Coastal Terraces
FRESHWATER MANAGEMENT UNIT
Discussion Document

Working with people | caring for Taranaki

Taranaki
Regional Council

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Purpose and contents of this discussion document

The purpose of this discussion document is to present the progress that Taranaki Regional Council has made on giving effect to the National Policy Statement for Freshwater Management 2020 (NPS-FM) requirements included in the National Objectives Framework (NOF). This is not a complete package of NOF requirements as it focuses on the initial and compulsory aspects of NOF.

This discussion document summarises previous feedback and presents the Council's progress on:

- attributes for ecosystem health and human contact and their baseline states;
- developing a Te Mana o te Wai (the mana of the water) objective;
- the draft long-term vision for the Freshwater Management Unit (FMU);
- the values at play within the FMU;
- draft environmental outcomes for each value within the FMU; and
- next steps for identifying additional attributes and setting target attribute states.

As with previous engagement, the Council is checking in and seeking feedback on these matters across the discussion document.

WE WANT TO HEAR FROM YOU

You can find where the Council is seeking specific feedback on this discussion document in the callout boxes of relevant sections. The specific questions the Council is keen to investigate are set out in the callout boxes in the following sections:

- Te Mana o te Wai
- Long-term vision for the Coastal Terraces FMU
- Environmental outcomes for the Coastal Terraces FMU
- Target attribute states

Responses can be made by taking the online surveys (available 25 September 2023) at www.trc.govt.nz/freshwater, attending one of our workshops or by writing to the Council at policy@trc.govt.nz

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About the Coastal Terraces Freshwater Management Unit

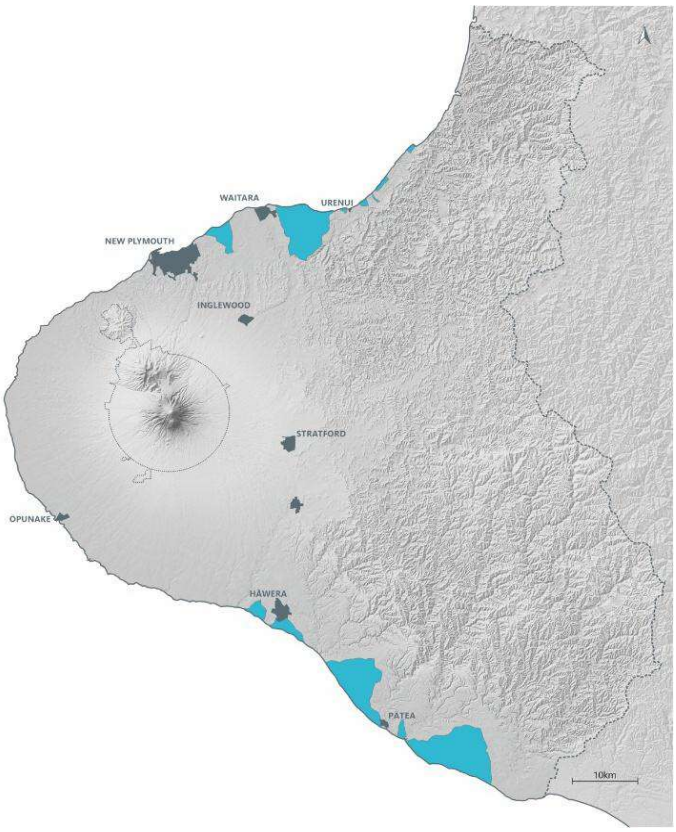

Figure 1 Coastal Terraces FMU sitting within the broader Taranaki region.

The 12 discrete areas of the Coastal Terraces FMU are clustered along the southern and northern coastlines of the region with five in the south and seven in the north (**Figure 1**). The 57 catchments which make up this FMU are short, only a few kilometres long, moderately flowing and behave differently to other FMUs within the region.

Catchments of this FMU are sourced from neither the Maunga nor the hill country but are instead from small, coastal groundwater springs which terminate over the edges of coastal cliffs or seep out into the sea rather than into larger rivers. This means that, unlike rivers and streams that drain to the coast through estuaries or stream mouths, in this FMU there is minimal back and forth interaction between freshwater and coastal waters. These waterbodies are underlain by sand dunes, peats and marine sediments and are freely draining with sandy bottoms.

Because the catchments of this FMU are interspersed across the region's coastline, it includes the rohe of many Taranaki iwi and hapū, including Ngaa Rauru, Ngāti Ruanui and Ngāruahine in the south and Te Atiawa, Ngāti Mutunga and Ngāti Tama in the north. There is one marae located in the town of Waverley. Each iwi, hapū and whānau hold tikanga (protocols) and mātauranga (knowledge) relevant to the awa for which they are kaitiaki (guardians). These significant relationships reflect the variety of histories that span the Coastal Terraces FMU and emphasise how each iwi are intrinsically connected to wai (water) through their whakapapa, culture and spirit. Some of these are recorded in Statutory Acknowledgements (contained in Deeds of Settlement) and others are included in Iwi Environmental Management Plans. Still, others live on in the kōrero (stories and lessons) of kaumātua and kuia (elders) handed down the generations in an unbroken line. The FMU contains a number of coastal pā, kāinga and urupā.

The majority of the FMU (90% of the total area) is cropped or covered by grassland (**Figure 2**). The freely draining soils make these areas versatile for wintering dairy cows where other land may become too muddy. However, freely draining soils can become problematic in the summer months leading to irrigation. In the southern areas, some farmers have also undertaken 'land farming' to combat the dry conditions. This involves adding inert muds from hydrocarbon drilling activities to topsoil to encourage it to hold moisture and be more nutrient rich for growing in. The combination of livestock on loose and sandy soils means that the FMU is prone to exacerbated erosion where fencing and planting of riverbanks has not been undertaken.

While the majority of land in the Coastal Terraces is used for intensive dairy farming, the FMU also contains the largest industrial area of the region, Bell Block. In this portion of the FMU, the inland industrial area sets unique challenges for freshwater health associated with discharges from a large number of industrial sites. Industrial areas tend to experience elevated nutrient levels, heavy metal concentrations and impose other impacts on ecosystem health.

Downstream from the industrial zone, the Mangati Stream runs through the Bell Block residential suburb which produces its own challenges for water quality. These challenges include: where and how much water is taken for municipal supply, contaminants from stormwater and wastewater discharges, culverting and piping of water bodies, and drainage of wetlands and removal of vegetation for subdivision that has previously been undertaken.

Although not located within the FMU themselves, the townships of Pātea and Waitōtara source their municipal supply from southern catchments in the Coastal Terraces FMU. These are monitored closely due to the increased risk of saltwater intrusion into groundwater supplies from abstractions occurring close to the coast.

Some parts of this FMU also contain significant oil and gas resources. In the north, the Tūrangi and Pohukura production stations, along with the Methanex plant, are located in the Motonui area. The southernmost Coastal Terrace is home to Taranaki's only onshore wind farm near the town of Waverley which takes full advantage of local and frequent coastal breezes.

Another interesting and unique feature of the Coastal Terraces FMU is the number of prominent dune lakes that house unique ecosystems that are both nationally and internationally rare and/or threatened. This FMU contains more than 300 mapped wetlands which, alongside the dune lakes, support a diverse range of flora, including a number of threatened plant species. Notable threatened or declining wetland fauna within the Coastal Terraces FMU include the Australasian bittern (Matuku), Spotless crake (Pūweto) and the fernbird (Mātātā). These sensitive ecosystems and the vulnerable species occupying them make the Coastal Terraces FMU important areas for biodiversity.

This FMU also hosts the popular recreational site of Lake Herengawe along with multiple beach camps and retreats.

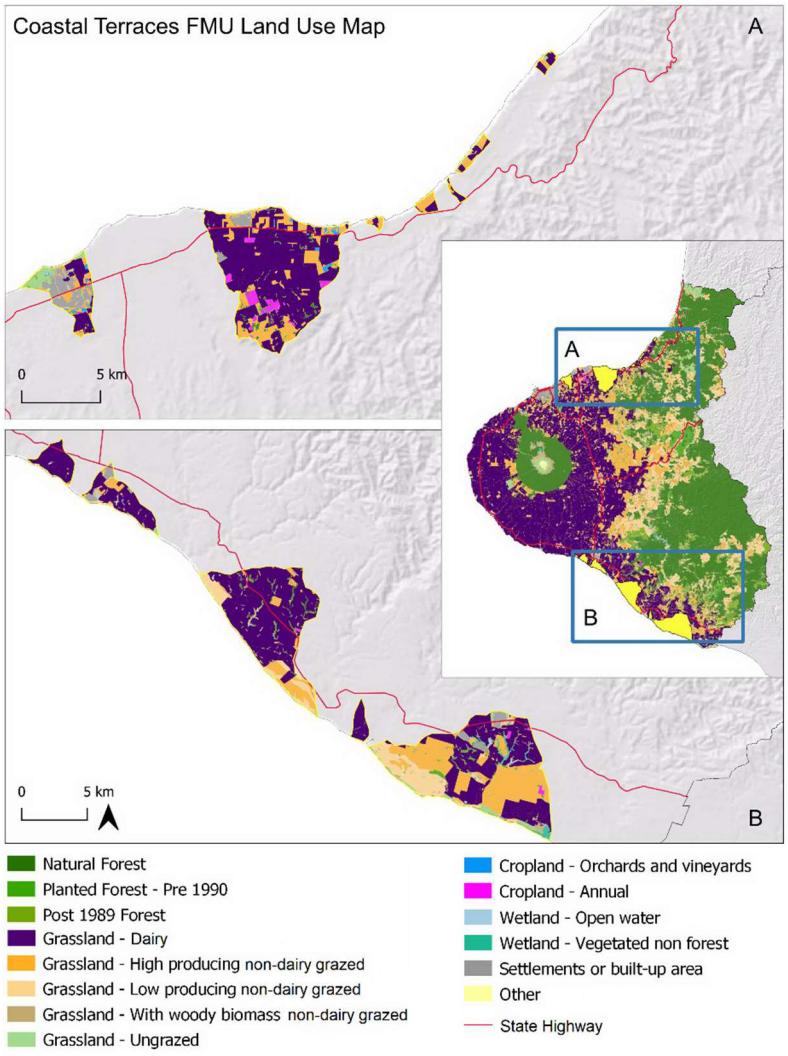

Figure 2 Indicative land use map of the Coastal Terraces FMU.

Background

The future of freshwater management in Taranaki

The *National Policy Statement for Freshwater Management 2020* (NPS-FM) sets out requirements for the management of freshwater. It is part of a broader suite of national direction on freshwater called *Essential Freshwater*, covering a range of initiatives including synthetic nitrogen caps and freshwater farm plans.

The NPS-FM sets out requirements for freshwater management to:

- manage activities that impact freshwater in a way that 'gives effect' to Te Mana o te Wai;
- maintain and/or improve freshwater and address any degradation;
- implement the National Objectives Framework (NOF);
- avoid any further loss or degradation of wetland extents and to encourage their restoration;
- improve fish abundance, diversity and passage;
- monitor and report on freshwater quality and quantity; and
- respond to any identified deterioration of freshwater (including ecosystems).

Key to implementing these requirements is ensuring that the values and concerns of the Taranaki community, including tangata whenua, and stakeholders are considered and integrated into the response. It's about having the right solutions to suit Taranaki.

What is the NOF process?

The National Objectives Framework (NOF) is a process regional councils must work through in tandem with their freshwater plan reviews. The NOF process involves setting long-term visions (aspirations) for freshwater health, implementing changes to freshwater management approaches (e.g. rules and consents) and monitoring key elements of the state of freshwater to track progress toward achieving outcomes. The NOF process is applied to each Freshwater Management Unit (FMU). It is important to keep in mind that the NOF is only one part of a much broader policy framework and there are other freshwater considerations that will be addressed through region-wide provisions in the remainder of the regional freshwater plan.

