



‘Get together, work together, write together’: a novel framework for conservation of New Zealand frogs

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Auheke: Ko tā te ture ki Aotearoa, mō ngā whakatau me ngā whakahaere o ngā momo koiara motuhake, me mahi tahi ki te iwi Māori o taua takiwāi. Me hanga te anga toi-ahurea ki ngā mātauranga Māori, ki ngā mātauranga tauwi hoki kia tiakina tika ai ēnei momo koiara. Heoi anō, ko te katoa o ngā hua i puta i tēnei pātuitanga, tē aro atu ai. Ko tētahi take kāore i whai hua ai ngā rautaki me ngā tūkanga i tukuna, ko te korenga o te whakauru i te ahurea Māori ki roto i te puāwaitanga o te mātauranga me te korenga o te renarena o ngā whenu o te pātuitanga. E tonoa ana e mātou he anga toi-ahurea mō te oranga tonutanga o ngā nukuwai, nā runga i ngā huritao me ngā tātaritanga o te pātuitanga e hāngai ana ki te hūnukutanga o tētahi momo poroka Māori (*Leiopelma archeyi*) ki ngā wāhi e rua o roto i te rohe pōtae o Waikato/Tainui, Aotearoa. I huritaotia e ngā kaituhi, Māori mai, tauwi mai, ō rātou wheako, ā rātou akoranga me ō rātou whakaaro i a rātou i whakatū i tēnei pātuitanga mō te kaupapa hūnuku i tū i taua rohe. Ko ētahi o ēnei huānga ka whakamāramahia e ngā tuhinga e whakamahi ana i ngā mātāpono rangahau kaupapa Māori. Ko te rerenga ‘Piri tahi, mahi tahi, tuhi tahi’ te anga e whakarāpopoto ai i ngā kitenga i kitea whai muri i tā mātou mahinga tahi. Ko te ‘Piri tahi’ te wāhanga ka whiria ngā whenu o te pātuitanga e rongoi ai te tangata i te whanaungatanga. Ko te ‘Mahi tahi’ te wāhanga ka whakatūtia te whakawhitiwhiti mātauranga, ā, ko te ‘Tuhi tahi’ e tohu ana i te reo o ngā kairangahau i te anga rangahau Māori. Ka whakamāramahia e mātou te tautake me te tūkanga o ia wāhanga e whakaae ai te whakamahinga i ērā atu horopaki o te koiara/ahurea.

Abstract: In New Zealand, it is a legal requirement to involve local Maori people in making decisions about the management of treasured species, and in carrying out that management. This requires a safe space in which both Maori perspectives and western scientific perspectives on how to protect these species can be included. Yet, the full benefits of having such a partnership are usually overlooked, and the protocols and strategies applied have often failed to incorporate Maori culture in the creation of knowledge and in maintaining the relationship. Here we propose a novel framework for amphibian conservation, based on an analysis of a two-way partnership developed during the translocation of a native frog species between two areas in the King Country. The framework ‘get together, work together, write together’ was identified after Maori and non-Maori authors reflected on the experiences, learnings and thoughts that they had during the partnership associated with this translocation project. ‘Get together’ refers to building a relationship that provides people with a sense of belonging (whanaungatanga). ‘Work together’ refers to the cooperative exchange of knowledge, and ‘write together’ refers to the contribution of new approaches and ways of carrying out research that incorporates all partners’ voices. This study provides evidence of the feasibility of partnerships and their long-term conservation benefits. It also emphasises that the multiple cultural connections of Maori with native frogs converge with western conservation perspectives. We offer a detailed explanation of each stage’s philosophy and practice to facilitate and encourage use of our framework in other biological/cultural contexts. This involvement should include face-to-face collaboration in order to share experiences, skills and knowledge.

Keywords: amphibian conservation, biocultural partnerships, *Leiopelma archeyi*

Introduction

Considering the human dimension of conservation is essential for the effective management of natural systems, including decision-making and planning (Carson et al. 2018; Weise et al. 2019). In the conservation management of a threatened species, input from the natural sciences is necessary to make evidence-based management decisions. But in order to align the local context with the proposed conservation actions (e.g. a management plan), it is also essential to incorporate social science research that optimises the ability to engage with local communities (Bennett et al. 2017). In this way, the conservation of biodiversity, at any level, should adopt a multidisciplinary approach that integrates analyses of the biological and social components involved (Soulé 1985).

In New Zealand, conservation policies and practices legally require the involvement of the local indigenous Māori people as partners with the British Crown (represented by the New Zealand Government) in decision-making, and in the management of taonga, i.e. species significant to Māori culture and worldview (Treaty of Waitangi 1840; Conservation Act 1987; Resource Management Act 1991, WAI 262 2011). Biocultural partnerships for the management of local natural resources are increasingly recognised as important conservation strategies, and their formation is strongly encouraged, both in New Zealand (Ruru et al. 2017; Lyver et al. 2019; Ogilvie et al. 2019) and worldwide (Alcorn 1993; Redford et al. 2018). In order to optimise the outcomes of conservation projects undertaken in collaboration with local indigenous communities, it is necessary to integrate science with a wider body of knowledge, practice and beliefs (Berkes 2008). Scientific collaborative research with Māori communities should be structured and implemented in a way that meets both Māori research excellence criteria and Western science excellence criteria (Ahuriri-Driscoll et al. 2007; Collier-Robinson et al. 2019).

