EATING WITH MY TUUPUNA

PRACTICES, KAI AND HAAKARI OF POUKAI, WAIKATO

R. MAHUTA & C. VAN SCHRAVENDIJK-GOODMAN (EDS)

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MAAKU ANOO E HANGA TOOKU NEI WHARE

National Science Challenges THE DEEP SOUTH Te Kōmata o Te Tonga

NIWA Taihoro Nukurangi

WAIKATO TAINUI

Cover image: Ringawera taking a break from food preparation. Image supplied by Rangi Mahuta

Eating with my Tuupuna

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2024

Co-edited by

Rangitiaho Mahuta

Waikato

Cheri Van Schravendijk-Goodman

Te Atihaunui A Pāpārangi, Ngāti Apa, Ngāti Rangi

Swamp Frog Environmental & Tree Consultants Ltd

E rere roimata ki runga o Maatangireia
Ruuanuku, Ruuarangi, Ruuapapa, huukerekere
Kaapai

Koutou kua kapohia e te Wairua, e moe
E te Koopu Ariki, Kiingi Tuheitia ko koutou kei te Rangi, ko koe
Te Arikinui Kuini Ngā wai hono i te po ki te whenua

E te whitiki o te kii, koutou ngaa rerenga iho
teenaa koutou

Kia hauhake ahau i nga kai o taku maara hei whaangai i te
Wairua o too ngaakau.
Hau!

EATING WITH MY TUUPUNA

There are 29 marae who annually hold Poukai in commemoration of the event first set in motion by Kiingi Taawhiao at Whatiwhatihoe in 1885.

Each year, we continue these traditions founded on awhi, manaaki and aroha for our people – past, present and future.

From the service of paatiki (flounder) at Whaataapaka Marae, to tuna puhi (migrant short-fin eel) at Waahi Paa, or matamata (whitebait) at Tauranganui Marae, the wonderful and dynamic tapestry of kai across all Poukai marae inspired us to determine how we might best capture and share the stories behind harvest and haakari.

The stories and recipes of this book are only snapshots of our collective learnings, experiences and manaaki for our valued kai, and cultural practices.

We curate these narratives here for our mokopuna, so like us, they can eat with their tuupuna too.

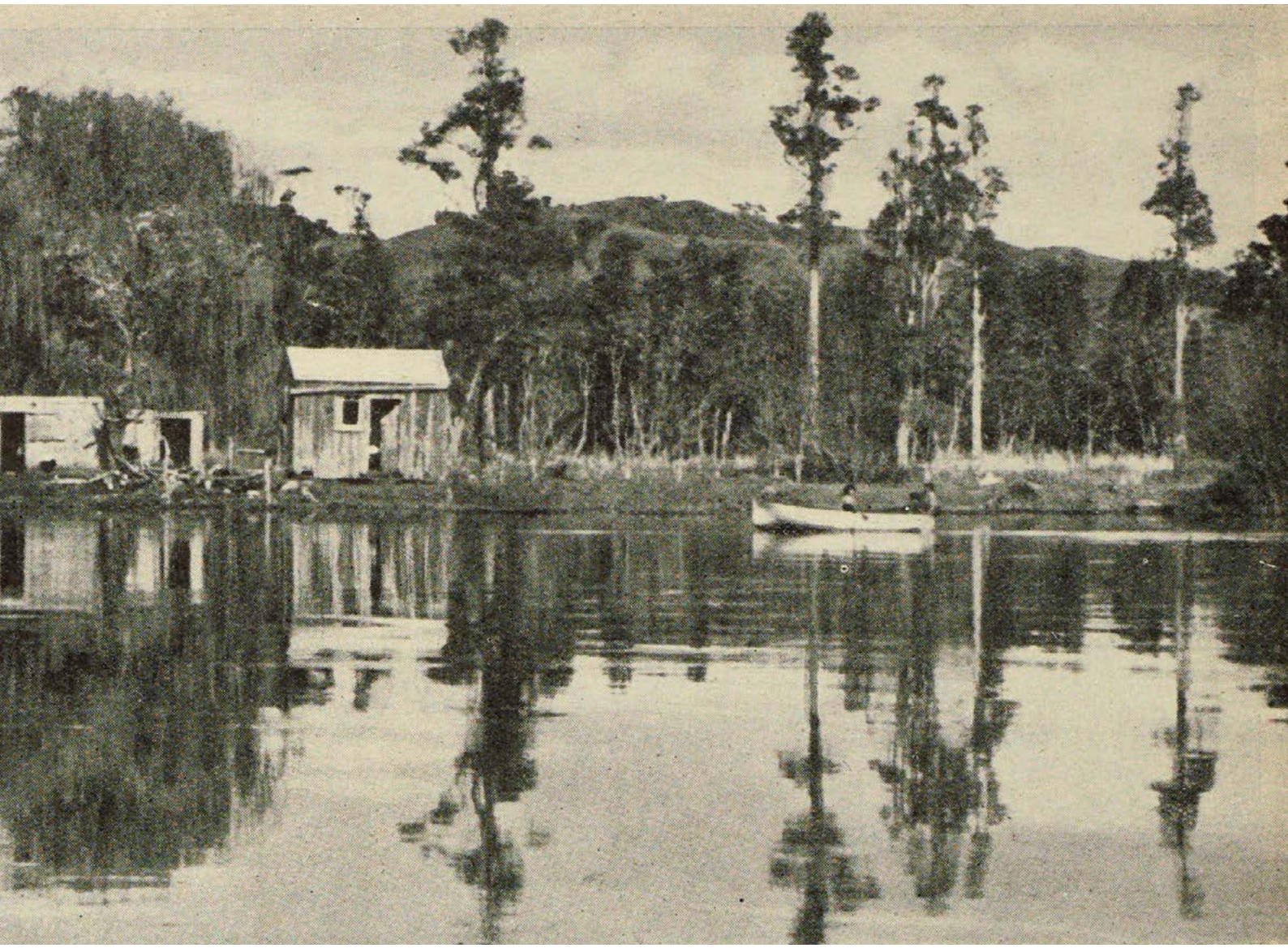

Image above: Photo taken of whaanau baches beside the Waikato River at Tuakau in 1938. Tall kahikatea stands (seen to the right and since felled for urban growth) once graced the historical swamp forests of the lower River. Cropped from original image source: "Reflections on placid waters". Auckland Libraries Heritage Collections. Image Ref: AWNS-19380921-49-01

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- Christine Apu (23 Jan 1952 –19 Sept 2023)
- Jenny Galpin
- Tame Moana Snr
- Tame Moana Jnr
- Te Aira Moana
- Herewini Moana
- Pat Kiingi, Margaret Clarke & Ramai Mangan

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- Melani Kirkwood
- Dennis Ngataki
- Pokaiwhenua Ngataki
- Ted Ngataki
- Denny Kirkwood-Wilson
- Vinny Kingi
- Maea Rawiri

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- Erina Watene

TIKIRAHI MARAE:

- Mamae Takerei Te Rau

TAURANGANUI MARAE:

- Patience Te Ao
- Tim Tahapeehi
- Nana Puku Hira
- Dorreen Kihi
- Rima Taua
- Hinerau Tini & Tom Taua
- Guy Hori
- Charlie & Peggy Minhinnick
- Sally Koia

WAAHI PAA:

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- Tim (Jnr) and Nicholas Manukau
- Rangimarie Mahuta
- Noah & James Manukau
- Huirama Matatahi – Marae Trustee
- Wahine Tumai Bright
- Tuutata Matatahi
- Korokii Waikai

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- Boydie Cooper
- Hero Potini
- Tuti Williams
- Barm and Tilly Turner
- Taroi Rawiri (Jnr)

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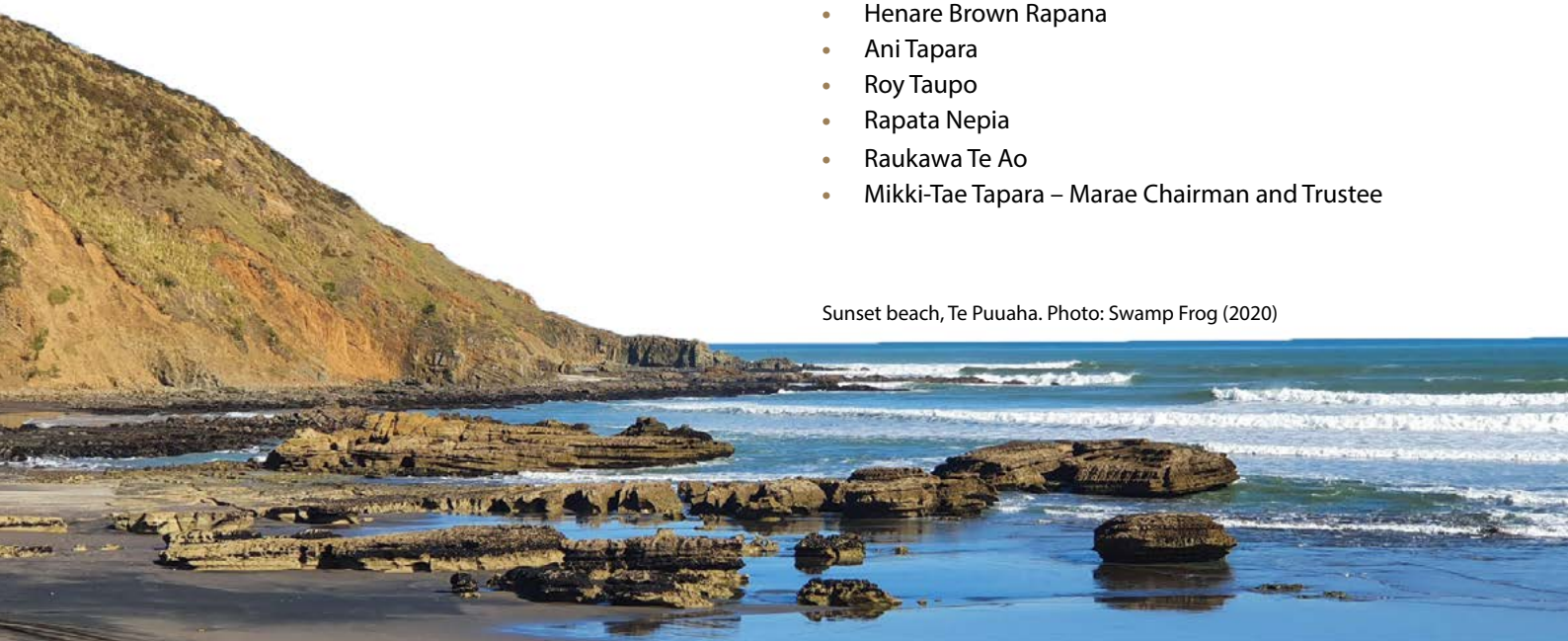
- Howard Taylor Snr
- Henare Brown Rapana
- Ani Tapara
- Roy Taupo
- Rapata Nepia
- Raukawa Te Ao
- Mikki-Tae Tapara – Marae Chairman and Trustee



Sunset beach, Te Puuaha. Photo: Swamp Frog (2020)

Waipaa/Ngaaruawaahia confluence. Photo: Waikato-Tainui FB page

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- Our amazing designer – the fabulous, talented and long-suffering, Abby Davidson
- Jo & Steve – Printhouse Ltd, Hamilton

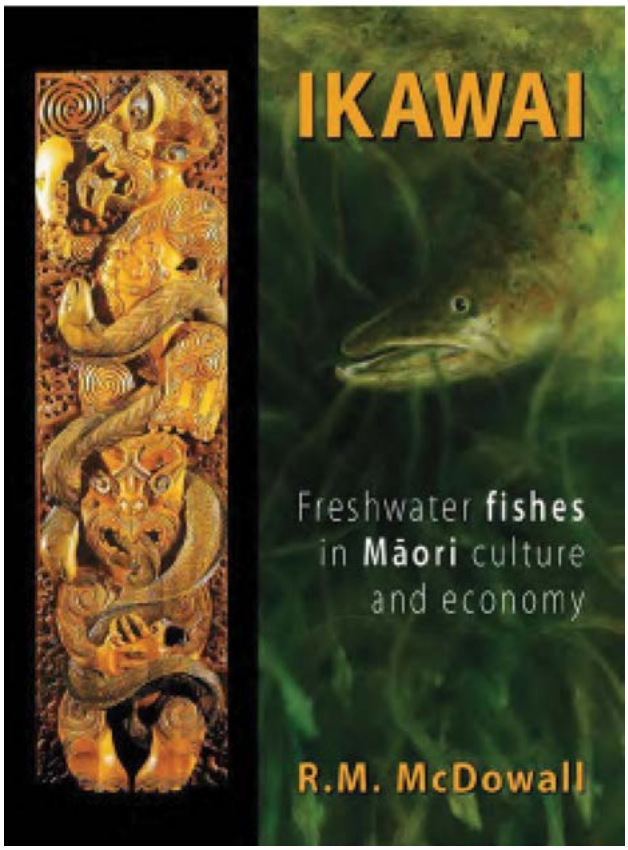
REMEMBERING ROBERT (BOB) MCDOWALL AND HIS INCREDIBLE CREATIVE LEGACY

Throughout this book there are a number of photographs and sketches that have been used to enhance the koorero and maatauranga shared about our kai, particularly our freshwater species. One important creative whom we are honoured to be able to include in this book is Bob McDowall.

Bob McDowall was a son, husband, father and grandfather foremost, and also a prominent fisheries scientist. During his career spanning over five decades, he produced an incredible array of photographic libraries, and drawings, that when coupled with his scientific research, left a legacy of valuable resources and information for each new generation of fish scientists and tangata tiaki to be inspired by.

One of our most treasured products of his work in the Swamp Frog library is his comprehensive book – Ikawai: freshwater fishes in Maaori culture and economy (2011). Bob carefully pulled from the available literature to relay some of the practices, names and dialects of hapuu and iwi across the motu. This provided us with a key starting point when looking into the possible species our tuupuna associated with the fish 'mohimohi' (which you can read briefly about in the chapter on matamata and poorohe).

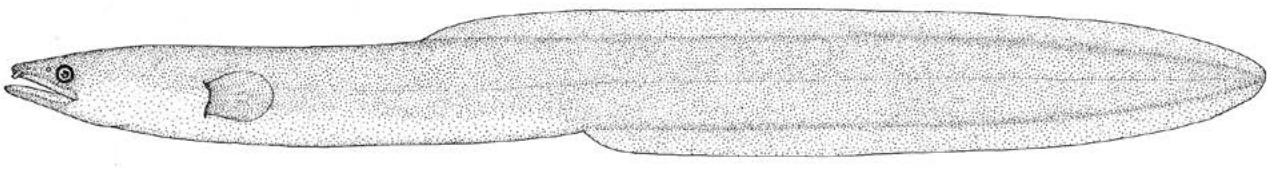
There has not really been anyone of his ilk since his passing in 2011. Scientific drawings, whilst a skill set that is still encouraged in academia, is rapidly being overtaken by the ease that comes with a cell phone camera. But life drawings give you something that a photo cannot – it is a story about the animal being captured via the pencil or paintbrush, but also the story of how they are viewed through the eyes of the person doing the drawing. Every line, every shaded area, every dot on the page, is a patiently crafted expression of respect for the representation of the creature. Importantly though, Bob's photos were also a lesson in meticulous and accurate depiction of our native fish.



And from what we understand, those photos also took a lot of patience to capture that snapshot of their life in time.

Bob was a keen advocate for our native fish, but his respect for nature also extended to other native fauna including a bird that we are passionate about as well – the kawau/maapunga. By sharing his imagery here, with the blessing of his whaanau, we hope that we are ensuring that his legacy as a valued visual communicator and scientist continues. And most importantly, that future generations of scientists and/or 'tutus' use his images as inspiration to also embrace their own inner creative natures to record and share the remarkable stories of our fish.

Thank you for providing us with these gifts to share Bob. And to his whaanau for supporting us to do so.



Longfin Tuna. Image: R. M. McDowall (shared with permission)

Next page: Te Awa Waikato as viewed from the river walk in Kirikiriroa (Hamilton). Photo: Waikato Tainui (2018)

EATING WITH MY TUUPUNA

The river beckons
My spirit yearns to return
The homecoming nears

The scent of the river meanders to the sea on the ebbing tide
A beacon to point the way home
The gathering approaches

Silently they move
My excitement builds
Stealthily sliding into the watery depths
The gaping mouth welcomes the delicate sparkling delicacy
Nga Karu o Matariki have returned

The pot simmers gently
The familiar aroma assaults my senses
Breathing deeply to relish the moment
The waiting is over

Closing my eyes in anticipation
I savour the taste of seasons past
And the memories overwhelm me

A kaleidoscope of images unreel in my mind's eye
Loving voices echo down the years
Generations from seasons past gather around me
As emotions bombard my soul

Oranga Ngakau, Oranga Tinana, Oranga Wairua
Heart, body and soul fulfilled
I whisper my dreams to the four winds
Hold fast to life's cycle of old
That one day I may have the honor
Of eating with my mokopuna

Image previous page: Tauranganui Marae
Next page: Maraetai Bay, Port Waikato (2020). Photo: Swamp Frog

KO NGAAKU KAI NAA NGOOKU TUUPUNA

Poowhiritia mai ai e te awa tupuna
Kooingoingo taku wairua
He huihuinga pae tata kua karangahia

Te kakara o ngaa pikonga o te awa ki ngaa hekenga o te tai o te moana
Tiiramarama mai ai ngaana tohu
Whakatata ake te whakatau

Maarirerire te eke panuku
Pupuu ake te tokomauri
Koropuku te paheketanga ki te tataotanga o te wai
Taarera te reo karanga ki te matamata koorekoreko
Kua tau ngaa karu o Matariki

Aungaawari te koropupuu o te koohua
Ka rongo i te taunga o te mookarakara
Hira ake nei te maarika
Kua ea a taihoa ake

Nau mai e ngaa hua....
Konakona te taawara tuauri
Haukerekere ngaa puumahara

Ka mahuki ake ngaa whakaahua takawhiiwhiwhi
Paaorooro te reo muri aroha
Korowaitia au e ngaa tuituinga tua whakarere
Ka tau te mauri, ka tau te wairua

Oranga Ngaakau, Oranga Tinana, Oranga Wairua
Kua ea, kua tau
Tuku i ngaa manako ia ki ngaa hau e whaa
Purutia, whakamau ki te tauoranga tuuaauriuri whaaioio
E heke iho ai ngaa whakamaanawa
O te kaitahi me ngaku mokopuna

Na Rangitiaho Mahuta
Kaiwhakamaaori Jason Kereopa

1.
BACKGROUND


POU KAI

TE TIRITI, KIINGITANGA AND RAUPATU

It is not possible to talk about Poukai without referring to the Treaty of Waitangi, the establishment of the Kiingitanga and the 1863 British invasion of Waikato and the confiscation of over a million acres of land – Raupatu.

In the years following the signing of the Treaty of Waitangi and the setting up of the new colonial government, Iwi authority over their lands and waters continued unchallenged.

However, by the mid-1850s concern was growing because of the perceived increased political and economic pressure with the launch of the new parliament in Auckland in 1854, and the growing activity of government and land purchase agents.[1]

After a series of inter-tribal hui, the Kiingitanga was established in 1858 and Pootatau Te Wherowhero was raised up as the first Maaori King.[2]

"It was the hope of the rangatira who supported the Kiingitanga that improved relations with the Crown would follow, because a balance between Maaori and Paakeha interests would be struck. Only if each people respected the rights of the other could they both co-exist peacefully.

Paakeha authorities however saw the Kiingitanga as a challenge to the authority of the Crown, and after hostilities in Taranaki between Maaori and the Crown, a decision was made to invade Waikato".[3]

The Raupatu that began with the British invasion of Waikato in 1863 shattered Waikato authority over their lands and waters which became subject to Paakeha law and the jurisdiction of many different authorities.[4]

Construction of a road to Waikato, Pokeno Hill. Temple, William (1833-1919). Urquhart album. Ref: PA1-q-250-52. Alexander Turnbull Library, Wellington, New Zealand./records/23044970

1 CMSR (1999): p. 11
2 HDT (1996): p. 11

3 CMSR (1999): p. 11
4 Ibid

Previous page: Whaataapaka Poukai (10 Apr 2018). **Photo:** Kiingitanga FB Page

Maaori at Tuurangawaewae Marae. Westra, Ans, 1936-2023: Photographs. Ref: AW-2004. Alexander Turnbull Library, Wellington, New Zealand. /records/38423381 Image copyright Ans Westra, courtesy of Suite Tirohanga.

POUKAI

Despite the underlying intent of the Crown's actions to divide and conquer, the second Maaori King – Kiingi Taawhiao – maintained unity of his people via a range of cultural practices including the establishment of annual gatherings at marae known as 'Poukai'.[5]

The first of these was held in 1884 at Whatiwhatihoe a settlement near the Pirongia township and they continue to be held across 29 marae around and beyond the rohe of Tainui waka.[6]

Fundamental to Poukai are haakari, the serving of food to lift the tapu at the conclusion of the formal proceedings of the poowhiri.

All Poukai marae are renown for providing dishes unique to their locale – coastal, whenua, ngaahere, freshwater. However, interpretations of these dishes are still unique to the influences and tastebuds of hau kainga providing a much-appreciated diversity of cooking techniques, flavours, textures and presentation for tribal food connoisseurs.

It was the wonderful and dynamic tapestry of kai across Poukai marae that inspired us to determine how we might capture and best share the stories behind our kai. Primarily to provide a record about Poukai for future generations of marae whaanau and secondly to explore and thus better understand the challenges for sourcing that kai as shared with us from kaumatua, ringawera and key harvester whaanau.

Based on our experiences and observations at Poukai, the feature of haakari represents a complex model of resilience and innovation by our people. Academics may refer to these as 'cultural food systems'.[7]

Expression of this within Poukai are explored through observations of the natural world when undertaking harvest. Underpinned with strong values, these cultural food systems are robust and flexible enough to change as expressed in both the preparation and serving of those dishes- one example being haangii.

We note though that there are challenges external to our communities that impact the sustainability of our kai. We also outline the general examples of these in relation to each of the kai highlighted.

However the intent is to also draw upon the tools we can use to help us counter that; specifically, the value of reigniting the maatauranga of ourselves and also that of the whenua.

5 Mahuta (1995)
6 Waikato-Tainui (2008): p. 9

7 Wehi et al. (2023)

Taniwharau Brass Band. Poukai at Hukanui, Gordonton. Band members L to R: Haupai Herewini, Ken Tumai, Suey Moana, Rapi George Tumai. **Photo:** M. Burt (1975)

CHALLENGES IMPACTS TO HAUANGA KAI

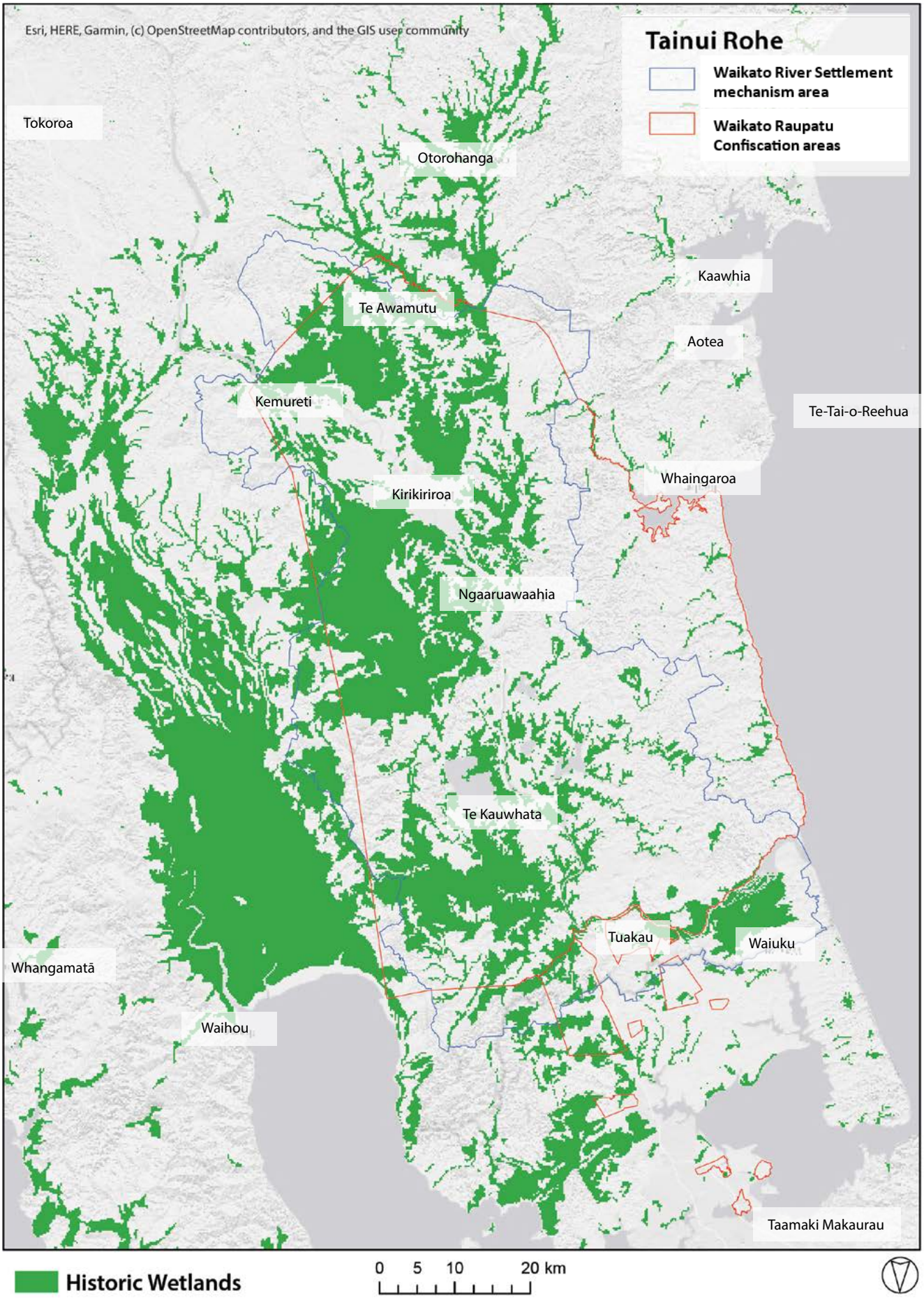
Following Raupatu, the rohe of Waikato was rapidly modified to accommodate pastoralisation and settlement. Notably, large tracts of forest were felled and thousands of hectares of wetlands were drained to make way for farms, towns and large infrastructure such as the hydro dams, main transport routes, water supply and wastewater discharge systems.

The impact on whaanau, hapuu and marae was felt acutely, with many species associated with those habitats experiencing population crashes and/or major geographic displacement.

Cultural practices were also impacted with harvester whaanau forced to move to new areas to source their kai, and/or having to adjust or even stop their practices due to the new laws imposed upon them by the settler government.

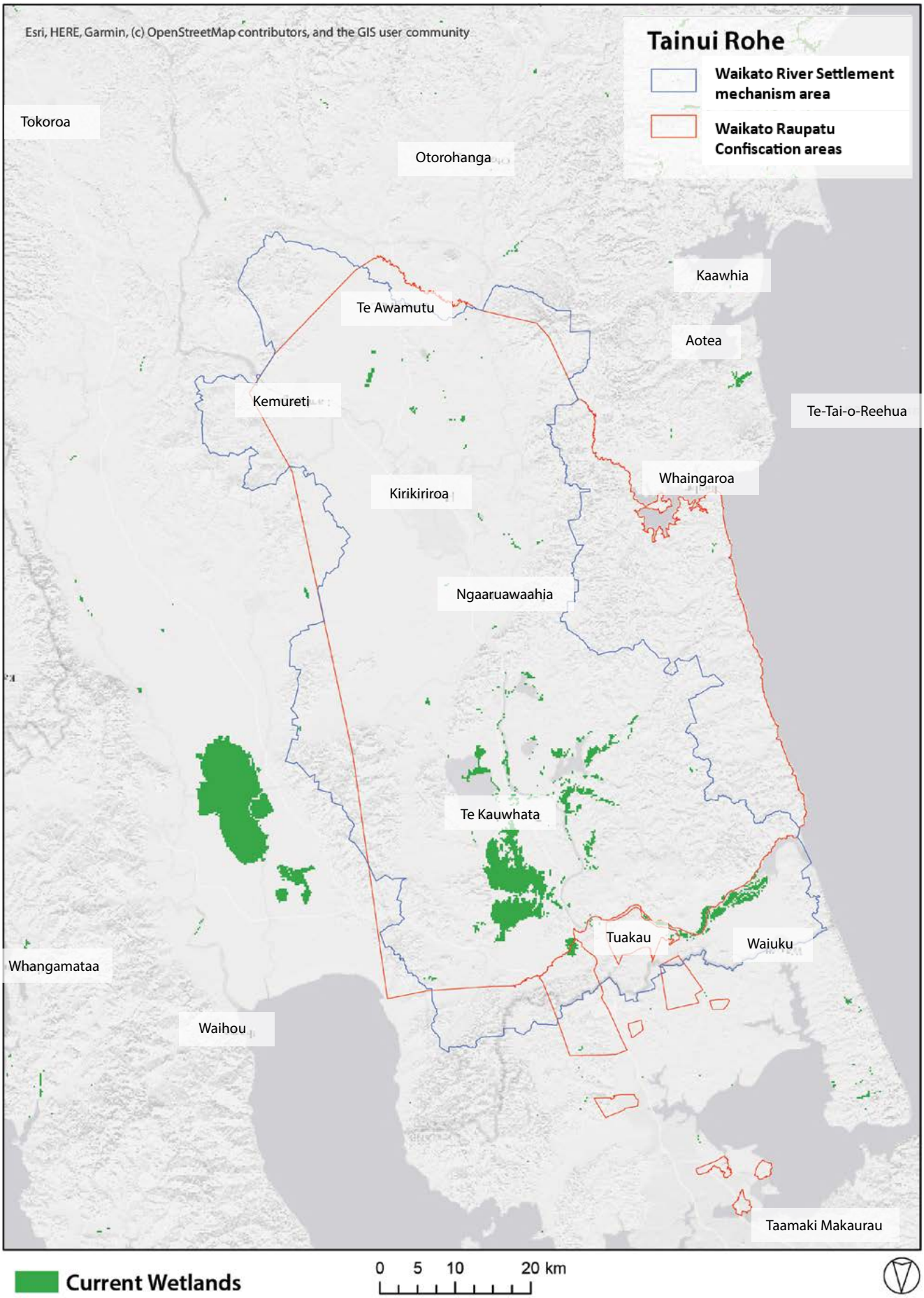
The following wetland maps (past and current) provide some context as to the degree of impact on Waikato peoples and their valued freshwater wetland species. Despite this, important tribal events like Poukai still endure.

As we face new trials such as is predicted with climate change, it becomes even more important to find ways to counter the effects of past landuse decisions on our species so that our practices and tribal events like Poukai can be maintained into the future.



Historic wetland coverage (c.1840) in the rohe of Waikato-Tainui. Map is presented here in line with the Waikato worldview: **Mookau ki runga, Taamaki ki raro.**

[Boundary lines supplied by Waikato-Tainui; Map built by Manaaki Whenua as part of their partnership with Waikato-Tainui, 2021]. Reproduced with permission from Waikato-Tainui Te Whakakitenga Inc. ©



Current estimated wetland coverage in the rohe of Waikato-Tainui. Map is presented here in line with the Waikato worldview: **Mookau ki runga, Taamaki ki raro.**

[Boundary lines supplied by Waikato-Tainui; Map built by Manaaki Whenua as part of their partnership with Waikato-Tainui, 2021]. Reproduced with permission from Waikato-Tainui Te Whakakitenga Inc. ©

ABOUT 'EATING WITH MY TUUPUNA'

There are 29 marae who annually hold Poukai – 25 are marae within Tainui, and 4 marae are in other areas of the North Island: Huria (Tauranga), Kokohinau (Te Teko), Poutu in Shannon, and marae affiliated with Ngaati Pikiao (Rotorua) who rotate and share Poukai responsibilities amongst them.

For this book, we talked to whaanau from a small subset of Poukai marae sitting in the lower Waikato River catchment (Raahui Pookeka to Te Puuaha o Waikato) and Te Maanukanuka o Hoturoa (the Maanuka Harbour) (see map below) and have adopted the use of the double vowel as the main dialect.

Map of Waikato Marae that hold Poukai within Tainui. Map is presented here in line with the Waikato worldview: **Mookau ki runga, Taamaki ki raro**. Compiled by C. van Schravendijk-Goodman using Google Earth ©

Whilst there are a number of other marae that we have not covered, we selected these marae because they cover freshwater, marine and whenua-based kai, and menus that are similarly served across other Poukai marae. We hope that all Poukai marae can see similarities within their own narratives to the ones that are shared here; recognising that our valued species do not know boundaries like we do.

