

Southern Hill Country
FRESHWATER MANAGEMENT UNIT
Discussion document



Working with people | caring for Taranaki



Taranaki Regional Council
Private Bag 713
Stratford

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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 where the Council has progressed to 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 a number of 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 Southern Hill Country FMU
- Environmental outcomes for the Southern Hill Country 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 Southern Hill Country Freshwater Management Unit

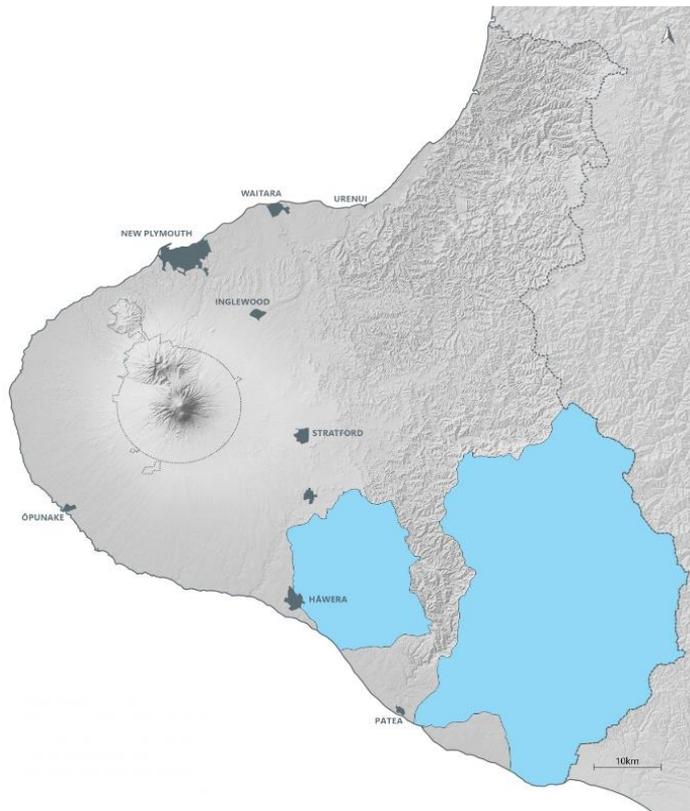


Figure 1 The Southern Hill Country FMU sitting within the broader Taranaki region.

The Southern Hill Country FMU (**Figure 1**) covers most of the south east of the region and extends from the Tangahoe River and inland to the Waitōtara River. It is divided into east and west sections by the Pātea Catchment, which forms its own FMU. There are four main catchments within the Southern Hill Country FMU: the Whenuakura and Waitōtara in the east; and the Tangahoe and Manawapou in the west.

Catchments of the Southern Hill Country FMU are sourced from the eastern hill country, which begin their journey as fast flowing narrow streams due to steep and hilly terrain, that then widen and begin to meander into long rivers as the topography flattens out. This differs greatly from waters flowing from Taranaki Maunga (particularly in the Volcanic Ring Plain FMU) which are fast flowing, narrow and relatively straight. The Waitōtara catchment, due to its slow moving water and flat topography, is also prone to flooding and is managed by the Council under the Waitōtara flood scheme.

Due to the highly erodible land and unstable

river and stream banks, these catchments can carry significant sediment loads through to the coast.

Like the Pātea, each of the rivers of the Southern Hill Country FMU transition to estuarine conditions as they approach the Tasman Sea. The Waitōtara estuary is the largest estuary in Taranaki and has a long tidal reach with substantial intertidal habitat.

The Southern Hill Country FMU contains most of Taranaki's lake-like wetlands. These unique areas are characterised by the specific lakes which the wetland habitats surround, such as Lake Rotokare and the Moumahaki Lakes. These areas contain many unique and important values, for example, Lake Rotokare is regionally identified as an outstanding freshwater body, and the Moumahaki Lakes provide critical habitat for numerous threatened wetland birds.

Topography is one of the land use drivers across the FMU (**Figure 2**). Higher in the catchments, where the landscape is steep, prone to erosion and less fertile, the primary land uses are sheep and beef farming and exotic plantation forestry. A large proportion of hill country land is also held under conservation title by the Department of Conservation. Downstream, as the steep topography gives way to flatter, undulating land, dairy farming becomes more prominent. Close to the coast, land is susceptible to drying out in summer months which is mitigated in some areas with irrigation.

The rohe of Ngāa Rauru, Ngāti Ruanui, Ngāruahine and Ngāti Maru and 12 marae are located within the Southern Hill Country FMU. Each iwi, hapū and whānau hold tikanga (protocols) and mātauranga (knowledge) relevant to the awa (rivers) for which they are kaitiaki (guardians). These significant relationships reflect the variety of histories that span across the Southern Hill Country 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.

Hāwera is the largest township within the Southern Hill Country FMU, with a population of more than 10,000 people and home to a number of industries, including dairy processing, meat processing, and meat rendering and concrete batching. The townships of Eltham, Waverley and Waitōtara also include significant employers such as Fonterra and Silver Fern Farms. Horticulture is also making an appearance with a recent kiwi fruit farm being established in Waitōtara. The Rimu production station in the Manawapou catchment produces light oil and gas/condensate.

Groundwater is generally utilised for drinking water and both groundwater and surface water are utilised for farm use in this FMU. The main groundwater source is the Whenuakura aquifer which is estimated to be tens of thousands of years old in some places and holds vast amounts of water that is generally of good quality. Municipal takes are located at Wai-inu and on the border of the Coastal Terraces FMU for the Waverley supply.

This FMU boasts popular whitebaiting spots at both the Tangahoe and Manawapou River. Lake Rotokare is also a commonly enjoyed recreational spot utilised for walking, bird watching, boating and swimming by the community. As a result of this, regular monitoring of Lake Rotokare is undertaken by the Council.

