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LINCOLN UNIVERSITY
TE WHARE WĀNAKA O AORAKI

A study of the cultural values of wild goldfish (*Carassius auratus*) in Te Arawa Lakes

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Prepared for Te Arawa Lakes Trust

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Executive Summary

This research supports management of morihana (*Carassius auratus*) by bringing together scientific, historical, and cultural knowledge. We synthesized existing scientific information about morihana, analysed historical archives, and interviewed knowledge holders to develop a shared knowledge base that can inform future freshwater fish management.

Historical materials showed how morihana were introduced in Te Arawa lakes in 1875, before trout, with Māori deriving value from them fairly quickly. Children caught and traded morihana, whānau valued eating them, and they featured regularly in descriptions of the place and time. As soon as 1916, Te Arawa whānau were staunchly defending their access to morihana from proposed government restriction. According to historical accounts, in the first half of the twentieth century morihana were considerably larger, more abundant, and more colourful than they are today. Social surveys indicate that morihana are still harvested but not by many.

Ecological information indicates that wild goldfish are widely distributed across Aotearoa and in Te Arawa rohe, residing in still areas like ponds, lakes, and slow-moving streams. In Te Arawa rohe their abundance is considered to have reduced but they are still very common, with thousands of morihana caught in catfish nets every year. Wild goldfish are bronzy olive in colour and typically up to 150mm, though some locations are thought to have larger and more colourful fish. The life cycle of goldfish is thought to somewhat constrain their physical range to the warmer North Island, and former harvesters can describe mātauranga relating to the timing and sex classification of the fish. It is unclear what effects goldfish have on the ecosystem, but some interviewees consider it likely to be negligible.

Morihana were caught by Māori principally using nets or by hand, with spearing also mentioned. Different families had different approaches, ranging from plucking the fish out of wetlands or the water column by hand, to scooping them with nets or creating corridors and chasing fish into larger net systems.

Harvesting of morihana was typically a family affair, involving children and their parents and/or grandparents.

Morihana harvest was guided by tikanga and mātauranga. Tikanga surrounded the timing of harvest and directed the types of fish that could be caught. Karakia and waiata framed the practice of fishing, connecting whānau and the fish to te taiao and the cosmos. One interviewee, Matua Timitepo, shared a rich story with spiritual elements, describing morihana related mātauranga that has been developed by his whānau and which he has now passed on to his children.

Morihana were prepared for consumption in several ways. Most common was boiling the fish followed by overnight refrigeration, so the fish could become like ‘jelly’ and bones would be soft. Other methods included pan frying, smoking, and raw consumption. Some preparation practices focused on removing bitter parts, while others focused on making the entire fish amenable for consumption. The fish are remembered as very bony, largely bland, and usually eaten with bread.

Wild goldfish have no national status for environmental management and are specified as of interest in three regional pest management plans. In Otago and Greater Wellington goldfish are listed as of interest for future potential control, and in Auckland they are listed as a pest for exclusion on Aotea/Great Barrier Island, with a ban on release of goldfish for the wider region. In Te Arawa rohe morihana are designated as taonga species, meaning harvest is regulated and requires a permit.

Interviewees expressed different ideas about what it means for a species to be called a taonga. These provide insight into different perspectives that can be considered together by decision makers. Decision making about the morihana fishery in Te Arawa rohe is entrusted to Komiti Whakahaere, who can consider all relevant information in this report as well as other knowledge and values held by whānau.

1. Introduction

Wild goldfish (*Carassius auratus*), called morihana in Te Arawa rohe, have been in Te Arawa lakes and waterways since the 1870s. Originally introduced into Lake Rotorua by agents of the colonial government, morihana came to be harvested, consumed, and traded by whānau, who subsequently built-up cultural connection with the fish. In 2015, morihana were classified as a taonga species in the first Te Arawa Fisheries Plan (TALT 2015), and in 2020 harvest of morihana was limited by fisheries bylaws to ensure sustainability of the population.

Morihana are considered to be "widely distributed" throughout Te Arawa lakes, albeit in possible decline due to degradation of wetland and lakeshore habitats (TALT 2015). Local knowledge and scientific research suggest only a small number of people harvest morihana anymore, with the larger trout more commonly preferred. Concern has been raised about heavy metal accumulation in morihana who dwell near geothermal areas, leading to scientific studies of those areas (Figure 1).

With morihana being an introduced species that affects lake ecology, there is interest from the community in learning why this species has been classified as a taonga, and what connections whānau have had with this fish. Generational change since the fisheries plan was first developed has meant that cultural memory about morihana has continued to diffuse. It is helpful, therefore, to create a shared evidence base describing cultural relationships with morihana that can inform future decision making.

Figure 1. Bucket of morihana collected from scientific monitoring at Lake Rotoehu, Oct 2024. Photo by Ian Kusabs.

2. Purpose

The primary purpose of this study is to collect historical and contemporary evidence pertaining to the cultural values and meanings of morihana in Te Arawa Lakes. Documenting and collecting stories of six whānau for whom morihana have significant cultural meaning will help iwi entities, kaitiaki, and community members to better understand and appreciate the range of connections that whānau have had with these fish.

A second purpose of the study is to bring together existing information about morihana from scientific, regulatory, and historical sources, to assist anyone in Aotearoa who wishes to better understand and manage these fish. To support this aim, we also conducted interviews with three management agency staff about morihana ecology, impacts, and values. Our aim is to provide a rigorous review of scientific knowledge on morihana woven together with stories and experiences of real-world study, interaction with and management of the fish.

An inspiration for this study was Robert McDowall's (2011) *Ikawai* which contains chapters addressing Māori connections to each species of freshwater fish in Aotearoa. *Ikawai* contains a chapter on morihana, but at under four pages, it left us wanting to know more. We envision this present report as an updated and extended *Ikawai* chapter on morihana.

Before proceeding it is important to describe the authors and their roles in the research.

Marc Tadaki is a Pākehā researcher who has lived most of his life in Auckland, Nelson, and now Christchurch. He is a social scientist and senior lecturer at the Department of Environmental Management in Lincoln University, who teaches and does research on freshwater management. Marc co-leads the Fish Futures research programme (2021-26), which focuses on understanding people's connections with freshwater fish. Marc supervised Sabrina's masters project, helped with the interviews and analysis, and led reanalysis and writing for this report.

Sabrina Davis is a Pākehā researcher from San Francisco who contributed to this research as part of her Masters in Sustainability at Maastricht University. When searching for a research project in 2023, Sabrina contacted Marc (a second cousin, once-removed) for advice on project selection, and Marc suggested aligning to address an interest from Te Arawa whānau about the history of morihana. Sabrina spent time in Aotearoa, led the interviews and initial analysis, completed her thesis, and has since helped write the report from San Franciso.

Nicole Hunt is Tūhourangi, Ngāti Pikiao, and Ngāi Tūhoe. Nicole grew up in Kawerau and is now based in Rotorua. She works as a Rangahau Coordinator for Te Arawa Lakes Trust. Nicole is interested in archiving, sharing and strengthening cultural knowledge. She led the filming and archiving of the interviews, helped organise and conduct the interviews, and contributed to analysis and writing.

Soweeta Fort-D'Ath is Tūhourangi and Ngāti Raukawa ki te Tonga. She is the Lakes Programme Coordinator for Te Arawa Lakes Trust, and her work includes supporting revitalisation of mātauranga related to taonga species and environmental stewardship. When asked in early 2023 about ideas for a potential student project that might support the work of Te Arawa Lakes Trust, Soweeta reflected that whānau have expressed curiosity to learn more about morihana. Soweeta led organisation of the project relationships, identified participants, helped organise and conduct the interviews, and helped with writing.

3. Methods

To collect information about the science, management, and cultural meanings of morihana in Te Arawa Lakes, we drew upon three sources of evidence: a traditional literature review, a structured analysis of historical documents, and interviews with knowledge holders.

For our traditional literature review we used Google Scholar, citation-following, and word-of-mouth from New Zealand freshwater fish experts (such as Dr Ian Kusabs) to identify relevant publications that discuss ecological aspects and/or cultural meanings of morihana in Te Arawa Lakes and Aotearoa. Key among these references were a social science study of mahinga kai in Te Arawa Lakes (Tipa et al., 2010), Kusabs' (2015) summary of morihana for the Te Arawa Fisheries Plan, chapters on morihana by McDowall (1990, 1994, 2011), Collier and Grainger's (2015a) edited volume on invasive freshwater fish, the NIWA (2020) report on pest freshwater species, and information on the NIWA (2025a) website. We elaborate relevant insights from these sources in the following sections.

To provide historical context for cultural associations with morihana, we also reviewed articles from historical archives, Papers Past. Papers Past is a digital archive of newspapers from Aotearoa and the greater Pacific spanning the 19th and 20th centuries. We searched the website using its in-built search feature to find the keywords "morihana", "goldfish", and "carp". We first limited the search to Bay of Plenty regional newspapers to find the most relevant articles, and then expanded to a national search using the same terms. We discarded mis-captured words and irrelevant stories, such as those about the keeping of pet goldfish in tanks or ponds. When there were duplicate or similar stories in multiple newspapers we analysed only one version of the story, typically the longest version. We also excluded stories about mass mortalities and the many articles since the 1940s on grass carp and aquatic weed management. Appendix 1 contains what we consider the 32 most relevant newspaper articles providing insight into people's relationships with morihana/wild goldfish in Te Arawa and wider Aotearoa.

To evidence current management perspectives and cultural connections to morihana, we conducted semi-structured interviews with nine knowledge holders who have interacted with morihana. Six whānau participants and a local Māori biosecurity officer were identified by Te Arawa Lakes Trust coordinator Soweeta Fort-D'Ath, who approached and invited them into the study. Soweeta also identified relevant local staff from Fish and Game and the Department of Conservation, who each referred us on to staff with bespoke expertise and experience relating to morihana. Interviewees and their experience are outlined in Table 1.

We developed a schedule of interview questions to provide a consistent structure for interviews (see Appendix 2). A semi-structured approach provides consistency while allowing each interviewee to spend time on those topics of greatest interest and relevance to them (King et al., 2019). Interviews began by inviting participants to outline their connections to Te Arawa rohe, the roto/lakes, and to morihana in particular. We then asked about the particularities of the fish, such as their size, abundance, and habitats, and invited participants to share stories that they recall and what they think about morihana. Interviews ended with participants reflecting on whether morihana should be considered a taonga species, and why.

Interviews were conducted in July 2023 either in-person in the Rotorua region or by Zoom (for Phoenix Hale). Fish and Game and DOC interviews were conducted only by Sabrina Davis and Marc Tadaki. All other interviews were conducted by Sabrina Davis, Marc Tadaki, Soweeta Fort-D'Ath, and Nicole Hunt. All interviews were consensually audio-recorded and transcribed, with transcripts provided back to participants for checking and corrections. Several participants provided additional consent for also filming the interviews for potential inclusion into Te Arawa cultural archives.

Table 1. Information about interviewees.

Name	Role	Experience with morihana
William Anaru	TALT biosecurity officer	**Type of experience:** Family who harvested morihana, morihana monitoring **Background:** Ngāti Whakaue, Ngāti Tuwharetoa, Te Whānau ā Apanui. Grew up around Rotorua, and lived in the United States for six years as a teenager. He grew up fishing for his family, but did not catch morihana to be eaten - only for fish tanks. Through netting for the Catfish Killaz programme, he encounters morihana regularly as bycatch.
Steven Henry	Skipper	**Type of experience:** Morihana harvest as child, family who harvested, morihana monitoring **Background:** Ngāti Pikiao, Ngāpuhi, Ngāi Tūhoe, and from Mourea. In childhood, harvested morihana by hand in the Ohau Channel, his awa, and the Okawa Bay. Learned the practice from his mother and aunties, who would sing waiata while the children caught morihana. Now he encounters morihana regularly as part of the catfish netting program.
Morgan Bidois	Skipper	**Type of experience:** Morihana harvest as child, family who harvested, morihana monitoring **Background:** Ngāti Rangiwewehi. In childhood, harvested morihana by net and by hand in the Reporoa creek and local caves. He learned the practice from his father and uncle. He often went out with his father and brother to catch morihana for the family. Now he encounters morihana regularly as part of the catfish netting program.
Matua Timitepo	Kaumatua	**Type of experience:** Morihana harvest as adult, family who harvested **Background:** Te Arawa, Tainui, Takitimu. Learned to harvest morihana in Lake Rotoehu from his kuia, who taught him tikanga and mātauranga related to morihana. He has passed on this knowledge to his children. Out of our interviewees, Matua Timitepo has most recently harvested morihana, in 2009, when the kingitanga visited Taheke Marae.
Ian Kusabs	Freshwater fisheries scientist	**Type of experience:** Morihana monitoring, Te Arawa lakes ecology **Background:** Te Arawa, Ngāti Tuwharetoa, Ngāti Maru, and grew up in Rotorua. While he did not harvest morihana himself as a child, he has memories of a teacher at Kaitao Intermediate telling the class that they used to collect them when they were bathing in hot pools next to the lake at Ohinemutu. Now, he is a leading expert on native fish and their harvesting methods in Aotearoa. He works closely with Te Arawa Lakes Trust as a freshwater advisor, and monitors morihana and kōura populations in the Te Arawa Lakes.
Arapeta Tahana	Komiti Whakahaere	**Type of experience:** Family who harvested morihana **Background:** Ngāti Pikiao, Ngāti Makino, Tapuika, from Tawhakarere Bay. Grew up hearing stories from his father and elders about morihana, who liked to harvest and consume it. He did not see morihana in the lake while growing up, but has an interest in understanding freshwater taonga. Contributes to the Komiti Whakahaere, which helps to implement the Te Arawa Fisheries Plan.
Matt Osborne	Fish & Game New Zealand Officer	**Type of experience:** Morihana monitoring, management **Background:** Now a seasoned staffer of Fish & Game, Matt has a background in pest fish management that he applies to his current role of running the fisheries programmes for the Eastern Region of Fish & Game. He is involved in many different operational groups throughout the region.

Phoenix Hale	Department of Conservation Technical Advisor, Freshwater	**Type of experience:** Morihana/goldfish management across Aotearoa, ecology **Background:** Ngāti Porou ki Hauraki, from Coromandel. Now resides in Dunedin, as a Technical Advisor for the Department of Conservation, with expertise on freshwater pests and their management throughout the country.
Te Wakaunua Te Kurapa (Waka)	Bay of Plenty Regional Council Biosecurity Officer	**Type of experience:** Morihana monitoring, pest management **Background:** Tūhoe, from Ruatāhuna. His awa, the Whakatane River, did not have morihana, but heard stories that some of his elders had made the long journey from Ruatāhuna to Rotorua to harvest morihana. He now works closely with Te Arawa Lakes Trust to monitor catfish and other pest species in the Te Arawa Lakes.

4. History of wild goldfish in Aotearoa and Te Arawa rohe

Any historical account of morihana in Aotearoa must explicitly address the slippage between the terms goldfish and 'carp'. In New Zealand newspaper writings till about 1980, reference is made to generic 'carp' either without naming the species or by attributing a species without the ability to discern the accuracy of the attribution. For example, several news stories refer to the widespread introduction of Prussian Carp (*Carassius gibelio*) across Aotearoa; yet there are no Prussian Carp in New Zealand presently and McDowall (1990) thinks this was a misattribution of what were goldfish (*Carassius auratus*), whose wild variants look similar to Prussian Carp.

Writers such as Thomson (1920) and Graham (1939) claim that the culturally-valued 'morihana' unambiguously refers to European carp (*Cyprinus carpio*), not goldfish (*Carassius auratus*), a distinction that the authors claim can be made visually as goldfish lack barbels under their mouth. In contrast, Pycroft (1933) merges goldfish and carp in his account of morihana and its introduction to the lakes. Looking into this matter, freshwater fish scientist and environmental historian Robert McDowall (1990: 231) considered that "The goldfish is often called carp in New Zealand (largely by those unaware of its identity and relationship to the domesticated fish), but the name carp applies to a very wide range of related species, and it's best not used." McDowall (1994: 220) further reasoned that, "from the widespread occurrence of goldfish in our waters, and the general lack of other carps, it seems most likely that the fish [referred to as 'carp'] were simply goldfish." Given McDowall's relevant expertise and the rigour he applied to his investigations of environmental history (McDowall 1990, 1994, 2011), we adopt McDowall's reasoning here, treating early mentions of 'carp' and goldfish as synonymous, with the label morihana applying to both. Since there are currently no European carp (*Cyprinus carpio*) or common/koi carp (*Cyprinus rubrofuscus*) in Te Arawa lakes (NIWA 2025b), we consider it reasonable to assume that early mention of 'carp' was a catch-all term used to describe goldfish.

Wild goldfish (*Carassius auratus*) first arrived in Lyttelton Harbour in 1864 aboard the British Empire, in the country's first shipment of live imported fish, in a consignment for one Alex Johnson (Thomson 1920, McDowall 1994). Subsequently, in 1867 the Auckland Acclimatization Society obtained and introduced 'carp' into Lake Pupuke, St Johns Lake, and elsewhere in that region, where goldfish are now common; the Nelson Society imported 'carp' from Sydney; and in 1868 the Canterbury Acclimatisation Society imported goldfish from Melbourne (Thomson 1920, Graham 1939, McDowall 1994). From there, goldfish were likely liberated far and wide, in lagoons, coastal streams, wetlands, lakes, and larger rivers, becoming "very abundant in many parts of the North Island, especially in the thermal lakes district" (Thomson 1920).

Since goldfish were never legally defined as an acclimatised fish, they could be taken - and moved - by anyone (McDowall 1994). As summarised by McDowall (1994: 220), "In spite of their early role in introducing goldfish, the [acclimatization] societies never had much interest in them, and never exercised any control over them." The proliferation of goldfish was likely shaped most heavily by pond keepers and aquarists, who wanted to increase the number and diversity of fish available in New Zealand's freshwaters; their ability to import and sell goldfish was not regulated until 1972 (McDowall 1990).

