TE KAAHU O TUAWHENUA

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CONTENTS

Produced by

TŪHOE TUAWHENUA TRUST

SUPPORTED BY

LANDCARE RESEARCH MANAAKI WHENUA

"E ngā pakiaka haere whenua, tēnei te tangi kōrihi a Te Tuawhenua me Manaaki Whenua ki a koutou katoa kia rarau mai ki ōna pūrongo mo tēnei tau 2018."

2018 has been another great year for the Tūhoe Tuawhenua Trust and Manaaki Whenua! We have made further progress in in our research projects and continue to extend our networks and relationships.

In this edition of Te Kaahu we report on the activities of the Tūhoe Tuawhenua Trust, featuring not only our honey business Manawa Honey NZ, but also some of the research we have worked on during the year.

We report on two aspects of our major research project with Landcare Manaaki Whenua in 2018 - biocultural methods for assessing and monitoring the state of and changes in our forest, and Te Weu o te Kaitiaki – The Root of the Cultural Guardian. We also provide updates on a number of collaborations with Landcare Research Manaaki Whenua - the Manaaki Whenua Scholarship, research on 'The Honey Landscape' and research on insect pollinators in manuka.

Puke Timoti presenting the findings of our matauranga research at a LINK seminar in Environmental House Wellington. Puke was supported on this occasion by Tuawhenua kaumātua and Ngati Whare representatives.

Tūhoe Tuawhenua Trust in 2018

Who's Involved

Trustees of the Tuawhenua: Tāhae Doherty (Chair), Korotau Tamiana, Doris Rūrehe, Hekenoa Te Kurapa, Tāne Rua, Richard Tūmarae, Brenda Tahi (Executive Trustee)

Te Kaupapa o Te Tuawhenua

The Trust is now into its third strategic plan to take us through 2018 to 2020. Our long term goals continue to focus on Te Iwi me Te Whenua (developing our land and people); Kaitiakitanga (protection and enhancement of Tuawhenua ecosystems); Te Matauranga me te Tuhonohono (Knowledge and Networks).

In the last year we have advanced a number of priorities:

- Creating jobs and training our local people into these roles.
- Growing production and markets for Manawa Honey NZ, with particular success in the supermarket sector.
- Advancing work on biocultural methods for monitoring forest biodiversity
- Partnering in a number of research projects with a range of providers
- Continuing to contribute to our networks, particularly in matauranga for managing biodiversity and mountain tourism.

The People: Job Creation & Training

Puke Tīmoti has advanced his studies in this last year to master level and is looking forward to graduation in 2019.

IN the 2017-18 season, three of our beekeepers (Raniera Te Kurapa, Waylon Rikiti, Toby Moon) undertook further training through a tertiary course held by the Eastern Institute of Technology. This continues our commitment to developing these staff in the beekeeping operation. In 2018 we have also initiated workplace training that will be implemented over the next year for all staff.

We continue to create jobs and as we come to the end of 2018, we have near 12 FTEs in our employment.

Networking and Contribution

During 2018, our researcher Puke Timoti and Phil Lyver of Landcare Research Manaaki Whenua along with our kaumatua of Ruatahuna have been presenting their research on matauranga and bio-cultural monitoring methods to a number of interested audiences. There has been some really positive responses to thes presentations—not only the ideas and research findings but also to Puke as a new person emerging in this field. Puke and Phil report in more detail on their research later in this edition of Te Kaahu.

Brenda Tahi has also been contributing with a tourism focus for the Trust, returning to Guizhou, China in 2018 to attend the conference of the IMTA (International Mountain Tourism Alliance). Brenda was asked to present the famous mountains of New Zealand, Aoraki Mount Cook and The Southern Alps, but she also took the opportunity to present on Manawa Honey and tourism development in the mountains of the Tuawhenua. A theme of her presentation was a plea for mountain tourism across the world to not displace or disenfranchise indigenous peoples, and to ensure they are able to access all the opportunities in business and employment that mountain tourism can offer.

The mountains of Guizhou also gave Brenda the opportunity to look further into how the ancient indigenous cultures of make good use of their lands.

Above: After his presentation to policy-makers in Wellington, Puke Timoti (at centre), supported by Tangiora Tawhara (at left) discusses some key points with Hon Nanaia Mahuta, who as the Minister for Maori Development and Associate Minister for the Environment showed a great interest in the research.

Below: Brenda Tahi presents the mountains of the Tuawhenua to the IMTA conference in Guizhou, China, highlighting honey production and tourism as land uses within the region.

