Te Kōrero o te rōpū whakahaere o te wai māori o Te Rangitāiki

The Rangitāiki Freshwater Management Unit Story

The purpose of this booklet is to explain draft options to address requirements of the National Policy Statement for Freshwater Management 2020 (NPSFM) in the Rangitāiki Freshwater Management Unit (FMU). These options are to do with how we manage freshwater in Rangitāiki to achieve outcomes the community wants there.

This booklet covers:

- A description of the draft FMU
- Freshwater management issues in this FMU
- Options for:
  - **A.** A long-term vision for freshwater;
  - **B.** Proposed outcomes for key freshwater values;
  - **C.** Water quality, ecosystem health and other issues and targets;
  - **D.** Water take limits and minimum flows; and
  - **E.** The kinds of rules and other methods being considered to achieve these things.

We are early in the policy development process and are seeking feedback from the community to help inform the important decisions.

Your feedback to the questions inside this booklet can be provided in writing on the corresponding question sheet, online via our website or in person at one of our community events.

TOI MOANA
BAY OF PLENTY
REGIONAL COUNCIL

Ko te wai te oranga o ngā mea katoa

Water is the life-giver and essence of all things

Ngā tohu

This design represents the multiple waterways and waterbodies such as streams, rivers, lakes, and sea. The overall flowing form represents a river/tributary carving its way through the whenua. The koru has been included to represent the life force that water embodies and gives. Haehae represent whakapapa, including the past, present and future. It is a visual celebration of water as a life-giver and the essence of all things.

Te Wairere represents a waterfall with huka (foam) the dynamic movement of the water and the connections between different tributaries as they flow from the land to the sea, mai i te whenua, ki te moana.

Te Mana o te Wai - Tirohanga whānui

Essential Freshwater - Overview

In 2020, the New Zealand Government released the National Policy Statement for Freshwater Management (NPSFM) which outlines the direction all regional councils must take in the management of freshwater. As a result, the Bay of Plenty Regional Council now needs to change its Regional Policy Statement (RPS) and Regional Natural Resources Plan (Regional Plan). This means changing some of the policies and rules we use to manage how freshwater and land is used.

Between April 2023 and September 2023 we will ask you about your aspirations for your local waterways and your feedback on our draft change options. Your elected regional councillors will then consider and decide on options.

By the end of 2024 we will notify formal proposed changes to policies and rules. Everybody will be able to make submissions and be heard by a freshwater hearings panel.

Draft change options *2022 - 2023*	**Community engagement** *April - Sept 2023*	**Amend options** *Late 2023*	**Councillors decide** *Late 2024*	**Notify propsed RPS and RNRP change** *Late 2024*	**Public submissions** *2025*	**Hearings** *Late 2025 - 2026*

We acknowledge there are already a lot of other changes happening due to a host of new national regulations and proposed new laws, and this is yet more. Nevertheless, we encourage your involvement because many of the proposals discussed are specific to this FMU and we need you, the community, to help work through and identify solutions that will work for us all.

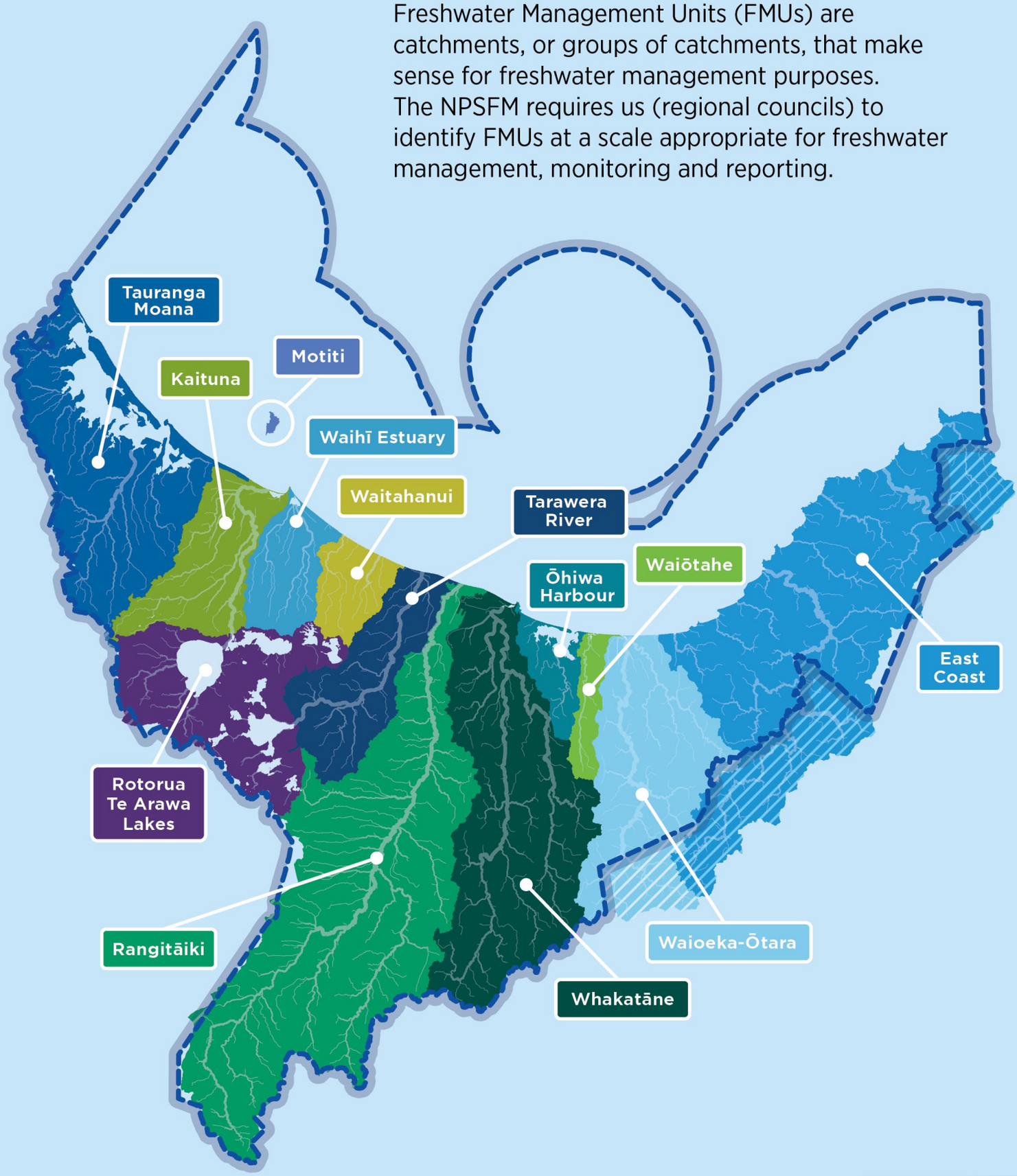
For more info

- Head to **boprc.govt.nz/freshwater**
- Read our Region Wide Overview booklet
- Sign up to receive our Freshwater Flash e-newsletter at **boprc.govt.nz/newsletters**
- Follow our social media
- Visit **participate.boprc.govt.nz**

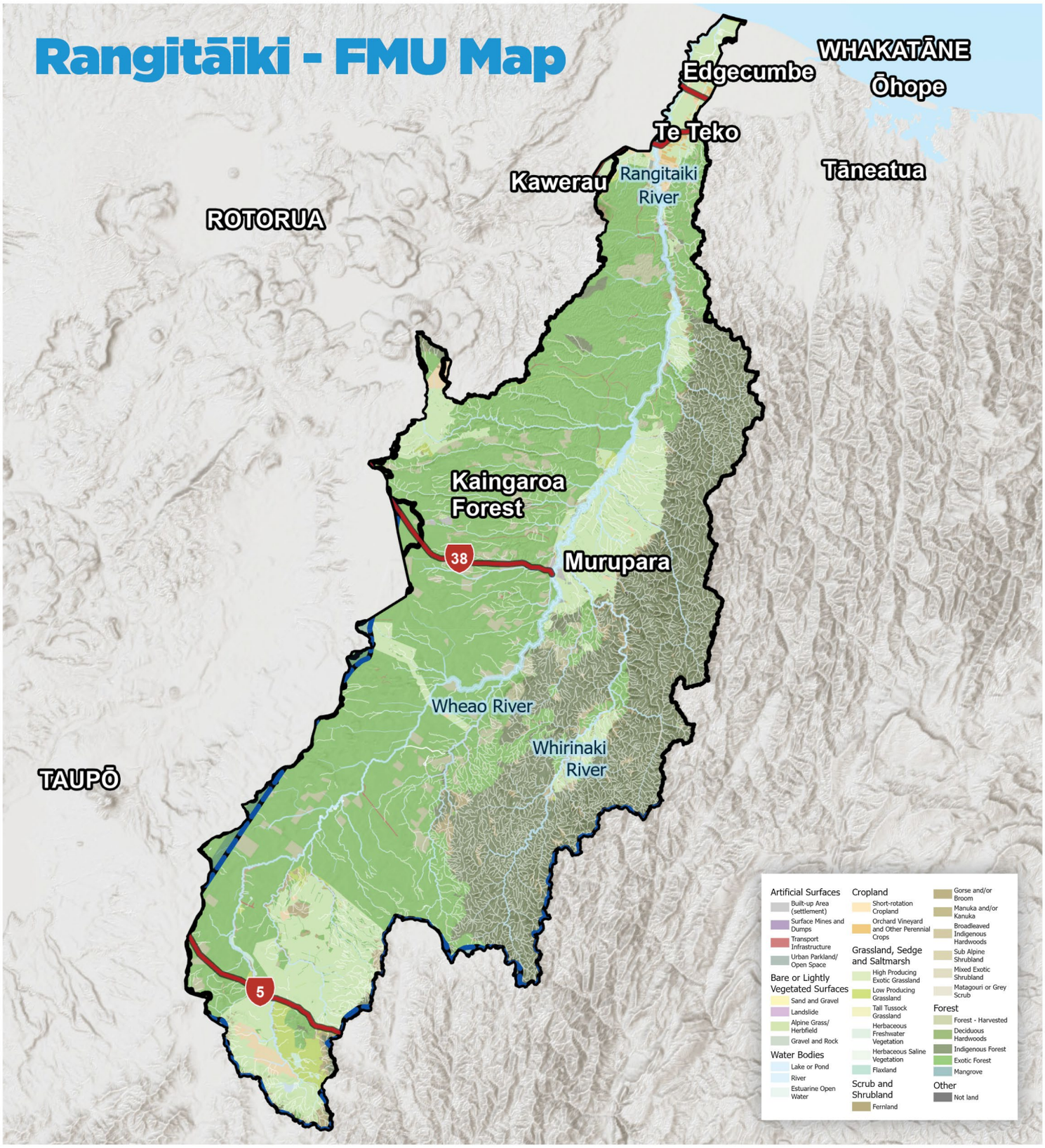
Ngā tauira o ngā rōpū whakahaere o te wai māori