The name 'morihana' was derived from the introduction of the fish into the central North Island lakes in the 1870s. Sub-Inspector Henry Charles Morrison was in charge of the Armed Constabulary (New Zealand militia) in Tapuaeharuru (Taupō) (Graham 1939), and, in 1872, collected a shipment of goldfish in Napier, from Auckland. Rotorua resident R. D. Dansey recounted to Thomson (1920) the introduction of morihana to Taupō, their naming, and how they were moved to Rotorua:

> I was present when... a small number of carp were first liberated in Lake Taupo by Sub-Inspector H. Morrison, of the Armed Constabulary, then stationed at Tapuaeharuru. They had been brought up from Napier in a billy. Members of the constabulary had been purposely stationed at intervals of several miles along the track from Napier to Taupo, 90 miles, and the billy and its precious contents was passed on from

> man to man till it reached Tapuaeharuru, where the fish were liberated near the outlet of the lake. All hands and the cook from the redoubt proceeded to the spot to see the liberation, and many Natives came across the Waikato River to see the new pakeha fish. There was great cheering as the little carp swam out from the bank. The Natives called them there and then 'Morihana,' after Captain Morrison, and they are still only known by the Natives in the Taupo and Rotorua districts by this name.

In another account of the same events, D.S. Cross (1972) elaborated that:

> An experimental parcel of about 30 carp was forwarded per s.s. Star of the South, Mr Lodder having kindly offered to superintend their transit to Napier. At that port they were received by a special messenger, whom Captain Morrison had directed to be in waiting, and were at once conveyed to Lake Taupo in excellent condition, 24 fish having survived the trip. These were divided into two parcels, one of which was liberated at the south end of Lake Taupo; the other in Roto Ngaio, a shallow lake, and abounding in weeds. The Maoris of the district are greatly interested in the experiment, and have promised Captain Morrison to liberate any of the carp that may be captured in their kupengas. If therefore the strangers can only keep out of the way of the shags until after the first spawning season, the success of this interesting experiment will be assured.

Three years later, the Thames Advertiser (1875) reported that the fish introduced to Taupo

> have increased and multiplied wonderfully. According to our informant the natives at Tokano [Tokaanu] are netting them wholesale, stringing and drying them as eels and young sharks are prepared for keeping by the Maoris. Many of the carp that have been caught weigh between four and five pounds.

In August 1875, a Rotorua telegram reported that “27 carp, forwarded by Mr Young from Taupo for Lake Rotorua, have been received” (see Auckland Star 1875). The Press (1875) later described the introduction in greater detail:

> Carp have at last been introduced into the Rotorua Lake. The feat of introducing them, says the Ohinemutu correspondent of the Bay of Plenty Times, was accomplished successfully last week through the forethought and care of Mr J. C. Young, of the Land Purchase Department, who originated the idea of bringing the fish from Taupo Lake, where they are now a great success, and prove a very important addition to the food of the inhabitants there. Mr Jack Loffley, the popular Taupo guide, undertook the conveyance of carp from Taupo by hand, and many thanks besides the small douceur he received for his trouble are due to him by the public generally. It is to be sincerely hoped that the carp will prove an equal success at Rotorua and Rotoiti as at Taupo. The Tarawera, Rotokākahi, and other lake natives are subscribing for a similar supply for those waters, and this will no doubt be accomplished during the summer.

R.D. Dansey recounted an element of this story to Thomson (1920):

> ...five of us subscribed a pound each and commissioned 'Jack Loffley' to bring a billy of young carp down from Taupo, where by that time they had become exceedingly numerous. They were duly liberated at the mouth of the Utuhina Creek and in a small lagoon emptying into the lake, where they multiplied at an enormous rate. The Maoris did not like them, considering them too full of bones and dangerous for their children.

Rotorua surveyor Captain Gilbert Mair (see Appendix 1) recalled introducing a second batch of fish to Rotorua in September 1875:

> I put 30 in Rotorua, 15 in Tarawera, and 14 in Rotokākahi Lakes. Those liberated in Rotorua seem to be increasing fast; as they can be seen in shoals in the warm water bay at Ohinemutu springing out of the water.

Appendix 1 accounts over the following years report the fish growing in both abundance as well as size, developing some bright colourations, affinity for warm areas, and being valued by Māori:

> Our carp are increasing in great numbers; they are evidently very partial to hot water, as it is in the vicinity of Ruapeka where they are generally seen disporting themselves. Bay of Plenty Times, May 1876

> The carp, liberated in the lake by Mr Young and Captain Mair a year ago, can be seen by thousands enjoying themselves in water almost too hot to bear one's hand in. Bay of Plenty Times, September 1876

> Carp are very plentiful in the Rotorua Lake: natives have caught some weighing close on two pounds. The chiefs have forbidden nets to be used until next season. Bay of Plenty Times, December 1877

> Carp are here in shoals, in the hot water, and are of a red color; only a short time has elasped [sic] since they were put first into the lake, and now they exist in thousands. Grey River Argus, March 1879

> The carp introduced some four or five years ago from Taupō by Messrs. Mitchell and Young into Rotorua Lake, and subsequently into Rotorua, Tarawera, Rotomahana, &c, by Captain Mair, have increased in a most wonderful manner, and are being now largely used by the natives for food. Bay of Plenty Times, March 1881

McDowall (1994) wrote that the primary consumers of morihana were Māori from around Rotorua, who "found them palatable food easily obtained from the lakes" (p220).

The Te Arawa fisheries plan notes that

> Morihana proved to be a popular fish for eating, but were only abundant and large enough to be worth catching around the warm, geothermally influenced areas of Lake Rotorua such as Ohinemutu and Ngāpuna. They were later introduced to lakes Tarawera, Rotoehu and Rotomahana. Although this new fishery was popular with Māori, it was localised and did not replace the more widespread fisheries of īnanga and kōkopu. (TALT 2015: 5)

A 1910 Auckland Star article on tales from the Rotorua region (Appendix 1) describes morihana as part of the cultural landscape:

> Around the rushy lake-shore we saw little Maori children "guddling" for the black carp and the goldfish that abound there. The carp are called by the Maoris "morihana," a name which has a rather curious origin. It is simply the Maori way of pronouncing " Morrison." ... [A] Mr. Morrison... introduced some carp here from Auckland, and liberated them in the lake, and the Maoris called them after him. The goldfish are called "ika-whero"' or "red-fish." (Cowan 1910)

Surveyor Gilbert Mair also wrote of how the

> much despised [goldfish had] become an important, every-day food... many a little lass or lad would have to go to school on an empty "tummy" were it not for the friendly [goldfish]." (quoted in McDowall 1994: 221)

Nature writer Pycroft (1933) wrote that

> The long and lucrative trade in goldfish sprung up between the Ohinemutu Maori children and visitors. Carp frequenting the thermal waters along the southern shores of Lake Rotorua soon turned a bright red or

> white, some partly red and partly silver. The children became adepts at catching them with their hands. The fish, weighing a quarter of a pound or more, frequented shallow water amongst reeds and rushes.

Goldfish were not listed as an acclimatised fish - and therefore remained officially unmanaged by the acclimatisation societies. However, Māori access to morihana was still policed by the government and fishers. Gilbert Mair elaborated that Māori children were sometimes

> threatened with punishment for catching [goldfish] about the wharf on the plea that they disturbed the trout while feeding, and an aged Maori widow... had her breakfast of fried [goldfish] confiscated because she had dared to gather a few... thrown up on the beach nearby during a "roaring westerly" (quoted in McDowall 1994: 221).

Thomson (1920) reported that

> in June, 1916, at a meeting of the Arawa tribe in Rotorua, it was decided to send a telegram to the Hon. W. H. Herries, Minister of Native Affairs, protesting against a recent Government notification forbidding the catching of carp in Lake Rotorua, and pointing out that the Maoris were thereby deprived of a food supply which they had enjoyed for the last 30 years.

Māori had by then incorporated morihana into their diet and culture. In an advertisement for a 1924 New Years Day carnival in Rotorua, for example, "Diving for carp (Ruku morihana)" was a named competition, with an entry fee of 1 shilling and a first prize of 10 shillings (Appendix 1). Historian Don Stafford wrote that Māori had taken "much interest" in the introduced food species, and were proactively managing them by liberating any that were caught in nets accidentally, and even banning the use of nets for the remainder of a fishing season (quoted in McDowall 2011). Articles featured in Appendix 1 include reports of fishers catching 'carp' as large as 4lb from the Ohau Channel in 1933, and even a 9lb fish from Lake Rotoiti in 1937.

In the morihana chapter of *Ikawai*, McDowall (2011) reports only one detailed story about the capture and consumption of morihana. It was from Florence Harsant, the daughter of a Pākehā schoolteacher in Taupō in the early 1900s:

> One delicacy I came to enjoy [when living among Māori] as much for its associations as for its flavour... we would take potatoes and matches and then catch a small variety of carp called 'morihana'. Wading the shallows we would feel for them among the water-weeds and catch them in our hands, a pastime accompanied by much splashing, shouting and laughter. The carp were later baked together with the potatoes, in the embers of our fire, and were deliciously sweet, but bony. (quoted in McDowall 2011)

In Papers Past, we also found two historical accounts of Māori fishing for 'carp' outside of Te Arawa rohe:

> Although carp are seldom seen in the Waikato River, they seem to be fairly plentiful in it. When it overflows in the winter, it fills all the lagoons along its banks, and the carp which seem to prefer the stagnant water remain behind. In the fall of the year the lagoons become almost dry, and Mr Frost states that he has seen them teeming with carp of all colours. There are red, golden, white-and-black, red-and-black, and white. The Maoris make hauls of them, and have great feasts. The only complaint they make in regard to the carp is that there are too many bones in them. The Maoris have a recognised method of catching these fish. They select a lagoon about one foot deep. Beginning at one end, they wade the whole length several times, stirring up the mud as much as possible. In a short time the lagoon is turned into mud. The fish do not like this, and they rise to the surface, and put their mouths out of the water until their heads may be seen in all parts of the lagoon. The Maoris then catch them by hand and transfer them to capacious kits, slung on the fishers' backs. The carp cannot see far on account of the muddy condition of the water, and are almost helpless. Otago Daily Times, March 1911

> Three Maori girls were seen catching carp in the Horowhenua Lake on Sunday, the method being to wade in the shallows and watch for a movement of the fish, which was deftly thrown up into a basket held by another girl. In about half an hour the basket was nearly full of beautiful fish. Feilding Star, August 1933

Patrick Burstall (1927-1993), conservator for the Rotorua district, reported that unlike toitoi and kōaro, which were always cooked, morihana were at least sometimes eaten fresh (cited in McDowall 2011). Morihana are notoriously bony, however McDowall (2011) notes that morihana are only half as bony as toitoi and kōaro, other freshwater fish harvested by Māori.

Over time, as the trout fisheries in Te Arawa lakes (introduced in 1880s) grew and as Māori obtained greater access to that larger, more abundant, and tastier fish, the harvest of morihana declined. Burstall (1980) also considered that the size of morihana had noticeably decreased since the 1930s:

> They were in various colours of brown, silver and red and fish in excess of one kilogram were not uncommon. I can recall as a boy in the 1930s catching these fish, particularly at twilight and during the early evening darkness, along the shore near where the Soundshell now stands. This area has long since changed and the large carp are not longer there but they are still numerous in lake Rotorua although I have not recently seen them attain the sizes that were common in the 1930s and, according to records, back into the 1890s. (1980: 117)

In 2011, McDowall concluded that

> there is little evidence of interest by Māori in morihana in recent times - they are probably a casualty of the shift of modern Māori communities to a western diet and the associated cash economy. Probably, too, abundance of morihana has declined owing to drainage of wetlands for development around many lake shores. Moreover, someone trying to catch these fish with either a hook and line, or some kind of net, is sure to encounter the wrath of managers of trout fisheries that often coexist in the lakes. (2011: 385)

However, a study by Tipa et al. (2010) reported that morihana were still harvested by at least four people from their sample of 18 Te Arawa cultural harvesters. When asked how the abundance of morihana had changed, most respondents thought that there were either “a lot fewer” (43%) or “slightly fewer” morihana (14%) than there used to be. Tipa et al. also reported specific reflections from interviewed whānau about morihana:

> Morihana was probably one of the most valued fish in Lake Rotorua or in any of the lakes, that was a real delicacy, morihana, but of course that was introduced. (2010: 129)

> Lake Rotorua was clear when I was going out [as a child] - clear as crystal and you could see - when we used to go and get morihana, you could see the schools and they were huge schools of morihana swimming all around the lake, all around the lakefront and they used to breed in the raupo. (2010: 99)

> As a child, I have never seen a morihana, I didn’t even know that they existed until as I have got older and we have spoken about the morihana, but they used to say you would just pick them straight up and eat them raw. (2010: 116)

Having traversed historical evidence about cultural connections to morihana, three things can be established. First, morihana were introduced by agents of the colonial government, to Christchurch and Auckland, then to Taupō, Rotorua and the other lakes and waterways across the motu, leading to many wild goldfish populations. Second, as a relatively accessible fish, morihana came to be harvested for consumption by Māori as well as traded with tourists, and morihana came to be considered part of the local fabric of place, environment, and culture. Third, through social and environmental changes, there is not much harvest of morihana anymore, and there is a sense that morihana have become less plentiful, in part due to environmental degradation.

5. Wild goldfish ecology

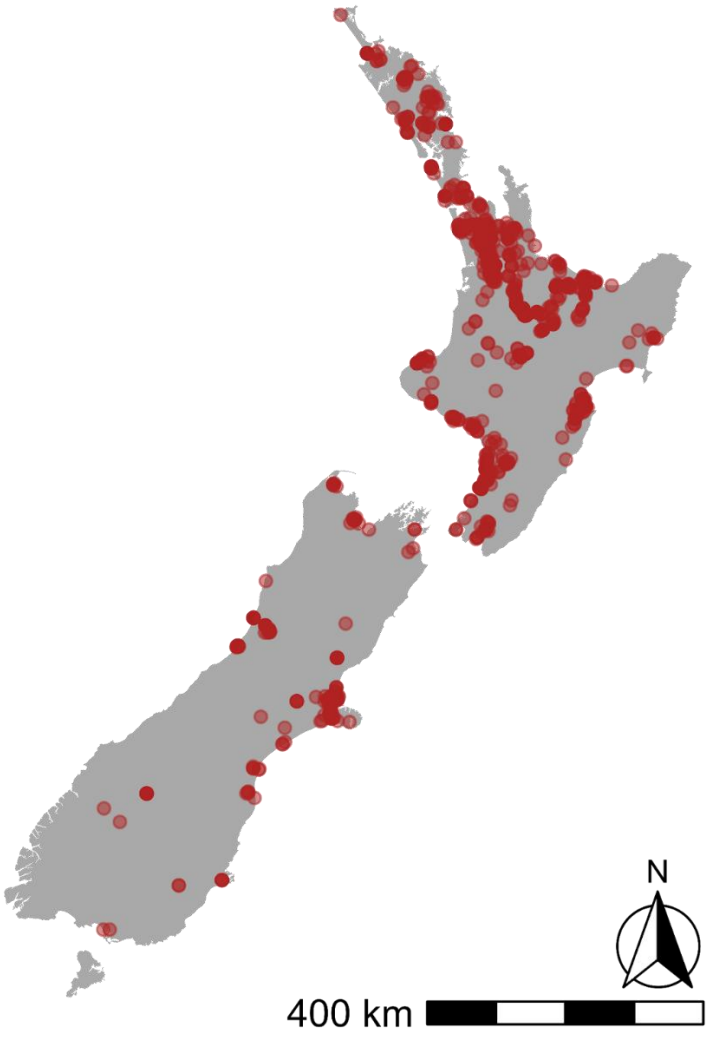
In this section we synthesise existing scientific knowledge about morihana and use interview material to expand insights into morihana ecology.

Distribution, habitat, and abundance

Wild goldfish populations mostly exist where they have been liberated, typically in small, still waters such as wetlands, ponds, and lakes, but they are also known to inhabit slow moving rivers and streams (McDowall 2011, NIWA 2025a). They can live in waters with very little oxygen (McDowall 1990), and prefer environments with plenty of aquatic vegetation, which they use for spawning and to hide from predators (McQueen and Morris 2020). Flooding of ponds and wetlands provide a pathway for goldfish to spread into other water bodies (Collier and Grainger 2015b).

Goldfish are considered “widespread and well established” across the North Island (NIWA 2025a), and occur in a few South Island locations such as Nelson, South Canterbury, central Otago, Southland, and the West Coast (Collier and Grainger 2015b, NIWA 2020, NIWA 2025a). The New Zealand Freshwater Fish database includes 1355 of reports of goldfish to 2023 across both islands (Figure 2).

Figure 2. Goldfish (*Carassius auratus*) reported in the New Zealand Freshwater Fish Database from 1961-2023. Map by Finnbar Lee.



Where they dwell, goldfish can be abundant. A study of invasive freshwater fish species in 770 sites from water bodies across the North Island revealed that goldfish and koi carp were by far the most abundant invasive fish in these waterways (Hicks et al. 2015a). A related modelling study of goldfish invasion potential concluded that "areas at risk of goldfish establishment are predicted to occur mostly within the current range of this species" (Collier et al. 2015b), meaning that while expansion of goldfish range is unlikely, increasing abundance within existing ranges is plausible.

Where they dwell, goldfish tend to co-occur with other species. Brown bullhead catfish, for example, occur more frequently with goldfish than any other species, and where koi carp are present, there is an 86% probability that goldfish are also present (Dean 2003).

