Harvesting and consuming freshwater fish

Ka mua, ka muri | Fish Futures Policy Brief 05

Author information

Ailsa Cain,[1] Kiely McFarlane,[2] Marc Tadaki[3]

[1] Kauati Limited
[2] Cawthron Institute
[3] Lincoln University

Fish Futures

The Fish Futures research project aims to improve freshwater ecosystems in Aotearoa New Zealand and the lives of people who depend on them. The project seeks to foster local relationships, empower fishery managers, enhance the mana of kaitiaki and generate new approaches that integrate mātauranga Māori and Western science.

The research examines interactions between humans, fish and ecosystems by assessing the consequences of fish introductions and removals, identifying social barriers to restoring fish passage and co-developing fish management strategies with Māori, communities and other stakeholders.

Expected outcomes:

- improve understanding of the social–ecological factors that impact freshwater fish populations
- enhance capacity for sustainable freshwater and fisheries management
- increase collaboration between scientists, iwi and policymakers.

The project's findings will inform policy development and support community-based management and collaborative decision-making for healthier freshwater ecosystems and thriving fish populations.

Policy briefs in this series

01. Management of freshwater fish species
02. Identities of freshwater fishers
03. Changing land use and freshwater fish
04. Access to freshwater fishing
05. Harvesting and consuming freshwater fish
06. Markets for freshwater fish

Recommended citation
Cain A, McFarlane K, Tadaki M. Harvesting and consuming freshwater fish. Fish Futures Policy Brief 05. Nelson: Cawthron Institute; 2026.

Cover photos: (Left) Whitebait. Photographer: D. Nicholson; October 1959. Source: Archives New Zealand; AAQT 6539 3537 57/A71885. (Centre) Drying tuna. Photographer: unknown; September 1934. Source: Auckland Libraries Heritage Collections; 1691-109. (Right) Lake Taupō. Photographer: E. Woollett; February 1954. Source: Archives New Zealand; AAQT 6539 3537 51/A33961.

Harvesting and consuming freshwater fish

Whitebaiting at the Kahutara River, Kaikōura. Photographer: R. Silcock; December 1968. Source: Archives New Zealand – Communicate New Zealand Collection; AAQT 6539 3537 86/A88299.

Key messages

- It's about connection, not just consumption. Harvesting for consumption builds connections between people, place and freshwater fish, and these relationships support stewardship of resources and cultural practices.
- It's not just about the catch. Harvesting practices involve multiple ecosystems, as they depend on seasonal activities of preserving, storing and cooking. Catching fish is just one part of consumption.
- Loss of harvest means loss of knowledge. Harvesting freshwater fish for consumption is declining due to social, cultural and environmental changes. This means that connections and knowledge are being lost.
- Investing in practice sustains knowledge and identity. Many communities still harvest freshwater fish for consumption, and organisations are working to support practices and preserve knowledge for future generations.

Overview

Freshwater fish have long been valued as a food source for many cultures, and this extends beyond their nutritional value. In Aotearoa New Zealand, freshwater fish such as tuna, kōura, īnaka / whitebait, salmon and trout are part of the cultural rituals of harvesting and feasting. They are also important for gifting and bartering and are key resources in cultural economies and identities. This policy brief outlines the evolving practices of freshwater fish consumption and considers:

> How and why has our consumption of freshwater fish changed over the last 200 years?

In New Zealand, consumption of freshwater fish used to rely on self-harvest or direct trade, but this has changed. While wild-caught fish are still prized, their availability, quantity and variety are declining, and they are often served only for special occasions. It is now easier to buy fish directly from a supermarket or specialist shop, although the species on offer are often limited and expensive. With more accessible options that bypass traditional harvests, it can be difficult to see what factors are driving changes in freshwater fish harvesting and consumption.

There are limited data available on freshwater fish consumption in New Zealand, as most research to date has focused on catch-and-release fishing. Only a small number of published studies have referred to how species are harvested and managed, and the complexity of the social, cultural and environmental factors influencing consumption and harvest. This knowledge gap means that we do not fully understand the implications of changes in harvesting and how they affect consumption and impact cultures, practices and diets.

Modern dinner tables

Īnaka, tuna, kanakana and kōura have always been important resources for kaihaukai (sharing / trading of food between whānau and hapū).[1] These species are highly valued items on dinner tables across New Zealand – they are a point of pride for the host and are warmly received by guests. While this value has held over many generations, the quantity of freshwater fish being caught and consumed has declined.[2] Īnaka and tuna, which were once plentiful and a main source of protein, are now regarded as a 'treat' or an entrée for special occasions.