Working through the NOF process will require changes to our current freshwater management system which will be implemented through a number of initiatives, including:

- the establishment and roll out of freshwater farm plans;
- the review of the existing Regional Freshwater Plan and relevant chapters of the Regional Policy Statement (notification of changes scheduled for the end of 2024);
- the development of targets and limits to address certain freshwater indicators; and
- the development of action plans to implement other regulatory and non-regulatory programmes to address tricky issues such as providing for fish passage and the protection of threatened species (post notification, likely in 2025).

More information on the NOF process can be found on the Ministry for the Environment website.

Previous engagement

This discussion document builds upon previous conversations with communities. These include:

- Engagement on long-term visions for Taranaki – In mid-2021 the Council undertook an initial consultation with the community on their aspirations for freshwater. This was conducted via an online survey and in-person workshop in New Plymouth.
- Stakeholder workshops – In April 2022, the Council conducted a number of workshops with different stakeholder groups. These workshops explored, at a high level, Te Mana o te Wai, vision setting and the challenges and opportunities for Taranaki in freshwater management.

- In late 2022 the Council undertook broad community consultation on draft Freshwater Management Units (FMUs), aspirations for freshwater and the values that apply across the region. This consultation was supported by FMU Storyboards - information pages for each draft FMU.

Partnering with tangata whenua

The Council has an agreement with Ngā Iwi o Taranaki to provide more meaningful opportunities for tangata whenua to be involved in NPS-FM implementation and the development of freshwater provisions in the Regional Policy Statement and the Regional Freshwater Plan. This agreement has resulted in the creation of two positions that assist Ngā Iwi o Taranaki to be involved in these work programmes. The work of these two positions has resulted in a number of position papers setting out the regional issues, aspirations for freshwater and regional approach to Te Mana o te Wai which brings Te Ao Māori perspectives to the fore to guide policy development and future engagement. These position papers have remained front of mind through the drafting process that has been undertaken in the preparation of this discussion document and will continue to be influential in policy development going forward.

This arrangement is the first of its kind for the Council and the partnership is continuing to be built as this work is progressed. The Council will continue to develop its understanding of these statements and work closely with tangata whenua in the future drafting and development of policy.

Freshwater Management Units (FMUs)

An FMU is a water body, or multiple water bodies, that the Taranaki Regional Council considers to be an appropriate scale for managing freshwater, including the setting of freshwater visions, objectives, targets, flows and limits. Every water body in the region must be located within one FMU. The draft FMU designations are set out in **Figure 3** below.

In setting draft FMUs, the Council applied the following principles, recognising that there are multiple ways that the region could be spatially defined.

FMU designation principles:

- 'Ki uta ki tai' – source to sea approach, not splitting catchments across different FMUs;
- go with the wai - catchment boundaries should be used rather than property boundaries to delineate FMUs;
- designed to enable freshwater accounting requirements for limit and target setting (rather than being based on land use practices); and
- keep it simple – fewer FMUs will reduce complications and ensure the NOF is workable.

The feedback received was generally supportive of the six areas, however, there were some comments and suggestions for change. These included:

- noting that Taranaki is a small region with a large number of catchments which does not lend itself well to separation into FMUs;
- noting that the Pātea Catchment FMU fragments the Southern Hill Country FMU;
- suggestions to consider additional areas be added to the Coastal Terraces FMU;
- suggestions of separating catchments that rise in Te Papa-Kura-o-Taranaki (the National Park) from those that begin on the lower areas of the Volcanic Ring Plain FMU;
- suggestions to set the Waitōtara and Whenuakura as their own FMU.

The Council has given consideration to each of these suggestions. Noting that the proposed FMUs were widely supported by those who provided feedback, the Council considers that any concerns raised can be addressed through appropriate policy drafting, without the need to change FMU boundaries.

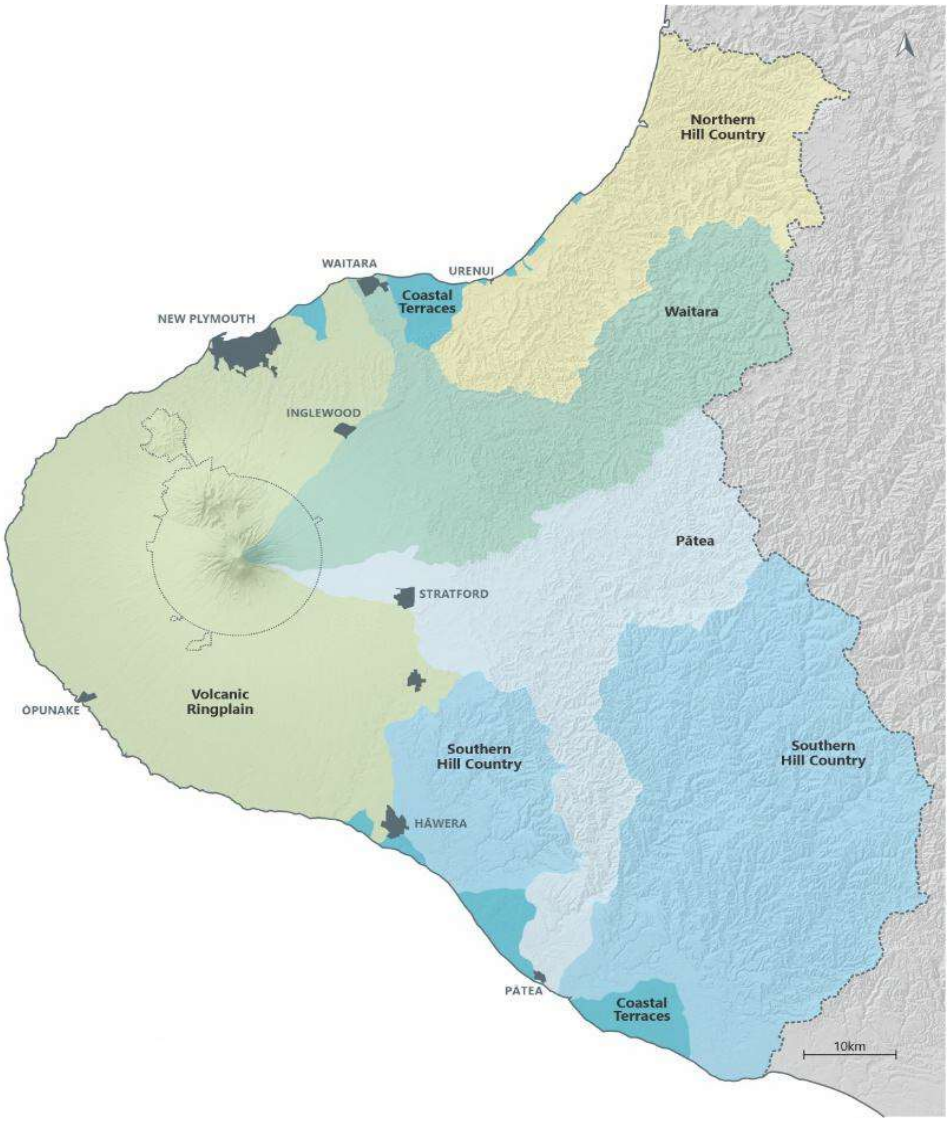

Figure 3 Draft Freshwater Management Unit designations for Taranaki.

TAKE OUR SURVEY

Council is seeking feedback on the following sections:

- Te Mana o te Wai
- Long-term vision for the Coastal Terraces FMU
- Environmental outcomes for the Coastal Terraces FMU
- Target attribute states

Responses can be made by taking the online surveys (available 25 September 2023) at www.trc.govt.nz/freshwater, attending one of our workshops or by writing to the Council at policy@trc.govt.nz

Freshwater in the Coastal Terraces FMU

Baseline states for compulsory attributes

Regional councils must identify baseline states (current or starting points) for a range of different attributes or measures of freshwater health. Baselines provide the context for which councils must either maintain or improve freshwater.

Different attributes relate to different values, uses and interests. Of the four compulsory values, attributes are identified for two: ecosystem health and human contact. There are five components of ecosystem health that tell us about how well an FMU, or part of an FMU, supports freshwater ecosystems. These are:

- *Water quality* – measures the physical and chemical characteristics of water, such as temperature, dissolved oxygen and nutrients.
- *Water quantity* – how much water is in river, stream, lake, or aquifer and how this changes over time.
- *Physical habitat* – the shape and appearance of a body of water, from the bed to the banks and plants present.
- *Aquatic life* – the abundance and diversity of species living in freshwater, from insects and fish to plants and microbes.
- *Ecological processes* – the natural cycling of carbon and nutrients through the food chain.

Attributes are assessed using NOF bands. Generally, NOF bands range from bands D (poor) through to band A (good). The NPS-FM also sets out national bottom lines for some attributes. Catchments that fail to achieve a national bottom line are priority areas for the Council and communities to focus their efforts. Descriptions of each of the attributes and what they are used for are included in Appendix 1 – NOF attribute descriptions.

How are we doing?

Ecosystem health is expected to vary throughout the Coastal Terraces FMU. While monitoring and information is limited, nutrients and sediment are likely to be elevated due to a combination of natural conditions and human activities, which can impact aquatic ecosystems. Periphyton is unlikely to be an issue for soft-bottom streams, however, further monitoring is required to better understand algal growth in streams and rivers and the health of coastal dune lakes. Generally, the state of aquatic life is mixed, as indicated by macroinvertebrate communities, with most monitored sites showing some degree of impact.

Culverts, dams, weirs and other barriers make it difficult for fish to freely migrate through streams. These barriers will require modification to allow fish passage.

Generally across the FMU, improvements are required to provide for safe contact with freshwater. Presently, around 90% of rivers and streams are considered unsuitable for swimming and recreation. Lake Herengawe is monitored during the summer bathing season (1 November – 30 March) and is generally suitable for swimming and recreation.

A summary of the baseline states at each monitoring site is included at Appendix 2 – Baseline states for monitored sites.

How baselines are identified

The Council's approach to compiling baseline information has varied depending on the attribute. Full details are set out in technical memorandums here www.trc.govt.nz.

Where available, monitoring data from water testing or ecological surveys has been used. Monitoring data provides an understanding of what is happening at a particular location. However, using monitoring data

alone can introduce site selection bias. This can result in under- or over-representation of rivers and lakes with certain characteristics.

Spatial modelling can help 'fill the gaps' between monitoring sites and present broad-scale patterns in water quality. These models make estimates of water quality or ecosystem health based on the relationships between catchment characteristics such as climate, soils, geology and land use. They can also be used to help us test the impacts of different management approaches, interventions and actions on freshwater outcomes in Taranaki.

Where both monitored and modelled attribute data is available, two methods have been employed to identify baseline state.

- For monitoring site data, each site within an FMU is assigned to a corresponding attribute band.
- For modelled data, a prediction of attribute state is made for each river segment (small geographic units of a river or stream, ranging from 10s to 1,000s of metres in length). The baseline state is identified by determining the total length and overall percentage of total river and stream segments that are assigned to each attribute band.
- For lakes, modelled predictions are made at the scale of the overall lake.

Uncertainty is a component of any freshwater monitoring or modelling. For example, river flows and levels fluctuate throughout the day, and nutrient levels will vary depending on how much rainfall and runoff is occurring. Pathogens and algae will grow in response to a range of factors, such as temperature, light and river flow. This uncertainty is described in terms of 'confidence'. For example, how certain it is that the actual water quality is reflected in the measurement which has been reported. Where possible, additional assessments have been undertaken to determine a level of confidence in the results.

