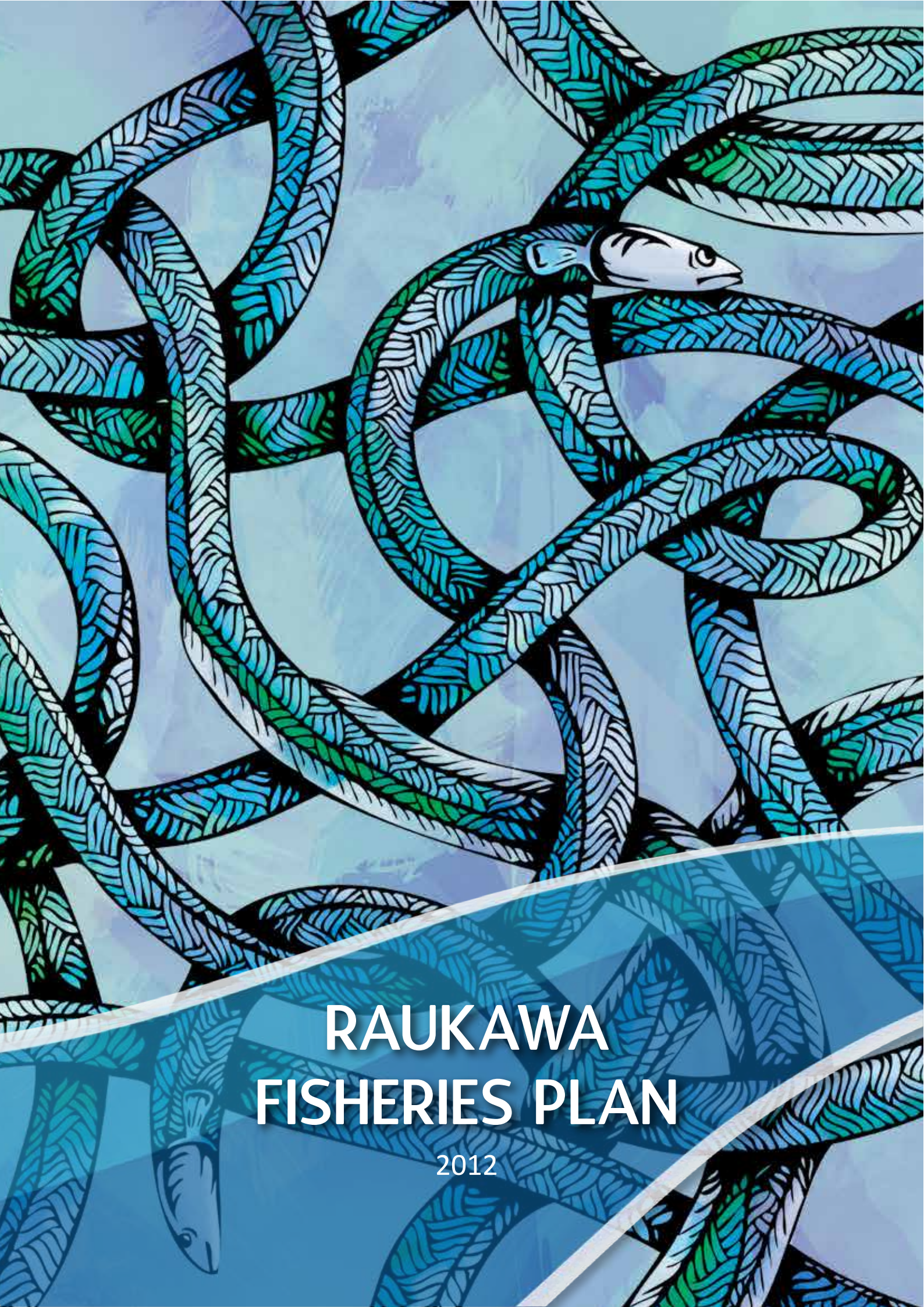


# RAUKAWA FISHERIES PLAN

2012

Prepared for the Raukawa Charitable Trust by Erina Watene-Rawiri and Jenni Fitzgerald

Document Design and Cover Illustration by Hayley Simmonds

# NGĀ MIHI

We acknowledge the funding support of the Waikato River Clean-up Trust and the Ministry for Primary Industries which has enabled the development of this plan. We would also like to acknowledge the valuable input of other river iwi and key stakeholders including Te Arawa River Iwi Trust, Mighty River Power, Waikato Regional Council, NIWA, Fish & Game NZ, Ministry for Primary Industries and the Department of Conservation. Special thanks to Mighty River Power and NIWA for the sharing of their mahi with the Fisheries Reference Group.

Finally, but by no means least, the input from ngā uri o Raukawa and those who participated in the Fisheries Reference Group established to guide the development of the plan: Ben Adlam, Johnathon Barrett, Wiremu Winika, Bill and Lorraine Miles, Wai Smith, Tomairangi Smith (Jnr), and Lorna and Ross Pope.

*Kei a koutou ngā kaumatua, ngā rangatira hoki, kei ngā mangai o te Fisheries Reference Group, kei ngā hunga ngākau mahaki e kaha ake nei ki te awhina, ki te tautoko, ki te hāpai i tēnei kaupapa he mihi aroha, he mihi mahana hoki ki a koutou kātoa. Nā koutou te kaupapa nei i whakatinana, i whakamana.*

FIGURE 1: Raukawa Fisheries Reference Group visiting Karāpiro Dam with Mighty River Power 24 August 2012.
PHOTO: Jenni Fitzgerald, Raukawa Charitable Trust

# RAUKAWA FISHERIES PLAN

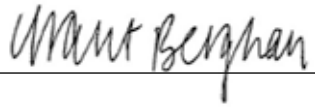
The Raukawa Fisheries Plan was prepared by the Raukawa Charitable Trust on behalf of and in consultation with ngā uri o Raukawa.

The Raukawa Charitable Trust resolved at its meeting on 28th November 2012 to adopt the Fisheries Plan.

For the avoidance of doubt:

- For the purposes of the *Ngati Tuwharetoa, Raukawa, and Te Arawa River Iwi Waikato River Act 2010,* this plan is an environmental plan.
- For the purposes of the *Resource Management Act 1991*, this plan is a planning document recognised by the Raukawa Charitable Trust in its capacity as an iwi authority.

Kataraina Hodge
**Raukawa Charitable Trust Chair**



Grant Berghan
**Raukawa Settlement Trust CEO**

Dated at Tokoroa this 26th day of February 2013.

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# KUPU WHAKATAKI
# INTRODUCTION

The purpose of this Fisheries Plan is to enable Raukawa to exercise mana whakahaere and effectively participate in the management of freshwater fisheries for present and future generations.

For Raukawa, fisheries are a taonga: they sustain our way of life, both physically and spiritually. In the physical sense, the fishery is a source of food for the Iwi. It was plentiful during all seasons of the year, it was reliable and it was respected. Spiritually it reflected the health of the broader environment with which we, as tāngata whenua, are inextricably linked. Traditionally, fishing locations were highly prized and often linked to the occupation or use of adjoining land. The rivers within the takiwā have been transformed dramatically over the past 150 years through urbanisation, hydro development, introduction of exotic species, and the modification and intensification of land use, and this has impacted significantly on our fisheries.

Raukawa consider waterways to be the veins of Papatūānuku, and as such they must be managed in a way that reflects the oneness of land and water. Waterways and aquatic life continue to be integral to the mana and wairua of Raukawa, and freshwater fishing for customary purposes is of on-going significance. As kaitiaki we have a responsibility to protect and effectively manage these taonga within our takiwā. This responsibility is imparted to us through our whakapapa: uri, whānau, hapū and iwi have the right and responsibility to protect our tribal waterways, including our fisheries. For Raukawa the practice of kaitiakitanga is holistic and multifaceted, it is about responsibility, leadership and protection. It is grounded in the korero tuku iho, tikanga and kawa of whānau, hapū and marae but it is also forward looking. It is about leaving a legacy for our tamariki mokopuna through the protection and effective and sustainable management of our natural resources (including but not limited to awa, ika, whenua and taonga tuku iho).

As a River Iwi Raukawa is committed to the restoration and protection of the Waikato River as expressed in *Te Ture Whaimana o Te Awa o Waikato* – the Vision and Strategy. We acknowledge that Raukawa alone cannot assure the wellbeing of the River and its fisheries. This is reflected in our approach to working collaboratively with other River Iwi, local and central government and other organisations in our rohe. We have, and will continue to, work closely with neighbouring River Iwi to secure the best outcome for the fisheries, and ultimately the awa, in keeping with our view of the awa as an indivisible entity. We have been able to draw on the experience of other iwi and fisheries staff within the Ministry for Primary Industries to develop this plan in an efficient and effective manner whilst ensuring it achieves the aspirations and objectives for freshwater fisheries management of ngā uri o Raukawa. Te Waihou is no less significant to Raukawa and we look forward to entering into co-management agreements covering this catchment in the near future.

# 1 WĀHANGA TUATAHI SCOPE & CONTEXT

## 1.1 KAUPAPA

The kaupapa (purpose) of this Fisheries Plan is:

*To enable Raukawa to exercise mana whakahaere and effectively participate in the management of freshwater fisheries within the rohe and activities that may impact upon them.*

## 1.2 VISION

The overarching vision for freshwater fisheries within the Raukawa rohe is:

*To protect, restore, enhance and rehabilitate freshwater fisheries and fisheries habitat for present and future generations.*

## 1.3 SCOPE

A key driver for preparing this plan was to complement the timing of the development of regulations for the Upper Waikato River which are required, under the Ngati Tuwharetoa, Raukawa, and Te Arawa River Iwi Waikato River Act 2010, to be recommended to the Minister for Primary Industries by November 2012. Funding for the Plan's development was obtained from the Waikato River Clean-up Trust contestable fund, as well as from the Ministry for Primary Industries and Raukawa Charitable Trust (RCT). Due to the funding sourced and timeframe, the Plan's development has had a particular focus on the Waikato River, however, the mātauranga, principles, issues, objectives and policies expressed are relevant for the whole of the Raukawa rohe. It is intended that the Plan will be integrated within the planned Raukawa Environmental Management Plan (REMP), the development of which will potentially further expand on the Fisheries Plan and confirm its applicability to different parts of the rohe. Figures 2 and 3 show the Raukawa area of association (as described in the Deed of Settlement signed by Raukawa and the Crown in 2012), and the Waikato River co-management areas.

This plan will influence decision-making on a number of matters that impact fisheries resources including the management of fishing and habitat protection. The following section outlines some of the key ways this plan will influence fisheries management.

## 1.4 LEGAL EFFECT

The Raukawa Fisheries Plan has the following effect (subject to certain requirements being met):

- Any person exercising functions, duties and powers under Sections 12-14 of the *Fisheries Act 1996* must recognise and provide for the Plan (Waikato River catchment).
- The Minister for Primary Industries must have particular regard to the Plan when making sustainability measures that relate to the Upper Waikato River.
- Any person exercising powers and authority under the Upper Waikato River Fisheries Regulations (expected to be gazetted in 2013) must act consistently with the Plan (Waikato River catchment).

- Any person carrying out functions or exercising powers under the *Conservation Act 1987* and enactments listed in Schedule One to that Act must have particular regard to the plan to the extent to which its contents relate to the functions or powers (Waikato River catchment).
- As a recognised iwi planning document, regional and district councils are required to take the Plan into account when preparing or changing a district or regional plan or regional policy statement under the *Resource Management Act 1991* (RMA).
- A consent authority (usually a regional or district council) considering an application for a resource consent under section 104 of the RMA must have regard to the plan if it considers s104(1)(c) applies to the plan (in other words, if it considers the Fisheries Plan is relevant and reasonably necessary in order to reach a decision).