Where we share narratives about species like our rig shark and paatiki, we recognise that the same or similar species are also found around other coastlines across Te Ika aa Maaui (the North Island). Tuna (our native eels) are a species well understood by iwi and hapuu across the motu, as are matamata (whitebait), and poorohe (common smelt); although the latter (poorohe) may be known by different names. Haangii is of course, a practice universal to our people, and is even recognisable to our whanaunga across the rest of Te Moana-nui-aa-Kiwa (the Pacific Ocean).

For each story, we are wanting to share the 'good, the bad, and the ugly', but also, 'the delicious'.

The 'good' speaks to the practices carried through time that enhance positive experiences and interactions between our people and valued species. The 'good' is also about the species themselves, and the things we understand about their whakapapa/ecology.

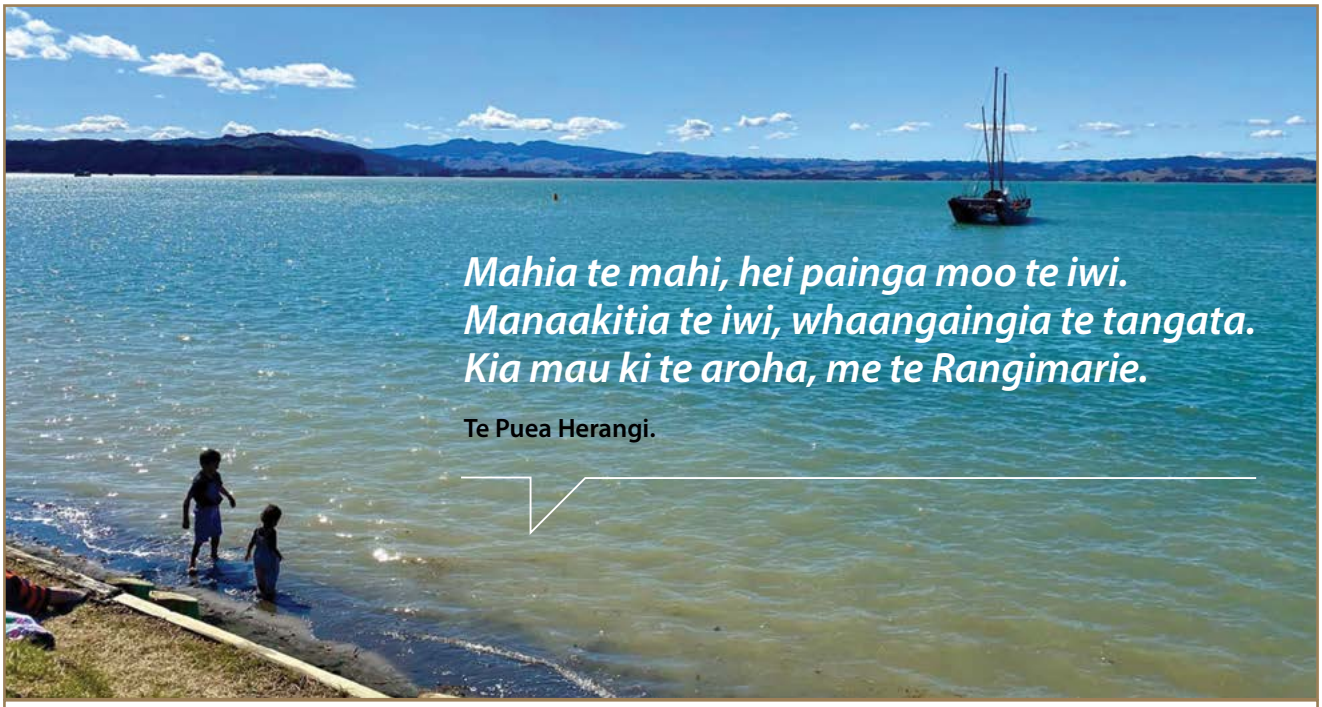
The 'bad' and 'ugly' refers to the pressures being faced by our species, our harvesting whaanau and our practices.

We all hear stories about the impacts of land use change on the environment since colonisation, particularly to our receiving waterbodies and coastlines. And we are also hearing more and more about 'climate change' and the 'climate crisis' with the associated scenarios on the horizon pointing to intensification of natural events like flooding, cyclones, drought, and/or heavier rainfall. For these reasons, we felt it was important to highlight these and other challenges. In this regard, we are hoping to increase community awareness so that our people are then empowered to proactively respond and/or engage where they can.

But it shouldn't all be doom and gloom – this is a cookbook at its heart after all. The 'delicious' therefore, speaks to the main kaupapa for this book – our manaaki for taiao and our people. This is presented in two ways:

1) **sharing** some of the wholesome recipes and/or cooking techniques that connect us all through time and space (and will hopefully continue to do so into the future); and,

2) **providing** tips and ideas for the whaanau regarding how we all can do our bit to look after our kai species, whilst also supporting and upholding our cultural practices and values.



Kaawhia moana. Photo: Kiingitanga FB page

POUKAI MARAE FEATURING IN THIS BOOK

Mookau ki runga,
Taamaki ki raro.

Images of Poukai marae in order of their poukai dates (top to bottom, left to right) Horahora, Whataapaka, Tauranganui, Waahi, Te Awamarahi, Rereteewhioi. **Images source:** Kiingitanga FB Page.

Next page: Waireinga Falls, Whaingaroa, Waikato (Oct 2009). Photo: Swamp Frog

2. HORAHORA HAANGII

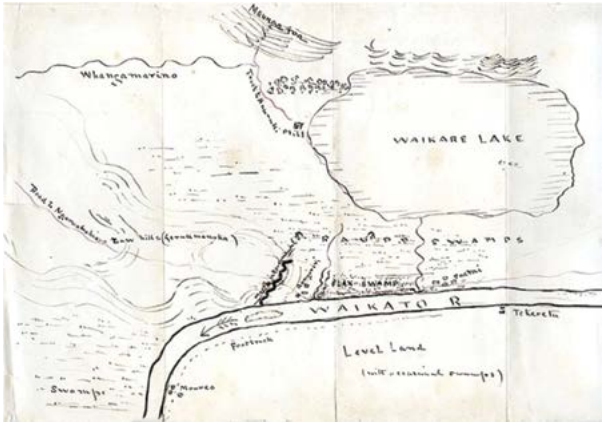
Location of Horahora. Orbica | Leaflet, © CC BY 4.0 LINZ

HORAHORA MARAE

Horahora Marae is located in Rangiriri West, north of Huntly. The principal hapuu that affiliate with this marae include Ngaati Hine, Ngaati Mahuta, Ngaati Naho, and Ngaati Pou of the Waikato Iwi.

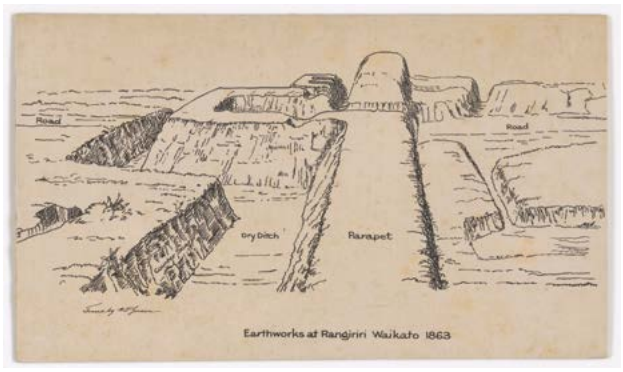
The wharemoe is named Te Whare i Whakaarohia, and the wharekai is Te Whare Pareue.

Horahora marae sits within the cultural footprint of Rangiriri – a key battle sites during the invasion of Waikato by colonial forces.



Sketch showing past swamp coverage around the area – Horahora is now around the word "Foottrack" Rough sketch map of Rangiriri, and Paetai on the Waikato River c1863. CC BY 2.0 DEED

The koorero we have is that the name of this place is 'te horahora o ngaa tuupuna'. It is a name that was given at the time of the battle of Rangiriri.[1]



Earthworks at Rangiriri, Waikato 1863, maker unknown. Te Papa (MU000049/012/0009)

Horahora marae (1 Jan 2021). Photo: Kiingitanga FB page

The Poukai at Horahora is said to have begun in 1933 and was initially held during September. This date was later exchanged with Tauranganui Marae to coincide with the matamata season.

From that time the Poukai is held on the 1st of January.

"...the marae, Horahora, was [originally] down by the river and it was beautiful. We had a veranda on our wharekai and next to it we had a big tree, a willow tree and they had pegged a pole down into the river and that's how they got their water like a flying fox. You tie the bucket to the hook, it would run down to the water, tip over and full up and then you would reel it back to you. I thought it was marvellous.

And they had another little whare where they would cook kai and they had a concrete stove that had small holes in the top it where you would put big cooper pots on it then you didn't have to cut the wood you would just shove the whole log in underneath. We had a wharekai and the pantry which would go into the wharekai. When you serve the kai, it would go through the pantry and into the servery."[2]

POUKAI is held annually on the 1st January

1 H. Moana cited in https://waikatotainui.com/resources/ngaa-poukai/

2 M. Witika (2018), pers. comm. to M. Takerei

HAANGII

Haangii has a long whakapapa, with its origins starting in the Pacific Islands. Utilising an ancient technique of cooking in the ground, we inherited this method from our tuupuna after they crossed Te Moana-nui-aa-Kiwa (Pacific Ocean) to reach Aotearoa.

Over time, the way it is prepared and cooked has evolved, but the core principle of cooking kai using heat and steam has remained consistent.

Iwi and hapuu once enjoyed undisturbed possession of and access to the abundance of natural resources required to build a haangii. Kai was sourced from the bush and waterways, and carefully managed and productive horticultural soils that were necessary for growing traditional root crops.

Table 1. Some of the names for earth cooking from around the Pacific

Island culture	Ingoa Pasifika
Samoa	Umu
Tonga	Umu
Fiji	Lovo
Hawai'i	Imu
Tahiti	Ahima'a
Aotearoa	Haangii

Past and current legislative frameworks and their implementation have had a significant impact on traditional kai species (e.g., manu), and the ability to gather material for preparation.

Haangii methods also have modified over time, with notable changes in ingredients and cooking equipment.

"We like the inground haangii, the steamer haangii hasn't got the taste."[3]

The timeline of evolution of our haangii highlight food items such as kereruu (*Hemiphaga novaeseelandiae*) and other manu prior to colonisation, along with our traditional staples of kuumara, taro, uwhiuwhi (yam) and leafy greens like puuhaa (amongst other forgotten native edible leaves and bulbs).

Now, we partake in a feast centred predominantly around animals and plants introduced by the colonisers.

Despite the changes and adaptations haangii still remains an integral part of customary practice.

3 M. Clarke & R. Mangan (2022), pers. comm.

Examples of maara (gardens) in Waikato – **(left)**: Unique drainage system of historic maara excavated in Taupiri (S14/250) (Gumbley & Gainsford 2020); **(right)**: Kuumara pits and umu excavated on Old Taupiri Road, near Ngaaruawaahia (photo supplied with permission by W. Gumbley)

TRADITIONAL PRACTICE

Although there are many variations, including geothermal haangii, there are two most widely noted approaches. It is not clear however, whether the methods were interchangeable across all tribal rohe, or if there were specific preferences for different hapuu and/or iwi:

A. The Haangii Pit Method

A pit was dug into the ground to cater for the amount of food to be cooked. Wood was then placed in the hole, in a stacked criss-cross pattern.[4] Stones were placed on top which fell through once the wood has burned. The embers were then removed, and the stones spread out level.

To remove any excess ash, a little water was poured over the stones to raise a "jet of steam". The stones were then covered with a layer of green leaves (species not clearly identified) and water was sprinkled over them.[5]

Prepared food ready for cooking was placed on top of the leaves – kuumara and any other durable foods first, followed by any kiinaki such as fish.

The food was covered with more vegetation – in some accounts this included whaariki ('flax mats', referred by some hapuu as 'taporo') or old kete (flax bags) and water was liberally sprinkled over it all. The whaariki/kete were then covered with soil to ensure that no steam escaped.

Cooking time was dependent on the food within the haangii and was carefully monitored by experienced haangii cooks.

B. Umu Komao

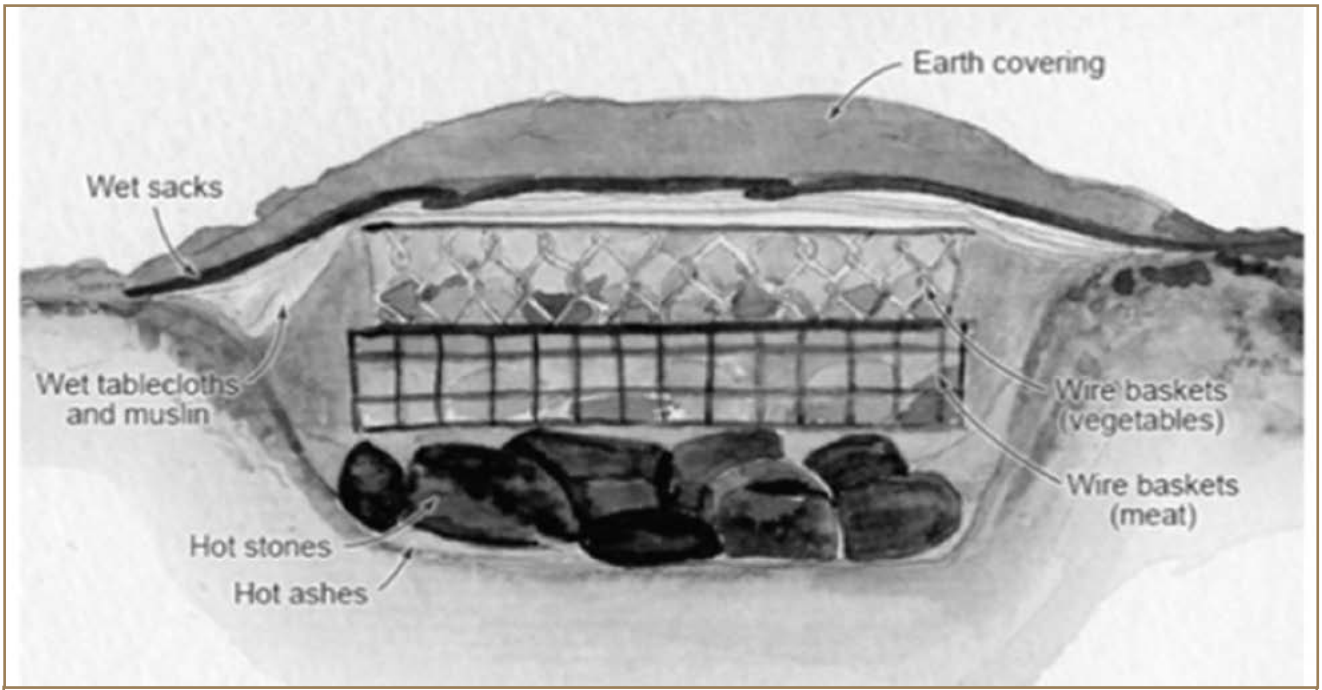
Elsdon Best (1923) has recorded a second example identified as 'umu komao'. According to his notes, umu komao were activated by lighting the fire beside the pit and then shifting the haangii stones into the pit when heated. In this method, there was less chance for ash and charcoal contaminating the food.

We note here that both of these methods are still used today throughout the motu but with modifications to both the materials and resources.

"It's the happiness aye. When you pull the dirt back and the bags and you get that smell and you know your haangii is cooked. The morale is good, and everyone around the pit is happy, a job well done, makes you feel good. And when you take the haangii into the kitchen for the serve out they know the smell too and everyone is happy that the haangii is ready for haakari."[6]

4 Walsh (1902), p. 23
5 Taylor (1855), p. 39

6 T. Moana Jnr (2020), pers. comm.



Cross section of a haangii. Harawira, W (1997). http://www.TeAra.govt.nz/en/artwork/40267/inside-a-haangii. http://www.TeAra.govt.nz/en/artwork/40267/inside-a-haangii

THE TRADITIONAL MENU

Observations by Paakehaa (prior to 1863) provide an insight into some of the preferences of our Waikato tuupuna. Whilst there were abundant supplies of pigs thanks to their release on the mainland by early European settlers, our tuupuna did not initially utilise them and instead favoured traditional foods:

"…their diet [was] chiefly vegetables and fish. Beans and potatoes are largely cultivated by them. Fern-root was their great staple; Indian corn, especially after having been soaked till it has reached a state of pungent putrefaction, is enjoyed by them with the keenest relish. Eels, cockles, snapper, and the mangoo, or small shark, are the fish of which they consume the greatest quantity."[7]

These traditional kai species along with a range of other species formed the diet of our whaanau for centuries.

Protein rich manu were seasonally harvested from the once extensive forested and wetland areas, and then stored in their own fat until cooked. Fish and tuna were sourced from the coast and/or rivers and lakes.

Root vegetables were tended and harvested from extensive gardens located across the alluvial soils surrounding our river systems. Kuumara (sweet potato Ipomoea batatas), uwhiwuhwi (*Oxalis tuberosa*?) and taro (*Colocasia esculenta*) were key carbohydrates brought to Aotearoa by our Polynesian tuupuna and were a key component of haangii.[8]

Overtime new carbohydrate sources were added such as introduced varieties of kuumara and riiwai (potato, *Solanum tuberosum*). Our tuupuna saw the advantages of growing riiwai in particular, which quickly became a staple after being introduced by Captain James Cook and Marion du Fresne.[9]

From the bush and tributaries, the fruits and leaves of various trees and shrubs, rito of mauku (cabbage tree, *Cordyline* spp.) and of niikau (*Rhapolystylis sapida*), pikopiko (the young fronds of *Asplenium bulbiferum*), puuhaa (native species, *Sonchus kirkii*) and waatakirihi (watercress, *Rorippa* spp.) were also harvested to provide seasonal variation to the haangii menu.

Uwhiuwhi (yam, *Oxalis Tuberosa),* also referred to as Oca by indigenous South Americans. Photo: Markus Leupold-Löwenthal CC BY-SA 3.0

Taputini kuumara. Source: Te Ara, The Encyclopedia of New Zealand https://teara.govt.nz/en/kumara

Niikau. Photo: W. Bennett CC BY-NC.

7 Swainson (1859): p. 22
8 Ibid
9 Harris (2005)

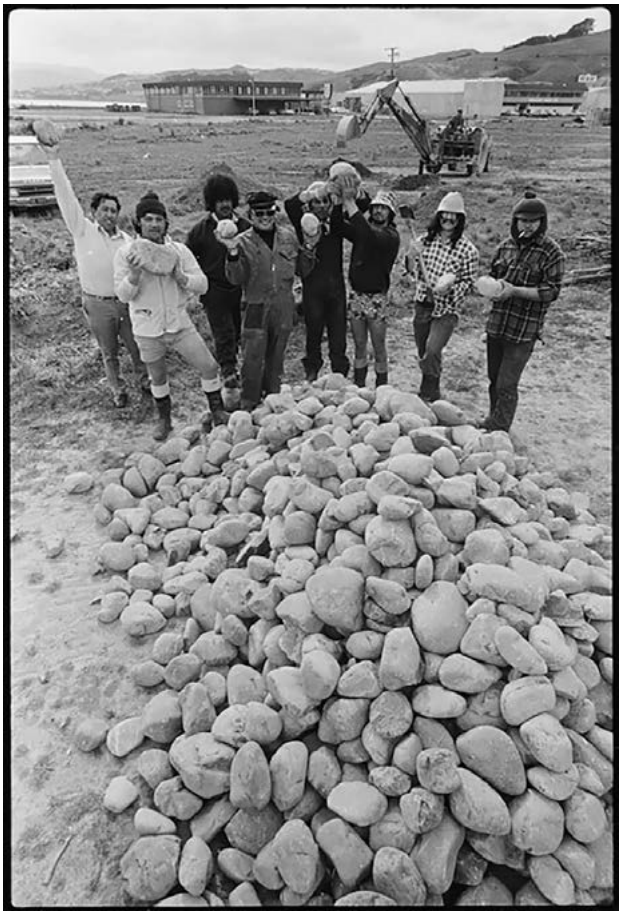
RESOURCES – WOOD

Maanuka is widely thought to be the best wood for heating haangii and imparting flavour, because it is dense and therefore burns longer and hotter than other species. Maanuka and dried brushwood were also the preferred firewood as they burn creating little ash.[10]

RESOURCES – KOOHATU (ROCKS)

Choosing the right koohatu is crucial to the success of a haangii. Because sedimentary rocks can explode, koohatu of volcanic origin is preferred because it can reach high temperatures and retain heat for long periods of time, releasing heat slowly. Early accounts note that there was a preference for large koohatu (i.e., the size of a grapefruit, or "the size of a man's fist" [11]), and these were always kept for reuse.

"When we were kids, we would wait till the kai was taken from the haangii pit and then all the kids would sit around the pit and pick the meat off the rocks. It was delicious and lots of fun!"[12]



Above: Stones for haangii to feed land marchers. Ref: EP/1975/4289/10A-F. Alexander Turnbull Library, Wellington, New Zealand. /records/22349161

An example of maanuka wood laid out ready for burning with volcanic koohatu placed on top. Photo: R. Spraggon

Haangii at Punawhakareia Poukai Pikiao. Photo Waikato-Tainui

"We still do in-ground haangii when I do one. Do all the hard yards, get the wood etc. Some people have doubts about doing a haangii. They are not confident; they have doubts that the haangii might not cook. Been there, but people start to panic so you just calm them down and remind them that there are combi ovens that you can finish the cooking in. That's why we do our haangii 2 hours early so if things like that happen we got time to do something. If not, we can keep the kai warm."[13]

10 Beaton (2007)
11 Taylor (1855): p. 392
12 P. Te Ao (2024)
13 T. Moana Jnr (May 2024), pers. comm.

CHALLENGES
DO YOU KNOW YOUR KOOHATU?

Koohatu can be broadly classified into three types: metamorphic, sedimentary and igneous (AKA 'volcanic')[14]. Igneous are the koohatu recommended for haangii.

Metamorphic koohatu are formed by the transforming of existing rock into new types. This is done via a combination of intense high heats, and super high pressures along highly active points within Papatuuaanuku, which causes the koohatu to liquify and mould into a new rock type. Pounamu is a rare foliated (striped) example of metamorphic rock known in geology as nephrite and is unique to the footprint of Kaa Tiritiri o te Moana (Southern Alps) in Te Wai Pounamu.

Sedimentary koohatu are also created by the breaking apart of rocks but are formed into new rocks via natural processes of cementation ('gluing'), compaction and recrystallisation of the broken pieces. Examples are greywackes, which are typically found in river systems, but also the sedimentary limestone features that form the endangered karst systems through parts of the western Waikato.

Igneous (volcanic) koohatu are formed from deep within Papatuuaanuku from magma (the molten material just under the Earth's surface). There are 3 main types: **basalt**, **andesite** and **rhyolite**. The former two are the most commonly used igneous koohatu for haangii.

The majority of the Earth's crust is made up of basalt. It is a dark koohatu, heavy and grainy and contains a lot of two metals: magnesium and iron. Andesites are lighter coloured, and contain less iron, but more silica than basalt. For interest, Ngaauruhoe is an example of an andesite volcano. Rhyolite is light-coloured or even white, and so has very little iron or magnesium, and a lot of silica. Some rhyolitic koohatu are very light and float due to bubbles of gas being trapped in the rock as it solidified. Pumice (also called pungapunga) is an example of a super light rhyolitic koohatu.

14 SLH (2017)

"The secret is in the stones and having enough stones. We don't have a button which turns it up to 200 Fahrenheit or whatever. We rely on what we know and what works, and making sure that those stones are red hot, white hot. If they're still black, they're not hot enough, so you don't bother putting food down." [15]

Basalt – https://rocksminerals.flexiblelearning.auckland.ac.nz/rocks/basalt.html

Andesite – https://rocksminerals.flexiblelearning.auckland.ac.nz/rocks/andesite.html

Rhyolite (pumice) – https://rocksminerals.flexiblelearning.auckland.ac.nz/rocks/rhyolite.html

15 R. Spraggon cited in Husband (5 March, 2023)

THE MODERN EXPERIENCE OF HAANGII PREPARATION AND COOKING

Despite changes to resources over time, the fundamental method of haangii remains strong. Traditional tools may have been replaced by other tools and ingredients. For example, wet hessian sacks may be used instead of flax mats; and cast-iron pieces are commonly added to, and/or replace volcanic koohatu. Through it all, our whaanau and haangii chefs continue to exhibit an incredible level of resilience and ability to adapt to change without compromising the integrity of the underlying cultural practice.

Table 2. Summary of Haangii Materials and Cooking Methods Overtime[16]

	Traditional haangii	Present/Modern haangii
Cooking location	In ground	In ground
		Portable above ground
		Home oven
Heat source	Koohatu heated by maanuka and kaanuka	Koohtu and/or iron heated by: • Readily available exotic species such as gum, macrocarpa and pine. • Maanuka and kaanuka
	Geothermal – mineral pools, steam	Geothermal – mineral pools and geothermal steam
		Gas kai cookers
		Electric Oven
Food wrap and covering	Harakeke	Tin foil
		Muslin cloth
		Cabbage leaves
		Cotton or hessian sacking
		Cotton sheets
		Corrugated iron
Baskets	Harakeke	Metal
		Harakeke

The haangii cooking at Horahora (2010). Photo: T. Moana Jnr

"A haangii, or traditional method of underground cooking using steam from heated stones, is historical and contemporary, symbolic and utilitarian, communal and individual; and reaffirms cultural values and beliefs. It is a central and vital component in the maintenance of tikanga (Maaori cultural customs and practices). Within the ever-changing technologies of contemporary life, the haangii adapts and survives while maintaining its core cultural meaning"[17]

The meat is pulled up at Pikituu (2007). Photo:Waikato-Tainui

16 Boundy et al (2023)

17 Whincup and Hemera (2011): p. 111

Haangii being prepared in a skip bin on a construction site, Wellington. Dominion Post (Newspaper): Photographic negatives and prints of the Evening Post and Dominion newspapers. Ref: EP/1974/7746/8-F. Alexander Turnbull Library, Wellington, New Zealand. /records/22825882

A contemporary spin on the traditional haangii pit at Maangere. This ensures that our practice of haangii continues to be accessible to each new generation. As our properties are also shrinking in size with each new urban subdevelopment, spaces like this support whaanau maintaining haangii practices and associated maatauranga. Photo: Rewi Spraggon

KAI – HARVEST AND SERVICE

The substitution of ingredients has also supported the evolution of traditional haangii into its modern form. Meats such as lamb, pork and chicken have become staples in the haangii taking the place of our native proteins – manu (e.g. kereruu) and fish species. And similarly, our traditional root vegetables (taro and kuumara), along with puuhaa and pikopiko are typically replaced by modern variants of vegetables and/or the addition of new ones such as pumpkin, kamokamo, parsnip, carrot, swede and cabbage.

Table 3. Summary of Haangii kai species over time[18]

	Traditional haangii	Present/ Modern haangii
Proteins	Manu such as: • Kereru • Paarera (grey duck)	Beef
	Tuna	Lamb/Mutton
	Other fish (fresh and/or marine)	Fish (if available)
	Pork (from late 1700s)	Pork
		Chicken
Root vegetables and carbohydrate	Taro	Potato
	Kuumara	Kuumara
	Uwhiuwhi (yam)	Pumpkin/squash/ kamokamo
	Hue (gourd)	Carrot
	Riiwai (potato, from late 1700s)	Yam (*Dioscorea* spp.)
		Parsnip
		Swede
	Paraaoa (bread), including variants such as rewena	Stuffing (bread, onion, carrot, herbs, butter/table spread)
Leafy plants/ Leafy vegetable	Pikopiko	Cabbage
	Puuhaa	Kaanga
	Mauku/Tii Koouka	Watercress (exotic)
	Waatakirihi (native watercress)	
	Niikau	
	Kaanga (from late 1700s)	
Dessert	Hiinau	Steamed pudding
	Raupoo	Plum duff

18 Boundy et al (2023)

Borrow pits at Horotiu. Photo: K. Jones in Furey (2006): p. 46

Haangii chefs preparing the meat, Horahora Poukai (2008). Photo: Waikato-Tainui

Kamokamo being prepped for the haangiii. Te Awamarahi Poukai (24 Nov 2017). Photo: Kiingitanga FB page.

Haangii Chef Rewi Spraggon demonstrates preparation of haangii with leaves of the native tree – puka (*Meryta sinclarii*) – used to line the baskets. Photo: Rewi Spraggon

"When I cook haangii, I always say my father and grandfather are there with me." [19]

"The old fulla taught me how to read the signs of his haangii"[20]

Prepping the vegetables is actually a time for whaanau reconnections, sharing some laughter and stories as they peel, chop and dice. Then there is also the gathering of ingredients and preparation of the steamed puddings to go into the tins for the haangii, and the making of the much coveted rewena and/or fry breads.

"Whangape kaumaatua would bring riiwai. People would bring kai as their koha. [We] miss the kai we used to get like terotero."[21]

Ringawera preparing kai at Horahora Poukai (2008). Photo: Waikato-Tainui

Kuumara and riiwai.

19 Spraggon (2024)
20 T. Moana Jnr (May 2024), pers. comm.
21 P. Kiingi & M. Clarke (31 Dec 2023), pers. comm.

CHALLENGES THE MODERN HAANGII KAI CONUNDRUM

There are various environmental impacts which have contributed to or limit the ability to maintain traditional haangii practices. Challenges continue such as decreased access to sites or resources embedded via legislative and/or statutory barriers. And declines in the integrity of native biodiversity and geological resources (koohatu) caused by pollution within hauanga kai/mahinga kai and/or increased biosecurity risks (amongst other pressures). Many of these arise from extensive land clearance, deforestation and wetland drainage in order to:

- raise cattle, sheep, pigs, chickens;
- maintain vast market gardens;
- support other landbased activities such as mining and quarrying;
- enhance urban expansion and associated infrastructure including roading and services that support housing and industry development.

In a twist of irony, many of these activities are key sources or are important supporting services for the most common (and notably non-native) ingredients served in our modern haangii.

Though we could lament on the absence of our native kai within our haangii pits, and the impacts our modern kai may be having, we also need to reflect on the potential to still be able to bring traditional kai back when it is sustainable to do so. Such an aspiration may not have been possible without the determination of our people to maintain and uphold our haangii practices providing us with the important knowledge we will need to respond to things like climate change.

"I've always been an advocate for haangii tuturu and making sure that this art form or this style of living doesn't get lost. By giving the community opportunity and teaching them how to haangii properly then that obviously will help the interest." [22]

"Haangii represents our connection to the whenua, to our tuupuna, and to our haapori, and it is a way to share kai and commemorate important occasions with loved ones. By continuing the practice of haangii, whaanau, and iwi are able to preserve this tradition and pass it on to future generations. The preservation of our maatauranga through upholding our traditional practices is essential to maintaining our sense of identity and connection to our tuupuna and whakapapa. The haangii is one of our cultural practices that, whilst evolving, remains strongly rooted in tradition, is celebrated and passed on."[23]

Preparing the miti at Horahora Poukai (1 Jan 2019).
Photo: Kiingitanga FB page

22 R. Spraggon in interview by Maaori Television (2020)
23 Boundy et al (2023)

OVEN COOKED HAANGII

SERVES 4

Whaanau sized…

Doing in-ground haangii may not be practical or doable for many of our people living in urban centres, or just wanting a haangii for dinner. So here is a recipe to cook one at home.

We use commonly used vegetables in the recipe but you can substitute or dd to it with others like bok-choy, parsnip, carrot, swedes, kamokamo etc.

Ingredients – Haangii

1 cabbage
1 large kumara
2 riiwai
¼ pumpkin

Choice of meats

4 pieces of chicken drumsticks or thighs
4 lamb chops and/or 4 pork chops or slices

Preparing Haangii Ingredients

1. Peel and quarter kuumara
2. Peel and cut riiwai into halves
3. Cut pumpkin into four or more pieces
4. Season chicken and/or selected meats

Ingredients – Stuffing

12 slices of bread
1 onion diced
2 tablespoons thyme
2 teaspoons salt
200g butter

Making Stuffing

1. Peel and dice onion
2. Bread slices into pieces
3. Combine in a bowl
4. Add thyme
5. Either cut the butter into mixture and rub together with your hands or melt the butter and pour into the mixture and using a spoon mix together.
6. Season to taste.

Cooked haangii for a whaanau in Brisbane (2024). Photo: J. Oti

Haangii ingredients being prepared (2024). Photos: Swamp Frog

Previous page: Kooura (rock lobster) steam cooked in the haangii. Photo: R. Spraggon.

