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 Te Ākau

Catchment context, challenges and values: Bream Bay freshwater management unit



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How to use this document

This document provides information about the Bream Bay 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 is divided into four main sections:

1. **Overview** – This section provides an overview of the Bream Bay 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. Each subsection also identifies community, tāngata 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 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 Bream Bay freshwater management unit covers (FMU) about 41,000 hectares along the east coast of Northland. It starts at Poupouwhenua Reserve near Marsden Point and stretches south to include the Mangawhai Estuary. The southern edge of the FMU lines up with the Auckland Council boundary.

To the west, the boundary follows the Brynderwyn Range, roughly along Lawrence Road and Garbolino Road, then heads north from Tara Road (excluding Tara itself) to the Brynderwyn Hills Reserve. From there, it curves around the Waipū Gorge Reserve, continues north to include Waipū Reserve, Waipū Caves, Blakes Bush, and Springfield. It then runs east from Whittle Road, along parts of Johns Road, to Mata Farm Settlement Reserve, and back to Poupouwhenua Reserve.

The catchments and rivers in the FMU drain to Bream Bay and Mangawhai Estuary, meaning the state of freshwater affects the estuary, the coast, and their ecosystems.

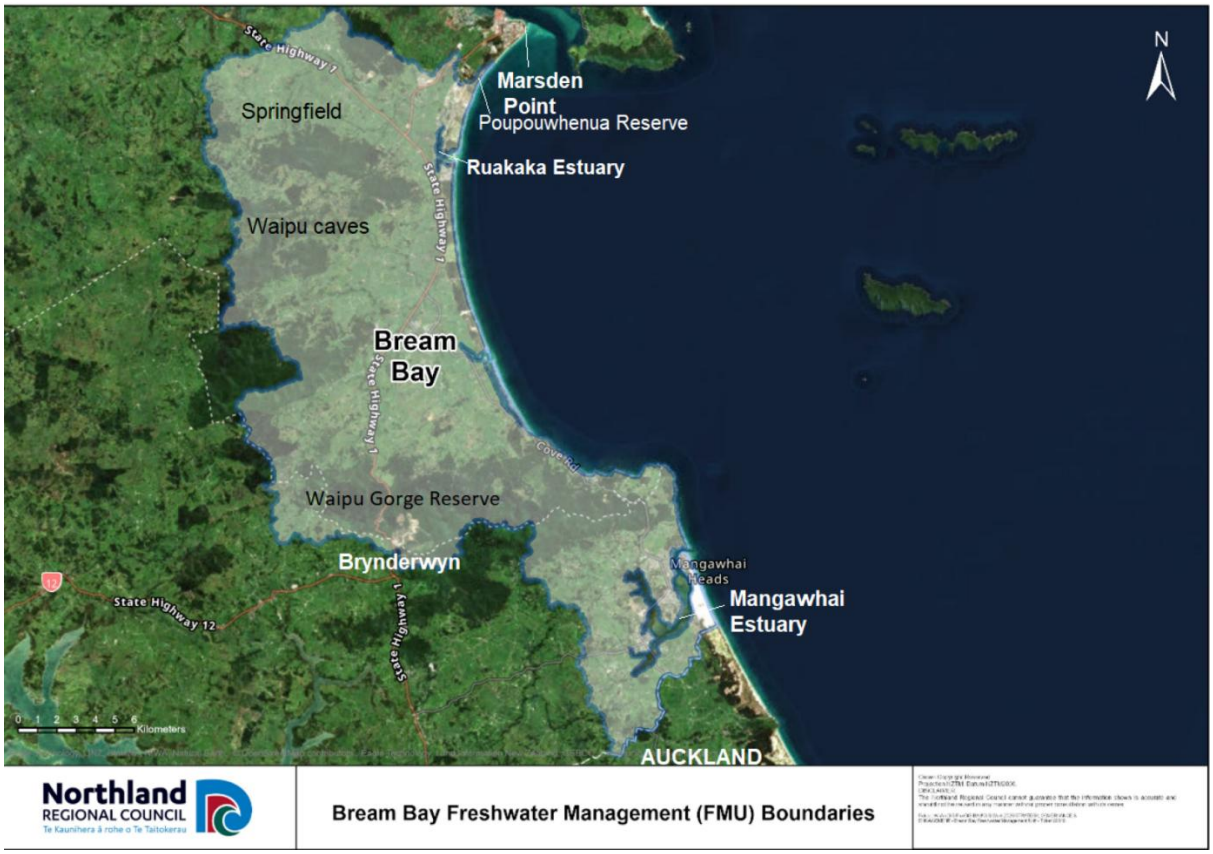
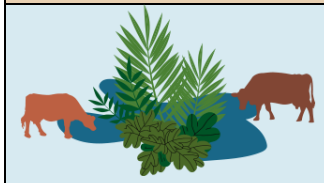
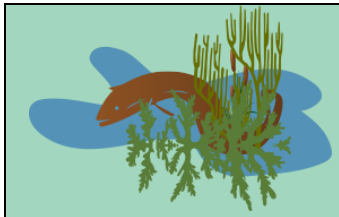