Phoenix Hale from the Department of Conservation summarised the spatial distribution of goldfish in Aotearoa in this way:

> *It really depends where you are. I know that up in the Te Arawa area, both them and catfish, you get them in every single net. There's some places in the Hawke's Bay as well, where some of our team have gone to potential koi carp sightings - because quite often we get goldfish signalled to us as koi carp, so obviously we go out and double check. There's been lakes that are absolutely riddled to the brim with goldfish, like Northland as well.*
>
> *But generally, as you go down the country from Cape Reinga to Bluff, there is a general decrease in abundance or spread. And a lot of that actually decreases at the Cook Strait, so actually between the North and South Islands, they're a lot less abundant down here, and that's not for lack of being able to survive. Maybe it's just more difficult for them to breed in some of these larger, faster-flowing rivers, but there hasn't really been a lot of research into that aspect. (Phoenix)*

We later asked Phoenix about how goldfish are spread, and he reflected on the difficulties of managing their distribution.

> *Q: What are the pathways of goldfish introduction and spread? Are people chucking their goldfish into a pond, for instance?*
>
> *A: I think it's quite difficult to quantify what's intentional and what's not. You could have things like, is there a potential that if you accidentally flush your maybe-not-dead goldfish down the toilet, that it's going to survive the flush and go into a lake or a river? We don't know, right? And then there is also the aspect of people changing their tank water in an area that does drain to a river or a lake or something, not realizing that there's eggs in their water. There are so many different variables and factors that we would consider unintentional spread, versus the intention of someone's deliberately going and moving them between waterways and catchments and stuff, which tends to happen a lot more with species that have higher values in some way, I'd say. I'm thinking trout, perch, there's been a lot of knowledge of them being spread around the coarse fisheries right off. Even to some extent koi carp, we've had anecdotal evidence of that being deliberately spread around as well, for various reasons, but also for the value that it does have in some cultures as a food source. There was a potential situation of that happening recently.*
>
> *So it's just really, really hard to quantify because first you gotta understand what the value is of that species and then why someone would want to spread it, and also what are the other mechanisms for spread as well. There's even the potential, and we don't know how often this happens, but there has been anecdotal evidence to suggest that maybe a duck has left the pond with a bit of weed on its foot that has eggs on the weed. Very unlikely for it to drop in a waterway, but that has been suggested to be a method of spread for certain, quite catastrophic infestations too. So it's really, really hard. We can only guess so much, essentially. (Phoenix)*

Distribution, habitat, and abundance in Te Arawa rohe

The 2015 Te Arawa fisheries plan states that "Today, morihana are widely distributed throughout the Te Arawa fisheries area but are only abundant in localised areas (e.g. the arms of Lake Rotoehu) (TALT 2015: 10). The plan identifies that morihana "were/are collected from the Ohau Channel and Lakes Rotorua, Rotoiti, Rotomā, Tarawera, Rotokākahi and Rotoehu" (ibid: p10).

Kusabs (2015) elaborates that "Populations of morihana occur throughout the Te Arawa lakes but are most commonly found in the warmer waters near geothermal inflows, but high densities also occur in the shallow weedy arms of lakes (Pers. obs. D Rowe, NIWA)."

Interviewees commented on the abundance of morihana from different perspectives. Interviewees who undertook catfish netting and scientific monitoring reflected that goldfish were surprisingly common in the Rotorua lakes.

> *For context, the catfish netting programme is limited to lakes Rotoiti and Rotorua, where we know catfish are currently present. So [morihana] are well established right throughout both of those lakes. We do, on the odd occasion, do wider surveillance in other lakes, and we have caught morihana in most of those lakes, those being Tarawera, Ōkataina, Ōkāreka, Rotoehu. So we know them to be present there as well.*
>
> *[Morihana] are very, very common. I think this year [2023] through the netting programme, we caught, let's say just under 15,000. (Waka)*

* * *

> *We used to think we would catch heaps of them, we might go out and catch maybe 10 or 15 of them at a time. But, since doing this catfish netting, I have actually noticed how many there are actually out there - there's heaps of them, and they all vary in colour and shape and size and everything. There's thousands of them out there … there's more of them out there probably than catfish. (William)*

* * *

> *We usually work on five nets in that little estuary [Waitangi Soda Springs], that's the main area I do any sampling for. When we're setting out nets, just a normal standard fyke net, we can get up to 40 in one of those nets. And that's only a little part of that estuary. There must be, I'd say, tens of thousands, there's plenty there. (Ian)*

* * *

> *We've been netting them when we're doing our surveys for the catfish. We never see them [swimming openly]; they only show up in the nets when we pull them up. It just goes to show they're there, but you never see them.*
>
> *Most of the time when we pull up a net - we'll have probably 40 nets in different areas - we'll have morihana in the net. In saying that, we're mostly netting in one bay, which isn't a very big bay at all, which seems to be a good environment, because we're targeting catfish, so they just seem to be a bycatch. Every time we seem to catch morihana as well. (Morgan)*

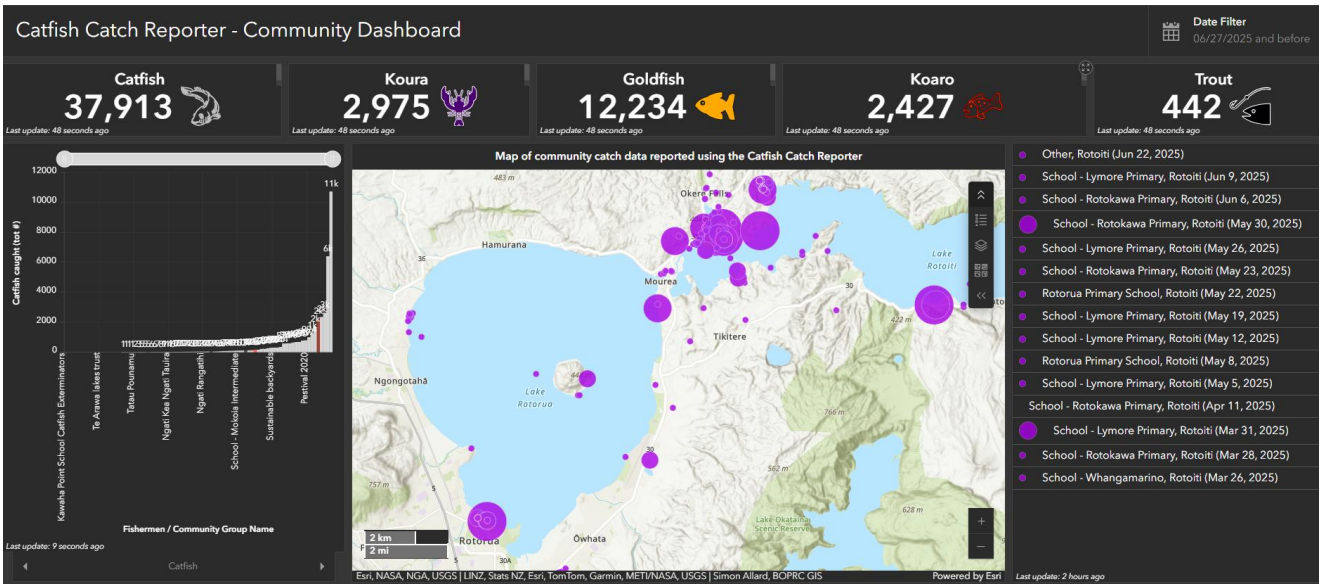
Data from contracted catfish netting in 2021-22 (Table 2) corroborate this observation of morihana abundance, showing that in Rotoiti, for example, almost as many goldfish were caught in the nets as catfish.

Table 2. *Contracted catfish netting and bycatch data for 2021-22 financial year (Te Arawa Lakes Trust 2022).*

	Nets set	Catfish caught	Bullies	Kōura	Kōaro	Goldfish	Longfin eel	Smelt	Trout
Rotoiti	40	7,105	187,627	3,873	215	6,260	2	13,446	14
Rotorua	1,101	34	10,900	44	0	0	0	690	2
Total	1,141	7,139	198,527	3,917	215	6,260	2	14,136	16

Since 2018, community netting efforts through the Catfish Killas program have also turned up thousands of goldfish even in areas not considered prime morihana habitat (Figure 3).

Figure 3. Total number of each species caught from catfish netting 2018-2025. From the Catfish Catch Reporter - Community Dashboard (27 June 2025)



Even among the interviewees with vast experience on and in the lakes, not everyone sees morihana in the lakes, and some were not even aware of their presence there until recently.

> *I didn't actually realize they were still on the lake. So I had assumed, from listening to Dad and them's stories, and then as a kid, not seeing anyone eat them or harvest them, I just assumed they were gone. And in fact, the first time I found out they were still in the lake was because one washed up here. I thought, "what the hell is this? Some carp's got into the lake!" I got on the phone to the regional council and said, "man, what's this fish?" "Oh, it's morihana. They've been here for ages." "Oh, okay." [laughs]. So this is the fish the old man and them were talking about, and I had never seen them. (Arapeta)*

* * *

> *We rarely get reports of goldfish/morihana coming through. They're kind of a background species, naturalised in our lakes. … [They're] not often seen by the public, but when they do wash up in weed strandings, we generally hear about it- and they are often misidentified as pest species sightings. This Is due to public being unaware of the presence of goldfish In the Rotorua lakes. " I've found a koi carp" or "I found a catfish." When we get these reports, we can positively Identify feral goldfish through photos or frozen samples. If we are unable to positively identify and follow up with observers we pass on reports to the regional council (Matt)*

We asked interviewees where morihana lived, and where they would typically find a morihana. Interviewees described finding morihana in still or slow waters amongst aquatic plants, such as raupō:

We were trying to set up our sampling program, tried a few different methods, and net types and stuff. But we found [morihana] mostly concentrated in the raupō beds… [Raupō] are like flaxes but they grow in the water, like maybe one, one and a half metres in the water, and they pop out. But [morihana]'re right inside those things, so you just have to set your nets as close as possible to those. (Ian)

* * *

I don't know if you've been down Ōhinemutu or the lakefront down there, but back when we were younger, there used to be like raupō and stuff everywhere, and they would be hanging out in there. They were quite easy to catch. There's no raupō down there now, but that's how my grandfather used to keep them. (William)

* * *

I haven't actually seen them from the shores, to be honest. Within some of the rivers and drainage schemes throughout the Bay of Plenty they are quite visible, so that's where you get the big ones. And that's where they're usually reported to us from. (Waka)

* * *

I was born and bred here down in a place called Mourea, Ngāti Pikiao is my iwi. Back in 1973 we used to swim in the Ohau Channel, that was my awa. In that time we used to have all native species along our riverbeds; we had raupō, harakeke, all sorts along our riverbed. And in those riverbeds we used to have morihana, and kōura, and eels, and trout. I think when my mum was doing it, her and her sisters, all my aunties and my uncles, the morihana, they used to catch them all about Ohau Channel, Okawa Bay, and Lake Rotoiti, so the marshes and the wetlands, and they used to catch them by hand. Well they had little nets, [but] most of the time was by hand. They used to catch them in the raupō and the harakeke. And used to feel them with their legs. So if there was more down there, they used to grab it, and used to hang it and dry it.

Q: And where did you mostly find and fish them from, was it a wetland?

A: No, I was in the rivers, in our river, and then Okawa Bay, and then up behind, Lake Rotorua, behind our clubhouse there used to be all wetlands in there, used to catch them in there. But most of them was always in the river and in Okawa Bay. It was quite simple, because the riverbed used to be pumice, it was all pumice, even around Okawa Bay it was all pumice, so it was quite good, you know, clean. Then the water was clean, you could see the bottom, see the fish. Nowadays it's hard to, you can't see nothing, so that's why we don't touch them. Even though they're there. (Steven)

* * *

My grandmother was a great weaver, both my grandmothers. So, as they got older, the flax became a bit too harsh for them. Arthritis comes with age, I guess. So, there's a paopao that grows in the water. That's where you would find morihana. So, after getting the morihana, then I had to get paopao for my grandmother. Yeah, so, we're doing two things at the same time. But morihana first, then get out and then back in the lake. Because you had to dive down and cut the paopao at the base, which was right in the water, sometimes really deep. Yeah, but that's how you got it, so. And you found morihana in those areas. And then Rotoehu was where the warm

water came out of the Soda Springs into the lake. Yeah, they seem to hang around there. But for bigger ones, they were in the cold. They were in the cold, so now and then we went there. (Timitepo)

Phoenix Hale considers that the need for slow moving waters likely is what limits the natural spread of goldfish across Aotearoa.

What we do know is they do prefer backwaters, slower flowing backwaters. They can tolerate a range of temperatures, they're the only freshwater fish that is sold in New Zealand that can tolerate cold water. If you go to a pet shop, every other fish you find, they might be able to survive lower temperatures, but they won't be able to breed. They might be able to get down to 18 degrees or something, whereas goldfish, they can get down quite low.

If you look at a lot of the larger rivers around the South Island in particular, they're quite significant rivers and they've got a lot of flow behind them, and that does partially come from extra gravity impacts from the Alps, just being flushed down, and you can see that quite a lot with the fact that a lot of the rivers down here are quite braided. And we don't know for sure, but we think it's quite unlikely that a goldfish that has been caught up in, like the Clutha River, is going to easily find an area of backwater for it to hide away in. And even if it does find that area, it's a luck of the draw as to whether it's got ideal conditions for spawning or whether it suddenly finds another goldfish there with whom to spawn. Because, yeah, for them to spawn, again, they're quite generalist, but we tend to find the eggs in similar places to koi carp and rudd, where they're quite in the root bed type area, or even just like with the hidden leaf litter and stuff. (Phoenix)

Physical appearance

Wild goldfish are a plump fish, typically olive/bronze in colour, 50-200mm in size (Figure 4). They lack the bright colours, bulging eyes and feathery fins of domesticated goldfish. They have large scales and a dorsal fin of 14-10 rays, the largest of which has strong serration (NIWA 2025a). They can be distinguished from their similar cousin koi carp (*Cyprinus carpio*) by their lack of teeth, lack of barbells below the mouth, and presence of a serrated dorsal spine (McDowall 1990, NIWA 2025a). Waka and Matt often received visual reports of koi carp that turned out to be morihana, as carp species have a similar shape and the general public perception of goldfish is of a small, colourful species with large flowing fins.

Wild goldfish are most commonly observed in the 50-150mm range but regularly reach up to 150-200mm in length (Figure 5, McDowall 1990, McQueen and Morris 2020, NIWA 2025a), and sometimes up to 300mm (McDowall 1990), and even 400mm (McDowall 2000). Interviewees report finding the largest wild goldfish in rivers and drainage schemes (~150mm, Waka), such as Reporoa (300mm, Morgan). Figures 4 and 5 show wild goldfish specimens clearly over 100mm in length. Prior to the mid-twentieth century, wild goldfish of 1-2kg were reported (Burstall 1980, McDowall 1990).

In aquaria, goldfish are selectively bred to have a bright orange, white, mixed or other colouring. Once released into the wild, however, subsequent generations of wild goldfish develop an olive-bronze colour (Figure 4), sometimes with blacker hues, though orange and lighter gold are still possible in wild populations (Figure 6, McDowall 1990, NIWA 2025a). McDowall (1990: 232) notes with irony that “the typical wild goldfish is, in fact, golden in colour” as opposed to the bright orange the public typically associate with aquarium goldfish.

Figure 4. A typical olive-coloured morihana, approximately 150-200mm, collected from Lake Rotoiti, Nov 2021. Photo by Sarah Wharekura.

Figure 5. A typical bronze morihana of ~155mm collected from Lake Rotoehu, Sept 2016. Photo by Ian Kusabs.

Figure 6. A bright orange morihana, collected from Lake Rotoiti, Jan 2021. Photo by Sarah Wharekura.

Wild goldfish are typically darker on their back and the top of their heads, paler on their sides, and silvery white on their belly (McDowall 1990), with all fins bronze to gold coloured.

Phoenix and Ian explained how wild goldfish colouring progresses from orange to bronze.

> *The orange ones are a lot more visible, so if there is something that's eating them, they're going to be targeted first. Or for smaller fish, where there's various other things that can eat them, not as many golden ones actually grow up to being the size where they might not be predated on. So it's some form of predation selection, and also the fact that the bright orange colour is something that's selected for actively when they're being bred. You see that a lot of freshwater fish, or even any species that's considered a pet or whatever, domestic value, they are selected for certain traits. With goldfish, it's this bright, bright orange, so as that pressure is lifted off them, that's an extra driving factor.*
>
> *From off the top of my head, it only takes about three generations of goldfish for them to grow from orange to darker colour to black pretty much, so they don't get picked up after such a short amount of time. That's also a really good way to track how long the incursion or the population has been there, is: has it been constantly added to, or is the population stagnant? (Phoenix)*

* * *

> *[From] the readings I've done, they used to be a lot bigger when they first put them into the lake. Gilbert Mair, who was captain of the Te Arawa Flying Column, he described them up to one to two kilos, which was quite a substantial fish, and quite colourful. But the sampling we do now, we do some out at Rotoehu, which is known to be the stronghold for morihana in this area. [With a] geothermal stream, the Waitangi Soda Springs stream, warm water goes into an estuary before it goes into the lake, and that provides ideal temperatures for them. It's quite a big area. We've been sampling there for morihana for the last six years, and we do still get the odd-coloured ones, but most of them are bronzy olive and are small, and they're quite cryptic now. But if you go there, there's a whole lot of big pine trees up on the banks, which is a shag rookery. So any coloured little goldfish swimming around, is, via natural selection, gone. So they're very nocturnal and are smaller and that olivey-bronzey colour. (Ian)*

Although the vast majority of wild goldfish are bronze, Graham (1939) described how, even decades after 'carp' were introduced in areas such as Rotorua, the carp in thermal areas maintained a "brilliant colouring", which he speculated was enabled by an abundance of food and clear water. Even recently, in Te Arawa lakes, William reported that

> *…you do get them, the bigger ones, they're that real vibrant highlighter orange. There's quite a variety of colours, but the majority of them are that brassy-gold colour. (William)*

Matua Timitepo reflected that the fish often look different in and out of the water: "in the water, they were like a bright orange**,** but when you pull them out, they were a browny colour, a mix between brown and orange or black and orange." He also talked about the distinct visual appearance of morihana as a wild goldfish, compared with domestic goldfish.