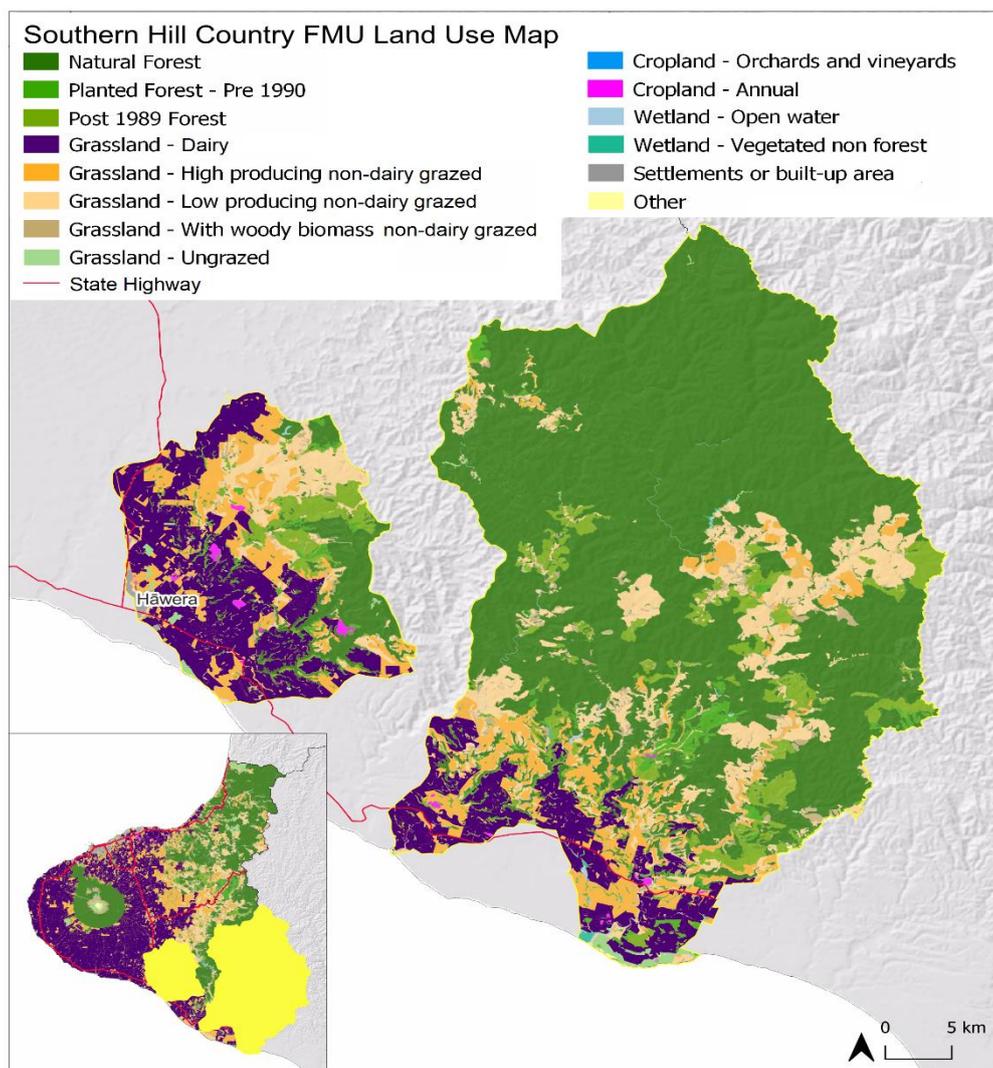


Figure 2 Indicative land use map for the Southern Hill Country FMU

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).



Photo 1 Erosion is a cause of sediment in the Southern Hill Country FMU.

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 which 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 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 statement 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 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 from those that begin on the lower areas of the Volcanic Ring Plain FMU; and
- 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.

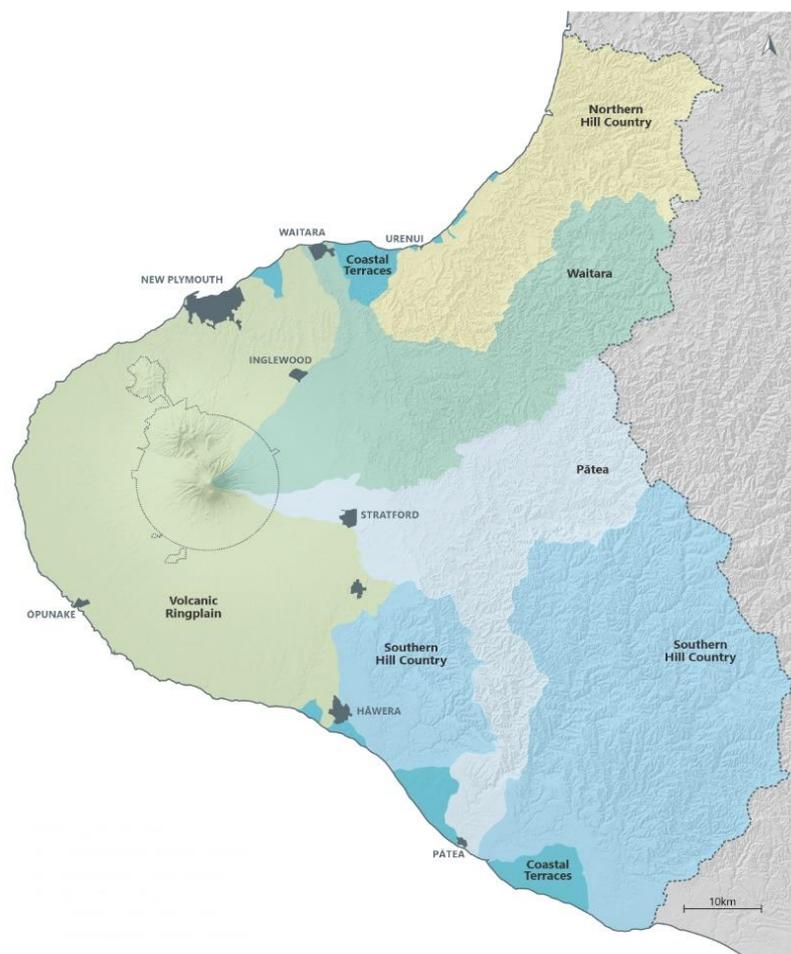


Figure 3 Draft Freshwater Management Unit designations for Taranaki



Freshwater in the Southern Hill Country

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** or **E** (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.

How we are doing

Ecosystem health is variable throughout the Southern Hill Country FMU. Nitrogen levels are generally low, but elevated in-stream concentrations of dissolved reactive phosphorous are found in the majority of rivers, along with high rates of sedimentation, which impact aquatic ecosystems. Periphyton is monitored at one site, with occasional blooms occurring, although there is limited data to provide a comprehensive picture of algal growth across this FMU. Macroinvertebrate community indices suggest that many of these waterways are in a degraded condition, and that improvement is required.

Culverts, dams, weirs and other barriers make it difficult for fish to freely migrate through some catchments around in the Southern Hill Country FMU. These barriers will require modification to allow fish to migrate and spawn throughout their lifecycle and will be a focus for freshwater improvement in coming years.