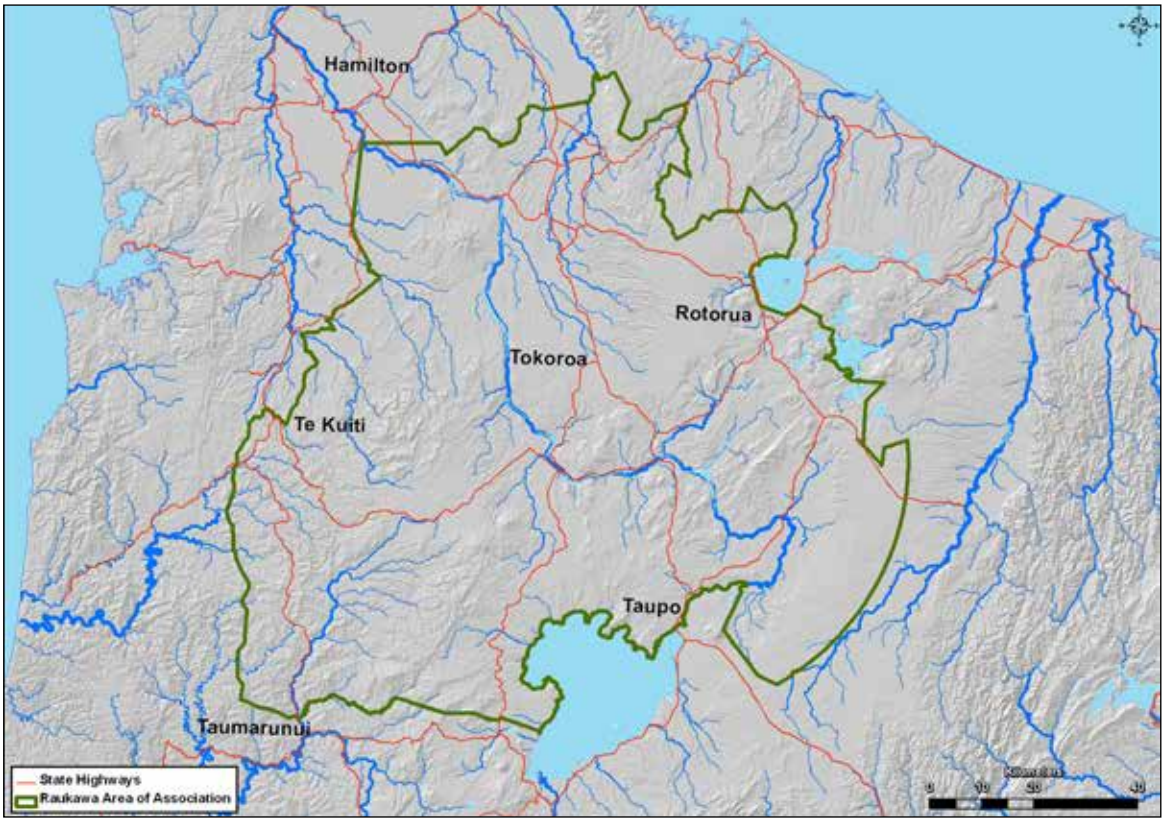



FIGURE 2: Raukawa Area of Association

## 1.5 THE RAUKAWA CONTEXT

Ngā uri o Raukawa asserts mana whakahaere within our takiwā and over the resources within it. Mana and mana whakahaere responsibilities include but are not limited to the exercise of kaitiakitanga, which is based on, amongst other things, the sacred relationship with our awa, including Te Awa o Waikato and Te Waihou, unbroken occupation, the continued exercise of ancestral mana and the fact that title has never been ceded.

We have a traditional, historic, and contemporary association and relationship with the land and waters, flora and fauna and all natural resources within our rohe. Raukawa accepts both rights and responsibilities as tāngata whenua and kaitiaki and we will continue to enhance, protect and manage these resources in a manner that is consistent with our values and our tikanga, ensuring they are left in a better state for future generations.

For Raukawa, fisheries are a taonga. They are treated as such because they sustain our way of life, both physically and spiritually. In the physical sense, the fishery is a foundation food source for the

Iwi. It was plentiful during all seasons of the year, it was reliable and it was respected. Traditionally, fishing locations were highly prized and often linked to the occupation or use of adjoining land. The rivers within the takiwā have been transformed dramatically over the past 150 years through urbanisation, hydro development, introduction of exotic species, and the modification and intensification of land use and this has impacted significantly on our fisheries.

Waterways and aquatic life continue to be integral to the mana and wairua of Raukawa and freshwater fishing for customary purposes is of on-going significance. As kaitiaki we have a responsibility to protect and effectively manage these taonga within our takiwā. This responsibility is imparted to us through our whakapapa: uri, whānau, hapū and iwi have the right and responsibility to protect our tribal rivers, including our fisheries. For Raukawa the practice of kaitiakitanga is holistic and multifaceted, it is about responsibility, leadership and protection. It is grounded in the korero tuku iho, tikanga and kawa of whānau, hapū and marae but it is also forward looking. It is about leaving a legacy for our tamariki mokopuna through the protection and effective and sustainable management of our natural resources (including but not limited to awa, ika, whenua and taonga tuku iho).

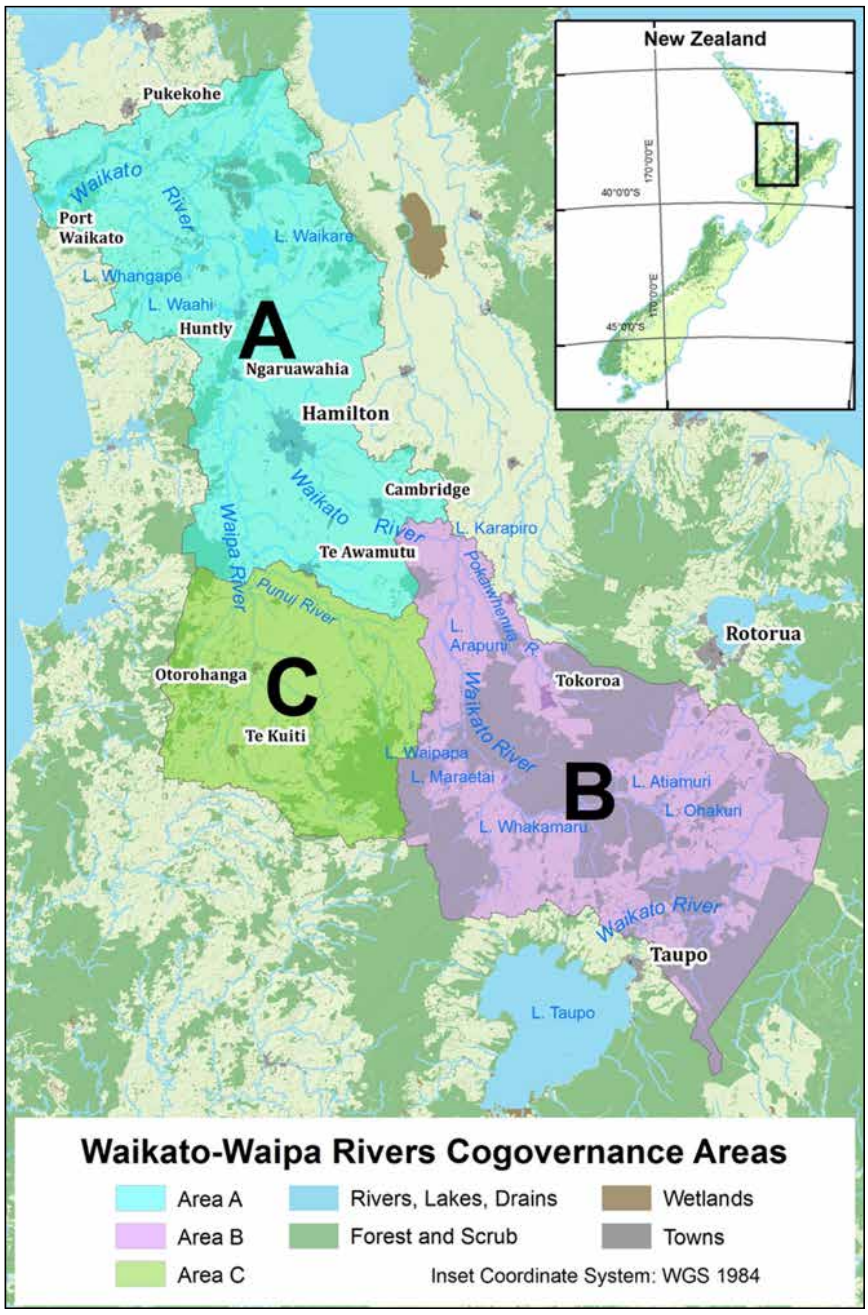



FIGURE 3: Waikato River Co-Governance Areas (SOURCE: HICKS ET AL. 2012)

### 1.5.1 Waikato River co-management framework

Raukawa have many rich associations with the Waikato River. The River runs through the centre of the rohe, and many sites within, and alongside, the River are important. Waka landing sites, food and material gathering sites, blessing and sacred sites are associated with the Waikato River. To Raukawa the Waikato River has mana and in turn represents the mana and mauri of Raukawa. The relationship with the River and our respect for it lies at the heart of our spiritual and physical wellbeing, and tribal identity and culture. The River is a taonga to Raukawa. It is a whole and indivisible entity that flows from Ruapehu to Te Puaha o Waikato.

Raukawa have been significantly affected by the loss of our lands, including those associated with the Waikato River and its tributaries, through the operation and impact of the native land laws, and Crown and private purchasing. Over a period of time the Crown has acquired land under public works legislation along the banks of the Waikato River to construct dams, flood areas for storage lakes, and carry out associated works. Some of this land was later sold or transferred to State enterprises. For Raukawa, the sale of our lands along the banks, and the acquisition of land for public works, has resulted in a loss of direct connection to the Waikato River.

Much of the Upper Waikato River has been affected by the construction of hydro-electric works with storage lakes flooding many sites of significance. Many points of access and food-gathering places along the banks of the River were lost to Raukawa due to dam construction and associated flooding. This included the significant loss of whare, pā, wāhi tapu, urupā, and other sites of significance. Many sites located along the banks and on adjacent lands, and taonga are now buried beneath the River. Raukawa have continuously asserted mana whakahaere in relation to our rohe. Raukawa have sought recognition of this role, and our desire to protect and maintain a healthy Waikato River.

The Crown has acknowledged the relationship between Raukawa and the Waikato River through the signing in December 2009 of the Deed in Relation to a Co-Management Framework for the Waikato River. This was followed in 2010 with the enactment of the Ngati Tuwharetoa, Raukawa, and Te Arawa River Iwi Waikato River Act.

The co-management framework contains mechanisms that enable Raukawa to better manage natural resources in the Upper Waikato River catchment. The key mechanisms for freshwater fisheries management are:

#### 1.5.1.1 Raukawa Fisheries Plan

The Fisheries Portfolio Accord sets out that Raukawa will develop a fisheries plan and will define specific objectives in relation to fisheries matters. The plan will guide implementation of the Upper Waikato River Fisheries Regulations (in development).

#### 1.5.1.2 Upper Waikato River Fisheries Regulations

Developed jointly with MPI, Te Arawa River Iwi Trust and Tūwharetoa Māori Trust Board, the Regulations will enable Raukawa to appoint kaitiaki and manage the issuing of permits for customary fishing, as well as recommending bylaws to the Minister that may restrict or prohibit fishing in parts of the Waikato River system.

#### 1.5.1.3 Upper Waikato River Integrated Management Plan

An Integrated Management Plan (UWRIMP) is required to be developed by January 2014. The co-management legislation sets out that the UWRIMP will contain a fisheries component, to be developed jointly between Raukawa, Te Arawa River Iwi Trust and MPI; and a conservation component, to be developed jointly between Raukawa, Te Arawa River

Iwi Trust and DOC. The fisheries component will be deemed to be a fisheries plan under Section 11A of the Fisheries Act. The conservation component will be deemed (in part) to be a freshwater fisheries management plan under Section 17J of the Conservation Act.

As a River Iwi we are committed to the restoration and protection of the Waikato River. We acknowledge that Raukawa alone cannot assure the wellbeing of the River and the Fishery. This is reflected in our approach to working collaboratively with other River Iwi, local and central government authorities and other organisations in our rohe. We have, and will continue to, work closely with neighbouring River Iwi to secure the best outcome for the fisheries, and ultimately the awa, in keeping with our view of the awa as an indivisible entity. We have been able to draw on the experience of other iwi and fisheries staff within the Ministry for Primary Industries to develop this plan in an efficient and effective manner whilst ensuring it achieves the aspirations and objectives for fisheries management of ngā uri o Raukawa.

### 1.5.2 Fisheries management in the Raukawa rohe

Within the Raukawa rohe there are:

- Seven district councils – Waipa, Matamata Piako, South Waikato, Rotorua, Taupo, Otorohanga and Waitomo.
- Three regional councils – Waikato, Bay of Plenty and Manawatu Wanganui (Horizons).
- Three Department of Conservation conservancies – Waikato, East Coast/Bay of Plenty and Tongariro/Whanganui/Taranaki.
- Fisheries quota management areas – each species managed under the Quota Management System is divided into 'stocks' with different boundaries – for example, longfin tuna in the rohe is included in quota management area 'LFE21'.
- Two Fish and Game regions – Auckland/Waikato and Eastern.

