



Research

A representation of a *Tuawhenua* worldview guides environmental conservation

*Puke Timoti*¹, *Philip O'B Lyver*², *Rangi Matamua*³, *Christopher J. Jones*² and *Brenda L. Tahi*¹

ABSTRACT. Indigenous peoples and local communities interact with approximately two-thirds of the world's land area through their worldviews and customary tenure regimes and offer significant knowledge contributions and lessons about sustainability. We worked with *Tuawhenua* Māori to document domains, concepts, and mechanisms within the worldview representation in a way that could guide environmental conservation in New Zealand. We then applied the framework to a cultural keystone species for *Tuawhenua*, the *kererū* ([New Zealand pigeon [(*Hemiphaga novaeseelandiae*)] to elucidate this human–environment relationship. *Whakapapa* (genealogy), *whenua* (land), and *tangata* (people) were interconnected domains that formed the conceptual basis of our framework. Within these domains, the concepts of *mauri* (life essence), *mana* (authority), and *ihi* (vitality) guided the expression of the community's relationship with the environment. Cultural expressions related to the *kererū* demonstrated the cultural significance of the bird to *Tuawhenua* that went well beyond the ecological and intrinsic value of the species. The *Tuawhenua* worldview representation also emphasized the human–nature relationship and the role that metaphor plays in expressing this relationship. Indigenous peoples and local community worldviews are important for establishing priorities, reconciling the human relationship with the environment, and facilitating the coproduction of knowledge in response to pressing local and global environmental conservation issues.

Key Words: *environmental conservation; indigenous peoples; kererū; Māori; worldview*

INTRODUCTION

The worldviews of indigenous peoples and local communities (IPLCs) are important for environmental conservation and management globally. Indigenous peoples and local community worldviews offer alternative perspectives centered on the quality of the human–environment relationship compared with worldviews that are dominant in modern societies and which are often materialistic and dualistic and assume the superiority of humankind (Van Opstal and Hugé 2013). Indigenous peoples and local communities interact with approximately two-thirds of the world's land area through their customary tenure regimes (Alden-Wily 2011, Rights and Resources Initiative 2015, Brondizio and Le Tourneau 2016) and offer valuable approaches and knowledge contributions to environmental sustainability (Tengö et al. 2017). The diversity of customary regimes is characterized by highly context-specific worldviews and knowledge systems (Johnson et al. 2016). The ability for IPLCs to express their worldviews through customary tenure regimes, however, is often confounded by the governments of countries that do not formally recognize IPLCs as having common ownership or statutory control over their lands, which may be as little as 5% of the land area in many countries (Rights and Resources Initiative 2015). Consequently, the institutions and common law that affect the presence and actions of people on these lands frequently reflect the worldviews and priorities of the ruling governments rather than those of the IPLCs (West et al. 2006, Lyver and Tylanakis 2017, Ruru et al. 2017). These fundamental differences in worldviews are creating increasing conflict as degradation of land, isolation from lands, and pressures over natural resources mount (Craig et al. 2012).

Worldviews can be defined as coherent collections of value orientations and cognitive maps that allow people to orient and make sense of their world (Aerts et al. 1994, Vidal 2008, van Egmond and de Vries 2011, Van Opstal and Hugé 2013). As

defined by Haverkort and Reijntjes (2007:431), “a worldview (or cosmovision) is the way a certain population perceives the world (or cosmos). It includes assumed relationships between the human world, the natural world and the spiritual world. It describes the perceived role of supernatural powers, the relationship between humans and nature, and the way natural processes take place.” Worldviews represent the ethical basis, principles, and assumptions around which people and populations organize themselves to interact with nature (Allport 1935, Haverkort and Reijntjes 2007). All humans are subject to different environmental conditions and behave within different contexts; therefore, “culture” as a factor exerts a major influence on worldviews and attitudes (Van Opstal and Hugé 2013).

While the legal recognition of land rights remain outstanding around the world, efforts to recognize IPLC rights in some countries have facilitated the rise of goals within contemporary environmental conservation systems to implement customary worldviews and tenure regimes (Berkes 2010). The fundamental weakness in this paradigm shift is that the worldviews governing institutions and technologies remain largely those of industrialized western governments and seldom represent those of the IPLCs (Mistry and Beradi 2016). Despite the rights of IPLCs being enshrined within the constitutions, policy, and common law of some countries, asymmetries in environmental governance and management remain (Brondizio and Le Tourneau 2016). Furthermore, problems related to the identification and use of effective methods for bridging a diversity of worldviews and indigenous knowledge systems have emerged from these processes (Agrawal 2002, Raffles 2002, Stevenson 2006), although conceptual and institutional approaches to mitigate these issues are well described internationally (Davies et al. 2013, Tengö et al. 2014, Rathwell et al. 2015). Indigenous peoples and local community worldviews also typically guide

¹Tūhoe Tuawhenua Trust, ²Landcare Research, ³University of Waikato

action at local levels, so are seldom applied at national or international scales (Walsh et al. 2013). Therefore, the capacity of government frameworks to engage indigenous peoples' worldviews, including their values, knowledge, approaches, and cultural expressions, remains challenged (Houde 2007, Ens et al. 2015).

Notwithstanding the issues, the need to engage IPLC worldviews as guides for “weaving diverse knowledge systems” to achieve methods and effective outcomes for people and the environment remains (Johnson et al. 2016, Tengö et al. 2017). Exposure to, and insights into, these worldviews would also provide actors who are responsible for institutions and technologies with a better understanding of “alternative ways of knowing” (Dods 2014), which would aid cross-cultural learning (Walsh et al. 2013). The objective of this study, therefore, was to represent a worldview of a Māori tribal group, *Tuawhenua*, in New Zealand in a way that could guide environmental conservation and land management. We describe and translate the core domains, concepts, and mechanisms that inform a representation of a *Tuawhenua* worldview. We then use *Tuawhenua* cultural expressions that are relevant to the *kererū* (New Zealand pigeon [*Hemiphaga novaeseelandiae*]) to demonstrate the applicability of this worldview representation. Finally, we discuss the need to reframe governance and related policy mechanisms to facilitate the expression of IPLC worldviews and strengthen cultural integrity as part of environmental conservation.

METHODS

Describing the *Tuawhenua* worldview

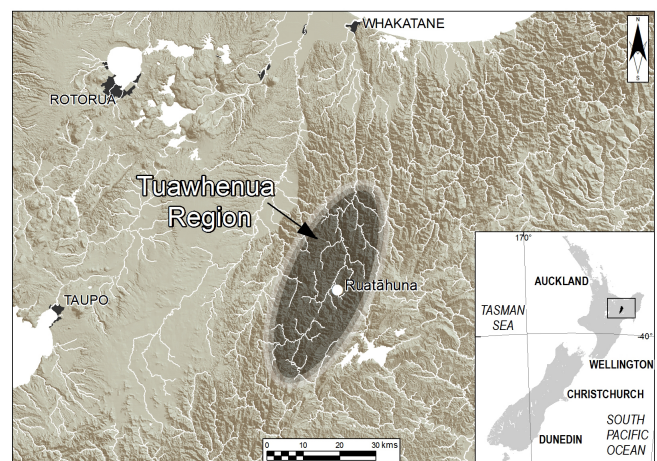
We documented a worldview representation by using a two-stage process in working with *Tuawhenua* elders and forest users from the Māori community of Ruatāhuna. Ruatāhuna is located in the heavily forested Te Urewera mountain ranges of New Zealand's North Island and consists of approximately 72 households clustered around 10 traditional *marae* (meeting places) (Morunga and Tahī 2013) (Fig. 1). The first stage involved constructing a preliminary worldview representation through one-on-one meetings with a subgroup of eight tribal elders ($n = 15$ meetings; range = 1–4 hours long). The worldview representation was updated iteratively through this series of meetings. The second stage involved using two one-day workshops, mostly with elders but also with some younger members from the *Tuawhenua* community, to further critique and verify the representation. The first workshop was attended by 13 participants (mean age: 60 years; age range: 39–80 years); the second was attended by 11 participants (mean age: 67 years; age range: 57–80 years). Both workshops were conducted primarily in the Māori language. Dialogue at both the meetings and workshops revolved around the definition and explanations of the domains and concepts within the worldview, mechanisms that linked the structure of the worldview, and the applicability of worldview in the context of *Tuawhenua*.

Engaging *Tuawhenua* knowledge of the *kererū*

To explore the function of the *Tuawhenua* worldview representation as it related to the *kererū*, we used indigenous knowledge contained within interviews conducted with elders and forest users in the community between 2004 and 2014. The *kererū*, a fruit pigeon, was abundant historically within Te Urewera

forests and was a significant source of food and feathers for *Tuawhenua*. Despite its population decline over the last 75 years (Lyver et al. 2008), it still holds significant cultural value for the *Tuawhenua* people. A purposive semidirected approach was used to interview participants (Huntington 2000, Telfer and Garde 2006). Although some participants lived outside Ruatāhuna at the time of their interview, all were originally from the community. Most interviews were conducted in the Māori language and were transcribed and translated into English before being verified by *Tuawhenua* researchers who were fluent in the local dialect.

