

WAO TĀNGATA

RECLAIMING MARAMATAKA PRACTICE: ENABLING CULTURAL
ENVIRONMENTAL INDICATOR DEVELOPMENT THROUGH THE
RESTORATION OF ANCESTRAL PRACTICE



Sustainable Seas National Science Challenge - Tangaroa Programme
Project T3 Ngā Tohu o te Ao: Utilising Maramataka as a Framework for
Marine Management

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Utilising Maramataka as a Framework for Marine Management

Prepared by Ngā Tohu Research Collective:

Manaaki Te Awanui Charitable Trust:

Waiaira Rameka, Kelly Ratana, Caine Taiapa

Wheiao Whakaaro:

Te Rerekohu Tuterangiwhiu

Ngātaki School, Ngātaki:


Wayne Petera, Tracey Ashby, Kerry Ann Petera, Yani Ferrens, Betsy Young

Pā Wānanga, Pākirikiri Marae:

Karen Pewhairangi, Rawinia Olsen-Kingi, Karauria Ratapu, Regan Fairlie

Ngā Pāpaka, Tauranga Moana:

Jasmine Apaapa, Garston Smith, Kane Keepa, Reon Tuanau



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For more information contact:

Manaaki Te Awanui Charitable Trust
3/58 Cross Rd
Tauranga, New Zealand
Email: admin@teawanui.com

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KUPU WHAKATAKI

EXECUTIVE SUMMARY

This report is one in a series of publications that sit within the Ngā Tohu o te Ao Project, funded by the Sustainable Seas National Science Challenge. Ngā Tohu is a three-year research project that aims to understand the reclamation of maramataka as a framework for the development of cultural coastal indicators.

This report provides an overview of how maramataka knowledge has supported the reclamation of maramataka practice. Specifically, it examines applied Wao Tāngata, the application and use of two cultural practices—tirotiro (cultural observation) and rūnanga (collective analysis)—as key components of tohu (cultural environmental-indicator) development.

The report begins by emphasising the importance of Wao Tāngata as the foundation for reclaiming ancestral practice. It explores the process of tirotiro, which facilitated the data collection. The report also delves into the core aspects of rūnanga, which seek to reclaim cultural practices related to collective analysis and decision-making.

This report highlights the experiential learnings and key insights derived from the reclamation of maramataka practice and illustrates how this process has developed across the three research areas, Tokomaru Bay, Tauranga and Ngātaki.

KUPU WHAKAURU

INTRODUCTION

This report is one of a series of publications that track the progress of the Ngā Tohu o te Ao research programme. Together, these aim to present the evolving theory regarding the reclamation of maramataka as a framework for the development of cultural environmental indicators.

1) TE PIRINGA

Collaborative Engagement and Meaningful Relationship Building (2020)

2) TE KOROWAI

Reclaiming and Preserving Indigenous Knowledge of Coastal and Marine Ecosystems (2020)

3) WĀNANGA ROA

Reclaiming Ancestral Knowledge of Maramataka to Inform Marine Monitoring Practice (2023)

4) **WAO TĀNGATA

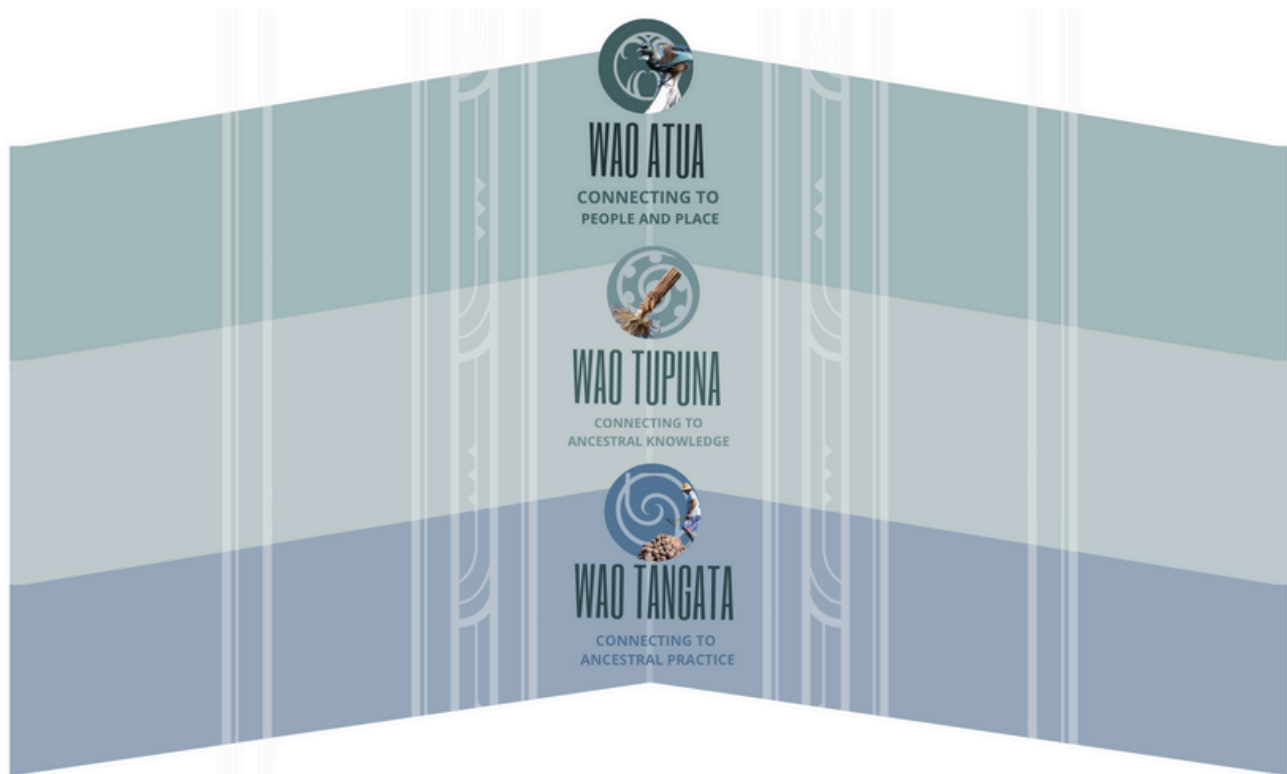
Reclaiming Maramataka Practice: Enabling Cultural Environmental Indicator Development Through the Restoration of Ancestral Practice (2024)

5) WAO ATUA

Maramataka Informed Cultural Environmental Indicator Development (2024)

This report focuses specifically on the reclamation of Wao Tāngata, one of the three core components of the Wao Atua Framework.¹ The report explores Wao Tāngata as applied in the Ngā Tohu Project, focusing on the revitalisation of cultural practices through experiential learning and active engagement; it provides a comprehensive description of the practical application of Wao Tāngata by offering detailed insights into the processes and activities that have facilitated the reclamation of ancestral practices associated with maramataka across three whānau research areas.