In species management, some examples of successful partnerships have had the explicit intention of weaving together the knowledge, worldview and practices of Māori communities with western-trained scientists and/or researchers (hereafter simply referred to as researchers). We acknowledge that ethnicity as part of a researcher's personal cultural background affects the way that relationships are built; however we do not emphasise this distinction in this article. Rather we emphasise the coexistence of different philosophical paradigms representing indigenous communities and researchers. For example, a partnership between researchers and the 'Rakiura Tītī Islands Administering Body' examined factors that affected the sustainable level of traditional harvest of tītī *Puffinus griseus* (Moller et al. 2009), relying on both mātauranga Māori, i.e. Māori knowledge, worldview, perspectives and cultural practices (Moorfield 2018), and scientific data. From their 15 years of partnership experience, the key conclusions are that trust between parties, equitable decision-making responsibility, and effective science communication were core conditions for success (Moller et al. 2009). Other studies and projects have included the use of mātauranga Māori to establish, for example, past geographical distributions of native New Zealand species, e.g. tuatara *Sphenodon punctatus* (Ramstad et al. 2007); fur seals *Arctocephalus forsteri* (Watson et al. 2015), and investigate management practices, e.g. harakeke *Phormium tenax* (Wehi 2006); and tītī *P. griseus* (Geary et al. 2019).

However, incorporating indigenous beliefs and practices in co-management is not always easy, or satisfactory (Tipa

& Welch 2006; Wehi & Lord 2017). For instance, James (1991) reported that Māori worldview and aspirations have been significantly under-represented in the management of Te Waihora (Lake Ellesmere). In other examples, there has been criticism of the quality and intent of the partnership process, because of power-balance problems (Coombes & Hill 2005), and/or because of a governmental ambivalence towards Māori customary environmental practices (Tipa et al. 2009). As with indigenous cultures elsewhere (Berkes 2008), it can be difficult for Māori to communicate their conservation perspective to researchers (Roberts et al. 1995). Likewise, a considerable amount of preparation may be required for non-Māori to communicate their perspectives appropriately within indigenous communities (Longnecker and Scott 2018).

In relation to New Zealand native frogs (*Leiopelma* spp.), the scientific literature reports only a few interactions between researchers and Māori, most of which are based on comments by early European researchers without clearly identifying a Māori voice (Thomson 1853; Smith 1921). However, Graham (1924) noted a story told to him by Hapi Te Pataka in the Moehau ranges (Coromandel) in 1889: "... on these ranges we saw a number of the small native frogs (which old Hapi called "Kuri-peke"), and said they were the "mokai" or pets of the Patu-pai-arehe¹, and acted as sentries for their masters."

More recently, a further two references within the frog scientific literature refer to Māori knowledge, or mātauranga Māori. The first calls for clarification of te reo Māori (Māori language) names for frogs (Bell 2007). The second recognises *Leiopelma* species as culturally significant and treasured by Māori people, and also reports three names for frogs in the Māori language (Bishop et al. 2013). Therefore, on the basis of the reviewed literature, there appears to be a lack of explicit intention by researchers to include, get involved, or engage with Māori communities for frog conservation. Furthermore, there are no records of researchers' intent to understand Māori cultural connections with frogs (but see Cisternas 2019).

The aim of this study is to present a novel framework for frog conservation that allows a culturally respectful interaction between researchers and tangata whenua (the local Māori people, and the interconnectedness between those people and the land). This article synthesises the knowledge acquired during a partnership that developed between two Māori communities and researchers during the conservation translocation of *Leiopelma archeyi* frogs in 2016 in the Waikato Region, New Zealand. The partnership objective was to facilitate a biocultural translocation process that incorporated the common interests of all participants. We provide a detailed description of a framework for integrating each partner's perspectives on conservation. This could be applied at a local scale for other partnerships between Māori communities and western-trained conservationists, e.g. the Department of Conservation (DOC), universities, zoos. On a global scale, this framework is an example of community involvement that integrates different cultural motivations and viewpoints into a genuine conservation co-management plan.

¹ Fairy folk; fair-skinned mythical people who live in the bush on mountains (Moorfield 2018).