Figure 1: The Bream Bay freshwater management unit

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

Challenges	Causes	Impact	Things to think about	Helpful map layers
 **Sediment in waterbodies** *The monitoring site on the Ruakākā River at Flyger Rd indicates sediment levels (as measured by water clarity and turbidity) are elevated.*	• 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. coli*) and other pathogens in waterbodies**	• Stock in or near waterbodies • Poor management of critical source areas (e.g. stockyards, races/tracks and stock crossings)	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 the mauri of the water so it is unfit for cultural uses.	• Do you have areas where stock can enter waterbodies or immediate margins? • What are the critical source areas and where do they discharge to? • What uses of water downstream of your farm that are sensitive to pathogens?	• Rivers • Registered Drinking Water Supply Sites • Swimming Sites • Fundamental Soils • Flood Risk

The monitoring site on the Ruakākā River (at Flyger Rd) indicates E. coli *levels are elevated.*	• Animal effluent disposal near waterbodies, drains or in overland flow paths or at rates that exceed the absorption capacity of soils • Frequently used unformed stock crossings • Soil compaction leading to overland flow	There is a higher risk that people can get sick from water-based recreation.	• 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** *Monitoring on the Ruakākā River (at Flyger Rd) indicates levels of high nutrients (total nitrogen and total phosphorus are elevated, although trends are likely to be improving).*	• 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. Some native fish species are particularly sensitive to nitrogen.	• 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

 **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. Monitoring shows the aquatic ecosystem is in poor health.*	• 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 leads to higher rates of 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** *It is estimated that a fifth of the region was covered in wetlands but now only about 5% of our original*	• 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. Loss of drought resilience, as wetlands act like sponges that release water in dry periods.	• 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

wetlands remain (roughly half the national average).				
 **Changing climate**	• Increasing annual temperatures • More extreme weather events	Drought leading to increased risk of erosion on hill slopes. Reduced water levels in waterbodies impacting on native species living in them. Flooding leading to nutrients and *E. coli* being transported into waterbodies. Sedimentation in waterbodies from soil eroded by flooding, collapsed banks as water levels rise.	• 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?	• Flood Risk

Te Horopaki me Ngā Uara | Context and values



Land and land use

The topography of land and how you use it affects freshwater quality. You need to keep these things in mind as you identify risks and consider actions to include in your freshwater farm plan. For example, steep terrain is more prone to erosion, particularly if it is in pasture. This can lead to poor water quality due to the resulting sediment, *E. coli* and nutrient runoff.

Topography

The Bream Bay freshwater management unit (FMU) generally has a flat to rolling topography.

- Around 52% is flat to undulating (0°-7°).
- Around 33% is rolling (8°-20°).
- The remaining 15% is steep to very steep (>21°).

The flat areas include alluvial river flats from the rivers feeding into Ruakākā, Waipū and Mangawhai.

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/BreamBayCCCV

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/BreamBayCCCV

Land use

Much of the flat and rolling areas of the FMU have been converted to pasture along with some steeper slopes. There is very limited cropping or orcharding.

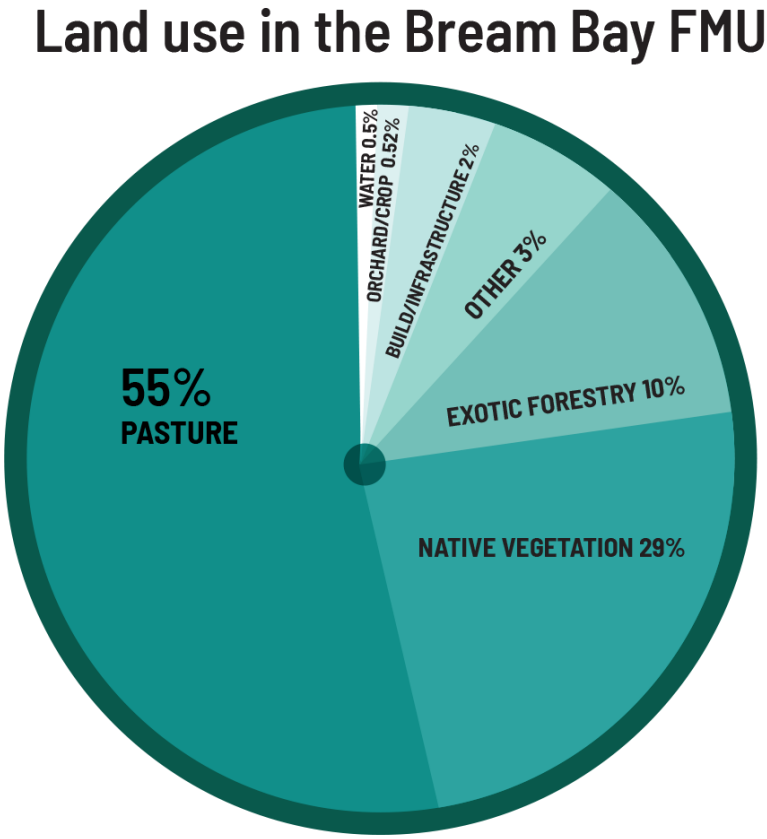


Figure 2: Land use in Bream Bay FMU



Soils

The Bream Bay freshwater management unit (FMU) soils include mudstone, sandstone, and alluvial. The catchment is almost entirely sedimentary base rock with the steeper areas tending to be stronger sedimentary rock and the flats being weak or loose.

