Northland REGIONAL COUNCIL
Te Kaunihera ā rohe o Te Taitokerau

He Mahere Pāmu mō Te Tiaki Wai

Freshwater Farm Plan

Te horopaki, ngā wero, me ngā uara o te riu hopuwai: Te wehenga whakahaere waimāori o Whangārei-Te-Rerenga-Parāoa

Catchment context, challenges and values: Whangārei freshwater management unit



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How to use this document

This document provides information about the Whangārei freshwater management unit (FMU). It enables you to understand the issues and challenges in the FMU and ensure they are recognised in your freshwater farm plan. It does not provide a template for creating your freshwater farm plan, but it provides guidance on the key things you need to think about as you prepare your plan.

The document has four main sections:

1. **Overview** – This section provides an overview of the Whangārei FMU and a summary of the key challenges to freshwater quality in the FMU.

2. **Context and values** – This section gives you contextual information about topics such as the topography, land use, soils, waterbodies, biodiversity, climate, and Māori iwi and hapū in the FMU. It also identifies community, tangata whenua, biodiversity or other values that you need to consider when preparing your farm plan.

3. **Challenges –** This section focuses on the challenges to freshwater in the FMU. Challenges are presented as subsections, each focusing on a specific challenge.

4. **Central government and regional council rules** – This section is a brief overview of relevant central and regional government rules and regulations.

Each section is important. Please check them all before preparing your farm plan. You can read the document from start to finish, or dip into the subsections as you need them.

This document can be read on a screen or as a printed copy. Links to further information are provided where relevant as you work through the document. If you read the document on a screen, click the links to find the additional information. If you read the document in print, look out for the arrow icon alerting you to online resources (see 'Abbreviations and interpretation' below). Type the URL beside the arrow icon into your browser to find an online resource library with all the further information links gathered in one place.

This document is designed to work alongside the Taitokerau CCCV viewer.

Abbreviations and interpretation

FDE	Farm dairy effluent
FMU	Freshwater management unit
ha	Hectare
Land Unit	An area of contiguous or non-contiguous land with similar biophysical features. (definition from RMA Freshwater Farm Plan Regulations 2023)
MCI	Macroinvertebrate community index
TLI	Trophic level index
	Online further information resource

He Tirohanga Whānui | Overview

The Whangārei freshwater management unit (FMU) covers 31,000ha (Fig 1).

The FMU surrounds the Whangārei Harbour, starting from Smugglers Bay and Urquharts Bay on the east coast and running northwest through Manaia Ridge and Maungatika Reserves. It heads north to encompass parts of Glenbervie Forest, then heads back south to Parakiori, through Pukenui Forest, the eastern part of Maungatapere. It runs southeast to Springfield and then back to the east coast at Poupouphenua Reserve.

Waterways drain to the Whangārei Harbour and coastal areas, meaning the state of freshwater affects the harbour, the coast, and their ecosystems.

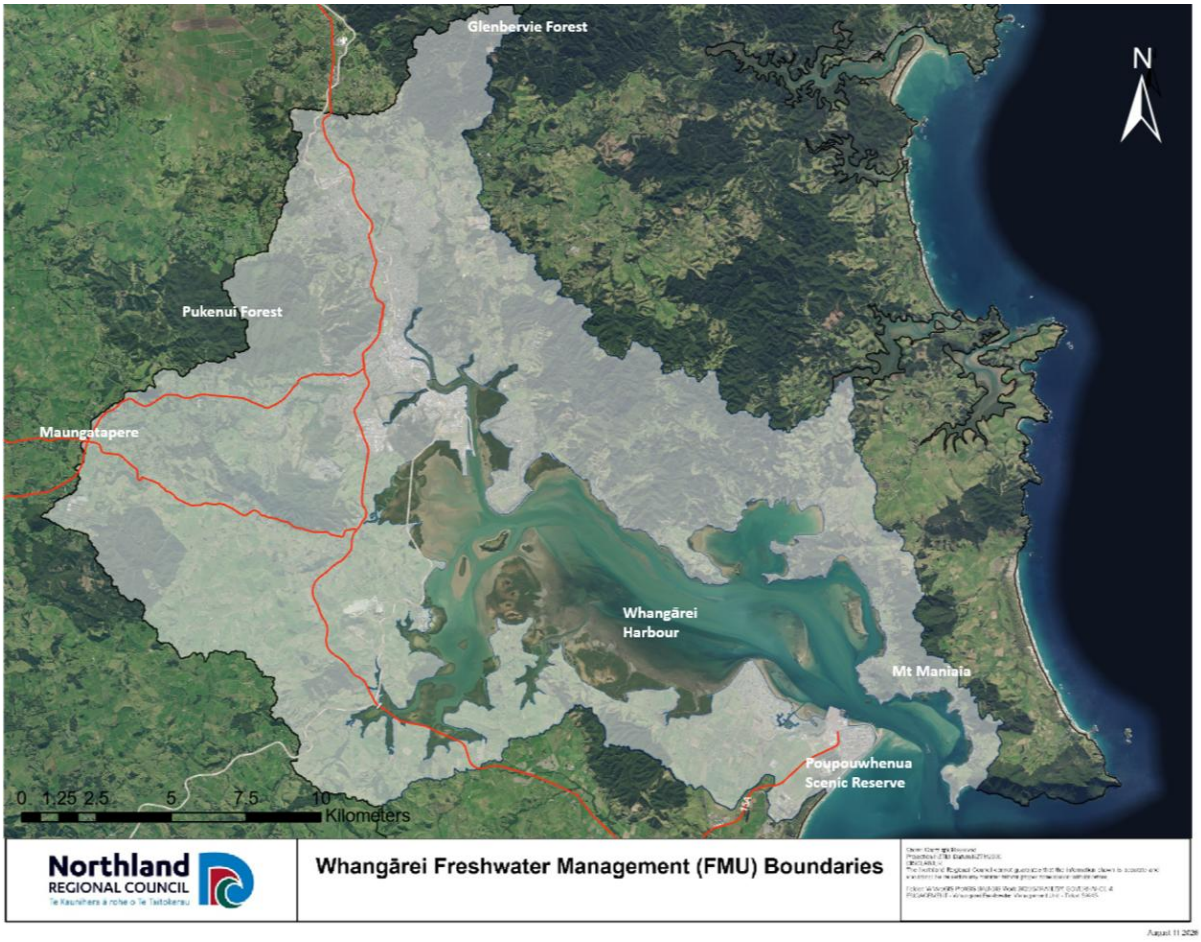
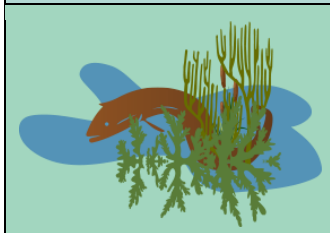


Figure 1: The Whangārei freshwater management unit

Table 1: Summary of causes, impacts, and considerations relating to freshwater quality challenges in the Whangārei freshwater management unit (FMU)

Challenges	Causes	Impact	Things to think about	Helpful map layers
 **Sediment in waterbodies** *Water clarity results from the Hatea River monitoring site indicate that while there are instances of poor clarity, overall water clarity is improving.*	Disturbance or exposure of erodible soils Run-off or erosion from steep slopes Cultivation close to waterbodies without filtering vegetation Rainfall Pugging/heavy stock Stock access to waterbodies and immediate margins Earthworks/farm races without sediment control Poor drain management	Sediment in waterbodies means less soil on farm. Healthy soils have better production. Sediment in waterbodies affects freshwater plants and animals by smothering the riverbed, reducing water clarity and plant growth. It can affect fish by reducing their ability to feed and clogging their gills. It makes water less appealing for recreation and unsuitable for mahinga kai. It can also mean water is not suitable for human uses, such as drinking, or that treatment costs for town supplies are higher. It affects coastal areas by smothering shellfish beds and reduces habitat quality for fish.	• What soils are on your farm? • What are your steeper areas of pasture and are they eroding? • What is your stock class, grazing intensity and rotation, especially in steep areas close to waterbodies? • What areas do not have riparian planting or filtering buffers? • What areas are high or low risk to cultivate? • How are you managing sediment from earthworks or races? • What areas are likely to result in sediment loss during heavy rain? • When do you undertake drain maintenance and to what extent? Where do you put the drain clearing spoil? • Are your drains fenced? • Can you reduce the sediment loads coming from your drains?	• Fundamental Soils • Terrain: Slope Map • Landcare SedNet • Waterbodies • Erosion and Sediment risk
 **Faecal contamination (*E.***	Stock in or near waterbodies Poor management of critical source areas (e.g.	Faecal contamination can mean water is unsuitable for drinking or domestic uses and that rivers are unsafe to swim in. It can also make mahinga kai unsafe to consume and degrade	• Do you have areas where stock can enter waterbodies or immediate margins? • What are the critical source areas and where do they discharge to?	• Rivers • Registered Drinking Water Supply Sites • Swimming Sites • Fundamental Soils • Flood Risk