Today, īnaka fritters and portions of tuna are usually smaller, with people carefully only taking one or two servings. Guests no longer fill their plates because they understand the host's supply will be limited. At special occasions, the host will hear appreciative comments about the availability and quantity of īnaka or tuna. The guests will likely be familiar with the harvest locations and the people involved, and may ask questions such as, *Where were you able to get this from?* Kanakana and kōura are now scarce and often missing from the menu or only shared in small groups. There is also a declining number of people with the skills and knowledge to harvest these important species.[3]

Salmon is now a popular freshwater fish for many occasions, and this is reflected in modern New Zealand cookbooks, which often feature recipes for salmon, snapper and terakihi. While there may still

be a recipe for īnaka fritters or trout; it is rare to see an entry for tuna.[4] Guests will generally assume that the salmon is store-bought rather than caught or traded by the host, and while a valued item, it does not hold the same appreciation or novelty as īnaka, tuna, kanakana or kōura. Farmed salmon is now easily accessible in urban and rural communities due to its consistent availability and pricing in supermarkets.

Whitebait fritters

1 tbsp flour
salt and pepper to taste
2 eggs, well beaten
225 g whitebait
butter for frying
lemon wedges to garnish

Put flour, salt and pepper into a bowl and stir in eggs. Mix in whitebait and drop spoonfuls of batter onto a hot buttered pan or griddle. Cook for 1–2 minutes on each side and serve immediately with lemon wedges.

Tuna natu

1 medium-sized eel (tuna)
2 medium onions, finely diced
450 g cabbage tree heart
1 tsp lard

Skin and bone the eel and place in a saucepan with the onion and cabbage tree heart. Barely cover with water and boil until soft. Mash well, blend in the lard and cook for a further 10 minutes.

Both recipes are from *Two Hundred Years of New Zealand Food and Cookery* [5]

Changes in consumption

To understand how consumption of freshwater fish has changed over time, we need to examine various social, cultural and environmental factors. The lack of publicly available data and analysis makes it difficult to establish historical or contemporary baselines, or define how and where change has occurred. However, intergenerational cultural and recreational fishing commentaries indicate declining practices and increasing restrictions on harvesting for consumption.[2,3]

Historical images and oral stories provide examples of how freshwater fish have been harvested and consumed, although the quantities and cooking preferences are not always obvious. A rare insight is provided in a description of a feast prepared by Te Waharoa of Ngāi Hauā in 1837 where '20,000 dried eels and several tonnes of fish were presented to the guests'.[5] Another account from the Christchurch Rod and Gun Club in 1911 details the variety of food presented at their annual supper menu:

> … crumbed trout au tomat, poached salmon and egg sauce, steamed trout and parsley sauce, stewed eels a la mode, baked salmon au Bechamel, baked trout aut fines herbs, baked salmon a la Italienne, baked trout a la Maître d'hôtel, soused eels and cucumber.[6]

Poutama Te Ture and whānau smoking tuna at Koriniti. Photographer: J. McDonald; c.1921. Source: Alexander Turnbull Library; PA1-q-257-79-1. Reproduced with permission from the Alexander Turnbull Library.

Unidentified man grilling trout fillets over an open fire, Tongariro River, Waikato Region. Photographer: Whites Aviation; 1939. Source: Alexander Turnbull Library; WA-04364-G. Reproduced with permission from the Alexander Turnbull Library.

For centuries, Māori have prepared freshwater fish for consumption in numerous ways. Drying and preserving fish helped with transport and trade, and these resources sustained communities through seasonal cycles of abundance and scarcity. The introduction of species like trout, salmon, catfish and koi in the 19th and 20th centuries expanded the diversity of fish consumed, although these introductions reduced availability of native fish and increased tensions over ownership and licensing.[7] Some introduced species, such as carp, trout and salmon, were eventually adopted into customary use.