The Ngā Tohu Project research collective consists of three whānau research teams: Ngātaki Collective in Te Hiku, Ngā Pāpaka in Tauranga Moana, and Pākirikiri wānanga in Te Ākau o Tokomaru. Each whānau research team worked collectively to reclaim maramataka knowledge and develop maramataka practice specific to the unique aspirations and needs of their whenua (lands), moana (seas), and whānau (communities). Throughout the programme, all three research groups came together for wānanga to share insights and develop collective learnings. This report describes some of the key collective insights emerging from research activities.



1. Rameka, W., Ratana, K., Taiapa, C., & Tuterangiwhiu, T. (2024). Wao Atua—Maramataka Informed Cultural Environmental Indicator Development. [Report]. Sustainable Seas National Science Challenge, Ngā Tohu o te Ao Project.

WAO TĀNGATA

CONNECTING TO ANCESTRAL PRACTICE

The act of reclaiming tūpuna practices serves multiple purposes: honouring and preserving cultural heritage; fostering a sense of identity, and belonging; promoting sustainable practices; and enhancing overall well-being to name a few. The following two chapters of this report describe the key methods and activities, undertaken by the Ngā Tohu research collective, to reclaim maramataka observation practice, with two focal areas being; tiro tiro (cultural observation) and rūnanga (collective analysis).

The first chapter introduces 'tiro tiro', as an evolving tūpuna practice that has laid the foundations for data collection. It presents the 'Tau Toru' framework, describing the key concepts that have guided the application of active tiro tiro practice within whānau research spaces, and provides examples of the tools utilised to support these endeavours. The chapter concludes with reflections from researchers, exemplifying the learnings and advancements in maramataka knowledge and practice that have been developed through active tiro tiro practice.

The second chapter delves further into the support systems that enabled a deeper exploration of tiro tiro practice. Specifically, it examines 'rūnanga', an ancestral practice that facilitated collective reflection and analysis of tiro tiro observations. The chapter demonstrates how rūnanga was applied to foster collective development of tiro tiro understanding. It concludes with reflections from researchers, exemplifying the complementary nature of rūnanga and tiro tiro.

It is important to acknowledge that reclaiming maramataka can take various forms and pathways. This report represents the culmination of three years' work and specifically focuses on the activities and learnings from the Ngā Tohu Project. This report aims to offer an exemplar of a systematic approach for whānau wanting to reclaim maramataka as a framework for the development of cultural coastal indicators.



TIROTIRO

CULTURAL OBSERVATION PRACTICE

TIROTIRO

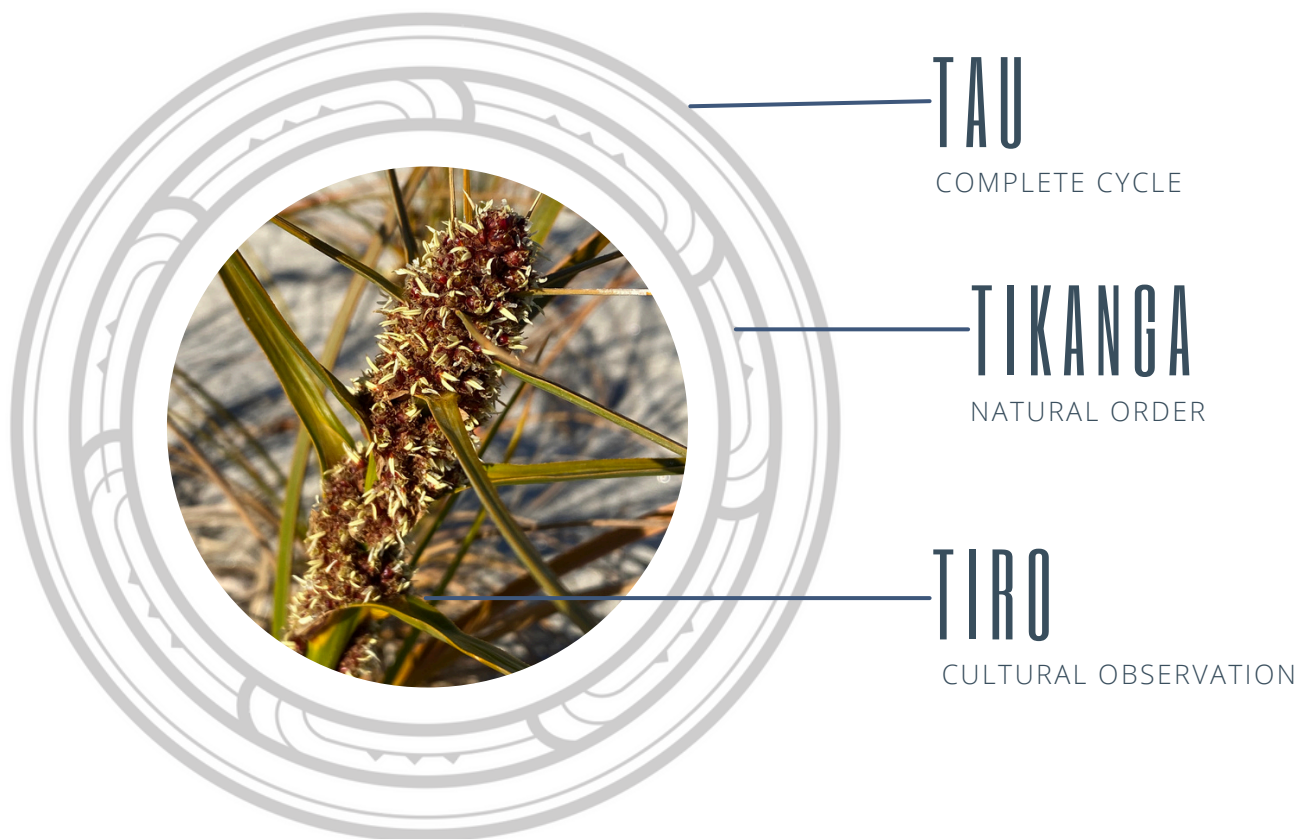
CULTURAL OBSERVATION PRACTICE

The word tiroiro consists of the root word tiro, which can be translated as “observe,” “look at,” “inspect,” or “examine.”² The repetition of the word tiro forms tiroiro, suggesting a repetitive and continuous act of observing. Through exploring tiroiro practice, the Ngā Tohu research collective has come to understand that tiroiro is far more than a simple act of observation: tiroiro is an observation practice grounded in Māori cultural knowledge systems.