Top: Wangfenglin, 'Ten Thousand Mountains': this region shows off the patterns of land use in mountains of Guizhou. The colours change with the seasons in the rice paddies and fields of wheat and rape. Wangfenglin is also famed for its karst landscape formed from limestone geology where the mountains are a distinctive cone shape, rivers run underground , and caves sit inside many of the mountains.

Centre: The food in rural parts of Guizhou is fascinating. Brenda explains "We saw many foods we could never identify – fruit and vegetables like nothing we had ever seen. But then there was also the more familiar, or similar. Here, in a street market stall, chillis, carrots and cauliflower sit alongside types of fungi that remind us of harore and mushrooms. We took a special interest in these fungi as our trust is considering edible fungi that may be attractive for the Asian market.

Bottom: Like us in Ruatahuna, the people of Guizhou keep a tight – knit whanau. China has long had a one-child policy to contain its exploding population. In recent years that control has been lifted, to get more balance in the structure of their population. But they are still small families – you can move them on a scooter. Here's two families on-the-go – obviously no traffic rules to stop them in China!!

Te Whare o Rehua

In June 2018, the Tūhoe Tuawhenua Trust, ran an academy programme for our rangatahi in Ruatāhuna, designed to reconnect them to the ngahere (bush/forest). We see that the ngahere is crucial for the well-being of our young people – physically, intellectually and spiritually – and intend this programme to develop our young people as future citizens and leaders of Ruatāhuna.

Manawa Honey NZ supported the programme and we also gained funding from the Whakatane District Council, along with additional support kindly provided by other sponsors. The programme involved workshops in the field and at the marae base to cover history, flora and fauna, matauranga and waiata. Te Whare o Rehua proved to be a great success with evaluation ratings from the participants high to very high satisfaction! We are seeking further funding to support the Trust to continue this programme in 2019-20.

Top right: James Doherty, expert in te matauranga o te ngahere, explains one of the very special attributes of the kaponga – how it is a perfect medium for other trees to drop their seed and begin to grow on.
Bottom: Puke Timoti, leader of our inaugural programme for Te Whare o Rehua, takes his group of young people through some aspects of matauranga during one of the programme outings.

Above: The Manawa Range 2018 – honey gift-packs, jar honey in manuka, rewarewa and tawari varietals, snap-packs and healing skin balms.

From left: Tania Blomfield, Makere Biddle, Tahae Doherty, Saul Wairama, Nick Mitai, Waioma Mitai & Ngapani Mitai received our awards on behalf of Manawa Honey NZ.

Manawa Honey NZ

Who's involved

Beekeeping & Extraction Operations: Hekenoa Te Kūrapa; Nick Mitai; Rāniera Te Kūrapa; Toby Moon; Raymond Te Kurapa; Timi Rāwiri Tahi.

Marketing & Business Support: Brenda Tahi; Tania Blomfield.

Beekeeping Operations

2017-18 was another challenging season but we continue to grow production. We also focused on developing our beekeepers through an apiarist course held by the Eastland Institute of Technology.

Every season is different and we certainly come up against some challenges in the last season. In contrast the early part of the 2018-19 season has delivered honey into the hive boxes to give us a pre-Xmas harvest! Predicting what might come each year is a question we have for research that we are pursuing with in the Honey Landscape research project (see update on this further on).

Manawa Honey Marketing

In 2018, our Manawa Honey was taken into another 90 or so Countdowns so that we are now well distributed across the country. We also completed export orders in 2017 to China and Japan but this has dampened somewhat in 2018. Our strategy is to consolidate our business in New Zealand and serve our customers here well, then to develop stronger market opportunities overseas.

Business Awards

Manawa Honey recently won two awards in the EBOP Business Awards— The Winner of Business Entrepreneurship for 2018 and Highly Commended for Business Excellence for Medium Business. Our Medium Business section was the toughest they say with section winner Murupara 4 Square also taking out the Supreme Winner. Winning the Business Entrepreneurship category is a great credit to trustees, all staff and supporters—awesome!!

Manawa Honey also became a finalists in the 2018 Inspire+ NZ Artisan Awards. With 397 high-calibre entries in our section, Manawa Honey was rapt to find out we had become a finalist! Although we didn't win our section, we were still really pleased to have gotten this far.

Pollen Research with Trees for Bees

We continued our research regarding our pollen in 2017-18 season, with some interesting results. Again we have found that one seasons can be entirely different to another. Whereas rewarewa and tawari showed strongly in pollen results from the previous season, the results of last season featured other types.