Some of this uncertainty arises because of the design of the monitoring network. The Council is currently undertaking a review of its freshwater State of Environment monitoring network to ensure it has adequate coverage across the region and aligns with NPS-FM requirements. Due to the high cost, there will always be limitations as to what monitoring alone can achieve.

Where possible, baseline state has been determined for different attributes using a combination of monitoring data and modelling. Due to a lack of available data, much of the information presented here has been drawn from regional models. Ten sites are available for the baseline identification process (Appendix 2 – Baseline states for monitored sites).

There is currently limited information with which to assess the baseline state of many attributes in the Coastal Terrace FMU. Over the past two years, the Council has introduced a new lakes monitoring programme, and redesigned the *Can I Swim Here?* summer bathing programme to align with NPS-FM requirements. Regional monitoring of some aspects of freshwater, such as mahinga kai, threatened species, dissolved oxygen, periphyton and fish require further development. In the Coastal Terraces FMU this also extends to nutrients and sediment for which there is currently little available information. To address these gaps, modelling has been used to determine the most likely attribute state, building on the regional models developed for Taranaki.

River Water Quality

Nutrients

Ammonia, nitrate and phosphorus are important for plant growth, but in excess amounts can cause problems in freshwater. They can lead to an overabundance of algae and aquatic weeds, impact on the growth of sensitive species, or even become toxic to freshwater organisms.

For ammonia, modelling suggests that all streams fall in band A (92%) or band B (8%) (**Figure 4**). Ammonia is expected to have little to no toxic effect on all but the most sensitive species.

For nitrate, around 12% of streams fall within band A and aquatic species are unlikely to experience the effects of nitrate. The majority of streams fall into band B (88%) (**Figure 5**).

Dissolved reactive phosphorus is present in elevated concentrations in streams, with modelling estimating that 95% fall in band D (**Figure 6**). This can result in excessive growth of plants and algae, significantly affecting the health of aquatic environments. The volcanic soils of the region are a natural source of phosphorus to freshwater, meaning that it is likely there are both natural sources as well effects arising from human activity such as discharges of effluent and the use of fertilisers.

Suspended Fine Sediment

Sediment enters rivers and lakes naturally through erosion and runoff, but increases significantly as a result of deforestation, land use activities and direct discharges. Modelling estimates that approximately 3% of waterways fall in band B, 17% fall in band C and 80% fall in band D (**Figure 7**).

Dissolved Oxygen (DO)

Two sites, in the Mangati and Waitaha Streams, are continually monitored for dissolved oxygen, both of which fall into band D. Both of these sites are downstream of the Bell Block industrial area; one of the largest industrial zones in Taranaki. Therefore, this monitoring data provides a useful measure of the impacts from this industrial area, but is less representative of the wider FMU. Minimum dissolved oxygen concentrations recorded at the current monitoring sites indicate that dissolved oxygen is, at times, low enough to cause significant stress to aquatic life.

Presently, there is no monitoring carried out for dissolved oxygen below point source discharges in the Coastal Terraces. The Waverley Oxidation Pond discharge is an example of a point source discharge within this FMU that will require continuous dissolved oxygen monitoring in the future. This is set to be addressed as part of the Council's monitoring network review.

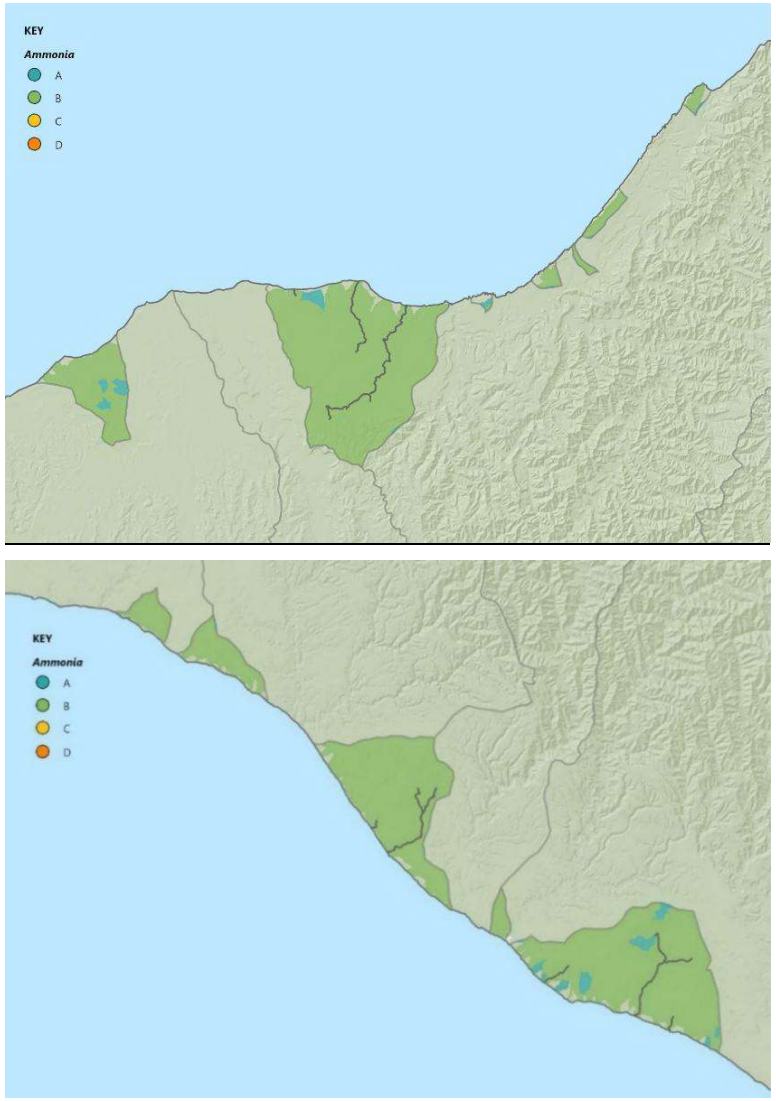

Figure 4 Ammonia modelling.in northern (top) and southern (bottom) Coastal Terraces FMU.

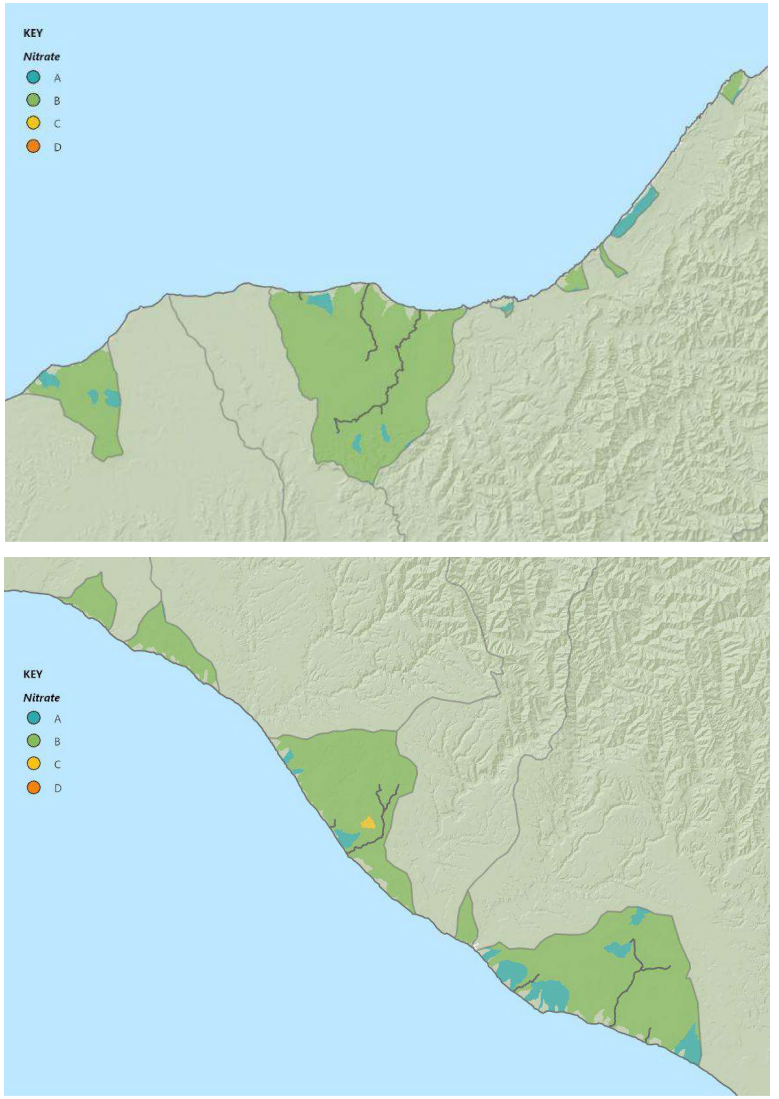

Figure 5 Nitrate modelling. in northern (top) and southern (bottom) Coastal Terraces FMU.

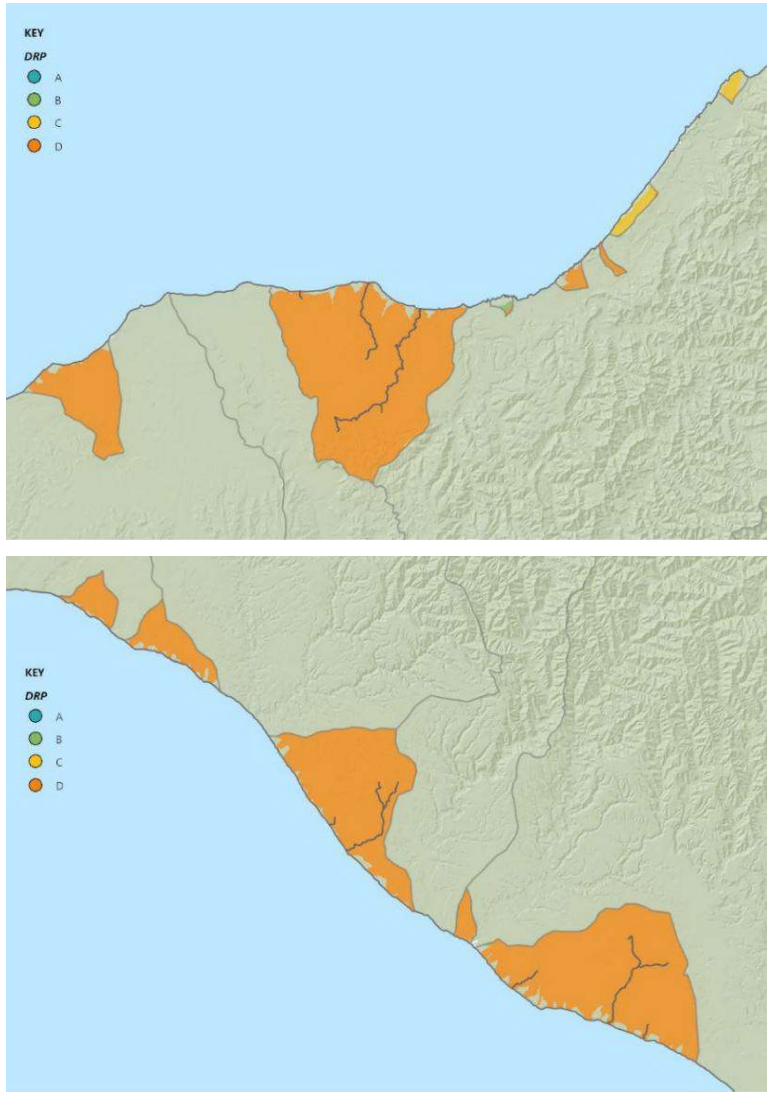

Figure 6 Dissolved reactive phosphorous modelling in northern (top) and southern (bottom) Coastal Terraces FMU.