Fig. 1. Location of the *Tuawhenua* region and community of Ruatāhuna within the forested mountainous region of Te Urewera on the North Island of New Zealand.



The first round of interviews (*Mātauranga o te kererū* - Traditional knowledge of the *kererū*) was conducted between 2004 and 2007 and focused on the biocultural context of *kererū* and the forest for *Tuawhenua*. We interviewed 10 male elders (mean age: 62 years; age range: 50–84 years) who were identified as having knowledge pertaining to the *kererū*. The second round of interviews (*Mātauranga o te Tuawhenua* - Traditional knowledge of the *Tuawhenua*) was conducted between 2011 and 2012 and focused on oral histories related to the use of forest resources (e.g., the *kererū*) by community members ($n = 18$ participants; mean age: 66 years; age range: 49–79 years). Lastly, the third round of interviews (*Mātauranga o te taiao* - Traditional knowledge of the environment) was conducted with *Tuawhenua* elders and forest users between 2013 and 2014. These interviews focused on the connection between the community and the forest, and on trends and changes in biodiversity ($n = 39$ interviews [three interviews were conducted with two or more participants present]: 29 male participants, 14 female participants; mean age: 58 years; age range: 18–82 years).

Validity was assessed using convergent triangulation (Creswell and Miller 2000) between *Tuawhenua* interview narrative, documentary, and artistic cultural expressions related to the *kererū*. Cultural expressions pertaining to the *kererū* came from unpublished *Tuawhenua* literature and traditional art works. A workshop with *Tuawhenua* elders and forest users ($n = 11$ participants; mean age: 67 years; age range: 57–80 years) was used

to augment and verify the accuracy and context of narrative related to the *kererū* as well as alignment to the worldview categories.

Ethical approval for the research

This study emerged from discussions between researchers and the *Tuawhenua* community as part of a 15-year forest research initiative. As a first step, the concept was formally introduced to the *Tuawhenua* community through a series of meetings and workshops. Guidelines and ethical approval to conduct the research were considered and approved as part of a Memorandum of Understanding between the host research institute, Landcare Research, and the *Tuawhenua*. In addition, a signed cultural safety agreement between individual researchers and *Tuawhenua* detailed obligations regarding prior and informed consent, intellectual property and ownership of traditional and scientific knowledge, confidentiality, reporting back to the community, process for the release of results and breaches of the agreement, and researcher accountability to the *Tuawhenua* community. Two of the authors of this paper are *Tuawhenua*.

RESULTS

Core domains, concepts, and mechanisms within a representation of a *Tuawhenua* worldview

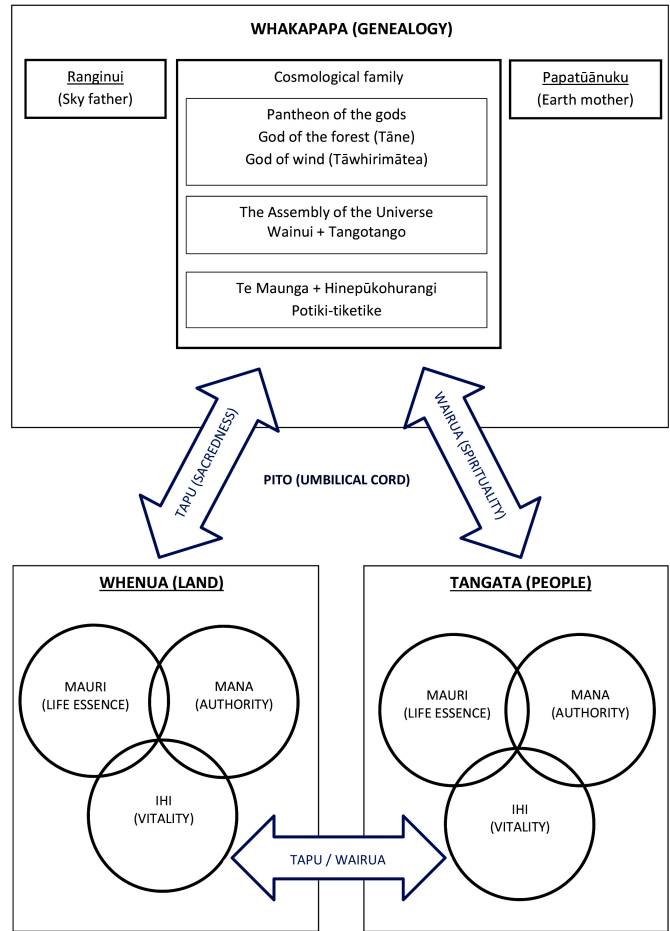
The *Tuawhenua* worldview representation was constructed around three domains broadly described as *whakapapa* (genealogy), *whenua* (land and environment), and *tangata* (people) (Fig. 2). Interlocking concepts of *mauri* (life force), *mana* (authority), and *ihi* (vitality) were constructed within the domains of *tapu* (sacredness or to be placed under restriction) and *wairua* (spiritual essence) (Fig. 2).

Whakapapa: *Tuawhenua* participants interpret *whakapapa* broadly as “genealogy” and consider it to be a sequential system that portrays the interconnectedness between all elements of the living and nonliving realms. *Whakapapa* connects *Tuawhenua* with their ancestors and defines their obligations to their environment. It is also interpreted as “origins” that binds the heavens to the earth. It is the root term for *raupapa*, denoting the order or layering of elements culminating in creation. A thorough understanding of *whakapapa* is considered by *Tuawhenua* elders to be pivotal to understanding their ideology and connection with the environment.

“Be watchful that you do not harm your elder *Tāne*” (god of the forest; the originator of people and the forest) (Wharehulia Milroy 2016, *Mātauranga o te taiao* meeting, Rotorua).

Whenua and Tangata: The importance of *whenua* (land) and the plants and animals upon it has a significant link to the domain of *whakapapa* (Fig. 2). *Tuawhenua* participants locate themselves as being part of the *whenua* and the living *whakapapa* of that environment. In the context of this study, *whenua* encapsulates land, as well as the environment that nurtures and nourishes people. *Whenua* also translates as the placenta that sustains the baby through pregnancy. The essence of the word symbolizes the connection *Tuawhenua* have with their land. *Tangata* is translated as “people,” including individuals, families, subgroups, and communities (Fig. 2).

Fig. 2. *Tuawhenua* worldview built around the three key domains of *whakapapa* (genealogy), *whenua* (land and environment), and *tangata* (people), and its function governed by the concepts of *mauri* (life force), *mana* (authority), and *ihi* (essential energy, feeling, and emotion).



Mauri: *Tuawhenua* participants describe *mauri* as life essence or life force which is linked intrinsically to *whakapapa*. It is a concept that describes the representativeness and condition of the relationships and responsibilities between elements of *whakapapa*. *Mauri* denotes the interconnectedness and appropriate sequential order of elements within *whakapapa*. *Tuawhenua* recognize that people have a critical role to protect the *mauri* of the environment. They also acknowledged that everything has a *mauri*, and that at times it can be invoked or instilled into someone or something to maintain the set of obligations within the *whakapapa*.

“You hold the life essence. That is your role—to maintain the vitality within your world” (Te Mahururangi Te Kawa 2015; *Mātauranga o te taiao* interview; translated from Māori, *Ruatāhuna*).

Mana: *Mana* was acknowledged by *Tuawhenua* participants as being authority and prestige that is derived from within the domain of *whakapapa* and the relationships that exist through this sequential order. *Tuawhenua* describe everything as having *mana*,

although the degree of *mana* assigned to a person, object, or entity could vary. The notion of *mana* can be inherited, and it provides a person with an unbroken link to their past and connects them to their future. It was also recognized that *mana* could be earned and acquired by an individual or grouping of people throughout the course of their lives. Participants reported that virtually every aspect of an activity had a link with the maintenance and enhancement of *mana*, which meant that it was also linked closely to the concept of *mauri*.

Ihi (*wehi* and *wana*): *Tuawhenua* participants recognize *ihi* as the vitality or energy that emulates from places, items, people, and significant events. For example, *ihi* can be felt on occasions when practitioners deliver outstanding cultural performances. It can also exist within an inanimate object or landmarks that are believed to be imbued with their own power. *Tuawhenua* recognize that the concepts of *ihi*, *wehi*, and *wana* could operate as single emotions or together as an assemblage. *Wehi* is a response to *ihi* and means to be “in awe” or overcome with admiration, reverence, or fear. It is also described as an emotional reaction to the acknowledgement of *ihi*. *Wana* is interpreted as the inspirational force and is the result of combining *ihi* and *wehi*. It is a heightened emotional state that unites a range of emotions and connects people to place, objects, landmarks, and other people. Collectively, *ihi*, *wehi*, and *wana* are used by *Tuawhenua* to gauge the vitality of the *mauri* and the *mana* within the *whenua* and *tangata* domains.

“Te *ihi*, te *wehi*, te *wana*. Those are your emotions. Those are your indicators in a Māori worldview to assess the vitality of the *mauri* and the *mana*. When you travel in different areas you feel the essential energy” (Te Mahururangi Te Kaawa 2015; Mātauranga o te taiao workshop; translated from Māori, Ruatāhuna).