Draft Freshwater Management Units

Freshwater Management Units (FMUs) are catchments, or groups of catchments, that make sense for freshwater management purposes. The NPSFM requires us (regional councils) to identify FMUs at a scale appropriate for freshwater management, monitoring and reporting.



We are proposing 13 Draft FMUs in our region, based on surface water catchments (or groups of these with similarities) and whether they feed into lakes, estuaries, or the ocean. Each Draft FMU has special characteristics (e.g., water body, cultural, community, geology, landform, land use and economic characteristics) that make it unique. Each will have its own chapter in the Regional Plan. The Regional Plan will have region wide rules but may also have rules specific to each FMU. The rules in FMUs may vary depending on the issues faced in that FMU.

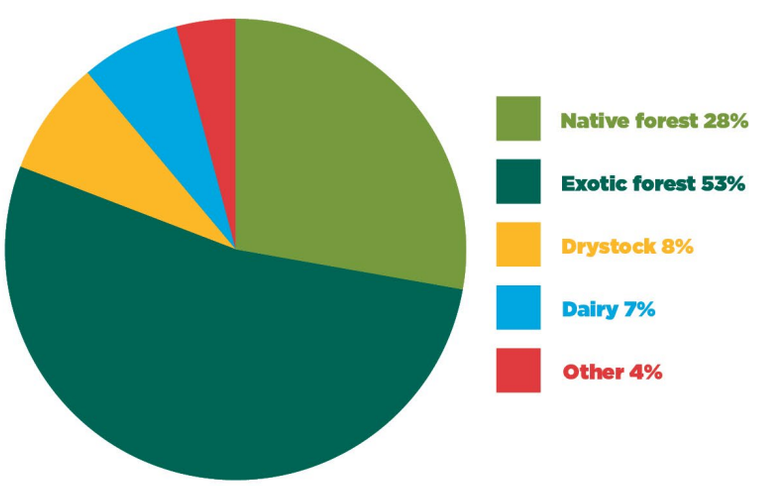


Land area:

292,693 ha

Population:

7,400 people



Mō te tauira o te rōpū whakahaere o te wai māori o Te Rangitāiki

About the Draft Rangitāiki Freshwater Management Unit (FMU)

The Draft Rangitāiki FMU follows the catchment of the Rangitāiki River, which flows north from the Kaimanawa Ranges to the coast. It is the longest river in the Bay of Plenty and includes large tributaries like the Wheao, Whirinaki and Horomanga rivers.

Large changes have been made to some rivers in this FMU. In the upper catchment, the Wheao Hydro Electric Power (HEP) Scheme diverts water from the Rangitāiki River to the Wheao River and Flaxy Creek, and discharges back into the Wheao. Lake Aniwaniwa, created by Aniwhenua HEP Dam behaves like a slow-moving stretch of river, whereas the lake created by Matahina HEP Dam is much deeper and has characteristics more like a lake.

In the lower reaches, the Rangitāiki River was diverted from its original course in 1914, to discharge directly to the sea at Thornton. Before this, the river naturally fed into wetlands across the plains before they reached Tarawera River and Whakatāne River. In the early 1900s a large network of canals and drains were constructed to drain the lowlands and enable agriculture – now managed as the Rangitāiki Land Drainage Scheme. Today, much of the Rangitāiki Plains area is actively pumped to protect rural settlements, production, and infrastructure. The Rangitāiki Flood Protection Scheme has seen river straightening, and riverbank reinforcement in the lower reaches. The original Rangitāiki River channel and some canals cut cross draft FMU boundaries.

Question 1 Do you think we have got this draft FMU boundary about right?

Tangata whenua

- This FMU covers the Rangitāiki River and all its tributaries within the Rangitāiki co-governance framework area. Te Ara Whānui o Rangitāiki Pathways of the Rangitāiki River Document 2015 contains a vision, objectives and desired outcomes for the Rangitāiki River developed under the co-governance framework. Iwi and hapū have also individually documented values, aspirations and concerns for the rivers over time.
- The Rangitāiki River Forum includes iwi members from Ngāti Whare, Ngāti Manawa, Ngāti Awa, Ngāti Tūwharetoa (Bay of Plenty), Hineuru, Ngāi Tūhoe, Ngāti Tūwharetoa and Ngāti Rangitihi. Other iwi that have expressed their interests and heritage associated with parts of the Rangitāiki Catchment include Ngāti Tahu/Ngāti Whaoa, Ngāti Raukawa, Ngāti Mākino and Tūhourangi.
- About 60% of the FMU land area, or about 176,000 ha, is Māori land. Land use on Māori-owned land is dominated by exotic forest (76%) and native forest (21%). By far the biggest land holding is the Kāingaroa Forest, transferred as settlement land to Central North Island Iwi Land Holdings Ltd.
- There are more than fifteen marae and twenty hapū alongside the Rangitāiki, Whirinaki, and Horomanga rivers and tributaries. Māori communities are based around hapū and marae, and are very closely connected through whakapapa.

- The tuna (eel) fishery of the Rangitāiki River and its surrounds is of particular importance to Ngāti Manawa. Ngāti Awa and Ngāti Tūwharetoa historical accounts identify raupō, flax, tī kōuka (cabbage tree), sulphur, warm mud and hot pools as important traditional resources. Many rivers, tributaries and the original path of the Rangitāki River in the lowlands, have cultural significance.
- Ngāti Awa, Ngāti Manawa, Ngāti Tūwharetoa (Taupō), Ngāti Tūwharetoa (Bay of Plenty), Ngāti Whare and Hineuru have statutory acknowledgements relating to water in this FMU.
- Council is committed to continuing the journey to involve tangata whenua in freshwater management and support Matauranga Māori.

Communities

- As of June 2022, the population of this FMU was estimated to be 7,400, mostly concentrated on the coastal plains (e.g., Edgecumbe, Te Teko) and Murupara.
- Community feedback so far has identified recreational values such as swimming, stand up paddle boarding, boating, kayaking, white water rafting and water skiing at sites along the length of the river. With many schools and marae near the river, it is used frequently in summertime. Ecosystem health values of the Whirinaki River were highlighted, along with spots for swimming, fishing and white baiting. People who responded to our online surveys in 2021 and 2022 were reasonably happy with the current state of the water.

Land and land use

- Most of this FMU is dominated by volcanic geology, with non-volcanic to the east, forming the steep Ikawhenua ranges.
- Exotic forest cover is the dominant land use (53%) followed by native forest 28%, predominantly in the Ikawhenua Ranges. Drystock (8% or 22,665 ha) and dairy farming (7% or 21,618 ha) land uses are located in the lowlands below Matahina Dam, the Galatea Plains (where irrigated pasture is common), and the upper most part of the catchment. Although the proportion of land in pastoral uses is small, it is still a large area because the FMU is so big.
- Horticulture around the Te Teko area includes kamokamo, watermelon, strawberries and kiwifruit. Arable crops include sweetcorn and maize.
- Natural character is high in forested upper catchments but highly modified in lower reaches. Te Urewera is identified as a significant indigenous biodiversity site and outstanding natural landscape in the Whakatāne District Plan.
- This FMU is in the Whakatane District, where dairy farming and sheep and beef farming is estimated to contribute $120 million and $14 million respectively to the Bay of Plenty's regional GDP in 2020/21. Horticulture and other crops are estimated to contribute $28 million, and forestry, logging and support services are estimated to contribute $61 million.