> [This diversification was part of a] rapid change in the Māori diet after Pākehā colonisation, and much of the Māori interests in freshwater fisheries seems to have dissipated over subsequent decades – a likely result of:
>
> 1. a shift to more easily obtained, Pākehā foods
> 2. decline in the abundance of traditional fisheries resources
> 3. relocation of much of the Māori population from the countryside to the cities
> 4. a consequential loss of traditional knowledge.
>
> … Eventually, Māori probably had little choice but to join the Pākehā cash economy, earn money, and buy food. (McDowall 2011, p. 40)[1]

A research study from around 2010 illustrated the scale of these changes in consumption. A survey in the Te Arawa rohe concluded that consumption of wild kai (including trout, tuna, puha, seaweeds, etc.) was steadily decreasing, from 241 g per person per year historically to 94.1 g in the mid-20th century and approximately 36.2 g in 2010, with variable trends across species and locations.[8]

Government reports on consumer fish preferences focus on seafood rather than freshwater species. These reports have identified a consumer preference for seafood products that are convenient and easy to prepare or consume, such as ready-to-eat, restaurant-quality meals and takeaways instead of fresh / chilled / frozen seafood, which requires more time and effort to prepare and cook.[9] Supermarkets and grocery stores are now the dominant retail channel for seafood purchases in New Zealand – a significant shift from direct harvest and trade, and local, small-scale sales. Mass-processing of fish disconnects consumers from the knowledge of where the harvest is sourced, as well as the physical characteristics of the fish.

A 2021 consumer study for the New Zealand retail grocery sector found that consumers had an established shopping routine and a preference to visit a single grocery store rather than make multiple trips to different locations. Participants typically reported a repetitive, habit-based or routine approach to grocery shopping in terms of store brand and location, and the products they purchased.[10]

Today, a challenge for both Māori and Pākehā is that many young people are growing up not learning the basic knowledge associated with fishing and harvesting, and the taste of wild-caught foods is becoming less familiar.[8] There is now a concerted effort by iwi and hapū, and public and private initiatives (e.g. Rangatahi Tūmeke, Patagonia, Fish & Game New Zealand's Wild Foods campaign), to encourage rangatahi (youth) participation in freshwater fishing and to grow their technical skills. There is also an increasing awareness of the need for food security, and in some communities, there is a move towards self-sufficiency and a return to local and traditional foods.[2] For example, a food resilience report for Queenstown Lakes District Council found that:

> As times have changed we have shifted away from this self-reliance to the system we have now, which has little diversity in its supply chain, and therefore significant vulnerability to shocks and crisis. (Wao Aotearoa 2023, p. 26)[11]

Changes in harvesting practices

Historically, for Māori, fishing required investment in watercraft and other equipment. This effort was accompanied by ritual observances during the catching and processing of fish, with tasks divided between men who fished and women who gathered.[5] The resources of the sea and rivers were the mainstay for tangata whenua, and freshwater fish were especially important for inland communities.[12] As Evelyn Stokes explained:

> … the river is the mother of the [Waikato] tribes, an ancestor who has provided sustenance for the people living along its banks … in its waters lurked the taniwha of mythology, and it provided eels, whitebait, and other sources of food. (cited in McDowall 2011, p. 39)[1]

For Kāi Tahu and other iwi, water remains a significant feature in mahinga kai due to its role in providing habitat, and its use in cultivation, harvesting, manufacturing and transport. The characteristics of each waterbody (smell, shape, bed, flow, etc.) are intrinsically linked with its health and reflect the qualities of surrounding lands. This has a direct impact on what species are harvested, and when, from each waterbody and its specific areas. The favoured sites for mahinga kai tend to be hāpua (estuaries, lagoons), repo (wetlands) and the riparian zones of rivers, streams and lakes.[1,13]

The health of a waterbody also influences the number, size and flavour of fish present. Consequently, changes in water quality and quantity have a flow-on effect on harvest and consumption. Pollution, drainage and straightening of waterways, as well as the presence of pests and predators, can reduce the ability and reliability of the harvest. Consumption is impacted by toxins in the fish (perceived or actual), and secondary risks to fishers within the water can lead to a reduction in catch. Other factors such as access and government or private waterbody development schemes can create additional barriers.[1] Historian Alan Ward made the following observation:

> … the loss to Māori of their rights to waterways has been very heavy – heavier in some respects than the loss of land. These rights are of the utmost importance to a people whose existence was as much bound up with water as with land, and the loss of customary rights, with little or no negotiation or compensation except in respect of major lakes, does not sit well with Treaty obligations. (cited in McDowall 2011, p. 585–586)[1]

Imported international influences have also driven both historical and contemporary shifts in harvesting – from the introduction of trout and the establishment of Acclimatisation Societies and fishing licences to the more recent rise in popularity of catch-and-release fishing. These changes have had disproportionate effects on Māori practices and values such as rangatiratanga (authority over fisheries) and kaitiakitanga (guardian obligations), undermining customary rights and ecological stewardship.