The Trees for Bees research programme now has many reports, tools and resources available on www.treesforbees.org. This research project has gathered lots of information about pollens of native plants and is disseminating that information to the beekeeping community.

We're proud to be contributors to this kind of research, and we also acknowledge the learning that we have gained through participation in this project. The next stage in this project is identifying the particular species members in our forests and fields that have been identified in the pollen research.

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Manaaki Whenua Scholarship Award 2017

The Tūhoe Tuawhenua Trust offers this scholarship each year in conjunction with Manaaki Whenua. The scholarship aims to promote development of Tuawhenua people primarily in the fields of forest ecology and environmental sciences and practices, but also in generalist generalist fields such as business studies or leadership. The interest in our scholarship is growing as we have been promoting the opportunity to the universities across the country. In 2017 we awarded this scholarship to Jackie Te Amo and Te Wakaunua Te Kurapa jointly.

Jackie is studying for her Tohu Kairangi (doctorate) at Te Whare Wananga o Awanuiarangi, and the topic of her research is Te Mana Motuhake o Tūhoe. Jackie already has bachelors and masters degrees, so this is the pinnacle of her years of study. In her application Jackie referred to her close links to the Tuawhenua and her upbringing in Ruatāhuna. Jackie also outlined her community involvement and contribution through a number of initiatives. She also comments: 'Ko te whakaaro ia ka taea tenei tuhituhi te arahi mai i a tatou o Tūhoe i roto i nga ra e heke mai nei'.

Jackie Te Amo is studying for doctorate at Te Whare Wananga o Awanuiarangi. Jackie has been active in local body and marua politics for some time and is applying her knowledge and experience in her studies about Te Mana Motuhake o Tūhoe.

Te Wakaunua Te Kurapa is studying environmental planning at Waikato University. He is pictured here with a rusa stag he shot at Te Tahora, Ruatāhuna. The head of this stag went into the record book – it's one of the biggest shot in the Tuawhenua region.

In 2018, Te Wakaunua has been completing his Bachelor of Environmental Planning, a 4 -year degree, at Waikato University. Te Wakaunua was also able to demonstrate close links to the Tuawhenua lands and people.

In his application, Te Wakaunua referred to his contribution to the Tuawhenua through his past involvement in restoration projects. He also explained that his degree 'is deeply rooted in science and planning and the skills develop in this course are transferable to a wide range of fields'.

He goes on to add that 'I chose this field of study because of my love for Te Urewera which was installed in me by my father at a very young age. I believe the skills gained in this degree could be of use to an organisation such as the Tuawhenua because a key function of environmental planning is developing and implementing policies, to ensure the sustainable use and development of natural and physical resources.' We agree entirely.

It's inspirational to see our young people achieving at the highest of academic levels, and we're honoured to be supporting them.

Scholarship Awards in 2018

In 2018, the Manaaki Whenua Scholarship has been awarded to Puke Timoti, who is currently a Masters student at Waikato University. Puke was born and bred in Ruatahuna and has been working for the Tuhoe Tuawhenua Trust for some time as our researcher. Puke's research has been facilitated by projects with Landcare Research Manaaki Whenua, and has involved understanding and interpreting changes and trends within a forest ecosystem using both western science and matauranga Maori.

Puke explains that his thesis for his masters studies "is entitled 'Te Mauri o te Kereru (Cultural keystone species: a case study of the kereru in Te Urewera)', and it explores the historic and traditional knowledge of the kereru and the cultural underpinnings embedded within the Tuhoe Tuawhenua culture as reflected in their fundmental roles in diet and materials." His work seeks to "begin to unravel the question around how current conservation and environmental management plans deal with such concepts." Puke is already looking forward to moving to doctoral studies looking at environmental management.

The Trust also awarded two Tuhoe Tuawhenua Trust Scholarships in 2018 to provide some assistance to:

- Waiora McLeod, of Ngati Koura, descendant of Pare Ruri, who has been studying at physiotherapy at Otago University.
- Halvana Doherty, mokopuna of Hinerangi Goodman and Ben Doherty, who recently gradated in accounting and marketing at the University of Auckland

Puke Timoti is also the researcher for the Tuawhenua Trust and here he is completing pellet counting in the bush as part of his work for our research projects being undertaken with Landcare Research Manaaki Whenua.

Update on Understanding the Honey Landscape

Who's involved?