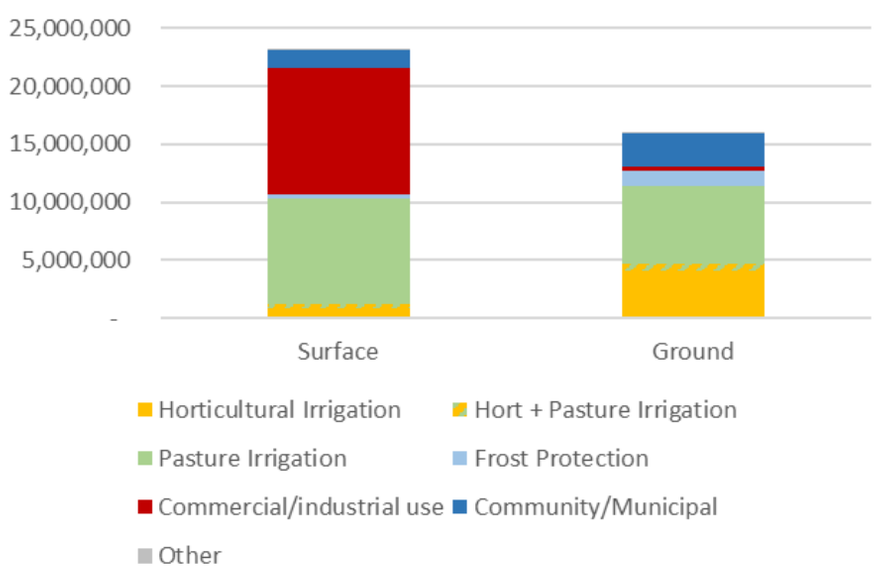
Rivers, streams, lakes, and wetlands

- The FMU contains habitats for 33 threatened freshwater species. It is the only FMU in the region with non-migratory threatened fish species (Dwarf Galaxias) and unique frost flat habitats. Two areas are identified for their significant coastal biodiversity. Twenty two priority biodiversity sites involve a water body within this FMU.
- There are 861.6 ha of wetland in the FMU (35% of the historical extent).
- A number of tributaries within the Rangitāiki FMU in the Ikawhenua/Urewera Range have been identified as having outstanding natural character.

- The Rangitāiki River and its tributaries are also valued for indigenous fish species, mainly tuna (eels) and inanga (whitebait), kākahi and kōura. At the river mouth, mullet and kahawai were identified.
- Fish and Game have identified the Rangitāiki River and tributaries including the Waihua, Mangamako, Ngatamawahine and Mangaharakeke Streams, and major tributaries the Horomanga, Whirinaki and Whaeo Rivers, as locations where adult trout are present and/or spawn.
- Pukehinau and Awakeri are low temperature geothermal systems (30°C-70°C) within this FMU.
- The Rangitāiki River Scheme operates in Galatea Plains and down the Rangitāiki River to provide flood protection and the Rangitāiki Drainage Scheme operates across the plains, providing land drainage to enable agriculture and other land uses. The plains were formerly extensive wetlands. Rivers in the lowland plains are highly modified, including the current recut to the sea at Thornton. It includes stop banks, flood gates, a mole structure at the river mouth and pump stations.

Water use, takes and discharges

- Water is used for a variety of purposes. It is used for a range of cultural purposes (such as karakia, iriiri, whakanoa), recreational purposes (such as fishing), mahinga kai, drinking/household supply, industrial and commercial uses, and for food production.
- As of January 2022, there were 142 water take consents in the Rangitāiki FMU (57 surface water, 85 groundwater). The majority of consents are for dairy farming and horticulture (irrigation and frost protection), but the volume is evenly split between industrial/commercial, and agriculture/horticulture uses.
- Commercial takes are dominated by a surface water consent for the Fonterra plant in Edgecumbe. Dairy product manufacturing in the Whakatāne District is estimated to contribute $53 million to the Bay of Plenty's regional GDP in 2020/21.
- Whakatāne District Council water takes provide municipal and community water supply to Te Teko, Edgecumbe, Te Mahoe and Murupara. There are a range of other providers that supply drinking water to Minginui, Waiohau, Kāingaroa Forest communities from groundwater and to the Golf Road area from the Waiariari Stream.



Rangitāiki FMU Resource Consents to take water – volume (m^3/year)

- There are two substantial point source discharges in this FMU into the Rangitāiki River, one from the Fonterra milk processing plant and the other for Murupara treated wastewater. There are 32 land discharge consents, 16 On-Site Effluent Treatment discharge consents and 32 discharge to water consents in total.
- There are three hydroelectric power (HEP) generation schemes in this FMU: Flaxy/Whaeo diversions, Aniwhenua Dam and the Matahina Dam. HEP schemes contribute to New Zealand's ability to generate electricity from renewable sources. They provide more reliable electricity, water-based recreation opportunities, jobs and a means to manage flood events. Hydro-electric generation in the Whakatāne District is estimated to contribute $25 million to the Bay of Plenty's regional GDP in 2020/21. The HEP schemes in the Rangitāiki contribute towards the Whakatāne District figures along with the Karaponga scheme located in the Draft Tarawera River FMU. However, these schemes are also known to have significant impacts on Tuna passage and cultural and other values in the rivers.

What is likely to happen with climate change over the medium to long term (mid-late century)?

- Under climate change, reduced summer rainfall and increased evaporation (from land or water) and transpiration (evaporation from plants) may increase water demand while reducing river and stream flow, particularly in gravel bed rivers and streams. This FMU includes both spring fed and gravel bed rivers and streams, so flow response will be mixed. Spring fed rivers and streams are expected to show a subdued response.
- There may be higher flood flows in summer and winter.
- Sediment loads reaching the sea are predicted to increase significantly due to larger rainfall events.
- Climate change projections are that land uses in the lowlands may be inundated by the sea, becoming less viable or unviable by the mid – late century.

Question 2 Does this brief summary about the people, land and water in this FMU seem right to you?

He aha tōu kitenga mō te anamata o te wai māori?

What is your vision for the future of freshwater?

Draft long-term vision for freshwater

A key part of freshwater planning is being clear about what you seek to achieve. A long-term vision for freshwater is required by the NPSFM and must set out what tangata whenua and the community collectively want to see for freshwater in the FMU. Visions should be ambitious but reasonable.

We've drafted some options based on issues and what we've heard from tangata whenua and communities so far. Te Ara Whānui o Rangitāiki - Pathways of the Rangitāiki River document includes a vision, desired outcomes and objectives which were given affect to through Change 3 (Rangitāiki River) to the Regional Policy Statement (RPS). The vision options for the Rangitāiki FMU will not affect the existing Rangitāiki River co-governance provisions already in the RPS but may refer to them:

Option A A healthy Rangitāiki River, valued by the community, protected for future generations. Tihei Mauri Ora.

E ora ana te mauri o te awa o Rangitāiki, e manaakitia ana e te iwi, e tiakina ana mō ngā whakatipuranga o muri mai. Tihei Mauri Ora.

1. Innovative and sustainable land and water management practices support food production, milk processing, hydro-electric power generation, drainage, and flood mitigation so that rivers, streams, lakes and wetlands are safe for human contact, mahinga kai thrives and the ecosystem health is enhanced.
2. Land use flexibility will be provided for Central North Island Iwi land above the Matahina dam with some future provision of water and for potentially more intensive land use.
3. In lower Rangitāiki - habitat for indigenous species (particularly whitebait), and natural form and character are restored over time.

This vision is to be achieved by 2045.

Option B A healthy Rangitāiki River, valued by the community, protected for future generations. Tihei Mauri Ora.

E ora ana te mauri o te awa o Rangitāiki, e manaakitia ana e te iwi, e tiakina ana mō ngā whakatipuranga o muri mai. Tihei Mauri Ora.

1. Tuna within the Rangitāiki Catchment are protected, through measures including enhancement and restoration of their habitat and migration paths (RPS O32, treaty settlement legislation).
2. Habitats that support indigenous species and linkages between indigenous ecosystems within the Rangitāiki River catchment are created, enhanced where degraded, and protected where significant (RPS O33).

3 Water quality in the Rangitāiki River catchment is maintained and improved where degraded (RPS O34).

4 The social, economic and cultural wellbeing of communities in the Rangitāiki River Catchment is enabled within the limits of the rivers and receiving environment (RPS O35).

5 The relationship between communities and the Rangitāiki River Catchment is recognised and encouraged (RPS O36).

6 The practice of kaitiakitanga in decision-making is recognised and provided for when managing ancestral lands, water, sites, wāhi tapu and other taonga in the Rangitāiki River Catchment (RPS O37).

7 The qualities and characteristics of areas and features that contribute to the amenity values and quality of the Rangitāiki River catchment environment are maintained and enhanced where degraded (RPS O38).

8 Access to the Rangitāiki River and its tributaries is maintained and enhanced (RPS O39).

9 In Te Urewera: Wai remains at the centre of life, in its natural state, for the benefit of future generations, and use is enabled only through agreed limits and constraints.

10 In lower Rangitāiki: Habitat for indigenous species (particularly whitebait), and natural form and character are restored over time.

The vision is to be achieved by 2045.

Question 3 As a draft vision do you prefer Option A or B?

Draft values and environmental outcomes

The NPSFM uses the term “values” to refer to important aspects of freshwater. We must manage freshwater to protect compulsory freshwater values and must also consider other values if present. We must set environmental outcomes for these values.

We have used tangata whenua and community feedback as well as our own research to identify the values we think matter most in this draft FMU. We have heard that people want to be able to swim and gather kai without getting sick and want to know that the water supports a range of fish and other native animals. In particular, the ability of Tuna to migrate up and down the river is a major concern for tangata whenua. We have also heard that looking after streams and wetlands enhances their mauri.

Water is also valued as a resource for people and communities to use – in marae and households, as drinking water for animals, for irrigation and food production, and for some commercial and industrial uses. Water is important for the livelihoods of local people, but we must make sure its use does not damage ecological health or diminish mauri.

The following table contains some draft outcome statements, based on what we have heard so far.