Packing the haangii for cooking

Preheat oven to 200°C

Roasting Dish – All in one

1. Line dish/tray with cabbage leaves and sprinkle with water.
2. Place the vegetables on the cabbage leaves followed by the chicken and meats and the stuffing.
3. Cover with another layer of cabbage.
4. Sprinkle water over cabbage leaves.
5. Cover roasting dish with tin foil and bake at 200°C for approximately 1 hour and then at 160°C for approx. 2 hours.

Individual Packs

1. Cut 4 sheets of tin foil to make individual packs.
2. Line each sheet of tin foil with cabbage and sprinkle with water.
3. Divide meat, vegetables and stuffing between the four packs and lay on top of cabbage leaves.
4. Wrap packs and place in a roasting dish.
5. Bake at 200oC for approximately 1 hour and then at 160oC for approx. 2 hours.

Haangii ready to roasting (2024). Photo: J. Oti, Brisbane

Haangii (2024). Photos: Swamp Frog

SUSTAINING OUR HAANGII PRACTICES WHAT CAN WE DO?

1. Gather your haangii chefs and whaanau and hold a waananga to learn more about haangii.

   Some helpful starting paatai could be:

   - What were/are some of the traditional kai served in your haangii and where were/are they harvested from?
   - What are the key resources needed for haangii? Are we still using the same ones, or has it changed?
   - What are the methods for haangii? Are we still using the same methods, or has it changed?
   - Record ingoa and/or other kupu for methods, kai, and other resources. This protects and upholds your unique mita, and also the whakapapa of those ingoa/kupu in relation to haangii.
   - What might be the causes for the changes to either practice or the resources used?

2. Compile any puu raakau, whakataukii, and/or waiata about haangii as it relates to your whaanau and rohe. These are important tools to help with knowledge retention, but also new knowledge creation and expression to help build resilience in our maatauranga.

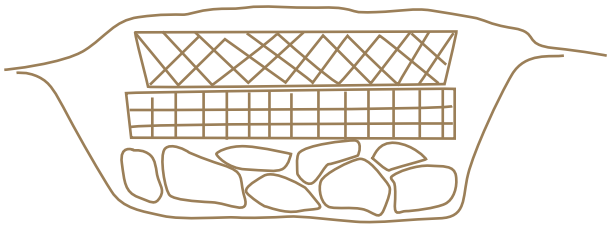
3. Build a list of the types of kai your tuupuna used to cook in haangii. And then map where those kai used to be found. Compare with maps of where they might be found now.

   [HINT: DOC can provide some information about species distribution, or you can try NIWA, Manaaki Whenua and/or your regional council].

4. Do the same list exercise for your resources – koohatu, raakau, harakeke, etc. And then map where those resources used to be found. Compare with where they might be found today.

   Maps of the past versus the present helps build a visual of what has changed. And also, to help you identify what changes might still happen, either due to urban sprawl and/or environmental changes such as the potential impacts of climate change.

5. One of the common things we heard was a concern about 'doing it wrong'. The only way to 'do it right' is to keep finding ways to continue doing the practice of in-ground haangii so that this knowledge is passed on to each new generation. And so we don't lose our tikanga, our maatauranga, and our connection to our whenua and wai.



6. Make time to reconnect with the physical exhibitions of our traditional haangii and tools that are held at museums (you can also jump online to see many of these taonga tuupuna). There are still many things we can learn from these remnants of our history with regard to whenua and wai that are as relevant today as they were for our tuupuna.

7. Hold fast to your reo and your unique dialects. Our language holds our stories, our tikanga, and a picture of what our past, and future could look like for our mokopuna and Taiao.

"As long as you follow the right process you can cook a haangii even in the rain."[24]

My action plan:

24 T. Moana Jnr (May 2024), pers. comm.

Next page: Windswept maanuka on the western Waikato coast (2020). Photo: Swamp Frog

3. WHAATAAPAKA PAATIKI

Location of Whaataapaka. Orbica | Leaflet, © CC BY 4.0 LINZ

WHAATAAPAKA MARAE

Whaataapaka marae is located by the Whaataapaka Creek, an estuary of Te Maanukanuka oo Hoturoa (the Maanuka). The principal hapuu are Ngaati Tamaoho, Ngai Tai and Ngaati Koheriki.

Whaataapaka was once an ancient fishing camp that was utilised during fishing seasons by the southern Waikato hapuu who came to harvest the bounty of the Maanuka.[1]

Over time the fishing camp evolved into the modern-day marae complex we have today which consists of the wharenui Tamaoho, the wharekai Te Kupenga and the wharemoe Te Ohaki o ngaa Tuupuna.

To have a Poukai at Whaataapaka was a long-held dream of the marae kaumatua. That moemoea was fulfilled on August 31st, 1983, when the first Poukai took place. This date commemorates the return of Te Arikinui Te Atairangikaahu from her first major overseas tour in 1975.[2]

While preparing for their day a decision was made by the marae kaumatua that kaimoana would be the kai of the Poukai with paatiki as their dish of the day accompanied by additional fish and shellfish from the harbour.[3]

"The whaanau – whaanau atmosphere is what I love most about our Poukai. And the next generation are learning, picking it up fast. Everything is being passed on – one experience and then the next. And like us they do it with great joy and laughter, they – we make it fun. By being together, doing the mahi together. Everyone doing their bit – that's us – that's Poukai."[4]

In this chapter we explore paatiki as they are experienced and shared by our whaanau at Whaataapaka.

POUKAI is held annually on the 31st August

1 P.L Ngataki (1997): p. 2
2 Whaataapaka Marae Trust Board (2008): p. 3
3 Ngataki, D. *pers. comm*. July 2023
4 M. Kirkwood-Kahi, pers. comm (2024)

Tamaoho, Whaataapaka marae. Source: https://tekotahiatamaki.nz/marae/whatapaka-marae/

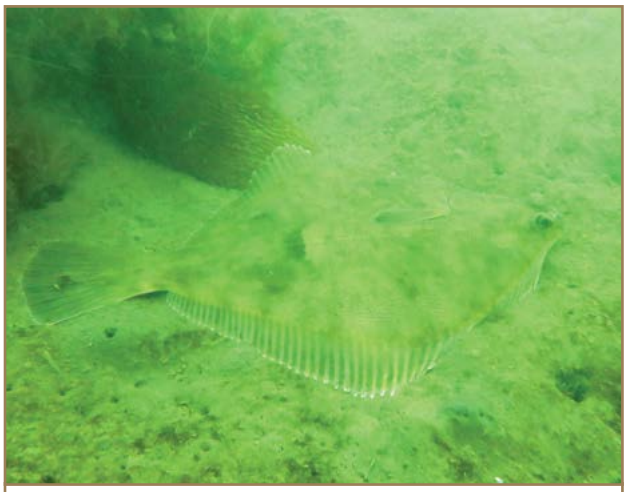
PAATIKI (FLOUNDER)

Paatiki – also known as flat fish, or "those funny fish with their eyes on the side" – are an important kai species for our marae and whaanau located around the west coast estuaries, and harbours of Waikato and south Auckland. Of the four key species of paatiki found in Aotearoa waters the sand flounder (*Rhombosolea Plebeia*) and the yellow belly (*Rhombosolea Leporina*) are the species that make up the majority of the paatiki catch in the Maanuka.

The sand paatiki are diamond shape and are greenish brown or grey above with a white underside. Male fish reach maturity at around 12 cm, females from 18 – 22 cm.

The yellow belly tends to be narrowly oval in shape being widest near the centre. They can vary in colour but are most commonly a dark olive green above and yellowish white on the underside.[5] Males mature at 15 cm and females at 26 – 27 cm.

Both yellow belly and sand paatiki prefer shallow muddy and sandy habitats. They are very effective and important shoreline and estuarine predators, blending into their surroundings and pouncing on their food as it moves past them. The whakapapa of their kai includes crabs, worms and shellfish. Yellow belly can also move into freshwater, where they eat insects e.g. midges.[6]



Sand flounder. Photo: NIWA

Yellowbelly flounder. Photo: NIWA

5 NIWA (2020): p. 2
6 Ibid: 8

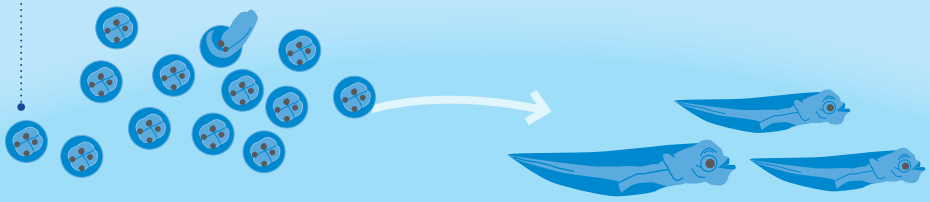
Previous page: Paatiki in net. Photo: NIWA

PAATIKI LIFE CYCLE

Paatiki (New Zealand flounder) are found in shallow, brackish (slightly salty) waters including harbours, estuaries and inlets, coastal lakes and even rivers.

EGGS

The paatiki starts its life as an egg off the coast. Adult paatiki spawn offshore and their eggs are washed into estuaries, harbours and inlets with the tides. Some paatiki can produce up to one million eggs each spawning event.

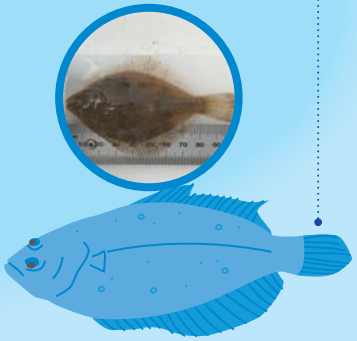


LARVAE

Paatiki hatch into an upright swimming fish with one eye on each side of their body. As they grow the left eye moves to the right side of the head to prepare for when they are lying on the sea floor. Although they can swim a little, they are usually carried by the currents and tides.

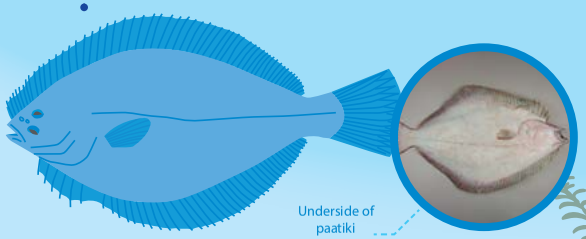
JUVENILES

Once the eyes of the paatiki are both on the right side of their bodies, they begin to lie on their side and move to the sea floor as juveniles. As juveniles they like to stay in the shallower parts of estuaries, harbours and inlets.



ADULTS

After about two years, paatiki have grown enough to begin to move out into deeper waters including the deeper parts of estuaries and harbours and inlets as well as out onto the open coastline. Sand flounder males reach maturity at around 12 cm, females from 18–22 cm. Yellow-belly flounder males mature at 15 cm and females at 26–27 cm. During summer they travel back into harbours to feed and to prepare to spawn in late winter and spring.



THE TRADITIONAL FISHERY

The Maanuka is an ancient traditional fishery of Waikato hapuu and iwi.[7] Even inland hapuu of Waikato – e.g. Ngaati Mahuta – had respected fishing rights over areas such as Whaataapaka and Awhitu.[8]

Fishing grounds were tribal property. Stakes would mark out the boundaries of the hapuu fishing grounds. Any trespass was not tolerated and would invite the wrath of the hapuu.[9]

Tuupuna fished throughout the harbour using traps, nets, hooks, lines, and sinkers; to catch a range of species including but not limited to kahawai, snapper, different shark species, paatiki mullet and stingray. The shellfish resources of the harbour were also widely used including puupuu, pipi, scallops, cockles, oysters and kuutai.[10]

Although heavily depleted the Maanuka remains a valued taonga and traditional food basket for the hapuu of Waikato iwi.

"…The harbour supplies seafood for all Waikato marae from Mangere on the northern boundary down to Ngaruawahia in the heartland, ..Those of us who live on the Maanuka make the very important contribution of seafoods. Take away from us the ability to make this contribution and you take something that means so much. Our mana, our prestige is lost…Whaataapaka Marae Trust Board is an example of a modern marae. It is a modern remnant of a proud past…The estuary and mudflats adjacent to the Marae is the source of seafood to provide traditional hospitality to guests, it also is an important means of reducing costs of such occasions...'

'...The foods that are available from these estuaries include puupuu, cockles. snapper, flounder, kahawai, mullet, shark and stingray… These natural resources will be lost to the marae and the people if what is regarded as useless mudflats are preempted as cooling ponds for the power station…The gathering of shellfish and fishing is not so much a recreation but a need to have this food as an important part of our diet. This way of life is necessary for our physical, social and mental wellbeing."[11]

CHALLENGES
CHANGES TO PAATIKI HABITAT

Observations made by our fisher whaanau highlight that there are impacts to our paatiki due to land use surrounding the harbours and estuaries. Some of these include:

- High sediment loads which are smothering the nurseries of larvae and juveniles, but also the habitat of important food sources. The ecology is also changing as a result with increased colonisation of areas by mangroves where it did not occur in the past.
- Pollution caused by high nutrient and/ or heavy metal loads to the estuaries and harbour which are affecting the health of both paatiki and their food sources.

In both of these particular situations, whaanau believe it is causing paatiki to shift from the areas utilised by our harvesters.

7 HDT (1996): p.143
8 Ibid: p. 145
9 Ibid: p. 144
10 ARWB (1990): p. 33

11 McLarin N.R. (1977): p. 5

HARVEST

"Whaanau learnt how to gather kai from the moana from their fathers, uncles or older brothers. Being safe on the harbour, the river, knowing the seasons, the tides and currents while gathering or diving for kaimoana are skills learned and practiced since boyhood. The seasons for scallops, knowing where the mussels are, the best places to fish or cast the nets for flounder. Going out on our boats relying on each other, binds us together."[12]

From its ancient beginnings as a fishing camp to the present, the activity of fishing has remained an integral part of life at Whaataapaka. Harvesting of paatiki and other kai is an annual activity for whaanau who live locally and also those whaanau of Waikato hapuu who travel to the harbour to gather kai for the home and hui. Harvest for many fisher whaanau occurred in the creeks near the marae and papakaainga, starting around July for Poukai, although other whaanau may start a bit earlier in autumn[13].

The main method for harvesting paatiki is set netting with supplementary catches achieved by night spearing.

"Before Poukai the work starts weeks, months even before hand…here at home spend night after night catching our flounders. Fishing, fishing, fishing, spearing, spearing, spearing. Eating two or three flounders for breakfast and putting the rest away for Poukai."[14]

Melani Kirkwood-Kahi setting the net on the Creek.
Photo: M. Kirkwood-Kahi

Whaanau still catch most of their paatiki from the estuaries of the Maanuka. Harvesting the required numbers for Poukai can be challenged though, by continued bad weather during harvest season and/or low numbers of fish caught. In these circumstances, whaanau source paatiki from elsewhere including purchasing from suppliers from across the country. Alternatively, the whaanau may provide more of the other kaimoana species that is available from the harbour such as cockles, puupuu, kuutai and scallop. These were also gathered from the harbour. On the odd occasion, whaanau would travel to Maketuu or Hauraki to harvest pipi, puupuu and kuutai (mussels) but this activity has declined in recent years.

12 Ngataki, D., In: Whaataapaka Marae Trust Board. (2008): p. 78
13 Kirkwood-Kahi, M. pers. comm. July 2023
14 Ngataki P. L., In: Whaataapaka Marae Trust Board. (2008): p. 46

Kuutai (Mussels). Photo: NIWA

Pipi. Photo: NIWA

Puupuu. Photo: Kawhia Primary School FB Page

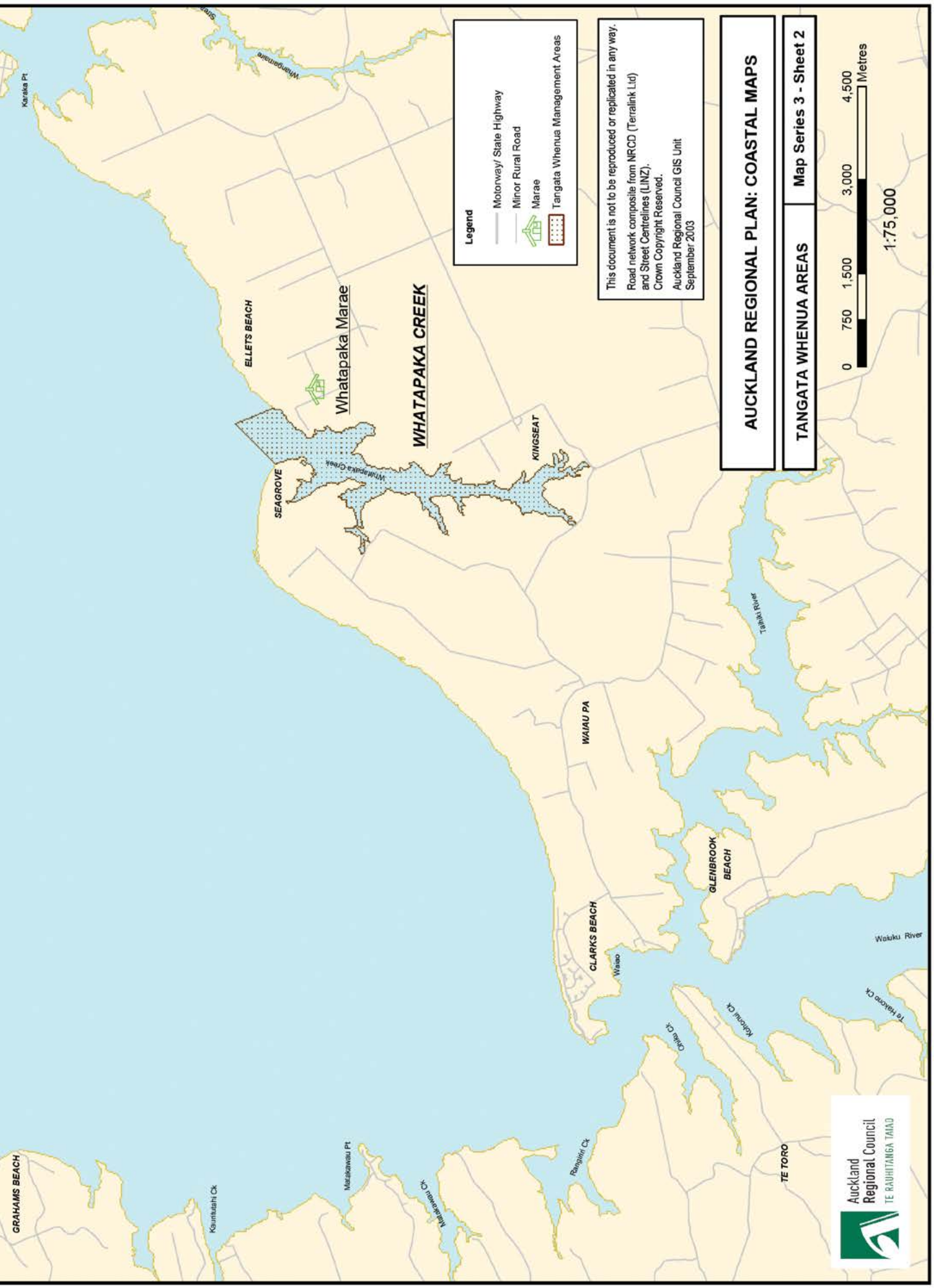
CHALLENGES
DECLINES IN PAATIKI POPULATIONS AND FISHER COMPETITION

In 1992, the Maaori Land Court gazetted the setting aside of fishing reserves specifically for whaanau of Whaataapaka and Puukaki Marae – Whaataapaka/Clarks Creek; and for the whaanau of Te Akitai and Te Ahiwaru o Waiohua – the Puukaki-Waiokauri stream (see maps on pgs 54 - 55). Despite these protections, our whaanau still grapple with a range of challenges to their fish stocks and retention of their practices, including:

- Illegal encroachment into the reserves from fishers and shell fish harvesters outside of the whaanau and/or area. Whaanau have tikanga in place for the utilisation and also protection of stocks in these reserves. Outsiders moving into these areas without first engaging with whaanau for permission, are breaching this tikanga, and generating competition with our fisher whaanau.
- Increased exotic waterfowl populations such as Canadian geese, which whaanau believe are grazing on juvenile paatiki and severely reducing stocks.

Next page: Scallops. Photo: NIWA

Fishing reserves in Te Maanuka – Puukaki Waiokauri and Whaataapaka Creek.



Fishing reserves in Te Maanuka – Puukaki Waiokauri and Whaataapaka Creek. Source link: http://www.aucklandcity.govt.nz/council/documents/regionalplans/coastal/mapseries3map2.pdf

PREPARATION/STORAGE

Once cleaned, paatiki are stored in the freezer until Poukai in August. As the Poukai date draws near, the paatiki are thawed and then threaded onto harakeke in bundles of 10. They are then placed in the chiller ready for the cooks.

"I like coming to Poukai and being with all of my cousins it's cool. But this year I didn't like it that much when we had to help with the flounders. It was gross, we put the flax into the mouth and pulled it through the gill and guts. It was yuck."[15]

"I think my first job at the marae was threading flounders on harakeke and hanging them in the chiller…At first it was fun; my cousins and I would laugh together and tease each other while we were doing it. But after a while your hands would get cold and real slimy and you start to get hoha so we would run away."[16]

15 McGee. T., In: Whaataapaka Marae Trust Board. (2008): p. 58
Note: At the time our mokopuna was 11 years old

16 Kingi, H., In: Whaataapaka Marae Trust Board. (2008): p. 103

Harakeke bush – Gordonton, Waikato. Photo: Swamp Frog

Paatiki ready and waiting in the chiller. Photo: D. Kirkwood

COOKING AND SERVICE

We often take for granted that our marae cooks are the engine room behind the Poukai and ringawera (cooks) at Whaataapaka are no exception. As well as ensuring that their signature paatiki dish is ready to go, the cooks also prepare and serve a range of other traditional dishes inspired by the kaimoana of the harbour to sit alongside the paatiki on the tables.

But cooking paatiki is not all glamorous and prepping them for service involves a lot of mahi to get them looking tasty for manuhiri.

"…cooking flounders…that was our job for three to five years. We would reek of hinu for what felt like days afterwards, and our feet ached standing in the same place doing the same mahi from 6am till about 1pm."[17]

"We had to count the paatiki in lots of ten as they were cooked. So many hundred by nine, and so many hundred flounders cooked and put in the warmers by ten. Halfway through the morning we were also flouring/battering and cooking the fish pieces and mussels at the same time…we did not count them."[18]

Due to Poukai being an annual event, spanning more than 40 years for Whaatapaka in particular, there are rotations of whaanau who undertake the mahi as well:

"Over the years different whaanau have taken on the task. 'The Wawatai whaanau…Eugene and Maea did it for five or six years, Vernon Smith for a while and even cousin Teresa got in there once as well."[19]

Mereana and Dennis Ngataki get the paatiki ready for service. Photo: D. Kirkwood.

CHALLENGES
SUSTAINING THE KAUPAPA: CLIMATE CHANGE

The increase in extreme weather events is a concern for the whaanau and was violently brought to the forefront of everyone's minds during and following the cyclone known as 'Gabrielle' in summer 2023. This event resulted in major flooding and landslides around the marae, urupaa and papakaainga.

The whaanau are aware that the impacts of climate change will eventually have a significant impact on their traditional fishing grounds and fishery. They are also sceptical that the decisions and actions required to reduce climate change will be implemented.

"Realistically it's only a matter of time before we could suffer enormously from climate change; that's unless dramatic change is made which for now is hard to imagine."

D. Ngataki, pers. comm., 2023

17 Rawiri, R.M.A., In: Whaataapaka Marae Trust Board. (2008): p. 72
18 Kirkwood, D. A. T., In: Whaataapaka Marae Trust Board. (2008): p. 72
19 Ibid

THE HAAKARI

"Right from the beginning starting with the tamariki sharing and caring, showing them that each job is important, to do their best at each job and then go onto the next job. Starting from the tea boys, showing them how important that job is, the waitresses the same thing. Everything the whaanau do, when they come to Poukai no matter how small they think it is, is important and appreciated. We cannot do this without each other. We cannot do this day, hold this day, feed the people without our kids and now their kids. Our kids and their kids together are the ones who will carry it on."[20]

Practice and tikanga for gathering food is related to providing for the whaanau, related to how manuwhiri are hosted in our homes or on the marae and also how we manaaki the place from where we gather our resources. They are not isolated events but collectively are among a series of actions required to achieve our goal to manaaki and tiaki.

Eating and not wasting any part of the paatiki is a lesson that is as important as knowing how to catch, prepare and cook the fish[21].

"The caring, the aroha, the why behind everything we do – manaaki te tangata, manaaki te manuwhiri."[22]

"The passing on of knowledge and skills to successive generations; the foundations on which to stand to uphold the responsibilities passed down from tuupuna."

"It's hard work, but all our Poukai marae whaanau, any marae is familiar with. The ringawera all of us working together to feed and take care of our people, that is good. Everyone knows what to do and just get on with the next job."[23]

"Things have to be done right the first time on Poukai day. …not like a tangi where you have two days to practice before the kai haakari."[24]

Coating the paatiki in flour. Photo: D Kirkwood

Jodie Hana and Kirsten McGee lay the table. Photo: D Kirkwood

20 Ngataki, P.L., In: Whaataapaka Marae Trust Board. (2008): p. 51
21 Kirkwood-Kahi, M. pers. comm, July 2023
22 Ngataki, D. pers. comm July 2023
23 Ngataki, D., In: Whaataapaka Marae Trust Board. (2008): p. 78
24 Ngataki, P.L., In: Whaataapaka Marae Trust Board. (2008): p. 48

Next page: May and Lena Pompey and whaanau serve paatiki. Photo: D. Kirkwood

PAATIKI

SERVES 2

Simple, old skool but tasty

Ingredients

2 x Paatiki

Flour – enough for coating each paatiki

Hinu (cooking oil)

Nice big bench to set up your 'production line'

1. Turn on the deep fryer and heat the cooking oil.
2. Using your hands, completely cover each paatiki with a good layer of flour
3. As the fryer is heating up, you should start to see the oil 'rolling and turning' which indicates that the oil is getting hot enough to cook with [Note: You could put a bit of bread in to check that the oil is hot enough to fry if you are not sure]
4. Carefully add the paatiki to the deep fryer and cook for 2-3 mins.
5. Remove and place on some paper towels to soak up excess oil
6. Serve the paatiki with a slice of lemon, and/or a small salad.

"It is special that sense of achievement, that sense of togetherness when all the kai is cooked and, on the tables, then afterwards, when the hui is over. Everyone is tired, dog tired but proud, another Poukai done, done well when everything is packed up and away. When everything is clean, tidy, leaving everything spotless, ready for the next hui. This is so important as well."[25]

Paatiki in the fry pan. Photo: M. Kirkwood

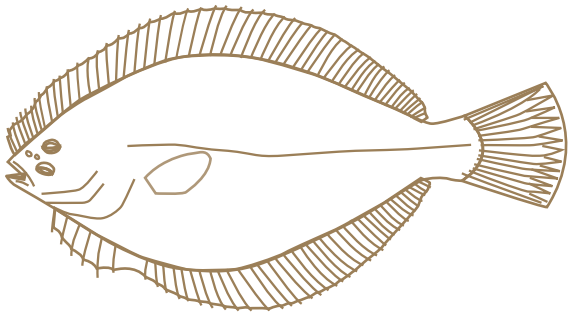
Hine, Danielle and Hemi Wawatai putting flour on the paatiki. Photo: D. Kirkwood

Vernon Smith at the deep fryer. Photo: D Kirkwood

25 Thompson, A. N., In: Whaataapaka Marae Trust Board. (2008): p. 36

SUSTAINING OUR PAATIKI AND ASSOCIATED PRACTICES

WHAT CAN WE DO?



1. Gather your whaanau and hold a waananga to learn more about your paatiki. This is all the more important with the growing awareness of changes occurring within the rohe and our kai species due to climate change.

   Some helpful starting paatai could be:

   - Where were/are they harvested from?
   - What does a healthy environment look like for paatiki according to your maatauranga? Smells, sights, tastes, sounds?
   - How did/do you harvest them? Has it had to change, and if so, why?
   - Are there different names for paatiki for either a part of their life cycle, and/or a behaviour they did?
   - What other species are found around paatiki (i.e., what is their whakapapa)?

2. Map your harvesting sites – both past and present. This helps build a visual of what has changed, and also to help you identify what changes might still happen.

3. Get out into the environment with your whaanau – get familiar with what 'normal' looks like for you all, and what doesn't. Take your rangatahi and Tamariki, along with your kaumatua so everyone can learn from each other.

4. Continue with the practices that get your people out into the environment, as well as back to the paa. You are the ones that have the knowledge to know how to respond to change, and it is important that this knowledge is passed on to each new generation so we don't lose our tikanga, our maatauranga, and our connection to our whenua and wai.

5. Hold fast to your reo and your unique dialects. Our language holds our stories, our tikanga, and a picture of what our past, and future could look like for our mokopuna and Taiao.

My action plan:

Flooding at Meremere (2020). Photo: Swamp Frog

Limestone and sandstone outcrops, western Waikato. Photo: Swamp Frog (2020)

4. TAURANGANUI MATAMATA AND POOROHE

Location of Tauranganui. Orbica | Leaflet, © CC BY 4.0 LINZ

TAURANGANUI MARAE

Tauranganui marae is situated on the Tuakau Bridge–Port Waikato Road, nestled by the Waikato River. Hapuu affiliated to Tauranganui include Kaiaua, Te Rangiwaahituu and Ngaati Tiipa of Waikato iwi.

The wharenui is Rangiwaahituu , the wharekai is Tu-kotahi and the wharepuni/ruruhau is Ngaati Kaiaua .

POUKAI

The Poukai commemorates the coronation day of Kiingi Mahuta (14 September 1894). According to ruuruhi, Puku Tahapeehi, the Poukai were held on the 14th of September. However, in later years the event was moved to the weekend to provide whaanau who were working and/or had migrated to urban centres the opportunity to return home to participate in their Poukai.[1]

Since then the Tauranganui Poukai has been held on the second Sunday of September. According to kaumatua koorero the 14th of September was exchanged with Horahora Marae so that the Tauranganui Poukai would coincide with the matamata season.[2] The Poukai and the matamata go together and there is an expectation by those who attend that matamata will be served at the haakari time.

The poorohe (common smelt) is also caught during the matamata season and served at the Poukai haakari. While not as widely known as the matamata both fish have always been an important traditional kai.

"Having matamata at the Poukai is part of the identity of the marae…It's our delicacy, it's what we are known for."[3]

"...poorohe are a huge resource from the river for our whaanau"[4]

In this chapter we explore these two kai – matamata and poorohe – as they are experienced and shared by our whaanau at Tauranganui.

POUKAI is held annually on the second Sunday of September

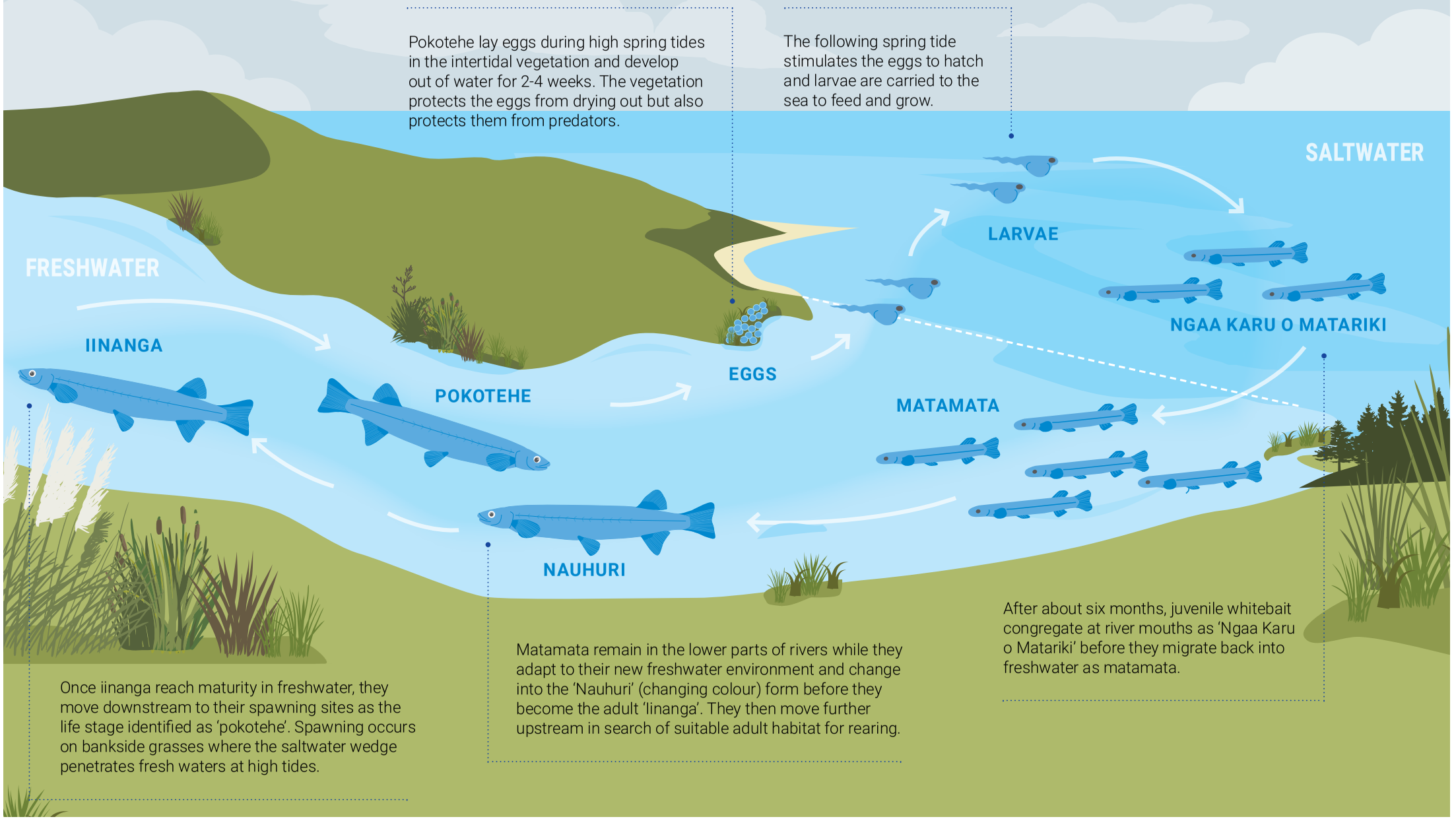
1 P. Tahapeehi (1995), pers. comm.
2 https://waikatotainui.com/resources/ngaa-poukai/
3 N. Hira and D. Kihi (19 October 2022), pers. comm .
4 H. Tini, (20 October 2022), pers. comm.