> *You know, I really thought they were [domestic] goldfish, when I first saw a morihana. And in the water, that's what they look like. But when you pull them out, they're just slightly different to a [domestic] goldfish. And my cousin says, oh, that's a goldfish, my auntie's got some in the pond at her place. I said, well, no, those are goldfish. These are not goldfish. And they're saying, "oh, but it looks like…" I said, "yeah, I made that same mistake too, my first time ever." And my kuia said to me, that's not a goldfish: that's a morihana." "Well, what's the difference?" She said, "that's a morihana." "Okay." (Timitepo)*

Morgan recalled a story from his uncle about the more colourful fish:

> *My uncle, he said quite often a gold fish would be at the front with all the brown ones following the gold fish. Now, whether that was because of the colour of it, I don't know. Possibly because it was a female, I don't know. (Morgan)*

Life cycle

Wild goldfish spawn in spring and summer months, in water temperatures above 15ºC and ideally closer to 21ºC (Collier and Grainger 2015b, NIWA 2025a). Thought to be initially cued by pheromones, a female goldfish will lay many small eggs - as many as 300,000 for a large goldfish - attaching them to aquatic plants in river backwaters or shallow margins of lakes, which hatch in about a week (Collier and Grainger 2015b).

During mating season males develop protuberances or 'pearl organs' on the head and body, and the females develop distended abdomens (McDowall 1990). Wild goldfish typically live for up to 6-7 years, with female goldfish maturing at two years, and males maturing earlier (Collier and Grainger 2015b).

In Te Arawa lakes, interviewees recalled the morihana harvest taking place in winter, around June, with tikanga around their seasonal harvest.

The season for morihana was about June, because they start to spawn, and they get a bit fat, so the whole month we used to get the morihana. And we didn't take all the morihana; we took the big ones, and that was it. Anything smaller, no. There was 10 of us, we got, say, about 20, 21, and that's it. But June, that was it, we stopped. June was the morihana, and July was the birds, and then about August were the animals. So it was all seasonal stuff, not just "go and help yourself all year round." Some people did, but we didn't, there was always that season. And we were taught by our koros n' uncles. (Steven)

* * *

It was a seasonal thing. The only part I hated was the fact that it was in the winter when you went to fish or fish for morihana. In the summer, my grandparents would say, no, no, leave them, let them spawn for the incoming season, which was the following winter. (Timitepo)

Matua Timitepo shared that when he was a child, his grandfather taught him mātauranga about how to identify the sex of the fish, as well as tikanga to respect the life cycle of the morihana:

My grandfather was the expert. I'd pull one out, and if it was a female, he'd put it back. He said, you just get the males; leave the females, because they'll spawn for next year. I said, oh, okay. I said, how do you tell them? He says, look at the bottom part of the jaw, it'll tell you whether it's a male or a female. He said, if there's a hook there, it's a male. He said, but if it's just flat, it's female, and then you put it back. You'll know it's a female, they're heavier than the male ones.

Temperature is understood to play a key influence on where and when goldfish spawn. As Phoenix from the Department of Conservation elaborates,

They're capable of spawning every year. I think even in aquaria they can spawn more often, so it's obviously where the climates are ideal. Because there hasn't been a strong history of management of the species, we don't know 100%. With a lot of these fish, spawning is triggered by drastic changes in temperatures, typically when it gets warmer. That's another factor down here, especially in the lower south, that water doesn't really get to the point that we provide that cue for spawning. But in areas where it does, it leads us to believe that they can breed every year.

Diet, predators, and ecological impacts

Wild goldfish are omnivorous, feeding on aquatic plants and organic detritus, as well as small insects and crustaceans (Kusabs 2015, NIWA 2025a). As described by Ian,

…they just pretty much eat vegetation, and sift through the sediments and detritus, and probably small insect larvae and stuff. Just grubbing around on the bottom.

Matt, by contrast, emphasises that goldfish mostly eat insects, and occasionally small fish:

Goldfish are known to eat a variety of detritus, weed and invertebrates, however we are aware of anglers occasionally catching goldfish on wet flies fished at night around stream mouths so it is possible at times they may even prey upon some juvenile fish species. (Matt)

Behaviourally, goldfish are considered cryptic, typically hiding under the shade of aquatic plants, or otherwise coming out at night (Kusabs 2015). William said that

> *Most of the time when I've seen them out swimming there, they're a nocturnal type fish. I seldom see them out during the daytime anymore.*

When William did encounter morihana out in the lake, he said "they might just dart past you, go from one patch of weed to the other."

We also asked interviewees what predates goldfish in the lakes. Responses included:

- I'm guessing shags would eat them. (Morgan)
- I think shags are probably the main predator. You don't often find them in trout stomachs, I don't know if that's actually been recorded (Ian)
- I have seen like shags and stuff eat them. You know, quite a few birds will chow down on the morihana. (William)
- It's not something we've investigated as an organisation. I imagine catfish and both long and shortfin eels would predate [them], and trout, possibly. (Waka)
- Predation on goldfish is quite hard to track, and that's because unless they're quite small, some of the only things that eat them would be eels, larger trout, maybe the odd shag. (Phoenix)
- Larger trout can eat morihana up to a certain size, because they can take in a prey species that's up to one-tenth of their size. So we do find them in trout guts occasionally. (Matt)

The scant scientific literature corroborates these views. In a 1950s study of gut contents from over a thousand trout in the Rotorua lakes area - where goldfish were very common at the time - goldfish were found in three of the trout (Smith 1959). A 1967 study of the diets of 93 white-faced herons across the country found one individual with 30 'carp' in its stomach (Carroll 1967), highlighting that the prey available in a given place matters a lot to an individual predator's diet. Searching through Papers Past, we identified accounts of shags eating goldfish/carp in the Press (1898), the Bay of Plenty Times (Odey, 1929), the New Zealand Herald (1930), the Hawke's Bay Herald-Tribune (1937), the Poverty Bay Herald (1939). McDowall (1990) also found reports that goldfish are a source of food for lake-living eels and for shags.

Beyond the effects of direct predation, goldfish also interact with the ecosystem more widely. One pathway is through competition, where goldfish might consume the same prey species as, for instance juvenile trout or the native dabchick (interviews: Matt, Ian; see also Lorenzoni et al. 2010).

In the international scientific literature, high densities of wild goldfish have been linked to moderate levels of direct nutrient excretion, bioturbation releasing nutrients and increasing turbidity, and loss of aquatic plants (Collier et al. 2015a, NIWA 2020). In addition, the larval/juvenile stage of goldfish is considered to have high impacts on the typical food sources for native fish, benthic invertebrates and zooplankton (Collier et al. 2015a). In the shallow lakes of the lower Waikato region, wild goldfish, along with koi carp, catfish and rudd are considered to have contributed to the collapse of submerged aquatic plants and progression to a highly eutrophic state (Tempero et al. 2015). Collier et al. (2015a) also suggest that wild goldfish could contribute to the development of algal blooms and act as vectors for invasive parasites, though these links have not yet been established in Aotearoa. When Rowe and Wilding (2012) reviewed the ecological risk posed by 77 non-indigenous fish in New Zealand, goldfish ranked 31st.

McDowall (1990: 235) reasoned that:

> *Although the question has never been studied, it seems that the goldfish has probably done little harm in the New Zealand environment, in contrast with what might be possible with the European carp, which has in very*

recent years become established in the Waikato River and perhaps elsewhere. It is important to recognise the distinction between these two rather similar carp species.

Collier and Grainger (2015b) further reason that, although koi carp pose a greater acute ecological threat than goldfish, the wide distribution of goldfish across Aotearoa means that any good or bad ecological effects of goldfish could have national-scale implications.

While the impacts of wild goldfish on ecosystems can be inferred from the scientific literature, the impacts of morihana in Te Arawa lakes is not clear. In his scientific brief for the Te Arawa fisheries plan, Kusabs (2015) concluded that "These omnivorous fish do not appear to have any adverse effect on native fauna and flora in any of the habitats within the Te Arawa Lakes, although this has not been well studied." This sentiment echoes the wider point by Collier and Grainger (2015b: 22) that "goldfish have been present in many lakes for many years without apparent declines in water quality." Matt from Fish and Game considered that "they're a species that don't appear to put a lot of negative effects on other species, or on the environment." When we asked Ian Kusabs what would change if morihana were removed from the lakes, he replied:

I wouldn't expect much to change at all. I just wouldn't really worry about them at all. The only thing I'd worry about is koi carp. If they hybridise, then we'll have problems. [Morihana]'re just sort of there, existing, not hurting anyone, I suppose. They can do their thing.

Changes in morihana

We asked Matua Timitepo, the interviewee who most had recently harvested morihana, what it was like when he last gathered morihana in 2009. He reflected that they were harder to find.

You could tell it was dying off. There weren't as many as there used to be. And my daughter would do the [waiata] thing while we were [fishing] ... I said to my cousins, "just come and help." And [they asked] "what do we do?" I said, "just stand there and hold the bin and I'll get in and get the morihana." They were really fascinated. They'd never ever seen it done that way before. And they said, "how the hell do you do that?" I said, "there's the key, [my daughter], doing what she's doing." Yeah, so. And after that, I believe, Willie Emery and them went out and [got] nothing. Nothing. And it was only a year later. So he came to get me and we went to all the lakes around the area, even Ōkataina, and nothing. Yeah. We heard there was some out of Rerewhakaaitu area and Rotomahana, but yeah. It's sad. You hardly ever see morihana now, and I really don't know why. (Timitepo)

Ian reflected on several possible reasons for morihana getting smaller and less abundant:

Q: Why do you think they've gotten smaller?

A: I'm not quite sure, but probably the bigger ones are easier to see by the shags and stuff. The small ones are easier to hide in the weeds, and the raupō and in the rocks and stuff. … I think in the old days, when they were colourful, you could see them in the stream and people would just collect them. And also, back in those days, Māori used to eat shags, you know, the cormorants, which are one of their main predators here. And then there was a bounty on shags from the wildlife service. The acclimatisation societies also had bounties on shags, so they really kept the numbers down. But now they're protected species and there's a lot more. They're quite effective predators, shags. (Ian)

6. Catching morihana

In the next three sections we report interviewees' stories that describe how morihana were caught and consumed. We start in Section 6 with methods of capture to provide a tangible way to imagine the harvest process. In Section 7 we illuminate tikanga and the wider social relations of fishing for morihana, including a story of spiritual elements. Section 8 then discusses the consumption of morihana, including its preparation, cooking, and flavour.

For scientific monitoring, literature indicates that the most effective methods for capturing wild goldfish are gill nets, trap nets, beach seine, purse seine, and electrofishing near the shoreline of a waterbody, at the outer edge of tall aquatic vegetation, and out into the waterbody a short distance (Hicks et al. 2015b). For cultural harvest of morihana, however, little has been reported in the literature about the methods, rituals, and experiences of harvest.

Using nets

We learned that morihana harvesting methods varied widely, often with a particular strategy being passed down within a family. One common method was using small nets.

> *One story that I've heard is, when they'd harvest in wetlands they'd make tightropes. You'd have two ropes like that across the wetland and they'd have to go along like that, [demonstrates use of swinging bars] because otherwise you'd get stuck if you try and walk through the wetlands. So they'd go along like that and then you'd be netting them while you go on the tight ropes. (Arapeta)*

* * *

> *I know some of the older people would use a hīnaki or a net to try and catch them in those thermal areas. There are different ways they would catch them, just using a net like for tadpoles or a set net or something like that.*
>
> *My grandfather used to catch them down when he was a kid. He would just use a little scoop net that they would make out of whatever they could find and get a feed of them. (William)*

* * *

> *[Matua William] told me they used to go down to the Waitangi Soda Springs and put a scrim, they called it. Have you heard of that? I think they used to use it for walls in houses, it was very fine stuff. I don't think it's very common now, but in those days it basically was a big long fine mesh net, and they'd get all the kids to jump and swim and splash around, go down the Waitangi Soda Springs stream, and they'd have that big scrim and they'd pull it up. (Ian)*

* * *

> *The fishing I did for them was in a little creek, and it was only no bigger than a metre wide and no deeper than two feet. It would be covered by blackberry at both ends, and you'd have to find a gap at each end. You'd splash 40 metres away from where you're going to net them, and they'd come travel down the creek that far to get away from that noise. And they would just come shooting down, and they'd be flying down the river. I'd be at the other end with the trout net in the water and I'd be just waiting for them. I'd hear them splashing further up and about one minute later, boof, you'd feel it hit the net. You'd lift up your net and you'd hold the bottom of the net so the morihana wouldn't get away, and then lower it back down into the creek again and you'd feel them hit again so you'd lift it up again, release it, let that morihana go down to the bottom and go back down again. And*

that just went on until you had enough in the net. Then you'd have your bin beside you and you'd just tip them into the bin.

That would only last for about 8 to 10 minutes. Once you'd finished doing that, [dad] would come back, or I'd come back, and then we'd sort through the ones that we wanted to keep, the bigger ones rather than the smaller ones. We'd normally keep about half a fish bin of them. Because there were quite a lot of them. And we'd come back to Rotorua and just dish them out to all the old people. They loved them.

We'd do a scout before we went in and netted. You had to be very quiet though, any thumping of the ground and they were off. They were obviously very sensitive. So we had to be very careful when we were going up to have a look before we went up and started splashing. I mean, it's a long distance to splash. Whether they picked up the senses of the other morihana trying to get away and they just tailed on and followed him down, I don't know. But that just seems to be the case, because splashing in one area that far away you'd think would only attract maybe one or two, but when you get a lot of them coming down it's like, "oh!", they must just all jump on. (Morgan)

By hand

Other families primarily caught morihana by hand. Steven describes two different situations of morihana harvesting by hand - one quieter, targeted approach, and one characterised by abundance of morihana.

They were inside the raupō, in the flax, and they're already there. So we used to go in - "there's a little group" - and we just move in, quiet, and they were there. I used to grab them by hand. We used to have a harakeke like this, and I used to swim up on the harakeke and just grab em. And nan, she said "no, that one". It wasn't a rush at all, it was just always quiet when dealing with the fish. You used to go around, swim up. It wasn't all bang bang, splash splash. It was always moving quietly, so the fish wouldn't get all agitated. Yeah, that's how we used to catch em. All by hand.

We used to swim in the rivers, we used to swim with them [morihana]. It was just one of the things, the aunties come down, say "oh can you get us some morihana," so we chased them to the rock there, and we'll go and grab some, and, "nah, not that one, grab this one," go to that one, "no, not that one, go to that one," you know, and just held them all up, and you can see them all, "oh, yeah, pick that one, pick that one." But we swam with it all the time, so it was just another species. We used to catch them all by hand, not by nets. (Steven)

* * *

Down by the little bay at Ōhinemutu, down there by that church, it's an explosion crater that blew up a few years ago. There used to be some bathing pools there. I remember I was at school, and the teachers used to be swimming in a pool, and when the kids got hungry, they used to whiff around and grab a couple of morihana in the weeds, and then come back and cook them in a hot pool. And they just had dinner, had lunch or whatever. (Ian)

* * *

Around Lake Rotoehu, we've got some hot springs, Waitangi Soda Springs, and the springs then run into Lake Rotoehu. One of the ways they used to harvest morihana around there was, the kids used to shun the morihana up the stream towards the geothermal and they get to the geothermal water and they get stunned and then they just scoop them up. When dad was a kid that was something they would do often, go around there and do that. (Arapeta)

* * *

They said they went around in little schools, and you could actually see them in the weed, the weed was actually moving. So they knew it was either morihana or frogs, because of the swamp, you see. Even when they were walking out there, they'd stand on something, "oh?" reach down, pick it up and it's either going to be a morihana or a frog. I guess these days we'd lift up our feet pretty fast, but back then it's like, "oh, food!"

I remember me and my brother, we went further up the creek to just go and have a look because Dad was down at the bottom doing whatever he was doing. But we decided to go up the creek a bit further and we found a cave. The hill was probably about five metres high, seven metres high. But there was a cave in there and we decided to go in the cave and have a look. Not knowing the risks of what could happen, but we were in there and it was full of morihana. And we were like grabbing these bloomin' things by hand and we were having a ball, not realising the danger above us. But there were definitely plenty of morihana in there. (Morgan)

Matua Timitepo described that his family's approach of catching morihana by hand was different to his peers.

Q: Do you know how your cousins would catch morihana?
A: Well, not how I used to.
That's what one of them said to me: "where's the net?"
I said, "what do you want a net for?"
He said, "well, how do you catch the morihana?"
I said, "just get in. Get in and swim out with me."
"Yeah, okay," he said.
"I don't believe you're going to get in today."
Anyway, he went back and he said to his grandfather, "oh, I'm not coming with you anymore."
And his grandfather goes, "why not?"
He says, "I'm going with Nanny, 'Mepo and them."
He says, "they don't use a net, Koro. Cousin just uses his hands and puts them in the bin then!"
His grandfather said, "oh, well, they must be trained morihana." [laughs]

Spearing

A final fishing method discussed was spearing the fish. For some, spearing was modified to work well for morihana:

[My uncle] was the one that told me about the spearing. They used a three-pronged fork to get them. It was bent up, so when they speared them, it went into morihana rather than the sand. So they were always catching something. (Morgan)

For others, like Steven's family, spearing was considered easier but ultimately inferior.