Tapu and *wairua*: The mechanisms of *tapu* and *wairua* are integral to the function of the worldview representation. *Tapu* is expressed by *Tuawhenua* as being something that is set apart, sacred, or forbidden with an untouchable quality. It was described as having innate qualities, drawing those from its origins within *whakapapa*. Participants recognize that applying *tapu* places animate or inanimate objects under restriction, therefore often imbuing those objects with *mana* or a greater level of reverence. The function of *tapu* was to provide boundaries and protect the *mana* and *mauri* of a place, object, time, species, person, or people. *Tuawhenua* participants also recognize that *tapu* is pivotal for understanding and exercising *wairua*. *Wairua* is described as the spiritual essence or soul carried within a person (or other life forms) that is released usually at the point of death, or sometimes during sleep. It also refers to an unseen realm that connects the person with the past, the present, and the future. The metaphor of the *pito* (umbilical cord) in the worldview representation is used to denote the conduit for infusing the three domains with *wairua*, which is governed by *tapu*.

“*Tapu* is a tool to place a protective cover over something you treasure. It provides protection for a resource when not in use so it be utilized at a later date” (Te Rongonui Tahī 2015; Mātauranga o te taiao wānanga; translated from Māori, 27 June 2015, Ruatāhuna).

“*Wairua* is intangible. You know that it is there or it exists but you can’t touch it or see it” (Tangiora Tawhara, Mātauranga o te taiao 2015, Ruatāhuna).

Function of a *Tuawhenua* worldview representation: a case study of the *kererū*

Function of the *Tuawhenua* worldview representation was exemplified through the relationship of *Tuawhenua* with the culturally significant bird species, the *kererū* (Table 1). *Tuawhenua* participants spoke about the forests of Te Urewera being renowned historically for the abundance of *kererū* and the community for its ability to provide the bird as a revered food. *Kererū* represents a shared identity for both the land and people (Table 1). It is regarded by *Tuawhenua* to be a *manu rangatira* (noble bird) within the *whakapapa* of the forest with significant *mana* and therefore holds a status above other birds in the forest. Names of places in the forest and other forest species reflect their relationship with the *kererū* (Table 1). The elevated position of the *kererū* within *Tuawhenua whakapapa* meant that it was considered to be imbued with significant *mauri*, which is reflected in the *ihi* associated with the bird (Table 1).

“No sooner had I finished my prayers I heard this thundering coming up the valley like a jet and I thought, ‘Oh! I’m in trouble here.’ Then I heard this sound, ‘Whoooooosh!!!’ By crikey, the trees are moving and they were quite a distance away when they turned around and it was white everywhere. There was a constant cooing all over the place. I was in awe and shivering with fear. I was so afraid I could feel my hairs standing. Some time went by and my excitement finally settled” (Poai Nelson; Mātauranga o te Tuawhenua 2011, translated from Māori, Ruatāhuna).

The *ihi* or the emotion that emanated from experiencing large flocks of *kererū* (300+ birds) congregating in the forest during the autumn to feed on the fruit of the *toromiro* (*Prumnopitys ferruginea*) is reported by *Tuawhenua* elders to reflect the health and vibrancy of the *mauri* in the forest (Table 1). Arrival of these immense flocks into the forest would elicit an intense emotional response in a hunter. Over the last 75 years, however, the *kererū* population has undergone an extensive decline, which has affected the *mana* of the *whenua* (Te Urewera) as a stronghold for *kererū*, and *tangata* (*Tuawhenua* people) as stewards of these birds.

The elevated status of the *kererū* also meant that consumption of the bird historically was often restricted to occasions of significance, and the bird was served mainly to guests and individuals of high rank within the tribe (Table 1). Garments (e.g., *korowai* [traditional cloak]) made from the feathers of *kererū* were generally reserved for women of high-ranking status (Table 1); however, this changed the nature of the woman’s relationship with the bird.

“The high-ranking women that wear the precious cloaks made of *kererū* feathers to enhance and wrap around one’s body do not eat the *kererū*. Eating the *kererū* lifts the *tapu* from the person so they become ‘common’ (*noa*); however, if the person wears a cloak of *kererū* feathers this makes the person highly revered (*tapu*) with respect to the *kererū*. So therefore this is why lore exists. The cloak made of *kererū* feathers is made of just *kererū* feathers and nothing else. Since the *kererū* is so revered, feathers from other birds are not used. This is why women of high status that wear cloaks made of *kererū* feathers do not eat *kererū*” (Moai Tihi, Mātauranga o te *kererū* interview, 14 April 2004, Tāneatua).

The importance of *wairua* and *tapu* within *kererū* harvest practices was emphasized by *Tuawhenua* (Tables 1, 2, and 3). Historically, strict observances around *kererū* harvest practices and protocols

Table 1. Examples of cultural expressions (as they relate to a cultural keystone bird species, the *kererū*, [New Zealand pigeon, *Hemiphaga novaeseelandiae*]) contained within the conceptual domains (*whakapapa* – genealogy; *whenua* – land; *tangata* – people) and concepts (*mauri* – life force; *mana* – authority; *ihi* – vitality) of a *Tuawhenua* worldview representation. As portrayed in Fig. 2, the domains and concepts are not mutually exclusive but rather overlap and interact with each other constantly.