Tiroiro involves deep explorations of taiao, delving into the intricate details of natural environmental cycles and processes. This practice involves layering and connecting observations to weave together the complex tapestry of taiao. As a cultural practice, tiroiro has played a pivotal role in both the reclamation of ancestral maramataka practice and the development of tohu.

TAU TORU

To consolidate the understanding of the processes involved in reclaiming tiroiro practice, three key concepts will be discussed in detail. These concepts—tau, tikanga, and tiro—have provided a simple framework for reclaiming tiroiro practice. The next section delves into each concept, describing the significance of their role in the framework and detailing how they were implemented in the project.



2. Williams, H. W. (1971). *A dictionary of the Māori language*. Te Papa Press

TAU

"Tau is a complete cycle, something that has a starting point, moves through its natural processes, and comes to a natural end point." (Tuterangiwhiu, 2023).

"Tau" is used to describe the concept of a completed cycle, indicating the culmination of a natural process. Within the context of Ngā Tohu, the concept of tau has been used to represent a full annual cycle of Papatūānuku (earth) around Tamanuiterā (sun).

Throughout this cycle, Papatūānuku interacts with the energy of Tamanuiterā, progressing through the various seasons of her tau. Beginning with the colder winter, she transitions into the warmer spring, followed by the heat of summer; she then retreats into autumn. Ultimately, Papatūānuku completes her tau as she returns to winter once again.

On a smaller scale, a tau can also encompass the annual cycle of an ecosystem, a single species, or a single individual. A tau can be as simple as the cycle of a

tree, starting with its dormant phase, followed by its fruitful period, and eventually returning to a resting dormant stage. A tau can capture the annual migration patterns of fish or the cycle of water storage in a puna (spring), transitioning from being full and flowing during the wetter months to dry in the hotter seasons. In essence, a tau represents the inherent cyclical processes experienced by all living creatures and natural environmental systems.

The concept of tau situates tiroiti within the framework of natural cycles. In this context, tau highlights the importance of conducting tiroiti over complete annual cycles to capture seasonal variations, identify long-term patterns, and develop deeper understanding of the interconnectedness of taiao. Consequently, as part of the project, each whānau research team committed to a full tau, a complete annual cycle of tiroiti.

TIKANGA

"Tikanga are the mechanisms by which mauri flows, the natural cycles that enable mauri and energy to flow. Through observing tikanga we can understand and track the flow of mauri." (Tuterangiwhiu, 2023)

Tikanga represents the natural laws of nature that govern the processes and cycles of regenerative life. It teaches us that every living thing follows a pattern or blueprint for life, a natural order that follows a natural logic. It reveals what is necessary and essential for energy to move and life to flow within a system. For example, a fruit tree must first undergo a flowering stage before it can bear fruit, and subsequently it must bear fruit before it can produce seeds. These are the tikanga of a fruit tree, the natural order that it must go through to give life, maintain energy flow and provide service to its surrounding taiao.

According to tikanga, tangata (people) have a responsibility to uphold and safeguard the tikanga of the environmental systems that provide for, and sustain, them. Tikanga provide acceptable cultural protocols that ensure the actions of tangata preserve and honour the natural energy flows of taiao, thus guiding respectful and mindful engagement.

Tikanga also dictates that everything follows a process and a natural order that can be observed and articulated. In observing tikanga and tracing the flow of energy within an environmental system, a deeper understanding is gained. This principle has been a fundamental motivation for not only setting the intention for tiroiti practice, but it has also provided an example to which tiroiti can be organised and tracked.

In the Ngā Tohu project, tikanga teaches us that everything has a distinct design and pattern. Tikanga provides a working knowledge system that encompasses complex relational dynamics, within which tiroiti can be positioned and monitored. Tiroiti, as a practice, aims to document tikanga, the phases of energy transition expressed by taonga (significant species) or wao atua (environmental system).

Below are some examples of tikanga, reclaimed and described by whānau research groups:

- WHETŪ—Papatūānuku, earth's movement through the universe (Pākirikiri Wānanga research collective, Tokomaru Bay)
- KAUPĒKA—Water processes over an annual cycle (Ngātaki research collective, Ngātaki)
- PĀPAKA—Asian paddle crab (*Charybdis japonica*, APC) reproduction and seasonal behaviour (Pāpaka research collective, Tauranga Moana)

Tirotiro have been used to monitor and describe tikanga, capturing and recording each individual interaction and observation. Collecting tirotiro over consecutive months generates extremely detailed accounts. When complemented with sensory observations, tikanga can be explored in great depth, revealing intricate details and complexities of taiao.

Over time, the accrual of observations has enabled researchers to develop more detailed descriptions of localised tikanga. Tikanga embodies an intricate knowledge of localised environments and highlights

that, what is considered natural and normal in one area might not hold true in another. Similarly, the interactions and engagements with wao atua that are deemed normal and accepted in one space may not be the same in another.

An example illustrating the significance of local tikanga, was observed during rūnanga (collective gatherings). Over time the northern research group (Ngātaki) consistently tracked native rākau flowering earlier than the southern groups (Tauranga, Tokomaru Ākau). As a result, fruiting occurred earlier in the north, triggering a cascade of natural ecosystem services and interactions. While this example may seem simple, the underlying processes of water movement, heat transfer, nutrient availability, and other complex requirements that enable energy processing, activation, and movement within the system are extremely complex. Furthermore, these processes ultimately shape how and when tāngata interact with wao atua, forming the key foundations of tikanga and maramataka practice.