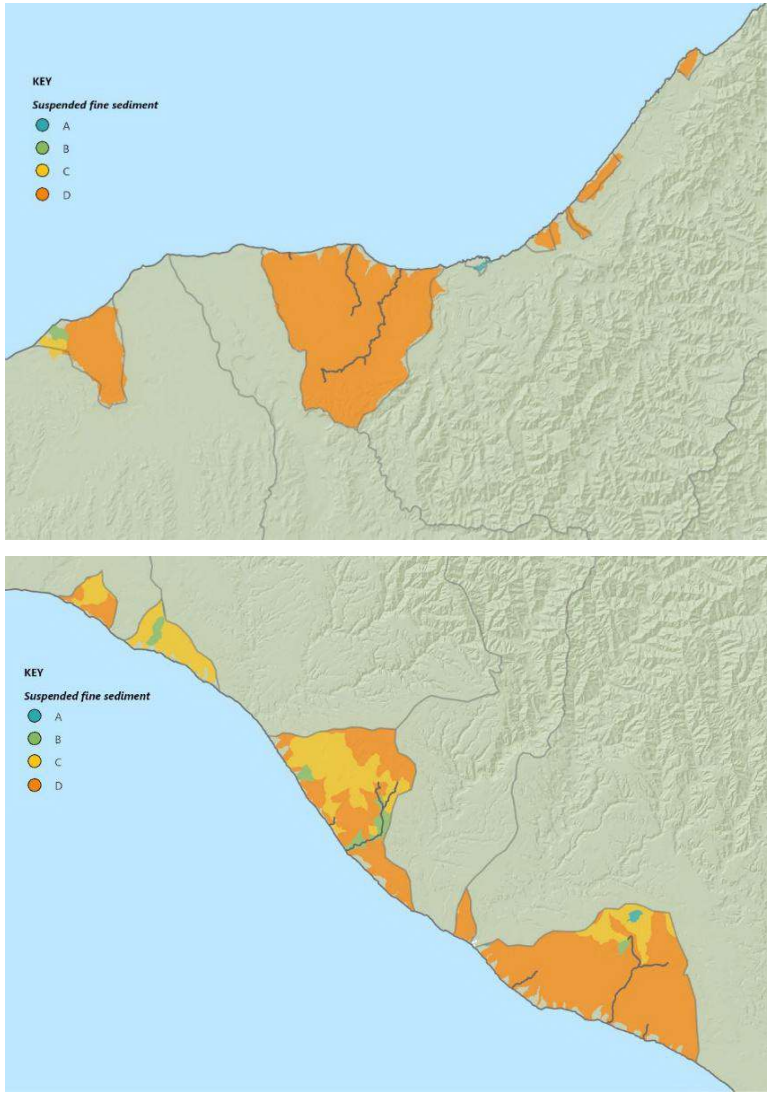

Figure 7 Suspended fine sediment modelling. in northern (top) and southern (bottom) Coastal Terraces FMU.

Water quantity

Water quantity is about tracking how much water is available and how it is being used. This is important for consent holders who might use water for crop irrigation or municipal water supply to enable them to comply with any consent limits. It is also important for ensuring that water allocated for use is done so in a way that provides for other freshwater values, such as ecosystem health.

Under the NPS-FM, water use is managed by setting environmental flows and levels, taking into account any changes that are likely to occur as a result of climate change. Limits can then be set on the rate and amount of water taken, and where and when that water can be abstracted. Monitoring of water use ensures that people comply with the relevant rules and regulations.

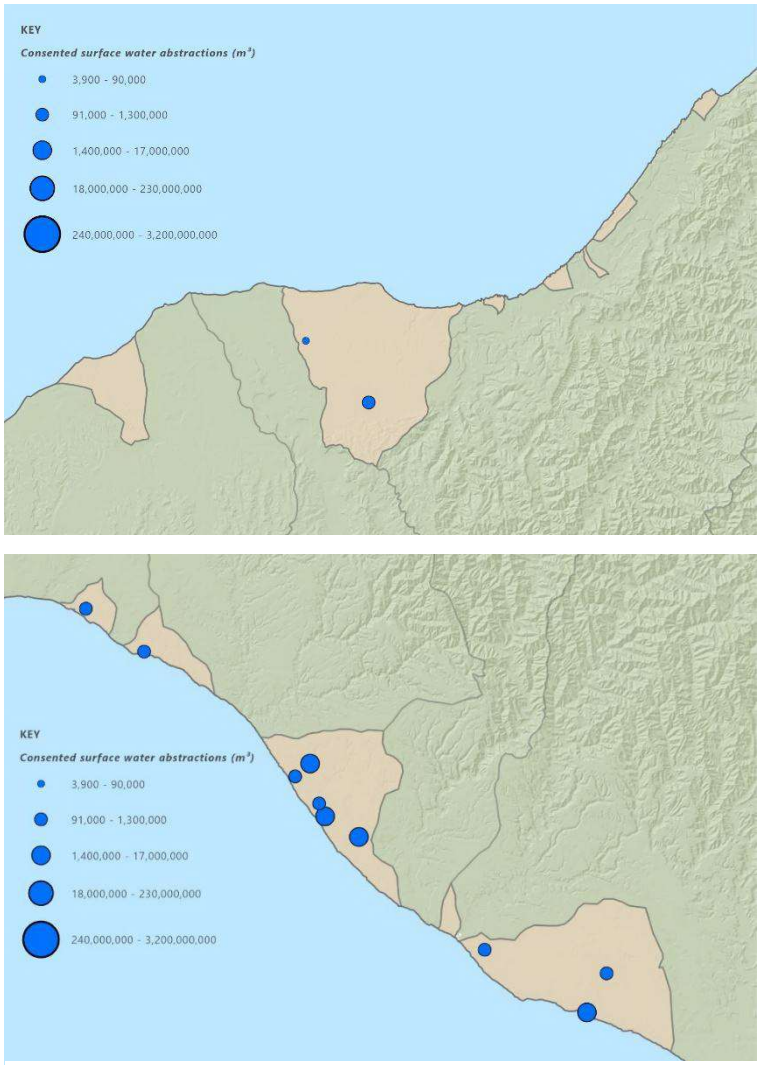

Figure 8 Consented surface water allocation in northern (top) and southern (bottom) Coastal Terraces FMU.

The Council's current Regional Freshwater Plan requires that 66% of the mean annual low flow (MALF) be retained as a minimum flow. There is no limit to the amount of water that can be allocated as a proportion of MALF. Currently there are 12 consents to take water in the Coastal Terraces FMU (**Figure 8**). Six streams currently have more than 33% of MALF allocated. Of these consents three currently have no minimum flow limit set.

Setting appropriate environmental flows and levels will be an outcome of the next stage in the NOF process however it is anticipated that more stringent limits will be necessary to provide for other freshwater outcomes such as ecosystem health, mahinga kai and threatened species. This is likely to have implications for the amount of water that can be allocated for use in the future.

Habitat

Ensuring rivers and streams have habitat suitable for supporting aquatic life is essential. The only compulsory attribute is deposited fine sediment. When sediment settles onto the river bed, forming muddy deposits, it can smother the habitats of aquatic organisms that make rivers their home.

Monitoring of deposited fine sediment in accordance with NPS-FM requirements began in June 2023. Due to this limited data record, the Council has repurposed pre-existing information and undertaken modelling

An existing national spatial model estimates that 5% of Coastal Terrace streams fall within band A, 24% in band B, and 16% in band C. The remaining 55% fall within band D, below the national bottom line and requiring improvement (**Figure 9**).

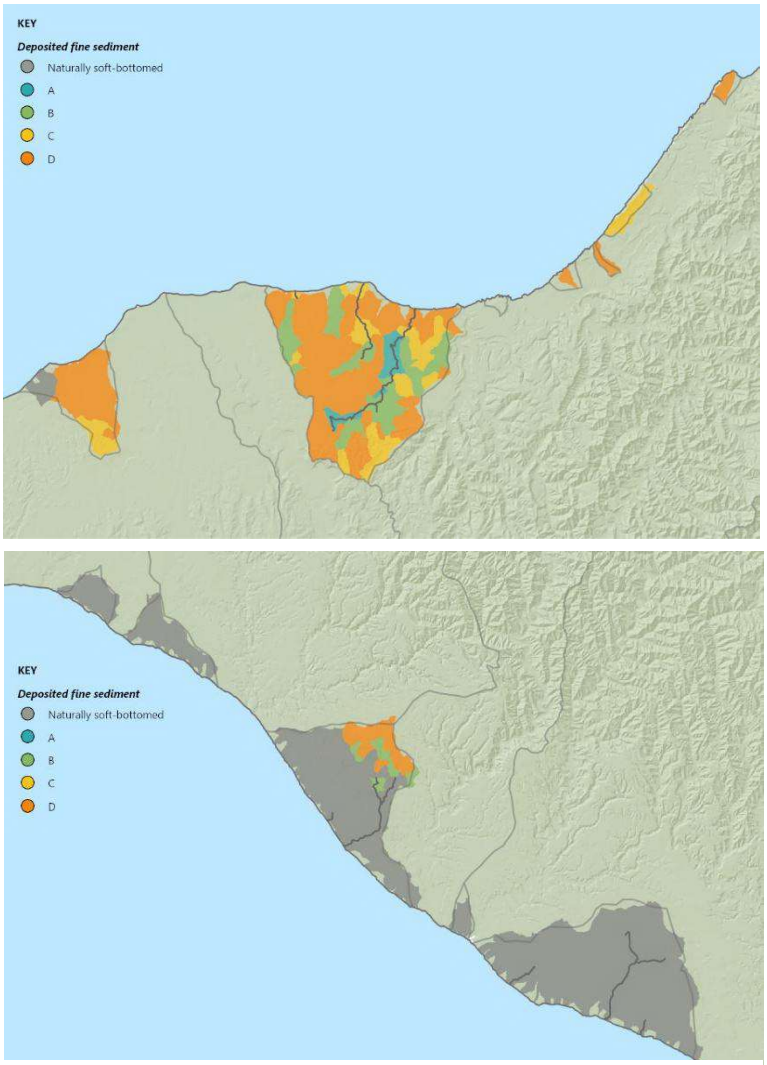

Figure 9 Deposited fine sediment modelling in northern (top) and southern (bottom) Coastal Terraces FMU.

River aquatic life

Aquatic organisms are sensitive to changes in water quality, quantity and habitat. By identifying the range of aquatic organisms living in rivers, lakes and streams, and counting their abundance, we can determine the health and wellbeing of freshwater. Some organisms are desirable (indigenous species and others that may be valued for fishing or mahinga kai) where others are undesirable (pest species).

Periphyton

Growth of periphyton generally occurs as a result of nutrient enrichment in combination with favourable conditions such as warm temperatures and low water flows. There are currently no periphyton monitoring sites in the Coastal Terraces FMU. While the monitoring network is being reviewed to improve coverage, it is noted that most Coastal Terrace streams are unlikely to support periphyton growth due to their soft-bottomed nature.

Fish

The fish attribute considers the integrity of fish communities. One site in the Mangati Stream is monitored for fish, and falls in band A. The Council has low confidence that this grade is representative of the wider FMU as water quality issues and known barriers to fish passage in the Coastal Terraces are both expected to have impacts on fish communities. Additional monitoring is required to better understand the state of fish health.

Macroinvertebrates

Three measurements are used to assess macroinvertebrate health: macroinvertebrate community index (MCI), quantitative macroinvertebrate community index (QMCI) and macroinvertebrate average score per metric (ASPM).

For MCI, the diversity of macroinvertebrate species is challenged by the environmental conditions in this FMU, with three of four sites falling in band D. These sites fall below the national bottom line and require improvement. At these sites macroinvertebrate communities will be dominated by species that are tolerant of pollution and nutrient enrichment. The remaining site is graded in band C. This is supported by the modelling, which estimates that around 54% of Coastal Terrace streams fall into band C, and 45% fall in band D, below the national bottom line (**Figure 10**). Macroinvertebrate communities here are moderately to significantly affected by pollution and nutrient enrichment.