Generally across the FMU, improvements are required to provide for safe contact with freshwater. Presently, 41% of rivers and streams are considered unsuitable for swimming and recreation, and both monitored river swimming sites fail to achieve minimum standards. Elevated *E. coli* in shoreline waters and cyanobacteria blooms present a risk to human health at Lake Rotokare.

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 flows. This uncertainty is described in terms of 'confidence'. For example, how certain it is that the water quality is reflected in the measurement 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.

The Southern Hill Country is under represented in terms of monitoring sites, with 11 sites including four lake sites and seven river sites available for baseline identification (see [Appendix 2 – Baseline states for monitored sites](#)). Over the past two years, the Council has introduced a new lakes monitoring programme, and redesigned the *Can I Swim Here?* summer bathing programme. Monitoring of some aspects of freshwater, such as mahinga kai, threatened species, dissolved oxygen, periphyton and fish still require further development.

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 the growth of sensitive species, or even become toxic to freshwater organisms.

Two sites are monitored for ammonia. Both fall in band A, meaning ammonia is likely to have little to no effect on all but the most sensitive species. Modelled estimates support monitoring results, with approximately 82% of streams and rivers expected to fall in band A and 18% in band B (**Figure 4**).

Two sites are also monitored for nitrate. One site falls in band A and the other falls in band B. At these sites, nitrate is likely to have little to no effect on all but the most sensitive species. Modelling estimates support monitored results, with approximately 85% in band A and 15% in band B (**Figure 5**).

Dissolved reactive phosphorus is present in elevated concentrations in rivers and streams. Of the two sites monitored for DRP, one site falls in band C and one site falls in band D. Modelling suggests that the majority of rivers experience elevated concentrations of DRP, with 21% estimated to fall in band B, 56% in band C and 23% in band D. Elevated concentrations of phosphorus can result in excessive growth of plants and algae, significantly affecting the health of aquatic environments. The high rate of erosion and soil loss in the Southern Hill Country FMU is likely the main source of DRP (**Figure 6**).

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. The two sites monitored for suspended fine sediment both fall in band D, below the national bottom line. Modelling suggests that 64% of rivers and streams fall in band A, 11% fall in band B, 10% in band C and 15% in band D (**Figure 7**). Given this FMU is susceptible to high levels of erosion and soil loss, significant efforts will be required throughout these catchments to see the necessary levels of improvement.

Dissolved oxygen (DO)

There are currently no continuous monitoring sites for dissolved oxygen in the Southern Hill Country FMU.

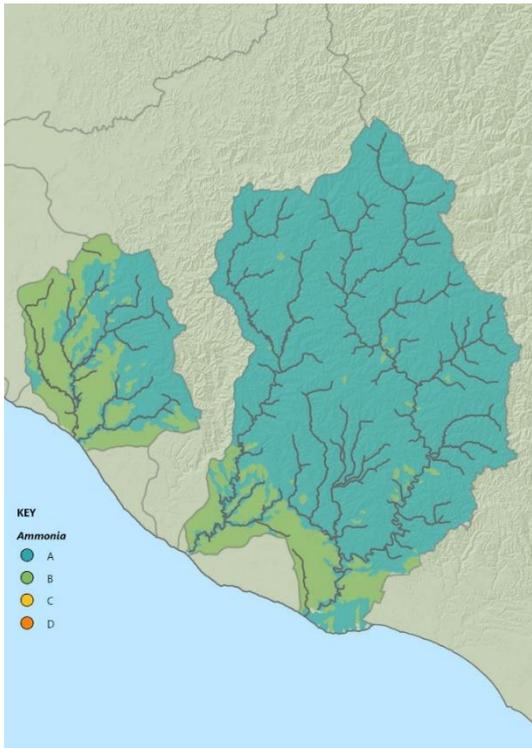


Figure 4 Ammonia modelling.

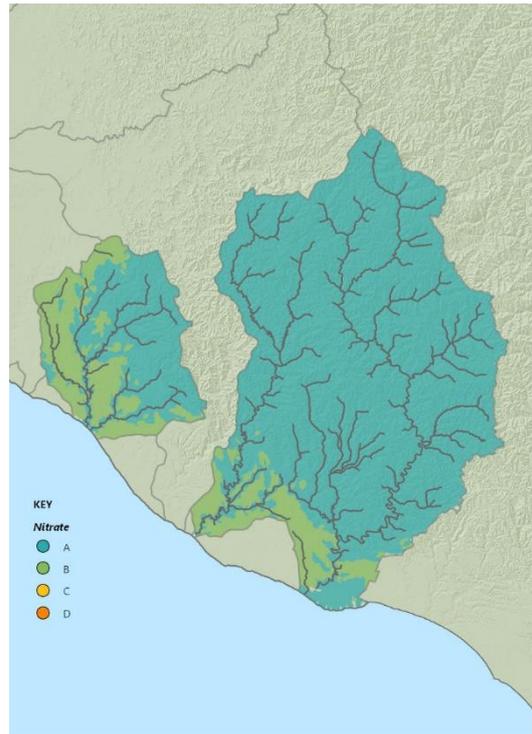


Figure 5 Nitrate modelling.

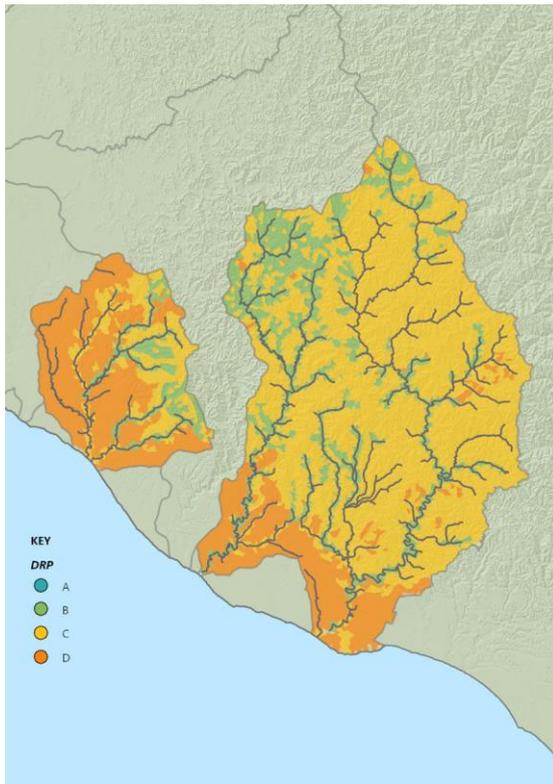


Figure 6 DRP modelling.