Freshwater Values *The ways fresh water is important* *Shaded values are compulsory national values in the NPSFM*	**DRAFT Environmental outcome** *How we would like the values to be*
Ecosystem health	Water quality in the Rangitāiki River Catchment is maintained and improved where degraded (RPS O34 Rangitāiki River). The flow within the Rangitāiki River catchment provides for the habitats and spawning areas of native and/or fishing species. Habitats that support indigenous species and linkages between ecosystems within the Rangitāiki River Catchment are created, enhanced where degraded, and protected where significant (RPS O33 Rangitāiki River). Native species, including whitebait and tuna, abound. The natural state of ecosystem health in Te Urewera is maintained.
Human contact	Water quality and quantity is maintained or improved to be suitable for swimming and for gathering kai without risk of getting sick.
Threatened species	Return of some threatened species. Protect the critical habitats and conditions required to support the presence, abundance, survival and recovery of threatened species.
Mahinga kai	Tuna within the Rangitāiki catchment are protected, through measures including enhancement and restoration of their habitat and migration paths (RPS O32 Rangitāiki River). The Mauri of the water is protected to support the continuation of mahinga kai practices and associated tikanga.
Natural form and character	The qualities and characteristics of areas and features that contribute to the amenity values and quality of the Rangitāiki River catchment environment are maintained and enhanced where degraded (RPS O38 Rangitāiki River). Natural form and character is restored over time in lowlands reaches, maintained and improved above Matahina Dam, and protected in the forested upper catchments.
Drinking water supply	Water quality and quantity provides for safe drinking water sources, where the water is used for that purpose, to the extent possible and subject to providing for the outcomes shaded above.
Wai tapu	Water is suitable for cultural ceremonies at traditional wai tapu sites.
Transport and tauranga waka	Access to the Rangitāiki River and its tributaries is maintained and enhanced.
Fishing	Water quality and quantity provide for commonly fished species that are abundant and safe to eat.
Hydro-electric power generation	Water quality and quantity is sufficient to provide for hydro-electric power generation to be maintained, to the extent possible and subject to providing for the outcomes shaded above.

Freshwater Values *The ways fresh water is important* *Shaded values are compulsory national values in the NPSFM*	**DRAFT Environmental outcome** *How we would like the values to be*
Animal drinking water	Farmed animals have sufficient, reliable, safe, and palatable drinking water, to the extent possible and subject to providing for the outcomes shaded above.
Irrigation, cultivation, and production of food and beverages	Reasonable and efficient irrigation and food processing freshwater needs are provided for with an adequate level of reliability, to the extent possible and subject to providing for the outcomes shaded above.
Commercial and industrial use	Reasonable and efficient commercial and industrial freshwater needs are provided for with an adequate level of reliability, to the extent possible and subject to providing for the outcomes shaded above.
Geothermal warm water	Significant geothermal warm water resources are protected from the cooling effects of activities and made available for efficient uses that require heat or heated water.

Question 4 What do you think of the draft values and outcomes identified for this FMU?

Te kounga o te wai me te oranga o te pūnahi hauropi

Water quality and ecosystem health

The vision, values and outcomes give a sense of where we want to be. How hard it is to get there depends very much on where we are right now. The things we do on the land can affect river, stream, wetland, and estuary health. We measure lots of different things to check the health of the environment- these are called attributes. The state given below is what it was like in September 2017 – called baseline state as defined in the NPSFM. The NPSFM has a grading system for each attribute. The grades are A-D bands. A band = very good state, D = poor state. The trend tells us whether it is getting better or worse over time.

River and stream water quality for ecosystem health

The main water quality attributes we measure in rivers and streams are the contaminants of concern for most areas; the nutrients nitrogen and phosphorus, and sediment. Find out more about how we monitor river health, here.

The Council has seven monitoring sites in this FMU to measure states and trends in river and stream water quality. This includes one site coming out of Lake Aniwaniwa which behaves more like a river. In areas where we don't have enough monitoring data, river health has been estimated by an Expert Panel using the best information available. This gives us a sense of states and helps us identify where changes may be needed to meet environmental outcomes. The NPSFM requires us to take action and make improvements if water quality is below a national bottom line or is degrading (shows a worsening trend over time), unless this is due to natural causes.

Nitrate concentrations at three monitored river and stream sites in the upper catchment (Rangitāiki at SH5, Otamatea at Wairere Road and Rangitāiki at Murupara) are elevated - B band and are some of the highest in the region. Groundwater monitoring shows elevated levels of nitrate-nitrogen at the head of the Rangitāiki Catchment. This is likely due to the combination of intensive land use and the rapid movement of nitrate through these porous soils. The good news is these trends in the upper catchment are likely to be improving. Nitrate concentrations elsewhere in this FMU were in the A band, however the trends are likely worsening.

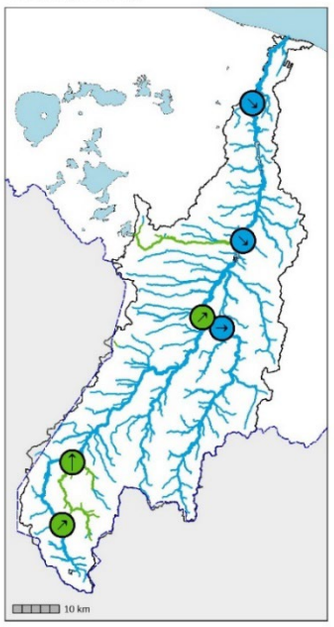
Measured dissolved reactive phosphorus concentrations are high, in the C or D bands, but showing improving trends. The high phosphorus is indicative of the volcanic soils in the catchment rather than a degraded state, but human activities will be adding to this as well.

Measured suspended fine sediment is A or B band for most sites, but the Whirinaki at Galatea site is in D band and does not meet national bottom lines. Trends are also likely worsening in most of the Rangitāiki FMU. High sediment in the Whirinaki will be partially due to natural causes, but human activities will be adding to this as well. Sediment is generally better in the mainstem Rangitāiki River than in tributaries, probably due to dilution and settlement within the HEP lakes.

This FMU has two point-source discharges that are also monitored for Dissolved Oxygen. Dissolved oxygen downstream of the Murupara oxidation pond discharge is A band, and the lower catchment downstream of the dairy factory discharge is C band. That means there is moderate stress on animals living in the water in the lower Rangitāiki River.

In addition to these monitored sites, some surveys of lowland drainage canals on the Rangitāiki Plains show quite poor water quality.

Nitrate (toxicity)



Regional boundary

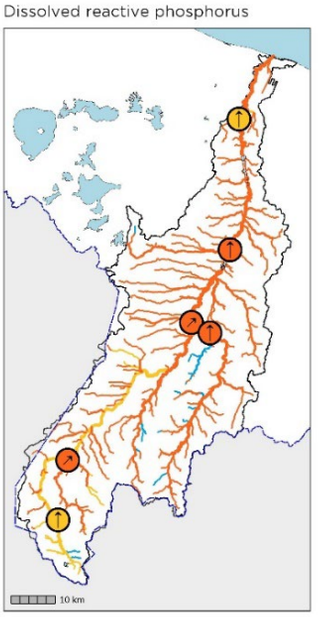
FMU boundary

Estimated state
A
B
C
D

Monitored state
A
B
C
D

Monitored trend
↑ Very Likely Improving
↗ Likely Improving
→ Indeterminate/Uncertain
↘ Likely Worsening
↓ Very Likely Worsening

Dissolved reactive phosphorus



Regional boundary

FMU boundary

Estimated state
A
B
C
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Monitored state
A
B
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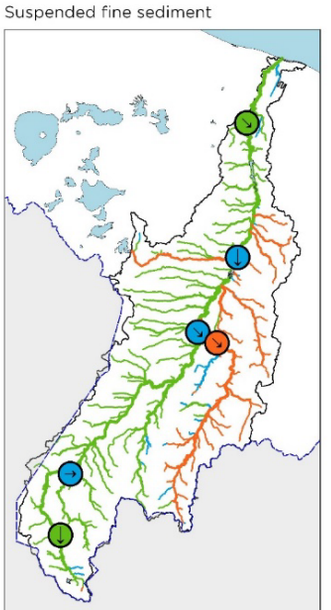
D

Monitored trend
↑ Very Likely Improving
↗ Likely Improving
→ Indeterminate/Uncertain
↘ Likely Worsening
↓ Very Likely Worsening

Suspended fine sediment



Regional boundary

FMU boundary

Estimated state
A
B
C
D

Monitored state
A
B
C
D

Monitored trend
↑ Very Likely Improving
↗ Likely Improving
→ Indeterminate/Uncertain
↘ Likely Worsening
↓ Very Likely Worsening

River and stream aquatic life for ecosystem health

The main aquatic life attributes we measure are fish, macroinvertebrates which include worms, snails, and insects, both in their immature larval phase, and as adults (e.g., mayflies, caddisflies, beetles), and periphyton - algae and fungi that grow on the beds of our rivers, lakes and streams and can make it slippery and slimy. For ease of interpretation, invertebrate data is simplified as special indices such as the Macroinvertebrate Community Index (MCI). The Macroinvertebrate Community Index (MCI) is based on the tolerance or sensitivity of species to organic pollution and nutrient enrichment and measures the presence (or absence) of invertebrates. Higher MCI scores indicate better river or stream conditions at the monitoring site. Two other indices are also used to describe macroinvertebrate health – the quantitative MCI and Average Score Per Metric; check out our Water Ecology Tool at www.boprc.govt.nz/wet for more information.

Fish surveys show the impact of obstacles to migratory fish access in Rangitāiki FMU (including pump stations and flap gates in the lower catchment, and dams in the upper catchment). The most widespread fish in the FMU are rainbow and brown trout, followed by longfin and shortfin eels. Indigenous species are heavily impacted by obstacles to fish migration and only four native species have been found above Matahina dam. Two of these – kōaro and giant kōkopu – are migratory.