Next page: Drone footage of the marae. Photo: N. Grainger (WRC).Drone Operator: Taylor Scott (WRC)

IINANGA LIFE CYCLE

NIWA
Taihoro Nukurangi

There are five migratory galaxiid species (commonly known as whitebait or matamata). They have a diadromous life cycle meaning they use the marine and freshwater environment to complete their development. In Waikato, the main species caught in the 'whitebait catch' – Iinanga (*Galaxias masculatus*) – are noted as progressing through several life stages as they move through these different environments. These are outlined below.



IINANGA (ADULT WHITEBAIT)

Matamata (whitebait) are the juvenile forms of fish from the Galaxiidae family. Of the 17 Galaxiidae species only five – the giant kookopu (*Galaxias argenteus*), iinanga (*G. maculatus*), banded kookopu (*G. fasciatus*), shortjaw kookopu (*G. postvectis*), and kooaro (*G. brevipinnis*) – make up the 'whitebait catch' in the Waikato River. These fish can be found in a range of freshwater habitat types such as rivers, streams, wetlands, and lakes.[5]

Whitebait will spend time in three different habitat types over their lifetime – estuarine (where freshwater and saltwater mix), marine and freshwater. They feed and grow throughout the lower Waikato River system, although most kookopu whitebait species will grow to adulthood within tributary streams rather than the main stem of the river.[6] Adult iinanga have been found right up to the Karaapiro Dam (approx. 75km from the River mouth at Te Puuaha o Waikato).

Iinanga are the smallest and most common of all of the whitebait species, making up at least 93% of the catch. They are considered to be a lowland species due to their reduced climbing ability. Because of their dominance in the whitebait catch, and the importance of Te Puuaha o Waikato (the location of Tauranganui Marae) to their spawning cycles, we will focus on iinanga for the remainder of this chapter.

"The whitebait population of the Waikato-Tainui fisheries area is restored and protected, and the restored whitebait population provides for a sustainable fishery"[7]

Īinanga.Photo: R. M McDowall (shared with permission)

Shortjaw kookopu. Photo: R. M McDowall (shared with permission)

Kooaro. Photo: R. M McDowall (shared with permission)

Giant kookopu. Photo: R. M McDowall (shared with permission)

Banded kookopu. Photo: R. M McDowall (shared with permission)

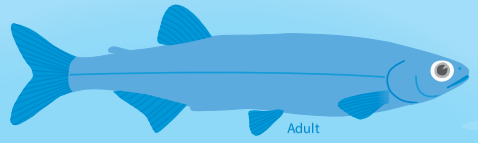
5 Mahuta, et al (2017): p.109
6 Ibid: p. 109
7 Recommended goal for whitebait management from Waikato-Tainui (2020) in their submission to DOC: p. 6

POOROHE LIFE CYCLE

NIWA
Taihoro Nukurangi

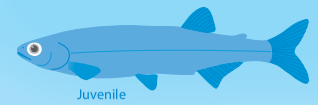
Poorohe (common smelt) is important to the Te Puuaha community in the lower Waikato River where they are also known as 'number two whitebait'. This species has scales, a distinctly forked tail, and is well known for their cucumber-like smell. In Aotearoa smelt can have either a diadromous (riverine/sea-going) or non-diadromous (associated with lakes) life cycle. Only common smelt (*Retropinna retropinna*) are found in the Waikato River. Very little is known about the life cycle needs of poorohe in the lower Waikato River.

SALTWATER



LARVAE

The larval period of the poorohe life cycle is largely unknown. After hatching in freshwater, the larvae (about 5 mm long) drift out to sea where they will continue to grow and mature.



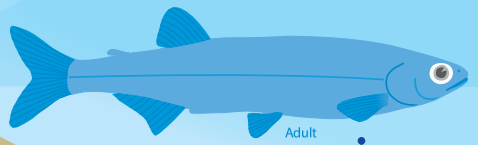
JUVENILES

Juveniles are translucent and have a whitebait-like appearance. It is thought that some juveniles mature in the marine environment and come back to the river as adults, while other juveniles migrate upstream in spring/summer and mature within the river system.

EGGS

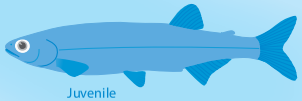
Poorohe spawn thousands of eggs approximately 1 mm in size. The eggs have large yolk sacs that can sustain the larvae for as long as 10 days.

We recognise that whaanau and hapuu across Aotearoa have an extensive range of names for their freshwater taonga species. In this resource the dialect used is from Waikato, but please check with your local hapuu for te reo that is relevant to your area.



ADULTS

After spending time at sea or within the river system, adults move to the lower river to breed. Mature poorohe range between 90–100 mm in length and are approximately a year old. During late autumn and early winter, mature adults will spawn along sandbanks and sandy shoals in the lower Waikato River. It is thought that after spawning, the spent poorohe die; however, some may survive spawning and spawn again the following year.



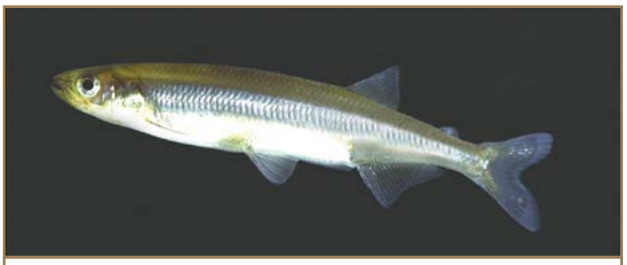
BRACKISH/FRESH WATER

POOROHE (COMMON SMELT)

Another important fish caught during the whitebait season is the poorohe (common smelt).

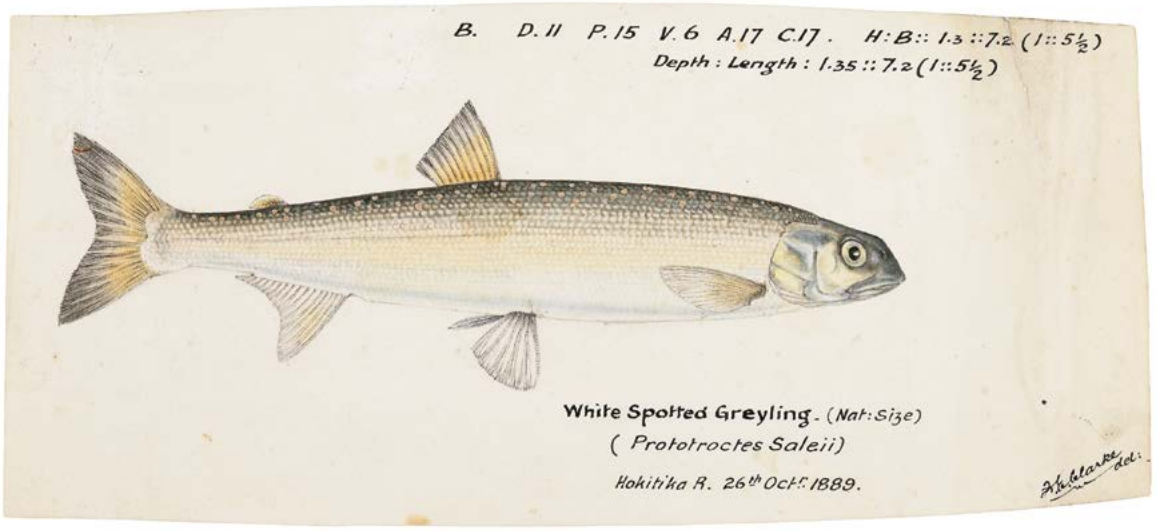
There are two species of smelt – the poorohe or common smelt (top image right, *Retropinna retropinna*) which is found throughout the country and the Stokell's smelt (middle image, *Stokellia anisodon*) which is only found in Canterbury. Both species are unique to Aotearoa. Poorohe are the living relative of the now extinct, native grayling (upokororo, pokororo, paneroro, kanae-kura; *Prototroctes oxyrhynchus*, bottom image) which was once widespread across Aotearoa.[8]

Poorohe – sometimes referred to as 'cucumber fish' because of the smell they have – live in both flowing and still water, and as either sea-going or land-locked populations. While not a climbing species like many of our matamata, poorohe are good swimmers and can be found well inland in low elevation river systems. Poorohe have been noted as being plentiful in the Waikato River catchment[9], but trends in their relative abundance are not presently known.



Poorohe. Photo: R. M McDowall (shared with permission)

Stokell's smelt. Photo: R. M McDowall (shared with permission)



Prototroctes oxyrhynchus (White spotted greyling), 1889, New Zealand, by Frank Edward Clarke. Te Papa (1992-0035-2278/1)

8 https://niwa.co.nz/freshwater/nzffd/NIWA-fish-atlas/fish-species/common_smelt
9 Crow et al (2016): p. 71

There are still large gaps in our understanding of poorohe ecology. Information we do know includes:

- Unlike our matamata, poorohe have scales.
- They are very sensitive to changes in dissolved oxygen (DO) in water, particularly when DO decreases. They therefore provide a useful biological indicator (tohu) of water quality change because their presence confirms other native fish also being present.
- Their preference for deeper waters compared to matamata, and using sand banks for spawning provides another valuable tohu for noting physical changes to the River; particularly if the poorohe move away from their current habitat.
- The behaviour of poorohe is different to matamata because they swim very fast and further away from the bank. This makes them difficult to catch especially with the traditional scoop net – the kaka. Whaanau have observed the Poorohe tend to turn and swim back whereas matamata will congregate at the end of the net in an attempt to push forward and through the obstruction. Harvest of poorohe therefore requires some skill with the kaka and a good understanding of the fish and its behaviours.
- Recent research indicates that poorohe may also play an important role as larval hosts in the recruitment of the rarest of two kaaeo (freshwater mussel) species found in the Waikato – *Echyridella aucklandica*.[10]

10 Melchior et al (2023): p. 22

CHALLENGES
WHEN 'PEST PLANTS' MIGHT ACTUALLY BE GOOD

One interesting conundrum is the use of exotic 'pest plants' as spawning habitat by adult whitebait. Especially where there is a lack of suitable native freshwater habitat.

Ultimately, our fish have also had to adapt to environmental change. In some cases, this can also create challenges for wetland restoration because they are often using plants that outcompete native wetland plants.

It is important to check what vegetation our fish are using before making decisions to remove pest plants. If they are using them, then it needs carefully planned phasing out, with suitable natives as replacements rather than outright eradication.

Lower River as seen from Tikirahi. Photo: Swamp Frog (2020)

THE TRADITIONAL WHITEBAIT AND POOROHE FISHERY

"Along this river, the Maori [sic], for an aboriginal race, led an ideal existance. Fish such as eels, whitebait, mullet, kahawau and herrings were plentiful for miles up the river past the tidal influence…"[11]

The matamata and poorohe are traditional fisheries of cultural importance for Waikato peoples. Historically, hapuu occupied seasonal fishing kaainga to harvest and process their catches before returning to their permanent settlements.

Each group had fishing places that consisted of areas rather than one specific 'fishing stand'. Haonga (fishing places) were always spoken of in the plural as in 'ngaa haonga' as each fishing area would normally contain more than one fishing spot that was for the use of members of the group. These fishing places were known to all as they were used by successive generations and mostly respected; although there were instances where different whaanau would challenge the right of some whaanau to occupy certain spaces.

11 Frost (1947): pp. 22-23

Women fish for matamata on the Waikato River near Tuakau. Photo: Te Ara – The encyclopaedia of New Zealand

FISHING GEAR

Traditional fishing was undertaken using 'kaka' (similar to the hiinaki) that were made of woven muka (flax fibre) attached to a kareao (native supplejack, *Ripogonum scandens*) frame. Another method used a handheld scoop net made out of muka, and kareao shaped into a hoop and attached to a maanuka pole.

An additional tool was the 'ariari'. In earlier times this was the trunk of the mauku (cabbage tree, *Cordyline australis*) stripped of its bark. The white wood placed in the water enabled the fishers to better see the matamata swimming past.

With the arrival of the Paakehaa new materials were introduced and adopted by our tuupuna. Handheld scoop nets were still constructed using the kareao (supple jack) for the hoops, and these were attached to a maanuka (*Leptospermum* spp.) pole. The muka weave (sourced from harakeke, *Phormium tenax*) was replaced by scrim (a type of open weave cotton or linen) which could be quite heavy when wet.

Over time 'kaka' were made of aluminium hoops and poles with nylon netting. 'Ariari' became painted boards held down by rocks or poles or tin down pipes painted white. The latter were easier to handle as they were open ended and filled with water weighting them down. With the introduction of set nets ariari are no longer necessary as the net is secured into a fixed position to catch the fish swimming upstream.

Today the handheld 'kaka' has pretty much been laid to rest in favour of the modern set net. These nets vary in size and requires much less effort from the fisher. Set nets (similar to a hiinaki) can be positioned in the water, on the bed, or are attached to fishing stands where they have a screen that guides the fish to the net. The fisher sits on their stand or the bank of the river and waits for their nets to catch fish. The only effort required is to empty out the net as the fish are caught.

"What needs to happen now is that cut the set nets right out and then let the fish go all the way through. 'Cause when you 'hao' (fishing with a handheld net) for your fish you're going to miss some and those are the ones that are going to get through. You put a set net in, it's the end of the story."[12]

12 'Speaker 81' – hui at Ngaa Tai E Rua marae; NIWA (2010): p. 223

In addition to the evolution of fishing methods, fishing stands have evolved from riverbeds and ledges to wooden and floating stands. Fishing camps have also grown from temporary raupoo (T*ypha orientalis*) whare (structures); to one room buildings; to structures that boast a number of rooms and power provided by wind power or solar panels. Fishing camps which were once used for fishing season graduated to duck shooting baches and have now become full time residences on the lower River for some people and their families.

CHALLENGES
EQUITABLE ACCESS TO THE FISHERY

Except for a change in the length of the fishing season (September 1st until end of October), whitebaiting remains a hotly contested and at times poorly enforced/managed activity. Specifically, there continue to be issues for whaanau when gathering their kai from the River. Homogenisation of whitebait regulations for most of the country in particular, do not appropriately manage the unique issues for the lower Waikato, for example:

- The impact of Raupatu (confiscation) which saw to the removal of lands from control and management by traditional Maaori landowners.
- Erection of illegal structures (baches) on Maaori-owned land – essentially supporting people 'squatting' – for the purpose of fishing in the lower River. This is challenged further with a Waikato Regional Council pseudo-fishing rights process which encourages the registration of whitebait fishing sites by fishers but does not enforce confirmation of land ownership and/or landowner permission to register that site.
- Increasing sizes and numbers of house-like structures in the lower River to accommodate fishing parties; a number of whom are not local to the area but return every fishing season (see map on p. 73).
- The above actions are undertaken in the belief that a 'Queens/Kings chain' exists on lands adjacent to water bodies providing for public use and right of access. This is not accurate and causes conflicts with the landowners in the protection of their rights; particularly Maaori landowners.
- Changes to fishing practices from the kaka to the set net have facilitated larger volumes of fish to be extracted faster and for lower effort. Use of the kaka requires strength and skill compared to set nets and screens which can be left in the water and then pulled up. Smaller volumes are pulled from the River using a kaka; and thus, more fish are able to make it through to repopulate the upper catchment.

Net in the River at Tauranganui Poukai (9 Sept 2018)

HARVEST

Traditionally, the imminent arrival of Matariki (Pleiades) heralded the start of the fishing season and the arrival of Ngaa Karu o Matariki. Now, access to the fishery is managed under fishery regulations administered by the Department of Conservation (DOC).

The first legislated whitebait season was July 1st to November 30th. However, when matamata catches started to decline, the season was shortened by a month and the start date shifted to August 1st. This date was in place for many years but did nothing to stop the decline in matamata numbers so the season was shortened again by two weeks and given a start date of August 15th. In 2022 the season start date changed to the 1st of September and the end date to the 30th October.

"The whitebait fishery is a highly dispersed activity, lightly regulated, and very lightly enforced. It has recreational, semi-commercial, and commercial aspects, occurring simultaneously. The fishers are numerous, highly mobile, and often erratic in their involvement"[13]

"Back in the day the fish was plentiful. But so many changes to the fishing season, changes to allow floaters (floating fishing stands) and set nets. Changes not for the good. Influenced our people to do the same as the Paakehaa"[14]

13 R. McDowall (1991)
14 R. Taua (20 October 2022), pers. comm

OPENING OF THE WHITEBAIT SEASON: MAORIS NETTING THE FISH ON THE WAIKATO RIVER, AUCKLAND DISTRICT.

Photo: Libraries Heritage Collections AWNS-19130904-52-02c, Auckland Weekly News

RELATED HARVESTING ACTIVITIES

The fishing season was not just about matamata and poorohe. Because similar signals indicating movement from the ocean to the River occurred for a number of other fish species, the diversity of the catch was a signal of successful spawning in the season previous, and a healthy marine environment for developing fish.

Other species caught included:

Mohimohi – these fish were threaded onto harakeke (flax, *Phormium tenax*) and hung up to dry. Because the practice of harvesting these fish has almost disappeared in the River, we are still trying to accurately identify what species these fish are. Koorero gathered from fisher whaanau, and also gleaned from discussions with hapuu elsewhere, indicates that mohimohi may have been either, or inclusive of all of the following: sprat (*Clupea antipodum*), anchovy (*Engraulis australis*) and/or sardine (*Sardinia neopilchardus*).

Anchovy. Photo: Rudie H. Kruiter (Aquatic Photographics)

Kahawai (*Arripis trutta***)** – Whaanau harvested kahawai enthusiastically during whitebait season. The main method to catch them was using a handline. The fish were then often smoked and/or served as a raw fish dish.

Kahawai. Photo: NIWA

Juvenile tuna (*Anguilla* spp.), commonly referred to as **tunatuna** or 'glass eels' because of their almost transparent appearance. These also enter the river during the matamata season. Koorero with fisher-whaanau on the Waikato River highlight that tunatuna used to run as an almost 'impenetrable wall of fish' that could put a halt to whitebaiting until they had passed. Sadly, though, whaanau have seen notable declines in the tunatuna migrations back into the Waikato River, raising concerns for future populations of our tuna. We discuss this more in chapter 5 (tuna).

Whaanau also shared accounts of gathering harakeke. As children, they were also gradually introduced to other culturally important plants; although they were not necessarily taught the names of the plants until they were adults. Sadly, in some situations, kaumaatua passed away before plant names were able to be shared causing a 'short-circuit' in sections of knowledge for subsequent generations.

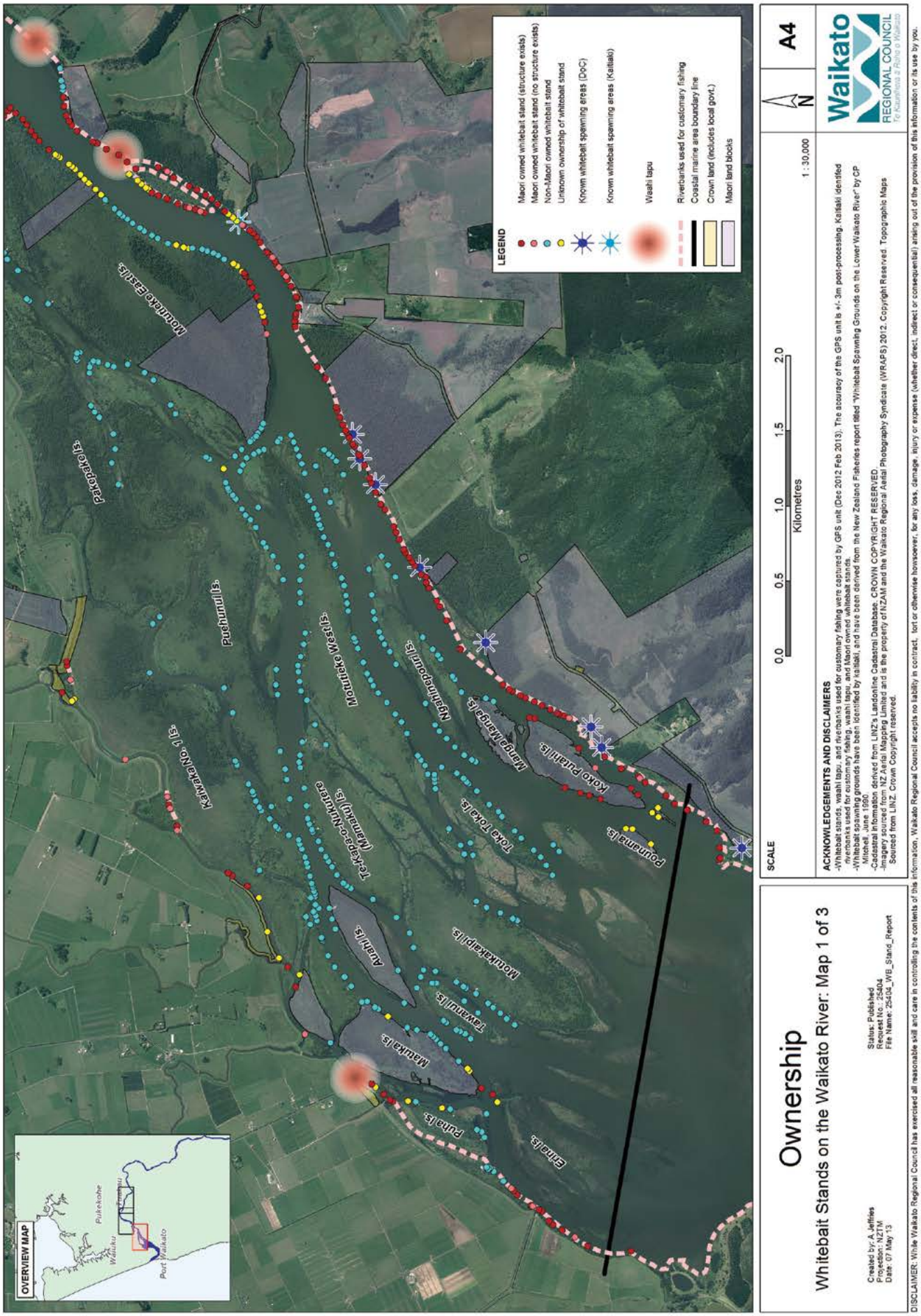
"It was 'go get that plant that looks like this'; or 'get that plant over there'. Our kaumatua knew the names, but we just knew them as 'this one – that one'."[15]

CHALLENGES
HABITAT CHANGE AND DECLINE

Iinanga and poorohe need good quality habitat for successful spawning and adult rearing. Along the full 425km length of the Waikato River, the system remains a connected whole from the mountains to the sea – despite the dams – and so impacts in the upper catchment do have an impact on the lower River system. In particular:

- All whitebait species require good quality wetland habitat, but over 80% of wetlands and swamp forests have been drained in the Waikato region, and the 20% remaining are declining in health. This puts pressure on remaining wetlands like Whangamarino to carry the habitat needs of our native fish, birds and insects.
- Poorohe are dependent on sand banks or sandy shoals in rivers and lakes to lay their eggs. Due to high sediment loads and barriers (the hydrodams for example) along the length of the upper river, the risk is that sands are either being covered with silts and clays, as well as sand regeneration being limited from the upper catchment (i.e., the Rangipo desert in the central plateau).

15 Whaanau koorero shared at whitebait hui in 2016 with R. Mahuta and C. van Schravendijk-Goodman.



One of 3 maps produced for the Waikato Regional Council Report investigating structures associated with whitebaiting in the lower Waikato River (Morris et al., 2012). Data was collected as part of a joint spatial project between Waikato Regional Council and Waikato Raupatu River Trust. This is a baseline survey of whitebait stand locations on the lower Waikato River as at May 2014. COPYRIGHT RESERVED.

MATAMATA AND POOROHE

While not the traditional method of how the matamata and poorohe were preserved and eaten in the past, the methods of cooking provided below have not changed since our tuupuna first started cooking the ika (fish) in this way.

It is the kai of home; it is the kai of the fishing camp; it is the kai of the Poukai.

Bruce Hori cooking whitebait fritters. Photo: supplied by Rangi Mahuta

MATAMATA FRITTERS

SERVES 1

Make it how you like it…

The best fritter is one based on your personal preferences. For this reason, we do not put measurements here, and leave it to the reader.

A hint: When making fritters do you want a lot of fish per fritter? Then use less eggs. If you want to make more fritters then use more eggs. You will get less matamata per fritter but it will go further.

Ingredients

Eggs (see hint box above)

Start with 100g Matamata and add more as you wish

Salt to season (and pepper if you like)

A knob of butter

1. Break eggs and whisk.
2. Add matamata and season with salt and pepper.
3. Melt butter in frying pan.
4. Ladle mixture into pan.
5. Fry until the fritter starts turning a golden colour. Flip it over and fry the other side until it is the same golden colour.
6. Serve with lemon cut into quarters .

Photo: Rangi Mahuta

MATAMATA BOILED WITH RIIWAI

SERVES 1

When cooked the taste of the matamata infuses the whole dish.

This dish was a favourite of the old people. They would fill their bowls with the boiled dish and have a mug of the hot juices on the side for dunking their bread and to drink.

Nannies or mums will mash a small bowl of the riiwai, matamata and juice and spoon feed to the babies. In this way the taste of the kai was passed on to the coming generations – the first step in the transfer of knowledge related to our kai.

Ingredients

At least 2 x medium sized Riiwai (potatoes)

100 g Matamata

Salt to season (and pepper if you like)

Knob of butter

1. Peel and cut riiwai into rough chunks.
2. Put into a pot of water and cook.
3. When potatoes are almost cooked add the matamata and a knob of butter.
4. Place lid on the pot and remove from the heat.
5. The matamata will cook in the heat of the cooked riiwai.
6. Serve with chunky bread.

Previous page: Table at Tauranganui poukai (13 Sept 2015) Photo: Kiingitanga FB page

TIITII, WATERCRESS, MOTUMOTU AND POOROHE

SERVES 2

Separately cooking the main kai items is a necessity for this dish to prevent a sore puku and a 'mushy looking dish'…

Shops were far away when whaanau lived on the River during matamata season. If something was needed before the next shopping day they turned to the 'whitebait buyers' who would purchase the supplies and – if possible – deliver the next day. If tiitii (birds from the shearwater genera in the petrel family: Procellariidae[16]) was on the menu for the coming week then this order would be put in several days before required to give the buyer time to find and purchase. One particular buyer would try and get in several tins of tiitii for the season because he knew it would be on the shopping list.

Cooking the Tiitii

Ingredients

1 x Tiitii

1 x small bunch of watercress (or other seasonal choices include: spinach, puuhaa, or silver beet)

100g Poorohe (or substitute with matamata)

Note: due to the natural saltiness of tiitii, cooking of the bird is dependent on individual taste…so keep taste-testing until you find the level of saltiness you like.

16 We note here that the bird most commonly referred to as 'tiitii' is the sooty shearwater (*Ardenna grisea*). However, historically, this may have also referred to other shearwaters that were historically more common around the Waikato.

1. Fill a large-sized pot of water and bring to the boil.
2. Quarter the tiitii and place in the pot to cook.
3. Change water if too salty and or fatty (but save the water). Bring the pot back to the boil to continue cooking the tiitii.
4. Place saved water in another smaller pot and dilute it down with hot water to break down saltiness and fattiness to your preference. Bring this pot to the boil.
5. When the second pot is boiling, add the watercress/ greens. Cooking in this water from the Tiitii allows the taste to infuse the greens.

Making the Motumotu (AKA 'Dough boys')

This step is done while the other kai are cooking. The motumotu can then added as they are being freshly made.

Ingredients

At least 11/2 cups of self-rising flour (you can adjust this if you prefer more or less motumotu)

Salt to season

1 x cup warm water

---

6. Add flour and salt in a bowl and mix.
7. Make a well and start adding warm water.
8. Mix together with your hands until you get a dough.
9. Roll the dough into balls and have them ready.

Adding all the ingredients together

10. Add the motumotu to the pot with the tiitii.
11. Add the poorohe and leave to cook for a further 5-10mins.
12. Make sure the poorohe is cooked properly or you will get a sore puku. You will know they are cooked when they lost their transparency and shine and turn white.

Serving it up

13. When plating the dish, we recommend the following order:
    - watercress
    - the tiitii and motumotu
    - the poorohe
    - and finally, pour juice from the pot over the kai.
14. Serve with rewena bread or your preference of chunky bread for soaking up the juices

CRISPY POOROHE AND KUUMARA

SERVES 1

Fishy chips!!!

You can choose to either do kuumara as boiled or roasted. For this recipe we are doing boiled kuumara.

Ingredients

100g Poorohe

Flour – enough to coat the poorohe

Knob of butter

1 x medium sized kuumara

1. Cut up kuumara into thick slices.
2. Bring a small pot of water to the boil. Add kuumara to the pot and leave to cook while preparing the poorohe.
3. Coat poorohe in flour.
4. Melt butter in frying pan.
5. Fry poorohe in pan till crispy.
6. Drain the kumara and serve up with the poorohe.

Note: Make sure poorohe is well cooked (i.e. golden brown). Undercooked poorohe will give you a sore puku.

CHALLENGES
SUSTAINING THE KAUPAPA: CLIMATE CHANGE

- One of the expected changes on the horizon under climate change is the risk of increased temperatures in the River system.
- Our fish as adults can tolerate temporary increases above 21°C provided there are cooler places they can also escape to. But prolonged periods of temperature ranges above this will have an impact on the survival of their species; specifically, their spawning success.
- Fluctuating water levels and/or high temperatures can dry out spawning areas, exposing eggs to the conditions, and killing them before the larvae get a chance to hatch and make it to sea.
- There is also the added challenge of sea temperature increases, of which we still do not understand enough regarding what the impacts to whitebait and poorohe larvae might be.
- Another complication is the impact of sea-level rise and movement of saltwater upstream. Saltwater can change vegetation causing a change to freshwater habitat.
- Changes to freshwater habitat may cause freshwater species to retreat further upstream. This means that our people will also have to shift where they harvest if they are to continue harvesting their traditional kai.

"Whitebaiting, going to get harakeke, pick kiekie and all the rest of it, because it's within those activities that lie your tikanga. It's in there. If you lose the activity, you have no more use for the tikanga. So that would be my biggest concern is that we no longer participate in those activities, whatever they may be."[17]

17 R. Mahuta cited in SLH & Waikato-Tainui College for Research and Development (2014)

SUSTAINING OUR MATAMATA AND POOROHE AND ASSOCIATED PRACTICES
WHAT CAN WE DO?

It can feel so overwhelming when we consider the full gambit of challenges for our fish. But the easiest thing we can do is to compile the things we know within our own maatauranga, and then focus on the things that are in our control to change.

1. Gather your whaanau and hold a waananga to learn more about the fish. This is all the more important with the growing awareness of changes occurring within the rohe and our kai species due to climate change.