Domain	Concept	<i>Tuawhenua</i> cultural expressions associated with the <i>kererū</i> (New Zealand pigeon)
<i>Whakapapa</i> (Genealogy)		<p><i>Kererū</i> (New Zealand pigeon [<i>Hemiphaga novaeseelandiae</i>]) is considered by <i>Tuawhenua</i> to be the treasured bird of <i>Tāne</i> (god of the forest). <i>Tāne</i> is personified in a number of forms. <i>Tāne-mataahi</i> was personified as the father of most birds, like the <i>kererū</i>, the <i>kōkō</i> (tūi [<i>Prosthemadera novaeseelandiae</i>]), and <i>kōparapara</i> (bellbird [<i>Anthornis melanura</i>]).</p> <p>The white breast feathers of <i>kererū</i> were used in traditional cloaks and signified <i>Te Maro o Tāra</i>nga, which refers to the linkage with <i>Maui-tikitiki</i> (first man) and <i>Tāra</i>nga (his mother).</p> <p>The white breast feathers of the <i>kererū</i> signify <i>Te Maro o Tāra</i>nga (<i>maro</i> – the frontal apron or waist garment; <i>Tāra</i>nga – mother of the demi-god, <i>Maui-tikitiki</i>). <i>Te Maro o Tāra</i>nga is in reference to <i>Maui-tikitiki</i> because <i>Tāra</i>nga was his mother. The <i>maro</i> was often made from the tail skin of a <i>kuri</i> (Māori dog [<i>Canis lupus familiaris</i>]) because of its white coloring. The blue neck feathers from the <i>kererū</i> were woven into a belt for the waist garment. This belt was referred to as <i>Te Tātua a Tāra</i>nga (the belt of <i>Tāra</i>nga).</p> <p>Proverbs related to <i>kererū</i> were important and often denoted significant relationships between <i>atua</i> (gods) in the <i>whakapapa</i> (genealogy) and the connection to <i>kererū</i>. For example, <i>Rehua ki te Rangī, Tāne ki te whenua; Tāne ki te Rangī, Rehua ki te whenua</i>. <i>Rehua</i> (personified by the star, Antares) is the brother of <i>Tāne</i>. The proverb indicates that when Antares appears on the horizon of the winter sky, that is the time to harvest <i>kererū</i>.</p> <p><i>Te Maunga</i> (the mountain) and <i>Hinepūkohurangi</i> (Mist maiden) are the eponymous ancestors of <i>Tūhoe</i>.</p>
<i>Whenua</i> (Land)	<i>Mauri</i> (Life essence)	<p>Respect for the <i>kawa</i> (rules) and <i>tikanga</i> (etiquette) related to the <i>kererū</i> were paramount. To preserve the integrity of the <i>kererū</i>, an individual's manner and way of thinking had to change while harvesting, preparing, and eating <i>kererū</i>.</p> <p>Practices that protect the <i>mauri</i> of the <i>kererū</i> included bringing the first birds harvested back to the <i>ahi tapu</i> (sacred fires) where they would be cooked and served to women.</p> <p>Strict season for harvest, governed closely by an <i>tohunga</i> (expert or priest), protects the <i>mauri</i> of the <i>kererū</i>.</p> <p>At times the <i>mauri</i> of the <i>kererū</i> is held back by <i>Tāne</i>, and therefore requires a <i>tohunga</i> to invoke the <i>mauri</i>, using ceremony and ritual so the hunters can take a harvest.</p> <p>The thundering sound from the flocks of <i>kererū</i> heard in the forest during the day represents the presence of <i>mauri</i>.</p> <p><i>Karakia</i> (prayers) were conducted at the <i>āpapa rākau</i> (trees where <i>kererū</i> perched) to draw in the <i>kererū</i>.</p> <p><i>Kererū</i> were harvested primarily by men, but those women who participated in the harvest forfeited their rights to eat the bird.</p> <p>An abundance of <i>taumatua</i> (perches) in the forest signifies abundance of <i>kererū</i> and vitality of the forest and bird.</p> <p>A booming sound sometimes heard in the forest at night is the departure of the <i>mauri</i> of the <i>kererū</i>. This signifies there has been a transgression against the rules and protocols associated with respecting and safeguarding the <i>kererū</i>.</p> <p>The practice of inserting <i>kererū</i> tail and wing feathers into the ground and then covering them over with leaf litter and soil denotes a mark of respect or practice of maintenance toward the <i>mauri</i> of the bird.</p> <p>Leaving evidence of the kill (e.g., blood, feathers, or innards) lying around in the forest violates the <i>mauri</i> of the <i>kererū</i>, which other <i>kererū</i> can sense, so make themselves unavailable.</p> <p>The decline in <i>kererū</i> abundance has been attributed to <i>Tāne</i> taking back the <i>mauri</i> of the <i>kererū</i> from man and no longer replenishing it because <i>Tuawhenua</i> were no longer harvesting the bird (because of government laws). The <i>mauri</i> of the <i>kererū</i> has been returned to a higher power than a human organization.</p> <p><i>Kererū</i> have a critical role in maintaining the <i>mauri</i> of the forest because they are the only remaining forest bird species with a gape large enough to swallow and disperse some of the larger fruits (and seeds).</p>
<i>Whenua</i> (Land)	<i>Mana</i> (Authority)	<p><i>Kererū</i> is a <i>mōkai</i> (highly significant species) for <i>Tuawhenua</i>. It is considered to be <i>Te kura huna o Tāne</i> (the hidden treasure of <i>Tāne</i>) because of its sometimes cryptic behavior.</p> <p><i>Kererū</i> is put up above all the other bird species in status because of its abundance and importance to people and the forest.</p> <p>The <i>kererū</i> is considered to be a <i>manu rangatira</i> (chiefly bird) species because of its historical abundance in the forest and important role in feeding and clothing women, esteemed guests, and high-ranking individuals in the tribe.</p> <p>Specific ceremony and customary regulations for harvesting, processing, and eating denotes the status of the <i>kererū</i>. Harvesting and processing is done in a special way not normally reserved for other species (e.g., to avoid defiling the <i>mana</i> of the <i>kererū</i>, feathers are not left scattered around forest floor, rather birds are brought back to the community for plucking and consumption).</p> <p>Only specially selected hunters can participate in the harvesting of <i>kererū</i>.</p> <p>Specific observances and practices for the eating of the <i>kererū</i> (e.g., breaking open of the bird was an honored and privileged role; there is an appropriate ritualistic method for breaking open the bird once its cooked; the <i>kererū</i> is not eaten at night).</p> <p><i>Kererū</i> is not eaten as a regular daily meal; instead, it is reserved for special occasions, such as the opening of <i>whareniui</i> (ancestral house), <i>whare karakia</i> (church), or <i>whare kai</i> (dining house). <i>Kererū</i> is not a common everyday food like chicken.</p> <p>High-ranking women who wear the <i>kererū korowai</i> (feather cloak) do not eat the <i>kererū</i>. Wearing of the cloak around the body makes the person <i>tapu</i> (sacred), while eating of the <i>kererū</i> makes them <i>noa</i> (common).</p> <p>Hunters needed to refrain from being <i>whakamomoko</i> (obstinate) toward the <i>kererū</i> if the flocks came late or were small. Hunters never boasted about the number of <i>kererū</i> they were planning to harvest. This is the respect accorded to the <i>mana</i> of <i>kererū</i>.</p> <p>You do not process or eat <i>kererū</i> with utensils because it is disrespectful to poke at something of such elevated importance.</p> <p>The traditionally weaved mat upon which <i>kererū</i> were piled and plucked was burnt once plucking was completed to preserve the <i>mana</i> of the bird.</p> <p>Names of species and locations reflect association with and importance of the <i>kererū</i>.</p> <p>The native conifer, <i>toromiro</i> (<i>Prumnopitys ferruginea</i>), is named after the way the <i>kererū</i> is required to stoop or extend its neck to feed on its fruits (<i>toro</i> – to stoop or extend; <i>miro</i> – the fruit).</p> <p><i>Tarapounamu</i> is the location where a <i>pounamu</i> (jade) spear-tip belonging to <i>Tamatea-kai-taharua</i> broke off in a <i>kererū</i> when it was lanced. The wounded bird was tracked and finally caught at a place called <i>Pūtaauaki</i>.</p> <p><i>Te Kohuru Tukuroa</i>: This site is a long ridge adjacent to the <i>Whakatane</i> River where extensive snaring of <i>kererū</i> occurred.</p> <p><i>Tapuikakahu</i> is a name of a particular <i>toromiro</i> above <i>Hanamahihī</i> on the <i>Whakatane</i> River. It was named after an act by a <i>Tūhoe</i> ancestor who came across some <i>kererū</i> caught in snares. He cast his <i>kākahu</i> (cloak) over the birds to claim them for himself (<i>tapui</i>).</p> <p><i>Te Angwhakatangitangi</i> is a sacred cave at <i>Maungapohatu</i> where the <i>karakia</i> (ceremonial prayers) were conducted to open the season for harvesting <i>kererū</i>.</p> <p><i>Te Weraiti umu tahu noa</i> is a reknown <i>Ruatāhuna</i> harvest location for <i>kererū</i> prior to it being milled. The name literally translates as “the ovens at <i>Te Weraiti</i> are always burning.”</p> <p><i>Te Uru-taumatua</i> is the post-settlement entity for the <i>Tūhoe</i> tribe; the naming is a reference to the strength and sustenance this tree provides to prosper. <i>Uru</i> is a grove of trees, and <i>taumatua</i> applies to a tree much resorted to by <i>kererū</i>, often referred to as <i>rakau āpapa</i> – tree perch of the <i>kererū</i>.</p>

(con'd)