Methods

Partnership background

The aim of the partnership was to facilitate a biocultural process in the translocation of *Leiopelma archeyi* frogs from Whareorino to Pukeokahu in 2016 (Fig. 1). *Leiopelma archeyi* is a terrestrial amphibian currently categorised as ‘At Risk-Declining’ in the New Zealand threat classification system (Burns et al. 2018), ‘Critically Endangered’ on the IUCN Red List of Threatened Species (IUCN/SSC/ASG 2017), and the world’s most Evolutionarily Distinct and Globally Endangered amphibian species (The Zoological Society of London 2018). One agent of decline presumed for this species correspond to the chytrid fungus *Batrachochytrium dendrobatidis* that causes the disease chytridiomycosis (Bell et al. 2004; Bishop et al. 2013). In 2006, a prevalence of 5% of chytridiomycosis was detected in frogs from Whareorino (Shaw 2012), and a translocation was initiated by DOC in response to this disease threat. In 2015 a second translocation was initiated by Auckland Zoo to supplement the translocation of 2006, as previously recommended by DOC (see Cisternas 2019).

Translocation of individual frogs from one location to another presents physical and logistical challenges (Parker et al. 2012). For Māori communities, translocations have further complexities because translocations involve tribal connections to the land, and the community’s role as family guardians for species. This comes from the ancestral responsibility that Māori communities have for the land and resources (mana whenua), and the community’s right to exercise authority (rangatiratanga) and hold this authority as kaitiaki over taonga.

The groups represented in this partnership were researchers and tangata whenua. As part of their responsibilities, tangata whenua act as guardians of an area, in this instance an area where frogs (*Leiopelma archeyi*) are found. For the frogs in Whareorino, tangata whenua were represented by Ngāti Peehi and Ngāti Te Kanawa, and for the frogs in Pukeokahu by Te Hau Kainga o Pureora. Researchers were western-trained

academics affiliated with the University of Otago. In 2016, this second translocation project was coordinated jointly by Auckland Zoo, DOC, tangata whenua and the University of Otago, and personnel from each of these institutions participated during this partnership (Cisternas 2019).

Frogs are taonga for the Ngāti Peehi and Ngāti Te Kanawa community at Whareorino, and as such these groups of tangata whenua were consulted, as required by law (i.e. Section 4 Conservation Act 1987), in order for DOC to grant a permit for these translocations to remove frogs from this area. The total number of frogs removed was 100 in 2006 and 80 in 2016 (Sherley et al. 2010; Cisternas 2019).

L. archeyi is also taonga for the community of Te Hau Kainga o Pureora at Pukeokahu. However, there is no evidence that this species ever occurred in the Pukeokahu area prior to the first release of frogs there from Whareorino in 2006 (Easton 2018). Thus, Te Hau Kainga o Pureora kaitiakitanga in relation to modern management of this frog species began in 2006. A formal relationship between tangata whenua in Pukeokahu and frog researchers began in 2015, when the local Māori people were invited to collaborate in the annual frog monitoring in the translocation release site organised by DOC since 2007 (Cisternas 2019).

The partnership described in this paper was based on 13 face-to-face meetings, kanohi ki te kanohi (Smith 1999), between tangata whenua and researchers held between October 2015 and June 2018 (nine visits of researchers to the Māori communities, three monitoring activities and one hui / work meeting). During this period, and additionally since July 2018, communication between partners has been maintained by phone, post and e-mail.

Analysis of the partnership and creation of the framework for frog protection

The inquiry method used to analyse our partnership and to create the framework proposed here for frog protection follows indigenous methodologies (Bishop 1996; Smith 1999;