The Council has 13 macroinvertebrate monitoring sites in this FMU to measure state and trends in river health. There have also been lots of other macroinvertebrate surveys in Rangitāiki FMU (another 142 sites). Generally, rivers and streams draining indigenous forest were in A band for MCI. In exotic forest most sites were in B band, but there was a wide range, with lots of sites in both A and D bands. This may reflect the effects of logging activities or other stressors. Streams in areas with pastoral land use classes had a wide range of MCI grades - A-D bands. Local riparian conditions appear to have a large influence on MCI state.

In addition to these monitored sites, surveys of lowland drainage canals (which are modified rivers and streams) on the Rangitāiki Plains were highly degraded showing poor habitat conditions, high amounts of fine sediment, channel straightening, lack of bank vegetation shade. These drainage canals often have excessive plant and weed growth and invertebrates at these sites were dominated by species which could tolerate the poor environmental conditions.

Whilst not at toxic levels, nutrients like nitrogen and phosphorous can promote plant, weed and algal growth. Periphyton (weed and algae) monitoring sites in this FMU target areas with cobble-beds, ideal for growth. The state for periphyton biomass in these areas is usually in the A or B band. The substrate in many other rivers and streams is dominated by fine, moving pumice which is unsuitable for periphyton growth.

Lake water quality for ecosystem health

The main water quality attributes we measure in lakes are the nutrients nitrogen and phosphorus. Lake Aniwaniwa behaves more like a river than a lake, so only Lake Matahina is reported here. Based on these nutrients, Lake Matahina is enriched with these nutrients – C band for phosphorus, and nitrogen is in D band which does not meet the national bottom line.

Lake aquatic life for ecosystem health

The main aquatic life attributes we measure in lakes are the native plants and invasive plants in the lake. For Lake Matahina, invasive plants like curly oxygen weed and hornwort are common and native species are degraded. Lake Matahina is in D band for both attributes and does not meet national bottom lines.

Human contact

The main human health attributes we measure are faecal indicator bacteria and cyanobacteria (blue/green algae). Elevated levels of faecal indicator bacteria from animal dung, human wastewater and birds can make water unsafe for people to swim in or gather kai from. This is often used as a measure of 'swimmability'. *E. coli* is the bacteria we measure in rivers and lakes as an indicator of other bacteria that could be present. Faecal coliforms and *enteorococci* are the bacteria we measure in estuaries and the sea. Find out more about how we monitor river health, here.

The Council has four monitoring sites for human contact in Rangitāiki FMU. Three of the four are in A or B bands, despite intensive pastoral land use in the Galatea Basin. Stock exclusion from waterways and dilution by large volumes of flow in the mainstem Rangitāiki, as well as ultraviolet die-off in hydro-lakes lower down in the catchment all help. This means most of the time over summer there is only a very small risk of getting sick from sites upstream of Te Teko. The state at the bottom of the catchment is C band which means there is a slightly higher risk of getting sick if you swim or wade here.

Mahinga kai

The mahinga kai compulsory value includes the freshwater-related plants and animals that people can eat, the places these are harvested from and the tikanga (practices) of collecting or harvesting them. It is important because the loss of these species can have a profound effect on the communities who rely on them.

Tuna (eels) have a unique and important customary fishery status in the Rangitāiki. Traditionally the abundance of whitebait provided local iwi with an essential food source. Mahinga kai is a compulsory freshwater value. We know there will be other important traditional harvest sites, practices and species in this FMU, but don't have much information about these and how tangata whenua would assess their state yet. We welcome any information tangata whenua wish to provide related to this awa.

Where do contaminants come from?

In the upper catchment down to Matahina dam, dairy and drystock make up a low proportion of land use but contribute a disproportionately high share of nitrogen and phosphorous loads. Native forest land use is estimated to contribute the largest share of the sediment load in this part of the FMU, reflecting the steepness of the Ikawhenua Range causing higher chance of sediment-laden runoff from this area.

Matahina dam controls the flow fluctuation and volume downstream. Downstream of the dam the point source discharge from Fonterra at Edgecumbe is estimated to contribute the largest share of the total nitrogen and total phosphorous load. Losses from dairy farming contribute most of the rest of the total nitrogen. Sediment and *E.coli* appears to come from a range of different land uses in this part of the FMU. Shallow landslide is the dominant erosion process, and channel bank erosion is another.

Modelling estimates that the total suspended sediment load delivered to the coast each year from the whole FMU under current land use and practice is about 64% more than would occur under natural land cover.

Freshwater health issues for this FMU

Elevated nitrogen and worsening trends. Nitrate concentrations in the upper catchment are elevated, 10-year trends at the dam sites and in the lower Rangitāiki River are worsening, and potential land use intensification poses additional risks. Nutrient enrichment and resulting algal/macrophyte growth affect dam operations, ecological health and recreational values in the hydro lakes Matahina and Aniwaniwa. Periphyton growth down stream of Lake Aniwaniwa also indicates nutrient enrichment and potentially a lack of flood flows. Excessive macrophyte growth affects operations and aesthetic and fishery values at Aniwaniwa, causing loss of storage capacity in the lake and blocking up canal intakes and overflows. The dam lakes act as sinks so that nutrient and sediment concentrations are lower downstream, but the trends are worsening.

Indigenous fish species are heavily impacted by obstacles to fish passage, including pump stations and flap gates in the lower catchment, and the HEP dams in the upper catchment.

Lowland, heavily modified tributaries (Reids Canal, Western Drain, Ngakauroa Stream) have degraded water quality, ecosystem health, cultural values and natural character. They have high nutrient levels, high turbidity, extreme levels of DO (both high and low), elevated temperatures, relatively low invertebrate abundance and diversity. Nitrate and ammonia increase with rainfall. Habitat features that support ecological health are generally absent. The cause is primarily land drainage, which enables productive land uses, and contaminant loads from point sources and surrounding rural land uses. The Lower Rangitāiki River is also heavily modified for flood protection, which remains very important to people.

Suspended fine sediment in the Rangitāiki River is not currently a problem for the main stem of the river as concentrations are low, but trends appear to be worsening and this is expected to be exacerbated with climate change. It is expected that suspended fine sediment concentrations are higher in lowland modified rivers and streams, including land drainage canals. Trends appear to be worsening and this is expected to be exacerbated with climate change. Sedimentation and forestry debris, affect dam operations and reduce capacity over time, also reducing flood detention capacity. There is potential to do better at keeping sediment and forestry slash out of rivers. Pest control in forest areas would also be beneficial.

Phosphorous is high but showing improving trends. This reflects both high naturally occurring phosphorous levels (derived from volcanic soils within the catchment) and also human activities (land use and discharges). Dairy farming land uses are estimated to contribute the most phosphorous compared to other land uses above Matahina Dam. In the lower Rangitāiki River, the Edgecumbe dairy factory discharge is the most substantial input.

Cultural indicators of health. We know there will be important cultural indicators that can provide a deeper understanding of wai ora, but don't have much information about these. We welcome any information tangata whenua wish to provide.

Question 5	Does this brief summary about water quality in this FMU seem about right to you?
Question 6	How satisfied are you with the water quality in this FMU?

What are we aiming for?

The NPSFM requires us to set targets for water quality that are at least as good as the baseline state of the rivers (as measured in 2017) and better than the national bottom lines set in the NPSFM. These targets are the specific, measurable levels of water quality or ecosystem health, which will help us to achieve the environmental outcomes (on previous page).

In this FMU, several attributes are in a good (in the 'A' band) state in main rivers (nitrate, ammonia, *E. coli* and suspended sediment), and we need to maintain this. Water quality and aquatic life attributes will need to improve in lowland modified rivers and streams. Nitrogen and phosphorus levels may need to improve in Matahina Dam Lake, although we do need to understand the processes going on in the Lake a bit more.

The scale of change required to reduce loads is estimated to be relatively small (compared to several other FMUs in the region) for all key contaminants, and a short timeframe (10–20 years) is suggested to achieve improvements.

Indicative scale of nitrogen, phosphorus, sediment and *E. coli* load reduction needed to improve water quality and meet draft environmental outcomes.

KEY: Indicative scale of change needed to improve water quality, or likely water quantity constraint.

Small | Moderate | High

How can we meet the outcomes and targets we set?

The outcomes we set for freshwater will be met via a mix of voluntary measures (things people choose to do themselves), investment and works/actions by Council, regulations the government has set that everyone must follow, and rules Bay of Plenty Regional Council sets in the Regional Plan. Regional Plan rules will be set if these are the most appropriate way to address remaining issues that are not likely to be addressed by national regulations.

Regional Councils must implement national regulations relating to freshwater (via consents, monitoring, and compliance). We cannot change these but can make additional rules if we think they are needed to address local issues. It is important to have a sense of what national regulations currently say:

National regulations for freshwater

Current national regulations require:

- Stock exclusion (with a 3 m buffer) from large rivers (>1 m wide), lakes and wetlands for dairy cattle on all terrain, and for drystock on low slope land (<5 degrees).
- Controls on activities within and close to rivers, streams, land and wetlands.
- Feedlots and stockholding area requirements: sealed; effluent collection, storage and disposal; 50 m setback from rivers, lakes, wetlands, bores, drains and the coastal marine area.
- Cap of 190 kg/ha/yr on the amount of synthetic N-Fertiliser applied to dairy farms, along with reporting requirements.
- Controls on intensive winter grazing on forage crops – subject to conditions or consent required.