The different soil types have different vulnerabilities under different land uses and weather events. They need 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/BreamBayCCCV

Soil types

Young greywacke soils

These soils are formed from the weathering of greywacke rock, a hard, compacted sedimentary rock. They 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 over-sowing 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.

Mature mudstone

Mature mudstone soils, formed from fine silt and clay rocks, 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.

Terrace

Terrace soils are found on elevated terraces and alluvial fans above flood levels, where they are no longer replenished by flood sediments. These soils formed from volcanic and sedimentary materials and often have high clay content. They are typically seasonally wet with poor natural drainage, sometimes due to subsoil pans that cause waterlogging and anaerobic conditions. This affects soil structure, root growth, and nutrient availability. Terrace soils are prone to cracking in dry summers and pugging in wet winters.

Effective management includes subsurface drainage, lime application, erosion control, and careful timing of cultivation and grazing.

Mature greywacke soils

Mature greywacke soils, found on rolling to steep hill country, develop from weathered greywacke – a compacted mix of sandstone and siltstone. These soils are strongly leached to weakly podzolised, with clay forming a columnar subsoil that causes poor drainage and makes them prone to pugging and surface sealing. Slipping is a major erosion risk, especially after drought followed by heavy rain, along with slump erosion and tunnel formation on steep slopes.

Management includes careful winter grazing, installing drainage or protecting wetlands, and planting poplars to stabilise slopes. Retiring steep or unproductive land may be necessary where pastoral returns are low or weeds dominate.

Young sandstone soils

Young sandstone soils form from shattered sandstone and mudstone rocks, often on steep slopes. These soils are typically winter-wet, with high clay content and poor drainage, making them prone to pugging and difficult to cultivate. They are highly erosion-prone, especially to tunnel gullying, slumping, and landslides during heavy rain. Soil fertility varies widely depending on the parent rock.

Management includes maintaining good pasture cover, avoiding cultivation on steep or wet areas, and using direct drilling for pasture renewal. Retiring marginal land and planting erosion-prone areas can help stabilise slopes and improve long-term productivity.

Old mudstone soil

Old mudstone soils, formed from weathered sedimentary rock on rolling terrain, 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.

Old sandstone

Old sandstone soils, formed under ancient kauri forests, are acidic and strongly leached, with sandy loam topsoil over mottled, poorly structured clay subsoils. These soils have low fertility and are prone to winter wetness, compaction, and summer dryness. Erosion, especially gully and sheet erosion, is common due to weak subsoil and high rainfall.

Management includes avoiding heavy grazing in wet conditions, using no-till cropping, and planting erosion-control trees like poplars. Revegetation is challenging where sulphide-rich subsoils are exposed, requiring extra measures like netting or debris dams. Careful nutrient and pH management is essential to maintain productivity on these fragile soils.

You can find more information about soil types and how to manage them in our soil fact sheets.

Soil fact sheets

www.nrc.govt.nz/BreamBayCCCV

Drainage

Except for coastal dunes, most of the Bream Bay FMU has moderate to poorly drained soils. Poorly drained soils limit deep drainage and lead to more water flowing over the surface. These flows can strip precious nutrients, like nitrogen, which are needed in soils. Nutrients then collect in streams and ponds during every rain event.

Areas with well drained soils have less overland flow and more connection to groundwater. Contaminants in the water, especially nutrients, then slowly seep into groundwater systems.

Artificial drainage

Much of the flatter farmland in the FMU relies on artificial drainage. Drainage can expand farmable land and boost economic gain, but it can also contribute to water pollution, sediment transport, and nutrient loading in waterbodies.

If you have drains on your property, it is important to consider when and how you undertake drain maintenance to reduce sedimentation and if you can exclude stock from the drains to prevent further contamination and erosion.



Waterbodies

The Bream Bay freshwater management unit (FMU) supports rivers, lakes, dune lake, wetlands, and estuaries.

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, food production, and general public wellbeing.

There are many popular swimming sites in the FMU. Some are mapped but many more are not. Most are coastal and typically have good water quality for swimming.

However, there are two monitored sites in the Ruakākā River and Mangawhai Harbour that tend to have lower water quality because of the significant volumes of freshwater they receive and the contaminants in it, such as sediment and nutrients. The Ruakākā and Waipū estuaries have been subject to algal blooms in the past – nutrients in freshwater are likely a contributing factor.

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.

Safeswim

www.nrc.govt.nz/BreamBayCCCV

Long term recreational swimming site information

www.nrc.govt.nz/BreamBayCCCV

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

Rivers and lakes

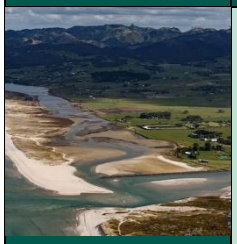
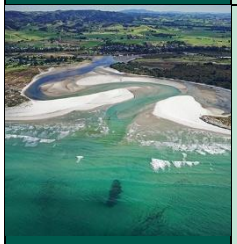
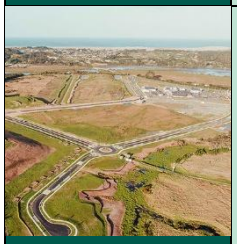
Water quality typically declines from the upper reaches to the lower reaches of a catchment due to impacts from nitrogen, phosphorus, *E. coli* and sedimentation. Consider the location of your farm in your risk assessment to guide the actions and priorities of your freshwater farm plan.