TIRO

"Tiro is the observation of things in their natural progression from the start. Retaining what is observed and absorbing it into our hinengaro."
(Tuterangiwhiu, 2023)

While tirotiro has been described as the continuous act of observation and inquiry, the root process that relates to the act itself is "tiro". Tiro involves sensory observation and immersive experiences with wao atua. It involves experiencing tairongo (the senses), which encompasses both physical and spiritual encounters, in a specific place, at a particular moment. Thus, tiro, as the action of observation, encompasses the holistic experience of observation that goes beyond what can be perceived solely through visual means. It necessitates engaging all the senses, including smell, taste, hearing, and touch, to become fully immersed in the environment. Being present and receptive is essential for engaging in tiro.

When examining the construction of the word "tiro," it can be considered in two parts³:

- **Ti**: refers to natural processes, particularly the beginning of a natural process.
- **ro**: refers to the process of internalising the observation or experience. It involves weaving together observation with pre-existing knowledge of the natural processes of wao atua.

By deconstructing the word 'tiro' we gain valuable insights into its deliberate messaging regarding the active and purposeful practice. By engaging in regular tiro practice, the ability to internalise and process a greater amount of data is enhanced. As a result, one's knowledge base expands, enabling perception of subtle changes and patterns. Through the practice of tiro, this increased awareness and internal understanding has enabled Ngā Tohu researchers to notice details that may have otherwise gone unnoticed. It has enabled a recalibration with wao atua, a recalibration of senses in time and space.

3. Te Rerekohu Tuterangiwhiu, *Nga Ahua- Development of Cultural Observation Practice. Part of Nga Tohu o te Ao, Sustainable Seas National Science Challenge [Video recording]*, 2022.

TIROTIRO APPLIED

The interplay between the three key concepts—tau, tikanga, and tiro—has formed the basis for tiro tiro practice. This section examines how tau, tikanga, and tiro have been applied, to identify key enablers and considerations for their practical application. The section delves into the functional connections between tau and tikanga, exploring how these concepts have worked together to guide applied tiro tiro practice.

It identifies key mechanisms that supported the effective implementation of tiro tiro and describes how tiro tiro have been tracked using reclaimed maramataka timing systems. Finally, it discusses examples of data collection tools that have been tested by Ngā Tohu researchers, their advantages and disadvantages.

TAU / TIKANGA

Early in the project, a shared commitment to cultivating comprehensive tiro tiro practice emerged from all three research groups. This practice was centred around the systematic observation, tracking, and description of tikanga, over a full tau, or annual cycle. By engaging in a year-long process, whānau researcher teams were able to capture the nuances of natural phenomena across seasons and marama phases. This approach ensured a robust dataset, identifying patterns and trends over time.

Tiro tiro was carried out with particular emphasis on two distinct types of tau. The first, referred to as “tau whāiti”, involved utilising existing knowledge to develop an annual cycle for a particular species or environmental system. Researchers tracked tikanga according to the known tau, thereby grounding and verifying the accuracy.

The second type of tau, referred to as “tau whānui”, was employed when there was no available data to support the development of a specific focused tau. In these cases, researchers collected and tracked general whole system tiro observations.

NGA PĀPAKA, TAURANGA MOANA

Tau Whāiti: Tiro tiro focused on the Asian Paddle Crab (APC). The APC’s tau was collated on the basis of past research, and tiro tiro activities focused on tracking its transition through its annual cycle. General taiao observations, rangi (sky), whenua (land), and wai (water) were also tracked to support a whole-system understanding.

PAKIRIKIRI WĀNANGA, TOKOMARU BAY

Tau Whāiti: Tiro tiro focused on pāua. This was collated on the basis of past research, and tiro tiro activities focused on tracking the transition of pāua through its annual cycle. General taiao observations, rangi (sky), whenua (land), and wai (water) were also tracked to support a whole system understanding.

NGĀTAKI COLLECTIVE, NGĀTAKI

Tau Whānui - Tiro tiro focused on understanding the tau of a broad wao atua system, Ngā Keketo, a dune lake. General taiao observations, rangi (sky), whenua (land), and wai (water) were tracked at Ngā Keketo, and in a number of significant locations within the research area.

TIROTIRO

Through engaging in ongoing tiro practice, two simple, yet fundamental, actions were identified as crucial for its effective implementation, 'puta ki waho' (to go outside) and whakarongo (to listen).

Putā ki waho—Connect with Wao Atua

Engaging in tiro requires that individuals immerse themselves in taiao. While the application of tiro practice varied among researchers, it was crucial that tiro activities were feasible and achievable within the context of researchers' daily activities. For some whānau actively practicing tiro necessitated a conscious commitment and the establishment of routines and habits. For some, putā ki waho involved integrating tiro into their daily activities, such as fishing, gathering kai, walking through the ngahere (forest), collecting rongoa (medicine), or surfing.

Other researchers chose specific times of the day or particular phases within the maramataka to focus their tiro. One example was the practice of Rākaunui (full moon) observations, which entailed in-depth observations of significant kāinga (home) environments during every full moon. While general observations were collected throughout the month, specific and detailed tiro were

intentionally gathered during this phase of the marama (lunar cycle).

Whakarongo—Sensory Experiences of Wao Atua

Engaging in sensory observation involves perceiving and interpreting the world using all of one's senses. While sight tends to be the dominant sense, tiro observations extend beyond just vision, engaging all senses, cultivating a deeper understanding and relationship with taiao. This mindful practice of whakarongo played an important role in the development of tiro, with all researchers incorporating it into their practice.

An example of developing sensory observation was exemplified by a researcher who tracked the expressions of nectar held in the pōhutukawa flower during the summer bloom. She explored the varying levels of sweetness between trees and noticed the different flavours throughout the flowering season. Another researcher described the sensation of cold, waterlogged mud between his toes after significant, continuous rains, providing valuable sensory insights. By actively involving all tairongo in the practice of tiro, hidden details are uncovered, and a deeper connection with the natural world is gained. Whakarongo has proven to be immensely valuable to the development of tiro practice.

TRACKING AND TIMING

The process of tracking tiro observations was guided by tūpuna knowledge reclaimed during the earlier Wao Tupuna stages of the project.⁴ Drawing upon this knowledge, each whānau research team identified significant time markers to guide the tracking of tiro. As part of this process, maramataka dials were created, providing a basis for positioning and tracking tiro observations over time.