- Consent required for substantial land use change from forestry to pasture, anything to dairy or dairy support, or extending the irrigated area within dairy farms (provisional rule expires 2025).
- Plantation Forestry: a number of practice requirements, including setbacks from rivers, lakes and wetlands, and requirements relating to earthworks, harvesting, slash and other activities.

Pending national regulations in 2023 are:

- Certified Freshwater Farm Plans will be required for all farms over 20 ha and horticultural enterprises over 5 ha. Farm operators will need to identify activities that pose a risk of contaminant loss and identify actions to reduce risks.
- New regulations requiring Regional Councils to control activities in drinking water source protection areas.

Draft water quality policy options

National regulations considered likely to make good progress towards the outcomes sought. However, we see a likely need to do more. Options we are exploring for this FMU include:

- Focus primarily on reducing nutrient concentrations and loads in the catchment above Matahina Dam, and in the lowland drainage network.
- Using Freshwater Farm Plans to reduce risk, require good management practice, set minimum standards, and seek continual improvement to address rural land uses and practices that pose a high risk of sediment, nitrogen, *E. coli* and phosphorus loss.
- Requiring no net increases in *E. coli*, nitrogen, phosphorus, or sediment as a result of future land use and practice change (this may require offsetting). However, some consideration is also being given to ways to enable some development of underdeveloped Māori land over time.
- Gathering farm data on stock, feed, fertiliser and other farm and horticulture nutrient inputs, and consider setting a cap on high nutrient inputs.
- Controlling intensive grazing that removes vegetation cover and cultivation, including active management of Critical Source Areas (overland flow paths), in similar way to national Intensive Winter Grazing Regulations.
- Exploring and encouraging physical technological solutions such as treatment of drain water, treatment wetlands, and sediment control bunds in appropriate locations.
- Encouraging restoration of in-river and in-estuary habitat, and river margin habitat, including fish passage, for all land uses.
- When point source discharge consents are renewed, strengthen conditions, including better discharge water quality, regular impact monitoring and reporting of key contaminants. Require lined animal effluent storage and effluent irrigation rate, timing and volume requirements.
- Requiring stock exclusion from rivers, streams, canals (which are modified rivers) and large drains. Maintenance of a thick grass sward on margins and/or planting of one side of drains and canals to provide shade and bring down water temperature. Require temporary stock exclusion from ephemeral flow paths in the lowlands when wet.
- Requiring consents for pumped drainage discharges and apply a best practicable option approach to reduce contaminants and restore habitat and fish passage. Consider constraining periods of time that flap gates can be closed, treatment of drain water prior to discharge, and/or good practice drain management requirements.
- Requiring plantation forestry management plans at the time of afforestation to address sediment loss during and after forest harvesting.

- Restoration of habitat along the main land drainage canals over time, which may require some retirement of land (e.g., to re-establish meanders, riparian habitat, whitebait spawning and refuge areas, wetland margins).
- Enable, encourage and/or incentivise land use change to land use that will contribute less contaminants and, in the lowlands, are appropriate to future wetter conditions.
- Encourage feral animal control in native forest to maintain river ecosystem health and reduce sediment and *E.coli* losses.
- Continue ecological restoration work in the wetlands around the upper section of Lake Aniwaniwa, and the wetlands just above Lake Matahina.
- Investigating the potential for improving connectivity between the river and its flood plain to provide for cultural and ecological values.

Question 7	Does our approach to setting the water quality targets seem about right to you?
Question 8	On balance, what is a reasonable timeframe to achieve these water quality targets for this FMU?
Question 9	Do you support the suite of draft water quality management options being considered for this FMU?
Question 10	What minimum good land management practice requirements do you think we should consider in this FMU?

Te nui o te waipapa me te tukunga

Surface water quantity and allocation

Surface water is the water that flows in rivers and streams, or in lakes. Across the region, water is taken for different uses, and is usually taken with a pump connected by pipe to the river or stream.

What are we aiming for?

How much water we take from a river or stream for people to use will affect how much water is left for native fish and macroinvertebrates that depend on it for their survival, and for in-river cultural, recreation and other uses.

One of our main aims with water quantity is for people to know how much water is available to be used without causing in-river harm. We do that by managing water takes to ensure plenty of water remains to sustain habitats for the fish that live in the river or stream, and generally thereby protect other values too.

The NPSFM hierarchy of obligations prioritises the health and well-being of rivers, streams, lakes, wetlands, and groundwater first, then human health needs, and then ability of people to provide for social, cultural, and economic wellbeing.

One of the ways we can do this is to protect native fish populations by setting limits on the total amount of water that can be allocated from each river or stream for people to use, and setting minimum flows, where users have to stop taking water if a river or stream gets too low. These limits can have a big influence of the health of a river or stream, the things living in it, on the community, economic development, and possible land use in the catchment.

Water availability and flows in the Rangitāiki River are dominated by the three hydroelectric power (HEP) schemes in the upper part of the catchment. The HEP consents do not take water from the river and are not reflected in the consent data shown. The dam (and associated electricity generation) is considered regionally significant infrastructure. The National Policy Statement for Renewable Electricity Generation (NPSREG) requires decision makers to recognised and provide for the national significance of renewable electricity generation activities.

How can we meet the outcomes we seek?

Our main tool for managing water quantity is the setting of minimum flows (limits to achieve the desired level of environmental protection).

Some rivers and streams are relatively resilient, and more water can be taken without affecting/damaging/stressing ecosystems, whereas others are more sensitive. Likewise, some fish prefer deep, fast flowing water and others prefer slower flowing, shallower rivers and streams.

Currently a ‘one size fits all’ approach is used to set limits for surface water takes from most rivers and streams in the region. This approach has a default minimum flow of 90% of the 1 in 5-year low flow (the average of the lowest flow recorded in a rolling 5-year period) and an allocation limit set at 10%.

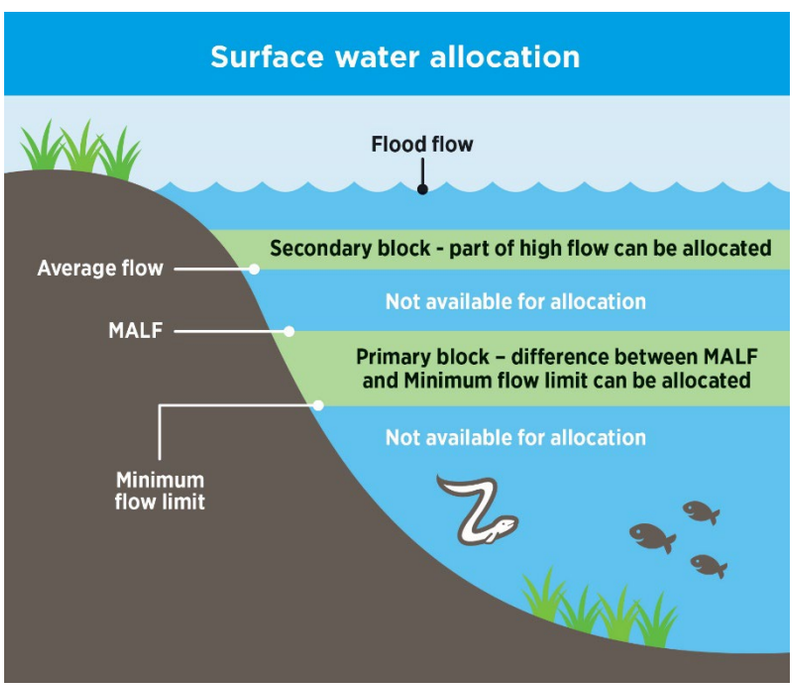
In eight locations, we now have river or stream specific scientific studies to help us understand the likely effects of different water levels on the different fish populations in each river or stream. We are using this information to draft new minimum flow limits for individual rivers

and streams, based on achieving a consistent level of habitat protection for native fish (and sometimes trout).

For rivers and streams where such studies are not available, we've based the limits on our knowledge of river or stream characteristics and the results of other studies.

The effect of the ecological limits must be considered alongside restrictions imposed due to consents related to HEP generation. Water availability and flows in the river are dominated by the three HEP schemes. The HEP consents do not take water from the Rangitāiki River and are not reflected in the consent data shown.

Flows below the dam are highly modified by the discharge from the power station. The dam operator is required to match outflow to inflow if inflow is at or below the one in 5-year 7 day low flow (38.4 m^3/s). For the purposes of assessing availability, below the Matahina dam catchment is treated as independent to above the dam because the minimum flow requirements relating to the dam effectively neutralise the effects of takes above the dam.



The above figure shows how the minimum flow limit, primary allocation block and secondary allocation block relate to the flow in a river or stream. Mean Annual Low Flow (MALF) is a commonly used measure that describes the average amount of water expected in a river or stream during times of low flow. It is calculated by averaging the lowest weekly flow in each year of the flow record.

If people are allocated (by resource consents) more water than the total allocation limit, a river or stream is over allocated. The NPSFM requires us to not allow over allocation. While nobody wants to be told to stop taking water, especially during a drought, there is a trade-off between managing effects on the health of the river or stream (constraining takes at the minimum flow), the amount of water available for people to use (allocation limits), and how often restrictions are needed (reliability).

Habitat retention levels

With a lot riding on the limits we set, we need to get them right. A key part of the consideration is what level of habitat protection we want i.e. At times of low flow, how much stress should organisms living in the river or stream experience (they will be used to some stress from natural causes).