The larger rivers in the Bream Bay FMU, the Ruakākā and Waipū Rivers, discharge into estuaries and the wider Bream Bay. 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 available on the NRC website and in the Taitokerau CCCV viewer.

Indicative Īnanga Spawning Habitat

www.nrc.govt.nz/BreamBayCCCV

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

River	Description
	**The Waipū River** drains a catchment of around 229km^2. It is fed by five main tributaries, all of which flow from the Brynderwyns: the Ahuroa River, Waihoihoi River, Waionehu Stream, Pohuenui River, and the Mill Brook. It flows into the Waipū Estuary then into Bream Bay. The Waipū Estuary has been identified as a significant ecological area in the Regional Plan for Northland due to its habitat value for native marine and bird life. For more detail see: Significant Ecological Marine Area Assessment Sheet: Waipū Estuary Marine Values www.nrc.govt.nz/BreamBayCCCV
	**The Ruakākā River** is about 22km long running east from the Ruakākā Forest to the Ruakākā Estuary and wider Bream Bay. It drains a catchment of 89km^2 that is dominated by pasture with native forest in the upper catchment. The underlying geology is primarily soft sedimentary rock and soils. Ruakākā Estuary has been identified as a significant ecological area and a site of significance to tangata whenua in the Regional Plan due to its habitat value for native marine and bird life. For more detail see: Significant Ecological Marine Area Assessment Sheet: Ruakākā Estuary Marine Values www.nrc.govt.nz/BreamBayCCCV
	**Mangawhai River** - This short river flows into Mangawhai estuary and harbour. Dunelands at Mangawhai Sandspit provide nationally important nesting grounds for New Zealand's rarest and most threatened bird species – the New Zealand fairy tern, northern New Zealand dotterel and the Caspian tern. For more detail see: Significant Ecological Marine Area Assessment Sheet: Mangawhai Estuary www.nrc.govt.nz/BreamBayCCCV

There are several lakes in the FMU, although most are small. The dune lake near Ruakākā, is identified as site of significance to tangata whenua (Patuharakeke) in the Regional Plan. It is the only dune lake in the Eastern Northland Ecological Region. It is habitat for three 'Threatened', seven 'At Risk', and three regionally significant bird species. Traditional uses of this lake include cultural harvest of tuna, freshwater fish and waterfowl, weaving materials and rongoā (medicinal plants).

Takahiwai Dam is a constructed lake and raupo reedland located within the Takahiwai Forest. Although it is man-made, it supports a range of species, is a spawning site for banded kokopu, and is culturally important to Patuharakeke.

Wetlands

The Bream Bay FMU hosts a variety of wetlands (repo) with significant ecological and recreational value. 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 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 waterways, estuaries and wider coastal waters
- 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 Bream Bay FMU by sub-catchment

Sub catchment	Significant freshwater wetlands
Ruakākā	Ruakākā River Forest Remnants is a discontinuous ribbon of indigenous riverine floodplain forest on the alluvial plains formed by the Ruakākā River and its tributaries. It is a series of ecologically significant native forest and reedlands with remnants of the original diverse podocarp-broadleaf forest. While parts of these remnants contain invasive species, they remain important as a habitat for bird and freshwater species.
	Doctors Hill Rd Wetland is an extensive freshwater wetland located in the gully of an unnamed stream which originates in Ruakākā Forest. It drains into the Ruakākā River Estuary. It is the largest natural freshwater wetland in Waipū ecological district. It is one of only five natural coastal freshwater wetlands in the area.
	Wilson's Dam, located within Ruakākā Forest, is a constructed dam for water supply for Ruakākā. The open water habitat within Wilson's Dam is bordered almost entirely by indigenous forest and provides habitat for indigenous species. It is also stocked with brown trout for recreational fishing.
	The Ruakākā Racecourse Dune Lake is situated in an interdune hollow behind the foredune which forms the northern side of the Ruakākā River mouth. This is the only dune lake in Waipū ecological district and is a site of very high ecological significance. It is one of only five natural coastal freshwater wetlands remaining in Waipū. Most natural freshwater wetlands which were present in the area in the past have been drained or modified. There are seven threatened fauna species (Australasian bittern, spotless crake, banded rail, red-billed gull, grey duck, white-fronted tern, and black shag) and three regionally significant fauna species (Australasian little grebe, Australasian shoveler, and NZ scaup) recorded from here.
Waipū	Glenmohr Rd Wetland is the largest raupo reedland in the ecological district, which is spread patchily along 2 km of farm gully, sheltered on one side by plantation forest. It provides habitat and acts as a corridor for freshwater species.
	Mountfield Road Wetlands comprises four separate open water ponds near the quarry on Mountfield Road, two of which have been constructed and two of which are semi-natural. All have some indigenous vegetation around the water margins and provide habitat for indigenous birds. The most common vegetation type is raupo reedland. The threatened grey duck is present at the site and there are historic records of spotless crake.
Mangawhai	Tara Road Swamp flows into the Mangawhai Estuary. Vegetation is dominated by flax and transitions into saltmarsh. Kawaupaka (New Zealand little shag) are present at the site.
	Cove Road Swamp flows into the Mangawhai Estuary. Vegetation is dominated by jointed rush, flax and raupo then transitions into saltmarsh. Bittern and pied stilt are present at the site.