The three primary time tracking systems used to support tiro practice included -

1. **Tamanuiterā (sun)**—The movement of Tamanuiterā plays a crucial role in tracking the annual seasons. Seasonal descriptions varied between research groups, with some recognising two main seasons, overseen by Hine Takurua (winter) and Hine Raumati (summer), while others subscribed to four seasons: Hōtoke (winter), Kōanga (spring), Raumati (summer), and Ngāhuru (autumn). Despite these differences, the movement of Tamanuiterā served as a common time marker for tracking the annual progression of the seasons.

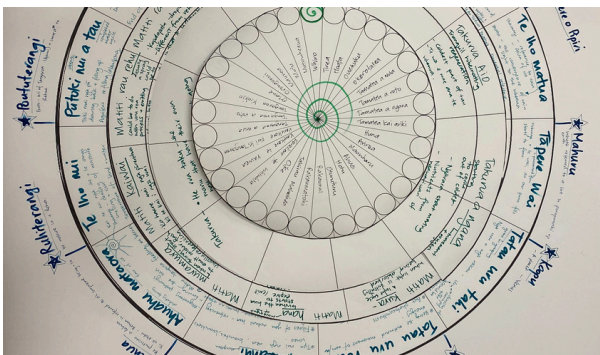
4. Rameka, W., Ratana, K., Taiapa, C., & Tuterangiwhiu, T. (2020). *TE KOROWAI: Reclaiming and Preserving Indigenous Knowledge of Coastal and Marine Ecosystems [Report]*. Sustainable Seas National Science Challenge, Ngā Tohu o te Ao Project.

2. **Whetū (star)**—The position of whetū (stars) played a significant role in marking time within the cycle of Tamanuiterā, tracking both seasonal progressions and moon cycles. Different whetū are associated with particular times of the year, seasons and months. In the context of tracking tiro, whetū were used to monitor moon cycles. As expected, while there were variations in the whetū recognised by the three research groups, all subscribed to twelve stars, representing twelve marama cycles, with some whānau also incorporating a thirteenth star to mark the three-year recalibration cycle.

3. **Marama (moon)**—Tracking time with the moon involves observing its various phases to determine its

position in reference to the earth. Marama enables the tracking of time in nightly increments. Similarly to the whetū and Tamanuiterā markers, each research group applied different names to the different phases of the marama.

While there were variations in their descriptions and applications, the three main maramataka timing systems, Tamanuiterā, whetū, and marama collectively helped researchers to track time and, consequently, tiro observations. Kaupeka (water processing), tai (tides), pō (night), and rā (day) were also identified as important maramataka time markers, however, not all research groups applied or explored these systems, and more work is needed to appropriately integrate these timing systems.



DATA COLLECTION

In the process of developing and applying tiro practice, the search for the most suitable and effective method for collecting and storing tiro data varied among Ngā Tohu researchers. Initially, the aim was to identify a single, standardised method of data collection that could be utilised by all researchers. However, it became obvious that a single approach would not appropriately take into account the circumstances of each researcher.

ONLINE DATA FORMS

Online data forms were developed to test the feasibility and effectiveness of online-data systems for collecting tiro observations. Online forms offered a well-organised system for inputting data, allowing users to identify the specific information they wanted to gather. These forms supported various types of data collection,

As a result, researchers experimented with various methods of data collection until an approach was found that was most suitable to their expertise and tiro practice requirements. Researchers employed four main data-collection methods: online data forms, digital photos, journaling applications, and maumahara (to remember).

including GPS location, text data, numerical data, and images. While these online forms provided a clear structure for tiro data collection, most researchers found them complicated and time-consuming, which limited their use for individual researcher's tiro observations.

Online forms, however, did prove successful in collating group or team tiro. In the case of the APC trapping program, where focused data collection was necessary, the structure of the online forms and the organisation and storage of data proved highly beneficial.

DIGITAL PHOTOS

Another common method, utilised by most researchers, involved capturing and storing photos using mobile phones. This approach presented several benefits, primarily due to the simplicity and user-friendliness of the technology. Researchers found it easy to take photos, which could be stored privately and shared with the research team. Additionally, the photos were automatically date-stamped, ensuring convenient retrieval when necessary.

JOURNALLING APPLICATIONS

Some researchers also experimented with a range of mobile phone journalling applications as data collection and storage systems. These apps facilitated daily journal entries and tracked them against the calendar, providing multiple display options for viewing entries. Although each journalling app differed in its features,

Various online form platforms, such as Survey123, Microsoft forms and Jot forms, facilitated the collection of both standardised data related to discrete APC trapping activities and general tiro observation descriptions.

A drawback of this method was its inability to document additional details, descriptions, or other observations, thus limiting its capacity to store comprehensive tiro information. This method relied on the photo as a trigger for recalling details of specific tiro observations. However, in some cases, this was insufficient to ensure detailed recollections, resulting in the loss of some tiro descriptions.

all of them allowed users to upload photos, enter descriptive text, and even record audio. This enhanced the researchers' ability to accurately document the details of tiro. While it supported more detailed capture of tiro, it also became somewhat time consuming and interest in this method decreased for most over time.

MAUMAHARA

The final data collection method applied by researchers was maumahara or "remember everything." This method was considered the most advanced approach to tiro data collection, as it required deep understanding of one's local natural environment. It operates on the assumption that the observer

possesses a comprehensive knowledge base, and their ability to recall observations is based on a deep sense of knowing. While not all researchers utilised this method, those who did were able to provide detailed descriptions of their interactions with local wao atua systems.

TIROTIRO REFLECTIONS

In the journey of reclaiming ancestral practices of tiro tiro, key insights emerged from the observations, reflections, and practices of researchers. This section presents the main insights gained through semi-structured interviews with researchers.⁵ These shed light on the significance of physical observation, the

gentle process of reconnecting with ancestral knowledge, the importance of regular practice, the value of connecting with the past, and active engagement in reclaiming practices.

5. Ngā Tohu o te Ao Research Collective. (2022). Interviews conducted during a wananga held at Waitaia Lodge, Omanawa, Tauranga, April 2022. Participants: Ngā Pāpaka (Tauranga), Ngātaki Collective (Ngātaki), Pākirikiri Wānanga (Tokomaru Bay)

Physical Observation for Deeper Understanding and Knowledge:

The act of physically observing the environment in various contexts was highlighted as crucial for deepening understanding and knowledge. It was acknowledged that the processes at play in the environment are diverse and multifaceted, and that an intellectual understanding of them alone is insufficient. Through active observation, researchers experienced a deepening of understanding by engaging intellectually, emotionally and physically. This embodied experience enabled a more comprehensive understanding of the natural processes and phenomena surrounding them.