***coli*) and other pathogens (in waterbodies** *All river monitoring sites in the FMU typically grade as poor or very poor state in terms of* E. coli*.*	stockyards, races/tracks and stock crossings) Animal effluent disposal near waterbodies, drains or in overland flow paths Frequently used unformed stock crossings Soil compaction leading to overland flow	the mauri of the water so it is unfit for cultural uses. There is a higher risk that people can get sick from water-based recreation.	• What uses of water downstream of your farm that are sensitive to pathogens? • Do you have areas where effluent collects and washes into waterbodies? • Is your farm effluent system appropriately sized and designed? • Where and when are you irrigating effluent? Is it near waterbodies or overland flow paths and what is the soil saturation? • Is there effluent entering water from your stock crossings? • Are your drains fenced? • Where are your flood risk areas that may increase animal effluent run-off into water?	
 **Elevated nutrients in waterbodies** *Half of the monitored river sites in the FMU have elevated dissolved reactive phosphorus.*	Application of fertiliser, especially close to waterbodies Urine from animals entering water or filtering through soils Effluent spreading Soil compaction increasing nutrient run-off Lack of filtering by vegetated riparian buffers	Elevated nutrients increase the likelihood of algal blooms in waterbodies (especially in hot, dry periods). Algal blooms can be toxic, and reduce the suitability of the water for swimming, and for collecting mahinga kai. Algal blooms can also block light, which reduces habitat quality and reduces nighttime dissolved oxygen levels to the point where aquatic animals can suffer or die. High nitrogen in drinking water negatively affects human health.	• Where and when are you spreading fertiliser and effluent – is the separation from waterbodies adequate? • Do you have stock in or near waterbodies? • How are you managing critical source areas for nutrient run-off (such as overland flow paths or stock crossings)? • How do your soils affect nutrient run off or uptake?	• Fundamental Soils • Waterbodies

		Some native fish species are particularly sensitive to nitrogen.		
 **Riparian vegetation loss** *Many river margins no longer have riparian vegetation, which reduces the quality of habitats of aquatic native species, many of which are adapted to cooler shaded water and rely on vegetated margins for part of their lifecycle.*	Stock accessing riparian areas Vegetation clearance	Loss of riparian vegetation can mean higher water temperatures, which can increase the risk of algal blooms and mean less suitable habitats for native species, which are often adapted to cooler, shaded water. Loss of ability of riparian vegetation to filter sediment, animal wastes and nutrients running off the land. Detrimental to native species, which often rely on vegetation next to waterbodies for breeding and feeding. Less vegetation increases stream bank erosion, which increases sedimentation and can undermine fencing.	Do you have areas where stock access riparian areas? How far back are your fences from waterbodies? Are your waterbody margins planted or maintained in long grass? Are there areas next to waterbodies where you could plant or enhance vegetation for filtering and shading? Do you have streambanks that are actively eroding? Could these be stabilised by planting?	• Waterbodies • Rivers
 **Wetland loss**	Drainage Grazing Earthworks	Loss of ecological functions such as sediment trapping and filtration of nutrients. Loss of habitat for native species. Increased flooding risk of areas downstream.	Do you have wetland areas? Do you have areas that would work well as wetland restoration locations to trap runoff from critical source areas? Are existing wetlands fenced?	Wetlands

It is estimated that a fifth of the region was covered in wetlands but now only about 5% of our original wetlands remain (roughly half the national average).		Loss of drought resilience, as wetlands act like sponges that release water in dry periods.		
 **Changing climate**	Increasing annual temperatures More extreme weather events and increased risk of wildfires Sea level rise	Drought leading to increased risk of erosion on hill slopes. Reduced water levels and increased water temperatures in waterbodies impacting on native species living in them. Increased flooding leading to more nutrients and *E. coli* being transported into waterbodies. Sedimentation in waterbodies and coastal areas from soil eroded by flooding, collapsed banks as water levels rise. Changing estuarine and coastal habitats – warmer water temperature leading to more frequent algal blooms and increased sediment accumulation due to higher erosion rates	When and where are you disposing of farm dairy effluent? Are there areas next to waterbodies where you could plant or enhance vegetation for filtering and shading? Do you have steep slopes or banks around waterbodies where you could plant to reduce sediment? Can you create off-stream water storage (e.g. farm dams) that can provide water supplies during drought or wildfires?	Flood Risk

Te Horopaki me Ngā Uara | Context and values



Land and land use

The topography of your land and how you use it influences your farm's potential impact on freshwater quality. You need to keep these things in mind as you identify risks and consider actions to take in your freshwater farm plan. For example, steep terrain is more prone to erosion, particularly if it has been converted to pasture – this can lead to poor water quality due to the resulting sediment, *E. coli* and nutrient runoff.

The catchments and rivers in the Whangārei freshwater management unit (FMU) drain to the Whangārei Harbour, meaning the state of freshwater impacts on the state of the harbour and its ecosystems, as well as on the coastal areas of the Pacific Ocean.

Topography

The Whangārei FMU generally has rolling topography.

- Half is flat to undulating (0°-7° slope).
- One third is rolling (8°-20° slope).
- The remainder is steep (>21° slope).

Slope is a key driver of erosion risk, as are soil type, geology and vegetation type, and this should be a focus of your risk assessment for your freshwater farm plan. The Taitokerau CCCV viewer includes maps of land considered prone to erosion.

www.nrc.govt.nz/WhangāreiCCCV

The Taitokerau CCCV viewer can indicate the slope of the land on your farm. If you want a more detailed breakdown of the slope or aspect on your farm, Landcare Research – Manaaki Whenua have a useful tool to assess these.

Landcare Research – Manaaki Whenua slope tool

www.nrc.govt.nz/WhangāreiCCCV

Land use

The Whangārei FMU has a mix of land uses. It has the largest urban area of all Taitokerau/Northland freshwater management units, and the harbour is popular for recreation. The flat areas include many of the urban and suburban areas of Whangārei and One Tree Point, along with farming on the alluvial flats throughout the catchment. The rolling areas tend to be pastoral farming. There are forest reserves in the steeper areas with some commercial forestry and cropping or orcharding. The cropping and orcharding is primarily in Maungatapere.

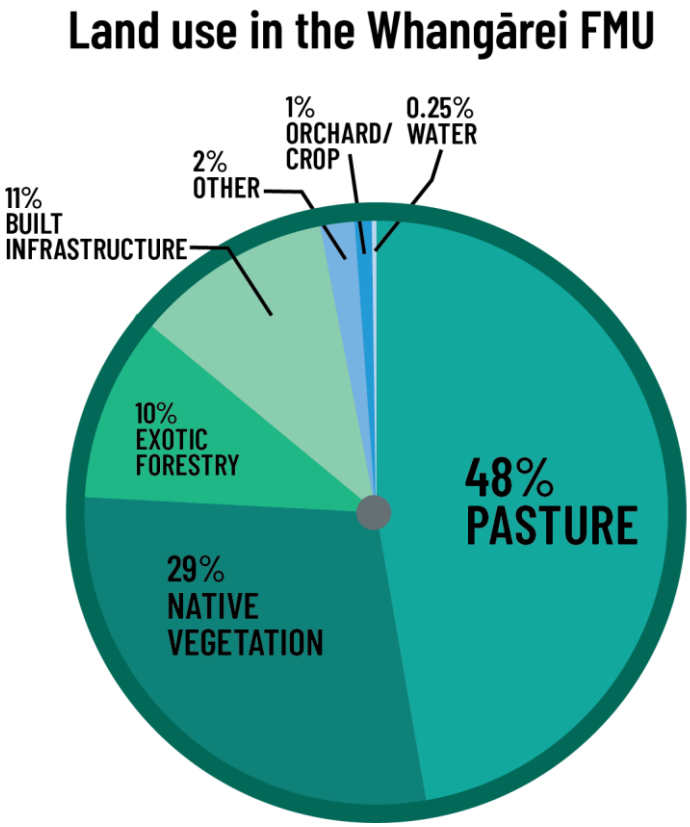


Figure 2: Land use in Whangārei FMU (2018)



Soils

The Whangārei freshwater management unit (FMU) sits mostly on a base rock of greywacke, and the soils are influenced by this. The soils are predominantly sedimentary clays, with some volcanics and sandstones. The different soil types have different vulnerabilities under different land uses and weather events, and they require different management to maintain their health and production abilities.

When you produce your freshwater farm plan, think about the type of soil you have on your farm and what you need to do to address the risks associated with it. Bear in mind that individual farms may have different soils across them. The Taitokerau CCCV viewer identifies soil types.

www.nrc.govt.nz/WhangāreiCCCV

Soil types

You can find more information about soil types and how to manage them in our Soil Fact Sheets.