We used to catch them all by hand, not by nets. We didn't have nets until, I think it might have been late 80s. One of my Pākehā mates introduced a spear, and that was it. We went, "oh, this is better!" But then the aunties didn't like it, they put too many holes in the fish. [laughs] So it was - throw the spear away, back to the hands. (Steven)

7. Social relations of harvesting morihana

Harvesting morihana was a social experience that was steeped in tradition, encased in rituals, and embedded within relationships.

Interviewees remembered fondly the family relationships of harvesting.

> *Actually, I look back now and I think, oh, this is just a family thing, you know? Because there was only three of us that did it. There was me, my brother, and my old man… It's kept in the family. My dad would just say "we're going to get morihana" and we'd be off: "Okay." It was that easy. Sunday. It was either that or "we're going diving."*
>
> *For me it was a lot of fun gathering them. Where we are, my dad and all their [my parents'] siblings would be out there as well, and when they went out there and got morihana, they were either spearing them, they were netting them, catching them by hand, or even standing on them. They were that abundant back then. (Morgan)*
>
> * * *
>
> *Q: How many morihana would you have to catch to feed your family?*
>
> *A: Oh about 30 to 40. It wasn't just our family, it was everyone. When we go fishing it was, everybody'd go fishing, we'd all be down. It was a whānau thing. The aunties would be up, while we - or whoever could swim - would hop in the rivers. Who couldn't swim would sit on the bank.*
>
> *It was a big thing, especially in June. It was quite cold too, the water. Really cold. They used to have a hot bath there, but we had those - "you're young, you're all right," So we used to just go and catch something, get out, and the nannies used to have the blankets, and warm us up, "have a cup of tea." We'd always have a cup of tea with them, and then off we go again, till we finished getting the quota. We wouldn't take much though, we always leave a lot compared to what we take. (Morgan)*
>
> * * *
>
> *Your kids are fortunate today; they have everything at their fingertips. But going to get morihana, that's an experience. And I say to them, "you don't learn about that in class, aye." Or "you don't Google it either." Morihana: I said the eating part, [but it's also] the fetching it, it's the fishing for morihana: there's the experience.*
>
> *Q: How long would it take you to catch enough to satisfy you?*
>
> *A: Just under an hour. Enough for everyone. Because it wasn't just about me and my grandmother and father. It was about the whole, from one end of our lake to the other. It was about feeding all of them.*
>
> *Because at that time, we had heaps of elders still around, and that was their preferred fish. They did fish from the sea, but not how we eat it today. They wouldn't eat fish and chips, the old people. They'd either have it raw or baked in an oven or whatever, or smoked. Morihana was a delicacy. You'd see there, if we had a gathering at a marae and it was on the menu, oh, you'd see their eyes just light up. But today, you don't see that. (Timitepo)*
>
> * * *

Q: Did you like catching them?

A: Yeah, it was good for my nans, because they liked it, the old people liked it. No good for us: we hated it, because we had to get them down the rivers and do it. But for my nans, it was more enjoyment seeing us doing it, so we did it for them. It wasn't for us, we just kept the nans happy, and my aunties and my mum happy. Every time they had a good laugh. As long as they were happy, we were happy, so that's how we were.

Q: Who would you catch them with?

A: My cousins, and my brothers. I had nine brothers, one sister, and my other cousins. They have 14, then their family, and they have another 10, and another family, big families. They had all the brothers, they're standing on top. But it was mostly the nans and aunties who would sit on the banks, and they got their little ketes, and "yeah, put them in here, put them in," "go up there," "oh, that's enough." They all get up, they all go and cook it. When it's all ready, they ate first, then we ate after. All the kids done the catching. When we first done it, the aunties would show us how they do it, they'd just walk through quietly. (Steven)

Tikanga, mātauranga, and the spiritual elements of harvest

As described in Section 5 Morihana Ecology, interviewees identified tikanga (protocols) that related the temporal harvest of the fish (in winter months only) as well as the types of fish caught (leaving pregnant females to spawn). These ecological elements of tikanga were also encased within wider relationships and obligations surrounding the harvest of morihana.

Steven placed the harvest of morihana within the annual kai calendar:

Q: Was morihana something you ate often?

A: It was often, yeah. Only in that month though, not the next month on, only in that month we had a big feast, in the spawning season. Not in the summer months, because they were too skinny, the water was too warm, it was only in those winter months, that's when all the food [ran out]. Summer was quite good, and the spring, because you had apples, and everything around, all the fruit, peaches; from the winter we'd get all that fish. (Steven)

Two interviewees detailed some of the wider tikanga and mātauranga that surrounded the harvest of morihana. Steven talked about how waiata and karakia framed the harvest of morihana:

They were always singing, they always used to sing their waiatas on the bank. They'd sing Hoki Mai, and they used to sing Hapaitia. They used to sing Tomokia. They'd sing a lot of waiatas, my people.

They're quite religious, our people. Always done the karakia before they started anything, and they always finish with a karakia when they stop. They have a lot of faith, our people. My mum was a Ringaetū and she was a minister. And she was a tohunga, she healed people. She was quite good at that, well, powerful as they call it. She had it, my grandmother had it, my koro had it, my great great grandfather had it. So it was passed down. Those were the good times.

But they always used to sing when we used to go out. We used to think it was, well, boring; but to them, it was good, because they used to laugh. Because they always came together, and it was good for them. (Steven)

Matua Timitepo shared how his whānau developed their own waiata and cultural practices for morihana harvest, which were infused with a spiritual element.

> *You don't see it anymore, morihana, and yet it was a big part of the diet for our grandparents and their parents. But today you don't. You're lucky to see one morihana. So today, it aroused my memories of when I was a kid with my grandparents. Because not many kids in the middle of winter would go diving for morihana, but I did. I did when the waters were freezing.*
>
> *I think of my kuia, my kuia had a gift. She never ever hopped in the water. And my granddad every now and then would, but he only had one arm. So I had to be the gatherer for them. And my kuia would perform a chant for the whole time I was in the water. And I'd be in there max nearly an hour, and I could fill a whole bin.*
>
> *The chant my grandmother used to perform - I won't give it to you, but I'll tell you what it was about. It was about her life force, being one with the life force of the water and anything in the water, which included myself and my grandfather. So I was able to basically just hop in the water and grab morihana and put it in the kete.*
>
> *I think it all lay in that chant my grandmother used to perform. I learnt it, I perform it now when my kids go eeling, or to go and get the freshwater crayfish. I do it then. I know it seems like being lazy, really, eh? You know, a lazy way of fishing, to be able to do that. You lose the excitement of the actual getting in there and fishing and whatever. But it was a lot easier.*
>
> *And I had to do all this before school. So, five o'clock in the morning, you find me in Lake Rotoehu, and it was freezing. It was freezing, but we would make our way down towards - we have a hot pool out there, but it's not sulphur, it's soda. Okay, so every now and then you'd get these gushes of warm water, which relieved you from the freezing cold waters.*
>
> *Morihana, I tell you, it was a delicacy. For my grandparents anyway, and all the other ones of their generation. So we'd go out and get morihana, and at that time they were in abundance. There was a lot of morihana. So we'd get enough for the whole week.*
>
> *Once we got all the morihana, it was my grandfather and I who'd go and deliver it to all the other elderly folk around the Lake Rotoiti area. And sometimes there were funerals on the marae, so rather than distribute them, we'd take it straight to the marae where the old people would indulge in a very big way.*
>
> *People talk about fishing, trawling, and fly fishing, and I guess they all had their own features, that experience. But morihana was different. Because there were times when my nan couldn't come, she was ill. And there was the excitement in trying to catch them without her doing her thing. And I'll tell you, she'd just sit on the shore and put her hand in the water and she'd chant this chant. And it seemed like she just hypnotised all the morihana in the water because I could dive into the water and they'd just - right in front of me and just look at me, so I'd just grab them and put them in the bin.*
>
> *One day I said to my grandmother, "are you a bit of a witch?"*
>
> *And she said to me, "what makes you say that?"*
>
> *I said, "well, how do you do that? How can you hypnotise the fish like that?"*
>
> *And, you know, she didn't answer me straight away. It might have been a couple of years later.*
>
> *She says to me, "I'll teach you that chant, but it's better for a woman to perform it."*

I said, "okay."

She said, "but I'll teach you, you might have daughters and you'll be able to teach them."

So after I recorded her, I said to her, "now tell me, what's that all about?"

And that's what she said to me in simple words. She says, everything has a life force, what we call in Māori as mauri. She said, whether it be a rock, grass, whatever, it all has a life force. She says, so you as a person, you need to try and connect with that life force and become one. She said, it's when you become one with it, with them, everything just happens.

And I said to her, "yeah, well that's close to being a witch."

She says "I guess so, if you watch all those silly programmes you fellas watch."

But for us as Māori, it was a part of our culture. And she says, it was just that close affinity our ancestors had with the land, the water, and everything else. So in order to appreciate what you have, she says, you learn to be one with them, be it a blade of grass, or a rock, or water, or whatever. She said, because it's when you do that, it's when you learn that skill, or learn those teachings, that you totally appreciate the world for what it is.

And I said to her, "far out, you're quite educated."

She said, "well, don't believe that."

She says, "because I didn't get to high school."

She says, "you know, as soon as I was ready, I had to marry your grandfather. That's just how it was."

She said but we were fortunate there, that her grandmother was still around, and that's where a lot of her teachings came from.

But my kuia, my grandmother, her whānau were known as the morihana family of our tribe.

So, yeah, that was my job, to help my kuia. [laughs]

Q: Do you think that experience is just held with morihana? Or it could be with other species…

A: It was certainly for everything. Aye, with my kuia and koroua. There were times when my kuia was that person. And then if we went to get kōura, my koroua was that person. So they both held their knowledge in those areas. Same with the eeling. The difference with the eeling was it was both my grandparents. It was about a shared responsibility, aye. You know, both of them carrying that responsibility. It was also about my safety. But there were times when they took turns, and there were times when they did it together.

…My mates used to think I was crazy.

I said, "well yeah, at first you think I am crazy."

"But the more you do it," I said, "it's really about what you're learning off your grandparents, that experience."

I said to them, "you don't get that in the classroom."

I said I was keen to learn. And I certainly did.

And here I am with that chant, that knowledge of the chant, and there's no morihana around. So I use it, I use it like I said, when my kids go and get freshwater crayfish, or eels, I use it then for them. They call me Harry Potter. That's what they call me when I do it. My baby daughter, she says, "Dad, we're going tonight, so we need Harry Potter." [laughs]

Q: Was the chant specifically for morihana?

A: Yeah. Well, it was for anything, but in the water. But when she did the chant and we went for morihana, we weren't to catch anything else. It was about morihana and just solely morihana. If you were to see an eel and grab it, well, no, you're breaching the protocols of the wānanga, you know, the House of Learning. You don't do that. Morihana is just morihana. Eels is just eels. There were boundaries where those things were concerned.

And my daughter, the older one, every now and then has a go at it. So it gives me a chance to get in the lake with freshwater crayfish with my other children to be a little bit active anyway. And she does her thing on the shore. It works, you know. I said, it works if you have that absolute faith in what you're doing. It's about the belief. I said, "things happen when you believe." It's going to happen, it will happen. So yeah, I school my children in that way.

…I was lucky, my kuia had that skill. It was like she hypnotized 'em and had 'em sitting in the water, just lying there. You know, when you dive in and they're just gawking at you, it just made life easier. And I used to go to school and boast, "Jeez! I was diving hard and swimming hard and chasing them." And not even! [laughs].

Until two of my cousins came with me one day and they got to witness what happens. They couldn't believe it. One of them was absolutely gobsmacked. When we got out of the water, you could tell. He didn't want to say anything. We get back to the house, we went to the hot pools. We had a bath. And I think when he defrosted, he said to me, "What the hell was that?"

I said "what do you mean, what the hell was that?"

And he says "how do you do that? Tell the fish just sit there and someone's coming to get you."

I said "well, you don't."

He said "but that's what happened, it was as if they just knew we were coming."

I said "I don't know."

He says "that's spooky."

I said "yeah, it is."

I guess, within the generations of today, yeah. But that was nothing to our grandparents. They were surrounded by that sort of thing. I said, yeah, times have changed. (Timitepo)

8 Consuming morihana

Interviewees described the process of consuming morihana, highlighting the preparation of the fish, the qualities of the fish meat, and the social experience of consumption.

Preparation

Although several methods for preparing morihana were mentioned, by far the most common was boiling the fish and letting it cool into a 'jelly'. This method was considered advantageous as it reduced the problem of hard bones.

> *The most common method I've heard preparing them is to boil them up with an onion, and then they would let it sit and cool down and then there would be that layer of fish fat or something on the top. It becomes like jelly eel, I suppose. It's the most common way I've heard of people doing it, but I know the smaller ones some people would just chuck them into a frying pan and just eat them like that.*
>
> *Q: So you've never eaten morihana?*
> *A: No, no. I was going to try some with this old guy I got some for a couple of years ago, but I never went around for that invite. There's enough snapper in the sea, I think. (William)*
>
> * * *
>
> *It's a shame that Willie Emery, Matua Willie, passed away a couple of years ago, but he used to be one of the last people harvesting them from the Waitangi Soda Springs at Rotoehu. The way he described to me how they cooked them was, they put them in a pot with water and they boiled them to make a jelly substance that they used for colds and flus, and it used to be quite good for that. But no, I've never tried it. (Ian)*
>
> * * *
>
> *I have a colleague, [laughs] I won't mention his name, but he grew up as a child in the 70s and 80s and said his grandparents would bottle morihana and he said he was forced to eat it as a kid and didn't actually like the taste of them very much. And there were similar stories like that, I heard one just before coming in here. While they are a taonga species, they're probably not the first fish on the list to be eaten, I suppose. He said they were boiled and bottled so that the bones would disintegrate, and then the fish was spread on bread or toast and eaten that way. (Waka)*
>
> * * *
>
> *We had them boiled in the pot. The older people preferred to have it boiled and cooled down, and it went like jelly and they preferred to eat it cold rather than hot. I don't know why, whether the flesh was firmer, but they all preferred to have it cold with all the jelly as well. I preferred it hot, only because I found I could just peel away the flesh a lot easier without having to worry about the bones.*
>
> *They also had a sac in behind the gill, can't remember the name of it. Like a bladder or something. We had to cut those out. Otherwise it just made it bitter if you burst it. We'd scale them and remove that small bladder, just behind the gill plate, and they'd just be boiled up. Not too long, just long enough to get it cooked just through. Keeps the meat tender. If you over-boil it, it gets hard just like anything. (Morgan)*
>
> * * *

It was simple. You never ever gutted them, you just boil them whole. And then you leave them to jelly in the fridge overnight. Then you ate them the next day. (Timitepo)

* * *

The Europeans come in and introduced the trout, and our people would have to eat the morihana at that time. So the morihana was a source of food for us. We liked it at the time, we used to just boil it, and it had plenty of bones in it, but boiling was better because the flesh used to come straight off, and you could get the bones out. But … yeah, it was a hard life for our whānau. To survive, you had to eat what you had to eat, inside our lakes.

Q: What were the main methods of preparation?

A: We just dry it out, or boil it up, and put them into jars and save them like that. When we used to eat them, our nans found that boiling them was better, so we wouldn't choke on the bones, because all the meat would just fall off. They smoked them, but they said the smoking was too much bones in it, so their method was boil it. They found it a lot easier. You can just take all the bones, and just eat the flesh. And they ate all that with - so they had morihana, then we'd have rotten corn, then we had rēwena bread. Their method was boil it, not fry it - we tried to fry it, it was just too many bones. (Steven)

Eating and taste

When interviewees reflected on eating the morihana, most commented on how they remembered different ways of navigating its bonyness.

Q: What was your first memory with morihana?

A: First memory, my gosh. Having a little fish instead of a big fish on the plate. Because we were used to having rainbow trout, or brown trout, which we caught on Lake Rotorua as well. But going from these fish to these small morihana, there's a big difference in size and texture, and the bone structure was totally different too to the rainbow trout.

So, back then when we were eating them, even pulling them apart, we had to be very careful because the bones were so hard. And in the top part of the morihana there were actually these Y-bones, they were really hard and they were sharp. They didn't just break like your normal fish bones would. They were hard and they were sharp and they were small.

So, we had to have bread on hand as well, just in case if it got stuck in your throat, you'd just have a bit of bread and it'd just help clear that bone. Just stop that choking.

I didn't mind them. I'd eat them, [but] like, I wouldn't go out of my way. [Older people]'d say, "I need to go and get myself a feed of morihana." But I enjoyed going out and gathering them, and eating them was OK. (Morgan)

* * *

Because they're really bony fish, you basically put it in your mouth and suck the meat out, but hold the bone in your mouth. I've seen many of the aunties and uncles do the act, [emulates slurping sound, and puckered face]. But I never experienced it. They talked a fair bit about morihana, but no one harvested while I was a kid that I'm aware of, there might have been the odd whanau. I assume that's because trout are a bigger fish, you get more meat in one fish, and I'm assuming possibly a nicer fish to eat, I don't know for sure. (Arapeta)

* * *

Q: Would you eat them with bread?

A: Bread. Always eat them with bread. No butter, just bread. The thing with morihana - it was a bony fish, so you had to be very careful. My grandparents would say to me, don't ever eat it straight out of the pot. Leave it in the fridge until it turns to like jelly, and then eat it that way, because of the bones. It was a real experience.

I loved the fish, eating it. If my grandmother cooked it, that was me.

It became a very big part of our diet in my grandparents' home. My siblings wouldn't go there: if it wasn't in batter, it was no good. It had to be fish in batter, fried, you know, and whatever. But morihana, because I lived with my grandparents: they didn't [batter and fry the fish]. [My siblings] were still with mum and dad, and more into hot dogs and fish and chips rather than boiled morihana.