Regular practice of observation has helped whānau researchers become more attuned to their surroundings. It has cultivated a heightened sense of awareness and mindfulness, allowing them to notice aspects of their environment that may have otherwise gone unnoticed, in turn supporting a deeper understanding of the natural world and the processes that occur within it.

Observation practice has helped to develop researchers' ability to recognise patterns and trends in the natural world. This was achieved by consistently observing and documenting environmental cycles, behaviours, and phenomena in their systems. This deepening of researchers' observation practice means they are better equipped to identify recurring patterns and gain insights into the interconnectedness of various elements in their surroundings.

Gentle Process of Reconnecting and Reigniting Ancestral Knowledge:

Reclaiming ancestral practices requires a gentle process of reconnecting with tupuna and reigniting the knowledge base. It was emphasised that this process

takes time, as it involves an inner shift and a reconnection to an old way of thinking. It was acknowledged that each individual arrives at a deeper understanding in their own time, making patience and collective support crucial.

Regular Practice for Consolidation and Integration:

Consolidating foundations and integrating reclaimed practices necessitates regular, ongoing engagement. Researchers stressed the importance of consistent practice, whether on a daily, weekly, or monthly basis. Making tiroiti practice a regular part of their lives, embeds the ancestral ways of thinking and acting into their daily routines. Regular practice enables the gradual transformation of behaviour and cultivates a natural and intuitive approach to the reclaimed practices applied in Ngā Tohu.

Connecting with the Past and Documenting Change:

Engaging in observation not only connected researchers with the present environment but allowed them to connect with the past by revisiting familiar spaces and comparing their past experiences of them. This allowed researchers to gain insights into the changes that have occurred over time, and, through reflection on the past, facilitated a deeper understanding of the environmental dynamics. Researchers also recognised the significance of documenting their observations as a record of change and as a way to inform future research and decision making.

A close-up photograph of tall, slender grasses, possibly beach grass, growing from dark, coarse sand. The grasses are a mix of vibrant green and golden-brown, indicating some are new growth while others are older. A semi-transparent, light-colored rectangular box is centered over the middle of the image, serving as a background for the text.

RŪNANGA

COLLECTIVE ANALYSIS

RŪNANGA COLLECTIVE ANALYSIS

"...it's been really, really wonderful coming together, especially our monthly pūmahara. And just coming together in that space to process different things that we're picking up on, whether that be with ourselves and tangata that we have around us, and with the environment." (Ferens, 2022)

Tiro can be described as a deeply personal experience that involves introspection and internal reflection. It entails engaging with one's subjective understandings to build individual knowledge and understanding that is particular to an individual's unique context, chosen areas of influence, and personal experiences. In line with the collective responsibility of the whānau research teams and the wider Ngā Tohu collective, rūnanga was implemented as a cultural practice to support the collective development of maramataka knowledge.

Rūnanga is a practice that involves convening a collective or council of experts to engage in discussions pertaining to community matters. It acknowledges each member of the council's valuable knowledge and understanding in their respective areas of expertise. As a collective, the council collaborates to find solutions, plan for the future, and deepen the collective knowledge and understanding pertaining to the welfare of their communities. In the context of Ngā Tohu, rūnanga served as a platform for collective reflection and analysis of tiro tiro, as well as the development of tūpuna knowledge related to reclaiming maramataka practice.

Rūnanga spaces were created for each whānau research team, according to the most practical mode of connection. Some gatherings took place in-person, while online meeting platforms were more appropriate for others. Based on the collective commitment to completing a full tau of observations, rūnanga were conducted during the Whiro (new moon) phase every marama with each whānau research team.

During each rūnanga, the whānau research team would come together to pūmahara. 'Pūmahara' speaks to the origins of memory and, within the context of the Ngā tohu project, involved recalling and recollecting tiro tiro from the month, weaving them together with those from preceding months, thereby, month by month, gradually assembling the pieces of the tau.

As a practice of reflective analysis, pūmahara served as the guiding structure for rūnanga discussions and inquiry. As well as providing a unique space for fostering whakawhanaungatanga (meaningful connections), it was the key mechanism for collective analysis of tiro observations, providing a dedicated space where each whānau research team could come together to collectively examine and interpret the tiro tiro data gathered during the month.

PŪMAHARA APPLIED

To begin with, pūmahara was a somewhat unfamiliar space for the Ngā Tohu researcher collective. But, by creating a structured approach, researchers were able to follow a simple process, guided by the main maramataka timing systems—Tamanuiterā, whetū, kaupeka, tirotiro, kōrero tuku iho (intergenerational knowledge), and me ahu pēhea (where to from here). A series of questions were employed to prompt reflection and deeper exploration of emerging concepts.

KAUPAPA KORERO Topics of reflection	TE TAKE Purpose—connect with and develop understanding	PŪMAHARA Enquiry and analysis	NGA HUA Outcomes
Tamanuiterā	Seasonal interactions with Tamanuiterā during the past month.	Where is Tamanuiterā rising and setting? Where is Tamanuiterā in relation to his wives, Hineraumati and Hinetakurua? What does the energy of Tamanuiterā over the past month tell us?	<ul style="list-style-type: none"> Track the movements of Tamanuiterā from a specific location and viewpoint. Understand the energy of Tamanuiterā throughout the year, gaining insights into how this drives the natural cycles of sky, land and water. Explore ancestral narratives and wisdom about Tamanuiterā during various phases of the tau.
Whetū	Whetū observed during the past month.	Which whetū are associated with this marama cycle? What does the name of this whetū mean to you? When is this whetū observed? Where does this whetū rise and set? What is the English name for this whetū? What is the English name for the star constellation?	<ul style="list-style-type: none"> Track whetū movements from a specific location and perspective. Explore ancestral stories and traditional knowledge about whetū observed during the month.
Kaupeka	Kaupeka water processes observed during the past month.	What is the name of the kaupeka? What does the kaupeka name mean to you? How is this kaupeka linked to the previous kaupeka? How is this kaupeka linked to the upcoming kaupeka?	<ul style="list-style-type: none"> Monitor the dynamics of water processes within specific localised environments. Gain comprehensive understanding of how water undergoes various transformations and interactions in localised environments over the course of a year, driving and triggering other environmental changes.