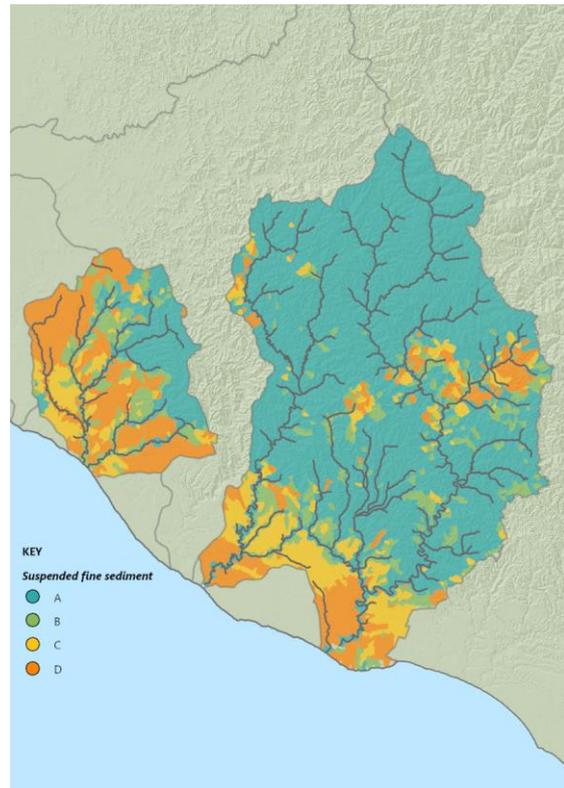


Figure 7 Suspended fine sediments modelling

River 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 must be 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.

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 13 consents to take water in the Southern Hill Country FMU (**Figure 8**). Four streams and rivers have more than 33% of MALF allocated. Of these consents three currently have no minimum flow limit set.

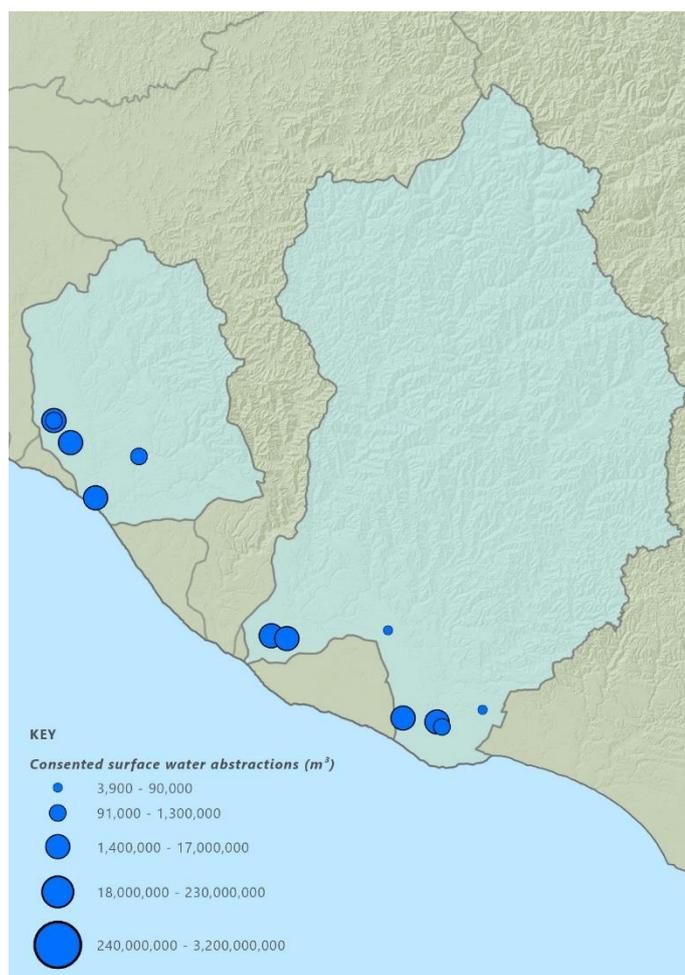


Figure 8 Consented surface water abstractions.

Setting appropriate environmental flows and levels will be an outcome of the next stage in the NOF process. 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.

River 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 April 2023. Due to this limited data record, the Council has repurposed pre-existing information and undertaken modelling.

There is currently one site in the Southern Hill Country FMU and it falls in band D, below the national bottom line. However, modelling suggests that streams and rivers are less impacted by deposited fine sediment overall, with approximately 16% of streams and rivers within band A, 28% in band B and 25% in band C (**Figure 9**).

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 purposes) where others are undesirable (pest species).

Periphyton

Growth of periphyton as algal blooms indicates nutrient enrichment or alteration to habitat or water flow. There is currently one site monitored for periphyton, and this site is graded in band B. New periphyton monitoring sites are currently being investigated in order gain a better understanding of periphyton biomass more broadly across this FMU.

Fish

There are currently no long-term state of environment fish monitoring sites in the Southern Hill Country FMU. The current monitoring network review aims to improve fish monitoring in the FMU.

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).

Macroinvertebrates are dominated by species that are tolerant of pollution and nutrient enrichment, with four of six sites falling in band C for MCI, and the last two sites falling in band D, below the national bottom line (**Table 1**). Modelling suggests that there are approximately 22% of streams and rivers within band A, 45% in band B, and 28% in band C, with just 5% of the FMU in band D and below the national bottom line (**Figure 10**).

For QMCI, the abundance of macroinvertebrates varies. One site falls in band A, one site falls in band B, two sites fall in band C, and two sites fall in band D (**Table 1**). Modelling suggests that the majority of macroinvertebrate communities fall in band C, with less than 1% of stream habitat estimated to be below the national bottom line for QMCI (**Figure 11**).

For ASPM, two of six sites fall in band B, three in band C and one site falls in band D (**Table 1**). These scores indicate that macroinvertebrate communities are affected by moderate to severe organic pollution and nutrient enrichment. Modelling suggests that approximately 41% of rivers and streams fall in band B, 54% in grade C and 6% fall in band D (**Figure 12**). No areas are estimated to fall in band A, meaning all waterways are affected to some degree by pollution and nutrient enrichment, based on this metric.