A lot of my own generation who wouldn't go there with morihana. They were like my siblings, you know, they had to be battered and fried. Otherwise, no go. I believe I was fortunate to have gone through that experience with my grandparents, with morihana. And sad, you hardly hear of it today, morihana. My mum… I guess she went through the same experiences that I did with her parents as a young girl. So she used to say to me, was it freezing? I said, what do you think? She says, I know exactly how you feel. That was me at your age, many years ago with my mum and dad.

Q: What did it taste like?

A: I got used to it. Because it was a part of the diet in my grandparents' house, I had no choice. You didn't have KFC and McDonald's, and we didn't even have a TV.

Q: Does that mean that you didn't like it the first time you ate it?

A: Yeah, I was a bit… [yuck] I thought, but I couldn't say that to my grandmother. Because she says, look, food is food. Be thankful for what you receive. (Timitepo)

* * *

Q: What did your dad or grandparents tell you about their morihana experiences?

A: My dad didn't like them. He thought they tasted like crap. My grandfather, I can't quite remember what he used to say about them, but I had an auntie who used to eat them too, and she used to love them. They can be quite sweet, I think, but they are a very bony fish. (Arapeta)

* * *

Q: What does morihana taste like?

A: It was a bland fish, you had to add something to it, it wasn't the best of fish, but it still filled you up, because you had the morihana, you had bread, you had potatoes, you had kumara, you just had it all. In those days, we thought it was neat. Until they brought trout in, and we thought that was better still. [laughs] Yeah, but we still ate it, we weren't fussy; whatever our nans and our koros put on the table, we just ate it.

To my mum, because that was the only source of food for them, it was good, yeah. It was interesting times, hard times. There were hard times then. You'd get together as a whānau and get through it.

It's this group, Māori people were there with their fish, then they introduced the trout, and then trout ate everything. That made it hard on our people, because we had to get a license to get the trout in our own rivers, the lakes, that was hard. None of our people listened, they were just going to get them anyway. (Steven)

Because of the historical association with morihana, it even carried prestige for some whānau.

It became a delicacy for the old people, especially when important people came to the marae. Which sometimes would serve wood pigeon, eh, the native [bird]. And for a lot of our maraes out there, it was the freshwater mussel, the kākahi, and the morihana. (Timitepo)

Arapeta reflected that taste was a complicated idea - it was linked to wider nostalgia, memory, and social relationships.

Q: In the stories that you've heard, do you know if morihana were considered tasty?

A: Look, the way they explain the stories, yes, they did enjoy them, but then they enjoyed some other foods that I didn't think were that nice either. Like kākahi is an example. When I was a kid, from time to time, kākahi was still on our marae table, but the only way I could ever eat them was heavily curried. As kids, we used to try and eat them out of the lake, but wow, it just tastes like rubber to me, they weren't very nice. I've had curried kākahi that are bearable, but I didn't really enjoy it.

But I think it's a lot more than just taste, with a lot of our kai. Part of it is, kai opens up in a memory. I noticed that with a lot of our older people, and as I get older, it's starting to happen to me too - I eat something and all these memories come back. Especially kai that are quite rare, or are really treasured in Māori settings. You eat that, and it transports you back to another place, or it reminds you of Nan and Koro, because they always used to eat that particular food.

So in a lot of ways, kai is much more than just food, it's… it's medicine, in a sense, it's a connector to the past, it's connected to memories, and that's what I often see with our people, that's really the deep relationship with these different food sources, is how it connects them to other places. That's more the important thing than the taste of it, and that's why I believe there's some kai that don't actually taste that great, but they do it because it sparks the memory, and I do that too. There's a few kai I don't really like that much, but I'll have a little bit, just because it takes me back to those places, or those people…

Q: Why would morihana have been preferred when trout were available?

A: Yeah, well, if I think about the stories that my dad shared with me from when he was young, they ate more trout than they did morihana. So, morihana was more of a delicacy, or, I don't know whether delicacy from a taste perspective, again, I think it was a delicacy from a memory perspective. I think it's probably, you'd have to go a bit further back than dad's generation to the ones that they were eating it more day to day, and that was probably at the period where there still weren't a lot of trout in the lake. Yeah, so, you know, part of eating the morihana was because, well, one, it was in the lake. I don't know whether morihana displaced our native fish as much as what trout did, so I don't know whether they had to eat Morihana because they couldn't get kōaro, or

tuna, or whatever, or whether it was just, oh, here's another fish, we'll start eating that one, even though the others ones are around as well. I'm not sure.

Yeah, but trout fishing, like, for my dad as a kid, they reckon they had to spend heaps of time rowing a boat for my koro, he'd fish, uh, around here, but that was something you were doing all of the time. Like, when my dad was a kid, 60% of their kai came from either the forest here or the lake, and they were, well, a lot of our whanau were relatively poor from an economic perspective, and dad came from a- they had 16 kids in their whanau. So, growing up, they had- their shorts for school were made out of sugar flour bags, as an example. They just didn't have a lot of money, and you had to recycle everything, so your flour bag became- Nan would turn them into shorts for you. [laughs] You had four people would sleep in a bed together, you know, with a few blankets on top of you. So, yeah, they came from quite poor backgrounds, and I think that's another, aspect of the relationship to kai too, because you- or not- it wasn't purely because you're poor, it was actually tradition, that's just how you ate, you ate from the environment around you. But when, I suppose, when colonialism came, and modern structures came, and modern economies came, they were relatively poor compared to the average person, so they continued to live a lot off the land. And I think that's a big shift from when my father was a kid, to me growing up, it would have gone from 60% of your kai came from this environment, in my dad's childhood, to my childhood was probably 5-10% of our kai came from around here.

Q: What would you say it is now?

A: Well, for me, it's probably 3% or so, 2%. It's the kai I eat from the environment here, it's not for living, it's not like I'm getting all my kai to keep me going day to day, the kai I eat from around here is to keep the connection. Yeah.

And this has sparked another thought, is the importance of kai in terms of connecting you to the mauri of the environment that you're around. So we talk about the life essence that exists in any natural being, kai is a way to connect directly to mauri. When I eat a plant from the ngahere, I'm eating the mauri of the ngahere, it's coming into me. So I believe that kai is a very important part of connection to place, both from a physical, tangible, life sustenance perspective, this food will keep you alive, but also from a spiritual perspective of connecting to the life force of those places. And so that's the only reason really I eat kai around here, from the environment around here, because I'm not a major wild kai eater kind of person, but I deliberately do it to keep that connection to the mauri of this environment. (Arapeta)

Steven shared a similar idea, that while trout were considered a tastier fish, the associations of morihana were powerful attractors for his whānau:

[Back then] we could go and get a trout, but they [nans and aunties] always preferred the morihana, because that's how they were brought up. I had a picture of my mum and my auntie holding it, my auntie this side, my mum this side, back in Hawthorne Bay. They had about, I think, 15 morihana on the stick. My brother's got it, I think. I'll grab it (see Figure 7). (Steven)

Figure 7. Steven's mum and auntie holding morihana, featured in Pikiao Panui (n.d.)

Paere Tamati shows off a good catch of morihana

9. Morihana management

Morihana are currently listed as taonga species in the Te Arawa Lakes (Fisheries) Bylaws (2020). To harvest morihana, whānau must obtain a pukawhaka mana (permit) from Te Arawa Poutiriao (permit issuers). Only morihana above 125mm can be kept, and they must be caught by hand, set net, or scrim line. No more than six fish per day can be taken for individual or whānau consumption, and no more than 50 for a significant event.

Elsewhere across Aotearoa, wild goldfish (*Carassius auratus*) are often listed alongside other "invasive" freshwater species and discussed as pests. They are one of only eight species of fish listed in the Department of Conservation's Invasive Fish Management Handbook, where readers are warned to watch out for their potential to impact an ecosystem via nutrient excretion, bioturbation, loss of macrophytes, and food web modification (Collier and Grainger 2015b). Although wild goldfish have no legal status nationally, they can be named as pests in regional pest management plans (RPMPs) (Collier and Grainger 2015a). Of New Zealand's 16 RPMPs, only three list goldfish at all. In Otago, goldfish are defined as "organism of interest" that "pose sufficient future risk to warrant being watch-listed for ongoing surveillance or future control opportunities" (Otago Regional Council 2019). No current control measures are specified in that RPMP. In the Greater Wellington RPMP, goldfish are defined as a "harmful organism", one step below "pest", similarly ensuring it can be controlled if the need arises in the future (Greater Wellington Regional Council 2019). Across Aotearoa, it is only the Auckland region that controls are provided to limit the impact and movement of wild goldfish. There, goldfish is labelled as a "pest" species, and the council's objective is to "exclude pest goldfish (*Carassius auratus*) from establishing on the Aotea/Great Barrier island group to prevent adverse effects on economic well-being, the environment, enjoyment of the natural environment and the relationship between Māori, their culture, their traditions and their ancestral lands, waters, sites, wāhi tapu, and taonga" (Auckland Council 2020). The Bay of Plenty RPMP, along with the other 12 throughout Aotearoa, does not mention wild goldfish species (Bay of Plenty Regional Council 2025).

The Department of Conservation's Phoenix Hale elaborates on the lack of national status for goldfish:

> *With regards to goldfish specifically, it is quite difficult because they are still legally sold and bought as pets. So legally, they're not pest species. At the moment with the way the legislation stands, the only situation in which they can be considered a pest species is if the individual regional council that has mandate under the Biosecurity Act develops its regional pest management plan and puts that species in, either under a management programme as an exclusion species, or a species of interest, one that's not an issue now, but maybe in 10 years' time. So we don't work directly on goldfish around the country, except in situations where we might team up with other people, but if we're doing biosecurity operations somewhere, we're not going to put the goldfish back into the river once it's caught kind of thing. So it's almost like a bycatchy situation, the way we manage them.*

In the Te Arawa Lakes specifically, William mentioned that

> *They're not really managed at all, I don't think. I mean, they're recognized in the fisheries bylaws as a taonga species, but not a lot of people harvest them nowadays.*

10. What makes a taonga?

We invited interviewees to reflect on what makes a species a taonga to them and their whānau.

One idea about what makes something a taonga is how much whānau rely upon the species for sustenance. Waka reasoned about defining taonga, drawing on a familiar example to his Tūhoe whānau,

> *I'll take you back inland. So, my people, a huge part of their diet was bird life, and as recent as the early, say, 60s, we harvested kererū. When the kererū population started to decline, there was a need to look for other forms of sustenance. And one introduced species my people attached themselves to was the waxeye. They were a lot easier to catch than climbing up high, muddy middle trees and trying to poke kererū. They developed a method to actually attract the waxeye to them, and then they quite simply just dong them on the heads. And that was dinner. So there's probably an element of a declining food source and then abundance of an introduced species that was a lot easier to catch. I suppose if it sustains you, how would you not consider it a taonga?*

For those generations of Te Arawa whānau who were sustained by morihana, maintaining the taonga title, and the associated protections, could provide a way of recognising the importance of the fish for the history and development of the people.

However, interviewees also reflected that morihana are barely harvested anymore, and that most people don't even know morihana exist in the lakes.

Several interviewees considered that the taonga status can change, and that the status of morihana should be re-evaluated according to its relevance for whānau today.

> *I guess I would [call morihana a taonga] in the day because there were a lot more people eating them too. But these days it's just getting phased out. It's just because people aren't getting them anymore. It's just getting forgotten, people are forgetting all about the morihana. A taonga, mm… these days, hard to say. (Morgan)*

* * *

> *It's not a taonga. Because if it was, you'd see people, Māori people, more harvesting it. (Steven)*

* * *

> *I think how you see something as taonga depends on context. Place and time. So I can fully appreciate calling something a taonga here and now if it's a key part of our survival or our culture as it is today. (Arapeta)*

Other ideas were that morihana, as a species introduced by colonists, could never merit the title of taonga.

> *I think they should be removed from the lakes. If you go back to when trout were introduced, our taonga, our actual taonga get eaten by the trout, right? It's a near extinction. So, our taonga that we used to catch are pretty much gone. We can't catch trout in our own lakes. And so the Crown released these fish [morihana] into our lakes to sustain our people.*
>
> *And if you look at it back in England, you've got that hierarchy of fishing. You've got the upper-class, middle-class and then the lower-class. Trout was always considered an upper-class type of fish over in England. And then you've got those coarse fishermen, like middle- and lower-class people. So you had the Crown release a fish into our waters after they destroyed our taonga that was equal to their middle and lower class type fish. So to me,*

it's a colonial slap in the face, to be honest. So that's why I don't consider them taonga. And I think they should be taken out of the lake.

Q: Do you consider them a pest?

A: I do, personally. Yep. The replacing of a taonga with something that's considered a crap fish in its own country is… sorry, a bit shit, if you ask me. (William)

* * *

It's not the gold standard taonga, I suppose. The ideal for me would be for us to get our bird populations back up and then be eating things like those, like kererū. (Arapeta)

Another perspective on valuing morihana is the cultural and social memories that it is associated with. For Matua Timitepo, the morihana are connected to the historical tikanga, the mātauranga passed on by family, and the wider environment. Matua Timitepo said,

I tell you, you don't know what you have until it's gone. And for me, it was about catching morihana, the experience, the getting wet, the freezing cold water, but it was also about learning the historical narratives around fishing, not just for morihana, for my grandparents. Today, I really am glad that I was there and spent all that time with them.

Another view was that, even if the fish are no longer harvested much, and if their ecological impacts are neutral, that there can be cultural heritage value of sustaining them. Morgan said,

There just seems to be a few more as a bycatch at the moment, which I don't mind. I think it's really cool to have them back in the end. I mean, if they're a pest, yeah, get rid of them, for sure. But nobody said they were a pest, so leave them alone. Let them do what they do.

11. Conclusion

This report brought together historical, scientific, and cultural knowledge about wild goldfish in Te Arawa lakes and Aotearoa, to support those tasked with managing wild goldfish into the future. Interviews with nine knowledge holders have extended ecological knowledge about wild goldfish and contributed a foundation to understand cultural significance of these fish for Te Arawa whānau.

The study helps to understand the historical and ongoing connection that Te Arawa whānau have had with morihana. Overall, four conclusions for decision makers can be drawn.

First, the study supports nuanced appreciation for how significant morihana were culturally to whānau. Morihana were introduced into the lakes early, even before trout, and were named by Māori and embraced early as an accessible and abundant food source. Māori developed sophisticated ecological understanding and tikanga to guide fishing for morihana, which included guidance about the timing, methods, and environments of harvest. Mātauranga also developed around the preparation and consumption of the fish, given its material qualities. Harvest of morihana was a deeply social and spiritual practice, about connecting with te taiao and with one's ancestors and ancestral knowledge. Waiata, karakia, and spiritual elements featured in the harvest and consumption of morihana, and these connections trace through to the present.

Secondly, this research shows that while morihana are widely present in Te Arawa rohe, they are not well known or understood. As catfish netting data reveal, morihana remain widespread and abundant in Te Arawa lakes. However, their appearance, size and behaviour has changed so they are less visible than previously and there is less awareness of their presence in the lakes. People are less likely to see them now than decades ago, and there is confusion with koi carp when they are washed up. This lack of visibility of morihana means that people's connection to them may be weakening. Although they are widespread, there is not much understanding of their ecological impacts or role. The scientific literature suggests there could be negative impacts, but the local assessment from scientists like Ian Kusabs are that impacts are likely to be negligible.

Thirdly, this research clarifies how people's relationships with morihana have changed. While morihana were widely harvested through the twentieth century, the opening up of the trout fishery led to a generational shift in fishing preferences toward those larger and tastier fish. Morihana are considered a taonga for older generations, with morihana harvesting remaining as a relic of memory and cultural significance rather than aligned with current preference or practice. The most recent social surveys in 2010 and 2025 show that morihana are still cited as culturally valued but only by a small number of whānau (Tipa et al. 2010, McCarthy et al. 2025).

Fourth, while it is for Te Arawa whānau and the Komiti Whakahaere to decide on fisheries objectives for morihana into the future, we see value in considering these questions in the process.

- Who still fishes for morihana, and what value do they derive from it?
    - How might the memories and tikanga associated with morihana be preserved and cherished?
- If taonga status for morihana is removed, should current protections no longer apply?
    - If those protections are removed, should control strategies then be implemented?
    - If so, what are the potential control methods for this fish?
- What roles do morihana play in Te Arawa lakes, how might their removal change the ecosystem?

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14. Appendices

Appendix 1. Excerpts from Papers Past articles about wild goldfish.

Title & Source	Quote
LIBERATION OF CARP IN LAKE TAUPO Thames Guardian and Mining Record, Volume I, Issue 228, 2 July **1872**, Page 3 https://paperspast.natlib.govt.nz/newspapers/TGMR18720702.2.15	We have much pleasure in recording the success which has so far attended the efforts of our Acclimatisation Society to establish this useful fish in Lake Taupo. An experimental parcel of about 30 carp was forwarded per s.s. Star of the South, Mr Lodder having kindly offered to superintend their transit to Napier. At that port they were received by a special messenger, whom Captain Morrison had directed to be in waiting, and were at once conveyed to Lake Taupo in excellent condition, 24 fish having survived the trip. These were divided into two parcels, one of which was liberated at the south end of Lake Taupo; the other in Roto Ngaio, a shallow lake, and abounding in weeds. The Maoris of the district are greatly interested in the experiment, and have promised Captain Morrison to liberate any of the carp that may be captured in their kupengas. If therefore the strangers can only keep out of the way of the shags until after the first spawning season, the success of this interesting experiment will be assured. D.S. Cross.
UNTITLED Thames Advertiser, Volume VIII, Issue 2005, 29 March **1875**, Page 2 https://paperspast.natlib.govt.nz/newspapers/THA18750329.2.9	Many of our readers will remember that about three years ago some three dozen young carp were liberated in Lake Taupo. These fish have increased and multiplied wonderfully. According to our informant the natives at Tokano are netting them wholesale, stringing and drying them as eels and young sharks are prepared for keeping by the Maoris. Many of the carp that have been caught weigh between four and five pounds.—Hawkes Bay Telegraph
UNTITLED Auckland Star, Volume VI, Issue 1600, 30 March **1875**, Page 2 https://paperspast.natlib.govt.nz/newspapers/AS18750330.2.9	The carp liberated in Lake Taupo by the Acclimatisation Society have increased with remarkable rapidity to the great satisfaction of the natives who are netting and drying them for winter use.
ROTORUA Auckland Star, Volume VI, Issue 1710, 11 August **1875**, Page 2 https://paperspast.natlib.govt.nz/newspapers/AS18750811.2.18.1	Carp for Lake Rotorua. Mr Pack, the celebrated Taupo guide, brought 27 Prussian carp for Rotorua lake, sent by Mr J. C. Young, now residing at Taupo.
Special Telegrams Waikato Times, Volume IX, Issue 504, 12 August **1875**, Page 2 https://paperspast.natlib.govt.nz/newspapers/WT18750812.2.7	A Rotorua telegram states that 27 carp, forwarded by Mr Young from Taupo for Lake Rotorua, have been received.