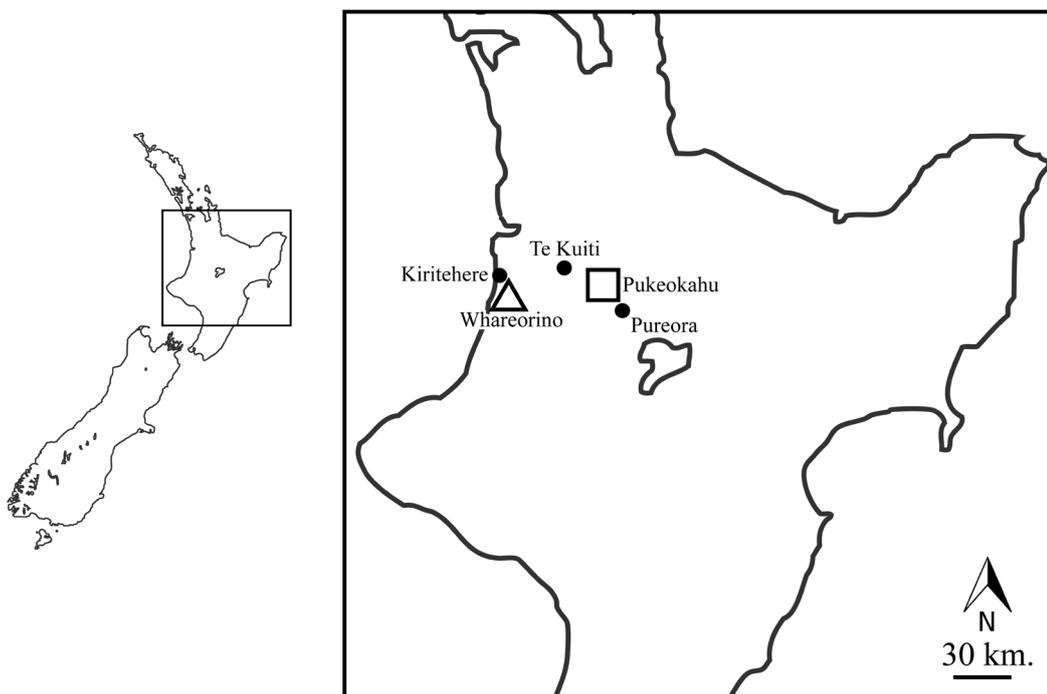


Figure 1. Localities visited during the partnership (circles), and the translocation donor site (triangle) and release site (square).

Marshall 2004). Within indigenous methodologies, the inquiry and analysis derive from reflections on the conversations and interactions between those involved (Peltier 2018). Bishop (1996) described these conversations as ‘chats’ within an ongoing relationship. They include informal dialogues between participants and also semi-structured, in-depth interviews that followed up some of these informal ‘chats’. It is the quality of the interaction between partners that triggers understanding of these reflections.

In order to analyse our partnership, we used elements identified within the definitions of Kaupapa Māori research as established by Smith (1999). In this way, we aimed to develop a culturally respectful conservation approach framed within the Treaty of Waitangi (1840), i.e. both Treaty partners have an obligation to collectively determined agendas that support each other’s perspectives (Bishop 1996). The goal of the framework here proposed is to protect native frog populations in the long-term, and it is thus directly related to the second principle of the Treaty of Waitangi (1840). In the case of frogs, this goal of protection is aligned with Māori concepts of kaitiakitanga (which requires actions to care for taonga species for future generations) and western perspectives of biodiversity conservation. Thus, it represents a common objective for all partners.

We include in our framework reflections about the initiation, benefits, representation, legitimisation and accountability of the partnership project (Bishop 1996). Specifically, we reflect on how to protect and preserve this frog species in a way that creates safe spaces in which all participants’ voices can be heard and considered. Constructing an authoritative and legitimate relationship relies on the ongoing participation and approval of both Māori community and researcher participants (Collier-Robinson et al. 2019). All participants have input

in developing the partnership process, and all partners have access to the knowledge created.

This manuscript was written as an iterative process that began when the lead researcher (JC) discussed work reported in Cisternas (2019) with the Māori co-authors of this manuscript. JC summarised these discussions and shared a new document with the co-authors, who added more comments, and a third document was created. We called this whole process one cycle of reflection. This manuscript is the result of five cycles of reflection among the co-authors.

Our analysis is at a local scale, which matches a tangata whenua extended family (whānau) scale and a frog population-level scale. Results and discussion are presented together in narrative form, and these provide descriptive explanations of the ideas that emerged from the analysis.

Results and Discussion

Partnership learnings and framework philosophy

The partnership described in this study was characterised by an ongoing learning process for all the participants involved, in terms of getting to know each other and developing an understanding of each other’s perspectives, i.e. ‘kapu tī’ within a Kaupapa Māori framework. A fluent relationship was the key component to achieve this (Fig. 2a). The relationship was based on reciprocity and shared signs of respect between partners in order to keep the relationship ‘healthy and strong’, i.e. aroha ki te tangata, a respect for people (Smith 1999). The relationship began with first contact between the partners, after which the agreement of a common purpose constituted the beginning point of our framework (Fig. 2). The legitimisation of all voices and the mutual agreement to work towards a