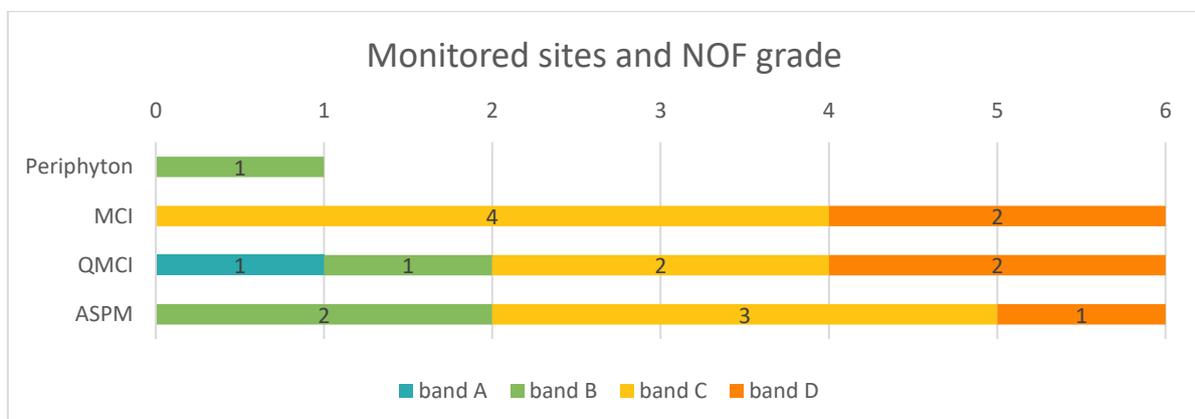


Table 1 Aquatic life results for monitored sites in the Southern Hill Country FMU.

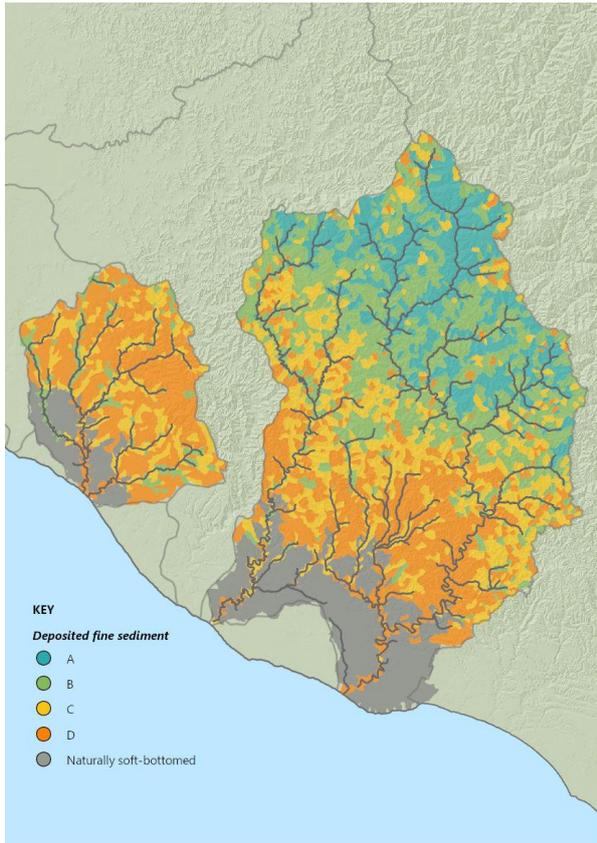


Figure 9 Deposited fine sediment modelling.

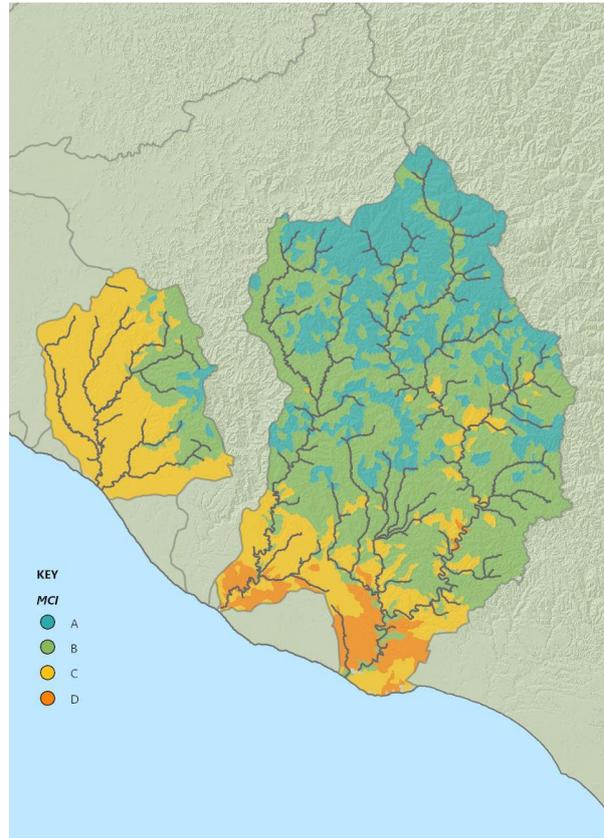


Figure 10 MCI modelling.

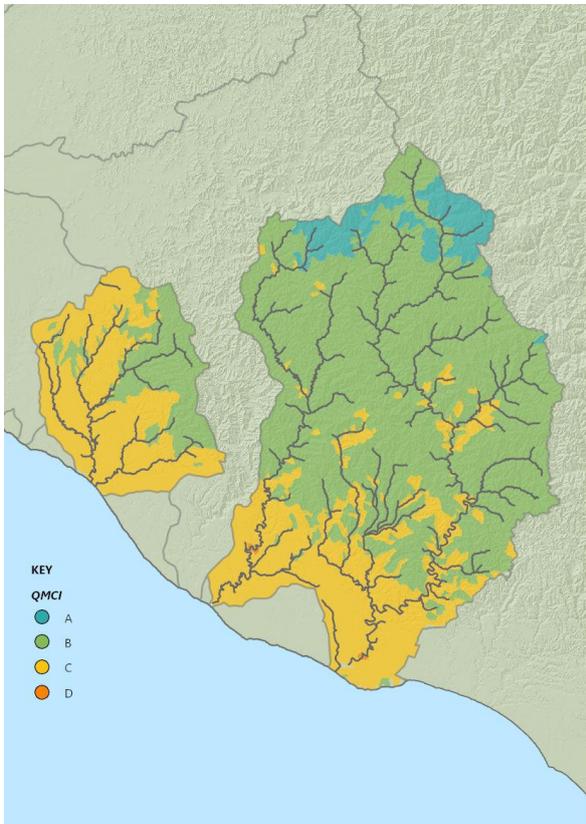


Figure 11 QMCI modelling.

