

North Otago Freshwater Management Unit (FMU) Catchment Context, Challenges and Values (CCCV)

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The below is the Catchment Context, Challenges and Values for the North Otago Freshwater Management Unit. In your Freshwater Farm Plan (FWFP), use this information to identify the health and potential risks to freshwater in your area. Once you know what the freshwater quality in your area is, this will help you with your Farm Plan.

Enter the address of your property into the [mapping tool](#) to find information that relates to your property in the North Otago FMU. You can also draw your boundary and using this tool. All of these maps and information will be able to be used in your farm plan. Instructions on how to use the mapping tool are [here](#).

If your Freshwater Farm Plan has identified that activities on your farm might contribute to low water quality, your action plan could include a number of new or existing actions. You can find some helpful resources [here](#) to help you with planning your actions.

Overview of the North Otago FMU

The North Otago FMU covers about 296,000 hectares and extends from Waitaki Bridge down through Ōamaru, Moeraki, and Palmerston to the southern branch of the Waikouaiti River. Some of the major catchments in the FMU are the Awamoko, Kākaunui, Ōamaru, Waianakarua, Trotters, Waihemo/Shag, Waikouaiti, Kakaho and Pleasant (Te Hakaupū).

Ōamaru, with a population of 14,000, is the largest town in the FMU. Outside of urban areas, in semi-rural areas, retirement homes, lifestyle blocks, and medium-sized farm holdings are scattered through the landscape. The FMU has several areas of high natural value. These are located in the upper catchments of the Kākaunui, Waianakarua, Trotters Gorge, and the South Branch of the Waikouaiti.

All the water bodies in North Otago are important to Kāi Tahu. The rivers were an integral part of the network of trails along the coast and to inland areas. Rivers, estuaries, wetlands and springs, and the species they support, were crucial to the practice of mahika kai/ resource gathering, which relied on a pattern of seasonal travel and harvest. There are surviving rock art remnants and rock shelters associated with these activities, which are a particular taoka/ treasure of the area and give a unique record of the lives and beliefs of tūpuna/ ancestors. The ability to pass on this knowledge and to keep mahika kai practices alive for future generations is of central importance to Kāi Tahu.

Climate

North Otago is sheltered from westerly rain but is exposed from the easterly quarter.

Westerly quarter winds and rainstorms are predominant in the west and south of the South Island but mostly bring dry conditions to North Otago.

The less frequent rainstorms from the easterly quarter occasionally bring heavier rainfalls which can cause flooding in North Otago rivers and streams.

Prolonged westerly quarter weather and a lack of easterly storms can result in drought-like conditions in North Otago.

Land and soil

The North Otago FMU consists largely of high and low-producing exotic grasslands, exotic forests, and tall tussock grasslands. High-producing exotic

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grasslands are the dominant land cover, occupying approximately 44% of the FMU, with low producing grassland and tussocks accounting for 34% and forest and scrub accounting for 10%. Sheep and beef farming is the dominant land use activity in the North Otago FMU and occurs on 45% of the land. Dairy farming occurs on 12% of the land, while plantation forestry, and conservation occurs on 7% and 6% of the land, respectively.

Brown soils are the predominant soil order, covering 51% of the FMU where the land cover comprises of mainly high producing exotic grasslands and exotic forests. These occur in catchments such as Waiānakarua and parts of Kakanui and Waikouaiti.

Pallic soils cover 40% of the FMU and have permeability ranging from moderate to slow. Their drainage is generally imperfect and occur in Waiareka Creek, Waikoura Creek, Awomoko stream, and parts of Pleasant river catchments.

It is important to understand how your farm's combination of topography and soil can affect a contaminant's ability to enter a freshwater body. For example, grazing of adult cattle in winter on steep slopes with soils of weak structure (e.g., Pallic) can cause severe soil damage that can lead to significant loss of topsoil during rainfall events and can contribute to elevated concentrations of E. coli in waterbodies.^[5]

Find out the soil types and topography on your property using the [mapping tool](#). You may also find other property specific information which you can use.