Young greywacke soils

These soils are formed from the weathering of greywacke rock, a hard, compacted sedimentary rock. These soils are typically shallow, stony, and clay-rich, with variable drainage depending on slope and soil depth. They are moderately leached and often have low natural fertility, requiring careful nutrient management for productive use. Erosion is a significant concern, particularly on steep slopes, where slips and gravel-laden runoff can occur during heavy rainfall.
Management includes avoiding cultivation, using direct drilling or oversowing for pasture renewal, and planting poplars or willows to stabilise slopes and reduce erosion. In some cases, marginal or erosion-prone land may be best retired from grazing.

Very old podzol soils

Also known as gumland or pipe clay soils, these soils developed under kauri forests and span various parent materials like sands, mudstones, sandstones, and volcanic rocks. They are strongly leached, acidic, and poorly structured, with thin, pale topsoils over a dense, silica-rich pan. Beneath this, clay has leached into a columnar subsoil that is highly erodible. These soils are prone to severe gully erosion, compaction, and seasonal extremes – wet in winter, hard in summer.

Management includes careful winter grazing, maintaining dense pasture to build organic matter, and using no-till methods. Erosion-prone areas benefit from willow planting in gullies and retiring vulnerable land.

Old mudstone soils

Formed from weathered sedimentary rock on rolling terrain, these soils are pale due to iron leaching and clay loss. Their structureless, low-clay topsoils are easy to cultivate but prone to turning into dust when dry. These acidic, low-fertility soils have poor drainage, leading to winter wetness and summer drought. Gully and sheet erosion are major risks due to a columnar subsoil structure.

Management includes avoiding heavy winter grazing, maintaining dense pasture, using no-till methods like direct drilling, and planting erosion-control trees such as willows. On steep or marginal land, retiring areas from grazing may be necessary to prevent further degradation.

Mature mudstone soils

Formed from fine silt and clay rocks, these soils are lighter in colour than sandstone soils due to lower iron content. They are strongly leached to weakly podzolised, with poor drainage and moderate fertility. These soils are easily compacted and structurally weak, especially when wet, leading to gully erosion, slumping, and folding.

Management includes avoiding overstocking, improving drainage, rotating grazing and cropping, and using no-till methods. Erosion control involves planting poplars and willows, restoring wetlands, and installing grade control structures in gullies to stabilise the landscape and reduce sediment runoff.

Soil fact sheets

www.nrc.govt.nz/WhangāreiCCCV

Drainage

The Whangārei FMU generally has poorly to moderately drained soils. Areas with poorly drained soils have reduced deep drainage and increased overland water flows, surface water, and subsurface flows. These flows can transport nutrients, such as nitrogen, into surface water. Areas with well drained soils have less overland flow and more connection to groundwater. Contaminants in the water, especially nutrients, can seep into groundwater systems.

Artificial drainage

Drainage can expand farmable land and boost economic gain, but it can also have negative impacts. For instance, artificial drainage can contribute to water pollution, sediment transport, and nutrient loading in waterbodies.

If you have drains on your property you need to consider when and how you undertake drain maintenance to reduce sedimentation and if can you exclude stock from the drains.



Waterbodies

The Whangārei freshwater management unit (FMU) supports rivers, streams, lakes and wetlands, and extensive mangrove and saltmarsh systems on the harbour edges.

Good water quality translates into high biodiversity of healthy indigenous plants, insect, fish, and bird life. These are essential to support community values such as collection of food and aesthetic value. A healthy freshwater environment is valuable for tourism, swimming, industry and primary production and general public wellbeing (such as community water supplies).

There are several popular swimming holes in the FMU such as at AH Reed Park, Oak Tree Pool and Whangārei Falls (Hatea River) and the Raumanga Stream at Raumanga Valley Reserve. Some are mapped but others are not. For current swim suitability you can use Safeswim or the Land Air Water Aotearoa long term recreational swimming site information. These are available through the Taitokerau CCCV viewer, or you can access the direct links below.

Some monitored swim sites include:

- Whangārei Falls – This 26m high waterfall has very poor water quality for swimming (Band E for *E. coli*).
- Raumanga River at Raumanga Valley Reserve – Has poor water quality for swimming.
- Otaika River at Otaika Valley Road – Has very poor water quality for swimming (Band E for *E. coli*).

Coastal sites within the receiving environment:

- Whangārei Harbour (Onerahi playground, Tamaterau Bay, McLeod Bay, Taurikura Bay, Urquharts Bay and One Tree Point) – These coastal sites generally have good quality water for swimming, due to the influence of tidal flushing and dilution.

Safeswim

www.nrc.govt.nz/WhangāreiCCCV

Long term recreational swimming site information

www.nrc.govt.nz/WhangāreiCCCV

It is important to recognise the community values associated with water quality and understand how your farming activity can affect them.

Rivers and lakes

Water quality declines from the upper reaches to the lower reaches of a catchment due to impacts from nitrogen, phosphorus, *E. coli* and sedimentation. Consider the location of your farm in your risk assessment to guide the actions and priorities of your freshwater farm plan.

There are three main sub-catchments in the Whangārei freshwater management unit (FMU):

- Hatea River
- Otaika River
- Waiarohia-Raumanga Stream.

Each has numerous tributaries. There are also numerous smaller rivers, streams and creeks which feed directly into the northern and southern shores of Whangārei Harbour. These include Limeburner's, Takahiwai, Waioneone, Awaroa, Waimahanga, Waikaraka, Taihu, Kohinui, Waitangata,Tokitoki, Waikaurakaura, Paneiraira and Mangapai.

There are very few lakes in the FMU. Lake Ora (2ha, degraded water quality) is a small lake formed when the valley was dammed by lava flow from Hurupaki volcano. The manmade Whau Valley Reservoir (19ha) provides water to Whangārei urban areas and is a priority drinking water abstraction point. There are also numerous smaller farm and irrigation ponds, as well as ponds associated with quarrying, such as at Winstone's Quarry in Otaika.

The FMU has a large estuarine receiving environment, and the lower reaches of the rivers and streams are influenced by the tides. Such tidal influence is ideal spawning habitat for our native īnanga/whitebait. They typically spawn between early March and late September in vegetation on the margins of waterbodies flooded during spring high tides. Special care is needed in these areas if undertaking earthworks or vegetation clearance or installing structures that could impact on īnanga spawning or reduce īnanga access to these sites. Northland Regional Council has mapped indicative īnanga spawning habitat. These maps are also available in the Taitokerau CCCV viewer.