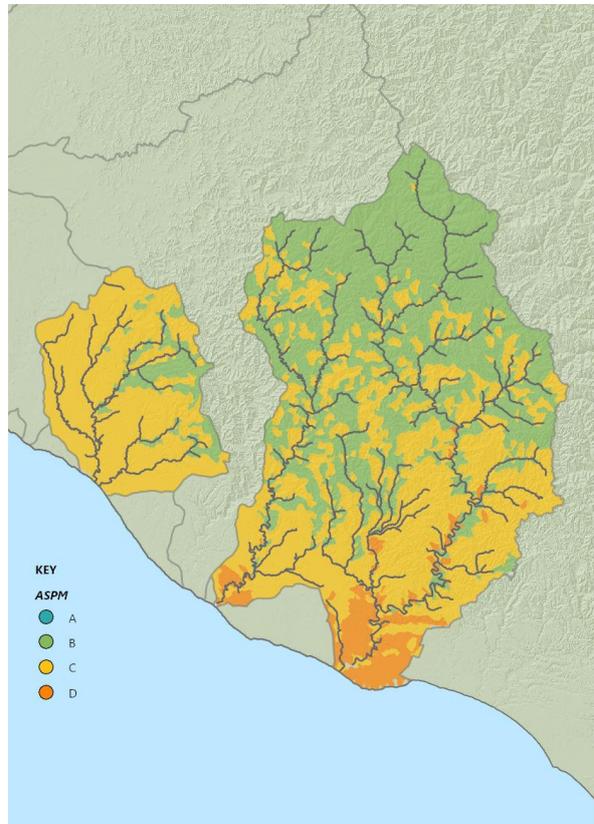


Figure 12 ASPM modelling.

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 no monitoring datasets or 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.

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 provide important habitat for indigenous plants and animals and can be susceptible to the growth of pest vegetation, so some additional attributes are also included.

Modelling and monitoring data have been used together to grade the health of lakes Rotokare and Waikare. Both lakes fall within band C for total nitrogen and total phosphorus, and band B for ammonia. Both lakes fall into band D for lake-bottom dissolved oxygen and mid-hypolimnetic dissolved oxygen (**Table 2**), meaning both fall below the national bottom line. Low dissolved oxygen can result in loss of ecological communities, and the release of nutrients from sediments at the lake bottom.

As in rivers, aquatic life is strongly linked to water quality in lakes. The measures of aquatic life in lakes are phytoplankton (algae) and native and invasive submerged plants. Modelling suggests that Lake Rotokare falls in band D for phytoplankton, which is below the national bottom line and requires improvement, while Lake Waikare falls in band C, where ecological communities are moderately affected by additional plant and algal growth from nutrients. Lake Rotokare has been graded in band C for the condition of both submerged native and invasive plant communities; indicative of moderate impacts. Lake Waikare has not yet been surveyed for submerged plant communities, however this is scheduled for September 2023.

Lake Rotokare 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	✓				
Submerged plant index (native species)		✓			
Submerged plant index (invasive species)		✓			
Lake Waikare 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 2 Modelled results for ecosystem health of Lake Rotokare and Lake Waikare. The grey lines indicate the national bottom lines set out in the NPS-FM for lakes.

Human contact

***Escherichia coli* - routine**

Grading of *E. coli* (**Figure 13**) 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.

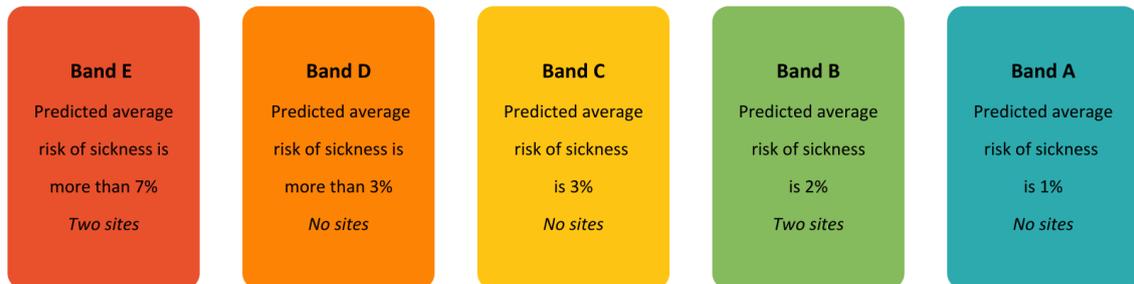


Figure 13 Grading of *E. coli* for year round monitoring.

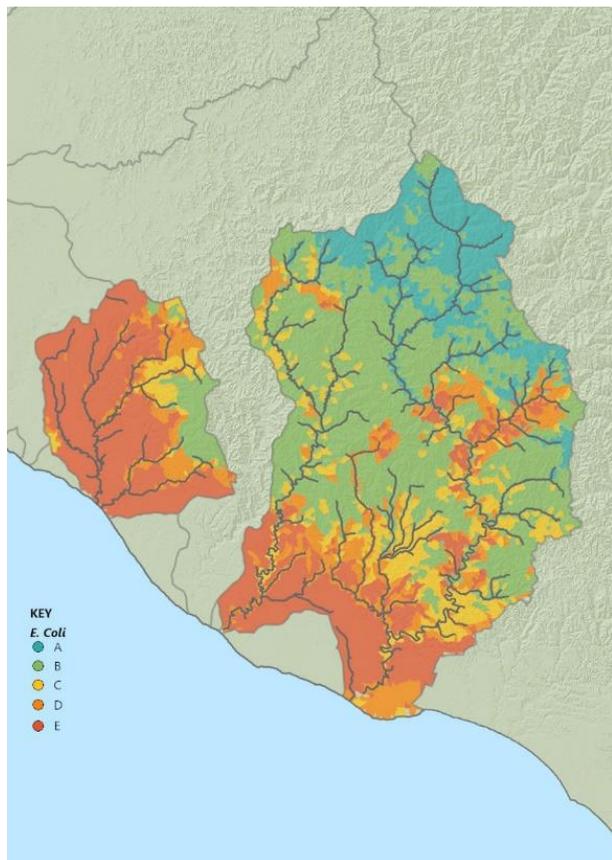


Figure 14 *E. coli* modelling.

The routine monitoring of *E. coli* is carried out every month at two river sites and two lake sites as part of the Council's State of Environment water quality monitoring programme.

Lake Rotokare and Lake Waikare are both graded in band B. Monitoring at these lakes began in 2023, and the results are preliminary. The two river sites monitored for *E. coli* are graded in band E, and are generally unsuitable for swimming. Modelling data suggests 12% of streams fall in band A, 36% in band B, and 11% in band C. The remaining 14% and 27% falls in bands D and E respectively and are considered unsafe for swimming (**Figure 14**).