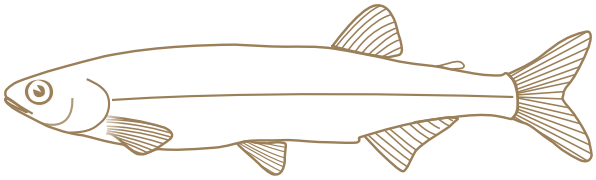
   Some helpful starting paatai could be:

   - Where were/are they harvested from?
   - What does a healthy environment look like for the fish according to your maatauranga?
   - Smells, sights, tastes, sounds?
   - How did/do you harvest them? Has it had to change, and if so, why?
   - Are there different names for the fish for either a part of their life cycle, and/or a behaviour they did?
   - What other species are found around matamata and poorohe (i.e., what is their whakapapa)?

2. Map your harvesting sites – both past and present. This helps build a visual of what has changed, and also to help you identify what changes might still happen. This is particularly helpful for identifying where wetland restoration could be prioritised.

3. Get out into the environment with your whaanau– get familiar with what 'normal' looks like for you all, and what doesn't. Take your rangatahi and tamariki, along with your kaumatua so everyone can learn from each other.

4. Continue with the practices that get your people out into the environment, as well as back to the paa. You are the ones that have the knowledge to know how to respond to change, and it is important that this knowledge is passed on to each new generation, so we don't lose our tikanga, our maatauranga, and our connection to our whenua and wai.



5. Consider landuse options for your lands that might better support our fish. Can you fence off and restore a wetland on your farm or restore riparian vegetation? Can some drains be blocked to allow land to reflood for fish habitat? Are there existing native forests or wetlands on your lands that could be buffered with more native plantings?

6. Hold fast to your reo and your unique dialects. Our language holds our stories, our tikanga, and a picture of what our past, and future could look like for our mokopuna and Taiao.

My action plan:

5.
WAAHI PAA & TE AWAMARAHI TUNA

Location of Waahi Paa. Orbica | Leaflet, © CC BY 4.0 LINZ

Location of Te Awamarahi. Orbica | Leaflet, © CC BY 4.0 LINZ

ABOUT THIS CHAPTER

Compared to other chapters in this book, the story we share here about tuna splits across the experiences of two of our Poukai marae: One, **Waahi Paa**, is renowned for the service of tuna puhi – a dish based on the migrants of male short-fin tuna. The other, **Te Awamarahi Marae**, puts a spotlight on the service of both long and shortfin tuna processed via the traditional technique of paawhara and then served either smoked or deep fried. These experiences are strongly interconnected across both species of tuna which share similarities in their ecology, and the application of our harvesting practices. For these reasons, we can't separate the narratives of the two marae out as we have done with other chapters.

We are therefore, approaching this chapter a little differently by creating three-parts within the story of tuna:

Part 1 — The whakapapa of the two tuna species.

Part 2 — The narrative about Waahi Paa, including the history of Raahui Pookeka where we dive into the story of tuna puhi and the practices as shared by whaanau at Waahi Paa.

Part 3 — And finally, we end the chapter with paawhara tuna as shared through the experiences of whaanau from Te Awamarahi.

PART ONE:
TUNA

The importance of tuna for many hapuu (sub-tribes) and iwi (tribes) cannot be underestimated. They were a significant food source that was widespread, abundant, easily caught and capable of being preserved.[1] For generations, the rich tuna fishery was central to the Waikato way of life. In some cases, the identity and mana of hapuu and iwi, and access to tuna are intertwined. Tuna were so highly regarded that inter-tribal wars were often fought over access to tuna fishing grounds.[2]

They are identified within Waikato maatauranga as descendants of the celestial realm, with some accounts referring to tuna directly as descendants of Te Ihorangi (Atua of rain). Other eel-like species (order: Anguilliformes) such as the conger, blind eel (hagfish, *Eptatretus cirrhatus*) and frostfish (*Lepidopus caudatus*) are also notable kin within this whakapapa.

Upon coming to the realm of Papatuuaanuku, these fish-kin chose to separate, taunting each other in the process about their preferred habitats that they chose to remain in. Tuna remained in freshwater systems, whilst its other marine kin (conger, hagfish and frostfish) preferred the realm of Hine-i-te-Moana.[3]

1 Watene-Rawiri (2010)
2 HDT (1992): p. 45
3 Ibid:45

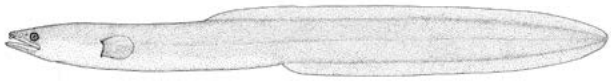
Tuna at Mt Bruce (2024). Photo: P. Pehi

Previous page: Tuna. Photo: Nick Bamford

THE SPECIES

There are two native species of tuna in Aotearoa: **Longfin** (*Anguilla dieffenbachii*) which are also endemic to Aotearoa, meaning they are only found here; and the **Shortfin** (*Anguilla australis*) which are also found throughout the wider South Pacific, and Australian waters. A third species the **Spotted longfin eel** (*Anguilla reinhardtii*) from Australia has been found in Aotearoa but has not yet established itself in large numbers.[4]

Longfin eel (*Anguilla dieffenbachii*), – top fin stretches further forward than the bottom fin.



Shortfin eel (*Anguilla australis*), – top fin only reaches a little further forward than the bottom fin.

Australian longfin eel (*Anguilla reinhardtii*), speckled or spotted in appearance.

Tuna Illustrations: R M McDowall (shared with permission)

"…the Waikato River with its tributaries, were the most celebrated in New Zealand for its pa-tuna and the quantities of eels found there, right away from the mouth up to the Huka Falls, near Lake Taupo, above which none are found. The Manga-tawhiri, the Maramarua, the Whangamarino, the Mangawara, the Waipa, the Awaroa, the Opuatia, and the two lakes Waikare and Whangape all in middle Waikato were famed for their eels…"[5]

The following table outlines some of the key differences between our two native tuna (short-, and longfin). It is a good idea to wrap our heads around these differences because it can help with identification and restoration planning to support both species.

Summary of differences between longfin and shortfin tuna.[6]

Shortfin eel	Longfin eel
Found in Aotearoa eastern Australia, and some Pacific Islands	Found only in Aotearoa
Range of colours, often light brown, olive	Usually dark brown/black
Grows up to 1.2 m long and can weigh up to 3.5 kg	Often more than 1 m long, can grow up to 2 m long, and can weigh up to 20 kg, sometimes more (although this is now very rare)
Small wrinkles on the skin when bent	Big, loose wrinkles on the skin when bent
Shortfins can be found in all types of lowland waters nearer the coast.	Lives at a wide range of altitudes, including very high elevations. Adult longfin eels like fast flowing water and stony riverbeds. They are very good climbers and can often be found well inland from the coast.
Both species can be found occupying the same places.	
Relatively pollution tolerant	Relatively intolerant of pollution
Lives for an average of 18–23 years and up to around 60 years in some locations	Lives for an average of 35–52 years and up to 100 years in some locations
Population Status	
Indications that population trends are increasing (Crow et al. 2016 cited ibid in Williams et al., 2017: p. 28)	Species in serious decline (PCE, 2013)

4 https://www.doc.govt.nz/nature/native-animals/freshwater-fish/eels/freshwater-eels-in-new-zealand/

5 Downes (1918)

6 Adapted from DOC (2016)

HABITAT

Tuna have a complex lifecycle and are diadromous, which means that they spend part of their life in the ocean and part in freshwater (see life cycle on page 86). In freshwater systems where they occupy wetland habitats, tuna are also known to occupy a range of micro-habitats within the riparian margins of the River and tributaries including tree roots and holes in the banks. Within the lower Waikato River area, many of these holes ('kaainga') were celebrated for supporting tuna and were even given names by local whaanau. One example of kaainga on the Opuatia creek included names like Ahipoupoutea, Matauera, Ngapore, and Koputa. Each of these kaainga consequently had their own whakapapa connected to the tuna held within, and knowledge relating to these spaces were passed onto a privileged minority to monitor and guard against abuse towards the fish.[7]

"Tuna were caught in the swamps. Swamps all around. The tuna in the swamp behind the Paa were not that big so we went to the drain just up the road. We caught big tuna in there".[8]

Tuna feed mostly at night. They have poor eyesight so they hunt by smell.[9] Small eels eat a range of invertebrates, including small insect larvae, snails, midges and crustaceans. As they grow and their mouths get bigger, they can also eat larger animals such as freshwater crayfish, fish including smaller tuna, small birds, and rats. [10]

An example of what a meal looks like for tuna. In this photo you can see the remnants of a kooura in the gut of the tuna. Photo: R. Mahuta (2024)

"When Murray Rd used to flood, we would spear tuna on the road and in the paddock."[11]

7 Maori Land Court: Opuatia Block, Mercer Minute Book, cited in HDT, 1992: p. 45
8 G. Katipa (April 2024), pers. comm.
9 https://www.doc.govt.nz/nature/native-animals/freshwater-fish/eels/
10 https://niwa.co.nz/te-k%C5%ABwaha/tuna-information-resource/biology-and-ecology/diet
11 B. Cooper (2024), pers. comm.

CHALLENGES
FLOODING

Modelling and scenarios of climate change suggest that rainfall events are going to become more frequent in some parts of Aotearoa. With higher rainfall, it is expected that flood events will also increase in frequency and severity. From the perspective of the human communities found along the edges of a River system like Waikato and its tributaries, this generates a lot of concern and stress because of the risk to human lives and infrastructure like roading, housing and supply of services.

For our tuna and other fish, a flood event is a natural occurrence, and one that they are generally well adapted to. Maatauranga and science is highlighting that flood events, particularly where floodwaters occupy flood plains and old wetland areas provide two key ecological functions for tuna:

- They act as a seasonal trigger for tuna heke (downstream migrations),
- The flooding of adjacent lands provides an additional temporary habitat for tuna, allowing them to forage across lands that they could not normally access in drier periods.

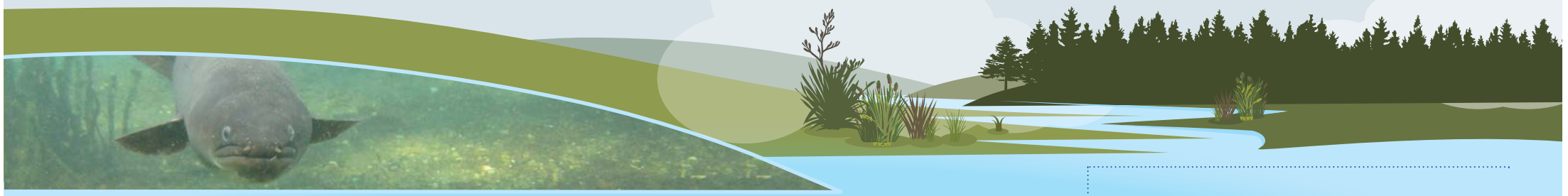
Whilst flood events are therefore important for the health and wellbeing of our fish, the conflict with human communities can make it a challenge to get the balance right between the needs of the two.

Paddocks with kahikatea swamp forest at Murray Rd, Te Puuaha o Waikato, after flooding in 2020. Photo: Swamp Frog

TUNA: what does science tell us about New Zealand eels?

NIWA
Taihoro Nukurangi

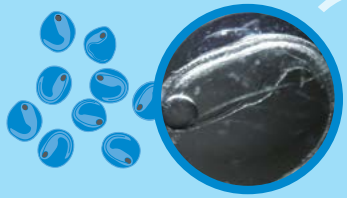
Tuna are the most widespread freshwater fish in Aotearoa. They also have an unusual life cycle which sees them travelling between the sea, estuaries and freshwaters.



MARINE LIFESTAGE

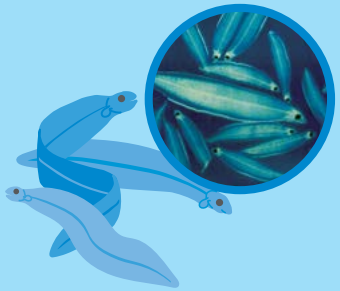
EGGS

The tuna starts its life as an egg out in the Pacific Ocean.



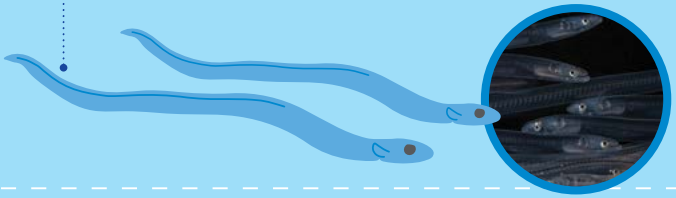
LARVAE

They hatch at sea into see-through (transparent), leaf-shaped larvae called *leptocephali* and spend between 9 to 12 months drifting on ocean currents which bring them back to Aotearoa.



GLASS EEL

When they reach the seabed near Aotearoa (continental shelf) they change shape and turn into colourless eels called glass eels, about 60–70 mm long. In early spring they move into estuaries, rivers and streams where they rest to get used to their new freshwater environment.



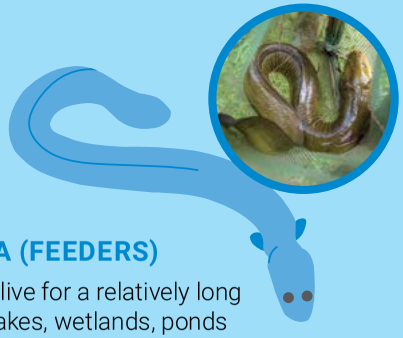
FRESHWATER LIFESTAGE

ELVERS (JUVENILE EEL)

After several weeks, they begin to turn brown (gain pigmentation) and begin their journey as an elver and head upstream. Keep an eye out in your local waterway during summer for elvers travelling up your stream.

ADULT TUNA (FEEDERS)

The adult tuna live for a relatively long time in rivers, lakes, wetlands, ponds and streams, eating and preparing themselves for when they are ready to begin their migration back out to sea.



TUNA HEKE (MIGRANT EEL)

After a long life in freshwater (on average between 11 and 52 years) tuna start to change and stop feeding. This is when they are known as tuna heke or "silver eels". During rainy nights in autumn (and sometimes spring) they begin their long migration (or journey) to the Pacific Ocean where they spawn and are thought to die.

TRADITIONAL FISHERY

Acquired from generations of observation and experience, maatauranga about our tuna species includes many things:

- Understanding the relationship between environmental parameters (rainfall) and the life cycle, migration patterns, and their preferred habitats.
- Sustainable harvesting techniques.
- Preparation, cooking and preservation methods.
- Fisheries conservation practices, and;
- Traditional names, and relationships with astronomy such as maramataka (Maaori lunar calendar).[12]

Practices describing tuna harvest highlight the ecological and engineering expertise of our tuupuna.[13] Their acute observational skills of tuna behaviour and seasonal patterns were translated into successful methods of harvest such as via the hiinaki and paa tuna (tuna weirs).[14] Embedded within these skill sets was/is a deep understanding of the natural materials utilised, and the landscapes where they implemented these practices.[15]

In particular, the knowledge about plant fibres and timbers:

- the strongest and most hard-wearing fibres like those found in key varieties of harakeke from which nets and hiinaki were created; and bush ferns like mangimangi/mangemange (*Lygodium articulatum*).
- Hard native timbers (particularly when put in water) such as maanuka/kahikatoa *(Leptospermum* spp.) and other native hardwoods used for paa tuna, and pia (spears).
- Building torches using materials such as the bark of kahikatea (*Dacrycarpus dacrydioides*), and/or rimu (*Dacrydium cupressinum*) and kauri gum.
- Our tuupuna also had a good understanding about the flex and durability of binding materials from plants like kareao (supplejack, *Ripogonum scandens*), and the roots of kiekie (*Freycinetia banksii*), and akatororaro (native passionfruit, *Passiflora tetrandra*).[16]

Kaitiaki is a pou carved by Johnson Taoho (Ngaati Whaawhaakia), the carving symbolises how tuna populations sustained the people of Raahui Pookeka. Photo: E. Watene

12 Watene (2021)
13 NIWA (2010)
14 van Schravendijk-Goodman (2023)
15 ibid: p. 1
16 HDT. (1992)

"You get a flax and you scrape the bottom, like a fibre and you thread the worm on, tuna got a lot of teeth aye, when they bite that flax they won't let go and they get hooked onto the fibre…" [17]

Hīnaki (eel trap), 1850-1878, Waikato, maker unknown. Te Papa (ME003728)

Native fern, mangimangi (also called mangemange). Photo: J. Rolfe (2006) Licence: CC BY

"Yes, it's very important [continuing traditions and cultural practices of harvesting] … it is part of our whakapapa and who we are. It connects us to our tuupuna and defines us in terms of who we are. No one else does what we do."[18]

CHALLENGE
RETAINING ACCESS TO AND PROMOTION OF OUR CULTURAL HERITAGE:

Transfer of knowledge is not just in the form of oral transmission, but also inclusive of the 'doing'. As part of the 'doing' there are the tangible elements of our cultural heritage in examples of hiinaki, paa tuna, pia (spears), and other tools/methods adopted by our tuupuna. Due to the impacts of colonisation, Raupatu and land alienation, many of these examples of our harvest methods have been relegated to memory in the form of photographic images held in national organisations like NZ Archives, the National Library or regional libraries.

Other physical examples such as old hiinaki and pia are held under the management and control of various museums across the country or internationally. Legislation relevant to this context are those administered by the Ministry of Culture & Heritage and its affiliates – regional and national museums, NZ Archives and others.

There are also risks to the retention of maatauranga as species decline and tastes change. Practices become eroded and forgotten as whaanau no longer set the hiinaki to catch tuna. Whaanau moving away from their marae and traditional papakaainga to seek work has depleted the pool of whaanau fishers that uphold the practices associated with harvesting, preparing, preserving, and cooking tuna. This decline in participation leads to a loss of maatauranga associated with techniques, methods and materials utilised, and also intergenerational connections to hauanga kai, to the fish itself and within whaanau.

17 T. Manukau Snr (May 2022), pers. comm.
18 T. Manukau Jnr (15 May 2022), pers comm.

PART TWO:

WAAHI PAA & TUNA PUHI

Waahi Paa is located on the west bank of the Waikato Awa adjacent to the Huntly Power Station in Raahui Pookeka (Huntly). The principal hapuu are Ngaati Mahuta, Ngaati Kuiaarangi, Ngaati Pou and Ngaati Whawhaakia.

The Paa complex includes the Wharenui – Taane I te Pupuke – and Wharekai 'Miiria te Kakara', a Koohanga Reo and Papakaainga.

POUKAI

The Poukai began at Waahi on the 8th of October 1967 and commemorates the Koroneihana of Kiingi Koroki.

WAAHI & TUNA

Tuna figure prominently in the oral history of the hapuu. Waahi was well-known as an eeling settlement contributing to the annual seasonal harvesting and redistribution of tuna across the rohe.[19] Tuna was once abundant, found in many waterways, easily caught and highly nutritious. Tuna provided much needed protein and was a source of essential fatty acids crucial for everyday life.[20]

A significant event involving tuna contributed to the naming of the area and several prominent landscape features. Koorero tuku iho shares about a time when the stocks of tuna became depleted. Counsel was sought from the Rangatira and tohunga who recognised that that time was needed to rebuild the stocks of tuna so a raahui was placed over fishing grounds. To announce the raahui, a pookeka (pou) was staked into the ground. From this **event/action** the region was named Raahui Pookeka.

At the same time the people began to 'waahi' or 'waawaahi', to 'share' or 'divide' their catches and from that activity the lake on the west bank was given the name of Waahi.

Waahi Paa and Papakainga. Photo: DOC (2024)

POUKAI is held annually on 8 October

Waahi became a well-known tuna settlement, evolving into Waahi Paa and the papakaainga. The whaanau still gather tuna from their river, stream, and lakes and Waahi Paa continues to serve tuna especially tuna puhi (male shortfin migrants) during important marae hui such as Poukai.

"Tuna is the 'Kai Rangatira' of Waahi Paa. It is our trademark dish that represents the connection of generations. It symbolizes the traditional practices of "rauwiri" and "paawhara", "hiinaki" and "ahikaa". Tuna is a tangible indication of the health of our waterways. The "mauri" of Lake Waahi and Taatahi Stream can be measured by the flow and abundance of tuna."[21]

19 Waahi Paa (2023), p. 6
20 Waahi Paa (2021)

21 ibid

TUNA PUHI HARVEST

Fishing for tuna puhi traditionally takes place at lake outlets because they are easier to block off than the larger streams.[22] The best time for fishing is late summer to autumn after big rains. V-shaped eel weirs called rauwiri are constructed across the width of the streams. During the migration hiinaki are then attached to the rauwiri to catch the migrant eels.[23] Historically, whaanau lived on the shores of the fishing lakes during the season which gave them the time to process their catches onsite. Today, with the benefits of vehicular transport, whaanau are able to commute back and forth during the season.

While the tools and some of the traditions have changed, Waahi Paa fisher whaanau continue to utilise their traditional fishing grounds for tuna puhi harvest.

Timi Manukau Snr pulling in the hiinaki Photo: E. Watene

CHALLENGES
HEALTH AND WELLBEING OF THE LAKES

Waahi lake covers an area of 522ha and is one of 15 riverine lakes found within the Waipaa and Waikato River catchments. Up to the 1970s the lake was a healthy habitat for many native flora and fauna, including tuna. However, due to impacts from surrounding land use, and changes to wetland coverage caused by drainage and infilling, the quality of water and habitat in and around the lake had severely declined by 1981. The impacts on tuna were almost immediate, with notable declines in the health of tuna harvested by whaanau occurring alongside severe declines in lake macrophytes (plants) and other freshwater species.

Since the mid-2010s, a multi-organisational team (including hau kaainga) with dedicated investments of time, labour, expertise and resources has been put into restoring the lake, and its main tributary to the Waikato River, Waahi stream. It is intended that learnings from this and related projects can be extended to other lakes in the catchments. This might include how to best manage surrounding land practices to reduce on-going environmental and cultural impacts to these important systems. For whaanau in Raahui Pookeka, the tuna is the keystone cultural species at the heart of this mahi.

"Eels were cleaned and dried on site. The head of the eel was placed between thin maanuka sticks – they called them 'kaui'. The tuna was tied into place and then another was added until the kaui was full...'

'...They could hold up to 20 tuna per kaui. The tuna were then hung to dry and later stored in the paataka. When cooking over hot embers the tuna could be cooked in batches still attached to the kaui."[24]

22 Watene-Rawiri, E. (2010)
23 T. Manukau Snr (15 May 2022), pers. comm.
24 A. Manukau (9 May 2022), pers. comm.

"…as kids my Uncle used to take us down to the lake here. 10 years went by, everything started getting polluted and what's happened over the years I've never had a chance to take my kids down there. It was gone, they don't know how to fish. Simple fact is we can't take them down there to fish..."[25]

"It's just that if you have a look at the lake, the condition of the lakes reflects the condition of the eels and the condition of the eels reflects the condition of the lake"[26]

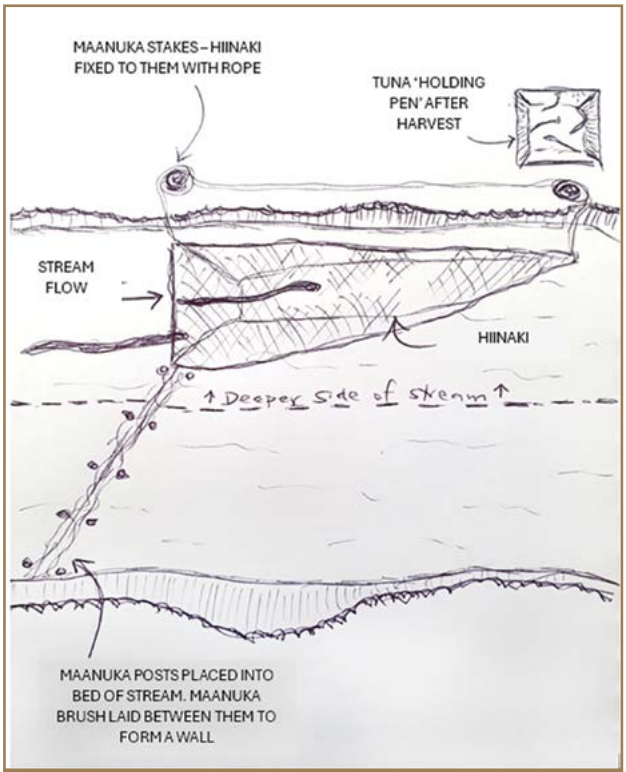
Other things were harvested by Waahi whaanau as well. Koorero shared from kaumaatua talked about the harvesting of swans and ducks which used to be abundant around the lower Waikato River lakes and in the tributaries. Seeking out and harvesting swan and duck eggs was usually a task of younger whaanau members.[27] Once upon a time, the main ducks seen and harvested by our tuupuna would've been our native paarera (also called the Pacific Grey Duck, *Anas superciliosa*). However, after the late 1860s, the European mallard duck (*Anas platyrhynchos*) was introduced to Aotearoa and began to hybridise with, and/or outcompete paarera. The European mallard is now the most common duck found across much of the motu.

"…they used to go duck shooting…and during the Koroneihana (May) quite a few of them they used to go out – they called it a swan drive, pow, pow, pow and they take them all up to Tuurangawaewae there. Pluck them and cook them, swan stew! But the people used to like it. It's what they put into it; you can put thyme in it…anything."[28]

Native paarera (native Grey Duck), black swan and mallard ducks. Photos: Neil Fitzgerald

"[Waahi] was clean 50 years ago and around the shoreline there was ducks, swans. They used to have a 'swan shoot' and then they used to take all the swans up to the Koroneihana. At that time that lake was clean and the vegetation aaahhhh, it was that thick aye, right around. You know that Waahi stream you couldn't find it because of all the rushes around it, you gotta cut your way through the rushes to get to the stream… that's the filter of the lake."[29]

25 Speaker '19' at Waahi Marae, NIWA (2010), p. 168
26 T. Manukau Snr (May 2022), pers. comm.
27 J. Galpin, (2020), pers. comm.
28 A. Manukau (May 2022), pers. comm.
29 T. Manuka Snr (May 2022), pers. comm.



A sketch of rauwiri as described by T. Manukau (Snr) to R Mahuta (2024)

"The rauwiri were cleverly constructed with stakes driven into the bed of the creek and Manuka bushes woven into a solid underwater wall. The rauwiri was a "V shape" eel trap with the hiinaki located at the Apex. It was impossible for eels, carp and sometimes catfish to escape. When the hiinaki were emptied the clothes lines throughout the Paa were filled with hundreds of eels drying in the hot sun"[30]

"I remember we used to stay down there, as kids, stay down at the lake, down by the outlet at the lake... just make hammocks…string em up between the big trees and slept there. So we used to stay there for the weekend while we catch the eels"[31]

PREPARATION/STORAGE

Techniques for holding tuna during harvest, before final preparation for drying and/or cooking were also a feature that is continued into modern times. This practice usually involves digging out, or utilising small, ponded areas to hold the fish prior to preparation (Tim Snr & Tim Jnr Manukau, *pers. comms*.)

"…they dig a hole beside the rauwiri…drag it to the hole to empty it all the time because if you leave that hiinaki in the stream it will bust, or you can't even pull it out; too full."[32]

Tuna puhi can also be covered in para – the slimy-like substance on their skin which is believed to provide them with protection from either predators (because it makes them slippery) and/or parasites (because it suffocates the parasites before they reach the skin). The para is usually cleaned off in preparation for cooking.

"It takes a while to get the para and that off – we used to get some salt and tip the salt in and they all start wriggling around one another, and the para starts to come off. And all you have to do is get the rest of the para off…and thread them – used to be flax…"[33]

Pulling in the hiinaki. Photo: E. Watene

30 Warupapa & Ete Morgan, cited in Waahi Paa Komiti (2015)
31 T. Manukau Jnr (May 2022), pers. comm.
32 A. Manukau (29th May 2022)
33 Ibid

COOKING AND SERVICE

Traditionally tuna puhi were cooked over ngaarahu (embers). A fire is lit and left to burn down to the embers before corrugated iron is laid over the fire, supported by bricks on each side. A wire grate is then placed on top of the iron and tuna puhi are placed on the wire rack to cook. When the skin of the tuna starts to 'blister' they are ready, but it is important not to let the blisters burst so that the fatty juices are retained. For some tribal events, the fire remains a common cooking method. More commonly though, tuna are now cooked in a deep fryer.

"I didn't mind that job, sit by the fire. All I remember growing up was smelling like eels and smoke."[34]

Timi Manukau Snr preparing the tuna puhi for cooking. Photo: T. Manukau Jnr

CHALLENGES
CHANGING TASTE BUDS

Tuna service at Waahi paa is something that many of our kaumaatua look forward to. For many of them, this is a kai they were brought up on, and reawakens many different memories for them as they partake in hakaari. For current generations though, there have been shifts in taste buds as indicated by the leftover tuna at the end of each Poukai.

Younger whaanau members may not have the same appreciation for the kai, and as noted by one harvester, our taste buds have become 'colonised' due to the processed foods that whaanau are normally exposed to in everyday eating practices. As a result, a number of our rangatahi, tamariki and even some adults are not eating kai like tuna puhi because it doesn't 'taste as nice' and lacks sweetness and/or the seasoning like salt that we have become accustomed to.

Waahi Paa whaanau have embraced the challenge though and have set themselves the task of exploring new ways to cook and serve tuna puhi to the current generations. Recent experiments with different spice mixes and adaptations to frying techniques have proven successful. The intention is to continue working with ringa wera to trial other ideas to ensure tuna puhi stay on the menu for future generations.

34 T. Manukau Jnr (15 May 2022), pers. comm.

TUNA PUHI

Deep fried

Ingredients

Tuna puhi

Flour

Hinu (cooking oil) for frying

Additional spices or herbs if you wish

Decent working space to prep your kai

1. Remove any last remnants of para from the tuna and hang them to dry while you are prepping your other ingredients
2. Turn on the deep fryer and heat the cooking oil
3. Put flour into a bowl; you need enough to cover the tuna for frying. If you wish to add some extra tasty spices, then add a couple teaspoons to the flour and mix it together evenly. Put the bowl to the side.
4. Cut the tuna puhi evenly into pieces, and then cover in the flour-spice mix
5. Carefully place the tuna puhi into the fryer and remove when golden brown

Noah and James Manukau help hang up the tuna puhi to dry.
Photo: Manukau Whaanau (2024)

Timi Manukau Snr adding flour to the tuna puhi before frying.
Photo: Manukau Whaanau (2024)

PART TWO:

TE AWAMAARAHI MARAE & PAAWHARA TUNA

Te Awamaarahi marae is located on the Tuakau-Bridge – Port Waikato Road. The hapuu of the marae are Ngaati Amaru, Ngaati Pou and Ngaati Kahu.[35]

Te Oohaakii aa Te Puea is the name of the wharenui and Aamaru is the wharekai. The Marae connects to the maunga Onepoto and to te awa o Waikato.[36]

KAITIAKI

The kaitiaki of the hapuu of Te Awamaarahi comes in the form of a tuna and is called Te Raroa.[37]

POUKAI

In 1941 a group of elders from the marae successfully petitioned Kiingi Korokii to grant Te Awamaarahi Marae a Poukai. The Poukai is held on the 24th of November a date which commemorates the Koroneihana of Kiingi Te Rata.[38]

Te Awamarahi whaanau have many rich narratives about their relationship with their freshwater fisheries. When the Poukai date approached, tuna were harvested from the small streams, the river and the swamps around the marae.

"That was our staple food at that time, paawhara tuna, (dried eels), matamata (whitebait), poorohe (common smelt), those are our natural resources from our tuupuna awa (ancestral river), Waikato".[39]

Te Ohaakii aa Te Puea

Artwork at Te Awaamarahi depicting the story of the marae. Photo: Kiingitanga FB page

POUKAI is held annually on 24 November.

35 Potini, H., cited in https://waikatotainui.com/resources/ngaa-poukai/
36 https://waikatotainui.com/marae/te-awamaarahi/
37 Potini, H., cited in https://waikatotainui.com/resources/ngaa-poukai/
38 ibid
39 ibid

HARVEST

Harvest usually occurred in the River or the creeks and drains that ran through lands near to and surrounding the marae. Those living near the fishing sites were tasked with setting the hiinaki.

Sometimes hiinaki were set in the streams and the fishers would go to the river end of the creek and start spearing and splashing in the weeds to drive the tuna towards the hiinaki. But mostly hiinaki were set and left overnight in the streams, drains or the river.