KAUPAPA KORERO Topics of reflection	TE TAKE Purpose—connect with and develop understanding	RUNANGA Enquiry and analysis	NGA HUA Outcomes
Tiro	Tiro observed during the past month.	What tiro rangi (sky observations) were observed this month? What tiro whenua (land observations) were observed this month? What tiro wai (water observations) were observed this month?	<ul style="list-style-type: none"> Track tikanga and tiro from specific locations and perspectives. Build understating of tau whāiti (focused tau) or tau whānui (general tau). Gain insights into how tiro contribute to the intricate system of energy movement through wao atua.
Kōrero tuku iho	Ancestral knowledge relating to maramataka that presented during the past month.	Can you think of any kupu that can be used to describe the tiro tiro observed? Have you encountered any new korero tuku iho that relate to this period?	<ul style="list-style-type: none"> Deepen understanding of key components of maramataka systems in the context of tūpuna knowledge. Gain insights into the holistic and cyclical nature of time as perceived by ancestral knowledge.
Ahu pēhea	Plan for the month/s ahead	What do you expect to see next month? What do you plan to do next month, based on the past month's tiro? What marama phase would be best for these activities?	<ul style="list-style-type: none"> Gain insights into the annual natural cycles based on the previous month's observations. Align interactions and activities with the natural rhythms of nature.

DATA COLLECTION AND COLLATION

An important consideration was accurately collecting, collating and presenting the tiro tiro observations and pūmahara insights shared during the rūnanga sessions. To ensure the appropriate collection of kōrero, all

rūnanga conducted via online meeting platforms were video recorded, and in-person rūnanga were audio recorded. All recordings were securely stored on appropriate storage platforms as defined by each whānau research team.

TIRO SUMMARIES

As well as collecting and securely storing the kōrero shared during rūnanga, collation of data was important in ensuring that data was presented in a meaningful, practical and usable format. Tiro tiro summaries—based on discussions shared during the rūnanga sessions—were produced for each whānau group in relation to each monthly rūnanga. These summaries categorised observations into three main groups—rangi (sky), whenua (land) and wai (water)—each of which provided

a description of the significant tiro tiro within that realm. The photos collected throughout the month were included in the tiro tiro summaries, serving as reference points for both past and future tracking. Each summary was also tagged to a whetū time marker, allowing for the progressive tracking of tiro tiro to each month of the tau, or annual cycle.

EXAMPLE OF TIRO SUMMARIES

ONO O WHITIANAUNAU

Akaakanui / Matiti Muramura



Ua

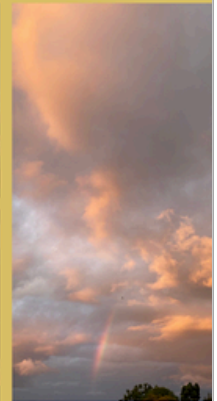
The heavy saturated clouds releasing their wai in heavy dumps of rain during the day.

Hau

This month the wind has dropped off, but the heat is relentless and bringing with it very humid conditions, pūwerawera.

Kapua

Clouds are very heavy, full of wai. Heavy rolling clouds were observed creeping over the top of the Kaimai, flowing down through the gully's. Parawhenuamea is the low dense cloud that brings humidity and mugginess. She hugs the ngahere, following the river systems often bringing rain. Fish scale shaped clouds were observed before the northerly rains come.



Rākau

Leaves starting to show signs of wilting and drying out potentially from being past their fertility phase, now releasing hā so some leaves look withered and spent. Lots of new growth in the previous month, with pua growth and now hua forming. The rākau may be redirecting energy and resources into these stages of growth. Rākau feeling the heat and need to increase processing of water and re-allocation of water. Red and yellow pōhutukawa flowering. Kānuka are blooming. Tikouka have lost their flower and are turning brown. Mānuka flowers spent, seed pods are starting to swell. Karaka fruit is swelling but green. Kumarahou and Harakeke seeds have formed. Totara cones have dropped, and the soft new shoots are starting to harden and darken. Kōwhangata (spinifex) looks ready to drop and Pingao seeds ready to harvest. Wiwī is flowering. Pikopiko still edible but starting to harden and go kawa. Kawakawa are fruiting and tūi feeding on ripened fruit, sometimes only eating the orange half and leaving a green stump of unripened fruit.

Ngangara

Increase in night insects, particularly pepe. Tatarakihi are present but sparse, can't hear the chorus yet.

Manu

Tūi active around fruit tree trunks, maybe feeding on all the little bugs. One tūi observed sitting atop a rākau, with its wings fully stretched out. Kōtare are still very active, feeding on worms when it rains.

Kīrehe

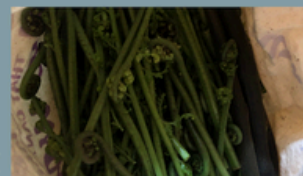
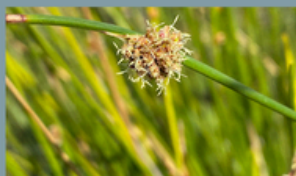
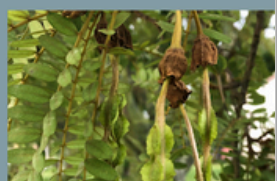
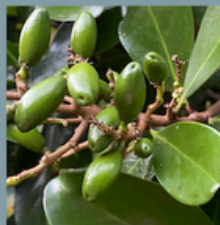
Rats and rabbits are active and often observed out during the day.

Repo

Raupo coming through, repo and stream edges looking lush with the new growth.

Maara

Very strong growth. Taro has taken off. Blueberries are the fruit of the month.



TAU TABLES

Another method applied to collate data collected during monthly rūnanga were "papa tiro" (observation tracking tables). For each whānau research team, key tiroiro observations were collated in a spreadsheet, charting each focal species identified, with associated tiro descriptions.

These tables played a crucial role in visually presenting, and tracking, data for specific focal species,

serving as important visual aids for understanding the physical expressions of different species as they progressed through various phases of their natural cycles. By examining the data in these tables, researchers were able to gain insights into alignments and interactions between species in localised environments. The tables also served as tools for identifying gaps in tiroiro practice that researchers could prioritise as areas for further development.

TITO COMPOSITIONS

Rūnanga also served as a platform for reclaiming ancestral knowledge and has played a crucial role in guiding contributions back into wao tūpuna. The practice of 'tito' was employed for collating and interpreting tiroiro data. Within the context of Ngā Tohu, tito are compositions in Te Reo Māori related to observations of a month, season, or tau (annual cycle). Tito were composed by the whānau research teams based on local observations.