There is a clear pattern of declining water quality as water travels through catchments in the Southern Hill Country FMU, as landscapes change from being dominated by indigenous forest in the head waters, to agricultural pastures closer to the coast.

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 Rotokare is the only primary contact site identified for this FMU. This site falls in band D, and is considered poor in terms of the risk to human health (**Figure 15**).

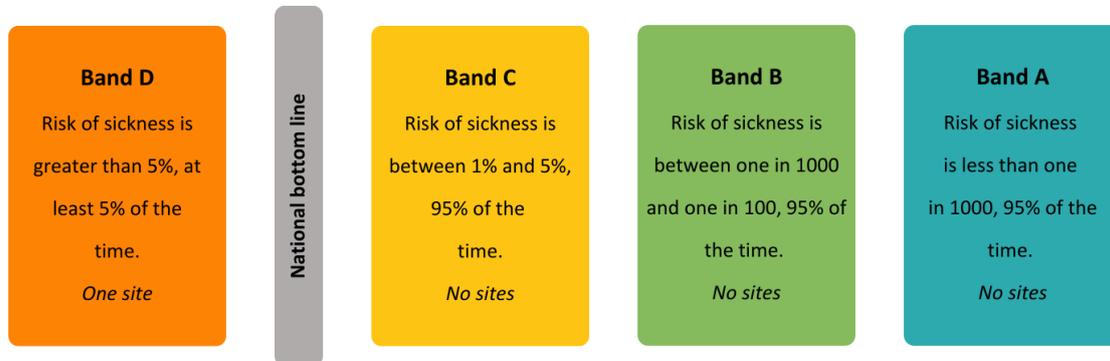


Figure 15 Grading of *E.coli* for primary contact sites.



Photo 2 The ability to swim in our rivers is a value that is important to the community.

Cyanobacteria

Cyanobacteria, otherwise known as blue-green algae, is monitored at lakes Rotokare and Waikare. Regular monitoring of these lakes only began in April of 2023, so there is limited information to assess the impact of cyanobacteria on human contact. Lake Rotokare is monitored at two locations (mid-lake and shoreline) for state of environment and *Can I Swim Here?* monitoring programmes. Whilst data from mid-lake is limited, there is a long monitoring record from the shoreline, which has helped to inform the grades for both sites.

Taranaki Regional Council has also used modelling informed by measured data to help evaluate cyanobacteria at both lakes. While not considered to be an issue at Lake Waikare, occasional cyanobacteria blooms can present a risk to human health at Lake Rotokare.

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.

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

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

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.

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

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 Wai¹.

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-FM Clause 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 Southern Hill Country 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 Southern Hill Country Freshwater Management Unit

In the Southern Hill Country 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 narrow and fast flowing streams of the eastern hill country down through meandering lower reaches and estuaries to the Tasman Sea, sustain the life force and mauri of the environment and reflect their natural variability and natural form and character;*
3. *the waters of Whanganui National Park and Conservation Lands are protected and celebrated as waters which behave in accordance with their natural character;*
4. *water bodies, including riparian margins, wetlands and lakes, groundwater and surrounding habitats, support diverse, abundant and connected ecosystems and the resilience of indigenous and threatened species;*
5. *the mana of tangata whenua and their traditional and ongoing relationships with wai are restored through mahinga kai and the practice of mātauranga Māori;*
6. *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 historical cumulative effects of intensive land use on the environment; and*
 - b. *being responsive to the current and future effects of climate change;*
7. *strong and resilient biodiversity provide for the sustainable harvest of mahinga kai, rongoa and fish; and*
8. *water bodies, in particular Lake Rotokare, are safe for swimming, mahinga kai and other customary and recreational purposes;*

by the year (date tbc).

QUESTIONS TO PONDER

LONG TERM VISIONS

Question 4: What do you think about the draft long-term visions for the Southern Hill Country FMU?

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

Values and environmental outcomes for the Southern Hill Country 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 other values 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) that 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 Southern Hill Country FMU have been informed by position papers from tangata whenua, previous consultation and Council knowledge.

Compulsory values

Ecosystem health

Environmental conditions ensure that ecosystems within the Southern Hill Country 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 waterbodies are provided for, by:

- a) *facilitating opportunities for safe contact at Lake Rotokare (refer [Appendix 3 – Identified values in the Southern Hill Country FMU \[Primary contact sites\]](#)), particularly in summer; and*
- b) *reducing the overall risk to human health throughout the Southern Hill Country FMU.*

Threatened species

Wetlands, riparian margins and other critical habitats within the Southern Hill Country FMU promote the continued survival, natural migration and long-term recovery of threatened species (refer [Appendix 3 – Identified values in the Southern Hill Country 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 Southern Hill Country 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 Southern Hill Country 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 Southern Hill Country 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 Southern Hill Country 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

Catchments/reaches of the Southern Hill Country FMU that are important for watercraft and tauranga waka (refer [Appendix 3 – Identified values in the Southern Hill Country FMU \[Watercraft and Tauranga waka\]](#)) have sufficient freshwater quantity to be navigable.

Fishing

The health and abundance of fisheries species within the Southern Hill Country FMU are provided for by suitable freshwater quality and quantity including at identified recreational fishing areas (refer [Appendix 3 – Identified values in the Southern Hill Country FMU \[Fishing values\]](#)).

Hydro-electric power generation

[The Council has not identified this as a value for the Southern Hill Country 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 Southern Hill Country 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 Southern Hill Country 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 Southern Hill Country 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 Southern Hill Country FMU?

Question 7: What do you think of the draft environmental outcomes identified for each value in the Southern Hill Country FMU?

For example, the value for fishing has the environmental outcome of *"The health and abundance of fisheries species within the Southern Hill Country 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 an identified national bottom line. 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 processes¹); and
 - b) to either:
 - i. maintain the baseline state where the relevant environmental outcome(s) is already been achieved (including clause 2a); 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 Southern Hill Country FMU?