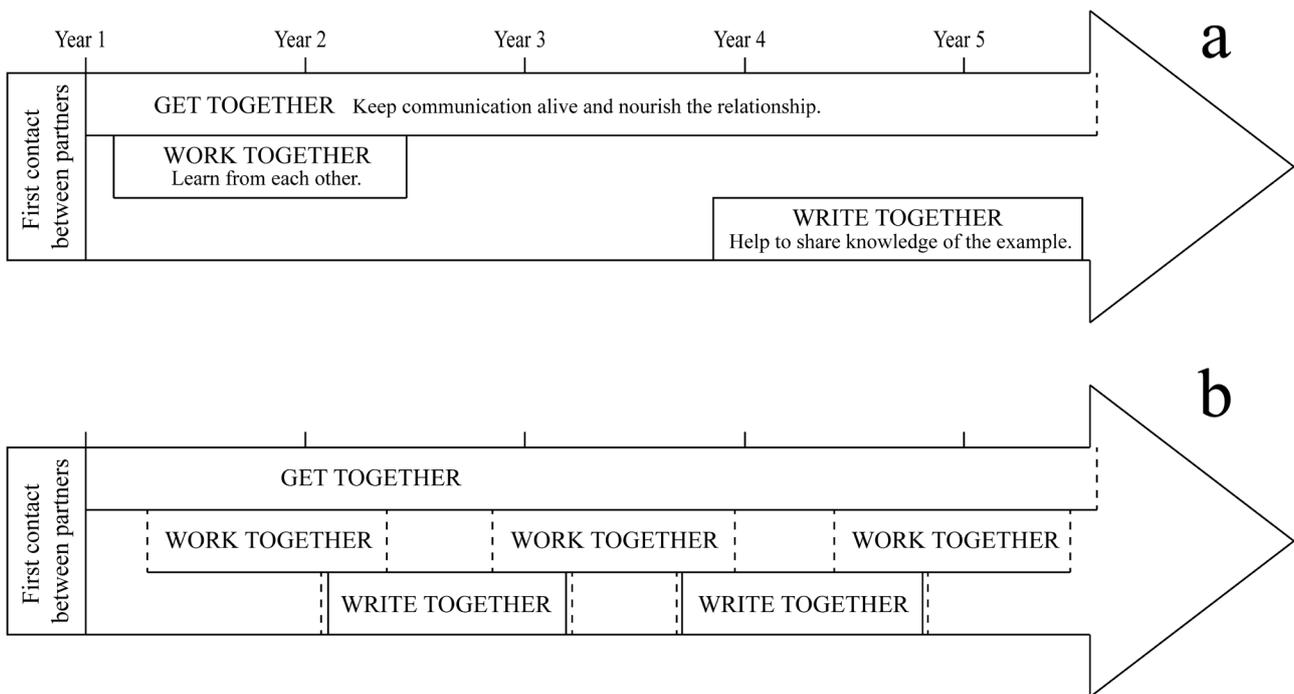


Figure 2. Timeline of the relationship between a western-trained frog conservationist and Māori local communities with detail of the three stages proposed in our framework: ‘get together, work together, write together’. Each stage in the figure is represented by a rectangle, which short sides represent the beginning and end of such stage. A single line symbolises an explicit beginning/end of such stage. A dotted line represents uncertainty on the timing of the beginning/end of that particular stage. A dotted line on the outside and a single line on the inside represent uncertainty on the beginning/end of such stage but remarks that if the action is carried out, there must be an explicit beginning and end of such a stage. a) The partnership analysed in this manuscript. b) Optimal frog conservation framework.

common goal – the protection of *L. archeyi* in Whareorino and Pukeokahu – were vital components of the partnership.

After first contact, three relevant stages were identified during the partnership process (Fig. 2a). These stages are hierarchical: ‘get together’ to establish the relationship, ‘work together’ to facilitate the exchange of knowledge, and ‘write together’, to validating learnings with governmental institutions, the scientific community, and the wider community. In an optimal relationship (Fig. 2b), these stages should occur in sequential order because ‘work together’ will be optimised if we have knowledge of each other’s skills and feasibility for studying frogs in the field; while ‘writing together’ would only be achievable after a period long enough to develop a strong relationship.

In the next sections, we describe the philosophy behind the partnership that served as a basis to create the proposed framework. We suggest that the three stages included in this framework (get together, work together, write together) are essential to facilitate an effective biocultural linking of ideas and actions (Fig. 2). Even though a degree of overlap may exist between stages, each stage addresses different purposes and uses different techniques. The description of each of the three stages of the proposed framework begins with a theoretical description followed by a detailed explanation based on our frog translocation partnership. Finally, there is an emphasis on the positive outcomes expected with this framework, and the challenges that may hinder its application.

‘Get together’

‘Get together’ is the first stage of our framework and refers to the partners meeting together face-to-face (*kanohi ki te kanohi*), in order to (1) build the relationship, and (2) optimise communication. Both partners agree about the way in which they will communicate and, if required, the nature of the protocols to follow in each of these encounters. Other complementary ways of communication could be agreed upon, e.g. combining face-to-face encounters with phone conversations, emails, and post.

This stage is relevant for all partnership beneficiaries, but it is essential for *tangata whenua*, because this stage relates to several aspects of Māori culture. For instance, when two parties who are new to each other, they traditionally follow accepted rituals (‘get together’). Even in modern contexts, the concepts of *kanohi kitea*, i.e. “the seen face, that is, present yourself to people face to face” (Smith 1999), and *manaaki ki te tangata*, “share and host people, be generous” (Smith 1999), are central to building new relationships. In our partnership, formal rituals of encounter (*pōwhiri*) were carried out with one *tangata whenua* group at the beginning of the relationship (October 2015 at Kiritehere), while with the other group, these rituals happened later (October 2017 at Pureora).