For QMCI, there is one site in the Mangati catchment falls in band D, below the national bottom line and requiring improvement. The three remaining sites located in the Waiau, Mangaroa and upper Mangati catchments, are graded in band C and experience pollution and nutrient enrichment that affect sensitive species. Modelling suggests that the majority of macroinvertebrate communities fall in band C, above the national bottom line with only 2% of stream habitat estimated to be below the national bottom line for QMCI (**Figure 11**).

For ASPM, three of four sites fall in band D, below the national bottom line and require improvement. The remaining site, located in the Waiau catchment is graded in band C. Modelling suggests that 54% of streams fall in band D and below the national bottom line (**Figure 12**).

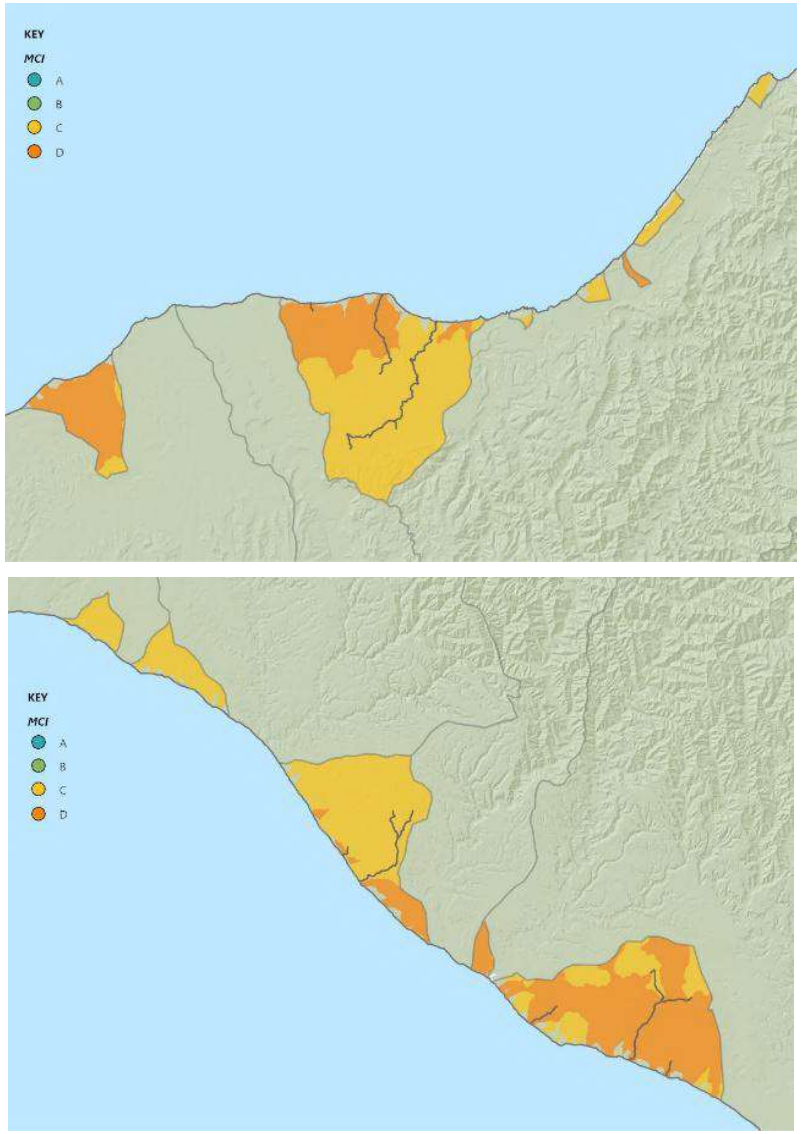

Figure 10 MCI modelling. in northern (top) and southern (bottom) Coastal Terraces FMU

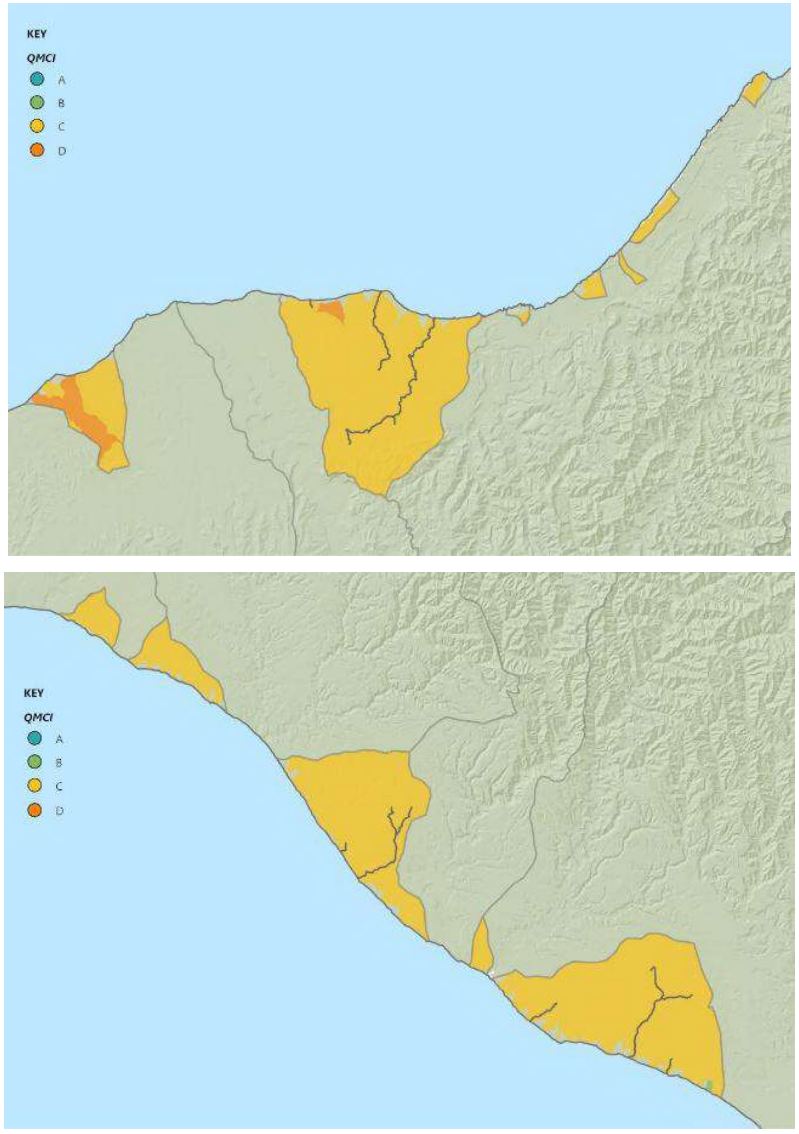

Figure 11 QMCI modelling. in northern (top) and southern (bottom) Coastal Terraces FMU

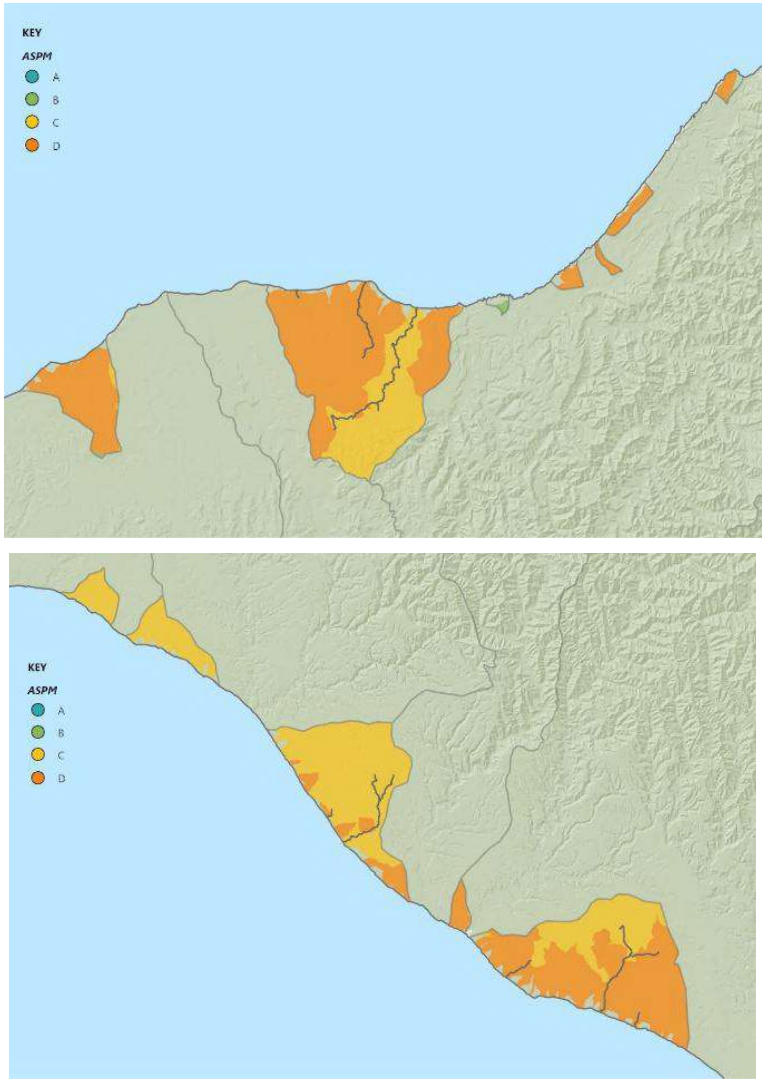

Figure 12 ASPM modelling. in northern (top) and southern (bottom) Coastal Terraces FMU

Photo 1 The extent to which macroinvertebrates, like this mayfly *Coloburiscus*, are present is an indicator of waterway health.

Ecological processes

Ecological processes are assessed by looking at ecosystem metabolism. This is derived from at least seven days of continuous dissolved oxygen monitoring collected during summer (1 November to 30 April). There is currently limited data and modelling to inform baseline state and a new monitoring programme is required. This will be possible as the Council rolls out its dissolved oxygen monitoring network to align with NPS-FM requirements over the next couple of years. There are currently two continuous monitoring sites for dissolved oxygen in the Coastal Terraces.

Ecosystem health in lakes

The health of lake ecosystems is affected by nutrients, sediment and other pollutants, just as it is in rivers and streams. However, lakes behave differently to rivers and streams due to being more confined environments, relatively still/slow flowing and having greater depths. Lakes are also important habitats for indigenous vegetation and can be susceptible to the growth of pest vegetation, so some additional attributes are also included.

Water quality is monitored in two lakes; Lake Kaikura and Lake Herengawe. The Council has used modelling, alongside measured data to evaluate the health of lakes in the Coastal Terraces FMU. Both lakes fall in to band D for nitrogen, indicating that excessive nitrogen is having a serious effect on ecological communities and is likely a driver of excessive plant and algal growth (**Table 1**). Both lakes fall into band C for phosphorus. This means the lake is likely to be moderately impacted by excessive plant and algal growth, as a result of elevated phosphorus levels (**Table 1**). Both lakes fall into band A for ammonia, meaning lake ecological communities are unlikely to be affected by ammonia (**Table 1**). Data collected at Lake Herengawe indicates dissolved oxygen levels fall within band A however, this may be due to the presence of an invasive aquatic plant, hornwort. Data suggests that Lake Kaikura falls in band C, and is at risk of nutrient release from sediments (**Table 1**). The data available to grade these lakes for dissolved oxygen is limited, and the confidence in the grades is low.

Photo 2 Lake Herengawe.