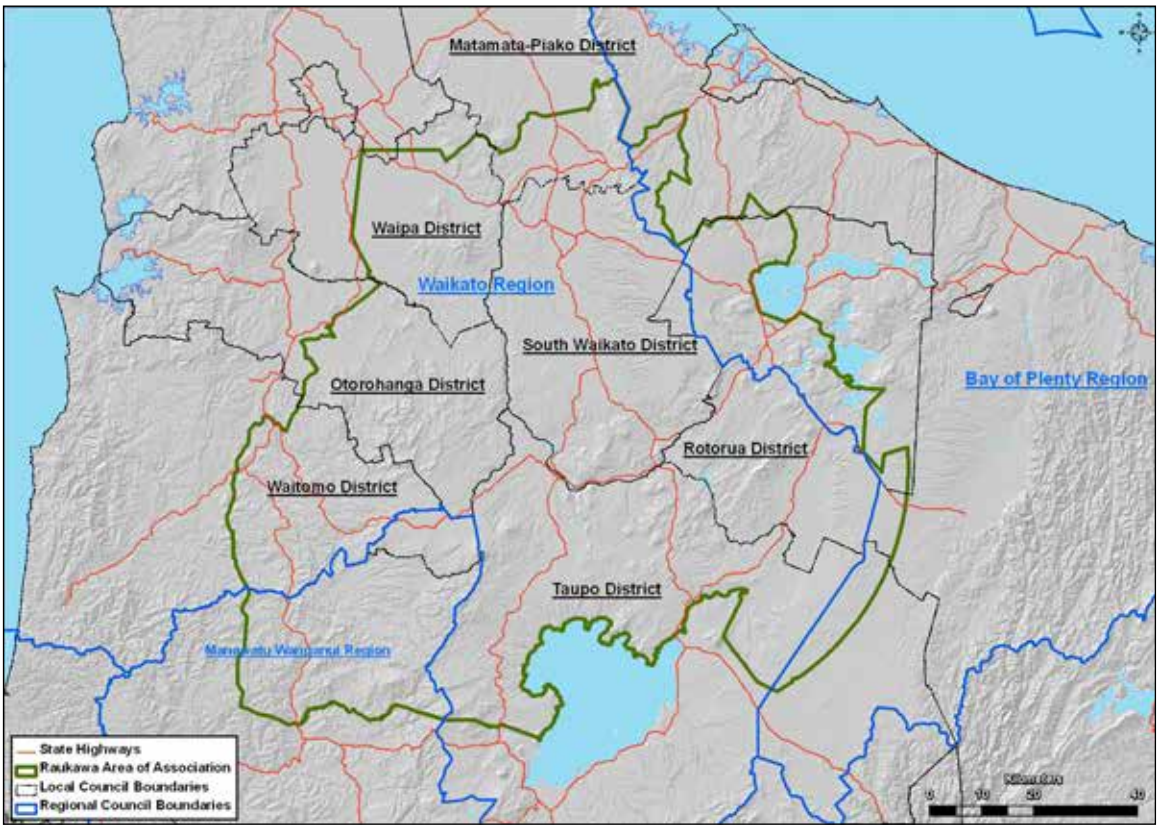



FIGURE 4: Regional Council Boundaries and District Council Boundaries

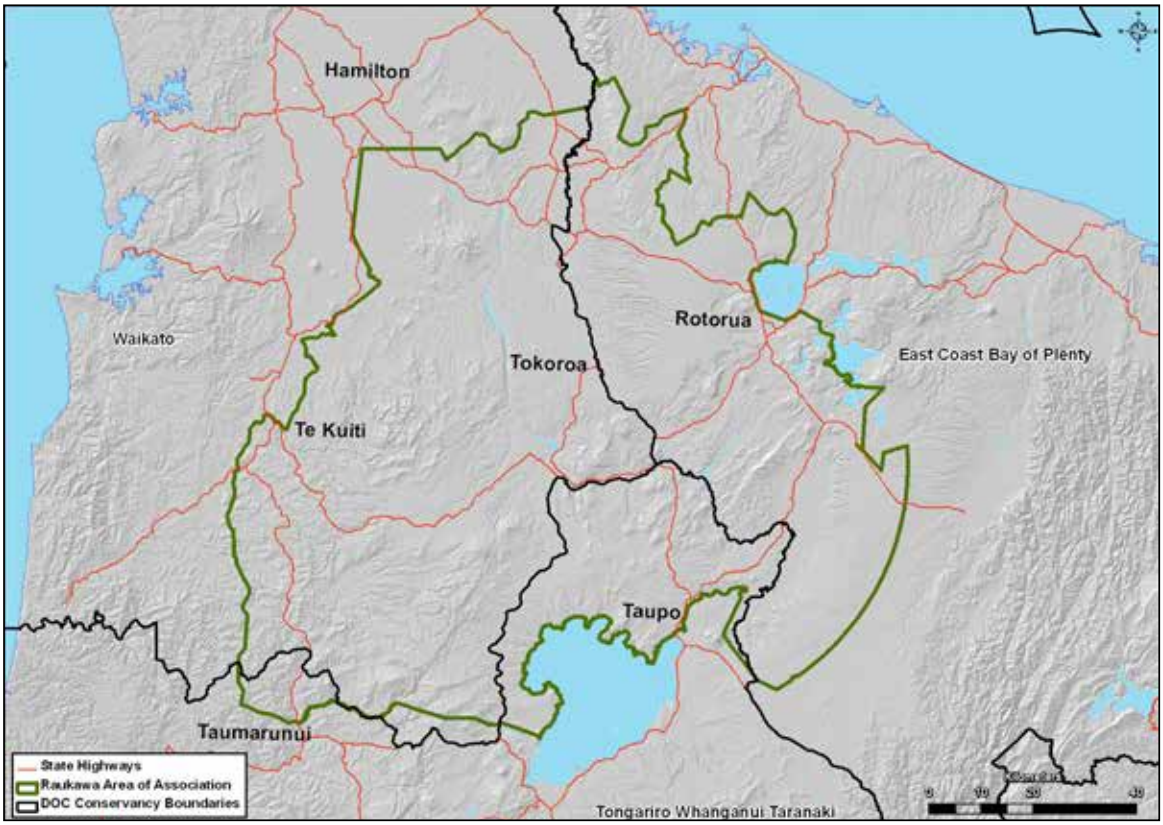



FIGURE 5a: DOC Conservancy Boundaries within the Raukawa Area of Association

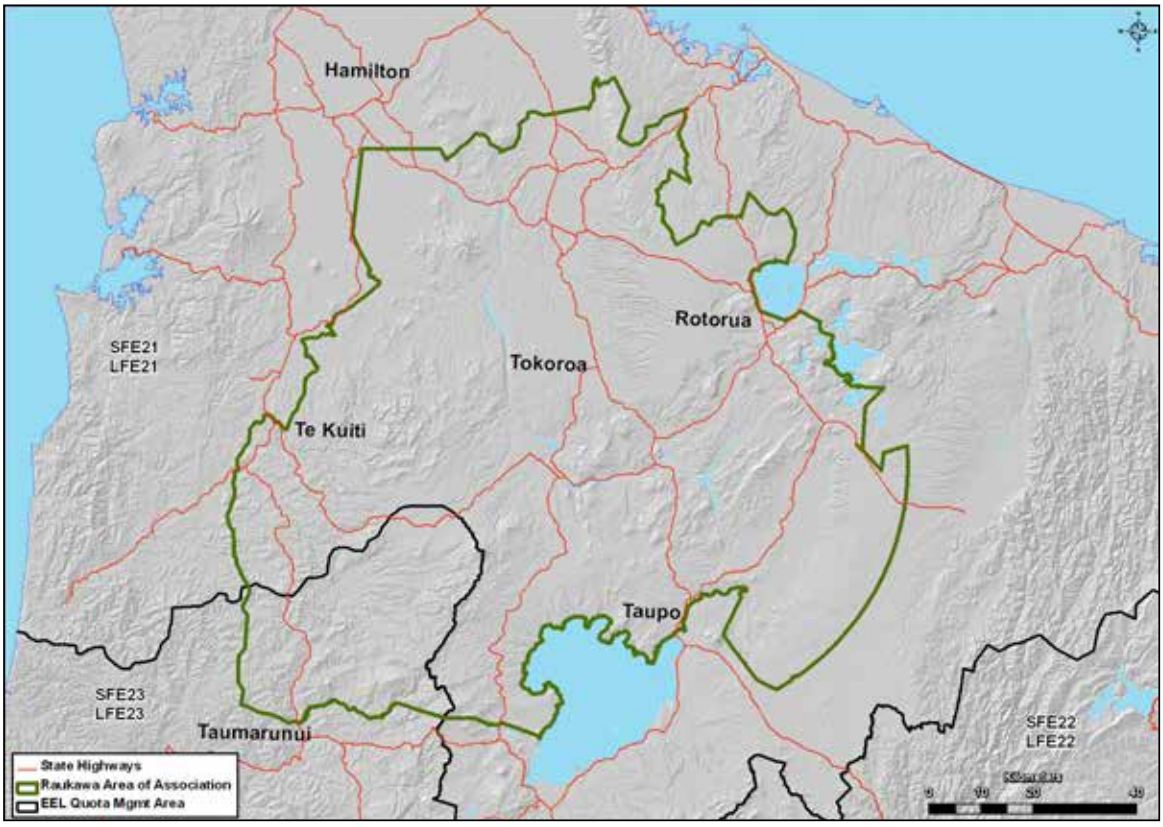



FIGURE 5b: Eel Quota Management Area within the Raukawa Area of Association

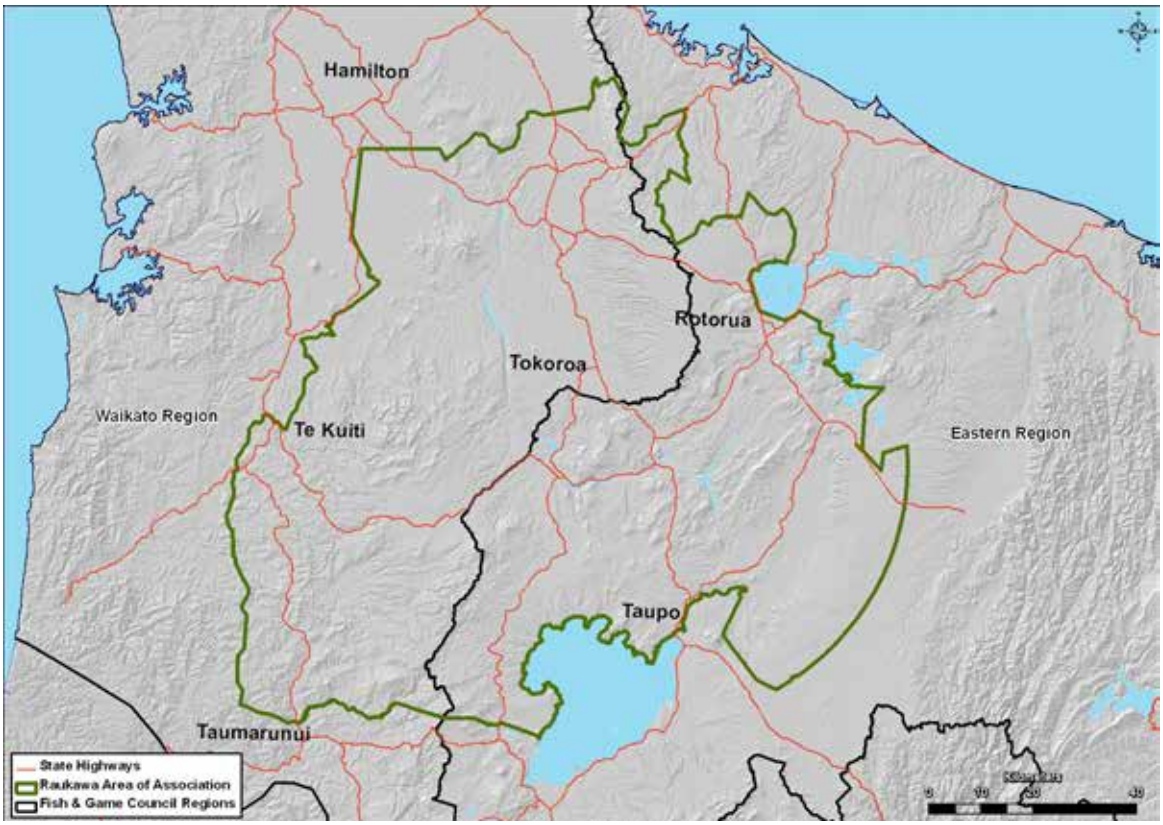



FIGURE 5c: Fish and Game Regions within the Raukawa Area of Association

## 1.6 FISHERIES MANAGEMENT IN NEW ZEALAND

A number of agencies have duties, functions and powers under various New Zealand laws for managing freshwater fish. The roles of the various agencies and the relevant legislation are summarised below.