Tuawhenua Trust: *Brenda Tahi*

Manaaki Whenua – Landcare Research: *Gary Houliston, Kiri Reihana, Mahuru Wilcox, Elise Arnst, Anne-Gaëlle Ausseil, Sarah Richardson, James McCarthy, Jessie Prebble*

Te Whare Wānanga o Waikato: *Stevie Noe, Mike Clearwater, Merilyn Manley-Harris*

Rangahau Ahumāra Kai (Plant & Food): *David Chagné*

Background

The Tuawhenua Trust is a partner in a honey research programme. The programme was co-developed with Manaaki Whenua, Rangahau Ahumāra Kai, and a group of Māori organisations who are also producing high value honey, including Ngati Porou Miere, Atihau-Whanganui, Taitokerau Miere and Tai Tokerau Honey.

The research programme has three broad realms; (1) Mana Whenua engagement, Mātauranga Māori, and business development models for Māori honey producers; (2) honey provenance and whakapapa; and (3) flowering and nectar production. In this edition, we will provide a brief update on the last realm, and future editions will describe the other two.

Our main goal is to be able to predict the amount of nectar and pollen available to bees throughout the year, for any site in New Zealand. This is no small feat!

First we need to determine which species occur in which region. We have been using data from thousands of vegetation plots, including some close to Ruatāhuna, to map where each species is found.

Above: Hinau in flower from a herbarium specimen stored at Te Papa Tongarewa. Specimens such as this one provide us with many details such as the location, the collection date, whether or not a plant was flowering, and which other species were nearby. Understanding flowering timing and patterns over the years provides with clues on how we might predict flowering of different species in our forests of the Tuawhenua. This knowledge can be invaluable for beekeping operations such as Manawa Honey NZ.

Second, we have been finding out when each species flowers, in each region. We have done this by compiling all the flowering times from published records, and by visiting herbaria around New Zealand to collect flowering data from stored specimens like the one pictured above.

Another way we are measuring flowering is by using game cameras (pictured below), mounted on posts. These record a picture of a plant every day and at the end of the year, we can download the photos and define when each species was flowering.

Now we are using statistical models to understand why flowering time varies around the country within a species. For example, mānuka flowers throughout the year in Te Tai Tokerau, yet only flowers during summer in Te Urewera. In contrast, tāwari flowers from November to January regardless of where it is found. These types of details can be used to make our model as realistic as possible.

Over the next year, we will be bringing together all this information to produce maps of nectar and pollen availability. Brenda and the other beekeepers can then assess whether the models have made realistic predictions and help us identify which things need re-working and improving.

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This game camera is set up to take a photo of the mānuka bushes every day through summer. At the end of the year, we download the photos and record flowering. This tells us when flowering started, how intensive flowering was, and when flowering finished. In case you're wondering, the barbed wire is to deter cattle from using it as a scratching post!

Biocultural Monitoring Methods for Assessing Forest State

Who's involved

Manaaki Whenua Landcare Research: Phil Lyver, Andrew Gormley, Sarah Richardson, and Chris Jones

Tūhoe Tuawhenua Trust: Puke Timoti and Brenda Tahi

Rationale & Method

When making decisions about the state of our forests, we need to understand how the realm of Tāne has changed over the last 5 years, 10 years, 50 years, or even 100 years. What tohu do you use? How do you decide when and what tikanga to apply? And how do you know when you have achieved your desired goals after kaitiakitanga has been applied? To tackle these questions, the Tūhoe Tuawhenua Trust and Manaaki Whenua Landcare Research have been working with the Ruatāhuna community to develop and apply a biocultural forest monitoring system that uses both scientific plot-based measures, and tohu identified by kaumātua, as they relate to a historic Ruatāhuna forest state (Baseline; 1955–1975), to compare the current state of two ecologically similar forests (Whirinaki and Ruatāhuna).

For the purposes of this study, we used tohu identified and prioritised by kaumātua to evaluate the condition of Ruatāhuna and Whirinaki forests. Firstly, we interviewed kaumātua and asked them to evaluate the tohu based on their memories on the Ruatāhuna forest between the 1950s and 1970s (Baseline forest). Researchers then accompanied kaumātua into the Ruatāhuna and Whirinaki forests and asked them to

Whirinaki field team (from left): Puke Timoti, Brian Karl, Chris Morse, Ella Hayman, Neil Fitzgerald, Kevin Drew and Sarah Richardson. Not pictured: Maureen Rangitoheriri (Ngāti Whare)

use the same tohu to evaluate the current forest state compared with the historical Baseline forest. We then developed a plot-based system based on a subset of Department of Conservation biodiversity measures. The selection of measures were based on recurrent themes identified by Tuawhenua over 10-years of research (e.g., increasing weed presence, the loss of large trees, the paucity of tree regeneration, the silence of the forest from the loss of birds and insects, and browsing impacts by ungulates). We randomly assigned a sample of 20m x 20m plots in both the Ruatāhuna and Whirinaki forests and recorded measures relevant to these themes.