Also, as occurs in Māori tradition, family members of all ages, from children (*tamariki*) to elders (*kaumātua*), were present during the partnership activities. This was used as an opportunity for the researchers to create and share educational materials and booklets with pictures and key biological facts presented in lay terms that were suitable for all ages. This educational material was perused and discussed with *tangata whenua* members while sharing a meal. People from the communities demonstrated excellent memory and recall of frog collection events, as well as specific encounters with frogs, e.g. “... they took the frogs down to Christchurch and then they brought them back up to the zoo with their babies. I think it was only about eight or 12 frogs that they [researchers and

DOC] brought back up and then they lost some of the babies up there. That was the last time I saw this native frog” (NH in a conversation with JC in October 2015). If researchers are able to share their knowledge in a simple and clear way with *tangata whenua*, this information will remain and empower *tangata whenua* for future consultation processes.

For every face-to-face encounter, food should be shared. For researchers, this is understood as an expression of friendship and unity. But in Māori culture, this action is also related to the prestige and authority of the *tangata whenua* in their role of providing all that they can to their guest (*manuhiri*) (Higgins & Moorfield 2004a).

The final face-to-face activity of this partnership was a hui organised to discuss the results in JC’s thesis on the translocation management of this frog species. This hui encapsulated all the ideas around the concept of ‘get together’: the idea of the hui was initiated by the researchers, but all partners contributed to its design, and all partners influenced its structure and content. Together, we decided which specific Māori protocols to follow, e.g. designating a spokesperson (*reo korero*) to open and close the hui, beginning the hui with official welcome speeches (*whakatau* process; Bishop 1996), and finishing it with formal farewell speeches (*poroporoaki* process; Higgins & Moorfield 2004a). After joint consultation, we invited a broad group to the hui, including government personnel, Auckland Zoo representatives, postgraduate students, and the *whānau* with whom we had been working.

The structure of the hui was designed to optimise the communication of information for all participants, including people of all ages (children to elders) and backgrounds (e.g. Māori and non-Māori people, with or without tertiary education). Thus, special care was taken in the content and format of the exchanged information. For instance, the presentation of research results was based on a PowerPoint presentation using lay terms, with small amounts of clear and simple text and many photographs as visual expressions of concepts or actions, to provide information as clearly as possible (Mullen 2010). A copy of a document that complemented the talk with graphs, statistical analyses and a brief report of preliminary results was available for all who wished to take away. The values of different parties were taken into account since values play a key role in whether people engage with information and how they do this (Longnecker 2016).

To ‘get together’ is essential for the health of the relationship, but, as illustrated in Fig. 2, the future of any relationship is uncertain. Future relationship connections require ongoing investment in time and money to ‘keep the relationship alive’. In the partnership described in this study, it is expected that the relationship between these *tangata whenua* groups and the University of Otago will continue, but we highlight here that this requires both resources and continuity in personnel. While face-to-face interaction is optimal, once the relationship is established, alternative methods of communication may be acceptable, and this has been the case in our partnership since July 2018.

The main challenge identified in this stage is related to economic constraints. Research processes done with cultural referencing may be slower and more expensive than other scientific endeavours without this cultural component (Roa et al. 2009). Budgeting for partnerships needs to include provision for unexpected changes, as well as cultural obligations such as *koha*, i.e. a gift, contribution; especially one that maintains social relationships and that has connotations of reciprocity (Moorfield 2018). In our partnership, unexpected

cancellations of a pre-arranged meeting occurred twice. On one occasion the researcher did not arrive to meet the whānau due to a misunderstanding between partners. This was inconvenient for the local community who had organised themselves to host a meeting with the researchers. Fortunately, this was promptly solved once communication improved. On another occasion, tangata whenua cancelled a meeting with the researchers seven days before the event due to unstable weather conditions and a flood in the area. Cancellations of pre-arranged meetings because of funerals (tangi) have been described elsewhere (Higgins & Moorfield 2004b).

Another challenge of biocultural partnership ‘get togethers’ is that activities directed toward local community needs should be carried out during weekends to ensure participation. Shared timeframes for events require consideration of the needs of both groups. It is vital to acknowledge that input by tangata whenua is often unpaid, and has to fit in with other responsibilities such as employment or other activities; input of governmental personnel and researchers often involves after-hours work.

‘Work together’

The second stage of our framework is ‘work together’, and refers to the actions carried out by both partners contributing towards the long-term protection of *L. archeyi*. This is an important stage for all the partnership beneficiaries, because the flow of knowledge is encouraged and the relationship is strengthened. As previously mentioned, researcher visits encouraged participation by tangata whenua, and increased their knowledge of this frog species. But ‘working together’ also represents an opportunity for tangata whenua to participate in practical activities and encounter their taonga (Walker et al. 2019). In our partnership, every activity carried out contributed to expanding all parties’ knowledge.