### 1.6.1 Ministry for Primary Industries (MPI)

The Ministry for Primary Industries was created in 2012 out of a merger and restructure of the Ministry of Fisheries and the Ministry of Agriculture and Forestry. The Ministry has responsibilities under the *Fisheries Act 1996* and *Biosecurity Act 1993.*

The purpose of the Fisheries Act is "to provide for the utilisation of fisheries resources while ensuring sustainability." The definition of "fisheries resources" includes fish and shellfish, as well as any plant or animal species that, at any stage of its life, must inhabit water. It has two main functions:

- Determining the allocation of fisheries resources and managing the long term sustainability of the resources.
- Managing the effects of fishing (on the species being caught, other species, the wider environment and other people).

The Fisheries Act established the Quota Management System (QMS) which is the framework under which commercial fishing is managed. Commercial fishers hold quotas under the system which dictates how much of a given species they can catch.

Anyone can fish and gather for recreational purposes, however, this is subject to the Fisheries Act and other legislation, and any relevant regulations which may set catch limits, size restrictions etc. Customary fishing is also provided for under the Fisheries Act via the *Fisheries (Kaimoana Customary Fishing) Regulations 1998*, which were amended in 2008 to apply to species taken in

fresh water in the North Island. (Note that once Upper Waikato River Fisheries Regulations come into force, these will prevail over other regulations made under the Fisheries Act.

### 1.6.2 Department of Conservation (DOC)

MPI is the lead agency for biosecurity in New Zealand, which includes avoiding new unwanted species entering the country as well as managing those already found here. The Ministry takes a coordinating role in maintaining the national list of unwanted organisms. The list of unwanted organisms is available on the Ministry's website at www.mpi.govt.nz. Unwanted organisms are banned from sale, propagation and distribution under sections 52 and 53 of the *Biosecurity Act 1993.*

The Department of Conservation is responsible for the management of freshwater fish, except for commercial fisheries (Ministry for Primary Industries) and sports fisheries (Fish and Game). The whitebait fishery and Lake Taupō trout fishery are the only fisheries that DOC directly manages.

The Department of Conservation is responsible for the management of freshwater fish, except for commercial fisheries (Ministry for Primary Industries) and sports fisheries (Fish and Game). The whitebait fishery and Lake Taupō trout fishery are the only fisheries that DOC directly manages.

The Department's functions under the Conservation Act 1987 include "to preserve so far as is practicable all indigenous freshwater fisheries, and protect recreational freshwater fisheries and freshwater fish habitats" (Section 6(ab)).

DOC also administers the *Freshwater Fisheries Regulations 1983*, which include provisions relating to both indigenous fish and "noxious fish", and the *Whitebait Fishing Regulations 1994*. *Under the Freshwater Fisheries Regulations 1983*, the Director-General of Conservation has a decision-making role in relation to fish passage when facilities such as new or modified culverts, fords, dams, weirs and diversions on natural waterways are proposed.

The *Whitebait Fishing Regulations 1994* set out rules relating to how and when people can fish for whitebait. These regulations contain provisions for customary gathering of whitebait for hui and tangi.

DOC has an important role in the management of alien invasive freshwater species once they have become naturalised. A permit from the Minister of Conservation is required to introduce any aquatic life (native or introduced fish, plants or invertebrates) into an area where they don't already occur.

### 1.6.3 Fish and Game

Fish and Game Councils are established under the *Conservation Act 1987.* They are responsible to the Minister of Conservation, but are financially and administratively independent of Government. Fish and Game manages, maintains and enhances sports fish and game birds, and their habitats, in the best long-term interests of present and future generations of anglers and hunters. Fish and Game provides regulations for fishing throughout New Zealand (except Taupō, where fishing is administered by DOC). These regulations are amended each year to suit changing sporting and environmental conditions, and are set to ensure that:

- fish populations are maintained and that the number of fish caught does not threaten the sustainability of the fishery;
- the quality of the fishing experience is maintained;
- spawning areas are protected;
- angling opportunities are not unnecessarily restricted;

- incompatible methods of fishing are kept separate; and
- anglers use sporting methods.

The approval of Fish and Game New Zealand is required to hold live sports fish and Gambusia, or introduce fish or fish eggs to sports fish or game bird habitats[1] . Sports fish administered by Fish and Game are listed in the First Schedule to the Freshwater Fisheries Regulations 1983.

### 1.6.4 Regional councils

Regional councils have functions under the *Biosecurity Act 1993* as well as the *Resource Management Act 1991* (RMA) that are relevant to our freshwater fisheries. Under the RMA, regional councils are responsible for managing fresh water; they regulate activities such as discharges to water, water takes and structures in water bodies. They also have broad responsibilities for biodiversity (a responsibility shared with district and city councils).

*Under the Biosecurity Act 1993*, regional councils have the primary responsibility for the eradication and management of pest species, and have the option of producing regional pest management plans. Regional pest management plans identify pest species within a particular region and how they will be managed. The *Biosecurity Act 1993* is the over-arching piece of legislation that deals with the exclusion, eradication, and management of pests and unwanted organisms in New Zealand.

1 http://www.doc.govt.nz/conservation/threats-and-impacts/animal-pests/animal-pests-a-z/fish/docs-work/

# 2 WĀHANGA TUARUA NGĀ IKA

Our fresh waters are inhabited by a variety of freshwater species, which fall in to three broad categories –native freshwater fish, marine 'migrants', and introduced species.

Few of our native species, except tuna, grow to any great size. Additionally, the behaviours, appearance and habitat of many species mean that our fresh waters can often seem to be deceptively void of fish life. A common feature of many of our native freshwater species is that they spend part of their life cycle in the sea (known as diadromy). Either they go there to spawn (e.g. tuna), or larvae go there to grow and develop (e.g. whitebait, smelt, bullies). McDowall (2001) identifies 36 native species (31 of which are found only in New Zealand) – 18 of these are diadromous. This is a key reason why barriers such as dams, culverts and weirs have such an impact on our native fish.

Marine migrants such as yellow-eyed mullet and kahawai are not likely to be found within the Raukawa rohe as they generally do not move far beyond the tidal influence in rivers, however, the grey mullet does penetrate up the Waikato River system as far as Karāpiro Dam.

Many species have been introduced into New Zealand fresh waters. Some, such as trout, have become valued recreational species. Others, such as koi carp, offer little or no recreational or commercial value and represent a significant threat to fresh water ecosystems.

There are four key ways our freshwater fish can be categorised - as sports fish, native fish, commercial fish or pest fish:

- "Sports fish" means those freshwater fish described in the First Schedule of the *Freshwater Fisheries Regulations 1983*, including: brown trout, rainbow trout, perch, rudd (Auckland/Waikato Fish and Game Region only), and any hybrid of the above species.
- Native freshwater fish have general protection under Part 10 of the *Freshwater Fisheries Regulations 1983* which prohibits the killing of indigenous fish, except for the purposes of scientific research or human consumption. The selling and trading of kōura is completely prohibited. "Whitebait" is defined as the young of all species of the genus Galaxias (collectively referred to as galaxiids) and the common smelt. How and when whitebait can be taken is managed under the *Whitebait Fishing Regulations 1994*.
- Freshwater species fished commercially include shortfin eel, longfin eel, brown bullhead catfish and koi carp. Eels were introduced into the Quota Management System in the North Island in 2004. Note there is overlap with both some indigenous and 'pest' fish managed as commercial species.
- Pest fish includes those designated as "unwanted organisms" by MPI (currently koi carp and gambusia), "pests" under a regional pest management plan or "noxious fish" under the *Freshwater Fisheries Regulations 1983* (Schedule 3) (currently koi carp and rudd).

## 2.1 UTILISATION

Freshwater fish were once among the most important traditional sources of food for Māori – New Zealand had no native mammal species except for the native bats, so fish and birds were staple features in the diet.

In addition to fish, other species such as kōura and kāeo are also important sources of food. Plant species such as harakeke (flax – *Phormium tenax*) and kareao (supplejack – *Ripogonum scandens*) were used to construct hinaki and other fishing tools. It is perhaps most important to recognise and remember that no species will survive without the habitat in which it lives and the food on which it feeds, and thus it is important to value and protect freshwater ecosystems as a whole and the species within them.

All indigenous species are recognised and respected by Raukawa as a significant part of the environment. The following freshwater species have been/are utilised by Raukawa as a source of food: native tuna, kōura, piharau, kōkopu and kōaro, kāeo/kākahi, as well as the introduced catfish, goldfish and trout. The use of the introduced species was likely to be a result of the relative abundance of those species over native species in our waterways.

For some, fishing was traditionally a specialist role undertaken by tohunga, "not just anybody fished"; for others it was an everyday part of life.

## 2.2 MĀTAURANGA

### 2.2.1 Fishing locations

Members of the Fisheries Reference Group (FRG) indicated that they "more or less fished where they lived". The list of fishing spots included swamps, lakes, rivers, drains, flood-prone areas, areas with factory discharges, unfenced areas, and parts of the ngahere (including the top of the Kaimai Ranges) were named as good fishing locations. Favourite spots were passed down to them by their parents; members sometimes fished in other tribal areas (e.g. Mangawhero) but usually stayed near their home/marae. Hapū/marae had their own fishing areas – and knowledge of these was protected.

Historically, Raukawa utilised pā tuna (e.g. Rapurapu, Waiomou) and tuna was exchanged for other resources. It was noted that there have been many changes in recent times (ownership, drainage, access) which has led to increased pressure on remaining resources and locations and that perhaps it is now time to place rāhui over fishing resources. Interviews conducted have told of large tuna being caught as far up the Waikato River as the Waipapa River and Mangakino between the late 1920s and 1940s (Allen, 2010).

Kōura were captured primarily from lakes and drains, and were generally commonly found.

Species such as kāeo/kākahi would be found in specific locations being less transient than fish, and these locations were known. They were previously found in the Okauia area but have not been seen for a long time. They were also known in the Waiomou River. The shellfish was thought to be a good indicator of water quality.

### 2.2.2 Fishing times

Maramataka (lunar calendar) was the main tool utilised by Raukawa when assessing the best times to fish. Sometimes other tribes' knowledge was borrowed/shared and retained locally. Fishing generally occurred as and when required, and was often associated with gatherings and events. Resting and rotation of fishing areas was practiced to allow stocks to recover.

### 2.2.3 Fishing methods

Many fishing methods have been utilised by Raukawa over the years. Some relate to fish behaviour – for example, different methods to catch tuna depending on the stage of their life cycle (tuna do not feed during migration). This knowledge was developed over generations of observation and practice and passed down.

Methods to catch tuna include: trapping with weirs or in hinaki, hooks, spears/gaffs (matu rau), flax muka thread and huhu ("bobbing" without hooks), ripi, and catching by hand (kōrapa, rapu tuna, takahi tuna). Traditional materials such as supplejack, mānuka and harakeke have been supplemented with modern materials such as steel, nylon, wire netting and pantyhose. Pukeko and ox liver were mentioned as great baits, as well as noke (worms) found along river banks (not normal garden worms). The best times to catch tuna were during floods. The resulting eels were full of earthworms, so it was necessary to hold in live storage for four days until they empty their stomachs.

Fishing methods for kōura included tau kōura (a method of immersing bundles of usually fern in the water for a period before retrieving complete with kōura) and fyke nets. Kōura were caught by some of the FRG members while they were fishing for tuna, and they released them back into the waterways. Kōura were thought to be reasonably plentiful.

Tuna and kōura could also be sourced when diggers were clearing drains, as the spoil was lifted onto the bank; both species were often present and plentiful.

### 2.2.4 Preparation and storage methods

Tuna need to be gutted straight away to avoid tainting of the flesh, additionally a small organ (blood sac) near the backbone needs to be removed. Once this is done tuna were prepared in many ways including pāwhara (dried), smoked, boiled, huahua (preserved) and bottled. Live storage was used, for example, live storage boxes were placed in streams near Pikitu Marae (Waotu).

Kōura were similarly prepared in a variety of ways including steamed, fried in butter, and cooked on a square mouth shovel. This latter method reflects a common theme whereby waterways were often the source of food at hand, for example lunch when out for the day swimming or working.

Kāeo/kākahi could be eaten raw or cooked. Some feel the knowledge to cook the shellfish well has been lost.

### 2.2.5 Cultural health indicators

While Raukawa may not measure in accordance with recognised scientific methods, the iwi has always been attuned to the state of the environment within the rohe. It is not always easy to articulate exactly why we consider a particular area to be healthy or degraded, there are many factors and variables in making an assessment that just seems intuitive to many. These assessments rely on the senses – what we can see, hear, smell, taste and feel; rather than necessarily what we measure.