Indicative Īnanga Spawning Habitat

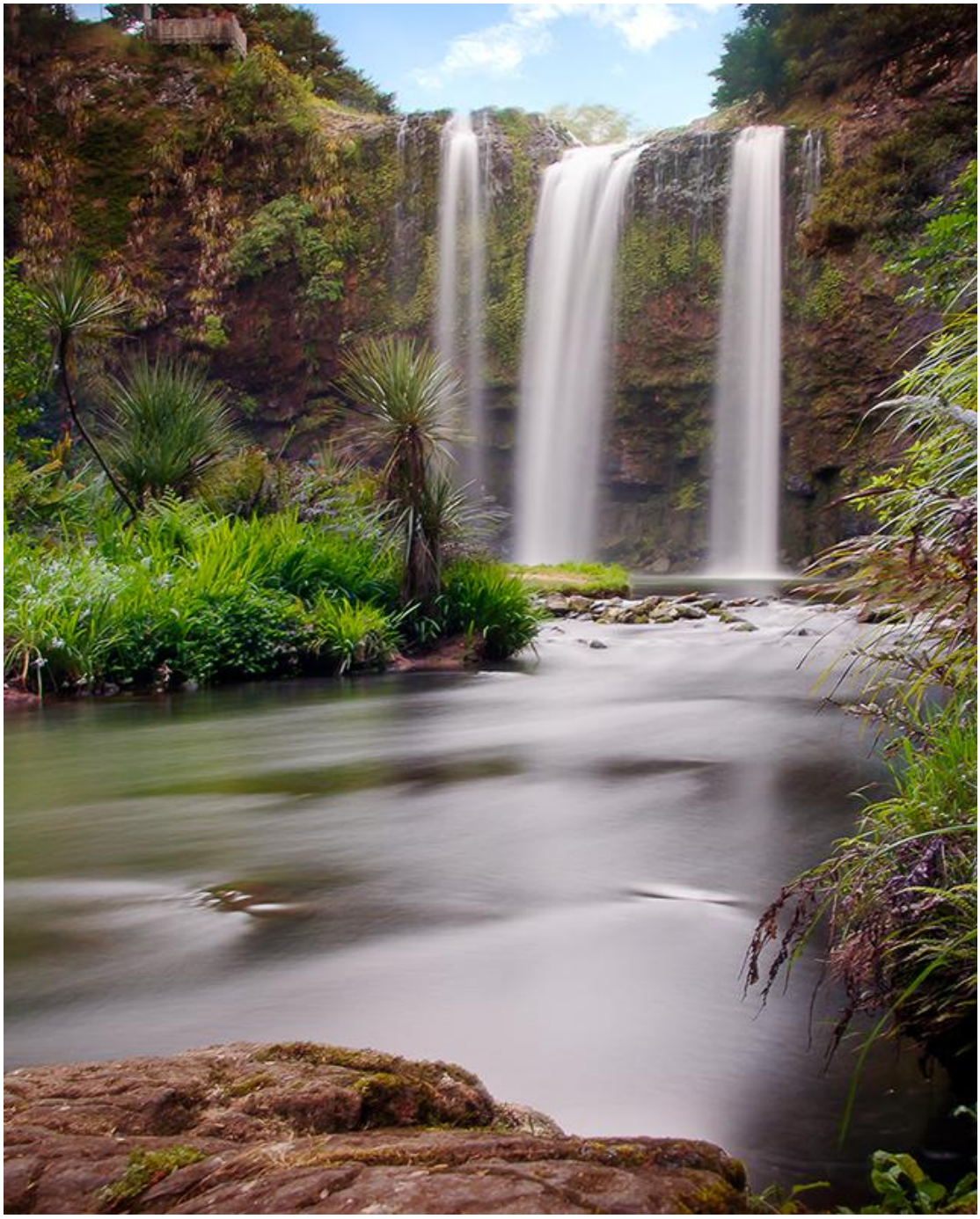
www.nrc.govt.nz/WhangāreiCCCV

Table 2: Rivers that contribute to the Whangārei freshwater management unit (FMU)

River	Description
Hatea	The Hātea River begins as the Waitaua Stream just north of Kamo. It flows southeast through Tikipunga and Mair Park into Whangārei Harbour. This short river, 17 km long, has a mixture of land uses in the catchment including urban, native forest and pastoral land. The river's main tributaries are the Waitaua, Wairau, Paranui, Otangarei, Waiaua, Putanui and Mangakino Streams, as well as the Waiarohia Stream (see below). The lower reaches of the Hatea River are managed by Whangārei District Council under the Reserves Act[1].

[1] See WDC Parihaka Hatea River Reserves Management Plan

Otaika	The Otaika Stream originates near Maungatepere and flows eastwards through a mix of mainly beef and dairy farms, skirting an area of native forest before draining into the Whangārei Harbour. The Otaika River sub-catchment includes: Puwera, Otakaranga, Te Waiiti, Whakapai and Nihotetea Streams.
Waiarohia-Raumanga	The Waiarohia Stream catchment is small (18 square km) and originates in the Pukenui Forest. The upper catchment is mainly native forest with some pine forest. The stream flows through a small area of low intensity farmland (mostly lifestyle blocks) before it reaches residential housing and the central business area of Whangārei. The Waiarohia Stream is a cobbled stream which provides a good habitat for aquatic fauna. This sub-catchment includes the Waiarohia, Raumanga, Waipunamu, Kirikiri and Te Hihi Streams. The upper reaches of the Waiarohia Stream drain into the Whau Valley water supply reservoir before joining the Raumanga Stream and then into lower reaches of the Hatea River.



Whangārei Falls

The Whangārei Harbour catchment is one of five Priority Catchments in the region, with the Whangārei Harbour Catchment Plan being adopted in 2017. This Catchment Plan provides helpful information as well as specific objectives (e.g. minimising the loss of productive soils through erosion), methods and actions for the Whangārei Harbour catchment. The Whangarei Harbour Catchment Plan also resulted in catchment specific rules in the Regional Plan that require certain livestock be excluded from rivers upstream of swimming sites at the Hatea and Raumanga Rivers (these areas are shown in the Regional Plan maps). This is because livestock access to rivers can degrade swimming water quality by increasing *E. coli* contamination and the risk of illness after contact with water.

Whangārei Harbour Catchment Plan (2017)

www.nrc.govt.nz/WhangāreiCCCV

Estuaries

Four estuarine water quality sites are monitored in the Whangārei FMU, with the latest information available from Land, Air, Water Aotearoa.

Land, Air, Water Aotearoa – Estuaries – Whangārei

www.nrc.govt.nz/WhangāreiCCCV

The Hatea River, Otaika Flats and Mangapai River monitoring sites show sedimentation (mud) is the major water quality issue, recording moderate to high impacts. One site, Portland Reach, records low impacts (Portland Reach) based on estuary macrofauna scores.

Nutrients are also elevated in the Whangārei Harbour.

Northland Coastal Water Quality (Results from 2018 to 2020)

www.nrc.govt.nz/WhangāreiCCCV

Wetlands

The Whangārei FMU hosts a variety of wetlands with significant ecological and recreational value. Most of these are saltmarsh and mangrove systems in the tidal reaches within the Whangārei Harbour. There are very few wetlands remaining further inland. Wetlands are home to many threatened plant and animal species.

In the past, wetlands in Northland covered approximately 258,451 hectares, or 32 percent of the land area. Today, only 5.5 percent, or 14,114 hectares, of the original wetland area remains. Many of these lost wetlands were unique and irreplaceable. Wetlands (repo) are highly valued by Māori for a range of reasons including as a source of mahinga kai, traditional materials and medicines.

Wetlands are important because they can:

- improve water quality by removing contaminants before they enter the wider catchment
- mitigate extreme weather conditions such as flooding, by slowing down flow of water; and drought, by releasing water to maintain water flows
- trap topsoil erosion, preventing it from entering the Whangārei Harbour and coastal areas
- help filter nutrients from fertilisers, chemicals, and animal wastes
- provide biodiversity hotspots and be highly valued by the community for cultural and recreational reasons (for example, tuna/eels and gamebird hunting). Eels and freshwater crayfish thrive in some wetlands. Wetlands are home to threatened species such as bitterns and native plants.
- reduce downstream flooding in high rainfall by absorbing water and slowing the flow into lower flood prone areas.

Table 3: Significant freshwater wetlands in Whangārei FMU by sub-catchment

Sub catchment	Significant freshwater wetlands
Hatea	Parahaki gumlands comprise two areas of gumland vegetation within a larger tract of indigenous forest and shrubland. They are habitat for several regionally significant

	plant species, North Island brown kiwi, and Auckland green gecko. Gumland on mid and upper hillslopes grades into secondary forest and scrub on the lower hillslopes. Some areas are threatened by clearance and weed invasion.
	Mangakino Stream wetland comprises riverine kahikatea forest, which is uncommon habitat in the Whangārei Ecological District. Threatened species present include mistletoe.
Otaika	Otaika Valley Bush marsh runs adjacent to the Otaika Valley Road, surrounded by pasture and with forest (which includes Otaika Scenic Reserve) on the other side of the road.
Waiarohia – Raumanga	Te Hihi Stream wetland comprises four freshwater wetland vegetation types on alluvium, including a narrow band of swamp forest. It merges with podocarp-broadleaved forest on an adjacent hill. Weeds are spreading. The wetland is probably drier due to an old drain along one side, but it is hydrologically currently stable. The wetland vegetation types occur along a gradient from wet soils to areas of saturated soils and shallow water.
Other	Parua Bay remnants is a small valley floor wetland that grades from freshwater to estuarine environments. Buffered on one side by indigenous forest, there is no evidence of drainage.
	McDonald coastal shrubland is the only area of gumland in the Manaia Ecological District. On a dacite (a type of volcanic rock) dome and merging with secondary coastal forest, this wetland provides habitat for North Island fernbird, and three regionally significant plant species. Threatened by weed invasion.

For more information:
Looking after your wetland

www.nrc.govt.nz/WhangāreiCCCV

Restoring wetlands and their ecological functions is essential for sustainability, benefiting both farming and indigenous biodiversity in the FMU. There are several wetland restoration initiatives underway, such as at Takahiwai Stream, where riparian planting and removing stock link existing wetland remnants. Even small wetland areas can improve biodiversity and act as a filter for sediment and nutrients. Restoration efforts may include stock exclusion, pest and weed management, and the creation of new wetlands. If you have a wetland on your property, your freshwater farm plan needs to consider your contribution to restoration efforts.

Northland Regional Council has developed indicative wetland maps that show where wetlands are likely to be found and their extent. You can use the maps as you develop your freshwater farm plan to help identify wet or sensitive areas and inform risk mitigating actions such as fencing, planting, and stock management decisions.

To access the maps, and find out more information, visit www.nrc.govt.nz/wetlandmaps or the Taitokerau CCCV viewer.

www.nrc.govt.nz/WhangāreiCCCV



Biodiversity

Indigenous habitats in the Whangārei freshwater management unit (FMU) have suffered extensive loss and modification due mainly to historical land clearance for agricultural activities. However, the FMU still contains areas of indigenous forest, such as Otaika and Pukenui forests, shrubland, wetlands, lakes, mangroves and saltmarsh. These habitats support indigenous ecosystems and unique plants and animals, many of which are classified as threatened or at risk. Your freshwater farm plan needs to recognise and provide for them.