Findings

The results emphasized that while the Whirinaki forest was generally in better state than the Ruatāhuna forest, and held attributes of the Baseline forest (e.g. abundance and density of podocarps), both forests were still well below the condition of the historic Baseline forest. The plot-based data suggested that forests at Whirinaki are more open, with a greater number of larger trees and fewer thickets of tree ferns and small trees. In contrast, greater disturbance (e.g. from historical logging) in Ruatāhuna forests has resulted in tree fern-rich successional forests with fewer large trees, and more opportunities for palatable tree seedling regeneration and weed invasion. Our monitoring showed no difference in species occurrence of native or exotic birds between the two forests, either in terms of species richness or total counts.

Findings: Flora and Fauna

Some native bird species (kākā, kākāriki and kōkō) were detected more often in Whirinaki, while other native species (kōparapara and kererū) were more common in Ruatāhuna forests. The relative abundance of possums was greater in Ruatāhuna, however, the relative abundance of deer was similar in both areas. Kaumātua considered that the external appearance and condition of the Whirinaki forest was beautiful and lush as characterised by full and glossy dark green canopy. The forest canopies at the Ruatāhuna sites were deemed by kaumātua to be patchy and uneven, including an olive coloration with shades of lighter green and yellow. Kaumātua also considered the 'language' of both the Whirinaki and Ruatāhuna forest sites to be 'muffled and quiet with little sound' compared with the historical Baseline forest (loud and noisy/full diversity of sounds).

The frequency of bird sightings and calls indicated that abundances of birds were 'not that great' within each of the forests compared with the Baseline forest. Fewer sightings of pellets and thicker understorey suggested to elders that deer and possum abundances were lower in the Whirinaki forest compared with Ruatāhuna. But both forests were considered to have significantly lower deer and possum densities than the historical Baseline forest.

Below: Researcher Puke Timoti works with Menu Ripia on matauranga for assessment of Tuawhenua forest. Note how bare the forest floor is in the background.

The abundance of seedlings within Whirinaki forest was considered by kaumātua to be plentiful and common relative to the Ruatāhuna forests. This was supported by the way kaumātua described the Whirinaki forest floor as having a thick luxurious carpet of vegetation. In contrast, the ground at Ruatāhuna sites was considered to be much firmer with leaf litter covering large areas.

Impressions of the presence and strength of mauri in each of the forests were informed by a range of factors reflecting the spiritual and biophysical relationships and responsibilities within the forest. The *mauri* of the Ruatāhuna forests was deemed by kaumātua to be present but in a poorer state than that of the Whirinaki forest. However, kaumātua generally felt that the *mauri* of both the Ruatāhuna and Whirinaki forests was diminished compared with what they associated with the Baseline forest. In contrast, no difference in *ia* between the forests was felt by the kaumātua although their ratings of *ia* in the contemporary forests were below that of the Baseline forest. *Ia* is tied largely to an emotional response or feeling based on past experience with the location. Since most kaumātua had spent little time in the Whirinaki forest, this part of the assessment may have been compromised.

Conclusion

The opportunity for tangata whenua to apply their traditional ways of knowing, interpret the signals as they understand it, and decide on the course of action is important for kaitiakitanga. Science and indigenous knowledge systems together can offer an integrated, informative approach to environmental assessment. Historical baselines of forest state can provide biocultural targets for restoration initiatives, and also identify where on the restoration continuum current forests lie. A complementary approach provides opportunities for tangata whenua to prioritise goals relevant to them, and include tohu that they understand, and see as valuable, to the monitoring process. It also provides information that iwi, hapū and whānau can relate to, which further facilitates learning and action.