Whenua (Land)	Ihi (Vitality)	<p>The sound of a large <i>kererū</i> flock (300+ birds) arriving was akin to a passenger jet flying into the valley. The experience would chill you and raise the hairs on your neck.</p> <p>The alighting of a large <i>kererū</i> flock (300+ birds) settling into the trees was like snow across the canopy and left you in awe.</p> <p>The constant “rustling” of the forest canopy caused by <i>kererū</i> moving around would be unnerving.</p> <p>Encountering a <i>kererū</i> nest in the forest by chance or to hear a <i>kererū</i> calling at night was a form of <i>pūhore</i> (bad omen).</p>
Tangata (People)	Mauri (Life essence)	<p><i>Karakia</i> was used prior to <i>kererū</i> harvest to (1) prepare hunters for the task ahead, (2) acknowledge the significance of <i>Tāne</i> and the <i>kererū</i>, and (3) maintain and prolong the harvest opportunity.</p> <p><i>Tohunga</i> (expert, specialist, or priest) or special person of influence was responsible for maintaining, or if <i>kererū</i> were scarce, invoking the <i>mauri</i> of the <i>kererū</i>.</p> <p>Eating of the <i>kererū</i> by pregnant women transferred the <i>mauri</i> of the bird to the unborn baby.</p> <p><i>Kaumātua</i> (elders) will offer prayers to the gods (to the unseen) so that the hunters can wave away any obstacles or bad omens and achieve the correct observances to allow the hunt to proceed safely and easily.</p> <p><i>Tuawhenua tohunga</i> and/or <i>kaumātua</i> used <i>karakia</i> (prayer) prior to the serving and eating of the <i>kererū</i> to ensure the <i>mauri</i> of the <i>kererū</i> remained with them, thereby allowing only the physical form of the bird to be given to other tribes. This practice warded against the <i>mauri</i> of the <i>kererū</i> departing with any visitors.</p> <p>Hunters needed to be <i>matakite</i> or in the right frame of mind and single-minded about their purpose while harvesting <i>kererū</i>.</p> <p>Community members cared for and prepared <i>kererū</i> as if it was their own heart. When <i>kererū</i> was distributed to chiefs, it was given as if it were a person’s own heart. This sealed the end of an individual’s responsibilities for nurturing the bird.</p> <p>Connections between tribes were founded upon the <i>mauri</i> of the <i>kererū</i>. Historically, there has been a rivalry between <i>Tuawhenua</i> and <i>Tūwharetoa</i> (a neighboring tribe) over holding the <i>mauri</i> of the <i>kererū</i>. If the <i>kererū</i> were absent from <i>Tuawhenua</i> lands, the <i>mauri</i> for the bird was considered to be held by <i>Tūwharetoa</i>. <i>Tuawhenua tohunga</i> would then use traditional incantations to recapture the <i>mauri</i> from <i>Tūwharetoa</i>.</p> <p>Partaking of <i>kererū</i> encapsulates the relationship with the people. “We are what we eat.” <i>Tuawhenua</i> recognized that they are part of the makeup of the forest environment. To consume <i>kererū</i>, in essence is re-establishing that link inwardly (to attain the attributes of <i>Tāne</i>).</p>
Tangata (People)	Mana (Authority)	<p>Provision of <i>kererū</i> as food demonstrates your skills and capacity as <i>kaitiaki</i> (environmental guardian) to care for the current and future prosperity of the environment.</p> <p>Revered <i>kaumātua</i> or <i>tohunga</i> are tasked with holding the <i>mana</i> and <i>mauri</i> of the <i>kererū</i>.</p> <p><i>Mana</i> comes from being able to provide <i>kererū</i> as food for high-ranking visitors.</p> <p>Decline in <i>kererū</i> populations is attributed to government usurping the <i>mana</i> for the <i>kererū</i> and forest from <i>Tuawhenua</i>.</p> <p>The elevated importance and significance of <i>rangatira</i> (chiefs) and women within <i>Māori</i> society means they are given the best parts of the bird (breast, thighs, and posterior of the bird) to eat. Men are given the bones, claws, and soup to eat.</p> <p>The eating of the <i>kererū</i> symbolized the significance of the spiritual domain. This was the spirit taken by the tribe during those times of harvesting.</p> <p><i>Korowai</i> (traditional cloaks) made from <i>kererū</i> feathers were worn by <i>māreikura</i> (noble women) or a <i>hautipua</i> (high-ranking women).</p> <p>Eating of the <i>kererū</i> by chiefs, women, and esteemed visitors is an expression of the link to <i>Tāne</i>. The <i>kererū</i> was considered the best of the foods, so the practice gives <i>mana</i> to the visitors by showing them that they are respected and important. No other food that could do that.</p> <p>Prior to serving <i>kererū</i> at a significant occasion, the <i>puha haka hari kai</i> (a ceremonial dance) would be performed to ensure that the <i>mana</i> (and <i>mauri</i>) of the <i>kererū</i> remained with the local people.</p>
Tangata (People)	Ihi (Vitality)	<p>Harvesting sites or territories for <i>kererū</i> associated with specific subtribes and families were fiercely defended by the <i>mana whenua</i> (local people).</p> <p>Prior to serving <i>huahua</i> (preserved <i>kererū</i>) at a significant occasion, the <i>puha-haka hari kai</i> (a ceremonial song and dance) would be performed to acknowledge the abundance of food and that the time of fasting was over. This tribute to the <i>kererū</i> was conducted largely by women and could be highly charged and suggestive because it linked the fertility of the land and people. As the <i>huahua</i> was laid on the table, those women participating in the <i>puha-haka hari kai</i> would take a small amount of oil and rub it into their hair to raise the <i>mana</i> of the <i>kererū</i> and to prevent others’ admirations of the <i>kererū</i>. The <i>puha-haka hari kai</i> process also safeguarded against visitors uplifting the <i>mana</i> and <i>mauri</i> of the <i>kererū</i> when they departed after the feast.</p> <p>Homage to the place or site where <i>kererū</i> were harvested was always paid by visiting chiefs.</p> <p>Boundary violations and transgressions infuriated local people, so threat of retaliation maintained the <i>ihi</i>, including <i>wehi</i> and <i>wana</i>.</p> <p>Transgression against rules and guidelines was avoided through the maintenance of <i>ihi</i>, <i>wehi</i>, and <i>wana</i> (e.g., timing of the harvesting season was very strict; a hunter would not eat during the process of harvesting <i>kererū</i>).</p> <p>Unusual behavior or events associated with the <i>kererū</i> were interpreted as acknowledgement of the relationship between the bird and people. For example, in 1987, more than 300 <i>kererū</i> were observed clinging to the wall of a cliff in <i>Waikaremoana</i> during a visit of <i>Tūhoe kaumātua</i> to a sacred cave. This event was interpreted as recognition of the people’s relationship to this particular site.</p>

(e.g., *karakia* [prayer and incantations]; cooking of the first *kererū* harvested in *ahi tapu* [sacred fires]) infused the process with *wairua* and lifted *tapu*. *Tuawhenua* recognized that these processes were used to protect the *mauri* of the forest and *kererū* in order to guarantee a good harvesting season (Table 1). Similarly, strict observances were also adhered to during the harvest itself (Table 1). The practices were used to re-establish the link to *Tāne* (god of the forest) through the *kererū*. *Karakia* by *tohunga* (specialist or expert) would establish the connection and acknowledge the *mana* of *Tāne* and of the forest (Tables 1 and 2). These practices were enacted to entice *Tāne* to pour out his abundance and enhance the *ihi* of the forest so that the harvest of *kererū* by the community would be bountiful.

“Rawiri Te Kokau was the last *tohunga* (specialist) to enact this practice in 1925. They (*tohunga*) would climb to the top of *Maungapohatu* (Tūhoe’s sacred mountain) to the caves that the *tohunga* of ancient times would visit to open the bounty of *Tāne* (god of the forest), Te Pua nui o *Tāne*” (Pou Temara, Mātauranga o te taiao meeting, 25 August 2014, Ruatāhuna).

“In 1972, Te Kaaho, John Rangihau’s uncle and others were still alive and a ceremonial feast was called, which was held with the people of Te Wai-iti. The purpose of the feast was to take back the life force of the bird to *Tāne* (god of the forest). The birds (*kererū*) were harvested and the table was set, and the prayers began. And it was upon those elders who were responsible for returning the life force of the birds back to *Tāne*” (Peho Tamiana, Mātauranga o te *kererū* interview; 22 April 2004, Ruatoki).

Tuawhenua participants reported that when an individual ate *kererū*, they were partaking in the *mauri* and *mana* of *Tāne* (Tables 1, 2, and 3). The notion that “you are what you eat” encapsulates the relationship with *Tāne*, not only as the symbol of the *kererū*, but as *Tāne*, the representative of the forest in its entirety. The attributes of *Tāne* could also be transferred to an unborn child if a woman ate *kererū* while pregnant. *Waiata* (traditional songs), *mōteatea*, *karakia*, and *haka* (ceremonial song and dance) were conducted to acknowledge the fundamental relationship the *Tuawhenua* people had with the *kererū* by capturing their history and relationship with the bird and its environment (Tables 1, 2, 3, and 4). The *haka kererū* (also referred to as the *puha-haka hari*

Table 2. Traditional *Tuawhenua karakia* (prayer and incantation) was used to entice the *mauri* (life force) and vitality of the *kererū* (New Zealand pigeon [*Hemiphaga novaeseelandiae*]), thereby maintaining its relationship with the people and ensuring its presence within the community. This example is one of many incantations and practices that were traditionally observed by *Tuawhenua* to reaffirm the unique relationship with the *kererū*. These acts are remembered in song and verse, and are painted on the rafters of traditional *Tuawhenua* meeting houses.

Te Reo Māori version	English version
<i>Hoki mai, hoki mai</i>	Return, return,
<i>Hoki mai ki to urunga</i>	Return to your abode
<i>Ki to moenga</i>	To your place of rest
<i>Ki te paepae tapu a Tāne.</i>	To the sacred perch of Tāne
<i>Hoki mai te manu ora ki te maunga koia e...</i>	Return the vitality of this bird to the mountains
<i>E ko ko koia e...</i>	And there remain.

Table 3. A *Tuawhenua mōteatea* (lament) relevant to the *kererū* (New Zealand pigeon [*Hemiphaga novaeseelandiae*]) that was delivered after formal speeches on the *marae* (traditional meeting place). This complete version was sourced from a private collection of traditional *Tūhoe* songs by the Reverend Wharetini Rangī family of *Tūhoe*, and was interpreted by Te Hauauru Tahī-Rangihau and translated by Puke Timoti.

Te Reo Māori version	English version
<i>Tēnā koutou te hua mai na!</i>	Greetings to you who have me in your thoughts!
<i>Kai te ūhia to kiri kanohi-e</i>	My eyes are covered in shame
<i>Kai te matatū tonu hia nei-e</i>	Restless I lay
<i>He manu maumu au kai te tao</i>	Like a wounded pigeon
<i>Nā Te Kurapa i whakatoro rā</i>	Taken on the end of the spear of Te Kurapa
<i>To kaihua kai Manuruhi rā</i>	On the tree perch at Manuruhi where birds are plenty
<i>He māngareka tōtoro mai rā</i>	Restlessness is my abode
<i>I te wā rā kai puhou ana</i>	I am like discarded food
<i>Ka haramai tēnei ka takoto</i>	A desired delicacy once in the time of my youth
<i>Ka pae taumoa ahau kai te whare!</i>	Here I lay in waste
<i>Te waka ia rā e te kōrero</i>	In the solitude of my house!
<i>E waiho i roto tohu mai ai</i>	In a night vision I see
<i>Kai kaihoko koe i ahau</i>	The signs of your coming
<i>Rere ana rā ki ngā hōrīre</i>	My heart is torn asunder
<i>Ka tū tonu au i te tohu</i>	Unable to be hidden within
<i>hei rāhui tapu</i>	Thou painfully affected me
<i>Ki te whanga ko Tara-mai-nuku</i>	Dedicated and set aside, at the foot of Tara-mai-nuku,
<i>Moea iho nei ahau</i>	I lay sleeping
<i>Ko Te Ihuwaka – kei ahau tonu</i>	Alas! Te Ihuwaka is still with me
<i>Oho rawa ake nei ki te ao</i>	Then I awake to the world
<i>Mapu kau au – ki taku moenga-e</i>	Sobbing – in my place of rest

kai—a ceremonial *Tuawhenua* song and dance associated with the *kererū* (Table 4) would be performed as *huahua* (preserved *kererū*) was served to esteemed guests and was used to acknowledge the seasonal abundance of food. The *huahua* was a highly nutritious, sought-after delicacy, but was presented through the *haka kererū* as the simplest of food the tribe had to offer. Serving *huahua* in this way honored the *kererū* and visitors, which in turn elevated the *mana* of the local people. It also ensured that the *mana* and *mauri* of the *kererū* remained with *Tuawhenua*. Most importantly, the *haka kererū* served to make the connection between the environment and the people, and points to the fundamental platform of life and existence—*Papatūānuku* (Mother Earth) (Tables 1 and 4). Concern was expressed by *Tuawhenua* participants that the loss of *kererū* had weakened these practices and their connection with the bird and forest.