Indicators that can be used to determine whether a waterway is healthy include:

- water clarity (e.g. is it free from sediment; are there any visible scums or foams?)
- riverbank condition (e.g. is it eroding? – can indicate whether there has been disturbance by stock etc)
- shape of the river (e.g. is it natural or has it been altered?)
- aquatic plants (e.g. are they typical native plants; is there an issue with weeds?)
- riparian vegetation (e.g. is it healthy; does it shelter the waterway; are they the right plants?)

- odour (e.g. is there anything out of the ordinary?)
- surrounding land use (e.g. is it land use that is likely to result in contamination of waterways?)
- temperature (e.g. is the water cool enough to support fish etc?)
- presence of insects, shellfish, kōura, fish (e.g. are the species found typical; have there been any changes noticed; are they in good condition?)
- flow of water (e.g. is the flow natural or altered; is there sufficient water?)
- contact and consumption is safe (e.g. does it taste the way it should; has there been any reactions or sickness caused after contact or consumption with the water or mahinga kai?)
- presence of birds (e.g. are there birds such as kingfisher, shags or ducks that indicate a reliable source of food?)
- nature of any discharges (e.g. are there any known discharges to the waterway?)
- upstream uses (e.g. are there structures, activities etc that impact on the waterway?)
- sources of food (e.g. are there sources of food to support fish?).

Both western science and mātauranga Māori have their place. The role of mātauranga in assessment and decision-making processes needs to be improved. In developing monitoring programmes within the rohe, it will be an aim to ensure Raukawa mātauranga is appropriately incorporated.

## 2.3 SPECIES

*Fish descriptions have been sourced from Speirs (2001), NIWA Atlas of NZ Freshwater Fishes and McDowall (2001).*

Speirs (2001) lists the following species as being present in the Waikato, Waitoa/Piako, Waipā and Waihou river systems:

| Species | Scientific name | Waikato | Waitoa/ Piako | Waipā | Waihou |
|---|---|---|---|---|---|
| NATIVE SPECIES | | | | | |
| Shortfin eel | *Anguilla australis* | ■ | ■ | ■ | ■ |
| Longfin eel | *Anguilla dieffenbachii* | ■ | ■ | ■ | ■ |
| Spotted eel | *Anguilla reinhardtii* | ■ | | | |
| Torrentfish | *Cheimarrichthys fosteri* | ■ | ■ | ■ | ■ |
| Giant kōkopu | *Galaxias argenteus* | ■ | | ■ | |
| Kōaro | *Galaxias brevipinnis* | ■ | | ■ | ■ |
| Dwarf galaxias | *Galaxias divergens* | | | | ■ |
| Banded kōkopu | *Galaxias fasciatus* | ■ | ■ | ■ | ■ |
| Inanga | *Galaxias maculatus* | ■ | ■ | ■ | ■ |
| Shortjaw kōkopu | *Galaxias postvectis* | ■ | | ■ | ■ |
| Lamprey | *Geotria australis* | ■ | | ■ | |
| Black mudfish | *Neochanna diversus* | ■ | ■ | ■ | |
| Common bully | *Gobiomorphus cotidianus* | ■ | ■ | ■ | ■ |
| Redfin bully | *Gobiomorphus huttoni* | ■ | | ■ | ■ |
| Crans bully | *Gobiomorphus basalis* | ■ | ■ | ■ | ■ |
| Common smelt | *Retropinna retropinna* | ■ | ■ | ■ | ■ |
| INTRODUCED SPECIES | | | | | |
| Catfish | *Ameiurus nebulosus* | ■ | ■ | | ■ |
| Goldfish | *Carassius auratus* | ■ | ■ | ■ | |
| Gambusia | *Gambusia affinis* | ■ | ■ | ■ | ■ |
| Brown trout | *Salmo trutta* | ■ | | ■ | ■ |
| Rainbow trout | *Oncorhynchus mykiss* | ■ | | ■ | ■ |
| Perch | *Perca fluviatilis* | ■ | | | ■ |
| Guppy | *Poecilia reticulate* | ■ | | | |
| Rudd | *Scardinius erythrophthalmus* | ■ | ■ | ■ | ■ |

## NATIVE SPECIES

### 2.3.1 Tuna (eels)

Tuna are highly significant to Māori, who relied on them heavily for sustenance in pre-European times. A great deal about the biology of eels is known through generations of observation and capture.

There are three species of eel in New Zealand, all of which are found in the Raukawa rohe. All three share common characteristics, including the physiological changes they undergo during migration, such as skin colour change, enlargement of the eyes and streamlining of the head. While there are overlaps in habitat preference, the longfin tends to prefer cool, forested, stony rivers and streams, and penetrate further inland than the shortfin. The shortfin is found predominantly in lowland regions of coastal catchments and muddy rivers. The spotted eel is a more recent arrival in New Zealand and less is known about this species. It seems to prefer estuarine habitats.

Commercial catch limits for tuna were introduced from 2000-2004, and further reduced in 2007 to improve the status of eel stocks.

#### 2.3.1.1 Longfin eel (*Anguilla dieffenbachii*)

Longfin eels are larger, longer-lived and much slower growing than most other eel species. Females can grow to over 2m and 30kg, males to about 700mm. They are good climbers but can be restricted by large waterfalls (or dams). They are nocturnal and come out at night to feed – smaller fish feed on stream insects, while larger eels are the top predator in our fresh waters, eating fish and even birds.

Male longfin eels mature at about 25 years and females 35 years, though females can be 80+ years before reaching maturity. During summer mature females transform to migrants, before heading out to sea in autumn and spawning in the Pacific Ocean, after which they die. Transparent 'glass eels' (60-75mm long) enter our rivers in spring.

#### 2.3.1.2 Shortfin eel *(Anguilla australis)*

Shortfin eels have a silvery belly are widespread in New Zealand and also found in some parts of Australia. Females reach 1.2m and 3.5kg and males

600mm. They are also nocturnal and eat insects and crustaceans until they reach around 500mm in size when they also prey on other fish.

Male shortfins mature at about 15 years and females at 30-40+ years. They also migrate to sea in the autumn, spawning in the Pacific Ocean, and returning to our rivers in spring as 50-70mm glass eels.

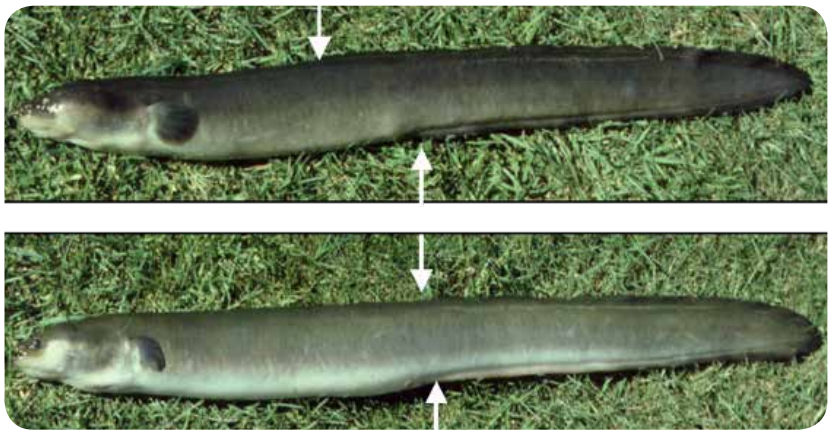


FIGURE 6: New Zealand eel species
**Top**: longfin eel (*Anguilla dieffenbachii*)
**Bottom**: Shortfin eel (*Anguilla australis*)
The white arrows indicate the dorsal edge of the fin relative to that of the ventral
SOURCE: McDowall, 1990

#### 2.3.1.3 Spotted eel *(Anguilla reinhardtii)*

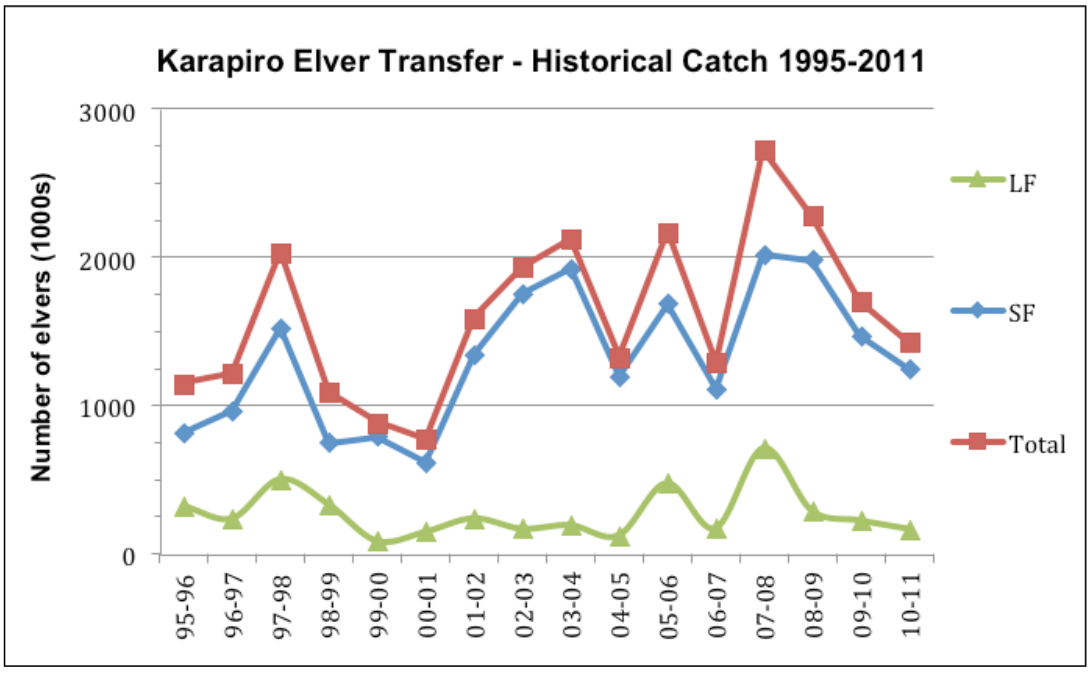
The spotted eel (or Australian longfin eel) is a more recent inhabitant of New Zealand fresh waters. In size, it lies between the longfin and shortfin species, with females reaching about

1.6m and 14kg, and males about 650mm. It also spawns in the Pacific Ocean but glass eels (60-75mm) are thought to enter our rivers in autumn/winter rather than spring.

Tuna are fished commercially under the Quota Management System, operated by the Ministry for Primary Industries.

Since 1992 special permits and transfer authorisations have been issued to allow young eels (elvers) to be captured at the base of the Karāpiro Dam and transferred upstream into the hydro lakes. Commercial fishers have worked alongside iwi and Mighty River Power in carrying out the transfer of the elvers, which are prevented by the dam from moving further inland. Millions of elvers have been transferred during this time. The graph below shows the numbers of elvers transferred each year according to data collected by NIWA between 1995 and 2011 (LF = longfin; SF = shortfin). Trials are currently underway to look at ways to allow tuna to safely navigate the Karāpiro Dam as they migrate downstream to breed.

FIGURE 7: Elvers captured in a trap at Karāpiro
SOURCE: NIWA



### 2.3.2 Piharau *(lamprey)*

Piharau or lamprey (*Geotria australis*) spend most of their adult life out at sea feeding parasitically on other fish. They enter freshwater and spend up to 16 months reaching sexual maturity and migrating upstream to small, shady, hard-bottomed streams where they spawn and die. Larvae spend around 4 years as filter feeders in freshwater buried in fine sediments before metamorphosing into miniature adults that then migrate downstream to begin their parasitic life stage in the ocean (James 2008).

Historically lamprey have great value as a food source for Māori, and were considered a delicacy. Māori developed sophisticated methods for the capture of lamprey and extensive fisheries existed in the Whanganui and Taranaki regions of the North Island and in the far south of the South Island. They were also taken from the Waikato and Waipa Rivers.

They are now rare in the Waikato River and most other New Zealand rivers. Although their sucker mouth gives lamprey the capability to move upstream of seemingly impassable barriers, the installation of hydro dams on many major rivers has probably affected their abundance (MfE 2010, James 2008).

FIGURE 8: Piharau (*Geotria australis*)
SOURCE: NIWA

### 2.3.3 Galaxiids

Five galaxiid species make up the whitebait fishery – īnanga, kōaro, banded kōkopu, shortjaw kōkopu and giant kōkopu – all are migratory and normally spend part of their lifecycle in the sea. When the juvenile fish return to fresh water, often in huge 'runs' comprised of many thousands of fish, they are collectively known as whitebait, an important commercial and recreational fishing resource. How and when whitebait can be caught is managed by the Department of Conservation under the *Whitebait Fishing Regulations 1994.*

The dwarf galaxias is part of the same family of fish but is non-migratory. Some migratory galaxiids can form land locked populations and complete their lifecycle entirely in freshwater.