For more information:
Looking after your wetland

www.nrc.govt.nz/BreamBayCCCV

The Bream Bay Catchment Group is a welcoming collective dedicated to protecting and restoring the local awa. If you would like to learn more or connect with them, please reach out:

Bream Bay Case Study 2025

www.nrc.govt.nz/BreamBayCCCV

Restoring wetlands and their ecological functions is essential for sustainability, benefiting both farming and indigenous biodiversity in the FMU. Even small wetland areas can improve biodiversity and act as a filter for sediment and nutrients.

If you have a wetland on your property, your freshwater farm plan needs to consider your contribution to restoration efforts. Restoration may include stock exclusion, pest and weed management, and the creation of new wetlands.

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/BreamBayCCCV



Biodiversity

Indigenous habitats in the Bream Bay freshwater management unit (FMU) have suffered extensive loss and modification due mainly to historical land clearance. However, the FMU still contains large areas of indigenous forest, shrubland, wetlands, a dune lake and dunelands. These habitats support indigenous ecosystems and unique plants and animals, many of which are classified as threatened or at risk, and 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/BreamBayCCCV

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

While public conservation land supports a significant proportion of the FMU's indigenous biodiversity, many important habitats are within the rural landscape and its waterbodies, and many of the mobile species rely on connectivity through farms.

Three estuaries in the FMU are mapped as Significant Ecological Areas in the Regional Plan for Northland – Ruakākā, Waipū and parts of Mangawhai Harbour. This is due to the range of habitats they provide for native species. Estuaries are directly affected by the quality of freshwater entering them from rivers – sediment and nutrients are of particular concern as they tend to accumulate in estuaries and reduce habitat quality.

For more detail see:

Significant Ecological Marine Area Assessment Sheet: Waipū Estuary Marine Values

Significant Ecological Marine Area Assessment Sheet: Ruakākā Estuary Marine Values

Significant Ecological Marine Area Assessment Sheet: Mangawhai Estuary

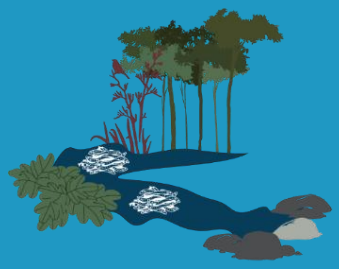
www.nrc.govt.nz/BreamBayCCCV

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 Bream Bay FMU

Significant species	Habitat and characteristics
Australasian bittern (Mataku-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. 
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 up streams 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. 

Īnanga/ whitebait
At risk – declining



Īnanga, often called whitebait, use grasses growing on riverbanks for reproduction. Īnanga can use several species of grasses to deposit their eggs but water levels must be sufficient to inundate the grasses at the correct height for the eggs to hatch. Īnanga spawning sites are found on the margins of rivers and estuaries that are inundated by spring high tides. Īnanga are caught recreationally and are an important part of freshwater food webs.



Photo credit: Jane Bennett

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.



Photo credit: Olly Ball Steve Pohe Collection

New Zealand fairy tern (Tara iti)
Nationally critical



The most endangered of New Zealand's birds. Tara iti have breeding grounds on both the Waipū Sandspit and Mangawhai Sandspit. They forage in the estuaries and coastal areas. Tara iti are highly vulnerable to predators, sensitive to disturbance and have their habitat restricted through modification of coastal areas. The health of the water flowing into the estuaries affects the health of their feeding grounds.



Hochstetter's frog
At risk – declining



Hochstetter's frogs are the only semi-aquatic and spend much of their time in wet areas close to the water's edge in shaded streams. They are nocturnal and eggs are laid in wet areas close to the stream. They are sensitive to predation, sedimentation and pollution and habitat loss.



Hochstetter's frogs require quality vegetation around waterways to survive and breed.

Protecting and enhancing freshwater habitat and biodiversity on farms can lead to better water quality outcomes. It 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 Bream Bay FMU is available online.

www.nrc.govt.nz/BreamBayCCCV



Climate

Climate is a major influencer of risks and impacts, and 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

In general, in the Bream Bay freshwater management unit (FMU), summers are warm and humid, while winters are mild with only a few light frosts each year. The average annual temperature in nearby Whangārei, for example, ranges from 4-18°C in winter to 11-28°C in summer and has upwards of 1900 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 increase the breeding rate of exotic pest species, such as gambusia. Shading streams is an important tool for reducing water temperatures and improving habitat quality as many native aquatic species are adapted to cooler waterbodies with vegetated riparian margins.

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 1,300 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 Bream Bay 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.

It is 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 and hillslopes 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.
- Limiting stocking rates and effluent disposal on poorly drained areas during wet periods to avoid pugging and run-off.