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Te Weu o te Kaitiaki – The Root of the Cultural Guardian
"Nau mai e manu e waha ki tōku tua"

Who's involved

Tuhoe Tuawhenua Trust: Puke Timoti

Manaaki Whenua Landcare Research: Phil Lyver

Earlier this year in February, Tūhoe Tuawhenua Trust and Manaaki Whenua Landcare Research facilitated a three-day wānanga with Tuawhenua elders and youth held at Mataatua marae, Ruatāhuna. The idea for the wānanga originated from the work that both Puke Timoti (Tuawhenua) and Dr Phil Lyver (Manaaki Whenua Landcare Research) have led in the community over the last four years. The aim for the wānanga was to provide an opportunity to support the inter-generational transfer of Tuawhenua mātauranga (knowledge) relating to the kererū.

For the people of Ruatāhuna the kererū is regarded as a manu rangatira (chiefly species) that hold a certain mana (status) amongst the children of Tāne. The kererū holds immense spiritual and cultural significance for Tuawhenua. However, laws prohibiting the kererū harvests, and the movement of our people into urban cities and other countries coupled with the loss of our taonga, have resulted in breaks in mātauranga and disruption of the knowledge transfer processes. It is important to us and our kaumātua that the tikanga and mātauranga concerning the kererū including other mātauranga o Tūhoe lives on despite these challenges. The title we utilized for the wānanga is part of a much larger passage of traditional karakia sourced by Pou Temara and used by our tipuna to invoke the mauri of the kererū by the tohunga to be used once more in this instance as a kōrero whakaheke (knowledge transmission).

Over the three days our kaumātua provided accounts of tikanga and cultural expressions relating to the kererū, the areas the birds were traditionally harvested and the appropriate times it was harvested. The tools used, how it was processed and eaten, and their experiences of growing up with their elders and living in Te Urewera. The two particular sites we visited were Tūtaepukepuke (Pukareao) and Hanamahihi both accessible only by foot, horseback or helicopter. For many of the kaumātua, these were areas that they traversed in their youth. Some of the kaumātua had not been back since. A flood of fantastic memories and kōrero ensued. The areas visited hold important histories relating to the kererū and

Right: Waka kereru were used with snares to catch kereru in the distant past. A few of these waka kereru remain in places in our forests that were frequented for this purpose. Here, Tuawhenua Trustee Korotau Tamiana passes on his knowledge of waka kereru to Kiri Tahi-Rangihau at left and Ngatai Rangihau.

Opposite: The wananga to compose a moteatea about the kereru was a serious business! In Te Whai-a-te-motu meeting house, Mataatua Marae, the kaumatua of Ruatahuna line up to contribute – at centre Te Toka Temara, Reremoana Pitau and Tangiora Tawhara look on as Kirituia Tumarae makes her contribution.

our old people that harvested them. Some of the younger members participating in the wananga had never set foot in these areas, so it was important for them to experience these places. We learnt about the ecology and the behaviour of the kererū including the environmental and astronomical knowledge relating to the kererū. We flew over old pa sites like Tahuaroa, and Ohaua -o-te-rangi and other kererū harvesting areas like Matawhero and Te Kohuru Tukuroa. In particular Manuruhi a reference point given in the Tūhoe mōteatea (lament) about the kererū, Te Kaihua o Te Kurapa.

Finally, the challenge was put to participants to compose a waiata (incl. mōteatea), haka (e.g. pātere, hari kai) as mechanisms for protecting and ensuring that the mātauranga captured here is carried on through to future Tuawhenua generations. By the end of the wānanga the group composed the following waiata mōteatea (lament) entitled Te Mauri o te Kererū.

We hope that the mōteatea might have a future place in Ruatāhuna and other community functions and encourage more wānanga of this nature to continue, and other waiata or other innovative means of kōrero whakaheke is created to immortalize our stories, our history and our identity.

An important outcome of the wānanga was to provide the community with a film record of the event and some of the kōrero that was provided. We hope that in future it will become a resource for the community. In the coming months we plan to screen the two draft documentaries for the community so people have a chance to review the footage and content. Our plan is to talk with Māori Television to see if they might be interested in picking up the screening rights. We like to thank everyone that was involved in the wānanga in some way for making it possible.