RECLAIMING SAHARA Press, Volume XXIV, Issue 3138, 21 September **1875**, Page 3 https://paperspast.natlib.govt.nz/newspapers/CHP18750921.2.21	Carp have at last been introduced into the Rotorua Lake. The feat of introducing them, says the Ohinemutu correspondent of the Bay of Plenty Times, was accomplished successfully last week through the forethought and care of Mr J. C. Young, of the Land Purchase Department, who originated the idea of bringing the fish from Taupo Lake, where they are now a great success, and prove a very important addition to the food of the inhabitants there. Mr Jack Loffley, the popular Taupo guide, undertook the conveyance of carp from Taupo by hand, and many thanks besides the email douceur he received for his trouble are due to him by the public generally. It is to be sincerely hoped that the carp will prove an equal success at Rotorua and Rotoiti as at Taupo. The Tarawera, Rotokākahi, and other lake natives are subscribing for a similar supply for those waters, and this will no doubt be accomplished during the summer.
TELEGRAPHIC Bay of Plenty Times, Volume IV, Issue 321, 6 October **1875**, Page 3 https://paperspast.natlib.govt.nz/newspapers/BOPT18751006.2.9	We hear that carp are to be sent at once to Lake Tarawera [from Taupō], the natives and the Europeans having indemnified Mr Young against loss for sending them.
FROM CORRESPONDENTS > TAURANGA Thames Star, Volume VII, Issue 2135, 6 November **1875**, Page 2 https://paperspast.natlib.govt.nz/newspapers/THS18751106.2.9.5	The Bay of Plenty Times' correspondent at Ohinemutu reports a great anxiety on the part of the natives for a sitting of the Lands Court in that district. He also says carp are breeding extensively in Lakes Tarawera and Rotokākahi.
THE LAKE DISTRICT OHINEMUTU, ROTORUA Bay of Plenty Times, Volume IV, Issue 331, 10 November **1875**, Page 3 https://paperspast.natlib.govt.nz/newspapers/BOPT18751110.2.10	A second supply of carp was recently introduced here by Captain Mair, who has also kindly supplied Lakes Tarawera, Rotokākahi, and other places with this delectable fish.
TE WAIROA, LAKE TARAWERA Bay of Plenty Times, Volume IV, Issue 348, 8 January **1876**, Page 3 https://paperspast.natlib.govt.nz/newspapers/BOPT18760108.2.14	A strange incident has occurred along the shores of Tarawera Lake; large quantities of crawfish and whitebait, so plentiful in all these inland lakes, are washing ashore. The Maoris attribute it to the Prussian carp which were imported here by the enterprise of Captain Mair and Mr Wakeham, who, by-the-bye, is determined to provide sport for invalids should they choose to stop here at our medicinal baths. The real cause of so many fish dying is the last earthquake, which was very severe, although natives say that they have had many more severe earthquakes without doing any damage.

ACCLIMATISATION SOCIETY New Zealand Herald, Volume XIII, Issue 4490, 4 April **1876**, Page 3 https://paperspast.natlib.govt.nz/newspapers/NZH18760404.2.18	Carp.—The following extract of a letter from Captain Gilbert Mair, of Ohinemutu, was read by the secretary. "Re carp, you will remember a small number being sent to Captain Morrison in 1872 or 1873, of which eighteen reached Taupo alive. Nine were liberated in Rotongaio, the small lake on the shore of Taupo, and nine at the south end of Taupo Lake, where the Tokano river runs into the lake. The shores here are muddy and covered with bulrushes and raupo, and numbers of warm springs. The fish have increased in an extraordinary manner. For the last two years, the natives have been catching them in vast numbers for food. They may be seen disporting themselves in the warm water, up to a temperature of 60 to 70 degrees. The natives catch them in nets. They state that the small fish are bony, but when nine or ten inches in length are very good. In September last year I had occasion to visit Tokano. Being anxious to stock Rotorua and adjacent lakes, I started out with three small boys in a little canoe. We paddled to the mouth of the river, took off our clothes, and got into the water at the mouth of a warm muddy spring. We only had an old boat's sail, about eight feet by four, but we soon scooped up over 100 fine fish—some of them being a foot in length, and weighing 3lbs. Most of those we caught were of a deep blueish black, but half-a-dozen were of a most brilliant golden red-like gold carp. Even the little fishes three inches long seemed as full of sport as the largest. I put 30 in Rotorua, 15 in Tarawera, and 14 in Rotokākahi Lakes. Those liberated in Rotorua seem to be increasing fast; as they can be seen in shoals in the warm water bay at Ohinemutu springing out of the water. I put a few in a mill-dam and two swamps at Tauraunga two years before last. Mr. Clarke, who looked after them, tells me they are very numerous now in both places. You can form some idea from the above how these fish have increased."
THE LAKE DISTRICT. OHINEMUTU Bay of Plenty Times, Volume IV, Issue 386, 24 May **1876**, Page 3 https://paperspast.natlib.govt.nz/newspapers/BOPT18760524.2.9	Our carp are increasing in great numbers; they are evidently very partial to hot water, as it is in the vicinity of Ruapeka where they are generally seen disporting themselves.
NOTES FROM OHINEMUTU Bay of Plenty Times, Volume V, Issue 418, 13 September **1876**, Page 3 https://paperspast.natlib.govt.nz/newspapers/BOPT18760913.2.13	The carp, liberated in the lake by Mr Young and Captain Mair a year ago, can be seen by thousands enjoying themselves in water almost too hot to bear one's hand in. In England, these fish are generally a dirty brown, but here (owing perhaps to being almost parboiled) they are a beautiful brilliant red gold. This change of color is an entertaining physiological and piscatorial fact, which might puzzle even Professor Agassis to explain.
NOTES FROM OHINEMUTU Bay of Plenty Times, Volume V, Issue 424, 4 October **1876**, Page 3 https://paperspast.natlib.govt.nz/newspapers/BOPT18761004.2.13	Some of us walk listlessly along the shores of the lake and watch the carp that play about in the shallow water (these fish like the hot water, and seem on the whole to have rather a good time of it)...

UNTITLED Bay of Plenty Times, Volume VI, Issue 545, 5 December **1877**, Page 2 https://paperspast.natlib.govt.nz/newspapers/BOPT18771205.2.4	Carp are very plentiful in the Rotorua Lake: natives have caught some weighing close on two pounds. The chiefs have forbidden nets to be used until next season.
A TRIP TO THE HOT SPRINGS Grey River Argus, Volume XXII, Issue 3294, 8 March **1879**, Page 2 https://paperspast.natlib.govt.nz/newspapers/GRA18790308.2.11	In the midst of the village of Ohinemutu, boiling springs are numerous, and on a still calm day the escaping steam covers a large space like a fall. Here the natives cook the food, boil their kettles, and perform their ablutions. Firewood is not to them a necessity. It is a curious sight to see the numbers of Maori kits with potatoes, pipis or cabbage alongside the tea kettle in a boiling water hole, and I can assure your readers it does not take a long time before the cooking is completed. The old adage, that cleanliness is next to godliness, is here exemplified literally. All day long, young and old, are either swimming or bathing. At times, the water is literally alive with dusky forms. From a small promontory bathers dive at once into deep cold water, and in a few yards by swimming round a point, they are at once into a hot temperature, becoming hotter as they near the source of supply, the hot springs from the banks in front of the township and village itself. Carp are here in shoals, in the hot water, and are of a red color; only a short time has elasped [sic] since they were put first into the lake, and now they exist in thousands. Their vitality, if I can use such a word as applicable is, however, so impaired by constantly remaining in the hot watery, that they will not flee your presence.
UNTITLED Bay of Plenty Times, Volume X, Issue 1014, 15 March **1881**, Page 2 https://paperspast.natlib.govt.nz/newspapers/BOPT18810315.2.5#image-tab	The carp introduced some four or five years ago from Taupō by Messrs. Mitchell and Young into Rotorua Lake, and subsequently into Rotorua, Tarawera, Rotomahana, &c, by Captain Mair, have increased in a most wonderful manner, and are being now largely used by the natives for food. The white fish ova, deposited by Mr J. C. Firth, may or may not be a success, as there is no certainty of any fish having been seen by Europeans, although the natives in some parts state that they have observed a strange fish. We hope that the strange fish is the white fish, and that the lake will soon be full of them.
CURIOUS CHANGE OF COLOUR IN FISH Bay of Plenty Times, Volume X, Issue 1104, 5 October **1881**, Page 3 https://paperspast.natlib.govt.nz/newspapers/BOPT18811005.2.15	It is not generally known that in Mr S. L. Clarke's swamp at Judea, and just at the rise of the hill approaching his farm, a very singular sight is to be seen. Some ten years ago a quantity of English carp were here turned out, which have thriven well. When they were first deposited there was nothing different in their ordinary appearance to distinguish them from other members of their species. The lapse of time has, however, developed a deep red tint in place of the ordinary dull color, and as they move about in the water on a sunny day they appear to the ordinary observer nothing but gold-fish. An examination of the fish will prove they are descendants of the original carp, having all the true characteristics of shape, structure, etc. Something in their habits has evidently effected them with regard to colour, and, though many suppositions have been made, nothing satisfactory has been really produced to account for such a singular change. Other carp placed out in neighbouring springs at the same time, and from the same consignment are in their natural condition as to colour, and these particular fish appear to be the only ones that, chameleon like, have changed their hue. The ordinary gold-fish imported from Fiji is a somewhat similar, fish, having all the characteristics of the carp, with the addition of the colour, and probably the same cause may have produced a like

	effect in both cases. It is difficult to obtain a sight of carp at Mr Clarke's swamp, as they appear very shy, and many journeys may be made before one can succeed in seeing them, but the time spent is well rewarded, for the fish have a singularly beautiful appearance when swimming swiftly about, with the sunlight glancing from their sides. Some of the fish have been caught and inspected, and to make the trial complete, duly cooked, and eaten with much relish and gusto, and are pronounced very sweet and good. The fish are of an average length of four to six inches, very few having been captured beyond that size.
TALES OF ROTORUA AND LEGENDS OF THE LAKES. Auckland Star, Volume XLI, Issue 131, 4 June **1910**, Page 13 https://paperspast.natlib.govt.nz/newspapers/AS19100604.2.101	Around the rushy lake-shore we saw little Maori children "guddling" for the black carp and the goldfish that abound there. The carp are called by the Maoris "morihana," a name which has a rather curious origin. It is simply the Maori way of pronouncing "Morrison." Many years ago Lake House Hotel was kept by a Mr. Morrison, who introduced some carp here from Auckland, and liberated them in the lake, and the Maoris called them after him. The goldfish are called "ika-whero," or "red-fish." - J Cowan.
IN TOUCH WITH NATURE Otago Daily Times, Issue 15083, 4 March **1911**, Page 5 https://paperspast.natlib.govt.nz/newspapers/ODT19110304.2.16	Although carp are seldom seen in the Waikato River, they seem to be fairly plentiful in it. When it overflows in the winter, it fills all the lagoons along its banks, and the carp which seem to prefer the stagnant water remain behind. In the fall of the year the lagoons become almost dry, and Mr Frost states that he has seen them teeming with carp of all colours. There are red, golden, white-and-black, red-and-black, and white. The Maoris make hauls of them, and have great feasts. The only complaint they make in regard to the carp is that there are too many bones in them. The Maoris have a recognised method of catching these fish. They select a lagoon about one foot deep. Beginning at one end, they wade the whole length several times, stirring up the mud as much as possible. In a short time the lagoon is turned into mud. The fish do not like this, and they rise to the surface, and put their mouths out of the water until their heads may be seen in all parts of the lagoon. The Maoris then catch them by hand and transfer them to capacious kits, slung on the fishers' backs. The carp cannot see far on account of the muddy condition of the water, and are almost helpless. Sometimes, when the operations are in hand, one of the Maoris treads upon a largo eel. Carp-fishing is then immediately suspended until the eel is secured.
WILD LIFE IN NEW ZEALAND Otago Witness, Issue 3459, 29 June **1920**, Page 61 https://paperspast.natlib.govt.nz/newspapers/OW19200629.2.219	THE CARP (CYPRINUS CARPIO) AND ITS ALLIES. The large family of the Cyprinidae, which contains the majority of the fresh-water fishes of the Northern Hemisphere, has no representatives among the indigenous fishes of New Zealand, nor indeed in any part of Australasia. But no fewer than 11 species have been introduced into this country, or at least attempts have been made to introduce them. Three of these—viz., carp, gold-fish, and tench—have become naturalised. The characters by which the various families of the great order of Teleost fishes—an order containing nearly 12,000 species—are divided from one another are mainly anatomical, and I will not attempt to give them. The carp is a thick, solid fish, with a rounded blunt snout and a narrow mouth, with four barbels, while its dorsal fin has a strong serrated bony ray. There are a great many varieties of this fish, which differ from one another in form, in the characters of the skin and scales, and other features. It is an European species, but also ranges into Eastern Asia. It is a long-lived fish, its life being said to extend to a hundred years or more, and its weight to as much as 30lb. Personally I do not think much of carp as a food fish, and this opinion is generally shared in Britain. But in Germany it is appreciated to an

	extraordinary extent, and it is cultivated very largely. Ponds for spawning, for young fish, and for mature fish are constructed on many of the large estates, especially in Prussia, and these yield a considerable revenue to their proprietors. Old Isaak Walton has a delightful chapter on carp and carp-fishing, and I think an extract from this will prove of interest to ray readers, and especially to those who desire to know how much good cookery was studied by our forebears. I may say that prohibition was unknown in Walton's time: "First, I will tell you how to make this carp, that is so curious to be caught, so curious a dish of meat, as shall make him worth all your labour and patience; and though it is not without some trouble and charges, yet it will recompense both. Take a carp, alive if possible, scour him, and rub him clean with water and salt, but scale him not; then open him, and put him, with his blood and his liver (which you must save when you open him), into a small pot or kettle; then take sweet marjoram, thyme, and parsley, of each half a handful, a spring of rosemary, and another of savoury, bind them into two or three small bundles, and put them to your carp, with four or five whole onions, 20 pickled oysters, and three anchovies. Then pour upon your carp as much claret wine as will only cover him, and season your claret welt with salt, cloves, and mace, and the rinds of oranges and lemons. That done, cover your pot, and set it on a quick fire till it be sufficiently boiled; then take out the carp, and lay it with the broth into the dish, and pour upon it a quarter of a pound of the best fresh butter, melted and beaten with half a dozen spoonful's of the broth, the yolks of two or three eggs, and some of the herbs shred; garnish your dish with lemons, and so serve it up. And much good do you!" This is good meagre diet!!
WILD LIFE IN NEW ZEALAND Otago Witness, Issue 3460, 6 July **1920**, Page 61 https://paperspast.natlib.govt.nz/newspapers/OW19200706.2.237	The Carp is very tenacious of life. In Holland it is said that they are kept alive for weeks in the winter time by being placed in wet moss hung in a net and occasionally dipped in water. The fish are fed on bread and milk. Under ordinary conditions carp feed on insect larvae, worms, water plants, and, to a less extent, on minnows and other small fish. In the European winter the fish bury themselves in the mud and pass months without eating. Carp begin to breed in their third year, and the production of eggs continues to increase till, in a 10-pound fish, as many as 700,000 are produced annually. The eggs are deposited upon water plants in May and June in Europe - corresponding to November and December here. I have no information as to the spawning habits of the fish in New Zealand. The first attempt to introduce this fish into New Zealand was made by Mr A. M. Johnson, of Opawa, who shipped 200 in London in the British Queen, bound for Lyttelton. The experiment was, however, unsuccessful, all the fish dying on the voyage. In 1867 the Auckland Society introduced 114 Prussian carp, and of these 12 were placed in Lake Takapuna. In 1870 Mr Dowling imported a number of Chinese and Prussian carp into Canterbury. An Otago importation in 1868 was a failure. From Auckland and Canterbury all the carp now in New Zealand seem to have spread. They are now abundant in many parts of the North Island, and are also in Lake Mahinapua, on the West Coast of this island. Mr R. D. Dansey, of Rotorua, who has given me a great deal of most interesting information regarding introduced animals in that part of New Zealand, tells me that carp are very plentiful in Rotorua, and are called "Morihana" by the Maoris. He gives the origin of this name as follows:-- "I was present when in 1873 a small number of carp were first liberated in Lake Taupo by Sub-Inspector H.

