional Māori healing practices
tā moko	traditional Māori tattoo
takutaku	traditional Māori ritual chant for healing
tamariki	children
Tāne Mahuta	male entity of the forest
Tangaroa	male entity of the sea
tangata whenua	people of the land
taonga puoro	traditional Māori instruments
taonga tohorā	the revered whale
tauīwi	non-Māori
Tāwhiri mātea	god of winds
Te Aho Tū Roa	an environmental regenerative programme
Te Aitanga-a-Māhaki	a tribe in the North Island, New Zealand
te ao Māori	the Māori world
Te Aupouri	a tribe in the North Island, New Zealand
Te Mauri o te Kauri	The Health of Kauri
Te Rangi	a sub-tribe of Mitimiti, North Hokianga, North Island, New Zealand
Te Rarawa	a tribe in the northern North Island, New Zealand
Te Rarawa Kauri Ora	Kauri healers from Te Rarawa

te reo Māori me ōna tikanga	encompassing Māori language, culture, beliefs, values, and practices
te reo o te waonui a Tāne	the voice of Tāne
te reo wairua	spiritual language
te taio	the natural world
Te Tao Maui	a sub-tribe of Mitimiti, North Hokianga, North Island, New Zealand
Te Tāwhiu	a sub-tribe of Whangapē, North Hokianga, North Island, New Zealand
Te Uri o Tai	a sub-tribe of Pawarenga, North Hokianga, North Island, New Zealand
tikanga	protocols and customs
tino rangatiratanga	self determination
tirotiro	careful observations
tohorā	whale
tohunga	expert practitioner
tuakana	older brother
tupuna	ancestor
tūpuna	ancestors
waiata	song; traditional Māori songs
waiata a te wahine	female flute voice
wairua	spirit, soul
wānanga	knowledge gathering
wānanga rongoā	Māori healing gathering
Warawara Whakaora Ake Komiti	Warawara Whakaora Ake committee
whakapapa	genealogy
whakatauki	proverb
whānau	family
whanaungatanga	relationship building, sharing of genealogy
whare wānanga	traditional house of higher learning
whatumanawa	seat of emotions
whenua	land

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