Regulations and permits to fish have removed the ability of Māori to harvest critical sources of food within their own rohe. The use of fishing permits continues to breach guarantees under the Treaty of Waitangi and has led to societal fragmentation.[1] For example, in the past decade, seasonal īnaka prohibitions have been legally challenged, and īnaka catches have become contentious as the unregulated fishery continues to decline. Federated Farmers and Fish & Game New Zealand have reported increasing tension over freshwater management, with anglers being denied access across private land.[14]

The cost of fishing has also increased, with helicopters and guided fishing groups visiting remote headwater locations; these tour groups are replacing fly-fishing in the easily accessible but more polluted lower reaches. There are more gadgets and equipment for specific species, environments and activities, and while this has increased some groups' access to harvesting, it has exacerbated social tensions.[15]

The growth in angling tourism throughout the 20th century has contributed to the adoption of international behaviours and norms within New Zealand fishing practices, guidelines and regional regulations. Trout are more often caught for sport, with trophies as the accepted 'prize'. In contrast, fly-fishing for consumption can be seen as inappropriate or 'ungentlemanly'. Catch-and-release fishing is regarded by some as an approach to protecting local fish populations and the ecosystems that support food and sport.[16]

> We believe that trout and salmon fishing isn't just fishing for trout and salmon. It is fishing for sport rather than for food, where the true enjoyment of the sport lies in the challenge, the lore, and the battle of wits, not necessarily the full creel. It is the feeling of satisfaction that comes from limiting your kill, instead of killing your limit. (Tony Orman, 1979 – quoting the philosophy of Trout Unlimited, an American organisation)[17]

Recommendations for policy- and decision-makers

Freshwater fish are still valued in New Zealand, but there is a growing disconnect between harvesting and consumption. This divide reflects the decline of native fisheries – driven by introduced species and environmental degradation – and is further shaped by lifestyle changes and shifting relationships with the environment. Current freshwater and fisheries management frameworks do not always recognise or support harvesting practices and the knowledge they sustain. Not everyone who now consumes freshwater fish has caught one or has a connection with fishing, and as harvesting for consumption declines, connections and knowledge are being lost.

The people who catch freshwater fish are divided on how to manage them – either you aim to harvest what you will eat, or you catch and release. Regardless, both approaches demonstrate that relationships between people and freshwater fisheries are critical and necessary for management.

While convenience shapes day-to-day consumption, these preferences do not influence special occasions or the desire of some communities to continue harvesting and maintaining their relationships with freshwater fish. Availability and affordability need to be addressed and prioritised to retain freshwater fish as a staple for important events – this means having local access to sufficient quality and

quantity of each species. To ensure availability, harvesting skills need to be maintained within communities, alongside continued familiarity with flavours, and preparation and cooking methods.

What should policy- and decision-makers do with this information?

- Recognise that freshwater fish remain a highly valued part of feasting and kaihaukai, but their availability for consumption is declining, and supply is increasingly uncertain. The ongoing reduction in harvesting is not a reflection of freshwater fish losing their cultural and social value.
- Investigate the regional pressures on freshwater fish and their habitats, and how impediments to harvesting practices have affected consumer preferences and attitudes.
- Examine how freshwater and fisheries management frameworks affect, and could better support, harvesting for consumption.
- Consider localised harvesting practices and the knowledge, communities and relationships they sustain, and what happens when these decline.
- Understand and provide for the interdependencies between culture, value, harvesting and consumption. These components should not be addressed in isolation.

How can policy- and decision-makers affect action and change?

- Uphold the relationships and connections with freshwater fish by supporting iwi, the wider community and private revitalisation efforts of wild foods.
- Commission research on the consumption and harvesting of freshwater fish to understand what is needed for future food security and the continuation of cultural and recreational practices.
- Consider management techniques that protect freshwater fish while providing for appropriate levels of harvesting for consumption.
- Understand that the evolving relationship with fish consumption offers important insights for shaping policies and initiatives that support customary fisheries and associated rights.