#### 2.3.3.1 Inanga

In most river systems, inanga (*Galaxias maculatus*) makes up the majority of the whitebait catch, and is probably encountered more often than other galaxiids. Inanga inhabit open rivers, streams, lakes, and swamps near the coast and can often be seen shoaling in open water. They are very poor climbers, however, and do not penetrate any distance inland unless the river gradient is very gradual.


FIGURE 9: Inanga (*Galaxias maculatus*)
SOURCE: NIWA

### 2.3.3.2 Kōaro

Although kōaro (*Galaxias brevipinnis*) comprise part of the whitebait catch, they also readily form land-locked populations. They are excellent climbers and can be found from coastal streams right up to steep headwaters. Rocky, tumbling streams are the preferred habitat of kōaro, and they are almost always found in streams with native bush catchments. Like the other large galaxiids, kōaro have a varied diet feeding on a diverse array of aquatic insects and terrestrial invertebrates.


FIGURE 10: Kōaro (*Galaxias brevipinnis*)
SOURCE: NIWA

### 2.3.3.3 Banded kōkopu

Banded kōkopu (*Galaxias fasciatus*) are generally the smallest of the five species that make up the whitebait catch. They are golden in colour and can be distinguished from the other galaxiid species by the presence of the thin, pale, vertical bands along the sides and over the back of the fish.

Adult fish usually live in very small tributaries where there is virtually a complete overhead canopy of vegetation. This vegetation does not have to be native bush, however, and banded kōkopu happily live in urban streams and exotic pine plantations so long as overhead shade is present. They can also form land-locked populations if conditions are right.


FIGURE 11: Banded kōkopu (*Galaxias fasciatus*)
SOURCE: NIWA

### 2.3.3.4 Shortjaw kōkopu

Shortjaw kōkopu (*Galaxias postvectis*) are unique to New Zealand. Although they penetrate well inland in many catchments, they appear to be restricted to streams with native forest vegetation. The species has an undercut jaw, with the lower jaw being shorter than the upper jaw and are rather drab in colour.


FIGURE 12: Shortjaw kōkopu (*Galaxias postvectis*)
SOURCE: NIWA

### 2.3.3.5 Giant kōkopu

This is the largest member of the Galaxiidae family. Specimens of over 450 mm in length have been reported, although fish in the 200–300 mm range are far more common.

Giant kōkopu (*Galaxias argenteus*) are primarily a coastal species and do not usually penetrate inland very far. They are unique to New Zealand and are found throughout the Waikato Region, though rarely found at high elevations or further than 150km inland. They prefer slow flowing or still waters such as lakes and swamps, and are usually associated with some form of instream cover like overhanging vegetation or logs.

### 2.3.3.6 Dwarf galaxias

The only population of this non-migratory galaxiid known in the Waikato Region is found in the upper reaches of Te Waihou. This is the most northerly population of this species known in New Zealand. Dwarf galaxias (*Galaxias divergens*) grow to 70-90mm and feed on insect larvae.


FIGURE 13a: Dwarf galaxias (*Galaxias divergens*)
SOURCE: NIWA


FIGURE 13b: Giant kōkopu (*Galaxias argenteus*)
SOURCE: NIWA

### 2.3.4 Torrentfish *(panoko)*

Torrentfish (*Cheimarrichthys fosteri*) inhabit swiftly flowing waters but are not good climbers so can be restricted by steep gradients or barriers. Like many natives, they spend part of their life cycle in the ocean.


FIGURE 14: Torrentfish (*Cheimarrichthys fosteri*)
SOURCE: NIWA

### 2.3.5 Black mudfish *(waikaka)*

The black mudfish (*Neochanna diversus*) primarily inhabits wetland areas. The species is under threat from habitat loss and introduced species such as gambusia. Mudfish are adapted to survive in habitats that periodically dry up.


FIGURE 15: Black mudfish (*Neochanna diversus*)
SOURCE: NIWA

### 2.3.6 Bullies

#### 2.3.6.1 Common bully *(hawai)*

Common bullies (*Gobiomorphus cotidianus*) are found throughout New Zealand (and only in New Zealand). There are both sea-going and land-locked populations. They mainly inhabit still or slow-flowing waters. Adults can reach over 120mm in size.

#### 2.3.6.2 Redfin bully

Unlike common bullies, redfin bullies (*Gobiomorphus huttoni*) are strictly diadromous and do not establish land-locked populations. They tend to inhabit areas near the coast despite being very good climbers. They have been recorded within Te Waihou considerable distance from the coast. Adult males have bright red fins and can grow to 120mm, females are smaller.

#### 2.3.6.3 Crans bully

Crans bullies (*Gobiomorphus basalis*) are non-migratory and are found throughout the Waikato River catchment and also within Te Waihou. They inhabit stony rivers and streams rather than lakes and can grow to 80-90mm.


FIGURE 16a: Common bully (*Gobiomorphus cotidianus*)
SOURCE: NIWA


FIGURE 16b: Crans bully (*G. basalis*)
SOURCE: NIWA


FIGURE 16c: Redfin bully (*G. huttoni*)
SOURCE: NIWA

### 2.3.7 Common smelt *(pōrohe)*

The common smelt (*Retropinna retropinna*) are diadromous and form part of the whitebait fishery. They have no climbing ability, however, and land-locked populations are common. Smelt are an indicator species, being one of the most sensitive native fish to pollutants. Smelt have a wide distribution due to their introduction into many waterways in conjunction with historic introduction of trout (they form the main food source for most trout fisheries). They generally grow to 90-100mm, sometimes larger, but lake populations can be considerably smaller in size (50-60mm).


FIGURE 17: Common smelt (*Retropinna retropinna*)
SOURCE: NIWA

### 2.3.8 Brown bullhead catfish

Brown bullhead catfish (*Ameiurus nebulosus*) are easily identifiable by the distinctive barbels around their mouth. They grow to 200-400mm in length and can survive for long periods out of water as well as being able to tolerate a wide range of environmental conditions. Native to North America, they have been in New Zealand since the late 1800s and were first recorded in Lake Taupō in 1985. Since then they have spread down the Waikato River and are present in all of the hydro lakes.

Further spread of catfish is undesirable. They damage the environment by eating small native fish and their eggs, and stirring sediments which reduced water quality for other animals and plants. They also compete for food with other native species, including kōura.

The Ministry of Fisheries published a Code of Practice in relation to catfish in 2007 which summarises the regulations that apply:

- If a non-commercial fisher catches a catfish, the fisher must kill it immediately. The penalty for possessing live catfish for non-commercial fishers is $750 under the *Fisheries (Amateur Fishing) Regulations 1986.*
- The sale of live catfish is prohibited. Commercial fishers must kill all catfish before selling them to a licensed fish receiver. The penalty for a commercial fisher selling live catfish is a fine of up to $20,000 under the *Fisheries (Commercial Fishing) Regulations 2001.*
- An authorisation is required to release any live animals or plants into any freshwater area. Failure to have an authorisation could mean a fine of up to $5000 under the *Conservation Act 1987.*

Catfish are a pest species under the *Waikato Regional Pest Management Strategy (2008-2013)*, classified as an 'Environmental threat'. Because they can survive for a long time out of water, they can be transferred to new areas easily (both intentionally and accidentally). The long term objective for these fish in the Waikato Region is to "contain, and where practicable, reduce or eradicate… in isolated freshwater systems". Rule 16.5.2 prohibits the release of catfish into any water body in the Region outside of areas they are already known to inhabit. Catfish are also identified as a pest under the *Bay of Plenty Regional Pest Management Plan (2011-2016)* where the objective is to control the species to eradicate new occurrences and current known populations of the fish. It is an offence to release or otherwise spread catfish in the Bay of Plenty Region.


FIGURE 18: Catfish (*Ameiurus nebulosus*)
SOURCE: NIWA

### 2.3.9 Goldfish *(morihana)*

In the wild, goldfish (*Carassius auratus*) are rarely the orange-red colour we associate with goldfish in ponds and tanks. They are more commonly an olive-bronze to deep gold colour with silvery bellies, and 150-200mm long. They generally inhabit ponds and lakes but are also found in slow flowing rivers and streams. First brought to New Zealand in the late 1860s they are now well-established in many areas. Goldfish are omnivorous benthic feeders taking mainly organic detritus, invertebrates and some macrophytes.

Goldfish are pest species under the Waikato Regional Pest Management Strategy (2008-2013), classified as an 'Environmental threat'. They have the capacity to out compete native fish and other species, leading to degradation of freshwater environments. They are also thought to potentially contribute to algal blooms. The long term objective for these fish in the Waikato Region is to "contain, and where practicable, reduce or eradicate…in isolated freshwater systems". Rule 16.5.2 prohibits the release of goldfish into any water body in the Region outside of areas they are already known to inhabit. Rules do not apply to the keeping of domestic goldfish that are contained (e.g. in ornamental ponds or fish tanks).


FIGURE 19: Goldfish (*Carassius auratus*)
SOURCE: NIWA

### 2.3.10 Gambusia

Native to the Gulf of Mexico, gambusia (*Gambusia affinis*) are also commonly called mosquitofish for their perceived ability to eat large amounts of mosquito larvae. They are small fish, with females growing to about 60mm, and males 35mm. Gambusia are live bearers and mature at six years. Large populations can develop quickly and they are known to be an aggressive species, attacking and competing with native fish. They are widespread in the Waikato Region and their habitat overlaps with inanga, smelt and the common bully.

Gambusia are pest species under the *Waikato Regional Pest Management Strategy (2008-2013)*, classified as an 'Environmental threat'. The long term objective for these fish in the Waikato Region is to "contain, and where practicable, reduce or eradicate…in isolated freshwater systems". Rule 16.5.2 prohibits the release of gambusia into any water body in the Region outside of areas they are already known to inhabit. Under Regulation 64(a) of the *Freshwater Fisheries Regulations 1983*, it is prohibited to obtain or keep gambusia in captivity without the prior consent of the relevant Fish and Game Council. Gambusia are also identified as a pest under the *Bay of Plenty Regional Pest Management Plan (2011-2016)* where the objective is to ensure the community understand the impacts and prevent their spread. It is an offence to release or otherwise spread, or sell or propagate gambusia in the Bay of Plenty Region.


FIGURE 20: Gambusia (*Gambusia affinis*)
SOURCE: NIWA

### 2.3.11 Trout *(taraute/tarauta)*

#### 2.3.11.1 Brown trout

Like rainbow trout, brown trout (*Salmo trutta*) were introduced to New Zealand in the late 1800s. They also similarly prefer cool, clean, well-oxygenated water. Brown trout grow larger than rainbow trout, commonly 800mm, and are also voracious predators thought to have impacted on native fish. Found virtually throughout New Zealand south of Auckland.


FIGURE 21a: Brown trout (*Salmo trutta*)
SOURCE: NIWA


FIGURE 21b: Rainbow trout (*Oncorhynchus mykiss*)
SOURCE: NIWA

#### 2.3.11.2 Rainbow trout

Rainbow trout (*Oncorhynchus mykiss*) were introduced to New Zealand from North America in the late 1800s. They prefer cool, clean, well-oxygenated water which can limit their range. They are aggressive fish and known to feed on smaller native species. Both rainbow and brown trout are sports fish managed by Fish and Game and a license is required to fish for them.

### 2.3.12 Perch

Perch (*Perca fluviatilis*) are found in the Waikato and Waihou Rivers in low numbers. They are carnivorous and predatory, feeding on invertebrates and small fish. Perch commonly grow to around 400mm or 1-2kg. They are defined as a sports fish in the Freshwater Fisheries Regulations 1983 and are thus the fishery is managed by Fish and Game.

Perch are pest species under the *Waikato Regional Pest Management Strategy (2008-2013)*, classified as an 'Environmental threat'. They prey on native fish and can contribute to water quality degradation. The long term objective for these fish in the Waikato Region is to "prevent the spread…to new areas". Rule 16.6.1 prohibits the release of perch into any water body in the Region where the introduction has not previously been legally authorised. The regional council can also direct the occupier of any land to destroy any perch in isolated ponds, lakes, wetlands and ditches. Perch are also identified as a pest under the *Bay of Plenty Regional Pest Management Plan (2011-2016)* where the objective is to control the species to eradicate new occurrences and of current known populations of the fish. It is an offence to release or otherwise spread, sell or propagate perch in the Bay of Plenty Region.


FIGURE 22: Perch (*Perca fluviatilis*)
SOURCE: NIWA

### 2.3.13 Guppy

A popular aquarium fish, guppies (*Poecilia reticulate*) are live bearers like gambusia. They are found in geothermal streams near Reporoa and can spread in summer but are limited in their ability to spread by their need for warm waters. They are not considered a threat due to this limited distribution.