Further information

NIWA has regional weather and climate information for Northland.

NIWA Northland weather and climate information

www.nrc.govt.nz/BreamBayCCCV

Stats NZ has rainfall data.

Rainfall data

www.nrc.govt.nz/BreamBayCCCV



Tangata Whenua

The Bream Bay 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 tuku iho (historical kōrero passed down through generations) and pūrākau (historical stories/events) 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 mahinga 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 the Bream Bay FMU

Several iwi have associations to Bream Bay 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/BreamBayCCCV

Iwi for the Bream Bay FMU are:

- Patuharakeke Iwi Trust Board (iwi authority under the RMA)
  Ngātiwai Iwi Trust Board (iwi authority under the RMA)
- Ngāpuhi
- Te Uri o Hau
- Ngāti Whatua
- Ngāti Manuhiri (although the majority of their rohe lies in Auckland region, Ngāti Manuhiri have areas of interest around Mangawhai in the Bream Bay FMU).

 www.nrc.govt.nz/BreamBayCCCV

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

 www.nrc.govt.nz/BreamBayCCCV

More information about formally recognised iwi groups

 www.nrc.govt.nz/BreamBayCCCV

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.

Te Uri o Hau have statutory acknowledgements/areas in the Bream Bay FMU which include Mangawhai Harbour and marginal strip, and Ngāti Manuhiri have a statutory acknowledgement over the coast south of Bream Bay. More information on the values and associations that Te Uri o Hau and Ngāti Manuhiri have with these areas is available here:

Statutory Acknowledgement Document

 www.nrc.govt.nz/BreamBayCCCV

Te Uri o Hau

The land now known as the Mangawhai marginal strip and Mangawhai Harbour are of great importance to Te Uri o Hau. These areas were traditionally used by Te Uri o Hau to gather kaimoana (seafood). Mahinga kai and Nohoanga sites are prevalent throughout Mangawhai.

The mauri (life force) of the Mangawhai Harbour and adjacent coastline represents the essence that binds the physical and spiritual elements of all things together, generating and upholding all life. All elements of the natural environment possess a life force, and all forms of life are related. Mauri is a critical element of the spiritual relationship of Te Uri o Hau with the Mangawhai Harbour.

Ngāti Manuhiri

Although Ngāti Manuhiri are not an iwi authority for Northland Regional Council, this iwi still has areas of interest in the Bream Bay FMU.

Ngāti Manuhiri

www.nrc.govt.nz/BreamBayCCCV

The coastal marine area and the coastal environment adjoining are central to the origins, mana and identity of Ngāti Manuhiri as an iwi, and as part of the ocean-focused tribal grouping Ngāti Wai ki te Moana. Ngāti Manuhiri have an important ancestral relationship with the coastal marine area extending from Mangawhai (the Mangawhai Harbour) to Matakanakana (the Matakana Estuary).

Mangawhai – "the estuary of the whai" (stingray) – is of major historical, cultural and spiritual importance to Ngāti Manuhiri. Mangawhai was one of the homes of Kahikatearoa, the son of Manuhiri. The estuary provided shelter for those travelling by canoe from Mahurangi to Whangārei. An overland pathway also linked the head of the harbour at Ōawatea with the Ōruawharo area on the Kaipara Harbour. A variety of fish were netted from the harbour, although this did not include the whai, which is a kaitiaki to Ngāti Manuhiri.

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 of importance to them, and their aspirations.

Iwi and Hapū environmental plans:

- Patuharakeke Iwi Trust Board – see also Patuharakeke GIS Storymap
- Ngātiwai Iwi Trust Board Ngātiwai iwi environmental policy
- Te Uri O Hau Environmental Management Plan

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 Regional Council and Central Government 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/BreamBayCCCV

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.

Sites and areas of significance	Description of significance	Status
Ruakākā Estuary mahinga mātaitai	Patuharakeke cultural values: Traditional harvest and customary management of kaimoana and other taonga species; Source of rongoa (medicinal plants); Source of weaving materials; Source of mātauranga. Ecological values; biodiversity, shellfish beds, mangrove nurseries for juvenile fish, taonga species and habitats that Patuharakeke have obligations toward in respect of kaitiakitanga.	Mapped in Northland Regional Council's Regional Plan
Ruakākā Dune Lake	Patuharakeke cultural values: Traditional harvest of tuna, freshwater fish and waterfowl; Source of weaving materials; Source of rongoā (medicinal plants).	Mapped in Northland Regional Council's Regional plan