As in rivers, aquatic life in lakes is strongly linked to water quality. The measures of aquatic life in lakes are phytoplankton (algae) and native and invasive submerged plants. Lake Kaikura and Lake Herengawe are both monitored for phytoplankton. Lake Kaikura falls in band C, where ecological communities are moderately affected by additional plant and algal growth from nutrients. Lake Herengawe falls in band D which is below the national bottom line. A survey of submerged plants in Lake Kaikura found that the lake was in band B for both native and invasive plant indices; representing high ecological condition. The ecological condition at Lake Herengawe is in a degraded state, with invasive plant hornwort dominating the aquatic plant community. A formal survey of submerged plants in Lake Herengawe is scheduled for September 2023.

Lake Kaikura attribute grades					
Attribute	**D band**	**C band**	**B band**	**A band**	**N/A**
Total nitrogen	✓				
Total phosphorus		✓			
Ammonia				✓	
Lake-bottom DO		✓			
Mid-hypolimnetic DO					✓
Phytoplankton		✓			
Lake submerged plant (native index)			✓		
Lake submerged plant (invasive index)			✓		
Lake Herengawe attribute grades					
Attribute	**D band**	**C band**	**B band**	**A band**	**N/A**
Total nitrogen	✓				
Total phosphorus		✓			
Ammonia				✓	
Lake-bottom DO				✓	
Mid-hypolimnetic DO					✓
Phytoplankton	✓				

Table 1 Aquatic life attribute grades using modelled and monitoring data for Lake Kaikura and Lake Herengawe..

Human contact

Escherichia coli – routine

Grading of *E. coli* for year-round monitoring is different to other NOF attributes. A fifth band, E, is included and there is no national bottom line, although band C and above is generally considered to be the minimum standard for primary contact

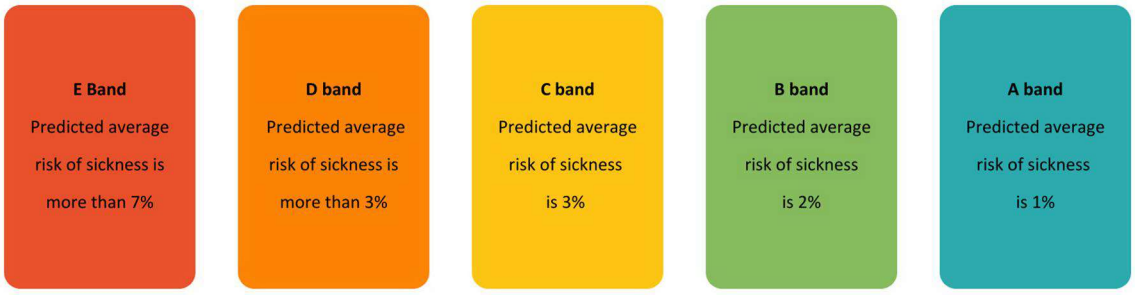

Figure 13 Grading of *E. coli* for routine monitoring which includes an additional 'band E' not included in other NOF attributes

The routine monitoring of *E. coli* is carried out every month at two sites as part of Council's State of Environment water quality monitoring. Lake Herengawe is graded in band A and Lake Kaikura is graded in band B (**Figure 13**). Monitoring at these lakes began in 2023, and the results are preliminary. Continued monitoring data is required to fully assess this site.

There are no monitoring sites for *E. coli* in rivers and streams in the Coastal Terraces FMU. However, modelling (**Figure 14**) suggests that 90% of streams fall into band E indicating a more than 7% chance of illness when swimming. Sources of *E. coli* to freshwater include agriculture, urban storm water and wastewater. All waterways below band A require improvement under the NPS-FM.

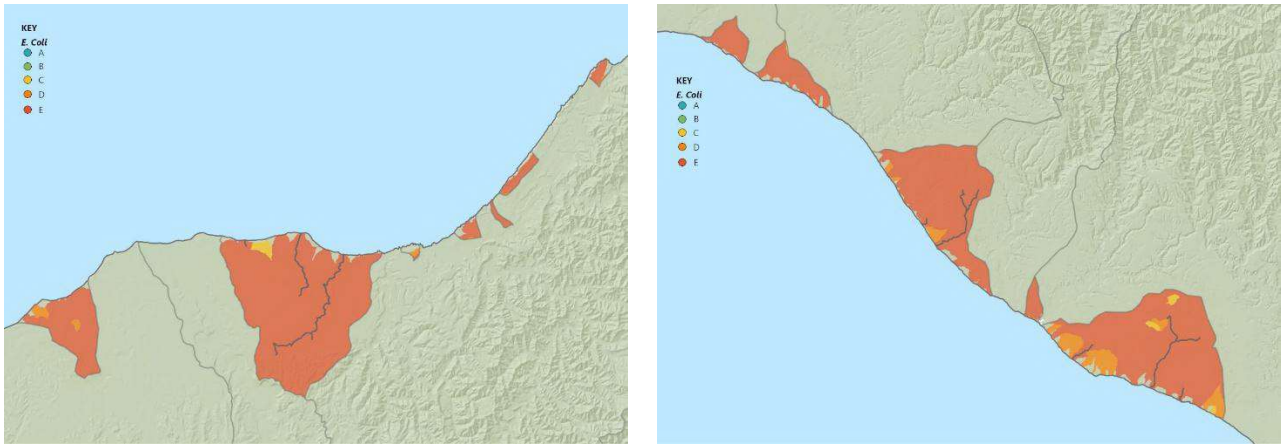

Figure 14 *E. coli* modelling in northern (left) and southern (right) Coastal Terraces FMU.

Escherichia coli (primary contact sites)

In addition to the routine monitoring of *E. coli*, the Council undertakes additional weekly monitoring of primary contact sites to identify potential health risks during the summer bathing season. Lake Herengawe is the only site in the Coastal Terraces FMU and is graded in band A (**Figure 15**). Results are based on the risk of getting sick when people go for a swim, however the short lifespan of this data means that there is low confidence in this assessment.

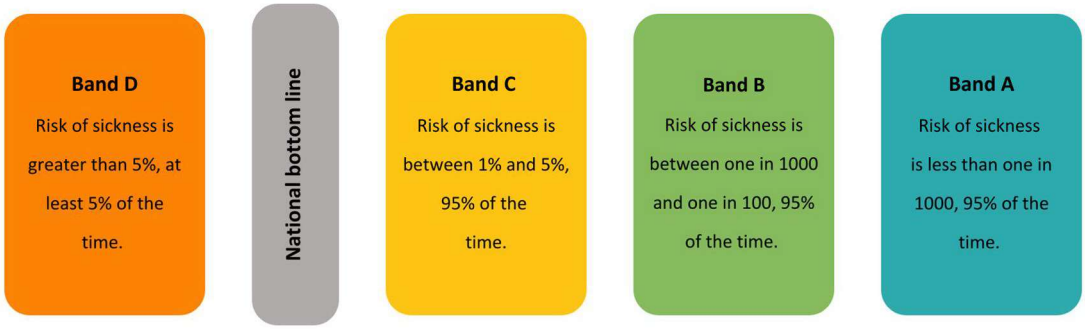

Figure 15 Grading of E.coli for primary contact sites.

Cyanobacteria

Cyanobacteria, otherwise known as blue-green algae, is monitored at two lakes" Lake Kaikura and Lake Herengawe. Regular monitoring of these lakes began in November 2022 and April 2023 respectively, the short lifespan of monitoring makes it difficult to assess the impact of blue-green algae on human contact. Instead, the Council has used modelling with measured data to evaluate blue-green algae at Lake Kaikura and Lake Herengawe. Modelled data suggests that Lake Kaikura falls in band A, and Lake Herengawe falls in band B. Blue-green algae is not considered an issue at Lake Kaikura and there is a low risk to human health at Lake Herengawe.

Te Mana o te Wai

Te Mana o te Wai is the central concept underpinning the NPS-FM 2020 and refers to the fundamental importance of water and the connection all New Zealanders have with it. It recognises that protecting the health of freshwater protects the health and well-being of the wider environment and the community. It recognises the relationship that tangata whenua have with wai (water) through whakapapa (familial relationship through heritage).

There are six principles of Te Mana o te Wai which identify the responsibilities that apply to different people. These principles are:

mana whakahaere: the power, authority, and obligations of tangata whenua to make decisions that maintain, protect, and sustain the health and well-being of, and their relationship with, freshwater.

governance: the responsibility of those with authority for making decisions about freshwater to do so in a way that prioritises the health and well-being of freshwater now and into the future.

kaitiakitanga: the obligation of tangata whenua to preserve, restore, enhance, and sustainably use freshwater for the benefit of present and future generations.

stewardship: the obligation of all New Zealanders to manage freshwater in a way that ensures it sustains present and future generations.

manaakitanga: the process by which tangata whenua show respect, generosity, and care for freshwater and for others.

care and respect: the responsibility of all New Zealanders to care for freshwater in providing for the health of the nation.

There is a hierarchy of obligations under Te Mana o te Wai which sets out the decision making priorities for freshwater management. The hierarchy prioritises:

- first, the health and well-being of waterbodies and freshwater ecosystems;
- second, the health needs of people (such as drinking water); and
- third, the ability of people and communities to provide for their social, economic, and cultural well-being now and in the future.

This hierarchy recognises that all freshwater needs and uses are reliant upon healthy water for their long-term provision.

Every regional council must include an objective in its regional policy statement that describes how the management of freshwater in their region will give effect to Te Mana o te Wai[1].

Ngā Iwi o Taranaki provided a first draft of a Te Mana o te Wai objective that reflected how tangata whenua see the concept being given effect to. The Council has prepared a second draft which springs from that. Following this consultative stage, and considering the feedback received, further work and refinements will be made to the draft objective in collaboration with Ngā Iwi o Taranaki. To support this objective, a broader policy framework will also be prepared to ensure that Te Mana o te Wai is given effect to through the different management and decision making processes of the regional freshwater plan.

The draft Te Mana o te Wai objective that the Council is seeking feedback on is included in the box that follows:

[1] NPS-FMClause 3.2(3), page 13.

Objective – Te Mana o te Wai

Through partnership with tangata whenua and the community, Te Mana o te Wai will be given effect to by:

a) recognising and providing for the mana motuhake, manaakitanga and kaitiakitanga of tangata whenua partners in management and decision making on freshwater;
b) strengthening the relationships between wai (water), whenua (land) and all people and, for tangata whenua o Taranaki, affirming and strengthening the enduring, integral whakapapa relationships;
c) upholding, protecting, and restoring the mauri, health, and well-being of wai and waterbodies for current and future generations;
d) acknowledging and responding to the unique whakapapa of waterbodies; and
e) providing for waterbodies to behave [naturally] as they wish;

so that the interconnectedness of wai, whenua and taiao continue to support and perpetuate life.

QUESTIONS TO PONDER

TE MANA O TE WAI

Question 1: What do you think about the objective of giving effect to Te Mana o te Wai?

Question 2: Do these provisions cover everything that is important to you? Please let us know if there is anything missing.

Question 3: Tell us to what extent you agree or disagree with these draft provisions in the objective.

Long-term vision for the Coastal Terraces FMU

A long-term vision is an objective that sits within the Regional Policy Statement (RPS) that reflects the aspirations of the Council, tangata whenua, and the broader community for freshwater within the FMU. The purpose of that objective is to set out an ambitious *but* reasonable goal for the FMU, and to illustrate what freshwater would look like in the long-term.

The long-term vision itself identifies the timeframe within which the objective is to be achieved, and the very nature of this is to be beyond the life of the RPS. This approach encourages the Council to anticipate and strategically plan for continuous and sustained improvements across a much longer planning horizon and to confirm the practicality of the vision.