	Morrison, of the Armed Constabulary, then stationed at Tapuaeharuru. They had been brought up from Napier in a billy. Members of the constabulary had been purposely stationed at intervals of several miles along the track from Napier to Taupo, a distance of 90 miles, and the billy and its precious contents was passed on from man to man till it reached Tapuaeharuru, where the fish were liberated near the outlet of the lake. All hands and the cook from the redoubt proceeded to the spot to see the liberation, and many Natives came across the Waikato River to see the new pakeha fish. There was great cheering as the little carp swam out from the bank. The Natives called them there and then "Morihana," after Captain Morrison, and they are still only known by the Natives in the Taupo and Rotorua districts by this name. In 1880 five of us subscribed a pound each and commissioned 'Jack Loffley' to bring a billy of young carp down from Taupo, where by that time they had become exceedingly numerous. They were duly liberated at the mouth of the Utuhina Creek and in a small lagoon emptying into the lake, where they multiplied at an enormous rate. The Maoris did not like them, considering them too full of bones and dangerous for their children." While I quite appreciate the objection of the Natives to this bony fish, it is interesting to note that in June, 1916, at a meeting of the Arawa tribe in Rotorua, it was decided to send a telegram to the Hon. W. H. Herries, Minister of Native Affairs, protesting against a recent Government notification forbidding the catching of carp in Lake Rotorua, and pointing out that the Maoris were thereby deprived of a food supply which they had enjoyed for the last 30 years. The gold fish (*Carassius auratus*) belongs to a slightly different sub-genus from the true carp (*Cyprinus*), in that the fish have no barbels round the mouth. They are supposed to have originated in China, where they are kept in porcelain vessels as domestic pets. But it is in Japan that the cultivation of these fish has been carried to the highest degree, where all sorts of dwarfed and fancy forms occur. The colour of these varieties ranges from bright red, through golden, to silver white; sometimes the anal fin is double; some have two, three, or four tails; the dorsal fin may be very long, or occasionally absent; while one variety has the eyes large and protruding. Gold fish never reach a great size, one foot being the maximum length. The first attempt to introduce gold fish into New Zealand was made by a Mr A. M. Johnson, of Opawa, who succeeded in bringing a few alive (the only survivors out of a large and varied assortment of fish), in the British Empire, in 1864. These were landed at Lyttelton. In 1868 the Canterbury Acclimatisation Society received a number from the Acclimatisation Society of Melbourne. Since these dates numbers have been brought into the country by dealers and private individuals, for the fish is easily carried, and is very hardy. These fish are very abundant in many parts of the North Island, especially in the thermal lakes district. Mr Dansey tells me that when they became common in Rotorua, "a lucrative trade sprang up between the Ohinemutu Maori children and visitors. The children became adepts at catching them with their hands among the reeds and rushes, up to a quarter of a pound weight or more."
WAYS OF THE WILD. THE GOLDFISH. BEAUTIFUL AND INTERESTING	Carp in New Zealand. The carp was introduced into New Zealand about 1864. It is now plentiful in many parts of the Dominion. A small number were first liberated in Lake Taupo in 1873 by Sub-Inspector H. Morrison, of the Armed Constabulary. Mr. H. D. Dansey, of Rotorua, states that he was present at the time. The fish were

Auckland Star, Volume LXIV, Issue 177, 29 July **1933**, Page 1 (Supplement) https://paperspast.natlib.govt.nz/newspapers/AS19330729.2.158.7	brought up from Napier in a billy. Members of the Constabulary had been purposely stationed at intervals of several miles along the track from Napier to Taupo, a distance of 90 miles, and the billy and its precious contents were passed over from man to man till it reached Tapuaeharuru, where the fish were liberated near the outlet of the lake. All hands and the cook from the redoubt proceeded to the spot to see the liberation, and many natives came across the Waikato River to see the new pakeha fish. There was great cheering as the little carp swam out from the bank. The natives called them then and there "Morihana," after Captain Morrison, and they are still only known by the natives in the Taupo and Rotorua districts by this name. Mr. Dansey states that he and four others subscribed one pound each for a billy of young carp from Taupo, where by that time they had become exceedingly numerous. They were duly liberated at the mouth of the Utuhina Creek and in a small lagoon emptying into the lake, where they multiplied at an enormous rate. The Maoris did not like them, considering them too full of bones and dangerous for their children. Before long a lucrative trade in goldfish sprung up between the Ohinemutu Maori children and visitors. Carp frequenting the thermal waters along the southern shores of Lake Rotorua soon turned a bright red or white, some partly red and partly white. The children became adepts at catching them with their bands. The fish, which were a quarter of a pound or more, frequented shallow water amongst reeds and rushes.
LOCAL AND GENERAL Feilding Star, Volume 10, Issue 4098, 16 August **1933**, Page 4 https://paperspast.natlib.govt.nz/newspapers/FS19330816.2.13	Three Maori girls were seen catching carp in the Horowhenua Lake on Sunday, the method being to wade in the shallows and watch for a movement of the fish, which was deftly thrown up into a basket held by another girl. In about half an hour the basket was nearly full of beautiful fish.
NEWS IN BRIEF Otago Daily Times, Issue 22042, 26 August **1933**, Page 20 https://paperspast.natlib.govt.nz/newspapers/ODT19330826.2.161	A 4lb carp, which was taken by net a few weeks ago. has been mounted and placed in the Rotorua office of the Department of Internal Affairs (says the New Zealand Herald). The fish was caught in the Ohau Channel, and is a heavy specimen for New Zealand waters. The carp had received an injury, having been struck by some object, and this made the work of mounting it more difficult.
ROTORUA REMINISCENCES Rotorua Morning Post, Volume 7, Issue 1624, 12 November **1936**, Page 6 https://paperspast.natlib.govt.nz/newspapers/RMPOST19361112.2.40.2	From my earliest years, prior to my parents' arrival in Rotorua, and my first attendance at the old school (which was then new) in 1886, I had been reared in a fishing atmosphere. Sani Haupapa (who I am pleased to see is still on deck) first initiated me into the capture of koura which we school children would then cook in the boiling pool below Dunbar Johnson's residence. Carp of varied colours were also plentiful and we became expert in catching these by hand among the lake shore reeds. In the lake were a few brown trout and some species of white fish of uncertain ancestry. There is, to my knowledge, no authentic history of whence or how they came.
ITEMS OF INTEREST Bay of Plenty Times, Volume LXV, Issue 12225, 14 January **1937**, Page 2	Three Rotorua natives, while endeavouring to ensnare carp along the muddy shores of Lake Rotoehu, in the vicinity of Hongi's Track, experienced quite a thrill the other day when a huge eel, weighing 15lb., became entangled in their net. They immediately dragged the net ashore, and killed their unwary prey. Eels' flesh is an undoubted delicacy to the Maori, and particularly to the Rotoiti

https://paperspast.natlib.govt.nz/newspapers/BOPT19370114.2.13	Maoris, who rarely sample such luxurious fare. Needless to say, the eel provided a most appetising meal.
NEWS IN BRIEF Otago Daily Times, Issue 23151, 30 March **1937**, Page 16 https://paperspast.natlib.govt.nz/newspapers/ODT19370330.2.166	A well-conditioned 9lb carp was caught in Lake Rotoiti the other day by Mrs Baker, of Queensland, the fish being one of a good bag of smaller fish taken on the fly.
NATURAL HISTORY NOTES Otago Daily Times, Issue 23873, 29 July **1939**, Page 24 https://paperspast.natlib.govt.nz/newspapers/ODT19390729.2.190	THE COMMON INTRODUCED CARP Several correspondents have during the past few years asked for some information about this popular introduced fish, which is known to science as Cyprinus carpio, to the Maori as Morihana, and must not be confused with its relative the golden carp or goldfish. The first attempt to introduce this fish into New Zealand was in 1864, when Mr A. M. Johnson, of Christchurch, shipped in London 200 specimens, but all died during the voyage. In 1867. 114 were liberated in the Auckland district, some of which were placed in Lake Takapuna, and in 1929 the writer caught very large examples from this lake. In 1831 the Otago Society obtained six carp and liberated them in the Waihemo darn, but when the dam burst the fish were lost.. In 1873 a number were liberated in Lake Taupo, which had been brought from Napier in a billy and set loose near the outlet of the lake, a description of which is stated in that excellent book of the late Mr G. M. Thomson, "The Naturalisation of Animals and Plants in New Zealand," as follows: "All hands and the cook from the military redoubt proceeded to the spot to see the liberation, and many Natives came across the Waikato River to see the new pakeha fish. There was great cheering as the little carp swam out from the bank. The Natives called them, then and there. 'Morihana,' after Captain Morrison, and they are still known by the Natives in the Taupo and Rotorua districts by this name." Captain Morrison, by the way. was in charge of the Armed Constabulary at Tapuaeharuru (Taupo). It will be seen by the above that carp were to be caught at Napier in 1873, but I am unable to find any reference as to when they were first liberated at Napier. In 1880, these fish had rapidly multiplied in Lake Taupo. when several Rotorua residents under the leadership of Mr R. D. Dansey engaged a man to catch a number of these fish and bring them to that town, when they were liberated in a small lagoon emptying into Lake Rotorua, where they multiplied at an enormous rate. Mr Dansey states that the Natives did not like them, considering them too full of bones. However, it was not long before a lucrative trade sprang up between the Ohinemutu Maori children and visitors. Carp in the thermal regions along the southern shore of the lake soon turned a bright red or white, some partly red and partly silver. The children soon became adepts at catching them with their hands among the rushes, up to a quarter of a pound in weight. In 1929-30, when a boy, the writer caught many carp in the swampy parts of Nanier, and strangely enough, they, too, were coloured, as stated by Mr Dansey, so that we can assume the warm waters of Rotorua were not the cause of such bright colouring. English writers state that carp assume this

	brilliant colouring when there is an abundance of food and clear water, decreasing in colour when they are short of food or in muddy situations. One of my correspondents asked the question how to distinguish between the goldfish and the common carp. The latter fish possesses two strong barbels or feelers below the mouth, the former having none; and these barbels, as in the case of other fish such as red cod, perform, to great extent, the office or sense of perception. The tongue and the plate are found to be far from sensitive, as in the majority of fishes. - D.H. Graham
JULIE'S PETS New Zealand Herald, Volume 78, Issue 24057, 30 August **1941**, Page 17 https://paperspast.natlib.govt.nz/newspapers/NZH19410830.2.152.8	Last, but not least, is Cleo, my goldfish. She loves her big bowl, and doesn't seem lonely by herself. Her tail is black, a nice contrast to the rest of her gold and orange skin. She was caught in the lagoon in front of our house with many other fish. One goldfish was huge, measuring about 7in. or 8in. long and about 3in. wide. A lot of carp were caught, also, but they weren't pretty, so they are back in the lagoon, together with the big one, which had to be kept in a basin, and therefore was a nuisance. - Yours sincerely, Julie Kusabs, Reporoa.
GOING FISHING WITH KOTARE Press, Volume CXV, Issue 34013, 29 November **1975**, Page 12 https://paperspast.natlib.govt.nz/newspapers/CHP19751129.2.87	Once I was sure Carassius auratus was about, I would put up the coats-fishing tackle and haul out half a dozen to have their picture taken. It would be like float-fishing for herrings at Paremata. All we caught was one large beetle. We roved along the lake edge, but the water was really too shallow. I tossed out some ground bait, hoping to attract some fish, but not even a smelt turned up. Sub-Inspector Morrison of the Armed Constabulary would have been surprised to see us fishing for carp at Motuopa. He would have advised us to go north to Tapueharuru, where the men of his detachment were used to fishing for them. That end of the lake was where Carassius auratus was first introduced, by the sub-inspector himself, all those years ago. All 100 years ago, in fact. The century of the carp's introduction in 1874 could hardly qualify as an occasion for a Taupo carnival, but this fish came here much earlier than the trout, and is thus the senior tenant. And which of the two provides the more straight-out fun for youngsters, especially at the southern end of the lake, it would be hard to say. Apart from those who scoop them up in nets, only the youngsters deliberately fish for Lake Taupo's coarse fish, for it's a vegetarian, and doesn't grow to anything like the proportions of rainbow or brown trout. Carassius auratus, or the common goldfish, as C.S. Woods identifies it in his book "Native and Introduced Freshwater Fishes," must not be confused with the Chinese grass carp, Ctenopharyngdon idella, which grows to well over 50lb in weight. Carassius in Lake Taupo, as far as I know, has never been taken on a fly. A Taupo Tiger or a Red Setter might even make the fish fly for its life. But one is on record as having taken a trolled spoon not far from the outlet some years ago.

	It wouldn't have given the surprised fisherman much of a fight, because the largest of the species is said to reach only some 12in, and this one was only 10in. Identification of the fish has varied over the years. Although Woods calls it Carassius auratus, G.M. Thomson in his classic work "The Naturalisation of Animals and Plants in New Zealand," published in 1922, names the species Cyprinus carpio. Thomson's account of the carp's introduction to Lake Taupo makes interesting reading. The story was told to him by Mr R.D. Dansey of Rotorua--who incidentally refers to yet another name for the car which has stuck with the fish ever since Sub-Inspector Morrison introduced it. The Maoris who watched the liberation called the fish "morihana," after the inspector himself. Mr. Dansey, who was present at the liberation, told Thomson that members of the Armed Constabulary had been placed at intervals of several miles along the track from Napier to Taupo. The billy of little fish came from Hawke's Bay that day, presumably on horseback, and was passed from man to man until it reached Tapuaeharuru. All hands--and the cook--from the redoubt went to see the fish liberated. Many Maoris "came from across the Waikato River to see the new pakeha fish. There was great cheering as the little carp swam out from the bank." Mr Dansey described how, in 1880, he and four others had subscribed £1 each and commissioned Jack Loffley to fetch a billy of young carp from Taupo. They were liberated at the mouth of Utuhina and in a small lagoon emptying into Lake Rotorua. He reported that the Maoris did not like them as food, considering them too full of bones and dangerous for their children. But in 1916, when the Government prohibited the catching of carp in Lake Rotorua, their dislike did not prevent them from sending a telegram to the Minister for Native Affairs protesting that the prohibition would deprive the Maori of a food supply which they had enjoyed for the previous 30 years.
NOXIOUS TAG FOR SIX FISH SPECIES Press, 11 October **1980**, Page 22 https://paperspast.natlib.govt.nz/newspapers/CHP19801011.2.117	Six fish species have been declared noxious in New Zealand. A new regulation will come into force on October 12, making it illegal to possess, hatch, raise, or consign noxious fish without the written authority of the Director-General of Agriculture and Fisheries. The six species are walking catfish, European carp and Japanese koi, pike, piranha, rudd, and tilapia. It will also be illegal to have sub-species, hybrids, and variations of them. All these fish represented a risk to both the natural environment and the people 1 of New Zealand, said Mr SJ Pullen, of the Ministry's Fisheries Management Division. Introducing some of them could cause biological and economic disaster. Permits would be issued to enable some of these fish to be kept in carefully controlled conditions, he said. Institutions that could provide rigid quarantine facilities, equivalent to those of a zoo, might receive permission to retain

	tilapia, walking catfish, or piranha. Permission to hold Koi might be given if they were already in possession, and subject to strict conditions, Mr Pullen said. Sale, trade, or breeding would not be allowed. Permits would not be allowed for pike or carp, and rudd would not be permitted in aquaria. Permission might be granted to retain them in farm ponds and similar places.

Appendix 2. Interview questions used

Questions - Iwi members

WHAKAPAPA

- Can you tell me about your connection to this place?
    - And what freshwaters are important to you?

MORIHANA

- How did you develop your relationship with morihana?
    - What are your most recent interactions with morihana?
    - How did you first start interacting with morihana?
        - How did you learn to fish them?
        - How did you learn to prepare and eat morihana?
        - Do you consider morihana a delicacy?
        - How does morihana relate to your life?
        - How did you come to have this appreciation of morihana (for me: cultural transmission)
- From what I've read, I'm confused on what is morihana - goldfish vs. carp. Can you help explain to me - what do you think of as morihana?
    - Can you describe morihana for me? What do they look like, how do they behave, do they have a particular taste, etc.?
- What stories can you tell me about morihana?
    - Can you share any personal anecdotes or stories that highlight the significance of morihana to your whanau?
- Can you tell me about the history of morihana with Te Arawa? In Rotorua?
- (Why) Do you consider morihana taonga?
    - Do you know why morihana came to be seen as taonga?
- Are morihana in danger from something, like people, other fish, plants, etc.?
    - If so, can you tell me more about what is putting morihana at risk?
- Are morihana causing another fish, plant, resource, or group of people to be in danger?
    - If so, can you tell me more about how morihana might be harming that other being?

MANAGEMENT

- What are your feelings towards current management of morihana?
    - Why?
    - How would you like morihana to be managed, ideally?
        - (Alternative wording - What future do you want for morihana?)
- What do other people think about morihana, and why?
    - Do you (or the Te Arawa iwi more generally) collaborate with other organisations, for example DOC or Fish & Game, to manage morihana?
        - If so, can you provide details about these collaborative efforts?

        - Can you share any interesting or memorable incidents related to the relationships and interactions with other morihana managers?
- What do you wish other managers of morihana knew about them?

Questions - Other management bodies

WHAKAPAPA (if applicable)

- Can you tell me about your connection to this place?
    - And what freshwaters are important to you?
- Can you describe your role in your organisation for me?

MORIHANA

- Can you describe morihana for me? What do they look like and how do they behave?
- What are the objectives of your organisation for morihana?
    - (DOC) (Why) Do you consider morihana pests in this region?
    - (F&G) What do your staff/governors/members want for morihana?
    - How do you interact with morihana day to day?

MANAGEMENT

- How are morihana currently managed in the Rotorua lakes?
    - How would you like morihana to be managed, ideally?
- Do you (or your organisation) collaborate with other organisations, for example DOC or Fish & Game, or the Te Arawa iwi to manage morihana?
    - If so, can you provide details about these collaborative efforts?
    - Can you share any interesting or memorable incidents related to the relationships and interactions with other morihana managers?
- How do you (or your organisation) communicate and coordinate your efforts to manage morihana?
- What do you wish other managers of morihana knew about them?