Within the flow of knowledge, tangata whenua contributed to the formulation of JC’s doctoral thesis research questions, particularly in relation to habitat studies carried out on *L. archeyi* for translocation purposes. Tangata whenua from the locality of Kiritehere (two elders and one child) accompanied researchers to monitor oviposition sites inside tree-fern stumps in the northern area of Whareorino. En route to the site, a conversation started about the particular conditions of Whareorino forest as habitat for this frog, and there was a discussion about how habitat features from the forest relate to humidity conditions. A tangata whenua member remarked that almost every tree trunk in that forest was covered by mosses and that these plants were not equally moist on different sides of the trunk (suggesting a humidity effect influenced by the proximity to the ocean). Thus, Cisternas measured and compared the relative humidity and density of trunk bryophytes in the donor and release sites associated with this translocation project. The results showed higher humidity at the donor site (Whareorino = 97.5%) than the release site (Pukeokahu = 93.3%) (relative humidity measured with dataloggers between October 2015 and February 2016; HOBO Pro v2 Loggers – U23-002, Onset Computer Corporation, Bourne, Massachusetts, USA). This is consistent with the higher proportion of non-vascular plants on the trunks, established using a visually estimated cover scale (Etienne & Prado 1982) measured in the donor site than in the release site, $X^2(6, N = 82 = 17.44, p = 0.008)$ (Cisternas 2019). Measuring bryophyte coverage on trunks, an idea initiated by tangata whenua, proved to be useful in determining habitat quality for this terrestrial amphibian.

Monitoring of the frog populations was an essential activity in ‘working together’. Monitoring enhances the (re)connection

of Māori with their taonga and can also help improve search effort to obtain enough data for monitoring analysis of species (Cisternas 2019). Tangata whenua in Pureora (elders and other adults) started helping in the annual monitoring organised by DOC in Pukeokahu in 2015. For many tangata whenua members, their involvement in the monitoring of frogs at Pukeokahu was their first opportunity to encounter this species of frog, and this was recognised as an exciting experience.

Monitoring is consistent with Māori cultural practices. A good way of building the relationship and improving communication between local communities and conservation scientists is to work together in monitoring activities. ‘Monitoring with a cultural meaning’ is understood here as the idea of obtaining useful information for management in a way that creates positive memories for all parties. It is done with all the professionalism required to achieve scientific standards, but also with a consideration of the cultural context of the place. This type of monitoring is designed in a way that is practicable for well-trained volunteers (Bonney et al. 2009) whose main qualification is their willingness to participate. This is the principle behind the collaborative monitoring carried out in Pukeokahu as part of this partnership (Cisternas 2019). As a strategic framework, collaborative monitoring has been demonstrated in other cultural and frog conservation contexts. Examples include rural school children (7–12 years old) in Patagonia (Aisén Region, Chile) monitoring abundance and breeding behaviour of local species (Cisternas et al. 2014), and local communities in Australia monitoring environmental DNA (Rojahn et al. 2018). Collaborative monitoring also addresses modern Māori desires to reconnect with their place (i.e. Māori concept of *tūrangawaewae*) (Ruru 2008; Michel et al. 2019).

The principal challenge found during this stage was associated with the volunteer status of the tangata whenua members involved, i.e. some researchers are paid for their contribution to the partnership while tangata whenua members volunteer, and receive no financial payment for their time commitment. For successful monitoring of the frogs ‘together’, an economic incentive could be associated with the participation of tangata whenua volunteers. To preserve the voluntary status of the activity, any economic benefit could be directed towards the community rather than to individuals.

Budget limitations impacted the duration of this stage. As shown in Fig. 2a, ‘working together’ started after getting the partners together (at least once) and continued for slightly more than one year. During that time tangata whenua developed monitoring capabilities that allowed them to continue collaborating with DOC in frog monitoring. In this amphibian conservation framework, the stage of ‘work together’ was the stage that empowered the local community and built on capabilities for protecting native frog species. A budget for joint training sessions must be included when planning the partnership process.

‘Write together’

The third stage of our framework is called ‘write together’, and its main purpose is to share the experience and knowledge gained through the relationship with others (e.g. the scientific community, other tangata whenua groups), but is most essential for researchers. Māori people have their own mechanisms of knowledge transmission and cultural enhancement, including some that were promoted during this partnership, such as monitoring activities, and sharing scientific information at the final hui of our partnership. For western researchers and governmental agencies, peer-reviewed publication of results

is a vital step in communication and validation of findings (Smith 2004; Ewen et al. 2013).

The narrative inquiry used to ‘write together’ aims to create a collaborative story that avoids positioning researchers as storytellers; rather it recognises researchers’ participatory connectedness with Māori participants in a way that minimises separation and promotes engagement (Bishop 1996). Interviews as ‘chat’ conducted within an ongoing relationship would become the most important source for the construction of these narratives. Therefore, the lead author responsible for drafting the document should have a relationship with the community before the writing process begins. This person should be recognised as a visible, trusted face for all the authors involved. It is important that both tangata whenua and researchers are represented in the narrative construction to ensure that the interests and needs of all perspectives are included.