The broader NOF framework and other directions in the NPS-FM set out the process for turning this ambitious long-term vision into something that can be implemented and achieved. It does this through the development of environmental outcomes, setting of target attributes, setting limits on freshwater use, applying conditions to resource consents, developing action plans and reviewing the freshwater rules and broader policy framework. This is a much broader process that will take more time and collaboration with stakeholders and tangata whenua to work through.

What is below is a starting point for those discussions to spring from. The draft below has sprung from and has been informed by position papers from tangata whenua, feedback from previous consultation, and Council knowledge.

You may notice that the date to achieve the long term visions is yet to be determined. This timeframe will be part of the conversations taking place in early 2024.

Long-term vision for the Coastal Terraces Freshwater Management Unit

In the Coastal Terraces Freshwater Management Unit:

1. *freshwater and the effects of activities on freshwater are managed to give effect to Te Mana o te Wai;*
2. *the journey of freshwater, from spring-fed coastal streams through coastal dune land where they release over the edge of coastal cliffs or seep out to join the Tasman Sea, sustain the life force and mauri of the environment and reflect their natural variability and natural form and character;*
3. *water bodies, including riparian margins, wetlands, coastal dunes and lakes, groundwater and surrounding habitats, support diverse, abundant and connected ecosystems and the resilience of indigenous and threatened species;*
4. *the mana of tangata whenua and their traditional and ongoing relationships with wai are restored through mahinga kai and the practice of mātauranga Māori;*
5. *land use and freshwater practices improve freshwater quality so that ecosystem health and human health needs are provided for and protected by:*
    a. *taking into account the sensitivities of ecosystems and habitats; and*
    b. *being responsive to the current and future effects of climate change;*
6. *strong and resilient biodiversity provide for the sustainable harvest of mahinga kai, rongoa and fish; and*
7. *Lake Herengawe is maintained in an excellent state for human contact and other water bodies are safe for swimming, mahinga kai and other customary and recreational purposes;*

by the year (date tbc).

QUESTIONS TO PONDER LONG-TERM VISION

Question 4: What do you think about the draft long-term vision for the Coastal Terraces FMU?

Question 5: To what extent do you agree or disagree with the draft long-term vision?

Values and environmental outcomes for the Coastal Terraces FMU

The NPS-FM uses the term "values" to refer to important aspects of freshwater that need to be considered and provided for when setting targets and limits. Freshwater must be managed to protect compulsory freshwater values and whether other values are present within the FMU. Compulsory values are those required to be addressed through the NOF: ecosystem health, human contact, threatened species and mahinga kai. Non-compulsory values must be considered and, if relevant to the FMU, taken through the NOF process.

For any value identified within an FMU, the regional freshwater plan must set out an objective (environmental outcome) which describes the desired state for water bodies in that FMU. Because environmental outcomes are included in the regional freshwater plan, they therefore have a strong association with the policies, rules and consenting processes relating to freshwater management decisions.

The identification of values and the draft environmental outcomes for the Coastal Terraces FMU has been informed by position papers from tangata whenua, previous consultation, and Council knowledge.

Compulsory values

Ecosystem health

Environmental conditions ensure that ecosystems within the Coastal Terraces FMU are healthy and resilient to seasonal variations, the impacts of climate change and the effects of land and freshwater use by achieving the following:

a) ***Water Quality:*** *the physical and chemical measures of freshwater including appropriate light penetration and nutrient and oxygen concentrations ensure the healthy functioning of ecosystems;*

b) ***Water Quantity:*** *the extent and variability in the level and flow of freshwater:*

- *i. maintains the hydrological connectivity;*
- *ii. maintains and improves aquatic habitats;*
- *iii. provides for life stages of aquatic biodiversity;*
- *iv. supports terrestrial habitats; and*
- *v. ensures appropriate nutrient cycling;*

c) ***Habitat:*** *the natural and physical form, structure and extent of water bodies are protected and improved from their current state to ensure the preservation of aquatic habitats and indigenous aquatic ecosystems;*

d) ***Aquatic Life:*** *healthy communities of microbes, invertebrates, plants and fish are found throughout and identified pest species are managed to reduce their impact on aquatic life;*

e) ***Ecological Processes:*** *the well-functioning interactions between water bodies (hydrology and physical-chemical characteristics), their surrounding environments (landscapes, geology and climate) and their biota are recognised and provided for.*

Human contact

Human connections to water bodies are provided for, by:

a) *protecting Lake Herengawe as a primary contact site that already supports safe and appealing interactions with freshwater;*

b) *reducing the overall risk to human health throughout the Coastal Terraces FMU.*

Threatened species

Wetlands, riparian margins and other critical habitats within the Coastal Terraces FMU promote the continued survival, natural migration and long-term recovery of threatened species (refer Appendix 3 – Identified values in the Coastal Terraces FMU [Freshwater dependent threatened species]).

Mahinga kai

Tangata whenua can safely practise mahinga kai, and sustainably harvest and consume species important to them for whānau and marae events, year-round within the Coastal Terraces FMU because:

a. *kaitiakitanga is exercised by tangata whenua according to their tikanga and customs, including while carrying out mahinga kai activities and practices;*
b. *waterways support a healthy, diverse and abundant range of mahinga kai species;*
c. *mahinga kai species can travel naturally throughout the catchments to complete necessary life stages;*
d. *habitat of mahinga kai species is thriving and flourishing (healthy and improving);*
e. *water quality and water quantity support healthy mahinga kai species and areas; and*
f. *whānau (all generations) can safely access mahinga kai sites, areas and waterbodies, and share knowledge and customs associated with mahinga kai.*

Non-compulsory values

Natural form and character

The natural form and character of water bodies within the Coastal Terraces FMU are protected and, where the natural form and character has been degraded, their restoration is promoted and provided for.

Drinking water supply

Sustainable and potable drinking water is provided for throughout the Coastal Terraces FMU by sufficient freshwater quality and quantity and is palatable where the natural chemistry of the source allows.

Wai tapu

Tangata whenua can access wai tapu sites and localities within the Coastal Terraces FMU which are free from human and animal waste, contaminants and excess sediment; the valued features and unique properties of wai are protected.

Watercraft and tauranga waka

[The Council has not identified this as a value for the Coastal Terraces FMU. If you think this value does apply, please provide feedback, including rationale and which catchment(s)/part of catchment(s) you think this value applies to.]

Fishing

[The Council has not identified this as a value for the Coastal Terraces FMU. If you think this value does apply, please provide feedback, including rationale and which catchment(s)/part of catchment(s) you think this value applies to.]

Hydro-electric power generation

[The Council has not identified this as a value for the Coastal Terraces FMU. If you think this value does apply, please provide feedback, including rationale and which catchment(s)/part of catchment(s) you think this value applies to.]

Animal drinking water

Water bodies within the Coastal Terraces FMU provide sufficient and safe water for the drinking needs of animals.

Irrigation, cultivation and production of food and beverages

Irrigation, cultivation and the production of food and vegetables within the Coastal Terraces FMU are sustainably provided for by suitable and reliable freshwater quality and quantity.

Commercial and industrial use

Commercial and industrial activities and opportunities within the Coastal Terraces FMU are sustainably provided for by suitable and reliable freshwater quality and quantity.

QUESTIONS TO PONDER

Values and Outcomes

Question 6: Have the right values been identified for the Coastal Terraces FMU?

Question 7: What do you think of the draft environmental outcomes identified for each value in the Coastal Terraces FMU?

For example, the value for fishing has the environmental outcome of "*The health and abundance of fisheries species within the Coastal Terraces FMU are provided for by suitable freshwater quality and quantity including at identified recreational fishing areas*"

Progressing towards identifying target attribute states

Progress towards achieving each of the environmental outcomes will be measured by identification of target attribute states. The target attribute states set out the milestones and overall goal for each attribute to support the achievement of the relevant environmental outcomes and long-term visions. A target attribute state must not be lower than the baseline state and must at least achieve national bottom lines. For attributes associated with the value of human contact, the target state must be higher than the baseline to deliver on national targets for improving swimmability.

Further work with tangata whenua, communities and stakeholders is required to identify possible mitigations and actions, and set target attribute states that are both ambitious and achievable. In doing so, the Council will need to identify the 'gap' between the current/baseline state and these targets, and consider the options and opportunities over the next years and decades to close that gap. These opportunities include updating rules and policies in the Regional Freshwater Plan where activities are having a detrimental effect on the environment, preparing action plans (non-regulatory approaches) to making improvements, and updating consent conditions.

Set out below are a set of draft principles to guide the setting of target attribute states.

Principles for setting target attribute states

1. All assessments of target attribute state must have regard to the foreseeable impacts of climate change.
2. All target attribute states must either maintain or improve the attribute state from baseline:
   a) to meet or exceed national bottom lines (except in the case of naturally occurring process[1]); and
   b) to either:
      i. maintain the baseline state where the baseline is considered to already achieve the relevant environmental outcomes(s) and clause (a) has already been achieved; or
      ii. improve upon the baseline state where this is not considered to achieve the relevant environmental outcome(s).
3. When identifying and assessing target attribute states, identify the actions/approaches/mitigations that would be required to achieve improvements at each NOF band.
4. Using best available information, ensure that an identified target attribute state is achievable within the timeframe set in the long-term vision and where the timeframe of a draft long-term vision may be unreasonable or unachievable, identify alternative options that may require incorporation into the draft long-term vision.
5. Where an attribute state is unlikely to meet the vision and environmental outcomes within 10 years, or where significant short-term gain can be achieved, support the target attribute state with interim targets (no more than 10 year timeframes).

QUESTIONS TO PONDER

TARGET ATTRIBUTE STATES

Question 8: What do you think of the principles for setting target attribute states?

Question 9: What is important for the Council to consider when setting target attribute states for the Coastal Terraces FMU?

Glossary

Biological diversity means the variability among living organisms, and the ecological complexes of which they are a part, including diversity within species, between species, and of ecosystems.	RMA
Ecosystem means the complexes of organisms and their associated physical environment within an area (and comprise: a biotic complex, an abiotic environment or complex, the interactions between the biotic and abiotic complexes, and a physical space in which these operate).	NPS-IB
Freshwater or **fresh water** means all water except coastal water and geothermal water	RMA
Indigenous biodiversity means the living organisms that occur naturally in New Zealand, and the ecological complexes of which they are part, including all forms of indigenous flora, fauna, and fungi, and their habitats.	NPS-IB
Natural form and character has the same meaning as in Appendix 1B of the NPS-FM, which refers to: matters contributing to the natural form and character of an FMU are its biological, visual and physical characteristics that are valued by the community, including: (a) Its biophysical, ecological, geological, geomorphological and morphological aspects (b) the natural movement of water and sediment including hydrological and fluvial processes (c) the natural location of a water body and course of a river (d) the relative dominance of indigenous flora and fauna (e) the presence of culturally significant species (f) the colour of the water (g) the clarity of the water.	NPS-FM App 1B
Resilience in relation to an ecosystem, means the ability of the ecosystem to recover from and absorb disturbances, and its capacity to reorganise into similar ecosystems. [Resilient has the same meaning].	NPS-IB
Restoration means the active intervention and management of modified or degraded habitats, ecosystems, landforms, and landscapes in order to maintain or reinstate indigenous natural character, ecological and physical processes, and cultural and visual qualities, and may include enhancement activities. [Restore has the same meaning].	NPS-IB
Te Mana o te Wai has the same meaning as set out in clause 1.3 of the NPS-FM.	NPS-FM
Water: a) means water in all its physical forms whether flowing or not and whether over or under the ground: b) includes fresh water, coastal water, and geothermal water: c) does not include water in any form while in any pipe, tank, or cistern.	RMA
Water bodies means fresh water or geothermal water in a river, lake, stream, pond, wetland, or aquifer, or any part thereof, that is not located within the coastal marine area.	RMA