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Te Mauri o Te Kereru	
Te mauri o te kereru *Tikina ki hea?* *Tikina ki te rangi* *Tikina ki a Matariki* *Te whetu tapu o te tau* *He tohu i te makuru kai hau kai* *Tērā ko Ngāwhata ki te tuapae* *Nau mai te manga tawai o Rehua* *Papā te whatitiri i te ana whakatangi* *Hoki mai te manu ora ki te maunga koia!* *E ko Te Pua-nui-a-Tāne* *Hau ko te kahikatea, te paikiaka haere whenua* *Kauā ko te Houwhi, ko Te Kōhai kawa porokaiwherea* *Nau mai e manu ki tōku tua* *Ka hikohiko e! Ka kapokapo e!* *Ka kapo, ka kapo* *Ka hiko i te pae o te rangi e* *Aue!*	*The life essence of the pigeon* *Where shall it be retrieved?* *Retrieve it from the heavens* *Retrieve it from Pleiades* *From the sacred star of the year* *That foretells the abundance of this season* *We look upon Ngāwhata (an arm of Orion's belt) that rests on the horizon* *And we welcome the resting perch of Rehua (Antares)* *The lightning claps in the sacred caves that echo* *Return o sacred bird to your mountain solace!* *To declare the opening abundance of Tāne* *In the presence of the great trees that walk this land* *No time during the Houwhi and the Kōhai that decays the flesh* *Return o sacred bird unto my shoulder* *Lightning flickers! People clutching!* *They clutch, they clutch* *It flickers in the horizon of the sky.* *Sadness!*

Understanding Māori values to strengthen the mapping of forest ecosystem services

Who's involved

Tuhoe Tuawhenua Trust: Brenda Tahi; Puke Timoti

Manaaki Whenua: Landcare Research: Phil Lyver; Andrew Gormley; Christopher Jones; Sarah Richardson; Suzie Greenhalgh

Rationale

Forests are hugely important for indigenous people around the world. The relationship Tuawhenua has with Te Urewera shapes and guides their values, beliefs and knowledge systems. To guide future management, decision-making and monitoring of Tuawhenua forests, we wanted to understand and compare the spectrum of values held by different generations in the community. We also wanted to understand what level of trade-off might be required to achieve different values.

Method & Findings

Within our study we mapped forest values across four themes relevant to the Tuawhenua community:

- The importance of place
- The capacity of forest to provide
- The connection between forest and community and;
- The future aspirations of Tuawhenua for their forests.

What we found was that there is consistent agreement between the older (≥60) and younger (<60) age groups about what values are important. *Mauri* (life essence; 51% of participants) and *Mahinga kai* (food procurement; 48% of participants) were the two highest ranking values identified most frequently across the four themes. These values were followed by *Oranga* (human well-being) and *Te ohanga whai rawa* (economic development).

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. Mahinga kai was often the general reason for the community for going to and being in the forest and harvesting and materials. We also found that values like Mahinga kai are closely linked with principles contained within kaitiakitanga (environmental guardianship) and are vital to the maintenance of other values and other activities such as knowledge retention and growth; transformative experiences, monitoring forest health and maintaining community interaction and resilience.

While Ahikāroa (keeping the home fires burning or an uninterrupted connection to the land) was the highest scoring value about why the forest, land and rivers were important to the community and significantly for the younger generations identified strongly with ahikāroa and whakapapa (genealogy).

The maintenance of ahikāroa was considered by Tuawhenua to be a crucial part of being linked to place and community to understand what is happening in the environment which defines and nurtures their identity because it instilled an inherited right to contribute to and make decisions about the land and their environment.

The conundrum however for the community is how to balance the cost benefits of Te ōhanga whai rawa against the aspirations of the community associated to nurturing and maintaining the integrity of the mauri of the land, the forest and rivers. Milling of large native conifers (e.g. mata, rimu, toromiro, tōtara) from Tuawhenua forests between 1950 and 1975 altered the forest structure which resulted in a simplified forest dominated by kaponga (tree ferns) and shade-tolerant, vigorously sprouting broadleaf tree, tawa. The benefits of the milling industry for Tuawhenua were local employment and income that supported Ahikāroa and people living and working in Ruatāhuna while allowing them greater opportunity to participate and improve community life. Significantly for a time it sustained the language dialect and traditions of the area including the practices of caring and working collectively (Mahi tahi) while other iwi moved into urban societies for the same reasons. The impact required trade-offs over other core values (e.g., Mauri - loss of ecosystem integrity, Mahinga kai - the lack of access and availability of traditional forest foods and materials, and Whakaheke kōrero - the process of transmitting knowledge) which are often fraught and unrealized.

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Trips like this are integral to the maintenance of the knowledge of the area and the environment. Kaumatua Len Te Kaawa (at centre) accompanied whanau home-schooling their children on correspondence to Ohaua-te-rangi Marae down the Whakatane River in the 2010s – an unforgettable experience for those that joined this trip. This trip was one of many taken by this group in this period to different parts of the ngahere surrounding the Ruatahuna valley.