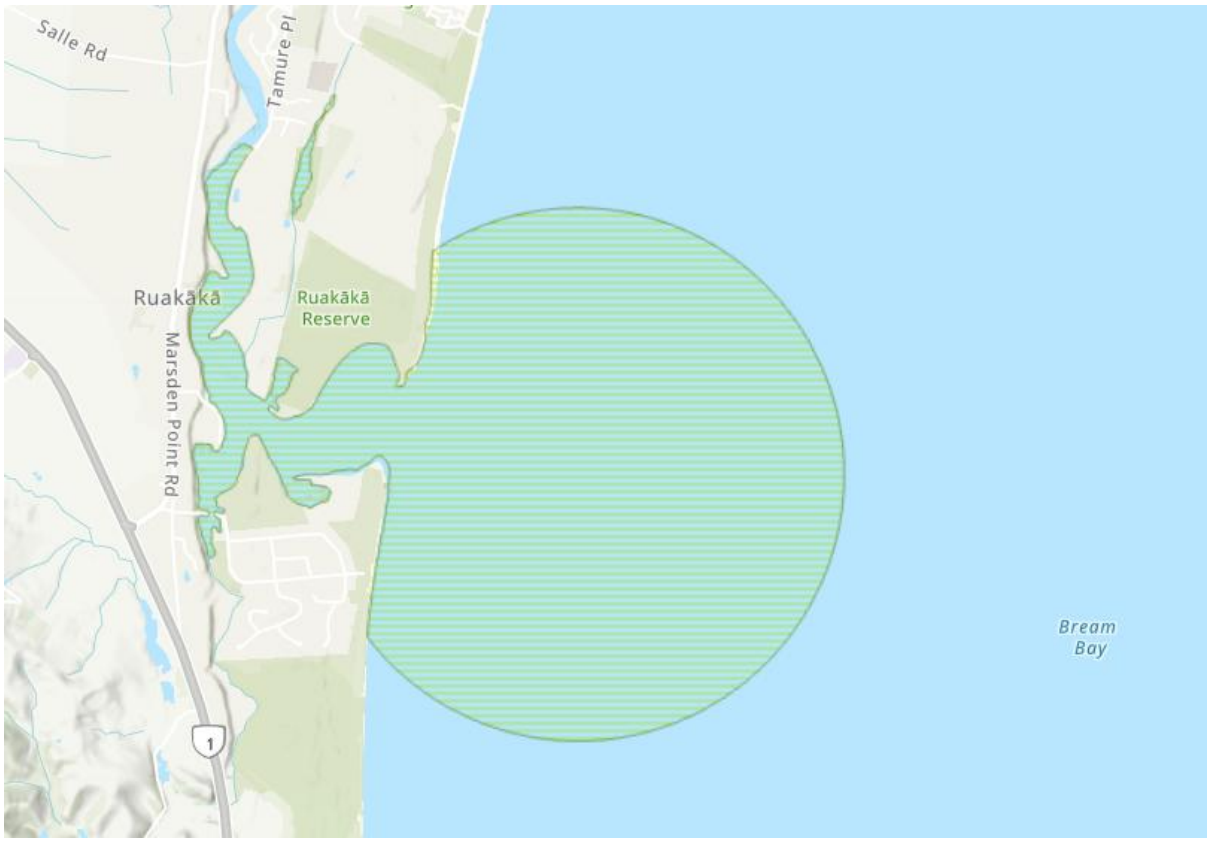


Figure 3: Ruakākā Estuary and Ruakākā Dune Lake

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 or species of significance in Bream Bay FMU. We will update this document with further details as soon as the information is available. If you need urgent assistance with identifying sites or species of significance to tāngata whenua in Bream Bay FMU, please contact Northland Regional Council on 0800 002 004 or info@nrc.govt.nz

Ngā Wero | Challenges

Freshwater in the Bream Bay freshwater management unit (FMU) suffers from poor water quality. The biggest challenges freshwater faces 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 in 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/BreamBayCCCV



Sediment in waterbodies

Slope, soil type, and vegetation affect erosion risks. About 17% of the Bream Bay FMU is mapped as Erosion Prone Land in the Regional Plan for Northland. These maps are available in the Te Taitokerau CCCV viewer and the Northland Regional Council website.

Regional Plan

www.nrc.govt.nz/BreamBayCCCV

Hill slope and streambank erosion are key sources of sediment in fresh and coastal waters of Bream Bay FMU. Sediment levels typically peak during and shortly after heavy rain. Water clarity testing at the Ruakākā River monitoring site on Flyger Road (five-year median) shows sediment has a moderate to high impact on instream life. Five-year median turbidity results also show elevated sediment loads. Trends for both measures of sediment are likely to be degrading.

Erosion degrades both land and freshwater. Eroded materials end up in waterbodies, including estuaries, which are important habitats for native species and sensitive to sediment. Heavy rain, land use practices, pugging from stock, low pasture cover, deforestation, and development-related disturbances make soil erosion worse, 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

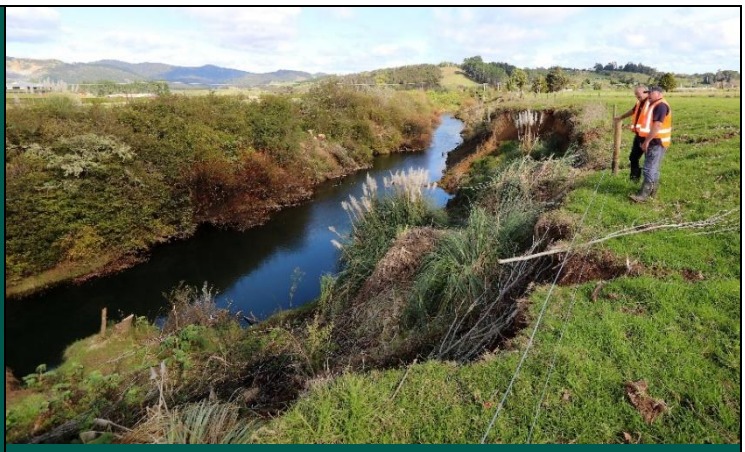
www.nrc.govt.nz/BreamBayCCCV

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

Table 5: 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.