You can find the conservation status of a species in the New Zealand Threat Classification System (NZTCS).

www.nrc.govt.nz/WhangāreiCCCV

The NZTCS website has links to other data sources, such as the NZ Freshwater Fish Database. You can also access current NZTCS reports.

More information about freshwater species classified as threatened and at risk for the Whangārei FMU is available here: Database and eDNA records for freshwater species of conservation interest (2023)

www.nrc.govt.nz/WhangāreiCCCV

The receiving environments for the FMU are the Whangārei Harbour and the coastal waters of the Pacific Ocean. The harbour provides a nationally and internationally important habitat for many species, and there are marine reserves in the lower reaches of the harbour. It is identified in the Regional Plan as a Significant Bird Area, Significant Marine Mammal and Seabird Area, and Significant Ecological Area.

The FMU is important for recreational and customary harvest of tuna/eels and the receiving environment (the wider harbour) is highly valued for fishing for other species.

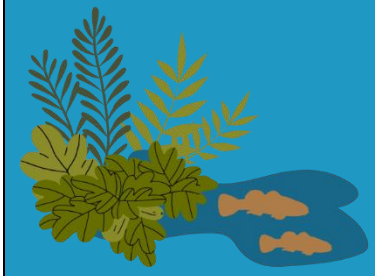
While public reserves and parks support a proportion of the FMU's indigenous biodiversity, much of the habitat occurs within the rural landscape, and many of the mobile species rely on connectivity through farms.

There are a wide range of native species that live in and/or use the FMU. The table below describes some of the more iconic native species that are indicators of ecosystem health – looking after these will provide for a wide range of other species as well.

Table 4: Significant native species found in Whangārei FMU

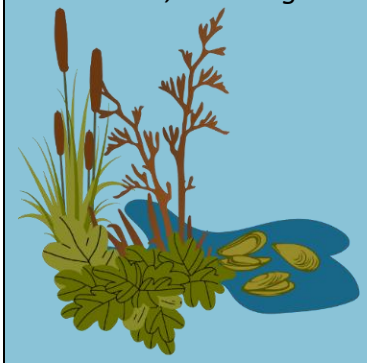
Significant species	Habitat and characteristics

Australasian bittern (Matuku-hūrepo) *Nationally critical (highest threat status), 250-1000 remaining* 	Apex predator found in wetlands lakes, slow moving streams, farm drains, ponds and paddocks. Bitterns are rarely seen as they are shy, camouflaged and spend much of their time hidden in dense aquatic vegetation. Bitterns use a range of habitat across a wide landscape and can travel long distances for food and breeding, so all wetlands should be treated as potential bittern habitat. Bitterns are a key species for indicating landscape scale wetland health.  ***Credit: Imogen Warren Photography***
Reef heron (Matuku moana) *Threatened - nationally vulnerable* 	Whangārei Harbour's coastal wetlands provide nationally important breeding and feeding habitat for reef heron. New Zealand's reef heron population is estimated at only 300-500 birds. Reef heron consume small fish, crustaceans and worms.  ***Credit: Scott Brooks***

Eel (Tuna) – Longfin and shortfin *Longfin eels – at risk* *Shortfin eels – not threatened* 	Tuna are a taonga species highly valued by tangata whenua. There are two freshwater eel species – the shortfin and the longfin. There are fewer eels today because of the loss of wetlands, fish passage barriers and historical commercial fishing. Eels migrate upstream as elvers to find suitable adult habitat. Longfins are one of the largest, slowest growing and longest-lived eel species in the world. Changes caused by drainage, irrigation schemes, and river diversions reduce eel habitat. Culverts and dams can prevent eel migration. Eels can be susceptible to pollution and their health may be used as an indication of the ecosystem health. 
Giant bully (Tīpokopoko) *At risk – declining* 	Giant bully can be told apart from common bully as its sail-like top fin never has more than six spikes. Its cheeks have gold/olive lines, and it is dark coloured, almost black. Giant bully are freshwater fish found in lowland rivers within a few kilometres of the coast and they prefer slow moving water with over-hanging vegetation and stream beds with large logs. Mainly active at night, giant bully are well camouflaged with golden specks. As its name implies, it is the largest of the bully family reaching 25cm in length, although most are between 12 – 15cm.  *Credit: Chlidonias*

Freshwater mussels (Kākahi/Torewai)

Threatened, declining



Freshwater mussels (kākahi/torewai) live in habitats ranging from small, fast-flowing streams to lakes. They are a valuable mahinga kai resource for many Māori.

They are important filter feeders that can clean water and are an indicator of good water quality and habitat.

Unlike marine mussels that attach themselves to surrounding rocks or other substrates, kākahi use their foot to move around, anchor themselves and burrow into sediment.

Freshwater mussels are under threat and declining due to loss of habitat, high nutrient levels, and high levels of sediment.



Native insects



Insects are widely accepted as indicators of stream health in water quality monitoring, as many species are known to be sensitive to pollution or habitat modification. They are also important food sources for fish and birds.

Streamside vegetation, in-stream habitat complexity and stability are important for their lifecycles.

Mt. Taika freshwater insect surveys showed that there are threatened and nationally critical mayfly and caddisfly species in Whangārei streams.

Mt. Taika Forest Freshwater Insect Survey 2022

www.nrc.govt.nz/WhangāreiCCCV



Credit: Olly Ball, Steve Pohe Collection

Protecting and enhancing freshwater habitat and biodiversity on farms can lead to better water quality outcomes and falls within the whole-of-farm or integrated farm planning approach. Actions to consider include:

- fencing off waterbodies, wetlands and remnants of native bush
- stabilising eroding streambanks with vegetation
- Planting shade species for exposed waterbodies
- planting and protection or creation of wetlands
- removing barriers to fish passage
- controlling pest plants and animals
- improving or restoring connections between native bush, wetlands and waterbodies.

Further information on species and ecosystems relevant to Whangārei FMU is available online.

www.nrc.govt.nz/WhangāreiCCCV



Climate

Climate is a major influencer of risks and impacts. It needs to be considered when you write your freshwater farm plan. For example, high rainfall in areas with poorly drained soils equals a high risk of erosion and runoff of contaminants to fresh water. Climate also impacts whether you have good grass cover going into winter, and the ability to leave adequate residuals to protect soils.

Temperature

Summers are generally warm and humid, while winters are mild with rare frosts. The average annual temperature in Whangārei, for example, ranges from 4-18°C in winter to 11-28°C in summer. Whangārei FMU enjoys more than 1,900 hours of sunshine annually.

Changes to our climate are projected to increase temperatures in the FMU by 0.5-1.0°C for all seasons by 2040. This temperature rise may lead to a change in the range of crops that can be grown and an increase in related pests and diseases. Higher temperatures might shorten crop maturity periods but can also lead to lower yields due to droughts and floods. Extreme weather events could stress or even kill livestock. An increase in temperature negatively affects freshwater environments. It can increase the risk or scale of algal blooms, which are detrimental to people, stock and freshwater plants and animals. It can also increase the breeding rate of exotic pest species, such as gambusia. Shading streams is an important tool for reducing water temperatures.

Rainfall

Rainfall is generally plentiful throughout the year, with occasional heavy downpours. Dry spells can occur, especially during summer and autumn. The catchment area has a median annual rainfall of around 1,400 mm, which is higher than the national median of 1,070 mm. Rainfall is reasonably consistent within the catchment with the higher inland parts receiving the most and coastal areas receiving less. The Whangārei FMU is generally sheltered but exposed areas can be very windy, and Northland sometimes experiences gales, often linked to tropical depressions. Northland is prone to droughts and floods, which impact on both farming and freshwater systems. Whangārei township is low-lying and can flood in high rain events.

It's important to adapt to temperature increases and rainfall changes, and you should plan for how to manage these in your freshwater farm plan. Actions to consider include:

- fencing off waterbodies, wetlands and remnants of native bush to allow plants to shade the waterbodies
- stabilising eroding streambanks with vegetation
- planting waterbodies and protecting or creating wetlands
- controlling pest plants and animals around waterbodies
- ensuring you have a water management plan during droughts
- providing shade for stock to reduce heat stress and water consumption.

Further information

NIWA has regional weather and climate information for Northland.
NIWA Northland weather and climate information

www.nrc.govt.nz/WhangāreiCCCV

Stats NZ has rainfall data.
Rainfall data

www.nrc.govt.nz/WhangāreiCCCV



Tangata Whenua

The Whangārei freshwater management unit (FMU) has areas of interest for several Taitokerau iwi. Māori have a long heritage in this FMU as kaitiaki over the waterbodies, taonga species, and preservation of kōrero toku iho (historical kōrero passed down through generations) and pūrakau (knowledge holders) that have shaped the cultural identity for each iwi.