A proposed habitat retention level we are aiming to achieve by setting these minimum flows is shown in the table below. The suggested levels for target native fish species are based on our understanding of how flows affect these fish species, and how scarce and vulnerable or resilient the species are. For example, shortjaw kōkopu and giant kōkopu are threatened species that are scarce and vulnerable, so the highest retention level is proposed.

We know other considerations may be needed too, including ensuring flows support mahinga kai, cultural or recreational values. For example, where trout are in a river or stream, we suggest setting habitat retention levels for those to provide for fishing values, so these are in the table below as well.

Target Species	Habitat retention level
Shortjaw kōkopu	100%
Giant kōkopu	100%
Other kōkopu species	95%
Kōaro (adult)	90%
Inanga	90%
Bullies (excluding bluegill)	90%
Eels (tuna) juvenile	80%
Eels (tuna) adult	75%
Torrentfish	70%
Bluegill bullies	70%
Trout	95%

In this FMU, flows below the dam are highly modified by the discharge from the power station. The dam operator is required to match outflow to inflow if in flow is at or below the 1 in 5 year 7-day low flow (38.4 m^3/s).

Question 11 We are moving to limits on water takes based on habitat protection for fish. Does this seem the best approach?

Water use

In this FMU there are two steps to determining the amount of water available for allocation. The constraints that relate to HEP schemes must be considered alongside to the ecological limits. At present, the HEP constraints mean that surface water allocation above the Matahina dam is limited to that already allocated and no new water can be allocated. For the purposes of assessing availability, below the Matahina dam catchment is treated as independent to above the dam because the minimum flow requirements relating to the dam effectively neutralise the effects of takes above the dam. In the lower part of the catchment flow is tidally influenced and the minimum flow relates to managing the upstream movement of the saltwater wedge, rather than the less conservative ecological minimum flow.

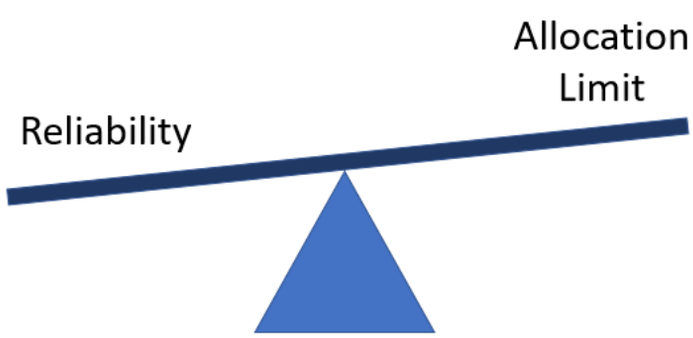
Landowners in the catchment have participated in a number of studies relating to the development of irrigation/water storage schemes, indicating a significant unmet demand for water. Of the 114,000 ha of Central North Island Iwi Treaty Settlement land in the Rangitāiki catchment, a significant proportion is potentially suitable for uses more intensive than the current land use of plantation forest. Without access to water, some future options such as horticulture, may not be achievable.

As a first step, we need to identify the minimum flow to protect the habitat for selected fish and decide how much water is available to allocate to users.

The current default allocation limit is currently set at 10% of the 1 in 5-year low flow. Based on these limits, the streams of the Galatea Basin (including the Haumea, Horomaunga, Mangakotukutuku and Mangamate) are over allocated.

Reliability is a measure of how often authorised water users have to stop or reduce their water take (because the river or stream is or would be below the minimum flow). The higher the minimum flow, the more likely the river or stream will fall to that flow due to natural conditions and the more frequently taking water will be restricted or stopped. The more water we allocate, the less reliable it is (the more often we need to restrict or stop water takes).

We've calculated the allocation limit by subtracting the minimum flow from MALF. This is called the primary allocation block. It is usually quite reliable, depending on stream flow characteristics and the minimum flow. Streams in the Rangitāiki Catchment include a mix of flow characteristics, mostly being intermediate between spring fed (stable streams) and more highly variable gravel bed streams. Our regional data shows that with a minimum flow of 90% MALF, both stream types average around 15 days per year where no water is available to take with a range of up to 110 days. At lower minimum flows, the days when no water is available decreases.



A balancing act: With a set minimum flow limit, there is a trade-off between the amount of water allocated for use and the reliability of water availability.

Question 12 Do you support or oppose the idea of encouraging more users to store water after heavy rainfall to help us all get through periods of drought?

Question 13 If you had to choose between a reliable water supply but very little water available and more water available but unreliably, which would you prefer and why?

Question 14 Sometimes our surface water challenges are because people take water at the same time. How willing would you be to work with others in your area to ensure water is taken from your stream(s) at different times?

Question 15 When the minimum flow is set at a high level, there isn't much water available to allocate and reliability is likely to be poor. Would you support reviewing the habitat retention levels of fish in over allocated catchments to increase the amount of water available for allocation?

Surface water quantity issues

As noted above, there is unmet demand for irrigation water both above and below the Hydro Electric Power (HEP) dams. While this affects many landowners, it particularly impacts on Central North Island Iwi settlement land, which currently has no water allocated. We have not been able to identify yet how best to make more water available for allocation in the catchment above the Matahina dam, and may need to focus on better sharing of the already allocated water.

Studies have shown that many users have been allocated much more water than they use, even in peak weeks of dry years. This can block others from accessing water. Reducing the gap between allocation and use and ensuring that water is used efficiently is important.

Water quantity management is complex in this FMU, due to significant unmet demand, the presence of regionally significant infrastructure and other existing uses.

Determining appropriate minimum flows below the Matahina dam to manage the saltwater wedge in the river is another challenge.

Question 16 Does this brief summary about water quantity in this FMU seem about right to you?

Surface water quantity options

Consistent with other draft FMUs, we've re-evaluated ecological minimum flows to provide a consistent basis for identification of options, but these must be considered alongside the long term HEP consents.

Option set 1: Choosing Habitat Retention Levels (minimum flows)

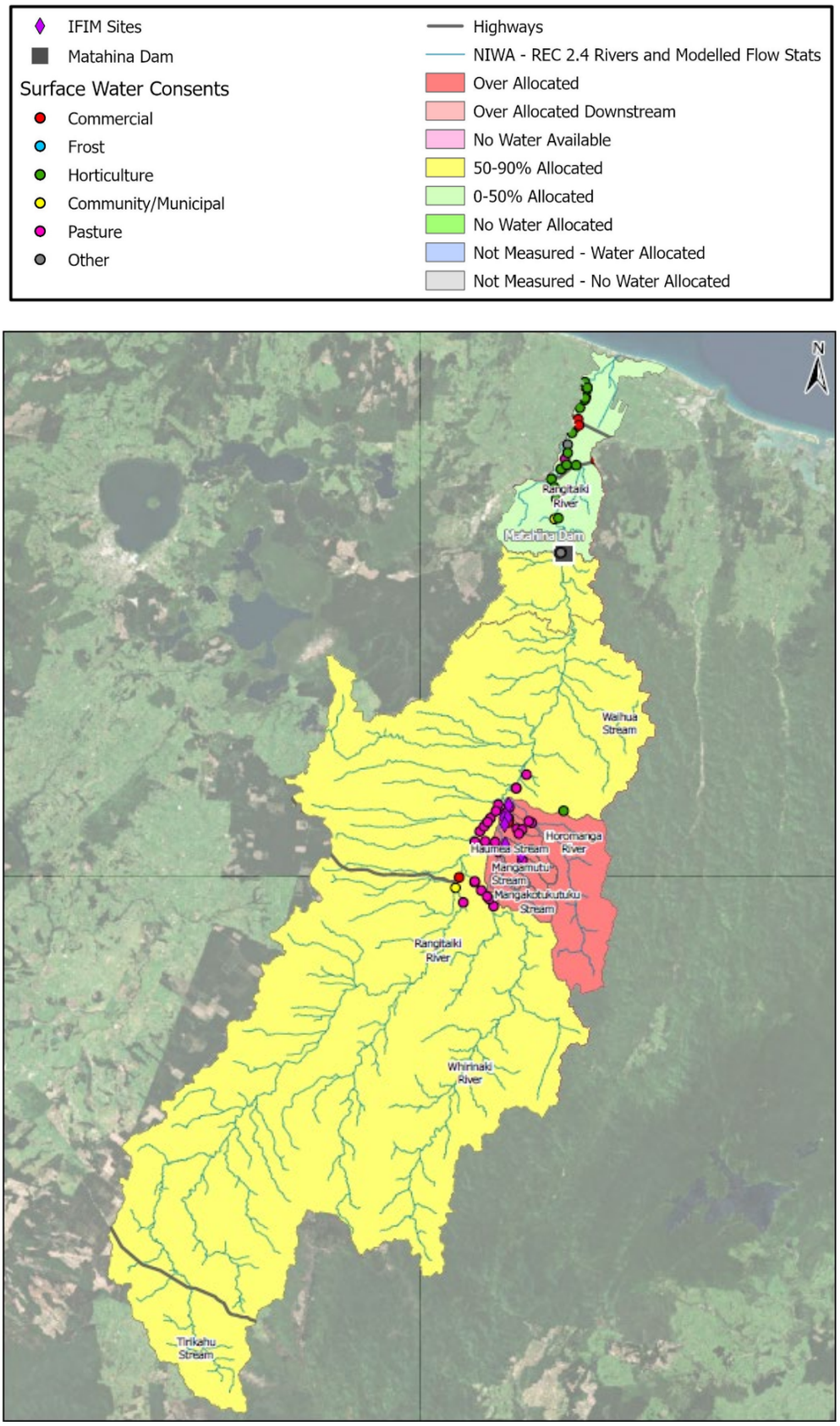
The first set of choices we need to make concerns the level of protection we give to the main fish present in the river. Essentially, we are keen to know what you think of the Habitat Retention Levels in the table on page 25. We could make them more protective, which would mean water takes would have to be restricted or stop more often, or less restrictive, posing a risk that low flows may reduce usable habitat for some fish.