The river monitoring site at Flyger Rd typically grades as very poor for *E. coli* (five-year median), making it unsuitable for human contact or swimming, and it is likely to be getting worse.

Land, Air, Water Aotearoa (LAWA) - Ruakākā at Flyger Road

www.nrc.govt.nz/BreamBayCCCV

Additionally, *E. coli* pollution from effluent discharges to water is unacceptable to tangata whenua.

In pasturelands, sediment and nutrients, along with *E. coli*, runs off into waterbodies especially where there is limited filtering by vegetated riparian buffers.

Monitoring at Ruakākā estuary indicates water is often not suitable for contact recreation or shellfish gathering, and high concentrations of Enterococci (a bacteria indicative of faecal contamination) have been observed at Ruakākā Estuary and Waipū Estuary. Similar results have also been observed for Mangawhai Harbour. Results for faecal coliforms (a bacteria that comes from intestines) reflect a similar pattern.

Northland Coastal Water Quality

www.nrc.govt.nz/BreamBayCCCV

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/BreamBayCCCV

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 – ruminant animals are a common source of *E. coli* in Northland.

Access the research

www.nrc.govt.nz/BreamBayCCCV

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 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 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* in waterbodies, with ruminants (cattle, sheep) typically being 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 contamination 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

Monitoring shows levels of nitrogen, phosphorus, and dissolved reactive phosphorus are elevated in the Ruakākā River.

Nutrients can accumulate as water travels downstream, and nutrient concentrations in estuaries and harbours can be significant and lead to algal blooms. Monitoring at Ruakākā Estuary shows high nutrient concentrations on ebb tides and dissolved reactive phosphorus concentrations exceeded water quality standards.

Northland Coastal Water Quality (See Section 4.9.4).

www.nrc.govt.nz/BreamBayCCCV

In March 2021, a particularly large quantity of nuisance algae was reported in Waipū Cove. As the algae started to die, microbial decomposition appears to have caused a rapid decrease in oxygen, which killed plants and animals. In Bream Bay there have been several large macroalgae events in recent years, producing unpleasant odours and restricting recreational access to the beach. Nutrient levels in freshwater from both the Ruakākā and Waipū Rivers are likely to have contributed to these events.

Elevated nutrient concentrations contribute to excessive growth of nuisance algae in both fresh and coastal waters. Nutrient sources include animal and human wastewater, application of fertilisers and run-off from grazing, cropping or horticultural land. A lack of vegetation on the margins of waterbodies and loss of wetlands means there is less filtering of run-off (and nutrient removal) before it enters water. Your freshwater farm plan should consider these sources and identify measures to reduce nutrient loss to waterbodies.

Wetland and habitat loss

Land use change, intensification, deforestation, drainage, reduced flows, pollution, sedimentation, nutrient enrichment and spread of invasive species can have had 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 Bream Bay (FMU) but have been lost due to drainage for farming, cropping/horticulture, forestry and urban development.

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/BreamBayCCCV

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 FMU. Many of our native 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.

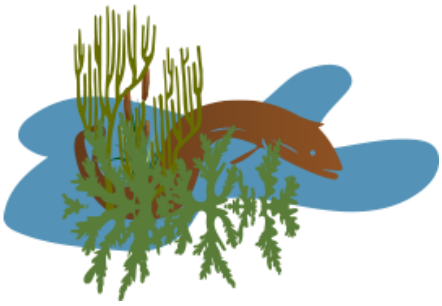
NIWA have developed a fish passage assessment tool which helps to show the barriers to fish passage and how to assess the structures on your farm.

NIWA fish passage assessment tool

www.nrc.govt.nz/BreamBayCCCV

Indicative inanga spawning areas are shown in the Taitokerau CCCV viewer.

www.nrc.govt.nz/BreamBayCCCV



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 don't score very well against an indicator of aquatic ecosystem health – macroinvertebrate community index (MCI) – which is essentially a measure of the variety and abundance of small animals without backbones that live on or just below the streambed. This is particularly the case for the FMU – both the monitoring sites have poor (grade D) macroinvertebrate scores.

The state of our rivers as measured by MCI is available on the LAWA website:

Land, Air, Water Aotearoa (LAWA) - River Quality (Select a river site and turn on the Ecology tab).

www.nrc.govt.nz/BreamBayCCCV



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/BreamBayCCCV

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. This makes it important to restore riparian cover, increase the area of wetlands to supplement flows in rivers, and use freshwater efficiently.

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

www.nrc.govt.nz/BreamBayCCCV

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

www.nrc.govt.nz/BreamBayCCCV

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/BreamBayCCCV

Regional rules are applied through the Regional Plan for Northland.

Northland Regional Plan

www.nrc.govt.nz/BreamBayCCCV

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.

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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).

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 Whangarei 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/BreamBayCCCV

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REGIONAL COUNCIL
Te Kaunihera ā rohe o Te Taitokerau