Other kai that was once abundant included:

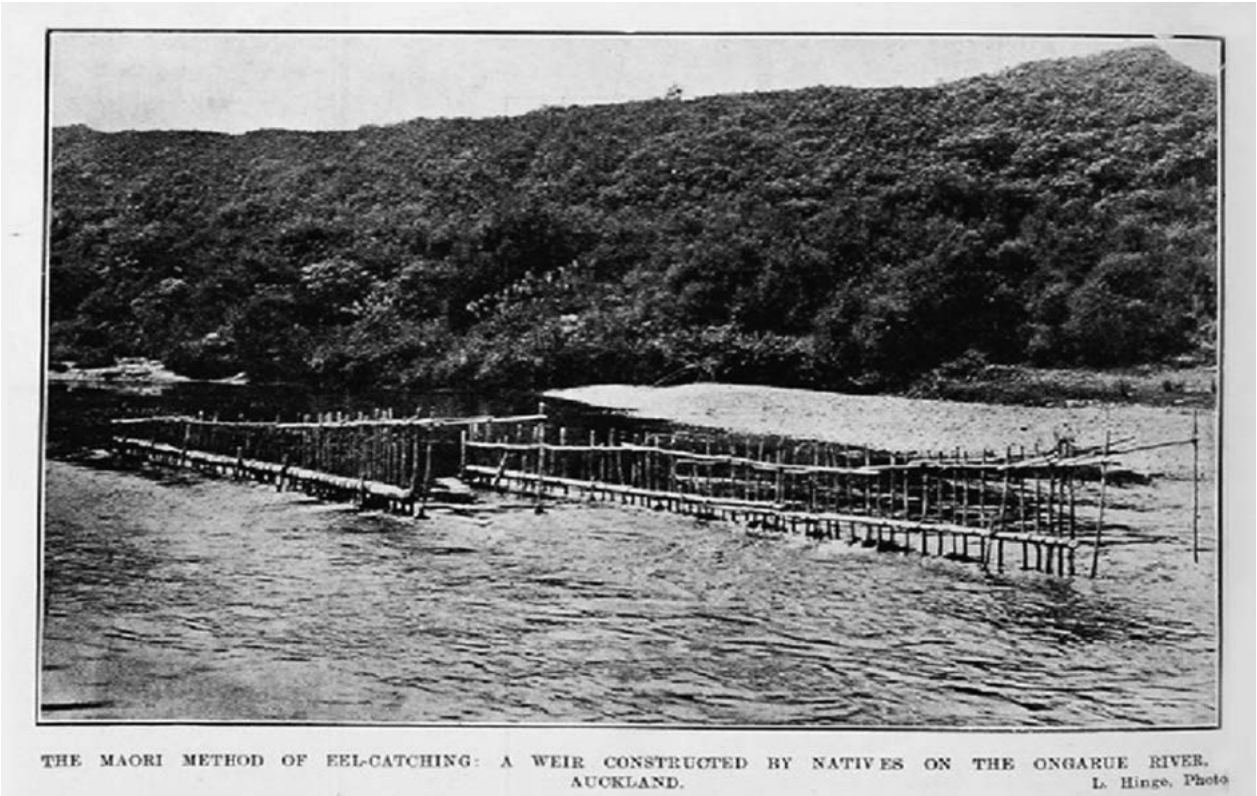
- Mohimohi (a silvery fish similar to anchovy or sprats, see Ch. 4 for more info on this). These were threaded onto harakeke and hung up to dry;
- Matamata and poorohe; and,
- Kaaeo (also called kaakahi, freshwater mussels, *Echyridella menziesii*). According to some whaanau though, kaaeo were tasteless, and so kaumaatua would cook them up as a curry.
- Notably, by the mid-1900s, invasive exotic fish such as brown bull-headed catfish (*Ameiurus nebulosus*) and carp (Cyprinidae family) were becoming more common in the River catchment and so were also harvested by our very pragmatic and resourceful tuupuna. Both of these types of fish were usually served as a curry dish.

Brown Bullhead Catfish. Photo: Noel Burkhead

Kaaeo/ Kaakahi. Photo: Stuart Mackay, NIWA

"We would go out to get the tuna for our Poukai 1 or 2 weeks before. Had to give them time to be hung up and dried." [40]

40 G. Katipa (April 2024), pers. comm.



THE MAORI METHOD OF EEL-CATCHING: A WEIR CONSTRUCTED BY NATIVES ON THE ONGARUE RIVER, AUCKLAND. L. Hinge, Photo

Photo: Auckland Libraries Heritage Collections AWNS-19080227-16-3

PREPARATION

After harvest, tuna were taken back to the Paa to be cleaned. The para was removed, and then they were gutted and hung to dry. For tuna paawhara, the head, bone and tail are removed, then they were salted and hung up to dry. In the past there were a lot of pine trees behind the old Ngaati Aamaru whare where all the tuna were hung to dry before Poukai. Today, tuna are hung on lines.

"…when we were young, we were taught to hang the tuna up on the line".[41]

"Well you cut it, open it up like how you do a fish, one side got a bone the other side got no bone and then you salt it, dry it up…then you just dust it in flour and fry it…When Wahine does it she just cooks it in the combi in the oven, no hinu or anything…she said 'no good the hinu, it's got its own hinu'…."[42]

Taroi Rawiri (Jnr) prepares paawhara tuna (2024). Photo: E Watene

41 Williams, T., cited in https://waikatotainui.com/resources/ngaa-poukai/

42 A. Manukau (May 2022), pers. comm.

COOKING AND SERVICE

"There was a lot of tuna back then – not that hard to catch, easy to cook, can cook it a lot of different ways."[43]

Traditionally, two methods used by the whaanau at Te Awamarahi to cook tuna using fire: (1) smoking; and (2) cooking in the ashes. For the smoking method, whaanau attached tuna to a Y-shaped stick, and staked it into the ground around the fire. The fire was managed so that it was mainly producing smoke and not hot flames.

But mostly tuna were cooked on the ngaarahu (embers). Again, whaanau would use a Y-shaped stick (manuka was a good raakau to use) but would make sure that the wood was green so it didn't burn quickly. They would attach the paawhara tuna to the stick and stake it into the middle of the ashes. When the stick started to burn they would change the stick and return it to the ashes. This was done until it was cooked.

"Pop would just take his tuna and roll it in the ashes; when it was to his liking he took it off and ate it – sometimes it wasn't totally cooked. But they liked it – it was to their taste."[44]

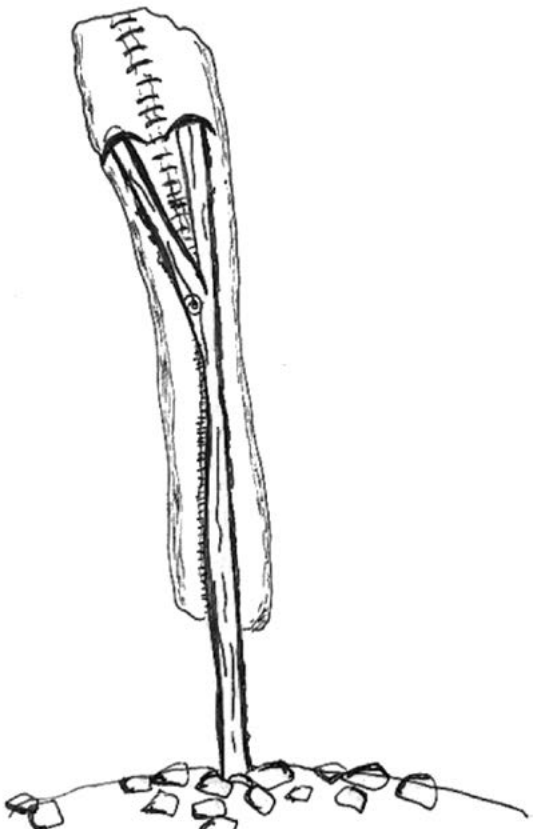
Fisheries Scientist and Waikato tribal member, Erina Watene (Papa-o-Rotu marae) checks a hiinaki. Photo: E. Watene

Paawhara tuna hanging on the fence. Photo: Manukau Whaanau

There are also references to old cooking methods utilising native plants like mauku (cabbage tree) which also assisted in the removal of para from the kai. Nowadays, tuna are either fried or deep fried, cooked in the oven or smoked.

Curry was a favourite ingredient used by the old people in a range of dishes including tuna, kaaeo, catfish and mullet.

In contemporary times tuna are fried, deep fried, cooked in the oven or smoked.

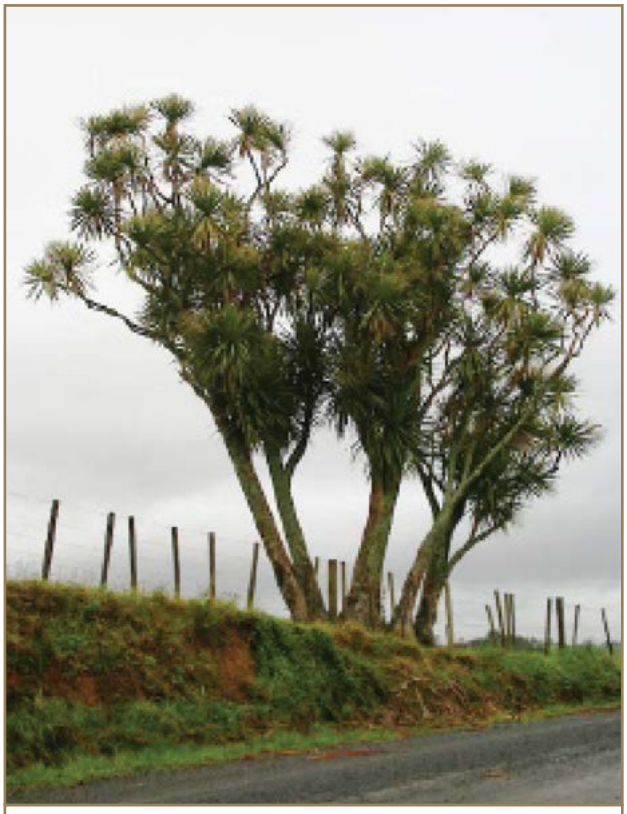


43 G. Katipa (April 2024), pers. comm.
44 H. Turner (May 2024), pers. comm.

CHALLENGES ONCE WERE WETLANDS

Historically, the lower Waikato River system held large expanses of diverse wetland complexes extending from Raahui Pookeka and past the River delta in Te Puuaha. There, freshwater wetlands and swamp forests then graduated into what would have been stunning coastal and dune wetland systems. Landuse changes beginning after colonisation in the late 1890s saw to many of the wetlands being drained, destroyed and/or infilled to accommodate human occupation and activities. And sadly, with that, were impacts to the freshwater species that utilised those wetlands as habitat.

While our tuna have shown some resilience to these changes over time, there are still very strong indications that the loss of wetlands and swamp forests has had an influence on the sustainability of their populations. The most acute impacts are being felt by longfin tuna in particular, which are classified as being 'at risk and declining'. Supporting their restoration therefore requires a look at the much bigger picture, including examining how wetlands can be enhanced, and where we may need to consider returning wetlands back to those areas where they were originally cleared.



Mauku (Cabbage Tree, Cordyline australis).
Photo: Wayne Bennett, Licence: CC BY-NC

"Tuna was a big part of our kai. We didn't eat much meat. Everybody caught and ate tuna – a lot of our cooking was similar, but some were different. You go to a hui or a Poukai elsewhere and you eat tuna, and you think 'oh that was nice or that was different, I wonder how they cooked their tuna or what they cooked it with'. Then you ask around."[45]

45 H. Turner (May 2024), pers. comm.

Below: Lower River in flood. Photo: Swamp Frog (2020)

SMOKED PAAWHARA TUNA

Hot smoking tuna

There are a range of different smokers and smoking techniques that can be applied and all of them are right!

Method One:

Smoker & Gas bottle

Maanuka shavings/Chips

Ingredients

Tuna Paawhara

Salt

Preparation of Tuna

1. Rub salt into tuna.
2. Cut tuna into desired sizes or leave whole.
3. Lay out on smoker tray.

Smoker

1. Put manuka shavings in the bottom of smoker.
2. Return tray with tuna to the smoker.
3. Cover.
4. Leave tuna to smoke for 2-3 hours (or to desired taste).

Alternatively you can add or use other ingredients to rub on the tuna e.g. brown sugar, herbs or spices and use wood from different trees for smoking e.g. fruit trees. These variations can add some interesting flavours to the tuna.

Ingredients

Tuna

Brown Sugar

Salt

Optional: Herbs, Spices

Method Two:

Prepared paawhara tuna

A mix of wood from your favourite fruit trees

Equal amounts of rock salt and brown sugar

Night before smoking

1. Prepare the tuna.
2. Mix salt and brown sugar together in a bowl.
3. Rub salt and sugar mix over both sides of the tuna. Rock salt will draw moisture out of tuna flesh and both ingredients will infuse the flesh of the tuna overnight.

Day of smoking

1. Split wood into pieces slightly bigger than kindling size to feed into smoker and aim to get the fire around 100°C.
2. Burn the wood and let it bank down to a point where the smoking can be controlled (around 70°C).
3. Depending on your smoker designer, you can either lay the tuna on racks or hang the fish secure to a bar at the top of the smoker.
4. When required, continue manually feeding wood to keep feeding the smoke. It is important that the fire temperature is kept around at 70°C. Any hotter and the smoking process will change to 'cooking process'.

(L to R) Fruit wood prepped to go into the barrel smoker; smoked paawhara tuna. Photos: Swamp Frog (2024)

FRIED PAAWHARA TUNA

Tasty tuna

Ingredients

Prepared paawhara tuna

Flour

Butter and hinu (oil)

Seasoning of choice – salt, pepper, and/or other spice mixes of your choice

A decently sized frying pan

1. Put flour into a bowl; you need enough to cover the tuna for frying. If adding seasoning, then add a couple teaspoons of this to the flour and mix it together evenly. Put the bowl to the side.
2. Take the paawhara tuna and cut into strips horizontally approx. 10 – 15cm wide. Coat each tuna cut in the flour mix.
3. Heat the butter in the frying pan. When heated add a little hinu to stop the butter burning, and then carefully add the floured tuna to the pan.
4. Fry the tuna on both sides until golden brown.
5. Drain the hinu off the tuna and serve.

Rangi Mahuta and Dan Goodman prepping the paawhara tuna for frying. Photos: Swamp Frog (2024)

SUSTAINING OUR TUNA AND ASSOCIATED PRACTICES
WHAT CAN WE DO?

1. Gather your whaanau and hold a waananga to learn more about your tuna. This is all the more important with the growing awareness of changes occurring within the rohe and our kai species due to climate change:

   Some helpful starting paatai could be:

   - Where were/are they harvested from?
   - What does a healthy environment look like for tuna according to your maatauranga? Smells, sights, tastes, sounds?
   - How did/do you harvest them? Has it had to change, and if so, why?
   - Are there different names for tuna for either a part of their life cycle, and/or a behaviour they did?
   - What other species are found around tuna (i.e., what is their whakapapa)?

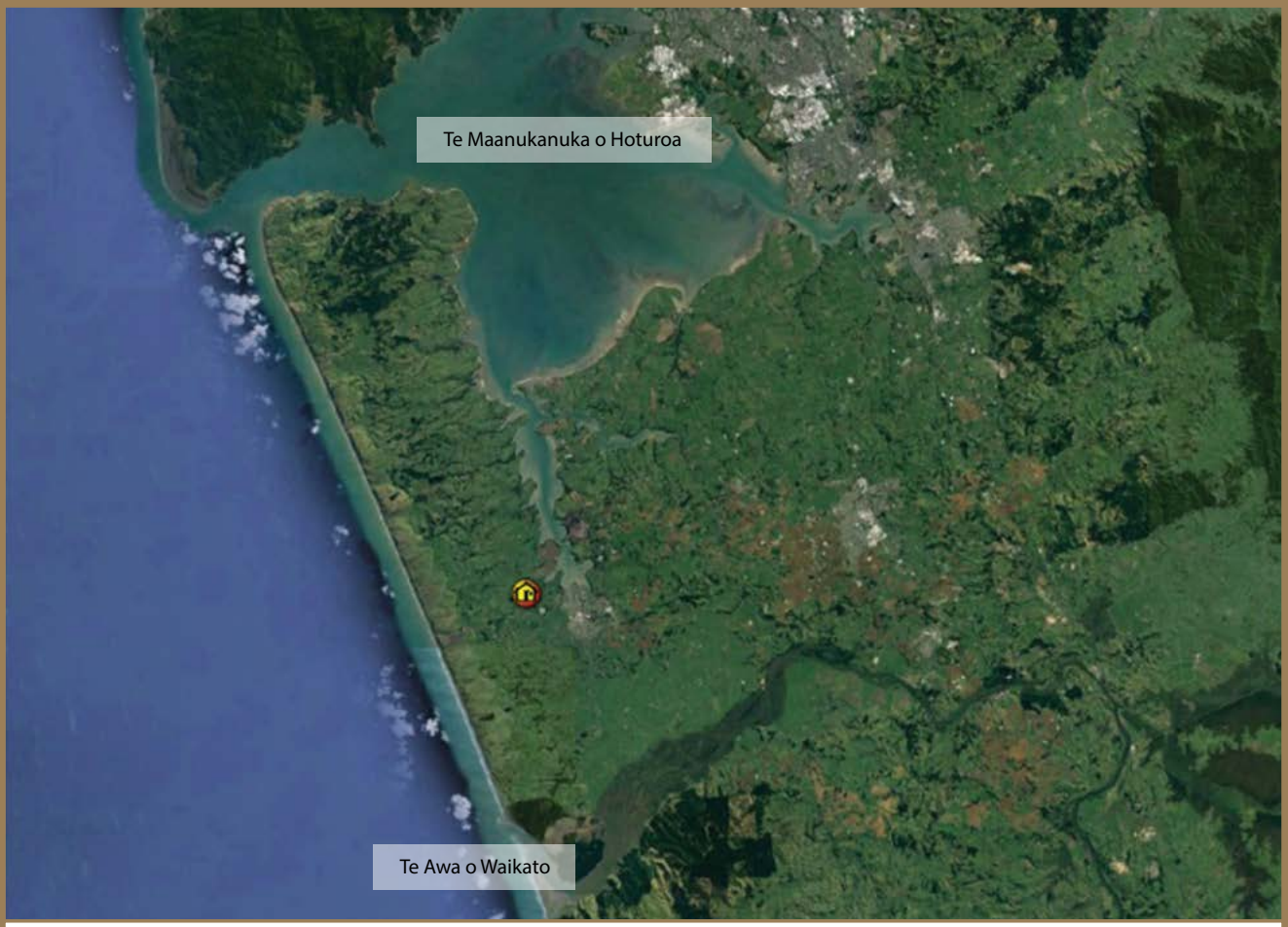
2. Map your harvesting sites – both past and present. This helps build a visual of what has changed, and also to help you identify what changes might still happen.
3. Explore whaanau maatauranga about 'tuna kaainga' (tuna holes) and where possible, map where they used to be/still are, and also record and capture the narratives shared about them. Consider if the kaainga can be protected, and/or if mahi can be done to create other kaainga for tuna to use in areas that are not at risk of impacts from surrounding land uses.
4. Get out into the environment with your whaanau – get familiar with what 'normal' looks like for you all, and what doesn't. Take your rangatahi and tamariki, along with your kaumatua so everyone can learn from each other.
5. Consider how you might be able to support buffering and/or restoration of wetlands either in your rohe (in partnership with others in the community) and/or on whaanau lands. While tuna might be the main driver to do this, remember that wetlands are also important habitat for other freshwater species, so consider how your restoration plans could also support those other species.
6. Continue with the practices that get your people out into the environment, as well as back to the paa. You are the ones that have the knowledge to know how to respond to change, and it is important that this knowledge is passed on to each new generation so we don't lose our tikanga, our maatauranga, and our connection to our whenua and wai.
7. Make time to reconnect with the physical exhibitions of our traditional tuna harvesting tools held at museums (you can also jump online to see many of these taonga tuupuna). We may not find the old methods appllicable for fishing today, but there are still many things we can learn from them about taiao and wai that are as relevant today as they were historically.
8. Hold fast to your reo and your unique dialects. Our language holds our stories, our tikanga, and a picture of what our past, and future could look like for our mokopuna and Taiao.

My action plan:

Next page: Looking up into Northern raataa canopy, Haakarimata Ranges, Waikato (2017). Photo: D. Goodman (Swamp Frog)
Following page: The band plays at the lowering of the flag at Rereteewhioi Poukai (2016). Photo: Swamp Frog


TAINUI

6. RERETEEWHIOI MANGOO



Location of Rereteewhioi. Orbica | Leaflet, © CC BY 4.0 LINZ

RERETEEWHIOI MARAE

The marae is located on Taurangatira Road (off Awhitu Road) and is home to the hapuu of Ngaati Paretauaa.[1]

The wharenui is named Arohanui, the wharekai is Te Iti o Waikato and the orator's piruru (shelter) is called Wihere.

"My childhood memories of seeing the shark drying from the trees were a reminder that Christmas was close and kai for Poukai was important.'[2]

POUKAI

The Poukai at Rereteewhioi was established in 1944 by Te Puea Herangi[3] and is usually held on the second Saturday of December.

Originally the Poukai was held on Boxing Day. Te Ata I rangi Kaahu Koroki, grandmother of Kiingi Tuuheitia changed the date to allow families to have quality time together over the festive Christmas break.[4]

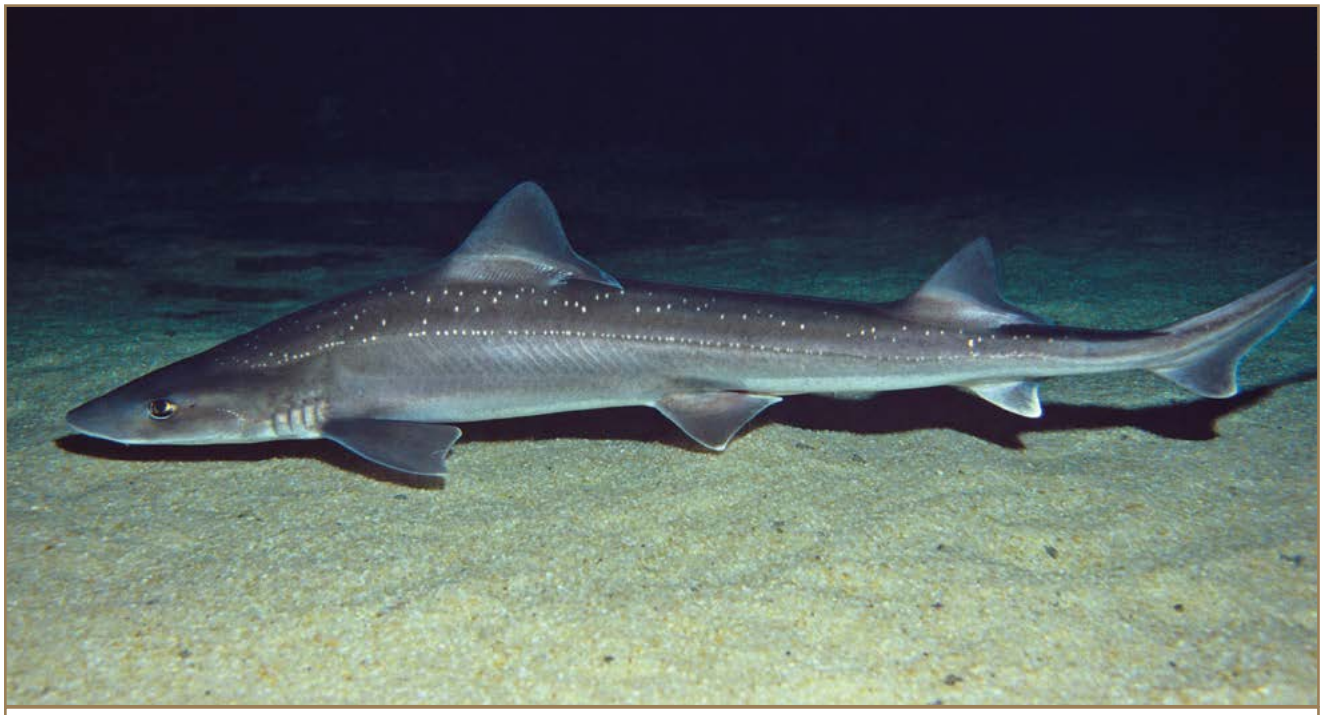
Rereteewhioi is bounded by the tides of Te Maanukanuka o Hoturoa, Te Puuaha o Waikato and Te Tai o Rehua (Tasman Sea).[5] The bounty of the harbour, river and sea is harvested by the whaanau for home and hui including Poukai. One of the delicacies harvested is the shark.

In this chapter we explore our mangoo (native sharks) as they are experienced and shared by our whaanau at Rereteewhioi.

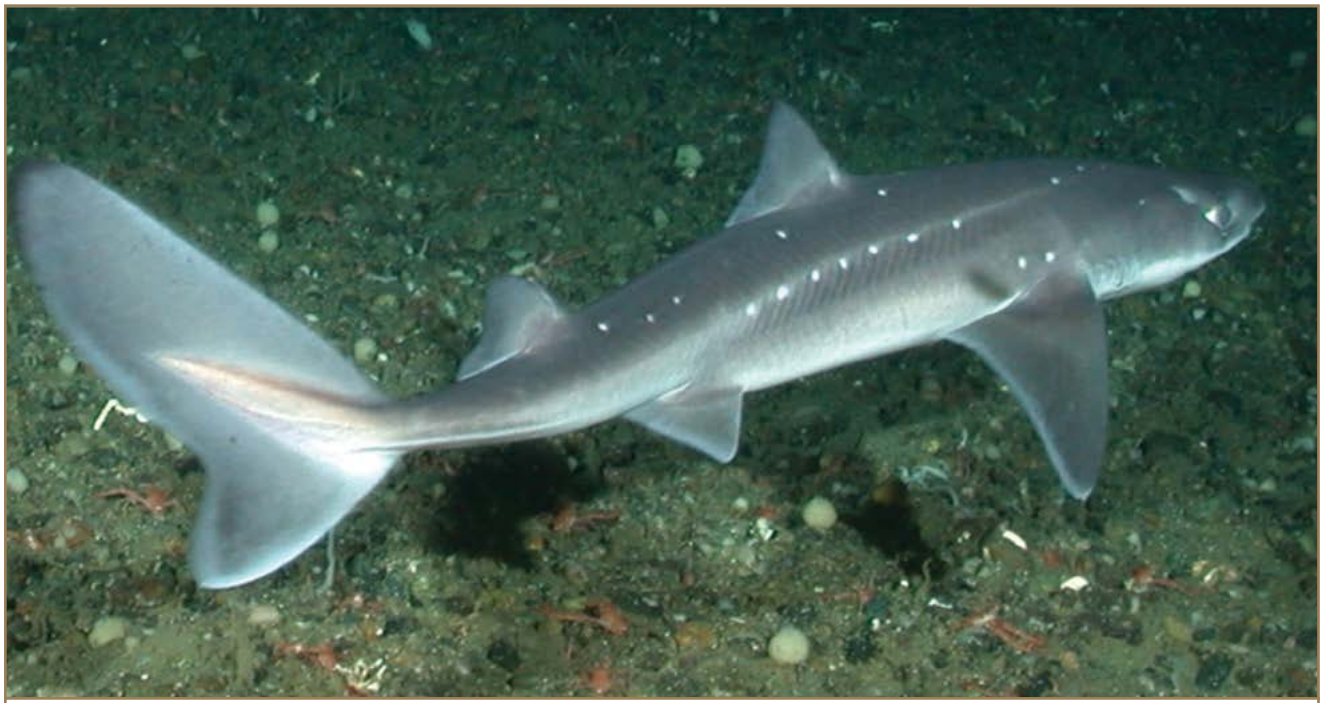
POUKAI is held the second Saturday in December.

Rereteewhioi marae.

1 Waikato-Tainui (https://waikatotainui.com/marae/rereteewhioi/)
2 M. Tapara (2024). pers. comm.
3 R.T. Minhinnick., cited in (https://waikatotainui.com/resources/ngaa-poukai/)
4 Waikato-Tainui (2008): p. 37
5 Ibid



Adult rig shark (*Mustelus lenticulatus*). Photo: Malcolm Francis (NIWA)



Spiny dogfish. Photo: National Oceanic and Atmospheric Administration

MANGOO (SHARK)

The sharks (referred to generally by many of our people as 'mangoo') are important animals within our maatauranga playing a role as both kaitiaki (usually in the form of taniwha), but also as important sources of kai and rongoaa. Two famous kaitiaki within Waikato maatauranga are the mischievous Ihe and Hiku-roa who formed part of the guidance support for the Tainui waka as it made its way to Aotearoa. Ihe is believed by some to have been in the form of a dolphin (possibly the short-beaked common dolphin, *Dephinus delphis delphis*). Hiku-roa is described as a shark; more specifically, a thresher shark (*Alopias* spp.).[6]

Maatauranga about the creation of the stars and celestial bodies also speak to the swimming pattern of Te Maangooroa (a great shark) as the source of the Milky Way.[7] Hammerhead (family: Sphyrnidae) and other large species of sharks are also regular features within our traditional designs as symbols of strength and determination.The fight to survive when caught, exhibited in particular, by the hammerhead, is memorialised in the whakataukii:

Kaua e mate wheke mate ururoa

Don't die like an octopus, die like a hammerhead shark.

Mangoo are a legacy of almost perfect planetary evolution within marine predators, with their ancestors first appearing c. 450 million years ago (mya). But it was the Carboniferous age (approx. 359 mya) when diversification increased and many shapes, and sizes across a range of shark lineages were formed. This is why the Carboniferous period is known as the 'golden age of sharks'.

Bigeye thresher shark (*Alopias superciliosus*)
Photo: NZ Ministry for Primary Industries

Common dolphin (*Delphinus delphis delphis*). Photo: DOC

Hammerhead shark surrounded by fish.

6 WTTKI, 2013
7 Rangi Mataamua (n.d)

Despite huge species extinctions of over 95% in the Permian period (approx. 252 mya), ancestors of mangoo persisted. They remained an important ocean predator and the body plan we recognise in our sharks now, began to take shape in the early Jurassic period (195 mya) starting with:

- the six-gilled sharks (Hexanchiformes),
- and then evolving later in that period to fish with flexible, protruding jaws allowing them to eat prey bigger than themselves and to swim faster.

In total, sharks survived five mass extinctions including the asteroid strike that killed the dinosaurs:

'I think it is safe to say that [sharks survived]… partly because sharks are able to exploit different parts of the water column – from deep, dark oceans to shallow seas, and even river systems. They eat a wide variety of food, such as plankton, fish, crabs, seals and whales. This diversity means that sharks as a group are more likely to survive if things in the oceans change.'[8]

Table 1: Summary of the many names of our key shark species[9]

Common name	Latin name (Genus, species)	Ingoaa Maaori	Alternative names – English
Rig	*Mustelus lenticulatus*	pioke, mangoo, kapetaa	lemonfish*, spotted dogfish, smooth hound, flake
Spiny dogfish	*Squalus acanthias*	koinga, karaerae, mako-huarau, mangoo-hapu, mangoo-pekepeke pioke	spiny dogfish, spurdog, mud shark, snow fillet**
School shark	*Galeorhinus galeus*	kapetaa, makohuarau, tupere	snapper shark, grey boy, tope

* **Lemonfish** is the market name for this species – i.e. at the Fish n' Chip shop.
** **Snow fillet**s are the market name for this species

MANGOO TODAY

Of the 113 species of shark found across Aotearoa, at least 8 species spend time in the waters of Te Maanukanuka o Hoturoa (the Maanuka). The most common is the rig (*Mustelus leniculatus*).[10] Due to their high seasonal abundance the rig, along with its cousins, the spotted spiny dogfish (also known as spiny dogfish, *Squalus acanthias*) and school shark (*Galeorhinus galeus*) are frequently caught together as part of the traditional catch.

Of these three, rig are the only endemic species to New Zealand, which means they are only found in the waters of Aotearoa; extending from the Kermadec Islands in the north, to the Chatham Islands in the south east, and the subantarctic Snares below Rakiura (Stewart Island).[11] Dogfish and school sharks are native to Aotearoa – i.e., they have naturally occurring populations, but they have a larger distribution through international waters.[12]

Aotearoa and outlying islands. Image: GNS

8 National History Museum (n.d)
9 Hutchings (2006)
10 Auckland Regional Council (2018)
11 Francis, 1988
12 Fordham et al., 2016; Walker, et al., 2006

CHALLENGES
RESEARCH GAPS

In this chapter we provide insights into the ecology of the three main species of mangoo caught by our people as part of their traditional catch. We also present the first life cycle poster generated for the rig shark (NIWA, 2024). This resource was inspired by the maatauranga of our people in the compilation of this chapter, and the realisation that very little is understood about mangoo; although there are marine scientists in Aotearoa dedicated to trying to close these gaps.