“The women perform the *haka* while carrying the plates of *huahua* (preserved *kererū*) right up to the traditional meeting house and when they get there the plates are placed onto the table and the man who did the opening call would invite everyone to the feast. The elderly women I’m talking about were from Te Wai-iti, Tiripou, and Te Ao. They were so beautiful when they performed by lifting their hips and bottoms in a semigrating fashion and when they finished the *haka* it completed the saying, ‘Tāne’s (god of the forest) blessing on the traditional meeting house—the house of Tāne Whakapiripiri—is complete’” (Poai Nelson, Mātauranga o te Tuawhenua interview, 26 September 2011, Ruatāhuna) (Tables 3 and 4).

“This and the next generation can’t comprehend the true meaning of what it means to perform such a *haka* (*puha haka hari kai*) (Table 4) because there is nothing tangible. We don’t physically do that *haka* anymore because our relationship with the *kererū* has waned” (Tangiara Tawhara, Mātauranga o te taiao interview, 22 January 2014, Ruatāhuna).

DISCUSSION

Reconciling the separation of people from the environment

In countries with colonial histories, indigenous peoples frequently confront challenges to their cultural identity, traditional knowledge, and customary environmental stewardship responsibilities (Turner et al. 2008, Tauli-Corpuz 2016). As a result, western environmental worldviews, values, attitudes, and laws often dominate management (Stocker et al. 2016). Increased political capacity and recent advances in legislative mechanisms that support indigenous rights and return of lands offer potential for leadership by, and participation of, indigenous peoples in environmental conservation (Pitty and Smith 2011, Lyver et al. 2014, Ens et al. 2015) (e.g., the Te Urewera forest mountain ranges were accorded with “all the rights, powers, duties, and liabilities of a legal person” [Te Urewera Act 2014, section 11, New Zealand Government 2014]). Giving effect to conceptual constructs and management approaches defined by indigenous worldviews and knowledge systems, however, continues to contrast with and challenge the prevailing management frameworks of western and industrialized nations (Smith 2012, Walsh et al. 2013).

Subversion of traditional Māori laws and treaty rights by the colonial government in New Zealand imposed an alternative worldview of the environment. The process whereby the *mana* of the environment has been usurped by the European government

Table 4. Versions of the *haka kererū* (also known as a *puha-haka hari kai*, a specific form of *Tuawhenua* ceremonial song and dance) would be performed with the serving of the *huahua* (preserved *kererū* [New Zealand pigeon, *Hemiphaga novaeseelandiae*]) at special events to emphasize and reinforce the relationship of the people with the bird and forest. Metaphor associated with the *haka kererū* linked the bountifulness of nature with fertility of the women and the future well-being of the tribe. Individuals tailored different versions of the *haka kererū* according to different dialects in their local area and their interpretation of the significance.

Te Reo Māori version	English version
Version 1	
<i>Ka aroha te puke e tu iho nei</i>	I am saddened by the hills that surround me
<i>Ka horehore, ka horehore</i>	They are barren, they are barren
<i>Ka aroha te puke e tu iho nei</i>	I am saddened by the hills that surround me
<i>Ka horehore, ka horehore</i>	They are barren, they are barren
<i>He aha i hore ai?</i>	Why is it so bare?
<i>He kore kai pea</i>	Perhaps because there is no food to be had
<i>A me aha?</i>	What shall we do?
<i>Me kai pea ko nga raho o</i> (name of the local or visiting chief)	Let's consider eating the testicles of (name of the local or visiting chief)
<i>Ka horehore, ka horehore</i>	They are barren, they are barren
<i>Ā neke neke hia</i>	Alas, keep moving, keep moving
<i>Ā, ɸ.</i>	Alas
Version 2	
<i>He kumara kai hamuhamu</i>	Only the fernroots remain
<i>Ko te ehū o te kupu nei na</i>	The essential word implies
<i>Kia hoki kau atu, ina te tinaki</i>	That we return to till the soil
<i>Taia mai, ka mate, taia mai</i>	We haul it back, no good, we haul it back
<i>Ka horehore, ka horehore</i>	Absolutely barren, absolutely barren
<i>Ka mate te puke tu iho nei</i>	The hills beyond me are barren
<i>Ka horehore, ka horehore</i>	Absolutely barren, absolutely barren
<i>He kotahi te kete i kimihia</i>	We have only but one basket
<i>Kei te kore, kore rawa aku iwi</i>	There was virtually nothing for my people
<i>Ki te mahi kai - i</i>	To prepare for a feast.
Version 3	
<i>Ka mate te puke e tu iho nei</i>	The hills beyond me are barren
<i>Ka horehore, ka horehore</i>	Absolutely barren, absolutely barren
<i>Ka mate te puke e tu iho nei</i>	The hills beyond me are barren
<i>Ka horehore, ka horehore</i>	Absolutely barren, absolutely barren
<i>Nekenekehia, nekenekhia</i>	Keep moving, keep moving
<i>E koro</i> (name of the local or visiting chief) <i>tūpou to ua ki te ngahere kia mau mai te kū-kū, te ku,</i>	Esteemed elder (name of the local or visiting chief) stoop down to the forest, and bear witness to the <i>kū-kū, te kū</i> (sweet sound of the <i>kererū</i>)
<i>Kia mau mai te kū-kū, te ku</i>	Bear witness to the <i>kū-kū, te kū</i> (sweet sound of the <i>kererū</i>)
<i>Nekenekehia, nekenekhia</i>	Keep moving, keep moving
<i>He kōkō kei runga kei te toromiro e tūnou ana</i>	There the tūi sings and nods perched in the <i>toromiro</i> tree
<i>Kū, kū, kū</i>	<i>Kū, kū, kū</i>
Version 4	
<i>Ka aroha te puke e tu iho nei</i>	I am saddened by the hills that surround me
<i>Ka horehore, ka horehore</i>	They are barren, they are barren
<i>He kotahi te mea i kimihia i te korekore rawa</i>	I have secured this mere morsal
<i>Taku iwi, ki te mahi kai e</i>	For my people to prepare a feast
<i>Aha pakōkō, aha pakōkō</i>	It has shrivelled, It has shrivelled
<i>Aha ka pakōkō nga raho o</i> (name of the local or visiting chief)	The testicles of (name of the local chief) have all but shrivelled
<i>Aha pakōkō</i>	It has all dried up

is linked by some Māori to the loss of native biodiversity in New Zealand. Ongoing declines in *kererū* populations within Te Urewera following the implementation of harvest prohibition law was interpreted as the *mauri* of the *kererū* being removed by *Tāne* since the bird was no longer being used by the people (Lyver et al. 2009). European prohibition laws usurped the *mana* of the tribes and chiefs, which were perceived to have disrupted and severed the linkages between the domains and core concepts of the *Tuawhenua* worldview. These laws effectively removed the local Māori communities from their roles and responsibilities in protecting their environment. The re-establishment of these connections is perceived as the first step to restoring not only the

health of the environment but also the well-being of the community. An indigenous worldview representation that emphasizes the importance of *whakapapa* is more likely to reconcile the separation of people (*tangata*) from the environment (*whenua*).

Our goal was to represent a *Tuawhenua* worldview in a way that could guide comprehension of its relevance and application within environmental conservation. The *Tuawhenua* participants in this study emphasized unequivocally that they would not assume their worldview represented other Māori tribes or indigenous cultures outside of New Zealand. Rather, it was a representation of a framework that consisted of domains,

concepts, and mechanisms that other Māori tribes might recognize, relate to, and organize in a way that suited their own circumstances. Here, the *Tuawhenua* worldview emphasizes the multifaceted connections the community has with its environment through *whakapapa*. Recognized within this *whakapapa* structure is the subordinate role people have with the environment. This tenet is defined by an ethic of reciprocity and care of your elders, including those “elders” within the plant and animal kingdoms. It ensures that people acknowledge their responsibilities to the environment and behave in a manner that safeguards the integrity of the natural world. In this role, people draw their *mana* and *mauri* directly from the well-being of the land and environment. The vibrancy of an ecosystem’s *mauri* increased the likelihood that other key values (e.g., identity, food security, spiritual well-being) and opportunities for cultural expression were supported. Failure to foster these connections can be detrimental not only to the maintenance of cultural integrity but also to the essential well-being of a people.