Glossary

<p>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.</p>	RMA
<p>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).</p>	NPS-IB
<p>Freshwater or fresh water means all water except coastal water and geothermal water.</p>	RMA
<p>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.</p>	NPS-IB
<p>Natural form and character has the same meaning as in Appendix 1B of the NPS-FM, which refers to:</p> <p>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:</p> <ul style="list-style-type: none"> (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
<p>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].</p>	NPS-IB
<p>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].</p>	NPS-IB
<p>Te Mana o te Wai has the same meaning as set out in clause 1.3 of the NPS-FM.</p>	NPS-FM
<p>Water:</p> <ul style="list-style-type: none"> a) means water in all its physical forms whether flowing or not and whether over or under the ground: b) includes freshwater, coastal water, and geothermal water: c) does not include water in any form while in any pipe, tank, or cistern 	RMA
<p>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.</p>	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
<i>Escherichia coli</i>	Lakes and rivers	<i>Escherichia coli</i> (<i>E. coli</i>) 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.
<i>Escherichia coli</i> (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. <i>E. coli</i> 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	<i>E. coli</i> (regional sites)	Fish-IBI	Macroinvertebrates SQMCI	Macroinvertebrates MCI	Macroinvertebrates ASPM	Deposited fine sediment	Dissolved oxygen (rivers)	Dissolved reactive phosphorous	<i>E. coli</i> (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																							
MMK000050	Moumahaki Stream at Johnston Road							C	D	C				N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
TNH000090	Tangahoe River 150 m upstream of Patete Stream confluence							A	C	B				N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
TNH000200	Tangahoe River at Tangahoe Valley Road bridge							B	C	B				N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
TNH000515	Tangahoe River 120 m downstream of railbridge							D	C	C				N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
WIU000700	Waiau 2 Stream 1.2 km upstream of Hawkin Road							C	D	D				N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
TWH000435	Tawhiti Stream at Duffy's water level recorder	B	A	B	D	E					D		D	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
WNR000450	Whenuakura River at Nicholson Road		A	A	D	E		D	C	C			C	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Lakes																							
LRK000003	Lake Rotokare at shoreline, 20 m east of boat ramp	N/A		N/A	N/A		N/A	N/A	N/A	N/A	N/A	N/A	N/A	D					D				
LRK000500	Lake Rotokare at deepest point	N/A	B	N/A	N/A	B	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	D	C	D	D	C	C	D	D	
LWK000100	Lake Waikare at deepest point	N/A	B	N/A	N/A	B	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	C	C	D	A			D	D	
LMW000200	Lake Mangawhio	N/A		N/A	N/A		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A					C	C			

Appendix 3 – Identified values in the Southern Hill Country FMU

Primary contact sites

Site	Catchment
Lake Rotokare	Tangahoe

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
Bats	<i>Chalinolobus tuberculatus</i>	Long-tailed bat, Pekapeka,	Nationally Critical	✓
Birds	<i>Anas chlorotis</i>	Brown teal, Pāteke,	Nationally Increasing	✓
	<i>Anas superciliosa</i>	Grey duck, Pāpera,	Nationally Vulnerable	✓
	<i>Ardea modesta</i>	White heron, Kōtuku,	Nationally Critical	✓
	<i>Botaurus poiciloptilus</i>	Australasian bittern, Matuku hūrepo,	Nationally Critical	✓
	<i>Charadrius obscurus aquilonius</i>	Northern New Zealand dotterel	Nationally Increasing	✓
	<i>Falco novaeseelandiae ferox</i>	Bush falcon, Kārearea, Kāeaea	Nationally Increasing	✓
	<i>Hydroprogne caspia</i>	Caspian tern, Taranui,	Nationally Vulnerable	✓
	<i>Hymenolaimus malacorhynchos</i>	Whio, Blue duck, Whio, Kōwhiowhio (Ngāi Tahu), Kowhiowhio, Mountain duck, Blue Mountain duck	Nationally Vulnerable	✓
	<i>Poliiocephalus rufopectus</i>	New Zealand dabchickweweia, Totokipio, Taihoropi (Hokianga), Taratimoho (Waikato), New Zealand grebe	Nationally Increasing	✓
	<i>Notiomystis cincta</i>	Hihi, Stitchbird, Hihi,	Nationally Vulnerable	
Fish	<i>Galaxias postvectis</i>	Shortjaw kokopu	Nationally Vulnerable	
	<i>Geotria australis</i>	Lamprey	Nationally Vulnerable	
Vascular plants	<i>Kunzea robusta</i>	Manuka, Kanuka, Kopuka, Rawirinui, Maru, Manuka Rauriki	Nationally Vulnerable	
	<i>Leptospermum scoparium</i> var. <i>scoparium</i>	Manuka, Tea tree, Kahikatoa	Nationally Vulnerable	
	<i>Libertia peregrinans</i>	New Zealand iris, Mikoikoi	Nationally Vulnerable	
	<i>Lophomyrtus bullata</i>	Ramarama, Bubble leaf	Nationally Critical	
	<i>Metrosideros colensoi</i>	Climbing rata	Nationally Vulnerable	

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

Taxa group	Scientific name	Common name(s)	Threat Status	Highly Mobile Fauna ²
	<i>Metrosideros diffusa</i>	White rata	Nationally Vulnerable	
	<i>Metrosideros perforata</i>	White rata, Akatorotoro, Akatea	Nationally Vulnerable	
	<i>Metrosideros robusta</i>	Northern rata	Nationally Vulnerable	
	<i>Ranunculus recens</i>		Nationally Vulnerable	
	<i>Sebaea ovata</i>	Sebaea	Nationally Critical	
	<i>Syzygium maire</i>	Swamp maire, Maire Tawake, Waiwaka	Nationally Critical	

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

- *Eudynamys taitensis* (Long-tailed cuckoo, Koekoeā, Koekoea, Kohopera, Long-tailed koel)
- *Oligosoma aff. infrapunctatum* "Southern North Island" (Kupe skink, Tamatea skink)
- *Brachyglottis kirkii* var. *kirkii* (Kohurangi, Kirk's daisy)
- *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.

Watercraft and Tauranga waka

Location/site name	Catchment	Boating	Tauranga waka
Lake Rotokare	Tangahoe	✓	

Fishing values

The following freshwater fish are found within the Southern Hill Country FMU and are valued for fishing:

Whitebait species		Other species	
Scientific name	Common name	Scientific name	Common name
<i>Retropinna retropinna</i>	Common smelt	<i>Salmo trutta</i>	Brown trout
<i>Galaxias maculatus</i>	Inanga	<i>Anguilla dieffenbachii</i>	Longfin eel
		<i>Oncorhynchus mykiss</i>	Rainbow trout
		<i>Anguilla australis</i>	Shortfin eel

The identified fishing areas for recreational fishing are:

Catchment	Sub-catchment/reach	Trout	Whitebait
Tangahoe River	Main stem		✓
Manawapou River	Main stem		✓
Waitōtara River	N/A		✓



Photo 4 Lamprey is a nationally vulnerable species that is found in this FMU.



Photo 3 Blue duck is a nationally vulnerable species present in this FMU.