Selected glossary

Term	Definition
Hākari	Feast, celebration
Hau kāinga / hau kāika	Home people, local people of a marae
Hīnaki	Traditional woven basket-like fish traps
Īnanga / īnaka	Main whitebait species (*Galaxias maculatus*)
Kaihaukai	A Kāi Tahu tradition involving the reciprocal exchange, bartering or sharing of food among kinship groups
Kaitiaki	Guardian
Kākahi / kāeo / torewai	Three species of freshwater mussel (*Echyridella menziesii, E. aucklandica, E. onekaka*)
Kanakana / piharau	Lamprey (*Geotria australis*)
Kōaro	Climbing galaxiid (*Galaxias brevipinnis*), a whitebait species
Kōkopu	Three species of galaxiid, also whitebait: giant kōkopu (*Galaxias argenteus*), banded kōkopu (*G. fasciatus*), shortjaw kōkopu (*G. postvectis*)
Kōura / kēkēwai / kēwai	Native freshwater crayfish (*Paranephrops planifrons*)
Kōwaro / hauhau / waikaka	Five species of mudfish (*Neochanna burrowsius, N. heleios, N. apoda, N. diversus, N. rekohua*)
Mahinga kai / mahika kai	Food-gathering sites, traditions and methods
Manawhenua	Customary authority over a particular area and use of its resources
Maramataka	Māori lunar calendar
Mātauranga Māori	The body of knowledge originating from Māori ancestors
Nohoanga	Seasonal occupation sites used by Kāi Tahu
Pā kanakana / utu piharau	Lamprey weir, used to catch lamprey swimming upstream
Pā tuna	Traditional weir for catching tuna
Porohe	Common smelt (*Retropinna retropinna*)
Rāhui	A temporary ritual prohibition, closed season, ban, reserve
Raupō	Bullrush (*Typha orientalis*), a common wetland plant
Salmonids	Trout and salmon species
Tangata whenua / takata whenua	Local Indigenous peoples
Tiriti o Waitangi	Te reo Māori text of New Zealand's founding document
Treaty of Waitangi	English-language text of New Zealand's founding document
Tuna	Freshwater eels, including the longfin eel (*Anguilla dieffenbachii*) and shortfin eel (*A. australis*)
Upokororo	Grayling (*Prototroctes oxyrhynchus*), extinct

References

1. McDowall RM. Ikawai: freshwater fishes in Maori culture and economy. Christchurch: Canterbury University Press; 2011.
2. Mahuta R, Van Schravendijk-Goodman C, editors. Eating with my tuupuna: practices, kai and aakari of Poukai, Waikato. Taupiri: Swamp Frog Environmental & Tree Consultants Ltd; 2024.
3. Morris B. World building: the story of kōura. New Zealand Geographic. 2024;189. Available from: https://www.nzgeo.com/stories/world-building-the-story-of-koura/
4. Burton D. Two hundred years of New Zealand food and cookery. Wellington: Reed; 1982.
5. Meredith P. Te hī ika – Māori fishing. Te Ara – the Encyclopedia of New Zealand. 2009 Mar 2. Available from: https://teara.govt.nz/en/te-hi-ika-maori-fishing
6. An anglers' feast. Rod and Gun Club's supper. Press. 1911 Mar 21:9. Available from: https://paperspast.natlib.govt.nz/newspapers/CHP19110321.2.57
7. Galbreath R. Working for wildlife: a history of the New Zealand Wildlife Service. Wellington: Department of Internal Affairs; 1993.
8. Tipa G, Nelson K, Emery W, Smith H, Phillipps N. A survey of wild kai consumption in the Te Arawa rohe. Hamilton: National Institute of Water & Atmospheric Research Ltd; 2010.
9. Ministry for Primary Industries. New Zealand seafood consumer preferences: a snapshot; 2019. Available from: https://www.mpi.govt.nz/dmsdocument/38750-New-Zealand-seafood-consumer-preferences
10. Ipsos. Consumer behaviour and preferences in the New Zealand retail grocery sector: consumer study report. 2021.
11. Wao Aotearoa. Queenstown Lakes District food resilience report. 2023.
12. Anderson A, Binney J, Harris A. Tangata whenua: a history. Wellington: Bridget Williams Books; 2015.
13. Knight C. New Zealand's rivers: an environmental history. Christchurch: Canterbury University Press; 2016.
14. Federated Farmers. Southland Feds boycott Fish & Game. Farmers Weekly. 2024 Oct 17. Available from: https://www.farmersweekly.co.nz/news/southland-feds-boycott-fish-game/
15. Cropp A. Fish fights: Kiwi anglers compete with tourists for prime spots on our waterways. Stuff. 2018 Mar 23. Available from: https://www.stuff.co.nz/business/100076914/fish-fights-kiwi-anglers-compete-with-tourists-for-prime-spots-on-our-waterways
16. Simpson M. Opening a can of worms. Fish & Game. 2014;83:48–53.
17. Orman T. The sport in fishing. Wellington: Reed; 1979.

Fish Futures

CAWTHRON

Kauati

LINCOLN UNIVERSITY
TE WHARE WĀNAKA O AORAKI