Biodiversity is more than just food

The cultural expressions outlined in this study have been integral to fostering the *Tuawhenua* peoples’ history, language, and relationship with the *kererū* and forest. These expressions were often crafted to maintain humility and remind the community of the responsibilities the people had to the environment. In some instances, interpretation required a deeper understanding beyond the literal meaning of the words used. The *haka kererū* (Table 4) linked the bountifulness of nature with fertility of the women and the future well-being of the tribe. It also was a point of reference for a period of *Tuawhenua* history when the tribe was suffering the impacts of the “scorched earth” policies of the colonizing European government. While wording within the *haka kererū* can be translated directly with reference to crops being destroyed and hills being devoid of food, the “barren hill” also refers to the woman’s mons pubis and the virility of the men and women in the tribe (Table 4).

Stories, oral history accounts, or cultural expressions are common media for portraying a message or lesson in preliterate societies around the world and were often used to guide and alter behavior related to species or the environment (e.g., Berkes 2008). Metaphors take on different forms and have been used in a variety of ways by societies to understand the human–environment relationship (Roberts 2012, Raymond et al. 2013). Cultural metaphors found within expressions like the *haka kererū* were used by Māori to signify the importance of the species or a resource to the people, but also to reinforce the *mana* of a tribe as an environmental steward. Similarly, Māori ancestral sayings guided customary management of plants and animals (e.g., flax [*Phormium tenax*] cultivations) (Wehi 2009). These forms of oral history practice reinforced the knowledge and relationship that a group might have with an animal, plant, or habitat, but can also provide a collective memory of the tribe’s history. They also served to reinforce social-ecological strategies for managing the environment. Explicit consideration of metaphors in management systems offers a useful mechanism to assist indigenous, and also nonindigenous, communities with their connection to, interpretation of, and response to, issues confronted in the environment (Raymond et al. 2013, Walsh et al. 2013).

CONCLUSION

The diversity of IPLC worldviews offers a range of ways of thinking about, relating to, and valuing, the environment. Current environmental ideologies conform largely to the agendas and approaches of western industrialized societies (Lyver and Tylianakis 2017), which creates few opportunities for worldviews of IPLCs to be expressed. In addition, IPLCs in some countries are increasingly under pressure to adjust their worldviews to fit market-based ideals and attitudes toward natural values (Adamowicz et al. 1998, Venn and Quiggan 2007, O’Faircheallaigh 2013). How to engage a range of IPLC worldview representations in national- and international-scale environmental conservation processes and structures without their institutionalization is problematic for governments (Mistry and Berardi 2016). The worldviews of indigenous cultures offer different priorities and approaches to environmental stewardship, and in some instances, will challenge the prevailing conservation management systems (e.g., prioritization of species and habitats in assigning conservation effort and funding). By placing people within conservation action in accordance with an indigenous worldview, both biological and cultural outcomes are emphasized. This approach also conforms to social-ecological systems theory where people are an integral part of ecosystems rather than external agents (Gunderson and Holling 2002, Berkes 2004, Folke 2006). Reforms to environmental conservation policy and systems that support IPLC leadership and participation are therefore needed to engage those groups more effectively in responses to local and global environmental issues (Mazzocchi 2006, Tester and Irniq 2008, Beddoe et al. 2009, Ens et al. 2015). Expression of these worldviews will contribute to “legitimacy, credibility, and saliency” associated with mobilization of indigenous and local knowledge and the positioning of knowledge types alongside each other (Tengö et al. 2017). Such reformed frameworks would also provide a basis for making informed and inclusive decisions about environmental conservation issues (e.g., prioritization of species for conservation action and/or funding). Policy and institutional reforms emerging from land claim and treaty settlements or participatory governance and community-based approaches to planning and management are evolving pathways in some countries (Kearney et al. 2007, Smyth 2008, Davies et al. 2013, Ruru et al. 2017). It is from these social-ecological relationships that the diverse and comprehensive knowledge systems required for protecting and enhancing ecological and cultural diversity and well-being will emerge.

Responses to this article can be read online at:

<http://www.ecologyandsociety.org/issues/responses.php/9768>

Acknowledgments:

We thank the Tuawhenua elders and community members who participated in and contributed to this study. The drafting of our worldview benefited from the advice of Tahae Doherty, Wiremu Doherty, Dr. Wharehuia Milroy, Tangiora Tawhara, Te Mahururangi Te Kaawa, Prof. Pou Temara, and Kirituia Tumarae. Moehau Kutia, Te Peeti (Spady) Kutia, Te Motoi

Taputu, Tangiora Tawhara, June Tihi, and Kirituia Tumarā-Teka contributed to the collection, translation, and transcription of interviews. Anne Sutherland constructed our location map. The study was conducted under the directorship of the Tuhoe Tuawhenua Trust and was funded by MBIE grants (C09X0308; C09X1307) and Crown Research Institute “Maori and Biodiversity” core funding. Thanks to the editor and two anonymous referees for their review of this article.

LITERATURE CITED

- Adamowicz, W., T. Beckley, D. Hatton Macdonald, L. Just, M. Luckert, E. Murray, and W. Phillips. 1998. In search of forest values of indigenous peoples: Are nonmarket valuation techniques applicable? *Society & Natural Resources* 11:51–66. <http://dx.doi.org/10.1080/08941929809381061>
- Aerts, D., L. Apostel, B. De Moor, S. Hellemans, E. Maex, H. Van Belle, and J. Van der Veken 1994. *Worldviews: from fragmentation to integration*. VUB Press, Brussels, Belgium.
- Agrawal, A. 2002. Indigenous knowledge and the politics of classification. *International Social Sciences Journal* 54:287–297.
- Alden Wily, L. 2011. *The tragedy of public lands: the fate of the commons under global commercial pressure*. International Land Coalition, Rome, Italy.
- Allport, G. W. 1935. Attitudes. Pages 798–844 in C. Murchison, editor. *Handbook of social psychology*. Clark University Press, Worcester, Massachusetts, USA.
- Beddoe, R., R. Costanza, J. Farley, E. Garza, J. Kent, I. Kubiszewski, L. Martinez, T. McCowen, K. Murphy, N. Myers, Z. Ogden, K. Stapleton, and J. Woodward. 2009. Overcoming systemic roadblocks to sustainability: the evolutionary redesign of worldviews, institutions, and technologies. *Proceedings of the National Academy of Sciences of the United States of America* 106:2483–2489. <http://dx.doi.org/10.1073/pnas.0812570106>
- Berkes, F. 2004. Rethinking community-based conservation. *Conservation Biology* 18:621–630. <http://dx.doi.org/10.1111/j.1523-1739.2004.00077.x>
- Berkes, F. 2008. *Sacred ecology*. Second edition. Routledge, New York and London.
- Berkes, F. 2010. Devolution of environment and resources governance: trends and future. *Environmental Conservation* 34:489–500. <http://dx.doi.org/10.1017/S037689291000072X>
- Brondizio, E. S., and F-M. Le Tourneau. 2016. Environmental governance for all. *Science* 352:1272–1273. <http://dx.doi.org/10.1126/science.aaf5122>
- Craig, D., L. Yung, and W. Borrie. 2012. “Blackfeet belong to the mountains”: hope, loss, and Blackfeet claims to Glacier National Park, Montana. *Conservation & Society* 10:232–242. <http://dx.doi.org/10.4103/0972-4923.101836>
- Creswell, J. W., and D. L. Miller 2000. Determining validity in qualitative inquiry. *Theory into Practice* 39(3):124–130. http://dx.doi.org/10.1207/s15430421tip3903_2
- Davies, J., R. Hill, F. J. Walsh, M. Sandford, D. Smyth, and M. C. Holmes. 2013. Innovation in management plans for community conserved areas: experiences from Australian indigenous protected areas. *Ecology and Society* 18(2):14. <http://dx.doi.org/10.5751/ES-05404-180214>
- Dods, R. R. 2014. Knowing ways/ways of knowing: reconciling science and tradition. *World Archaeology* 36:547–557.
- Ens, E. J., P. Pert, P. A. Clarke, M. Budden, L. Clubb, B. Doran, C. Douras, J. Gaikwad, B. Golt, S. Leonard, et al. 2015. Indigenous biocultural knowledge in ecosystem science and management: review and insight from Australia. *Biological Conservation* 181:133–149. <http://dx.doi.org/10.1016/j.biocon.2014.11.008>
- Folke, C. 2006. Resilience: the emergence of a perspective for social-ecological systems analyses. *Global Environmental Change* 16:253–267. <http://dx.doi.org/10.1016/j.gloenvcha.2006.04.002>
- Gunderson, L. H., and C.S. Holling, editors. 2002. *Panarchy: understanding transformations in human and natural systems*. Island Press, Washington, D.C., USA.
- Haverkort, B., and C. Reijntjes, editors. 2007. *Moving worldviews. Reshaping sciences, policies and practices for endogenous sustainable development*. Compas series on worldviews and sciences 4. ETC/Compas, Leusden, Netherlands.
- Houde, N. 2007. The six faces of traditional ecological knowledge: challenges and opportunities for Canadian co-management arrangements. *Ecology and Society* 12(2):34. <http://dx.doi.org/10.5751/ES-02270-120234>
- Huntington, H. P. 2000. Using traditional ecological knowledge in science: methods and applications. *Ecological Applications* 10:1270–1274. [http://dx.doi.org/10.1890/1051-0761\(2000\)010\[1270:UTEKIS\]2.0.CO;2](http://dx.doi.org/10.1890/1051-0761(2000)010[1270:UTEKIS]2.0.CO;2)
- Johnson, J. T., R. Howitt, G. Cajete, F. Berkes, R. Pualani-Louis, and A. Kliskey. 2016. Weaving indigenous and sustainability sciences to diversify our methods. *Sustainability Science* 11:1–11.
- Kearney, J., F. Berkes, A. Charles, E. Pinkerton, and M. Wiber. 2007. The role of participatory governance and community-based management in integrated coastal and ocean management in Canada. *Coastal Management* 35:79–104. <http://dx.doi.org/10.1080/10.1080/08920750600970511>
- Lyver, P. O’B., M. Taputu, S. T. Kutia, and B. Tahi. 2008. Tūhoe Tuawhenua mātauranga of kererū (*Hemiphaga novaezealandiae novaezealandiae*) in Te Urewera. *New Zealand Journal of Ecology* 32:7–17.
- Lyver, P. O’B., C. Jones, and J. Doherty. 2009. Flavour or forethought: Tūhoe traditional management strategies for the conservation of kererū (*Hemiphaga novaezealandiae novaezealandiae*) in New Zealand. *Ecology and Society* 14(1). [online] URL: <http://www.ecologyandsociety.org/vol14/iss1/art40/>
- Lyver, P. O’B., J. Davies, and R. B. Allen. 2014. Settling indigenous claims to protected areas: weighing Māori aspirations against Australian experiences. *Conservation & Society* 12(1):89–106. <http://dx.doi.org/10.4103/0972-4923.132134>
- Lyver, P. O’B., and J. M. Tylianakis. 2017. Indigenous peoples: conservation paradox. *Science* 357:141–142. <http://dx.doi.org/10.1126/science.aao0780>
- Mazzochi, F. 2006. Western science and traditional knowledge. *EMBO reports* 7:463–466. <http://dx.doi.org/10.1038/sj.embor.7400693>