### 2.3.14 Rudd

Rudd (*Scardinius erythrophthalmus*) are a member of the carp family. The Auckland/Waikato Fish and Game region is the only region in the country where rudd are managed as a sports fish – in all other parts of NZ they are classified as a noxious fish (Schedule 3 of the *Freshwater Fisheries Regulations 1983*). Juveniles are carnivorous but adults eat mainly aquatic plants, reportedly preferring our native plants. They commonly reach 200mm in size.

Rudd are pest species under the *Waikato Regional Pest Management Strategy (2008-2013)*, classified as an 'Environmental threat'. They can impact on trout fisheries as well as on native fish and plants. They are prolific breeders. The long term objective for these fish in the Waikato Region is to "prevent the spread…to new areas". Rule 16.6.1 prohibits the release of rudd into any water body in the Region where the introduction has not previously been legally authorised. The regional council can also direct the occupier of any land to destroy any rudd in isolated ponds, lakes, wetlands and ditches. Rudd are also identified as a pest species under the *Bay of Plenty Regional Pest Management Plan (2011-2016)* where the objective is to reduce the density and distribution of known populations. Landowners and occupiers are required to destroy any populations on their property and it is an offence to release or otherwise spread, sell or propagate rudd in the Bay of Plenty Region.

As a sports fish in the Auckland/Waikato Fish and Game region, rudd are managed by Fish and Game in accordance with the Auckland/Waikato Fishing Regulations which are updated annually. As a noxious fish under the *Freshwater Fisheries Regulations 1983* it is prohibited to possess, rear, hatch or ship rudd in all other parts of the country.


FIGURE 23:Rudd (*Scardinius erythrophthalmus*)
SOURCE: NIWA

### 2.3.15 Non-fish species

#### 2.3.15.1 Kāeo/kākahi *(freshwater mussel)*

Kāeo or kākahi (*Echyridella menziesii*) once formed extensive beds in the Waikato River, and are still present in some of the hydro lakes. Individuals can live for more than 30 years, although average age of populations can vary considerably (Collier and Hogg, 2010). They reproduce by releasing an early larval stage (glochidia) into the water column, which then attach to the gills of fish as a means of dispersal (Collier and Hogg, 2010).

They feed by filtering particles from the water column and excreting inorganic material. Given this behaviour it is possible that could be manipulated and have a role in improving water quality, they could also potentially be used as a bio-indicator (Collier, 2010).

FIGURE 24: Kāeo or kākahi (*Echyridella menziesii*)
SOURCE: NIWA

#### 2.3.15.2 Kōura *(freshwater crayfish)*

There are two species of kōura found in New Zealand, one of which (the northern kōura, *Paranephrops planifrons*) is found in the Raukawa rohe.

Kōura are nocturnal, emerging at night to look for food. During the day they stay hidden along banks or under cover in streams, and in burrows deep down in lakes. They occupy a range of habitats in lakes, streams and wetlands; however introduced predators and the change from native vegetation to grazing land may affect their distribution (Watene and Parkyn, 2002).

Female kōura produce eggs between April and December, and most in May and June. Between 20 and 200 berry-like eggs are carried under the side flaps of her abdomen. Small kōura hatch about 3 to 4 months later, looking exactly like their parents in miniature. They cling to their mothers with their pincers until they are nearly 4mm long, around December of their first year. By their fourth year they are 20mm long and become adults.

Kōura or freshwater crayfish have long been prized as a food source for Māori. The flesh is sweet and firm, usually only the tail is eaten, as the claws and legs are too small (McDowall 1995).

They were historically abundant prior to hydro dam development in the Waikato and are helpful indicators of habitat and water quality.

FIGURE 25: Northern Kōura (*Paranephrops planifrons*)
SOURCE: WIKIPEDIA

# 3 WĀHANGA TUATORU KAITIAKITANGA

In seeking to achieve the overarching vision of this plan, a number of issues need to be addressed. This section of the plan discusses key issues for Raukawa and identifies the objectives to be achieved and policies to be implemented in relation to each issue.

There are a number of ways in which this plan will be used:

- as an information source/education tool;
- to inform the work of the RCT Environment Group, for example when making submissions on policies and plans, setting work programmes, supporting projects;
- to guide the decision making of other agencies, for example when setting policies, issuing approvals, setting priorities or making funding decisions;
- to guide practical 'on-the-ground' actions, for example restoration projects;
- to contribute to the development of monitoring programmes, and the incorporation of mātauranga Raukawa.

It is intended to produce implementation plans to identify how the objectives of this plan will be achieved, by whom and when. These implementation plans will be reviewed each year and will guide ngā uri o Raukawa and external stakeholders about priorities, expectations and responsibilities for the following 12 months. They will also be used to measure the success of this plan through reporting against the previous year's actions.

FIGURE 26: Developing issues and objectives for the Fisheries Plan, July 2012

PHOTOS: Leleina Tolovae, Raukawa Charitable Trust

## 3.1 MANAGEMENT ISSUES

### 3.1.1 Habitat

Loss of habitat is probably the biggest threat to our native fisheries. Habitat can be impacted by a range of activities, both within the waterways themselves but also on adjacent land, such as:

- drainage of wetlands
- clearance of streambank vegetation (leads to changes in water temperature, light, absence of leaves, tree roots etc as food and habitat, destabilised banks)
- physical modification of waterways (leads to changing flow and flooding characteristics, loss of habitat)
- pest plants (leads to loss of habitat, food, changing light levels)
- barriers to fish passage (interrupts migration necessary to many species to complete stages of their life cycle)
- discharges resulting in reduced water quality.

Most New Zealand rivers once had forested headwaters and were well-shaded until the channel width exceeded about 10m. Many insect and fish species are sensitive to high temperatures and thus adequate shading is critical. Forest clearance has resulted in less diverse habitats being available and subsequently to a loss of stream biodiversity (Parkyn *et al*., 2002).

Wetlands provide important habitat for a number of fish species, and are also important for natural water quality and flood control services they provide. Wetlands have been drained and modified extensively in the Waikato Region. Allen (2010) refers to "a significant reduction in the wetland area previously encountered between the Waipa and Waikato Rivers below Mangakino."

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| **Issue** | **I1** | ***Historic and continued loss and degradation of habitat, including:***<br>• native forest and riparian vegetation clearance;<br>• drainage and clearance of wetlands;<br>• habitat modification and competition due to pest and weed species;<br>• modification of waterways, such as through channelisation, diversion, stabilisation works, drain clearance and dredging;<br>• artificial barriers to fish migration;<br>• changing flow regimes through water takes, damming and diversion; and<br>• declining water quality. |
| **Objective** | **01** | Aquatic habitats are enhanced and restored to support healthy and sustainable fisheries, including through restoration and enhancement of terrestrial ecosystems. |
| **Policy** | **P1** | Develop a programme to work with Raukawa land owners to improve land management practices on Raukawa land, including through stock exclusion and planting of all riparian margins. |

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| | **P2** | Advocate for fisheries habitat restoration, creation, enhancement and protection through relevant Resource Management Act 1991 processes, such as policy and plan development, resource consents, enforcement and monitoring, particularly in relation to:<br>• riparian management;<br>• fish passage;<br>• sedimentation;<br>• nutrient enrichment;<br>• wetland protection; and<br>• water level and flow management. |
| | **P3** | Support initiatives that will result in improved aquatic habitat that will support healthy and sustainable fisheries. |
| | **P4** | Identify opportunities to source funding and establish partnerships for restoration projects that will result in improved habitat. |
| | **P5** | Ensure consideration is given to potential impacts on fisheries from flood management and land drainage activities undertaken by councils. |
| | **P6** | Advocate for a catchment-based approach to land management that integrates land and water management. |
| | **P7** | Advocate for appropriate management of pest and weed species that impact on fisheries habitat with relevant agencies, such as councils, Ministry for Primary Industries, Department of Conservation, and with land owners and managers. |
| | **P8** | Support education and awareness raising about the spread of aquatic weeds and the impact of these on aquatic habitats. |

### 3.1.2 Pest fish

A number of introduced fish species impact on native fish. Once fish establish in an area, it can be very difficult or impossible to control them. It would be of significant concern if further introduced species established within the Raukawa rohe, or within new areas within the rohe – for example, it is undesirable for koi carp to extend their range into the Upper Waikato River.

Environmental impacts caused by pest fish include:

- reduced numbers of native fish through predation and competition
- hybridisation
- introduction or spread of parasites and diseases
- decline in water clarity related to changes in plankton communities
- habitat degradation through browsing of aquatic plants and sediment disturbance (MfE, 2002).

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| **Issue** | **I2** | ***Impacts on the abundance and distribution of native fish due to pest fish.*** |
| **Objective** | **O2** | No new populations of pest fish develop within the Raukawa rohe and existing populations are eradicated or managed to reduce the impacts on native fish. |
| **Policy** | **P9** | Work with the Department of Conservation and Fish and Game New Zealand to reach an agreed solution for banning fishing for pest fish in the rohe. |

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| | **P10** | Advocate for appropriate identification and management of pest fish species with relevant agencies, such as councils, Ministry for Primary Industries, Department of Conservation, and with land owners and managers. |
| | **P11** | Support education and awareness raising in relation to the impacts of pest fish and their spread. |
| | **P12** | Support measures to reduce and eradicate pest fish within the rohe. |

### 3.1.3 Complicated management framework

The *Bay of Plenty Regional Pest Management Plan (2011-2016)* contains the following statement:

> *The introduction and subsequent spread of pest fish in New Zealand has mostly been by intentional means and all the most significant incursions throughout the country are as a result of illegal releases. In many cases pest fish have been released to establish recreational fisheries, particularly for rudd, tench, perch and koi carp.*
>
> *Bay of Plenty Regional Council's position is that banning the practice of fishing for pest fish outright will decrease the risk that someone deliberately introduces a pest fish in our waterways to establish a new fishery. With no opportunity to catch unwanted fish in our region, the incentive to introduce them in the first place is reduced.*
>
> *We cannot ban fishing for all pest fish at this stage. Tench and perch are managed as 'sports fish' in our region under the Conservation Act 1987 by Fish and Game Councils. The Biosecurity Act 1993, and any rules in our Plan made under that Act, cannot derogate from the Conservation Act.*

This highlights the issue of the complicated management arrangement for freshwater fish, with different organisations having different mandates. As discussed in earlier sections, a variety of organisations with a variety of mandates have direct responsibilities for the management of fish and fishing activities, as well as habitat management. Short of streamlining all of these, an integrated and collaborative approach is required to ensure the activities of all are aligned and consistent.

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| **Issue** | **I3** | ***Complicated and fragmented resource management arrangements can impact the health (quality and quantity) of fisheries, the accessibility of traditional resources, and the exercise of kaitiakitanga by Raukawa.*** |
| **Objective** | **O3** | Fisheries in the Raukawa rohe are managed in a way that is sustainable, holistic and integrated, consistent with Te Ao Māori, is easily understood by ngā uri o Raukawa and the wider community, and Raukawa is actively and effectively upholding our responsibilities as kaitiaki and as co-managers of the Waikato and Waipā Rivers. |
| **Policy** | **P13** | Advocate for and facilitate increased collaboration between agencies with responsibilities for fisheries management to reduce overlap and conflicts and increase efficiency and user-friendliness for ngā uri o Raukawa. |
| | **P14** | Collaborate with Waikato-Tainui, Te Arawa River Iwi, Ngāti Tūwharetoa and Ngāti Maniapoto to sustainably manage customary fisheries in the Waikato and Waipā River catchments. |
| | **P15** | Pursue collaborative arrangements with Ngāti Tūwharetoa and Te Arawa River Iwi for management of the Upper Waikato River fisheries. |

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| | **P16** | Engage with other whānaunga to understand their interests and values in relation to fisheries within the Raukawa rohe. |
| | **P17** | Advocate for management arrangements tailored to the Raukawa context. |
| | **P18** | Exercise kaitiaki through involvement in regulation and management of fisheries and activities impacting fisheries. |
| | **P19** | Ngā uri o Raukawa are enabled to undertake customary gathering in accordance with Raukawa tikanga and with minimum 'red tape'. |

### 3.1.4 Monitoring and enforcement

There is a concern that not enough is known about the state of fisheries within the Raukawa rohe, which hinders appropriate management. It is also important to ensure that rules that are in place are being enforced – this includes fishing activity (commercial, recreational and customary) but also activities that impact on habitat. For example, ensuring that fish passage is provided for, preventing unauthorised drainage of wetlands or vegetation clearance, preventing unauthorised discharges to waterways etc. Ngā uri o Raukawa have also expressed an interest in being directly involved in monitoring and enforcement activities that occur in the rohe.