Option set 2: Deciding how much water can be allocated (primary allocation)

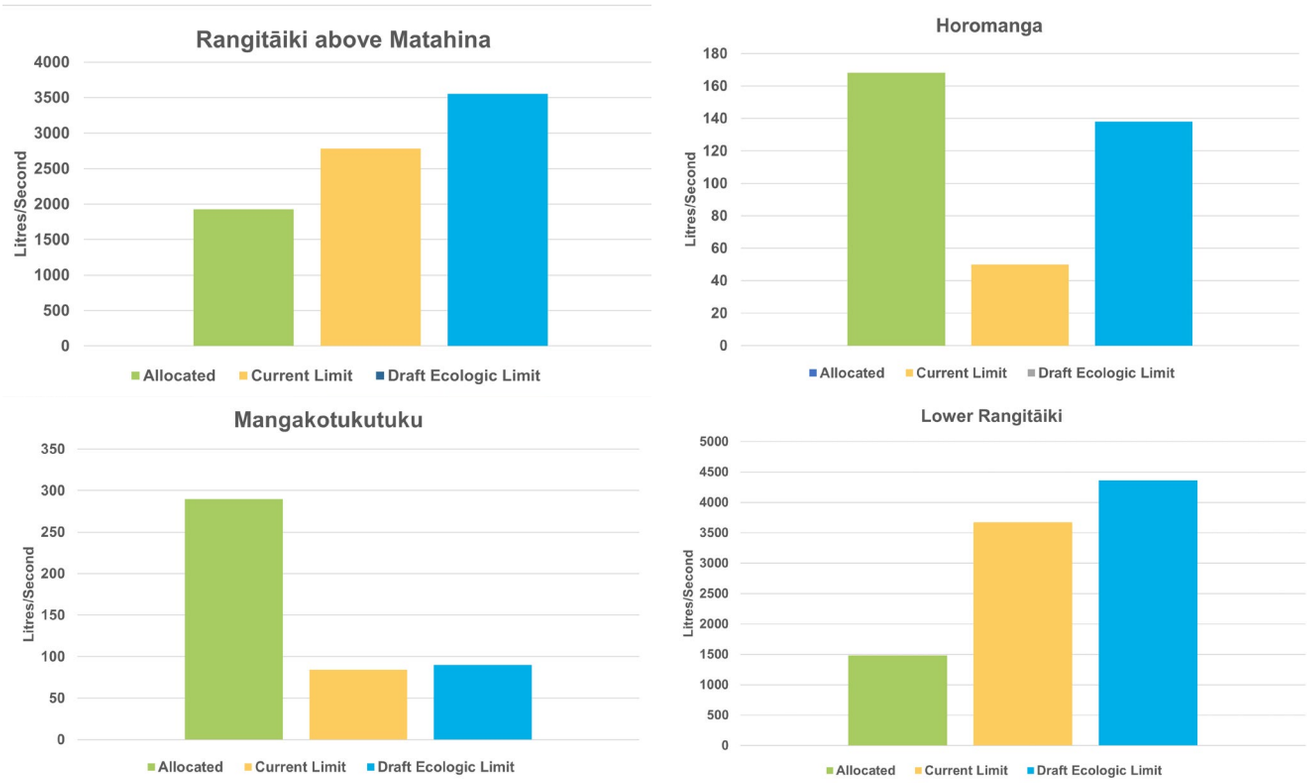
Our next choice concerns how much water to allocate and the effect of this on reliability for users. We propose that the allocation limit should be the difference between the Mean Annual Low Flow (MALF) and the minimum flow. Several catchments will be over allocated under this scenario because more than this amount of water is currently allocated in resource consents. The map on the following page shows the current allocation status using this option. We could make the allocation limit bigger, i.e., allocate more water, but this will mean that people will be told to restrict or stop taking more often.

Option set 3: Primary and Secondary Block

We could allocate a lot more water (maybe twice as much) if we allocate a secondary block that can only be taken during periods of high flow. In this situation, users of the secondary block would probably need storage dams to provide reliable access to water during dry periods, because there will be more days when the allocated water cannot be taken. We are still investigating where this might be suitable, or how much extra water could be allocated, but it's likely that this option would better provide for current and future water dependant development if water storage dams are built.



Allocation status based on draft minimum flows, and an allocation limit that is the difference between the Mean Annual Low Flow and minimum flow. Note that above the Matahina dam (marked) water availability is restricted due to consents relating to hydroelectric power schemes. In addition to this constraint, streams in the Galatea basin are allocated above limits needed to achieve habitat protection levels.



Total water currently allocated to water users, current allocation limit (default allocable flow in the current Regional Plan), and draft ecological allocation limit (total allocable flow using the difference between the Mean Annual Low Flow and the ecological minimum flow).

Question 17 We have options to set water allocation limits for a catchment that are complex and species and area specific; or more generic, simple and region wide. Which approach to water allocation limits do you prefer and why?

Question 18 A small number of catchments in the Tauranga Moana, Kaituna, Rangitāiki and East Coast FMU's are currently over allocated. We may need to claw back or reduce the overall water allocation in some catchments. How do you think we should approach this i.e. prioritise particular uses, timeframes for transition?

Te nui o te wainuku me te tukunga

Groundwater quantity and allocation

Groundwater is the water that flows underground – through gravel, sand, mud and between the crevices in rocks. Groundwater can be taken for irrigation or storage and can usually only be accessed via a bore drilled into the ground. In general, groundwater is more costly to access than surface water, especially if it is difficult to find or extract.

We manage groundwater differently to surface water. For groundwater, our focus is much more on the annual volume of water taken, while the surface water we are concerned about the rate of take at any one time. However, our concern for groundwater takes, also relates to how they will affect surface water features such as wetlands, rivers, and streams.

The eastern extents of the mid-upper Rangitāiki Catchment are underlain by solid basement rocks called greywacke in the Te Urewera/Whirinaki areas. The remainder of this FMU is predominantly volcanic geology called ignimbrite.

Fractured ignimbrite deposits typically enable a high proportion of rainfall infiltration, have a high capacity for groundwater storage and significant groundwater discharge to surface water bodies.

Rivers and streams draining from these ignimbrite catchments typically have very large and steady baseflows and less flood flows. There is limited groundwater abstraction from bores in these areas, mainly due to the dominance of exotic forestry. Groundwater can also be difficult to access from ignimbrites due to how deep the water is.

In the inland basins at Murupara/Galatea and Waiohau there are sediment and rock layers deposited by rivers, and agricultural land uses in these areas have high water demand and groundwater allocation.

A deep sequence of volcanic and marine/river sediments occur across the Rangitāiki Plains. Underneath is is Matahina Formation ignimbrite which hosts a productive confined aquifer and a number of groundwater takes are present supporting agriculture and horticulture irrigation operations as well as a take for Whakatāne District Councils public water supply.

Issues

The current allocation in this FMU of 15.8 M m^3/year is low compared to the amount of groundwater recharge across the FMU. However, the vast majority of abstraction is confined to either the coastal plain or the Galatea Basin.

Significant recharge occurs across large parts of the FMU covered by thick ignimbrite deposits, however there are few groundwater takes in these areas which are predominantly in plantation forestry.

- Some areas with high demand may be approaching acceptable limits. There is a high allocation concentration along the eastern Rangitāiki Plains – the results of modelling will inform sustainability of existing or increased allocation scenarios.
- Accessing groundwater from ignimbrite rock layers that hold more water is potentially difficult. There is relatively low use of significant groundwater resource, and so there is potential for increased use to support growth (depending on demand), if it can be accessed.
- There is some risk that salt water from the sea will move inland in the groundwater if there are too many large or concentrated takes near the coast.

Policy options

The FMU is included within Bay of Plenty Regional Council's regional scale groundwater flow model for the Rangitāiki, Tarawera and Whakatāne areas. This model will be used to inform the limit setting process by simulating various levels of hypothetical groundwater abstraction and evaluating the associated cumulative effects on river baseflows and groundwater levels.

Given the localised proliferation of shallower takes in some areas, policy options being explored include:

- encouraging the use of deeper, confined groundwater in preference to shallower, and unconfined groundwater, and
- promoting efficient water allocation across the region (which is all about ensuring consented take volumes more closely match what is actually used).

A key consideration for this FMU (and some of its neighbours) will be how (spatially) management units are defined. This is because the scale and spread of cumulative abstraction effects depends very much on the scale at which they are viewed. One of the problems with the current water allocation regime is that some management units are very small meaning they can appear "over allocated" despite an abundance of groundwater nearby.

Question 19 Does this brief summary about groundwater quantity in this FMU seem about right to you?

Question 20 Groundwater is managed primarily to protect and maintain surface waters, and to meet current and future beneficial uses. What other things should it be managed for?

Question 21 Our understanding of groundwater availability is incomplete. We can set groundwater allocation limits that are lower i.e. more conservative or higher i.e. greater risk of overallocation. Where on the spectrum of risk are you?

For more information go to www.boprc.govt.nz/freshwater-info

Ngā mea e whai ake nei
Next steps

Feedback can be provided via our online platform, in person at community meetings, or in writing via post.

You can sign up to receive our Freshwater Flash e-newsletter at **boprc.govt.nz/newsletters** follow our social media or visit our website for regular updates.

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