Your freshwater farm plan needs to consider how to protect and/or enhance tangata whenua values and sites of significance on your property, such as wāhi tapu (cultural and spiritual areas of

significance) and wāhi tupuna (landscapes and places of significance) sites and areas for gathering māhinga kai (food sources) and habitats and freshwater migration pathways of taonga species.

For example, you may have an important waterbody that is a migratory pathway for tuna or banded kōkōpū on your farm. You might create an action to check any river crossings or culverts to make sure that they are compliant with fish passage rules, so migratory pathways are not compromised. This enhances cultural values like mauri and manaakitanga by ensuring that the whakapapa of these taonga can continue and your actions are looking after them and preserving their life.

Iwi of Whangārei FMU

Many iwi have associations to Whangārei and iwi may have overlapping areas. Each iwi has significant ongoing interests in maintaining and restoring the health of freshwater and freshwater ecosystems of the FMU, as well as economic interests through land ownership.

Learn about iwi freshwater values and interests in online iwi story maps.

 www.nrc.govt.nz/WhangāreiCCCV

Iwi for the Whangārei FMU are:

- Ngāti Whatua
- Ngāpuhi
- Ngātiwai Iwi Trust Board (iwi authority under the RMA)
- Patuharakeke (iwi authority under RMA)
- Te Rūnanga o Ngāti Hine (iwi authority under RMA)

 www.nrc.govt.nz/WhangāreiCCCV

Indicative iwi boundaries can be found in the Taitokerau CCCV viewer.

 www.nrc.govt.nz/WhangāreiCCCV

More information about formally recognised iwi groups

 www.nrc.govt.nz/WhangāreiCCCV

Information resources

Statutory Acknowledgements

Treaty Settlements and the related Statutory Acknowledgements provide more detail on the specific connections that the respective hapū and iwi have with particular sites and places, as well as their historical associations with the entire catchment area.

Currently, there are no statutory acknowledgement areas in the Whangārei FMU.

Iwi and Hapū Environmental Management Plans

Iwi and Hapū Environmental Management Plans (IHEMPS) and other related iwi planning documents also provide useful information and direction as to when iwi and hapū wish to be consulted, what is important to them, and their aspirations.

Iwi and hapū environmental plans:

- Ngātiwai iwi environmental policy
- Patuharakeke Te Iwi Trust Board – see also Patuharakeke GIS Storymap
- Te Rūnanga o Ngāti Hine
- Ngāti Hau HEMP 2016

Other useful resources

The New Zealand Archaeological Association maintains a website which is a good source of recorded archaeological sites.

The Regional Plan for Northland includes maps of some sites and areas of significance to tangata whenua in fresh and coastal waters (see section Central Government and Regional Council Rules for more information).

The resources provided in this document do not give a complete picture. It is recommended that you contact your local marae to enquire about sites relating to freshwater on your property, and for advice to help protect and enhance them. Visit Te Puni Kōkiri (Ministry of Māori Development) for contact information, or Te Kāhui Māngai and Māori Maps to find lists of representative groups for the iwi and hapū in your area.

www.nrc.govt.nz/WhangāreiCCCV

Mauri of water

Tangata whenua spiritually identify with wai (water) in their lands. Rivers have spiritual significance to Māori as well as being a valuable food and water source for many marae. To Māori, water is a taonga (treasure). It must be safeguarded for future generations.

Water has mauri, which connects its ability to sustain life and healing properties, to its vitality. To Māori, any discharge of contaminants into water, no matter how well purified in a treatment process, reduces the water's ability to sustain life. It thereby reduces its mauri. If the mauri is reduced in wai, it will start to affect the hauora (health) of the communities as well.

Sites and species of significance

Historical and archaeological sites, ancestral lands, waterbodies, wāhi tapu and other taonga are significant to Māori. There are numerous pa sites, terraces, pits and middens along the coasts, and further inland in some areas. Taitokerau Northland was one of the first areas settled by Māori in New Zealand.

Mapped sites of significance to tangata whenua

Activities affecting freshwater, coastal or marine sites and areas of significance to tangata whenua that are mapped in Northland Regional Council's Regional Plan are subject to Regional Plan rules.

Other sites and species of significance to tangata whenua

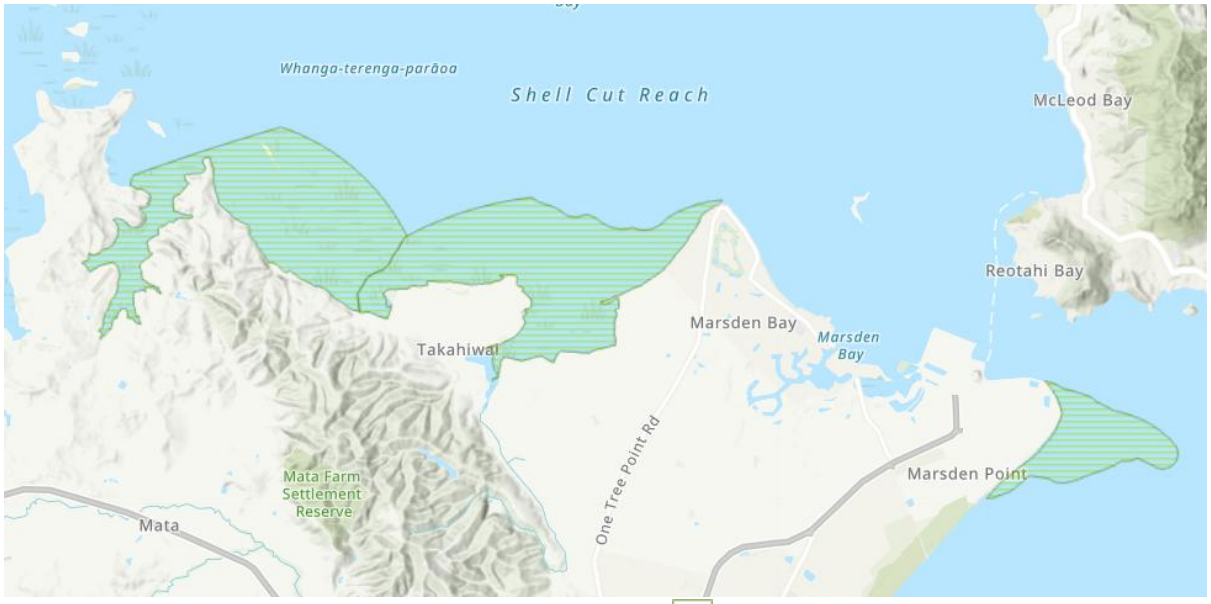
Not all freshwater, coastal or marine sites that are important to tangata whenua in Taitokerau are currently mapped in the Regional Plan. Impacts on sites of significance that are not included in the Regional Plan may still be considered as part of any resource consent process. Contact the relevant iwi/hapū for information on sites of significance that may be affected by activities on your farm. There are also species that depend on freshwater that are considered taonga by tangata whenua. These significant species are indicated in the biodiversity table of this document.

The below table shows both mapped sites of significance and known other sites of significance.

Table 5: Sites of significance for Whangārei FMU

Sites and areas of significance	Description of significance	Status
Mangawhati Mahinga Mataitai	Mangawhati Peninsula Mahinga Mataitai (also known as Skull Creek) is the site of significant historical battles, in particular the Ngati Maru/Te Taou battle during the early 1800's. It is one of the key strategic areas of Patuharakeke for linking iwi and hapū around Te Rerenga Paraoa during times of tribal war. The rivers and harbour (including Skull Creek) provided important transportation routes. These trade and transport networks served a major social and political function in maintaining the linkages from one hapū to the next. For Patuharakeke, in acting as kaitiaki (guardian of the resources and taonga) and kaimanaaki (host), this served to entrench its recognition as a means of maintaining its viability as a hapū holding mana over its rohe.	Mapped in Northland Regional Council's Regional Plan
Takahiwai Mahinga Mataitai	Motupapa Takahiwai – traditional "oyster/tio garden" mataitai deliberately cultivated through placement of rocks and was also a site for the gathering of pupu and karehu, which took place at Takahiwai Creek/estuary. Immensely significant kaimoana (and other taonga species) harvesting and management area used historically and to this day by Patuharakeke as mana moana. Takahiwai River was also a site of spiritual significance where baptisms took place. Waahi tapu, including places where bathing and healing rituals were enacted, and where bodies were washed and bones prepared for final internment, were known to fall within Mahinga Mataitai locations. Specific locations are not given for sensitivity reasons.	Mapped in Northland Regional Council's Regional Plan
Te Poupouwhenua (Mair and Marsden Bank) Mahinga Mataitai	Poupouwhenua was an extremely important tauranga waka and was occupied frequently by various war parties stopping there to prepare for battles further south. Preparations included training and discussions of tactical warfare. The number of war parties varied between small groups of 20 to 50 to some numbering in the thousands. It is one of the key strategic areas of	Mapped in Northland Regional Council's Regional Plan

	Patuharakeke for linking to iwi and hapū around Whangārei Te Rerenga Paraoa during times of tribal war. Much of the area along the foreshore and dunes between the Marsden Point Wharf and Refinery Jetty was used regularly as a nohoanga (camping site for harvesting kai at adjacent mahinga mataitai) by Patuharakeke up until the development of the site began to restrict this practice in the 1960s. Species gathered included tamure, mango, pipi, kokota, tuangi/cockle, tuatua, kutai/mussels and tipa/scallops.	