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| **Issue** | **I4** | ***Inadequate monitoring and enforcement.*** |
| **Objective** | **O4** | The state of fisheries in the Raukawa rohe is better understood, and regulations are upheld to ensure the relevant objectives are met. |
| **Policy** | **P20** | Develop a monitoring strategy to determine progress towards achieving objectives and the effectiveness of the Raukawa Fisheries Plan. |
| | **P21** | Promote increased collaboration between agencies currently conducting monitoring work in the rohe, including to identify research requirements and to share information. |
| | **P22** | Advocate for increased monitoring and research within and specific to the Raukawa rohe. |
| | **P23** | Work with regulators to ensure enforcement is adequate within the Raukawa rohe, including enforcement of fishing rules as well as activities impacting on fisheries habitat. |
| | **P24** | Facilitate direct involvement ngā uri o Raukawa in relevant monitoring and enforcement activities within the rohe. |
| | **P25** | Develop cultural health indicators reflecting Raukawa mātauranga that can be incorporated within monitoring programmes. |

### 3.1.5 Education and capacity building

During development of the plan, concerns were voiced about the loss of traditional Raukawa knowledge pertaining to fishing. There are also frustrations that external agencies do not recognise or understand Raukawa, our histories and our relationships with the environment, including the fisheries. There is also a lack of understanding within Raukawa about the state of the fisheries and rules and regulations governing their management.

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| **Issue** | **I5** | ***Need for education and capacity building, including:***<br>• improved understanding about the fisheries;<br>• protection of traditional Raukawa knowledge; and<br>• improved understanding for users and managers about the Raukawa context. |
| **Objective** | **O5** | Improved understanding of fisheries, including of the Raukawa perspective (issues, values, aspirations, knowledge), both within ngā uri o Raukawa and among external stakeholders, including managers and users. |
| **Policy** | **P26** | Support the preservation of Raukawa mātauranga, tikanga and kawa relating to fisheries, particularly through education of rangatahi. |
| | **P27** | Support and facilitate the understanding of stakeholders about Raukawa perspectives related to fisheries through sharing information and knowledge, where and as appropriate, with external stakeholders. |
| | **P28** | Support and facilitate research or education opportunities to increase knowledge and understanding about fisheries, including identification of priority areas for protection, such as areas supporting critical life stages (e.g. spawning). |
| | **P29** | Appoint and facilitate training of kaitiaki and honorary fisheries officers from within ngā uri o Raukawa. |
| | **P30** | Develop and strengthen relationships with the fishing community. |
| | **P31** | Ensure kaitiaki and fisheries officers are provided training about Raukawa fisheries objectives. |

### 3.1.6 Waikato hydro scheme

The Waikato hydro scheme is an important component of the national energy network, however it does impact on fisheries. This is not always necessarily in a bad way – for example pest fish such as koi carp are restricted from reaching the Upper Waikato River alongside native fish. Mighty River Power continues to invest in research and projects alongside commercial fishers and iwi to look at ways to mitigate some of the impacts on particularly the tuna fishery.

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| **Issue** | **I6** | ***The historic and on-going impact of the Waikato hydro scheme on Waikato River fisheries.*** |
| **Objective** | **O6** | Practical steps are taken to mitigate any impacts of the Waikato Hydro Scheme on the Waikato River fisheries. |
| **Policy** | **P32** | Support on-going research and implementation of ways to mitigate the effects of the Waikato Hydro Scheme on fish passage, such as the elver trap and transfer system, and downstream tuna bypass trial at Karāpiro Dam. |
| | **P33** | Support research into options for remediation and management of heavy metal contaminants trapped in the hydro lakes. |
| | **P34** | Maintain and further develop the Raukawa partnership with Mighty River Power. |

### 3.1.7 Access

A number of factors have contributed to reduced access to fisheries for ngā uri o Raukawa. These include changing land ownership and loss of relationships – the increasing emphasis on health and safety and liability further complicates gaining access to private land. The rohe has also undergone significant changes over the generations – the development of the Waikato hydro scheme,

drainage of swamplands, land use conversions (to pine, dairy, pastoral farming etc). There has been increasing complexity of regulations to negotiate, as discussed in earlier sections of this plan, which also acts to reduce people's ability to fish.

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| **Issue** | **I7** | ***Ability to access fisheries has been reduced through increasing (and complicated) regulation, changing land tenure and rights of access.*** |
| **Objective** | **O7** | Barriers to accessing fisheries resources are reduced over time and ngā uri o Raukawa are able to undertake customary gathering to meet their needs. |
| **Policy** | **P35** | Advocate for consideration and provision of public access, or negotiated access to waterways important for fishing. |
| | **P36** | Advocate for streamlining of regulation and its implementation. |

### 3.1.8 Declining fish numbers

The commercial tuna fishery in the Waikato catchment developed rapidly during the 1960s and was overfished in the following two decades. Various controls were introduced during the 1980s and 1990s to restrict further expansion (Allen, 2010). There is a perception among some that commercial fishing is responsible for declining tuna numbers. It should be noted that commercial fishers rely on sustainable populations as much as everyone else and they have instigated voluntary measures in the past to ensure the fishery flourishes.

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| **Issue** | **I8** | ***Declining fish populations due to exploitation.*** |
| **Objective** | **O8** | Fishing is managed to ensure the sustainability of the fished species and ngā uri o Raukawa are not restricted from undertaking customary gathering to meet their needs due to a lack of fish. |
| **Policy** | **P37** | Undertake, support and facilitate restocking, restoration and enhancement of fish stocks as well as the habitat necessary to support them. |
| | **P38** | Engage in setting of sustainable catch limits (quota) for freshwater species (including Total Allowable Catch and Total Allowable Commercial Catch). |
| | **P39** | Recommend bylaws under the Fisheries Act 1996 for areas of the Waikato River to restrict or prohibit the taking of fish for the purpose of protecting significant areas and resources, or enabling fish stocks and/or habitat to recover. |
| | **P40** | Advocate for measures to increase the size and availability of tuna stocks, including:<br>• prohibiting the commercial harvest of glass eels and elvers;<br>• increasing the minimum size of commercially harvested eels to 300g by 2013;<br>• reducing the maximum size for commercially harvested longfin eels to 3kg by 2014, 2.5kg by 2016, and 2kg by 2018;<br>• prevention of fishing during eel migration and spawning run;<br>• increasing the size of escapement tubes; and<br>• rotational fishing practices as a sustainability measure. |
| | **P41** | Seek to work with commercial fishers to identify opportunities to ensure the restoration and sustainability of fisheries. |

### 3.1.9 Food safety

Where mahinga kai can be found, we are not always sure that it is safe to eat. The Waikato River is known to have significant heavy metal contamination – some as a result of natural geothermal inputs but also as a result of previous methods associated with electricity generation from geothermal energy. It has been estimated that the Wairakei Geothermal Power Station contributed approximately 65% of the 175 tonnes of arsenic per annum received in the Upper Waikato River (Allen, 2010). Rather than being flushed out to sea, much of these heavy metals are now trapped in the sediment of the hydro lakes. Other contamination can result from discharges to water. Mixing of waste with water is abhorrent and is something Raukawa does not support in general. Even after the best treatment methods it is strongly held that discharges of waste must pass through land before entering water.

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| **Issue** | **I9** | ***Water and habitat quality impacts on food safety.*** |
| **Objective** | **O9** | Mahinga kai is safe to gather and eat from within the Raukawa rohe. |
| **Policy** | **P42** | Work with science and health providers to identify any areas within the Raukawa rohe where there are food safety issues and ensure information is available to ngā uri o Raukawa. |
| | **P43** | Support remediation of any contamination of waterways that has food or contact safety implications. |
| | **P44** | Advocate for practices that minimise the likelihood of toxic algal blooms, such as through reducing nutrient input and regulating water temperature. |
| | **P45** | Advocate for avoidance of new heavy metal contamination of waterways resulting from the use of geothermal resources, including through reinjection of fluids rather than discharge to surface water. |
| | **P46** | Work with regional councils to ensure regional plans manage discharges to avoid contamination that results in impacts on the ability to safely harvest mahinga kai. |

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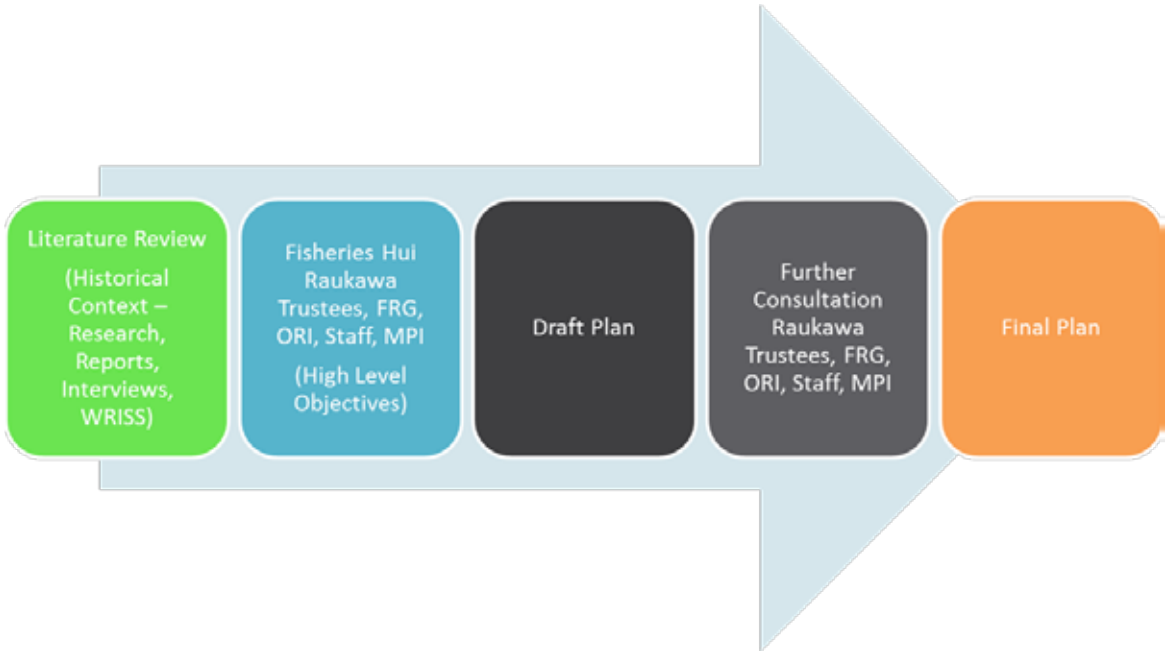
# APPENDIX A - METHODOLOGY

## DEVELOPING THE FISHERIES PLAN

The process used to draft the Fisheries Plan involved:

- completing a literature review
- establishing a Raukawa Fisheries Reference Group (FRG)
- conducting a series of workshops with Raukawa Trustees and the FRG to provide input and direct the content and form of the plan
- compiling the draft plan and sending out for targeted feedback
- summarising feedback and amending draft plan
- amended draft sent out for further feedback from wider community, stakeholders and uri
- consultation hui with Raukawa Trustees and uri
- incorporation of feedback into final plan
- adoption of the Raukawa Fisheries Plan by Raukawa Charitable Trust



# APPENDIX B – SUMMARY OF MANAGEMENT OF KEY SPECIES

| Species | Management |
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| **NATIVE SPECIES** | |
| Shortfin eel<br>Longfin eel<br>Spotted eel | Managed by the Department of Conservation (Conservation Act 1987); and for commercial fishing under the Quota Management System by Ministry for Primary Industries (Fisheries Act 1996) |
| Torrentfish<br>Dwarf galaxias<br>Lamprey<br>Black mudfish<br>Common bully<br>Redfin bully<br>Crans bully | Managed by the Department of Conservation (Conservation Act 1987 and Freshwater Fisheries Regulations 1983) |
| Giant kōkopu<br>Kōaro<br>Banded kōkopu<br>Inanga<br>Shortjaw kōkopu<br>Common smelt | Managed by the Department of Conservation (Conservation Act 1987 and Whitebait Fishing Regulations 1994) |
| **INTRODUCED SPECIES** | |
| Catfish | Regulated under the Fisheries (Amateur Fishing) Regulations 1986 and the Fisheries (Commercial Fishing) Regulations 2001 (Ministry for Primary Industries); Conservation Act 1987 (Department of Conservation); and the pest management strategies of the Waikato and Bay of Plenty Regional Councils |
| Gambusia | Regulated by the Freshwater Fisheries Regulations 1983 (DOC); and pest management strategies of the Waikato and Bay of Plenty Regional Councils |
| Brown trout<br>Rainbow trout<br>Perch | Managed by Fish and Game (except for Lake Taupō, managed by DOC); Conservation Act 1987 (DOC); and, for perch, the pest management strategies of the Waikato and Bay of Plenty Regional Councils |