Special insect pollinators in Manuka

Who's involved

Tuhoe Tuawhenua Trust: Brenda Tahi

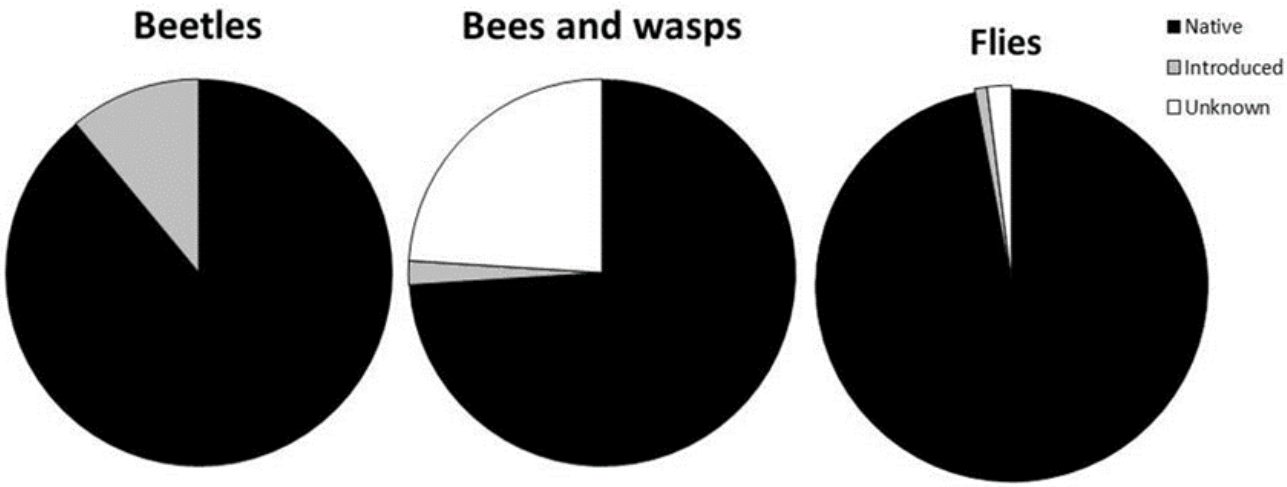
Manaaki Whenua: Landcare Research: Corinne Watts, Sarah Richardson, Andrew Dopheide, Robert Holdaway, Danny Thornburrow and Carina Davies

Honey production from New Zealand's native flowers is a rapidly growing industry. Honeybees are not native to New Zealand, however, and their effects on native invertebrates, including pollinating species, are largely unknown. Furthermore, little is known about native invertebrate pollinators.

We collected invertebrate communities from two locations at Tuawhenua with mānuka-dominant vegetation and at each location we found a site with beehives (Te Waiti) and a site without beehives (Parahaki). We used three traps to sample the flying insects or invertebrates inhabiting foliage. Our traps were open-sided tents made of fine mesh cloth, and these were left in the field from mid-December 2016 to mid-January 2017. The invertebrates in the samples were then sorted and counted using a microscope.

Over 20,000 invertebrates were collected at Te Waiti and Parahaki, and native species were dominant. Many important pollinating species, such as native bees, were found. The native bee fauna in New Zealand is characterised by a low diversity of species and they are very difficult to tell apart. Native bees look like dark honeybees but are much smaller (about 10 mm) and do not 'buzz' as honeybees or bumblebees do. Native bees are solitary, digging branching tunnels in bare ground in which to lay eggs. The female's hairy back legs are used to carry pollen back to the nests as food for the larvae. The majority of these species are known to pollinate mānuka. Among the other important insect pollinators we found pintail beetles, march flies, drone flies, hover flies, and bristle flies. A large diversity of moths was found at Tuawhenua – likely to be one of the most important pollinators of native plants at night.

The insect community at Parahaki was different from the one at Te Waiiti. For example, over twice as many native bees, *Lasioglossum*, were found at Parahaki than Te Waiiti. While this might be because of the beehives, it could also reflect subtle differences in the abundance of plant species other than mānuka. To attempt to understand these differences, we have also measured insects at other sites in the central North Island with or without beehives. Results suggest that beehives could be affecting native insect communities, but the effects are highly variable among sites.



Insect soup - a typical view down the microscope when sorting and counting the diverse Te Waiti and Parahaki malaise trap samples.

A pinned insect collection showing the diversity of beetles in malaise trap samples.