We don't completely understand why knowledge gaps exist for some mangoo species compared to other marine species like our ihe and tohoraa (whales). We could try to guess about the answers:

- For starters mangoo are not as endearing to the public. They can be seen as intimidating as well as terrifying. The larger species are regularly highlighted in the news for their 'attacks' on humans and/or sensationalised as 'terror species' in movies.
- They can also be difficult to track, particularly when they move into deeper waters.
- There is an assumption by some, that we have 'plenty of sharks'; however, there is little data to confidently back this claim.
- For others, mangoo are a pest, particularly in the fishery industries. This is because they are often targeting the same fish species we are. Some mangoo species catch their prey by working as a whaanau to surround and then explosively infiltrate schools of fish. As a result, they often get caught as 'by-catch' having chased their prey straight into the nets.

What we do understand, particularly after doing this mahi, is that the health and wellbeing of our cultural practices are intimately connected to the fate of mangoo.

Cultural harvest includes monitoring as we assess our catches to feed our people. And so, disconnecting from the practice and relying more on, for example, purchases from other fisher networks, removes our ability to read the key signs that could tell us when their populations might be in real trouble.

"If you lose the activity, you have no more use for the tikanga. So that would be my biggest concern is that we no longer participate in those activities, whatever they may be.

It's not just about the fishing. Even if you're just going to get kaimoana, if we don't bother and just go to the shop and buy it, well we lose that tikanga too. So, when you lose your tikanga, you lose a part of who you are, your culture. You lose a big chunk of yourself.

If you can find yourself an activity – whether it be waka ama, rowing whatever – take it up, go out on the water, experience it, live it, and then I think when you start to live it and experience it, you start to understand..." [13]

Image below: "Maori feast at Remuera, 1844". This image depicts a feast hosted by Waikato Chiefs as captured by the artist. The information for the image notes that over 4000 Maaori attended this, with kai served including over 9000 sharks, 11000 bags of riiwai and 100 pigs. Artist: Merrett, Joseph Jenner (11 May 1844). Image source: Auckland Libraries Heritage Collections 1700-01.

13 R. Mahuta cited in SLH & WTCRD (2014)

RIG LIFE CYCLE

Rig (*Mustelus lenticulatus*), also known by the names mangoo, pioke and kapeta, spotted dogfish, and sometimes sold as 'lemonfish', are a native species of shark found in coastal waters around Aotearoa-New Zealand.

JUVENILE

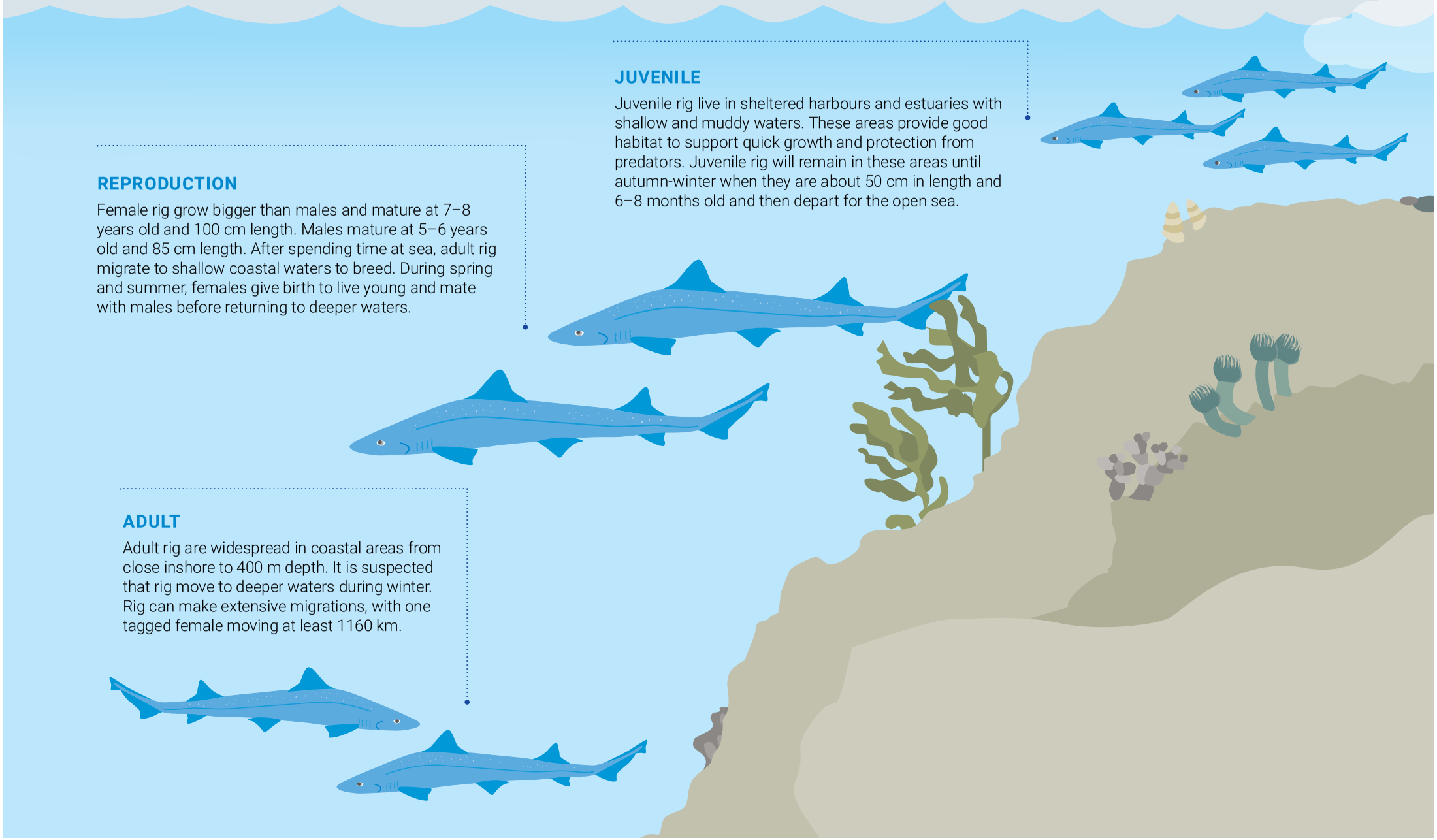
Juvenile rig live in sheltered harbours and estuaries with shallow and muddy waters. These areas provide good habitat to support quick growth and protection from predators. Juvenile rig will remain in these areas until autumn-winter when they are about 50 cm in length and 6–8 months old and then depart for the open sea.

REPRODUCTION

Female rig grow bigger than males and mature at 7–8 years old and 100 cm length. Males mature at 5–6 years old and 85 cm length. After spending time at sea, adult rig migrate to shallow coastal waters to breed. During spring and summer, females give birth to live young and mate with males before returning to deeper waters.

ADULT

Adult rig are widespread in coastal areas from close inshore to 400 m depth. It is suspected that rig move to deeper waters during winter. Rig can make extensive migrations, with one tagged female moving at least 1160 km.



A CLOSER LOOK AT OUR MANGOO

1: RIG SHARK

Rig shark (source: www.fishspecies.nz)

Length at maturity	Key features	Breeding	Spawning
85cm to 1.3m	• Bronze, grey colour. • Small spots on topsides and along lateral line. • Two dorsal fins and 1 anal fin. • Teeth designed for crushing and grinding. • Life span up to 15 years.	• Breeding ages: Males after 5 years; females after 7 years. • Rig are viviparous, meaning they give birth to live young, average of 11 pups. • Known koohanga: Raglan, Kaipara and the Maanuka.	• Birth occurs October to December. • Pups stay in the kohanga (harbour or estuary) until at least April or June.
	Diet	**Predators**	**Main habitat**
	• Benthic feeders (feed off sea floor). • Opportunistic feeders. • Crabs, worms, snails and shellfish.	• Few predators at inshore locations. • Predation is from larger fish species due to their small size and possibly also seals.	• Spring to Summer: Congregate in coastal areas. • Winter: move to deeper waters to 400m.

2: SPINY DOGFISH

Spotted spiny dogfish (Source: Talley's seafood)

Length at maturity	Key features	Breeding	Spawning
58cm (males) to 73cm (females). **Max sizes up to 1.1m**	• Brown, grey colour. • Large white spots on topsides. • Slim body shape, narrow pointed snouts. • Two dorsal fins with spines. • Nomadic, slow swimmers.	• Long gestational period (2 years) and low fertility. • Dog fish are viviparous, meaning they give birth to live young.	• Found all over the world, breeding is influenced by oceanic water temperatures. • Mainly occurs offshore in Autumn (locations not well understood).
	Diet	**Predators**	**Main habitat**
	• Benthic feeders (feed off sea floor). • Opportunistic feeders. • Worms, sea anemones, shellfish, crustaceans (e.g. kooura), cephalopods (octopus, squid), small fish.	• Larger fish, sharks, orca and leopard seals (*Hydrurga leptonyx*).	• Occupy areas on the continental shelf to depths of 700m.

School shark (Source: NIWA)

3: SCHOOL SHARK

Length at maturity	Key features	Breeding	Spawning
Size at maturity around 1.3m but can get up to 1.75m	• Grey topside, white underside • Long snout and crescent-shaped mouth. • Often mistaken for bronze whalers (also known as 'copper sharks', *Carcharhinus brachyurus*). • Can close its eyes by drawing up its lower eye lid.	• Breeding ages: unknown, noted as 'late age'.[14] • School sharks are viviparous, meaning they give birth to live young. • Known koohanga: Hauraki – historically Whangaparaaoa and Kawau bays were carefully managed by tangata whenua from Tiritiri Matangi.[15]	• Late Spring to early summer: females migrate to inshore waters to pup. • Can deliver anywhere between 6 – 52 pups, depending on size of mother. • Females likely return to same spawning grounds every year.
	Diet	**Predators**	**Main habitat**
	• Food preferences influenced by changes in habitat. • Very little is understood about their diets, but probably fish and cephalopods (octopus, squid).	• Orca (*Orcinus orca*)	• Widespread throughout temperate waters. • Although their geographic distribution includes a large range of countries, data from 1985 suggests there are individuals that move only between Aotearoa and Australia[16]. • Found throughout the continental shelf down to 600m.

14 Lucifora, et al. (2004)
15 DOC (2022)
16 Hurst, et al. (1999)

CHALLENGES
CAN OUR SHARKS SURVIVE ANOTHER MASS EXTINCTION?

Though sharks have made it through five significant extinction events in the history of the Earth, questions remain whether they have the same resilience and adaptive abilities to cope with impacts caused by humans.

To ensure resilience, populations need to be large and genetically diverse enough to cope with the inevitable effects of major (and cumulative) events. Currently, we know very little about our shark populations – including where they might migrate to after spawning – and yet humans continue to make decisions that impact their health and wellbeing.

Some of the more important pressures on mangoo that we are aware of include:

- **Changes to temperature and salinity, particularly for our endemic rig shark:** Sharks regulate the impacts of these two factors via their behaviours, including movement to spaces where the impact (i.e., high water temperatures) is felt less. What we don't understand is where these retreats are, and also, what the temperature "tipping points" are for rig and other sharks like the spiny dogfish.
- **Degradation of spawning habitat in our estuaries and harbours:** Although turbidity does not have a direct impact on juvenile rig, it does impact their kai sources; particularly **benthic** species (i.e., species that live on the beds of harbours, estuaries and the ocean). Dogfish are potentially even more susceptible to habitat loss and degradation because of their longer gestational periods and lower fertility. This makes them more vulnerable to population decline or collapse.
- **Overfishing (including by-catch):** For all the shark species in this chapter, since colonisation commercial fishing has had the greatest impact on populations. For example, female school shark populations crashed in the Hauraki gulf after demand increased for shark oil in the late 1800s to early 1900s.[17] All of our sharks are regularly caught as by-catch by recreational fishers and trawlers.

Our sharks will not have a fighting chance in the future if we remain ignorant about their status and continue to underinvest in much needed research and monitoring. Our maatauranga alongside targeted ecological studies and population modelling, needs to be brought together to assess and ensure their sustainability.

A predator of sharks – the leopard seal (*Hydrurga leptonyx*) in the waves at Houghton bay, Taputeranga Marine Reserve. Photo: Brent Tandy, DOC (CC BY 4.0)

Another important shark predator, Orca (*Orcinus orca*). Photo: DOC

17 DOC (2022)

THE TRADITIONAL FISHERY

The shark fishery Te Maanukanuka o Hoturoa (the Maanuka) is a component of the wider fishery ecosystem that for well over five centuries has sustained the hapuu situated around its shores, and the inland hapuu who came to the harbour annually to fish the bounty of its waters.

The traditional fishery of the Maanuka was implemented with strict controls. Raahui was imposed seasonally with fishing and harvesting rotating seasonally from bay to bay around the harbour allowing for structured rest periods for the fishery.[18]

"These were seasonal joyous occasions. They would bring with them the bounty of their rohe: fowl and tuna from the rivers and streams."[19]

The practices adopted by our tuupuna are still relatively the same today. Mangoo were harvested using nets, and then processed and hung to dry at the fishing camps.

While the flesh of the shark was a valuable food resource, the liver, oils and teeth were also very important. The shark liver oil could be mixed with red ochre to make the paint used on carving. When blended with scented shrubs such as Raukawa (*Raukaua edgerleyi*), a perfumed cosmetic for the body and hair was created. Shark oil is also noted as an important component of taa moko – mixing it with charcoal created the black that was added to taa moko and kauae that graced the faces of our tuupuna.

Image above: Maaori fishing camp with shark drying in the foreground, Rangitoto. **Image:** Heaphy, Charles 1820-1881 :Rangitoto Id. Extinct volcano. No 2 [1850s?]. Ref: C-025-002. Alexander Turnbull Library, Wellington, New Zealand. /records/23116010

Image above: Dogfish (kapetaa) drying on poles Tokohiwai, Whangaarei Harbour (1914). **Photo:** Auckland Libraries Heritage Collections AWNS-19141224-35-02, photographer D. W. Miller

18 HDT (1996)
19 ibid

Juvenile leaves of Raukawa (Stokes Valley, Lower Hutt). Photo: Jeremy R. Rolfe, 25/12/2004 (CC BY 4.0)

Examples of traditional jewellery using the teeth of mangoo. Photos: (left) Mako (shark tooth ear pendant), New Zealand, maker unknown. Te Papa (OL000058/.S) (right) Mako (shark tooth necklace unit), 19th century, New Zealand, maker unknown. Te Papa (ME015852)

HARVEST TODAY

In October, three months before the Poukai, whaanau will go fishing for shark. Fishing occurs at different places depending on the purpose. For example, when harvesting for Poukai they would fish at certain places in the Maanuka. Otherwise, 'if we just going for ourselves, we might choose to go to other places on the harbour'.[20]

"There are whaanau who still go fishing for shark. They go back to the old places where our old people fished."[21]

Fishing is normally a whole whaanau event. As for traditional methods, the primary means of catching is via nets which are approx. 100 metres in length with lead weighted bottoms, anchored at each end. Harvesters wait until the tide is high and then will set the net across the channel. Shark and other species of fish are then caught in the net on the outgoing tide.

"The mudflats could be deep so sometimes we had to make our way out to the net to collect our fish sliding on our puku, so we didn't sink. Then do the same thing on the way back dragging the bins of fish."[22]

When asked what species of shark they were catching the whaanau member replied 'kai, that's what we caught; kai'.[23] The key message here amongst all the whaanau we talked to is that their catch – whatever the species – is based primarily on need.

"Caught about 40 last year. Might catch more if we went out a lot but we just catch what we need."[24]

"As a small boy, I remember when the big tree next to the kaauta was ladened with freshly hung mangoo, the smell attracted large swarms of flies. I broke a tall piece of bamboo and proceeded to run around the tree chasing the flies of the mangoo. One of my aunties came running out and told me to stop as they were adding the 'salt and pepper."[25]

Hakono Fishing Camp, Awhitu Peninsula. Photo: M. Clarke

Perhaps the most famous of the dishes served by our people of the Maanuka and further down along the west coast, is kooki; a preparation of the shark liver similar in texture to a pâté (a French cuisine resembling a meaty paste). Preparation relies on experience, and skills passed down over many generations and uses all parts of the shark; nothing is wasted.

To prepare kooki the shark liver is first separated from the stomach lining. The lining is cleaned and used as a bladder to hold the liver when cleaned. To clean the liver the green bile sac is removed. If not removed, the kooki will taste bitter when cooked. Once the liver is cleaned it is stuffed into the lining until it is full then it is tied off and hung up. Alternatively, if you do not want to use the lining or hang the liver you can place in bags and freeze.[26]

A common memory of our people about the kooki and its preparation, is the smell, putting it in similar company with kaanga piirau/kaanga wai:

"I never stayed close to those who prepared and cooked the mangoo, as the smell sent me running in the opposite direction, which is why I never acquired the taste."[27]

"Ohhh the smell aye, you know that smell of shark"[28]

"Yeah, that smell; woah! Still tastes really yum though!"[29]

20 R. Nepia (2024), pers. comm.
21 T. Kirkwood Edwards (January 2024), pers. comm.
22 Ibid
23 R. Nepia (June 2024), pers. comm.
24 R. Te Ao (2024), pers. comm.
25 M. Tapara (June 2024), pers. comm.

26 R. Te Ao (June 2024), pers. comm.
27 M. Tapara (June 2024), pers. comm.
28 T. Kirkwood Edwards (January 2024)
29 C. Goodman (May 2024), pers. comm. [NOTE: C. Goodman is a rangatahi (noo Te Atihaunui-aa-Paapaarangi me Ngaati Apa) who had never tried kooki before. She also got to see it being prepared; another first for her.]

KOOKI

Kooki can be served as an entrée for the whole whaanau, with options to serve it with slices of toasted rewena or water crackers.

Kooki can have a very rich and 'gamey' flavour depending on how it is prepared prior to cooking. If not hung up first, it can produce flavours that are too strong for some taste buds. We present here two options for cooking kooki – steamed and baked.

"Some people will cook it fresh, without hanging it up but I don't really like it like that – too rich for me."[30]

Ingredients for both methods:

2 – 3 x Kooki

Cabbage leaves

A Steamer pot

Steamed Kooki

1. Line the steamer with cabbage leaves.
2. Add the kooki.
3. Cover with more cabbage leaves or wrap kooki in cabbage leaves to make individual parcels.
4. Cover with lid and steam for at least 30 minutes NOTE: Cooking times will be to personal taste.
5. Serve spread on slices of rewena or other bread.

30 R. Te Ao (June 2024) pers.comm

Baked Kooki

1. Preheat oven to 200.
2. Place kooki in an oven dish.
3. Bake for 30 to 40 minutes.
4. Keep checking the kooki and reduce heat if required.
5. The kooki will be very rich due to the oil. If not to your liking either strain off the oil or selectively scoop out the kooki.
6. Serve spread on slices of rewena, paratihi or other bread.

Method Two

Same as above except:

1. Wrap kooki in cabbage leaves to make evenly sized individual parcels.
2. Place into oven dish and pour water into the dish to cover bottom.
3. Bake for 30 to 40 minutes.

(**Left**) Shark being prepared for steaming; (**right**) Steamed shark ready to serve. Photos: C. Goodman, 2024 (Swamp Frog)

STEAMED SHARK

Comfort coastal food…

Ingredients:

At least 2 small sharks (after preparation and hanging – see 'Preparation for the Haakari')

A Steamer pot

1. Cut shark into pieces slightly bigger than the size of your hand.
2. Place in steamer.
3. Cover with lid and leave to steam for 30 to 40 minutes (longer if preferred).
4. Serve.

Steamed shark. Photo: Swamp frog

DRY SHARK JERKY

No cooking needed…

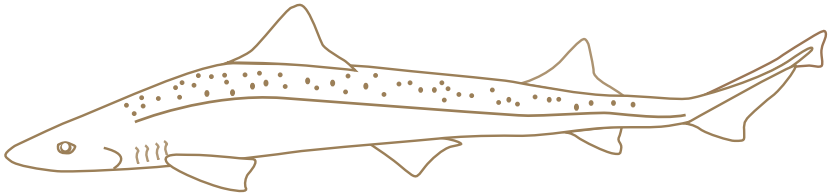
Ingredients:

1 x dried shark

Like any other types of jerky, the concept is that strips can be sliced from the dried shark as and when required.

Drying shark. Photo: M. Clarke

Next page: Kai prepared by Rangitiaho Mahuta. Photo by C. Goodman 2024 (Swamp Frog)



SUSTAINING OUR MANGOO AND ASSOCIATED PRACTICES

WHAT CAN WE DO?

1. Gather your whaanau and hold a waananga to learn more about your mangoo. This is all the more important with the growing awareness of changes occurring within the rohe and our kai species due to climate change:
   - What do you understand about the species that are harvested? Do they have names? Are there features on them that whaanau can recognise?
   - Where were/are they harvested from?
   - What does a healthy environment look like for mangoo according to your maatauranga? Smells, sights, tastes, sounds?
   - How did/do you harvest them? Have the methods had to change, and if so, why?
   - What other species are found around mangoo (i.e., what is their whakapapa)?
2. Map your harvesting sites – both past and present. This helps build a visual of what has changed, and also to help you identify what changes might still happen.
3. Explore whaanau maatauranga about the behaviours of mangoo – including the big species – particularly when they come into the estuaries and harbours to pup, and/or when observed in the open ocean. Do any members of the whaanau have memories or stories about where our mangoo may go when they leave the estuaries? Do you have puu raakau, waiata or toi that capture your whaanau or hapuu relationships with mangoo?
4. Get out into the estuarine environments with your whaanau – get familiar with what 'normal' looks like for you all, and what doesn't. Take your rangatahi and tamariki, along with your kaumatua so everyone can learn from each other.
5. Consider how you might be able to support buffering and/or restoration of the estuaries either in your rohe (in partnership with others in the community) and/or adjacent to whaanau lands. While mangoo might be the main driver to do this, remember that estuaries are also important habitat for other species – e.g. paatiki, kahawai, shellfish, kawau, iinanga – so consider how your restoration plans could also support those other species.
6. Consider also how you might be able to support actions to uphold the health and wellbeing of the moana; a key habitat for our mangoo when they leave the estuaries. Plastic waste – including microplastics – is probably one of the most impactful human activities on the moana. Though it is easy to lay blame at the feet of those producing it, we should also reflect on our own actions in terms of purchasing items in plastic containers and/or how we dispose of plastics.
7. Continue with the practices that get your people out into the harbours and estuaries, as well as back to the paa. You are the ones that have the knowledge to know how to respond to change, and it is important that this knowledge is passed on to each new generation, so we don't lose our tikanga, our maatauranga, and our connection to our whenua and wai.
8. Make time to reconnect with the physical exhibitions of taaonga associated with mangoo that are held at museums (you can also jump online to see many of these). The way our tuupuna interacted and valued our mangoo can still teach us a lot about taiao and waitai.
9. Hold fast to your reo and your unique dialects. Our language holds our stories, our tikanga, and a picture of what our past, and future could look like for our mokopuna and Taiao.

My action plan:

Moanatuatua Peatland remnant, Waipaa District (Oct 2008). Photo: Swamp Frog

7.
KIINAKI


4.7

KIINAKI

Though there are key dishes that our Poukai marae are renown for in their haakari, it is also the dishes 'on the side' that create a stir amongst dining whaanau. These dishes are an expression of both the resilience and adaptation of our people to new tastes and experiences, upheld through the traditional methods of kai harvest, preparation and service. There is a long list of these dishes available at Poukai.

For this chapter, we have decided to put a spotlight on a small group of them. We do not share recipes for these kai here, mainly because there are so many variations that can be made to the dishes. These changes can be dictated by availability of both the kai itself and also other ingredients. A change in our (taste buds) has also required many of our marae chefs to become more inventive in how they prepare and serve traditional kai so that it remains popular amongst each new generation.

In addition to changes to our food preferences, one of the other great challenges for our Poukai marae is the decline in locally accessible wild sourced kai for these and other dishes. For many of our Poukai marae, they are having to reach further afield – including to the South Island – to source and purchase the kai species that were once abundant in their rohe. There are a range of reasons as to why local decline is becoming a real issue, and we attempt to highlight some of those within the relevant sections following.

The key message we are trying to share, is that we should not take these kai for granted; they are not guaranteed for our next generations if we do not try to find ways to better support and enhance their populations. This is despite the apparent abundance of them as viewed on our supermarket shelves or in roadside food carts. The reality is that the physical access to these valued species is being eroded due to the range of pressures that our kai sources face. But also, because the number of our people skilled in wild food harvest is also starting to decline.

Cockles. Photo: NIWA

To undertake restoration in ways that make sense to us as Maaori, this requires that part of the journey must include exploring the ways we interact with them (past and present), including our practices associated with their harvest and preparation for service. It is within those practices that we hold important information about the species themselves; information that could be used to help them. But we will not be able to do that effectively if we stop going into our hauanga kai/ mahinga kai to uphold those experiences and associated maatauranga. The hope we have, is that by getting back out into the environment, it also builds our capability and capacity to respond appropriately to change as we see it affecting our valued species. Experience is a legacy of our tuupuna, and one we also have within our power to pass onto our tamariki, rangatahi and mokopuna.

To ensure we cover as many bases as possible for this chapter, we cover side dishes that include harvest from **moana** (shellfish and fish), harvest from **whenua** (kaanga wai and pikopiko), a **mix of both** (toroi), and **sweet dishes** (steam pudd). Enjoy!

Previous page: Sunrise at Te Paea o Hauraki during training for tribal members in kaimoana harvest. Photo: Waikato-Tainui

KAIMOANA
RAW FISH

Raw fish (ika mata) dishes are very popular at our Poukai and are made up of any locally available fish to the marae. The more common species are those caught with nets such as kahawai, (*Arripis trutta*), but can also extend to taamure (snapper, *Pagrus auratus*), trevally (*Pseudocaranx dentex*) and tarakihi (*Nemadactylus macropterus*). Once upon a time, kanae (mullet, *Mugil cephalus*) may have also been a key fish species for this dish – although for some areas of the catchment they may require some effort to 'flush' them of river muds prior to food preparation.

Traditionally, our tuupuna may have sourced wild plant bulbs and/or leaves of native trees and shrubs for simple marinades, in addition to using drying techniques to prolong storage.

With the changing of our tastebuds, and the introduction of new foods and cooking experiences, we now find that more modern interpretations of the dish include the addition of coconut cream, lemon juice and simple tomato and onion-based marinades and salsas.

Kanae/Grey Mullet. Photo: NIWA

Tarakihi. Photo: NIWA

Raw fish being prepared at Maurea Poukai (24 Feb 2018). Photo: Kiingitanga FB page

PIPI – TIO – SCALLOPS – PUUPUU – COCKLES

Our shellfish form incredibly important components of a marine ecosystem. In addition to being important food for sea birds, kooura, crabs, star fish, wheke (octopus) and big fish like taamure (and us humans!), they are also very important filter feeders and are sometimes referred to as 'the kidneys of the sea'. Their beds (collections of large numbers of the shellfish) can also provide important habitat for marine plants, and the juveniles of fish and crustaceans.

Harvest of shellfish is an important whaanau event, where members of all ages can participate in the annual tradition of digging your feet into the sand to hunt out pipi (*Paphies australis*); scrambling over rocks seeking out puupuu (Mudflat snail, *Amphibola crenata*), or diving for tio (oysters), scallops and kuutai (mussels). These tasty kaimoana take pride of place on many Poukai tables.

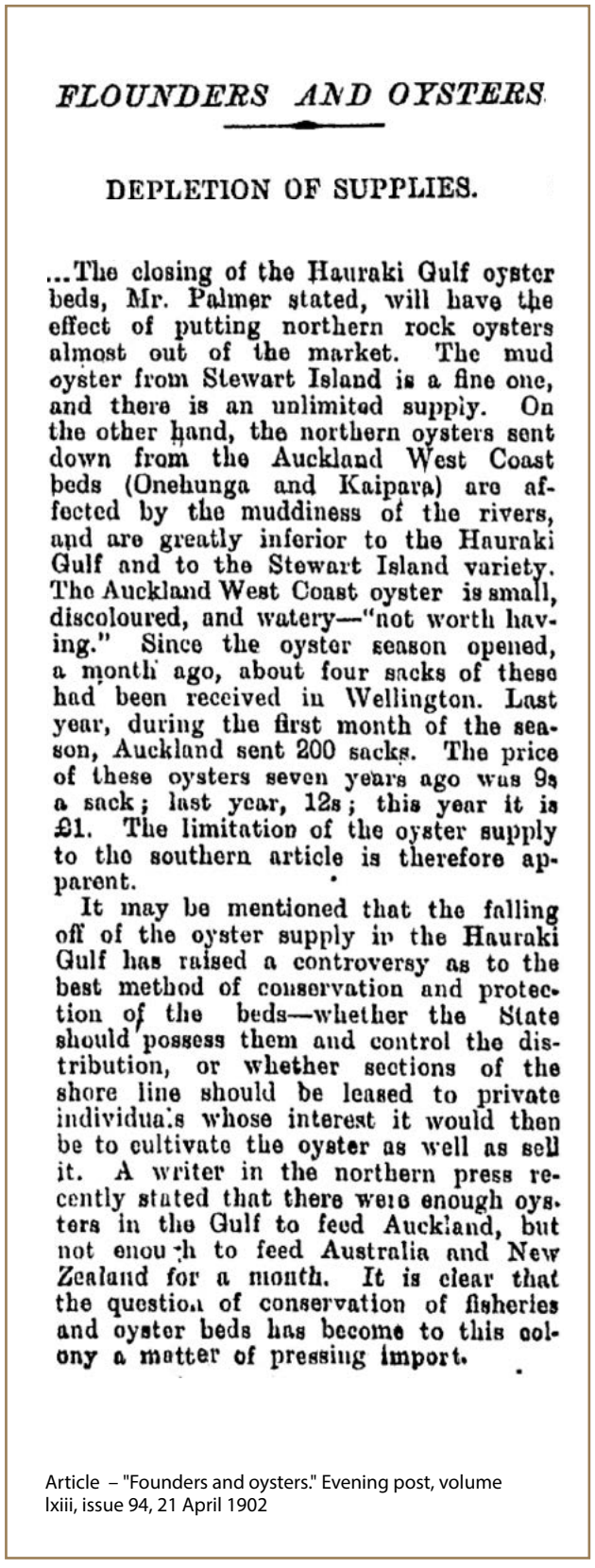
Pipi in particular, can be found in the estuary of the Waikato River on sandbanks or sandy flats, as well as in the estuaries of Te Maanukanuka o Hoturoa (the Maanuka) and other western Waikato harbours. Tio (rock oysters) were once also commonly found on rocky outcrops near the mouth of the River as well as along the coast. Our tuupuna were noted for nurturing 'gardens' of native tio (*Saccostrea commercialis*[1]) (NIWA, n.d). However, it is the more common and exotic Pacific Oyster (*Crassostrea gigas*) that we usually see on our plates. This is because our native tio populations have been outcompeted by the Pacific Oyster (which is also a burgeoning commercial fishery) since their introduction in the 1960s.

Pipi in hand. Photo: Sarah Hailes, NIWA

Puupuu. Photo: Kawhia Primary School FB Page

Pacific oysters being prepped for service at Waahi 50th celebration. Photo: Kiingitanga FB page

1 NIWA: https://niwa.co.nz/aquaculture/species/pacific-oyster



FLOUNDERS AND OYSTERS.

DEPLETION OF SUPPLIES.

...The closing of the Hauraki Gulf oyster beds, Mr. Palmer stated, will have the effect of putting northern rock oysters almost out of the market. The mud oyster from Stewart Island is a fine one, and there is an unlimited supply. On the other hand, the northern oysters sent down from the Auckland West Coast beds (Onehunga and Kaipara) are affected by the muddiness of the rivers, and are greatly inferior to the Hauraki Gulf and to the Stewart Island variety. The Auckland West Coast oyster is small, discoloured, and watery—"not worth having." Since the oyster season opened, a month ago, about four sacks of these had been received in Wellington. Last year, during the first month of the season, Auckland sent 200 sacks. The price of these oysters seven years ago was 9s a sack; last year, 12s; this year it is £1. The limitation of the oyster supply to the southern article is therefore apparent.

It may be mentioned that the falling off of the oyster supply in the Hauraki Gulf has raised a controversy as to the best method of conservation and protection of the beds—whether the State should possess them and control the distribution, or whether sections of the shore line should be leased to private individuals whose interest it would then be to cultivate the oyster as well as sell it. A writer in the northern press recently stated that there were enough oysters in the Gulf to feed Auckland, but not enough to feed Australia and New Zealand for a month. It is clear that the question of conservation of fisheries and oyster beds has become to this colony a matter of pressing import.

Article – "Founders and oysters." Evening post, volume lxiii, issue 94, 21 April 1902

Kuutai – as we know them today – are usually in the form of the endemic (i.e., only found in Aotearoa), green-lipped mussel (*Perna canaliculus*). Traditionally though, and dependant on where in the motu you were harvesting from, kuutai harvest might have also included the horse mussel (also called the 'salt-water clam', *Atrina zelandica*), and probably a number of others from the 22 species that are found here in Aotearoa. Mussels are found across a range of marine habitats including intertidal areas, rocky reefs and subtidal areas of the coastline.[2]

Harvesting of our various shellfish can happen all year round, although traditionally, whaanau may have only harvested for defined periods during the year as a means to manage the resource. Traditionally, our tuupuna would have also either dried or fermented these kai. Both methods were a way of ensuring there were food supplies beyond the harvesting periods.