Key: Sites and Areas of Significance to Tangata Whenua

Figure 3: Mangawhati, Takahiwai, and Te Poupouwhenua

www.nrc.govt.nz/WhangāreiCCCV

Your freshwater farm plan should consider how your farming operations could affect any site or species of significance and how to protect it.

We are working to confirm any other sites of significance in Whangārei. We will update this document with further details as soon as the information is available. If you need urgent assistance with identifying sites of significance to tangata whenua in Whangārei, please contact Northland Regional Council on 0800 002 004 or info@nrc.govt.nz

Ngā Wero | Challenges

Freshwater in the Whangārei freshwater management unit (FMU) suffers from poor water quality. The biggest challenges our freshwater water bodies face are sedimentation, *E. coli*, elevated nutrients (phosphorous, and nitrogen), wetland loss, riparian vegetation loss and the changing climate. For a summary of these challenges refer to the table in Section 1. More detail on each of these challenges can be found below.

Identifying your on-farm risks, having regard to these challenges and the actions you can take to address them, should be priorities as you create your farm plan.

Consider where you are in the catchment. Overall, sites higher in the FMU with predominantly bush headwaters have better water quality. As these waterbodies move down the FMU and into farmland there is a greater accumulation of contaminants as the waterbodies are affected by land use activities. However, there are exceptions, so check your individual location: some waterbodies can be degraded even high in the FMU due to intensive land use.

Northland Regional Council monitoring data for contaminants

Raw data (Environmental Data Hub)

www.nrc.govt.nz/WhangāreiCCCV



Sediment in waterbodies

The major challenge for farmers in the Whangārei freshwater management unit (FMU) is managing sediment run-off into waterbodies when it rains.

An estimated 15,797 tonnes of sediment per year flows into the Whangārei Harbour due to decades of deforestation and land-use intensification, bare stream banks, and stock access. A significant portion of the FMU is identified as Erosion Prone Land in the Regional Plan for Northland maps.

Taitokerau CCCV viewer

www.nrc.govt.nz/WhangāreiCCCV

Slope, soil type, and vegetation affect erosion risks. Pastoral land use accounts for 43% of total erosion sediment, while land-based erosion processes account for about 85% of total erosion in the catchment, stream bank erosion varies considerably by sub-catchment.

Erosion degrades both land and freshwater, as eroded materials end up in waterbodies. Heavy rain, land use practices, pugging from stock, low pasture cover, deforestation, and development-related

disturbances exacerbate soil erosion, especially in hill country and stream banks. Managing land use is key to controlling erosion.

Northland Regional Council has mapped erosion and sediment risk to help you understand key sources of erosion and sediment that may affect rivers, harbours, and estuaries. The maps show where erosion is likely to occur and how likely sediment is to reach waterways. They can be viewed at property or sub-catchment scale and are colour coded to show the degree of risk. There are no rules associated with the maps – they are for information only – but they can help you to undertake risk assessments for erosion and sediment loss to water as you develop your freshwater farm plan.

Erosion and sediment risk maps - Northland Regional Council

www.nrc.govt.nz/WhangāreiCCCV

Your freshwater farm plan should consider the following sources of sediment and how these can be managed on your farm.

Table 6: Sources of sediment

Surface erosion This occurs when soil particles are detached from the surface and carried across the ground by water, wind or gravity.	
Fluvial erosion This happens when running water gouges shallow channels or deeper gullies into the soil. On sloping land, the gullies can cut deep into the subsoil or undermine the surrounding soils.	

Mass movement Otherwise known as slips, slumps or landslides, this is the most common form of erosion in hill country. It is most common after heavy rain.	
Stream bank erosion Stream bank erosion is a natural process but can be exacerbated by a lack of vegetation and disturbance of the stream bank (e.g. by stock). Faster run-off from pastoral land can also lead to higher flow velocity that can worsen stream-bank erosion.	



Faecal contaminants (*E. coli*) and other pathogens in waterbodies

E. coli comes from the excreta of warm-blooded animals and is an indicator of the risk of infectious disease from contact with freshwater. Key sources are run-off from farm animals, stock in waterbodies and discharges of human or animal effluent. Wild birds and pest animals are also a common source in Northland. All monitored river sites in the Whangārei freshwater management unit (FMU) typically grade as poor or very poor for *E. coli* (median), indicating unsuitability for human contact or swimming. Additionally, *E. coli* pollution from effluent discharges to water is unacceptable to tangata whenua.

The areas in the FMU with lower levels of *E. coli* tend to be in the unmodified bush areas. In pasturelands, sediment and nutrients, along with *E. coli*, runs off into waterbodies especially where there is limited filtering by vegetated riparian buffers.

Northland Regional Council has collated *E. coli* monitoring data and modelled estimated *E. coli* concentrations across the region.

E. coli monitoring data

www.nrc.govt.nz/WhangāreiCCCV

The council has also commissioned research into the state and sources of *E. coli* in Northland. Research indicates that Northland has high levels of *E. coli* in the river networks across the region that appear to be generated from diffuse pollution sources from intensive land uses.

Access the research

www.nrc.govt.nz/WhangāreiCCCV

When you create your freshwater farm plan, you will need to consider both diffuse and point sources discharges of *E. coli* in waterbodies. Diffuse sources are widespread or dispersed sources such as runoff from pasture and include (but are not limited to):

- rainfall/ overland flow/ run-off from pastureland, especially erosion-prone land in extensive or intensive land-use with high connectivity to waterbodies
- poorly drained lowland pasture (e.g., floodplains with shallow water tables)
- application of farm dairy effluent (FDE) to land, generating runoff from poorly drained or saturated soils.

Point sources are from a single fixed point, such as a pipe or drain or dairy shed outfall and include (but are not limited to):

- direct stock access to water bodies
- Farm dairy effluent (FDE) discharges to water
- farm infrastructure/practices with high connectivity to waterbodies e.g., stock drinking troughs, races, wintering pads, stream crossings and the outfall of drains.
- storm water, storm water systems cross-contaminated with sewerage
- poorly constructed or maintained human wastewater systems.

Source tracking and *E. coli* monitoring in our region have shown that diffuse sources of *E. coli* from pastureland need prioritised management to reduce *E. coli* loads in waterbodies. Ruminants (cattle, sheep) are typically the dominant source of *E. coli* (but this can vary with location and land cover).

Stock exclusion by effective fencing, riparian planting and use of wetlands or detention bunds to intercept overland flow from *E. coli* sources are very effective in reducing faecal loads in waterbodies. Afforestation in highly erodible land and eliminating farm dairy effluent discharges to waterbodies are also encouraged to eliminate *E. coli* pollution.



Elevated nutrients in waterbodies

Activities like cultivation near lake edges and drains discharging to lakes can increase nutrient and sediment loads. Unlike rivers, lakes hold nutrients running off from surrounding land uses. These can lead to accelerated aging of the lake. Within the Whangārei freshwater management unit (FMU) Lake Ora suffers from eutrophication (accumulation of nutrients) and is considered of low ecological value because of its degraded state.

The catchment for Whau Valley reservoir is managed by Whangarei District Council under its bylaws for water supply purposes and a reserve management plan controls activities within the catchment to maintain its high water quality.

Pukenui o Ngahere Management Plan

www.nrc.govt.nz/WhangāreiCCCV



Whau Valley reservoir (photo: Whangarei District Council)

Whangārei Harbour has a history of algal blooms. Nutrients that run off farmland into freshwater (which then drains into the harbour) are likely to contribute to these events. These blooms can be toxic to humans and affect the ability to use the harbour for recreation and mahinga kai (shellfish can become toxic).

In April 2023, a large algal bloom was reported in the Hātea River, Whangārei, which extended for 7.5 km, from the Town Basin to Onerahi. Sampling indicated that the dominant species was *Heterosigma akashiwo*, which is the Japanese name for 'red tide' and is known to be toxic to fish. Water quality monitoring during the bloom found exceptionally high concentrations of chlorophyll-a, total nitrogen and total phosphorus at the Town Basin, in Whangārei.