Appendix 1 – NOF attribute descriptions

Rivers

	NOF Attribute	Applies to	Description
Water quality	Ammonia (toxicity)	Rivers and lakes	Ammonia and nitrate are two forms of nitrogen; an essential nutrient for plant growth. They are components of nitrogen based fertilisers which enter the environment from point source discharges and runoff. Ammonia and nitrate contribute to the rapid growth of aquatic weeds and at certain levels are toxic to aquatic life.
	Nitrate (toxicity)	Rivers	
	Dissolved reactive phosphorus (DRP)	Rivers	A form of phosphorus that is available for plants to use for growth. High levels of DRP can contribute to periphyton (green-brown algae) growth in rivers.
	Suspended fine sediment	Rivers	Fine particles of sediment from erosion, runoff, and effluent discharges reduce light penetration and smother habitat. Too much fine sediment can make rivers and streams unpleasant to swim in and unsuitable for drinking water and for mahinga kai.
	Dissolved oxygen	Rivers	Dissolved oxygen is required by all aquatic life for respiration. The availability of oxygen dissolved in water will decrease as nutrients, temperature and algal growth increases. If the amount of oxygen dissolved into water drops below a certain point, it can lead to stress, harm or death of aquatic life.
	Dissolved oxygen	Rivers (below point sources only)	Oxygen dissolved in water can be directly affected by a point-source discharge such as a pipe at a factory or wastewater facility. The nutrients and organic matter in wastewater discharges can lead to increased microbial growth in aquatic environments, which can subsequently deplete dissolved oxygen concentrations.
Physical habitat	Deposited fine sediment	Wadeable rivers	Deposited fine sediment is mud, silt or sand that has been accumulated onto the river bed. When sediment is deposited, it fills spaces between rocks and reduces the available habitat for freshwater organisms.
Aquatic life	Periphyton (trophic state)	Rivers	Periphyton is the green-brown algae that grows on the rocks and on the riverbed. Growth of periphyton is affected by temperature and nutrients in the water. When rivers rise with rain, periphyton is washed away but during low flows excess periphyton growth can cause issues for freshwater ecosystems, drinking water and for recreation.
	Fish (rivers)	Rivers	Fish habitat can be impacted by deposited sediment or excess algal growth, making it difficult for fish to survive and spawn. Many native fish also migrate, travelling the lengths of the rivers from which they spawn. The presence or absence of fish species in waterbodies is representative of fish community health. Reduced fish

			community health may be indicative of reduced ecosystem health generally or other factors such as barriers preventing fish from moving through a catchment.
	Macroinvertebrates (1 of 2) – MCI & QMCI	Rivers	Macroinvertebrates are small animals such as aquatic worms, insects and snails. Their sensitivity to environmental changes makes them a good indicator of stream health. MCI simply accounts for the presence of a particular species, whereas QMCI also includes the number of individuals present.
	Macroinvertebrates (2 of 2) - ASPM	Rivers	The ASPM measure of macroinvertebrates combines both MCI and QMCI, and also counts of three particularly sensitive, closely related, families of insects.
Ecosystem processes	Ecosystem metabolism	Rivers	The cycling of energy, nutrients, carbon and oxygen through the food chain provides the appropriate balance to support organisms from plants and algae through to fish and birds.

Lakes

	NOF Attribute	Applies to	Description
Water quality	Total nitrogen (trophic state)	Lakes	Total nitrogen is a measure of the availability of all forms of nitrogen in lakes, including ammonia and nitrate. Nitrogen is an essential nutrient for aquatic plants however, elevated nitrogen can contribute to excessive lake plant and algal growth and degrade ecological communities.
	Total phosphorus (trophic state)	Lakes	Total phosphorus is a measure of all the available forms of phosphorus in lakes, including DRP. Like nitrogen, phosphorus is an essential nutrient for plant growth, but it can accumulate with sediment at the bottom of a lake where it can be released periodically when dissolved oxygen concentrations are depleted, helping drive lake algal blooms.
	Ammonia (toxicity)	Rivers and lakes	Ammonia contributes to the rapid growth of aquatic weeds and at certain levels is toxic to aquatic life.
	Lake-bottom dissolved oxygen	Lakes	This relates to the levels of dissolved oxygen on the bottom of lakes which is important for aquatic organisms inhabiting these areas. The availability of oxygen dissolved in water will decrease as nutrients, temperature and algal growth increases. If the amount of oxygen dissolved into water drops below a certain point, it can lead to stress, harm or death of aquatic life.

	Mid-hypolimnetic dissolved oxygen	Seasonally stratified lakes	This relates to the levels of dissolved oxygen in the lower parts of seasonally stratifying lakes, where fish are most likely to reside due to more conducive temperatures. The availability of oxygen dissolved in water will decrease as nutrients, temperature and algal growth increases. If the amount of oxygen dissolved into water drops below a certain point, it can lead to stress, harm or death of aquatic life.
Aquatic life	Phytoplankton (trophic state)	Lakes	Phytoplankton are microscopic organisms that float freely near the surface of lakes. In high numbers, phytoplankton are seen as algal blooms.
	Submerged plants (natives)	Lakes	Native submerged plant species are an important part of the freshwater ecosystem, providing food and habitat for fish and other aquatic animals. Plants also help to improve water quality by filtering pollutants and sediments.
	Submerged plants (invasive)	Lakes	Invasive submerged plant species can disrupt freshwater ecosystems by displacing native plant species and can have negative impacts on lake ecosystems.

Human contact

Attribute	**Applies to**	**Description**
Escherichia coli	Lakes and rivers	*Escherichia coli* (*E. coli*) is used to indicate faecal contamination in freshwater which create risks for human health in elevated concentrations. Contamination might come from wastewater, industry and animal effluent discharges.
Escherichia coli (primary contact sites)	Primary contact sites in lakes and rivers (during the bathing season)	Popular swimming and recreational spots have been identified as primary contact sites which are monitored over the summer period. *E. coli* measures are graded against recommendations from the World Health Organisation on safe recreational water quality. These grades provide a level of risk for getting sick.
Cyanobacteria (planktonic)	Lakes and lake-fed rivers	Blue-green algae, or cyanobacteria, live naturally in freshwater. Blue-green algae can become problematic when excess nutrients and elevated water temperatures allow them to grow excessively, resulting in algal blooms. These can be seen as bright green or blue-green globules in the water column or as surface scums that can accumulate at lake edges. Some species of cyanobacteria produce toxins which can present health risks to people and animals.

Appendix 2 – Baseline states for monitored sites

Site code	Site name	Periphyton (trophic state)	Ammonia (toxicity)	Nitrate (toxicity)	Suspended fine sediment	*E. coli* (regional sites)	Fish-IBI	Macroinvertebrates SQMCI	Macroinvertebrates MCI	Macroinvertebrates ASPM	Deposited fine sediment	Dissolved oxygen (rivers)	Dissolved reactive phophorous	*E. coli* (primary contact sites)	Phytoplankton (lakes)	Total nitrogen (lakes)	Total phosphorus (lakes)	Cyanobacteria (lakes)	Submerged plants (natives)	Submerged plants (invasive species)	Lake-bottom dissolved oxygen	Mid-hypolimnetic dissolved oxygen
Rivers																						
MGT000488	Mangati Stream 200 m downstream of railbridge							C	D	D				N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
MGT000510	Mangati Stream immediately upstream of State Highway 3											D		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
MGT000520	Mangati Stream adjacent to Te Rima Place footbridge							D	D	D				N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
MGT000530	Mangati Stream 40 m upstream of pump station						A							N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
MRO000210	Mangaroa Stream at Manawapou Road							C	D	D				N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
WAI000110	Waiau Stream at Inland North Road							C	C	C				N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
WTH000104	Waitaha Stream below State Highway 3											D		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Lakes																						
LKK000500	Lake Kaikura at deepest point	N/A	B	N/A	N/A		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	C	D	C	A	B	B	C	N/A
LHN000100	Lake Herengawe at deepest point	N/A	B	N/A	N/A		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	D	D	C	B			A	N/A
LHN000005	Lake Herengawe at Rotary Reserve jetty	N/A		N/A	N/A		N/A	N/A	N/A	N/A	N/A	N/A	N/A	A				B				N/A

Appendix 3 – Identified values in the Coastal Terraces FMU

Primary contact sites

Site	Catchment
Lake Herengawe	Wairoa

Freshwater dependent threatened species

The following table contains those freshwater dependent threatened species that the Council has identified for this FMU. The list is a draft and further work is required to better understand the status of these species across the FMU (including habitats critical to their survival) and to identify additional species (if any) to be added to the list:

Taxa group	Scientific name	Common name(s)	Threat Status	Highly Mobile Fauna[2]
Birds	*Anarhynchus frontalis*	Wrybill, Ngutu-pare	Nationally Vulnerable	✓
	Anas superciliosa	Grey duck, Pārera	Nationally Vulnerable	✓
	Botaurus poiciloptilus	Australasian bittern, Matuku hūrepo	Nationally Critical	✓
	Egretta sacra sacra	Reef heron, Matuku moana	Nationally Endangered	✓
	Falco novaeseelandiae ferox	Bush falcon, Kārearea, Kāeaea	Nationally Increasing	✓
	Hydroprogne caspia	Caspian tern, taranui,	Nationally Vulnerable	✓
	Poliocephalus rufopectus	New Zealand dabchickweweia, totokipio, taihoropi (Hokianga), taratimoho (Waikato), New Zealand grebe	Nationally Increasing	
Plants	*Amphibromus fluitans*	Water brome	Nationally Vulnerable	
	Leptinella tenella		Nationally Vulnerable	
	Leptospermum scoparium var. scoparium	Manuka, Tea tree, Kahikatoa	Nationally Vulnerable	
	Limosella (b) (CHR 515038; Manutahi)		Nationally Critical	
	Metrosideros diffusa	White rata	Nationally Vulnerable	
	Metrosideros excelsa	Pohutukawa, New Zealand Christmas tree	Nationally Vulnerable	
	Metrosideros perforata	White rata, Akatorotoro, Akatea	Nationally Vulnerable	
	Sebaea ovata	Sebaea	Nationally Critical	
	Syzygium maire	Swamp maire, Maire tawake, Waiwaka	Nationally Critical	

[2] As identified in [Appendix 2: Specified highly mobile fauna] of the National Policy Statement for Indigenous Biodiversity (NPS-IB).

The Council is also assessing the following threatened species for their 'freshwater dependence':

- *Oligosoma aff. infrapunctatum* "Southern North Island" (Kupe skink, Tamatea skink, Tamatea skink)
- *Crassula manaia*
- *Leptinella dispersa* subsp. *Rupestris*
- *Metrosideros fulgens* (Rata, Akatawhiwhi)
- *Rorippa divaricate (*New Zealand water cress, Matangaoa)
- *Solanum aviculare* var. *aviculare* (Poroporo)

Additional information provided by other organisations or individuals will be valuable to this process.

Photo 3 Australasian bittern

Watercraft and Tauranga waka sites

The Council has not identified sites for the Coastal Terraces FMU. If you think there are sites that apply, please provide feedback, including rationale and which catchment(s)/part of catchment(s) you think this value applies to.

Fishing values

The following freshwater fish are found within the Coastal Terraces FMU and are valued for fishing:

Whitebait species		**Other species**	
Scientific name	**Common name**	**Scientific name**	**Common name**
Galaxias fasciatus	Banded kokopu	*Anguilla dieffenbachii*	Longfin eel
Galaxias argenteus	Giant kōkopu	*Anguilla australis*	Shortfin eel
Galaxias brevipinnis	Kōaro		

The Council has not identified areas for recreational fishing for the Coastal Terraces FMU. If you think there are areas that apply, please provide feedback, including rationale and which catchment(s)/part of catchment(s) you think this value applies to.