The ethical aspects of the partnership become particularly important during the writing process. Caution is encouraged to ensure the protection of indigenous rights in terms of what specifically is going to be published. Efforts should be made to confirm that people named and/or quoted are aware of the written document and are in agreement with its conclusions.

We acknowledge the existence of many other ways of sharing the knowledge that we acquired during the partnership. However, we use the word ‘write’ to highlight that even when there is a recurrent call to reconciliation with indigenous people in New Zealand, and worldwide by groups in power, such as governments and academia, there are few examples demonstrating this in the formal authorship of scientific literature. For a truly collaborative approach to research, one that facilitates reconciliation, it will be necessary for members of both indigenous communities and the research community to write and work together (Bishop 1996).

In addition, ‘writing together’ is key for achieving an authentic indigenous voice. To ‘write together’ means there is agreement about the ideas expressed and promoted. As shown in Fig. 2, the stage of ‘writing together’ has a specific beginning and an end in terms of the authors’ (indigenous and non-indigenous) consent and agreements.

This stage is challenging because it requires a level of mutual understanding and trust, and so it cannot be accomplished at the beginning of the relationship (Fig. 2). It requires that the different voices representing the partners be expressed in document(s) written together. The strategy adopted in our partnership was to write about the aspects recognised as useful by the authors in a way that highlights the reciprocal value of the relationship.

Additional findings and recommendations

Māori tikanga, i.e. “the customary system of values and practices that have developed over time and are deeply embedded in the social context” (Moorfield 2018), and the western conservation vision of protecting species are compatible in multiple ways. Frogs are taonga species for tangata whenua. Tangata whenua feel connected with the frogs as part of their history and genealogy, and hence as part of their identity. To be guardians for this species (i.e. to act as kaitiaki for this taonga) entails a responsibility to honour the welfare of the frogs.

Mātauranga Māori, like other indigenous systems of knowledge, is not static; rather it involves a dynamic process of knowledge generation that makes it meaningful

for communities today (Berkes 2008; Bartlett et al. 2012; Broughton & McBreen 2015). This characteristic of mātauranga Māori strongly aligns with the engagement of tangata whenua, as pointed out during our frog translocation partnership. For example, although it was unclear to the tangata whenua groups involved in the translocation project whether or not their elders (kaumātua) were aware of the existence of *L. archeyi*, for tangata whenua now, this frog is taonga. In addition, throughout the partnership process, many tangata whenua members have shown interest and concern for this species of frog in Whareorino and Pukeokahu. For example, in Kiritehere beach there is one reference to a song that the elders of that area used to sing: ‘Another poroka jumps upon another poroka’s back’. Poroka is the te reo word recognised in the translocation area for frog (see Appendix S1 in Supplementary Materials).

Tangata whenua commitment is long-term, because it is not about what we do today, but about our responsibility to the next generations. Tangata whenua involved in the translocation project acknowledged the opportunity of learning about this frog but they especially acknowledged the opportunity to teach the younger generation how to continue protecting the species. In addition, tangata whenua valued outdoor activities in which tamariki were able to interact with their taonga.

If the partners keep communication strong and healthy, this adds explicit value to the relationship. This element becomes of ultimate importance when deciding on, and planning, management actions with a high cultural impact, such as translocations. It was established during the relationship that translocations were a sensitive issue for tangata whenua because of their guardianship role with this taonga. Moving animals from one territory (rohe) to another can be understood by non-Māori as analogous to dispersing members of a family and entrusting their care to someone else. As explained by Lyver et al. (2019), tangata whenua do not perceive translocations as simply the physical transport of species, but also as an exercise that enhances the responsibility and relationships of all the practitioners and stakeholders involved.

Concluding remarks

Three fundamental elements are required for effective biodiversity conservation: (1) researchers providing useful scientific knowledge that accounts for biological aspects of biodiversity, (2) a local community aware of the importance of biodiversity conservation, (3) a territory without conflict for land-use (e.g. the development of a human economic activity that negatively impacts a species’ habitat). In New Zealand, there are multiple opportunities to combine these three elements for native frog conservation, particularly within protected areas. Tangata whenua and DOC consider *Leiopelma* species important, and both should decide together on the species management. A number of authors have emphasised that the relationships between tangata whenua and western science guided professionals (e.g. DOC, non-Māori researchers) will play a relevant role in future New Zealand conservation actions (Ruru et al. 2017; Wehi and Lord 2017; Lyver et al. 2019). We encourage others to attempt novel approaches for trans-disciplinary biodiversity conservation strategies, and we offer the ‘get together, work together, write together’ framework as a model for achieving species preservation in a culturally respectful way.

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Supplementary material

Additional supporting information may be found in the supplementary material file for this article:

Appendix S1. Te reo Māori names for frog species.

The New Zealand Journal of Ecology provides supporting information supplied by the authors where this may assist readers. Such materials are peer-reviewed and copy-edited but any issues relating to this information (other than missing files) should be addressed to the authors.