Te Ora o te Taiao ā-Takutai Moana: State of the Environment Coastal 2024

www.nrc.govt.nz/WhangāreiCCCV



Wetland and habitat loss

Land use change, intensification, deforestation, drainage, reduced flows, pollution, sedimentation, nutrient enrichment and spread of invasive species can have significant consequences for our freshwater species, many of which have declining or threatened populations. Stress from compromised habitat reduces immunity in animals and can cause flares of fungal or parasitic diseases that wouldn't otherwise affect fish populations.

If your farm has a river or stream with tidal influence, it is a potential habitat for īnanga/whitebait spawning (egg laying). Protecting and improving habitat in these areas is important to ensure that these fish can breed. If your farm includes such an area, the activity you are planning to undertake on your farm may have additional rules to be mindful of.

Wetlands

Wetlands were once extensive across the Whangārei freshwater management unit (FMU) but have been lost due to drainage for farming, cropping/horticulture, forestry and urban development. Around 5.5 percent, or 14,114 hectares, of the original wetland area remains in the region.

Northland Regional Council provides wetland mapping, including two complementary map layers:

- 'Known wetlands' maps – these maps show known wetlands, but they are incomplete and may under-represent wetlands in the FMU.
- 'Indicative wetlands' maps – these are more comprehensive indicative (unconfirmed) maps showing where wetlands are likely to be.

It is important to note that the 'Indicative wetlands' map layer does not replace the 'Known wetlands' mapping. Both maps should be viewed together to gain the best available understanding of potential wetland areas.

You can view the maps in the Taitokerau CCCV viewer.

Learn more about the indicative wetlands maps.

www.nrc.govt.nz/WhangāreiCCCV

Your freshwater farm plan should identify any wetlands on your farm and set out actions to protect them and, if necessary, restore them. There are also likely to be opportunities to create wetlands in some cases to help reduce sediment, *E. coli* or nutrient loss to freshwater.

Fish passage

Culverts, weirs, fords, dams, and tide and flood gates are common in streams and rivers throughout the Whangārei freshwater management unit (FMU). Both the Otaika Valley weir and Whau Valley dam present major fish barriers lower in the catchment. Many of our fish species are migratory. For example, eels need to swim to the ocean for spawning and the elvers back to the rivers for reaching adulthood. If instream structures are not designed, maintained and installed correctly, they can stop fish migrating and spawning.

A pilot study on barriers to fish passage in the FMU surveyed 225 fish barriers, which found both manmade and natural barriers.

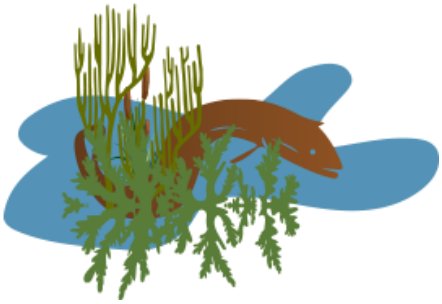
NIWA have developed a fish passage assessment tool which helps to show the barriers to fish passage and how to assess the structures on your farm.

NIWA fish passage assessment tool

www.nrc.govt.nz/WhangāreiCCCV

Of the existing in-stream structures recorded in the fish passage assessment tool in the FMU, 137 are assessed as having a very high risk to fish passage, 125 as being of high risk and 91 of medium risk.

www.nrc.govt.nz/WhangāreiCCCV



Riparian vegetation loss

Vegetation on the margins of waterbodies is an important part of freshwater ecosystems. Most of our aquatic native species are adapted to bush-clad waterbodies that provide shade, cooler water temperatures and good connections between freshwater and land that many species rely on for feeding and lifecycles. The loss of this riparian vegetation can reduce habitat quality for native species and result in lower dissolved oxygen, warmer water and more frequent algal blooms. This is one of the reasons why around 50% of Northland rivers do not score well against the macroinvertebrate community index (MCI), an indicator of aquatic ecosystem health. The state of

our rivers as measured by MCI is available on the Land, Air, Water Aotearoa (LAWA) website (select a river and turn on the Ecology tab).

Land, Air, Water Aotearoa (LAWA) – River quality

www.nrc.govt.nz/WhangāreiCCCV



Changing climate

Your freshwater farm plan should consider challenges due to climate change, such as drought, extreme weather events and increased water temperatures.

Drought potential is projected to increase due to higher accumulated evapotranspiration, reduced rainfall, and drier soils. It is most accurately projected through potential evapotranspiration deficit accumulation, which considers the difference between water demand for plant growth, soil water capacity, and water loss through evaporation and transpiration.

Much of Northland's primary sector relies on takes from rivers and streams, which can be unreliable water sources during drought. This can have significant economic and social impacts. Reliability of supply from rivers and groundwater is likely to reduce with climate change.

Dry periods can lead to soils cracking. When rain does occur on cracked soils there is greater movement of nutrients into the water systems.

Increased severity of storms, including wind strength and intensity of rainfall, is likely to cause significant slips and erosion, damaging forests and farm infrastructure like fencing and roads. High rainfall in areas with weak bedrock and soils increases the risk of erosion, landslides, stock damage, and runoff of contaminants into freshwater.

Flood hazard zones are shown in the Taitokerau CCCV viewer.

www.nrc.govt.nz/WhangāreiCCCV

Take care with the timing and location of the application of farm dairy effluent to avoid transport of nutrient and *E. coli to* water during rain events. Flooding can also transport sediment from exposed earth/cultivation if adequate sediment controls are not in place.

Climate change predictions also include rising water temperatures. Higher ocean temperatures causing sea level rise may increase salinity upstream, potentially moving coastal and estuarine habitats and requiring water in-takes to be relocated.

Warmer water temperatures also increase the frequency of algal blooms in rivers and lakes (especially when flows are low and nutrient levels are high). These blooms can limit the ability to take and use water and affect recreational and cultural values for water.

Many of our native freshwater species are adapted to cooler water and shaded waterbodies. Climate change is therefore likely to make current issues facing native species even worse, meaning restoring riparian cover, increasing the area of wetlands to supplement flows in rivers and using freshwater efficiently more important.

You can find more information at Northland ClimateWEB.pdf (niwa.co.nz)

www.nrc.govt.nz/WhangāreiCCCV

Ngā ture kāwanatanga ā-motu, ā-rohe hoki | Central government and regional council rules

There are both national and regional rules that are relevant to freshwater farm plans. National rules include:

- The Resource Management Act 1991 Part 9A Freshwater Farm Plans
- The Resource Management (Stock Exclusion) Regulations 2020
- Resource Management (National Environmental Standards for Freshwater) Regulations 2020

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The Ministry for Cities, Environment, Regions and Transport provides additional information about freshwater farm plans.

Ministry for Cities, Environment, Regions and Transport – Freshwater Farm Plans

www.nrc.govt.nz/WhangāreiCCCV

Regional rules are applied through the Regional Plan for Northland.

Northland Regional Plan

www.nrc.govt.nz/WhangāreiCCCV

There can be overlaps between national and regional rules – in these cases the most restrictive rule applies. For more guidance, please see the Northland Regional Council Farmers Hub webpage.

www.nrc.govt.nz/WhangāreiCCCV

The sections of the regional plan most relevant to freshwater farm plans are listed below:

C.2 Activities in the beds of lakes and rivers and in wetlands
C.3 Damming and diverting water
C.4 Land drainage and flood control
C.5 Taking and use of water
C.6 Discharges to land and water
C.8 Land use and disturbance activities (including livestock exclusion, earthworks, cultivation and vegetation clearance). There are also catchment specific livestock exclusion and erosion control rules that apply in the Whangārei FMU – see Rules E.3.5.1 and E.3.5.2

In some cases, rules apply to areas identified on regional plan maps. The regional plan maps most relevant to freshwater farm plans are:

Hill Country and Lowland Areas – these relate to livestock exclusion rules (the rules differ for Hill Country and Lowland areas depending on livestock type). Please note there are also catchment specific livestock exclusion rules that apply in areas mapped as Whangārei Swimming Sites Stock Exclusion Areas.

Erosion Prone Land – tighter controls on earthworks and cultivation are applied to these areas mapped in the regional plan.

Outstanding Freshwater Bodies – these maps identify lakes and rivers (and their catchments) that have very high ecological, cultural, recreational or landscape values and are therefore subject to specific rules.

Priority Drinking Water Abstraction Points - these identify drinking water takes where particular controls on farm wastewater discharges and livestock exclusion are applied upstream of the water take (under Rules C.6.3.1 and C.8.1.2).

Mapped Sites of Significance to Tangata Whenua – these maps show sites and areas of significance to tangata whenua in the Regional Plan that are in freshwater bodies or the coastal marine area. Note: The maps do not reflect all sites that are important to tāngata whenua in the region, as many are not mapped or included in the Regional Plan. It is recommended that the relevant hapū is contacted for information on such sites.

Regional Plan maps

www.nrc.govt.nz/WhangāreiCCCV

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Northland
REGIONAL COUNCIL
Te Kaunihera ā rohe o Te Taitokerau