The practice of tito involved a creative exploration of tiroiro, allowing writers to weave together the ancestral

knowledge held within purākau (stories), waiata (songs and chants), whakapapa (genealogies) and their current-day tiroiro. Tito served both the preservation and transmission of tiroiro knowledge, providing cultural-composition pieces that could be shared with, and taught to, the wider communities.

Although tito were not composed for every monthly rūnanga, each whānau research team composed a written piece describing the observations shared during a rūnanga session as part of reclaiming tūpuna practice. An example of a tito composition is provided below.

POUTŪTERANGI

*Kōpu tiaho, ka rere a Whānui
Nau mai ko Poutūterangi, ka waituhi, ka waipuke
Kīkīwa ko Rākaunui, Ko Takirau māhehehe
Te makau mutunga o Tamanuiterā ki a Hineraumati
Marangai, marangai, ka ruia
Ko Moanātūkiterepo te Putokinui o te tau
Tuna heke whakarite whiriwhiri to haere ki te moananui
Whakarite e te iwi
Ka tau mai te matao
Ka piri, ka puia
Kia kore e taka ki te makariri o Tikākāmuturangi*

This composition reflects the observations collected by the Pāpaka research team in Tauranga. It acknowledges Poutūterangi as the guiding whetū, marking the passage of time for the month. The composition highlights a specific moment during the full-moon phase when the autumn equinox takes place, describing the prevailing storms and rainfall during the period and linking these conditions to the time when tuna (eels) gather and migrate from streams to the sea. The composition also looks ahead to the coming

months, encouraging whānau to come together and prepare for the approaching cold of winter.

Tito has played a significant role in reclaiming traditional practices and safeguarding both ancestral and current knowledge in a way that is relevant and meaningful to the researchers and their communities. These tangible expressions of cultural legacy not only serve to reinforce cultural identity but provide a valuable resource for broader whānau and hapu communities to connect with maramataka knowledge and practice.

RŪNANGA REFLECTIONS

During the Ngā Tohu project, the monthly rūnanga emerged as a significant and cherished practice. These gatherings provided a dedicated space for researchers to come together, as whānau research teams, to process their observations and engage in meaningful discussions. Their regularity allowed for consistent ongoing dialogue, fostering a sense of connection and collective learning. Key reflections identified from semi-structured interviews with researchers⁶ include:

Inspiration through Collaborative Growth

Researchers expressed their enjoyment and fulfilment in witnessing both their own and others' growth throughout the tiroiro and rūnanga sessions. Being part of a collaborative process enabled them to learn from each other, spark new ideas, and explore different perspectives. The rūnanga stood out as a highlight, as they offered a recurring opportunity to observe progress, share insights, and inspire one another.

Creating an Intimate and Open Space for Sharing

Rūnanga created an intimate, open space to share observations and experiences. This environment of trust and openness allowed the free flow of ideas, encouraging meaningful conversations to delve into various aspects of observations. The supportive atmosphere fostered the safe exploration of new knowledge.

Documenting Observations for Future Reference

Researchers highlighted the importance of documenting their observations for future reference. By video and audio recording the rūnanga and capturing experiences, valuable resources were created. These not only serve as a record of the collective journey but offer a tangible tool that can be revisited and utilised in educational contexts.

Embracing the Diversity of Realms and Perspectives

Rūnanga revealed the beauty and richness of embracing diverse realms and perspectives. Each researcher focused on their own unique area of interest within the natural environment, bringing forth distinct observations and insights. Recognising and appreciating these varied perspectives enhanced the depth of collective understanding, allowing for a more comprehensive exploration of the environment.

Tracking Observations Over Time for Deeper Connections

One of the researchers' key insights was the importance of tracking observations over an extended period. When reflecting on previous cycles and linking them to current observations, deeper connections and patterns began to emerge. Rūnanga enabled revisiting and building upon previous observations, and provided a broader perspective and deeper understanding of the environment, reinforcing the value of long-term engagement with tiroiro.

Resources as Educational Tools

The development of resources has been a valuable outcome of the project. Researchers expressed excitement about the potential of these resources, particularly once a full tau had been collected. The tiro were developed into resources, designed with simplicity and visual appeal at the heart. Researchers saw them as holding great promise as educational tools for tamariki in the local kura (schools).

6. Ngā Tohu o te Ao Research Collective. (2022). Interviews conducted during a wananga held at Waitaia Lodge, Omanawa, Tauranga, April 2022. Participants: Ngā Pāpaka (Tauranga), Ngātaki Collective (Ngātaki), Pākirikiri Wānanga (Tokomaru Bay)

ME AHU PĒHEA?

WHERE TO FROM HERE?

Tirotiro and rūnanga have provided a comprehensive framework for personal and collective development, observation, analysis and renewal of maramataka knowledge. These methods have enabled the reclamation of traditional practices, deepened cultural understanding, and helped to facilitate the transmission of knowledge, insight and wisdom to wider communities. Engaging in tirotiro has allowed Ngā Tohu researchers to develop deeper understanding of their unique context and areas of influence, fostering personal awareness and self-reflection. Rūnanga, as a collective practice, has granted researchers deeper knowledge and understanding, enabling them, alongside their communities, to collaboratively discuss and make decisions. Ngā Tohu shows that, combining individual insights from tirotiro with collective wisdom from rūnanga, a holistic understanding of complex knowledge systems can be fostered.

While this report does not specifically discuss tohu (cultural environmental indicators), it emphasises the importance of tirotiro and rūnanga as crucial entry points for their development.

Ngā Tohu demonstrates that the exploration and establishment of tohu must be approached cautiously and with deliberation. Engaging with ancestral knowledge, cultural practices and community values requires time and respectfulness. Rushing the process or neglecting cultural protocols could result in shallow understanding or misrepresentation of tohu. By prioritising thoughtful exploration, tirotiro and rūnanga have laid a solid foundation for the development of grounded tohu that genuinely reflect community values and aspirations.

The next step for the Ngā Tohu project will involve consolidating collective thinking around tohu development and application. It will synthesise the knowledge, insights and experiences gained from tirotiro, rūnanga and the exploration of ancestral-knowledge systems. This final report will contribute to the ongoing development and refinement of cultural environmental-indicator knowledge and theory.