- Mistry, J., and A. Berardi. 2016. Bridging indigenous and scientific knowledge. *Science* 352:1274–1275. <http://dx.doi.org/10.1126/science.aaf1160>
- Morunga, K., and B. Tahi. 2013. *Industry and people: development in the Tuawhenua*. Tūhoe Tuawhenua Trust, Ruatāhuna, New Zealand.
- New Zealand Government. 2014. *Te Urewera Act 2014. Public Act No. 51*. Parliamentary Counsel Office, Wellington, New Zealand.
- New Zealand Government. 2016. *New Zealand biodiversity action plan*. Wellington, New Zealand.
- O’Faircheallaigh, C. 2013. Extractive industries and Indigenous peoples: A changing dynamic? *Journal of Rural Studies* 30:2–30. <http://dx.doi.org/10.1016/j.jrurstud.2012.11.003>
- Pitty, R., and S. Smith, 2011. The indigenous challenge to Westphalian sovereignty. *Australian Journal of Political Science* 46:121–139. <http://dx.doi.org/10.1080/10361146.2010.546336>
- Raffles, H. 2002. Intimate knowledge. *International Social Science Journal* 54:325–335. <http://dx.doi.org/10.1111/1468-2451.00385>
- Rathwell, K. J., D. Armitage, and F. Berkes. 2015. Bridging knowledge systems to enhance governance of the environmental commons: a typology of settings. *International Journal of the Commons* 9:851–880. <http://dx.doi.org/10.18352/ijc.584>
- Raymond, C. M., G. G. Singh, K. Benessaiah, J. R. Bernhardt, J. Levine, H. Nelson, N. J. Turner, B. Norton, J. Tam, and K. M. A. Chan. 2013. Ecosystem services and beyond: using multiple metaphors to understand human–environment relationships. *Bioscience* 63:536–546. <http://dx.doi.org/10.1525/bio.2013.63.7.7>
- Rights and Resources Initiative. 2015. *Who owns the worlds’ land? A global baseline of formally recognized indigenous and community land rights*. Rights and Resources Initiative, Washington, D.C., USA.
- Roberts, M. 2012. Mind maps of the Maori. *GeoJournal* 77:741–751. <http://dx.doi.org/10.1007/s10708-010-9383-5>
- Ruru, J., P. O’B. Lyver, N. Scott, and D. Edmunds. 2017. Reversing the decline in biodiversity: empowering Māori within reformed conservation law. *Policy Quarterly* 12:65–71.
- Smith, L. T. 2012. *Decolonizing methodologies: research and indigenous peoples*. Second edition. Zed Books, London, UK.
- Smyth, D. 2008. Just add water? Taking Indigenous Protected Areas into sea country. In D. Smyth and G. Ward, editors. *Protecting country: indigenous governance and management of protected areas*. AIATSIS, Canberra, Australia.
- Stevenson, M. G. 2006. The possibility of difference: rethinking co-management. *Human Organization* 65:167–180. <http://dx.doi.org/10.17730/humo.65.2.b2dm8thgb7wa4m53>
- Stocker, L., L. Collard, and A. Rooney. 2016. Aboriginal views and colonisation: implications for coastal sustainability. *Local Environment* 21:844–865. <http://dx.doi.org/10.1080/13549839.2015.1036414>
- Tauli-Corpuz, V. 2016. *Rights of indigenous peoples. Report on the Special Rapporteur of the Human Rights Council of the rights of indigenous peoples*. A/71/229, 29 July 2016, 71st Session of United Nations General Assembly, United Nations, New York, USA.
- Telfer, W. R., and M. J. Garde 2006. Indigenous knowledge of rock kangaroo ecology in Western Arnhem Land, Australia. *Human Ecology* 34:379–406. <http://dx.doi.org/10.1007/s10745-006-9023-3>
- Tengö, M., E. S. Brondizio, T. Elmqvist, P. Malmer, and M. Spierenburg. 2014. Connecting diverse knowledge systems for enhanced ecosystem governance: the multiple evidence base approach. *AMBIO* 43:579–591. <http://dx.doi.org/10.1007/s13280-014-0501-3>
- Tengö, M., R. Hill, P. Malmer, C. M. Raymond, M. Spierenburg, F. Danielsen, T. Elmqvist, and C. Folke. 2017. Weaving knowledge systems in IPBES, CBD and beyond—lessons learned for sustainability. *Current Opinion in Environmental Sustainability* 26–27:17–25. <http://dx.doi.org/10.1016/j.cosust.2016.12.005>
- Tester, F. J., and P. Irniq. 2008. *Inuit Qaujimagatuqangit: social history, politics and the practice of resistance*. *Arctic* 61:48–61.
- Turner, N. J., R. Gregory, C. Brooks, L. Failing, and T. Satterfield. 2008. From invisibility to transparency: identifying the implications. *Ecology and Society* 13(2):7. <http://dx.doi.org/10.5751/ES-02405-130207>
- van Egmond, N. D., and H. J. M. de Vries. 2011. Sustainability: the search for the integral worldview. *Futures* 43:853–867. <http://dx.doi.org/10.1016/j.futures.2011.05.027>
- Van Opstal, M., and J. Hugé. 2013. Knowledge for sustainable development: a worldviews perspective. *Environment, Development and Sustainability* 15:687–709. <http://dx.doi.org/10.1007/s10668-012-9401-5>
- Venn, T. J., and J. Quiggan. 2007. Accommodating indigenous cultural heritage values in resource assessment: Cape York Peninsula and the Murray-Darling Basin, Australia. *Ecological Economics* 61:334–344. <http://dx.doi.org/10.1016/j.ecolecon.2006.03.003>
- Vidal, C. 2008. Wat is een wereldbeeld? (What is a worldview?). In H. Van Belle and J. Van der Veken, editors. *Nieuwheid denken. De wetenschappen en het creatieve aspect van de werkelijkheid*. Acco, Leuven.
- Walsh, F. J., P. V. Dobson, and J. C. Douglas. 2013. *Anperirrentye: a framework for enhanced application of indigenous ecological knowledge in natural resource management*. *Ecology and Society* 18(3):18. <http://dx.doi.org/10.5751/ES-05501-180318>
- Wehi, P. M. 2009. Indigenous ancestral sayings contribute to modern conservation partnerships: examples using *Phormium tenax*. *Ecological Applications* 19:267–275. <http://dx.doi.org/10.1890/07-1693.1>
- West, P., J. Igoe, and D. Brockington. 2006. Parks and peoples: the social impact of protected areas. *Annual Review of Anthropology* 35:251–277. <http://dx.doi.org/10.1146/annurev.anthro.35.081705.123308>