Today, it can be difficult to source sufficient quantities of our shellfish for Poukai due to localised impacts on habitat, caused in part by activities related to surrounding land uses:

- Pollutants entering the waterbodies (particularly from urban and industrial areas),
- High sediment loads which can smother shellfish beds,
- Outbreaks of toxic algae in shellfish making it unsafe to harvest for human consumption,
- And also, localised declines in populations as a result of overharvesting.

We can do our bit for our shellfish by firstly building an understanding about their habitat needs, identifying where valued harvesting areas are, and working with whaanau, local environmental managers, researchers and community groups to build protection around what we have left.

2 SLH (2015)

KINA

Despite their prickly appearance kina (also called echinoderms, or 'sea urchins', *Evechinus chloroticus*) are a coveted kai for many whaanau and are popular side dishes at Poukai. Kina are harvested for their roe – the swollen, orange-coloured reproductive organs of the kina. Traditionally, though, all internal parts of the kina were eaten and never wasted. It has only been since the popularity of commercially available products that there has been a shift to the service of roe only – probably brought about by changing taste buds over generations.

Typically, service at haakari involves scraping out the roe and then storing in diluted salt water until they are put onto the tables. Where once we would have eaten the roe straight out of the shell, it is now usually processed before service.

Traditional tohu for kina harvest (between August and January depending on location) are linked to the flowering events of key plants found within the rohe which might include (but are not limited to) koowhai (*Sophora* spp.), maanuka, and/or poohutukawa (*Metrosideros excelsa*) when the kina are deemed to be 'fat'.

More recently, kina have become an ecological challenge for some vulnerable marine ecosystems due to their grazing of kelp beds and impacts to the other marine life that rely on those underwater forests.[3] This is, however, a clear indication of system imbalances caused by other factors such as the overfishing of their key predators, taamure (snapper) and kooura (red rock lobster, *Jasus edwardsii*), which can assist in keeping kina at manageable, and less destructive levels. This highlights the importance of understanding 'food webs' (the whakapapa between predator and prey) when trying to rebalance/restore valued hauanga kai.

Man and a boy eating kina (sea eggs). Photo: Alexander Turnbull Library, Evening Post Collection (PAColl-0614) Reference: 1/4-054105; F

Kina being prepared at Kokohinau Poukai (2020). Photo: Kiingitanga FB Page

Kooura. Photo: NIWA

3 Gee (2021)

Flowers of swamp Maanuka (*Leptospermum repo*) (Hamilton Basin, Waikato). Photo: Peter J. de Lange CC BY 4.0 DEED

Poohutukawa foliage. Photo: Department of Conservation Public domain

Koowhai flowers, (Nugget Point). Photo: John Barkla CC BY 4.0 DEED

TOROI

Toroi is a traditional condiment dish made from kuutai (mussels) and any green vegetables available. It requires the adoption of fermentation techniques to create the distinctive taste and consistency associated with it and harks back to a time when our people had no fridges and so had to adapt techniques for food preservation.

In the past our tuupuna would have used locally available greens such as our native puuhaa, *S. kirkii*), waatakirihi (native watercress, *Rorippa* spp.) and/or our native spinach (kookihi, *Tetragonia tetragonoides*). However, many of these native vegetables are declining and are becoming more difficult to locate in the wild. This is due to a number of factors including competition with other exotic species, browse by herbivores (e.g., rabbits, hares and/or deer), and/or impacts to habitat. But also because of the growing disconnection between our whaanau and the old kai due to limited access, and/or limited understanding and familiarity with the plants.

Ever resilient though, today, a lot of the whaanau will experiment with more easily accessible exotic varieties of puuhaa (*Sonchus* spp.), spinach (*Spinacia oleracea*) and waatakirihi (watercress, *Nasturtium* spp.) which supports the retention of the practices. Some whaanau have even shared that the exotic plants are also less bitter than the natives, and so are considered tastier by current generations who have not been as lucky to grow up with fermented kai as a staple in their diet. To support our native biodiversity though, we argue that it may be time to consider reintroducing them back into our diets alongside the exotic plants we already know.

Greenshell mussels. Photo: NIWA

Watercress (the popular exotic variety, *Nasturtium* spp.) served at Waahi Paa 50th anniversary. Photo: Kiingitanga FB Page

(**Left**) Kookohi. Photo: J. Rolfe (2006) CC BY; (**middle**) Native puuhaa. Photo: B. Mitcalfe Licence: CC BY-NC.; and (**right**) native waatakirihi, Rorippa palustris. Photo: P de Lange Licence: CC BY-NC

KAIWHENUA
PIKOPIKO

These are the developing, young shoots of native ferns, specifically the 'Hen & Chicken' (*Asplenium bulbiferum*) and have often been referred to in the culinary world as 'the native asparagus'. The Hen & Chicken fern is one member of the 21 spleenwort fern whaanau found in Aotearoa; hence also earning it the common name of 'Mother Spleenwort'. Today, the ingoa 'Pikopiko' is also given as the name for the fern itself. However, in line with how our tuupuna gave names for different life cycles of fish for example, we also believe that a similar approach was made for ferns and other plants. Other names recorded such as mouki, manamana, koopuapua, maku, manehau, moku, mauku, tururu-mauku and mouku for the ferns[4] are possibly a reflection of this broader traditional classification system adopted by our tuupuna, although it deserves further exploration with local whaanau and hapuu experts.

Pikopiko formed part of wildly sourced spring vegetables within our traditional diets and would have been easy to access within the understorey of the vast swamp and lowland forests once found within the Waikato and Maanukanuka catchments. Many of our ferns are also important rongoaa and were acknowledged as such in the gifting of an herbarium from Kiingi Taawhiao to a Canadian doctor – Dr Rennie – for his assistance to Waikato peoples during the Spanish Flu epidemic in the early 1900s[5].

Sadly though, pikopiko are not used as commonly as they once were, possibly due to a number of factors including:

- Fragmentation of suitable fern habitat due to land conversions and urbanisation;
- Limitations on access to the ferns (particularly those on privately owned blocks and/or the DOC conservation management areas, where a permit to harvest is required);
- Legacy contamination issues on lands that are habitat for the ferns (e.g. heavy metals such as cadmium and arsenic);
- Intensive browsing of ferns by introduced herbivores – deer, goats, pigs, rabbits, possums, etc; and/or,
- 'Short-circuiting' in the transfer of knowledge relating to the identification of our ferns and their uses since Raupatu. The impacts of confiscation were also reinforced by legislation such as the now repealed Tohunga Suppression Act (1907) which forced our knowledge 'underground'.

Hopefully, by putting the spotlight back onto them, we may start to see a resurgence in their restoration and use again within Poukai menus.

Pikopiko. Photo: Atlas Obscura (https://www.atlasobscura.com/foods/pikopiko-maori-new-zealand)

Hen and Chicken fern under the canopy of karamu in an urban native garden, Taupiri (2024). Photo: Swamp Frog

4 For more info about the fern, see: https://rauropiwhakaoranga.landcareresearch.co.nz/names/f0ca5208-b067-4960-ae50-0c6a41f1da6b

5 You can view the collection here: https://collections.tepapa.govt.nz/object/477511

KAANGA WAI

Preparation of kaanga wai (or kaanga piirau) draws on traditional fermentation methods adopted by our tuupuna with corn cobs. Fermentation, smoking and drying techniques were a pragmatic solution to long-term storage in the absence of refrigeration like we have today. However, the specific invention of kaanga wai probably didn't appear as a culinary dish until after the introduction of maize in 1772 from early European arrivals. Recognising its value as a crop and delicious new kai, our tuupuna embraced it quickly and moves were made to bring it into our traditional menu utilising the fermentation skills that were already practiced with other plant-based foods.

The key to successful kaanga wai is good water quality – kaanga (corn) are put into bound sacks and placed into flowing streams to go through the fermentation process which can take between 2 to 3 months. Historically, these sacks may have been made from split supplejack, or harakeke, lined with fern fronds. Today, hessian sacks are amongst the 'tools of the trade'.

Pollution of the important tributaries used in this process is one of the greatest challenges to our chefs and the maintenance of the practice. There are clever adaptations being made by different marae to counter the decline in water quality in our streams (we suggest you go back to your marae to ask the whaanau if you are interested), in addition to developing techniques to reduce the unattractive smell that can accompany the cooking process that follows fermentation. But at the heart of this all, remains a deep connection between this kai and our freshwater bodies and their respective health and wellbeing.

Kaanga wai can be served as both a savoury dish, and/or a dessert – it basically looks like a porridge when prepped. At a handful of Poukai, kaanga wai is served as a pudding with sugar and cream. This makes kaanga wai very palatable to current generations (provided they can handle the smell), and it is not unusual to spot whaanau lining up at the kitchen door after haakari to take leftovers home.

"We used to do our own kaanga wai in the river. The river was flowing good then."[6]

Maaori boy carrying coloured maize, Korohe. Ngaati Tuuwharetoa. Photo: Whites Aviation Ltd: Photographs. Ref: WA-12542-G. Alexander Turnbull Library, Wellington, New Zealand. /records/22906502

6 P. Kiingi, & M. Clarke (31 Dec 2023), pers. comm.

KAIREKA – THE EVOLUTION OF OUR PUDDINGS

HIINAU AND RAUPOO TO STEAM PUDDING

The beloved steam pudding (also called purini mamaoa) was enthusiastically adopted by our tuupuna after being introduced to the recipe by early European settlers; along with the 'plum duff' (another version of a steam baked cake).

The concept of a steamed cake was not new to our tuupuna though as evidenced by traditional recipes utilising native plants such as hiinau (*Elaeocarpus dentatus var. dentatus*) and raupoo (*Typha orientalis*). Hiinau fruits were collected and softened with water to help separate the stone from the fruit flesh. The flesh was then pounded to create a paste which was formed into cakes and cooked in haangii. Hiinau cakes were noted by early ethnographers as being coveted delicacies amongst our tuupuna.[7]

The cakes made from the yellow pollen of raupoo was carefully harvested by whaanau but was very labour intensive. The pollen was added to water to make a mixture that was then cooked over the fire or in haangii. Sadly, the practice of making cakes from our native plants is not as popular today – and could possibly be considered a 'dying art'. However, many ringawera definitely know how to whip up a delicious steam pudd.

"When we were kids the aunties would make the pudding in a big tub. We would all sit around waiting for the tub so we could run our fingers along the inside scraping the sides and licking the pudding batter off our fingers. The pudding batter was just as good as the cooked pudding."[8]

Steam puddings follow a traditional recipe and for large events like Poukai, are typically steamed in the haangii in large tins or wrapped in tin foil. If cooking at home, the process of steaming can be achieved by placing the tin or tinfoil wrapped cake mixture into a pot of hot water. Service of the puddings always includes some custard, a smattering of whipped cream and some fruit, washed down with a decent kaputii or kapukawhe.

For generations of Maaori kids raised in the 70s to 90s, our versions of 'large tins' were the ones we used to get fruit salad in. Or, the family sized tins of Milo.

Unripe fruits of hiinau (Coromandel). Photo: J. Smith-Dodsworth, CC BY-NC

Raupoo in flower. Photo: M Peters

Custard being added to the pudding, Rereteewhioi Poukai (9 Dec 2018). Photo: Kiingitanga FB page

Steamed puddings in the tins,Waipapa Poukai (March 2017). Photo: Kiingitanga FB Page

7 For more useful information, see: https://www.temarareo.org/TMR-Hinau.html
8 P. Te Ao (2024)

Kaumatua on the paepae at Kokohiinau Poukai (8 Feb 2020). Photo: Kiingitanga FB page

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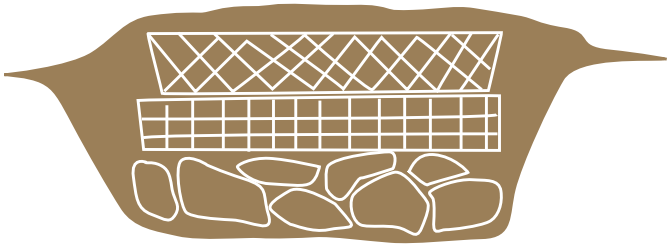
Te Awa oo Waikato from Tikirahi (2020). Photo: Swamp Frog.

Previous page: The 'wake' (stirred up water) from a boat on Whangamarino River, Waikato. Photo: Swamp Frog (2020)



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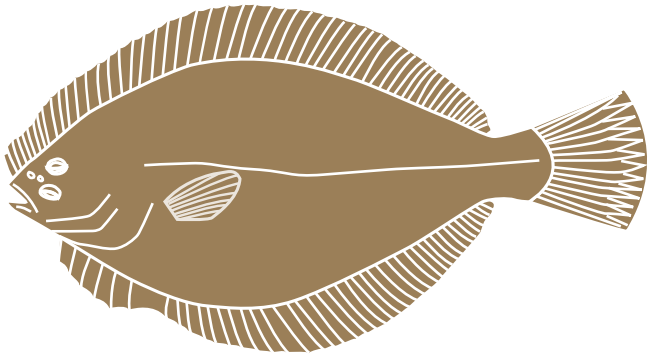

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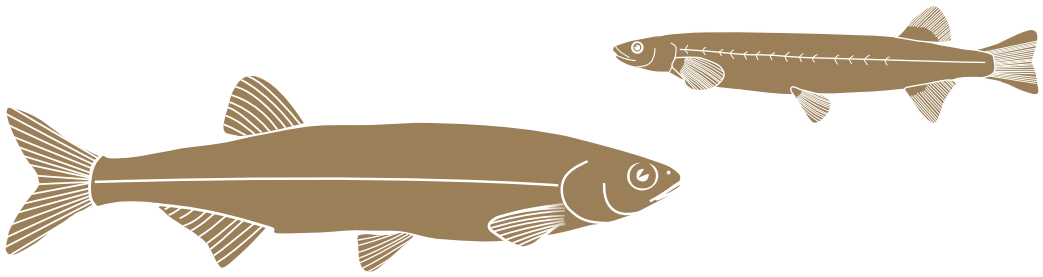
Tangi te Korowhiti, Kaawhia moana. Photo: Waikato-Tainui



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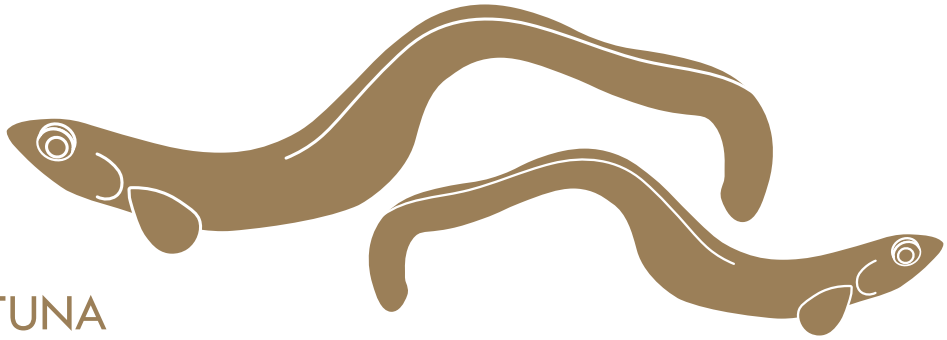

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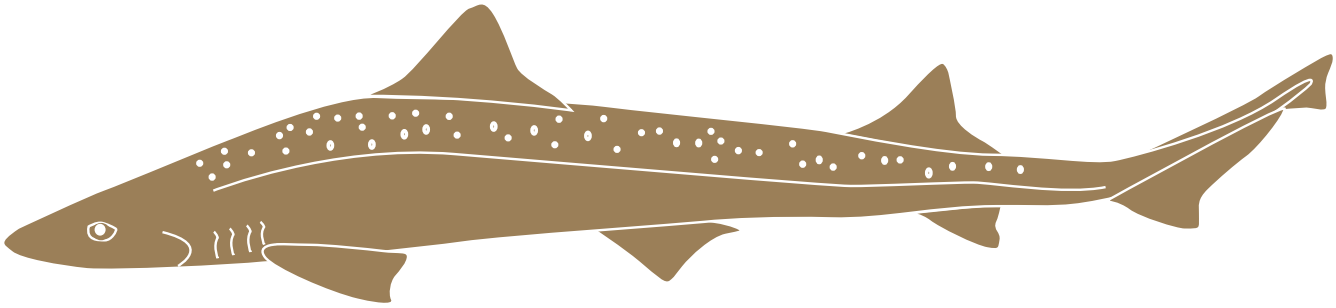

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Raw fish dishes:

Recipe: We're calling it: raw fish is the new prawn cocktail (1news.co.nz)

Kahawai:

NIWA blog: https://niwa.co.nz/news/summer-series-2-kahawai-the-people%E2%80%99s-fish

Pipi – Tio – Scallops – Pupu – Cockles:

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Kuutai:

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Restoration using maatauranga and western science:

- Kohunga Kutai (tetiniatangaroa.org.nz)
- Kohunga Kutai – Sustainable Seas National Science Challenge (sustainableseaschallenge.co.nz)
- Kūtai mussels: How to clean up the Hauraki Gulf – Te Ao Māori News (teaonews.co.nz)
- Suspended kūtai on harakeke ropes aims to bring new recruits – Revive Our Gulf

Kina:

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Collaborative solutions for restoring unbalanced marine ecosystems:

- We need to talk about kina – The Noises
- Kinanomics: Kina causing ecosystem havoc could bring economic joy (1news.co.nz)
- https://www.nzgeo.com/stories/kina-nomics/
- Kina is a delicacy, but what about the shell? – Te Ao Māori News (teaonews.co.nz)

Taamure (Snapper):

Research

- Case study: What does ancient DNA tell us about the snapper population? – The future of commercial fishing in Aotearoa New Zealand | Office of the Prime Minister's Chief Science Advisor (pmcsa.ac.nz)

Has Intensive-Fishing Shaped Snapper Evolution? (royalsociety.org.nz)

Kooura (rock lobster):

Educational resource – Science Learning Hub: Kōura – Science Learning Hub

Maatauranga-informed research: Kōhanga pēpi kōura | Deep South Challenge

KAIWHENUA

Pikopiko:

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Rangatahi experiences with traditional kai: Rangatahi react to eating kānga pirau (rotten corn) for the first time (renews.co.nz)

Native puuhaa, spinach and waatakirihi:

Manaaki whenua – Nga Rauropi Whakaoranga:

- Puuhaa: Sonchus oleraceus. Rauriki. Pūhā. Sow thistle. – Ngā Rauropi Whakaoranga (landcareresearch.co.nz)
- Kookihi/ Native spinach: Tetragonia spp. Kōkihi. New Zealand spinach. - Ngā Rauropi Whakaoranga (landcareresearch.co.nz)

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KAIREKA

Hiinau:

Te Maara Reo – The Language Garden website: Te Māra Reo (temarareo.org)

Raupoo:

Manaaki Whenua website: Raupō » Manaaki Whenua (landcareresearch.co.nz)

Te Maara Reo – The Language Garden website: Te Māra Reo (temarareo.org)

Steamed Pudding:

Recipes:

- Steamed pudding, hāngī style | Stuff
- Aunty Marinas' Steam Pudding (ngatiporou.com)
- A Christmas Memory- Steamed Pudding – New Zealand Maori | Island Time (wordpress.com)

Kawau (black cormorant) and kaaruhiruhi (pied shags) at Lake Hakanoa, Raahui Pookeka (2021). Swamp Frog

GLOSSARY

GLOSSARY

KEY: **Where possible we use Waikato dialect	
EN	Endemic – genus and/or species originates from Aotearoa
N	Native – naturally occurs in Aotearoa, but also naturally occurs in other countries
e	Exotic – introduced to Aotearoa by humans
non N	Non-native, but found own way to Aotearoa and yet to naturalise here

Ingoa Maaori**	Other names	Reference chapter/s	Main Habitat Type	Geographic Origin	Scientific Name	
					Genus	*Species*
Aanau	Black swan	Ch. 5	Ngaa repo	N	*Cygnus*	*atratus*
Akatororaro	NZ passionfruit	Ch. 5	Whenua	EN	*Passiflora*	*tetrandra*
Aniana	Onion	Ch. 2	Whenua	e	*Allium*	*cepa*
Araara, raumarie	Trevally	Ch. 7	Te taiao moana	N	*Pseudocaranx*	*dentex*
Harakeke	NZ flax	Ch. 8 (ch. 2, 3, 4, 5)	Ngaa repo (whenua)	EN	*Phormium*	*tenax*
Heihei	Chicken	Ch. 2	Whenua	e	*Gallus*	*gallus domesticus*
Hiinau	Hiinau	Ch. 7	Whenua	N	*Elaeocarpus*	*dentatus var. dentatus*
Hipi	Sheep	Ch. 2	Whenua	e	*Ovis*	*aries*
Huitene	Swede	Ch. 2	Whenua	e	*Brassica*	*napus napobrassica*
Hue	Gourd, calabash	Ch. 2	Whenua	e	*Lagenaria*	*siceraria*
Ihe	Common dolphin (?)	Ch. 6	Te taiao moana	N	*Delphinus*	*delphis delphis*
Iinanga	Whitebait	Ch. 4	Wai maaori (Te taiao moana)	EN	*Galaxias*	*masculatus*
Kaaeo	Freshwater mussel	Ch. 5	Wai maaori	EN	*Echyridella*	*menziesii*
Kaanga piirau, kaanga wai	Corn	Ch. 7	Whenua (wai maaori)	e	*Zea*	*mays*
Kaanuka	Kaanuka	Ch. 2	Whenua	EN	*Kunzea*	*robusta*
Kahawai	Kahawai	Ch. 4	Te taiao moana	N	*Arripis*	*trutta*
Kahikatea	White pine	Ch. 5	Ngaa repo	EN	*Dacrycarpus*	*dacrydioides*
Kamokamo	Squash	Ch. 2	Whenua	e	*Cucurbita*	*pepo*
Kamu	Gum	Ch. 2	Whenua	e	*Eucalyptus*	
Kanae	Mullet	Ch. 7	Wai maaori	N	*Mugil*	*cephalus*
Kareao	Supplejack	Ch. 4 (ch. 5)	Whenua	EN	*Ripogonum*	*scandens*

Previous page: Mauku (cabbage tree)-dominated wetland remnant on the western ranges of north Waikato. (Swamp Frog, 2020)

Ingoa Maaori**	Other names	Reference chapter/s	Main Habitat Type	Geographic Origin	Scientific Name	
					Genus	*Species*
Kareti	Carrot	Ch. 2	Whenua	e	*Daucus*	*carota*
Kau	Cow, beef	Ch. 2	Whenua	e	*Bos*	*taurus*
Kereruu	NZ pigeon	Ch. 2	Whenua, te ararangi	EN	*Hemiphaga*	*novaeseelandiae*
Kiekie	Screw pine	Ch. 5	Whenua (Te taiao moana, ngaa repo)	EN	*Freycinetia*	*banksii*
Kina	Sea urchins	Ch. 7	Te taiao moana	EN	*Evechinus*	*chloroticus*
Kooaro	Kooaro	Ch. 4	Wai maaori (Te taiao moana)	EN	*Galaxias*	*brevipinnis*
Kookihi	NZ Spinach	Ch. 7	Whenua (Te taiao moana)	N	*Tetragonia*	*tetragonoides*
Kookihi	Spinach	Ch. 7	Whenua	e	*Spinacia*	*oleracea*
Kootore	Sea anemone	Ch. 6	Te taiao moana	N	Family: *Cnidaria*	
Koowhai	Koowhai	Ch. 7	Whenua (Te taiao moana, ngaa repo)	EN	*Sophora*	
Kooura	Freshwater crayfish	Ch. 5	Wai maaori	EN	*Paranephrops*	
Kooura	Rock lobster	Ch. 7	Te taiao moana	N	*Jasus*	*edwardsii*
Kuihi	Canadian Goose	Ch. 3	Wai maaori, te ararangi	e	*Branta*	*canadensis*
Kuumara	Sweet potato	Ch. 2 (ch. 4)	Whenua	e	*Ipomoea*	*batatas*
Kuutai	Green-lipped mussel	Ch. 7 (ch. 3)	Te taiao moana	EN	*Perna*	*canaliculus*
Kuutai	Horse-mussel, salt-water clam	Ch. 7	Te taiao moana	EN	*Atrina*	*zelandica*
Maanuka/ kahikatoa	Maanuka, NZ Tea tree	Ch. 2, 4, 5	Whenua, ngaa repo	N	*Leptospermum*	
Mangimangi/ mangemange	Bushman's mattress	Ch. 5	Whenua	EN	*Lygodium*	*articulatum*
Mangoo	Big-eye Thresher shark	Ch. 6	Te taiao moana	N	*Alopias*	*superciliosus*
Mangoo	School shark	Ch. 6	Te taiao moana	N	*Galeorhinus*	*galeus*
Mangoo	Rig shark	Ch. 6	Te taiao moana	EN	*Mustelus*	*lenticulatus*
Mangoo	Hammerhead shark	Ch. 6	Te taiao moana	N	Family: *Sphyrnidae*	
Mangoo	Spiny dogfish	Ch. 6	Te taiao moana	N	*Squalus*	*acanthias*
Matamata	Giant kookopu	Ch. 4	Wai maaori (Te taiao moana)	EN	*Galaxias*	*argenteus*
Matamata	Banded kookopu	Ch. 4	Wai maaori (Te taiao moana)	EN	*Galaxias*	*fasciatus*
Matamata	Short-jawed kookopu	Ch. 4	Wai maaori (Te taiao moana)	EN	*Galaxias*	*postvectis*
Mauku	Cabbage tree	Ch. 2 & 4 (ch. 5)	Whenua, ngaa repo	EN	*Cordyline*	*australis*

Ingoa Maaori**	Other names	Reference chapter/s	Main Habitat Type	Geographic Origin	Scientific Name	
					Genus	*Species*
Mohimohi?	Anchovy	Ch. 4	Te taiao moana	N	*Engraulis*	*australis*
Mohimohi?	Sardine	Ch. 4	Te taiao moana	N	*Sardinia*	*neopilchardus*
Mohimohi?	Sprat	Ch. 4	Te taiao moana	N	*Clupea*	*antipodum*
Morihana	Carp	Ch. 5	Wai maaori	e	Family: *Cyprinidae*	
Ngooiro, kooiro	Conger eel	Ch. 5	Te taiao moana	N	Order: *Anguilliformes*	
Niikau	NZ palm tree	Ch. 2	Whenua	EN	*Rhapostylis*	*sapida*
Noke	Polychaetes, marine worms	Ch. 6	Te taiao moana	N	*Various*	
Paanipi	Parsnip	Ch. 2	Whenua	e	*Pastinaca*	*sativa*
Paapaka, kooura	Crab	Ch. 6	Te taiao moana	N	Order: *Decapoda*	
Paarera	Pacific grey duck	Ch. 5	Ngaa repo	N	*Anas*	*superciliosa*
Paatiki	Yellow belly flounder, flat fish	Ch. 3	Te taiao moana, wai maaori	EN	*Rhombosolea*	*leporina*
Paatiki	Sand flounder, flat fish	Ch. 3	Te taiao moana, wai maaori	EN	*Rhombosolea*	*plebeia*
Paina	Pine	Ch. 2	Whenua	e	*Pinus*	*radiata*
Para	Frost fish	Ch. 5	Te taiao moana	N	*Lepidopus*	*caudatus*
Paraki, poorohe	Stokell's Smelt	Ch. 4	Wai maaori (Te taiao moana)	EN	*Stokellia*	*anisodon*
Paukena	Pumpkin	Ch. 2	Whenua	e	*Cucurbita*	*maxima*
Pikopiko	new shoots of Hen & Chicken Fern	Ch. 7	Whenua	N	*Asplenium*	*bulbiferum*
Pipi	Pipi	Ch. 7 (ch. 3)	Te taiao moana	EN	*Paphies*	*australis*
Poaka	Pig, swine	Ch. 2	Whenua	e	*Sus*	*domesticus*
Poohutukawa	Poohutukawa	Ch. 7	Whenua	EN	*Metrosideros*	*excelsa*
Poorohe	Common smelt	Ch. 4	Wai maaori (Te taiao moana)	EN	*Retropinna*	*retropinna*
Puka	Cabbage	Ch. 2 (ch. 6)	Whenua	e	*Brassica*	*oleracea var. capitata*
Puuha	NZ Puuha (native)	Ch. 7	Whenua	EN	*Sonchus*	*kirkii*
Puuha	Puuha (exotic)	Ch. 7	Whenua	e	*Sonchus*	
Puupuu	Cat's Eye, sea snail	Ch. 7 (ch. 3 & 5)	Te taiao moana	EN	*Amphibola*	*crenata*
Rakiraki	Mallard duck	Ch. 5	Ngaa repo	e	*Anas*	*platyrhynchos*
Raukawa		Ch. 6	Whenua	EN	*Raukaua*	*edgerleyi*
Raupoo	NZ Bulrush	Ch. 7 (ch. 4)	Ngaa repo	N	*Typha*	*orientalis*

Ingoa Maaori**	Other names	Reference chapter/s	Main Habitat Type	Geographic Origin	Scientific Name	
					Genus	*Species*
Rimu	Red pine, southern conifer	Ch. 5	Whenua	EN	*Dacrydium*	*cupressinum*
Riiwai	Potato	Ch. 2 (ch. 4)	Whenua	e	*Solanum*	*tuberosum*
Taamure	Snapper	Ch. 7	Te taiao moana	N	*Pagrus*	*auratus*
Tarakihi	Tarakihi	Ch. 7	Te taiao moana	N	*Nemadactylus*	*macropterus*
Taro	Taro	Ch. 2	Whenua	e	*Colocasia*	*esculenta*
Tio	Native oyster	Ch. 7	Te taiao moana	N	*Saccostrea*	*commercialis*
Tio	Pacific oyster	Ch. 7	Te taiao moana	e	*Crassostrea*	*gigas*
Tipa	Scallop	Ch. 7 (ch. 3)	Te taiao moana	EN	*Pecten*	*novaezelandiae*
Tiitii	Sooty Shearwater	Ch. 4	Whenua, te ararangi	N	*Ardenna*	*grisea*
Tohoraa	Whale	Ch. 6	Te taiao moana	N	Family: *Cetacea*	
Tuangi	Cockles	Ch. 7 (ch. 3)	Te taiao moana	EN	*Austrovenus*	*stutchburyi*
Tuere, tuare, napia	Hagfish, blind eel	Ch. 5	Te taiao moana	N	*Eptatretus*	*cirrhatus*
Tuna	Eel - Long fin	Ch. 5 (ch. 4)	Wai maaori (Te taiao moana)	EN	*Anguilla*	*dieffenbachii*
Tuna, also see Tuna puhi	Eel - Short fin	Ch. 5 (ch. 4)	Wai maaori (Te taiao moana)	N	*Anguilla*	*australis*
Upokororo, pokororo, paneroro, kanae-kura	Greyling	Ch. 4	Wai maaori (Te taiao moana)	EN	*Prototroctes*	*oxyrhynchus*
Uwhiuwhi	Yam	Ch. 2	Whenua	e	*Oxalis*	*tuberosa*
Waatakirihi	Watercress (native)	Ch. 7	Ngaa repo, wai maaori	EN	*Rorippa*	*palustris*
	Watercress (exotic)	Ch. 7	Ngaa repo, wai maaori	e	*Nasturtium*	
Whai	Stingray	Ch. 2	Te taiao moana	N	Order: *Myliobatiformes*	
Wheke	Octopus	Ch. 6	Te taiao moana	N	Family: *Octopodidae*	
	Brown bull-headed catfish	Ch. 5	Wai maaori	e	*Ameiurus*	*nebulosus*
	Leopard seal	Ch. 6	Te taiao moana	N	*Hydrurga*	*leptonyx*
	Macrocarpa	Ch. 2	Whenua	e	*Hesperocyparis*	*macrocarpa*
	Orca	Ch. 6	Te taiao moana	N	*Orcinus*	*orca*
	Spotted eel	Ch. 5	Wai maaori (Te taiao moana)	Non N	*Anguilla*	*reinhardtii*
	Starfish	Ch. 7	Te taiao moana	N	Phylum: *Echinodermata*	

Koromiko (bellbird, *Anthornis melanura*) feeding on harakeke nectar. The orange on its head is the pollen of the harakeke. which it then takes to another harakeke flower, aiding in its pollination. Source: Neil Fiitzgerald Photography (www.neilfitzgeraldphoto.co.nz/)

Wetland remnant on western Waikato coast and iron sand dunes. Photo: Swamp Frog (2020)