Land use capability

The Land Use Capability (LUC) is a classification system that grades land on its ability to support continuous production (primary industries). It uses soil properties (erosion potential, soil depth, stoniness, water holding capacity, fertility, salinity and toxicity), rock type, slope, and climate to identify the most limiting factor. This determines a grade between 1 and 8, where grades 1-3 are considered most versatile and capable of supporting a range of productive land uses with minimal limitations.

To find out the LUC classification of your farm go to the '[Land use and soils map](#)' [here](#). Use your soils, topography and the LUC classification to think about the risks they create for your farm. If you want to find out more about [LUC](#) [click here](#).

Handy hint - what to consider in your freshwater farm plan

Topography and soil, and the farming or growing activity on the land can increase or decrease the ability of a contaminant to enter freshwater bodies.

Your FWFP should identify if your farm's land and/or land use activities could enable contaminants to enter or build up in freshwater bodies in different climate or weather events. You should then consider what actions you can take to reduce the risk of contaminants to freshwater bodies in your action plan. In your action plan consider national and regional policy direction. You can find this [information here](#).

Fresh water

Fresh water is comprised of surface water and ground water sources and includes lakes, rivers, aquifers, and wetlands.

Rivers

Otago Regional Council (ORC) operates a long-term State of Environment (SoE) water quality monitoring network in lakes, rivers, and streams throughout Otago.

In the North Otago FMU, the following rivers are monitored by the ORC; the Waikouaiti, Waiareka Creek, Waianakarua, Waihemo/Shag, Trotters Creek, Pleasant, Oamaru, Kauru, Kakanui and Awamoko. Monitoring results indicate several pressures on water quality in the FMU:

- North Otago Rivers are naturally subject to low flows, particularly between November and April. North Otago is not as dry as some inland areas but still experiences a relatively low rainfall. Rivers in dry catchments have less dilution and flushing capacity (i.e., low water levels and a higher concentration of contaminants). They are more susceptible to high nutrients and other water quality pressures associated with high-intensity land use. ^[1]
- Nutrients: High levels of nutrients, primarily nitrogen and phosphorus, can cause increased growth (blooms) of plants and/or algae in waterbodies.
 - Nitrogen: In a farm system, the primary inputs of nitrogen to the soil are effluent from livestock, plant materials (organic matter), and synthetic fertiliser. Any N not taken up by plants is lost through the soil.
 - Phosphorus: On a farm, P is typically added through the use of phosphate fertilisers. When soil is lost by runoff (for example after/during rain), it takes the phosphorus with it.
- Bacteria: E. coli is used as an indicator of human and/or animal faecal contamination. Bacteria are deposited on the soil surface and are, therefore, transported predominantly by overland flow. However, artificial drainage can also act as a conduit for sediment/bacteria to surface water bodies.

- Suspended fine sediment: Sediment can come from soil erosion, human activities such as construction or from the decomposition of plants and animals. The heavier the rainfall the more likely sediment can be transported.

Find out the quality of water on your property using the [mapping tool](#). You may also find other property specific information which you can use.

Water Quality

The below table is a tool that shows the catchments monitored in North Otago and the contaminants of concern for each catchment. This information has been prepared at a catchment level. This tool will help you to target your property actions to specific contaminants. By targeting actions to one contaminant, you may also be to address the other contaminants in the table. If you want to find out more about these key contaminants [go to our helpful resources page](#).

Table 1: Catchments of North Otago and Contaminants Needing Action

Catchment	TN (Total Nitrogen)	TP (Total Phosphorus)	E. coli	Sediment
Awomoko	action required	action required	action required	action may be required
Kakanui	action required	action required	action required	action may be required
Waianakarua	action may be required	No action required [^]	action required	action may be required
Trotters	action required	action required	action required	action may be required
Shag	action required	No action required [^]	action required	action may be required
Pleasant	action required	action required	action required	No action required [^]
Waikouaiti	action required	action required	action required	action required

[^] where the table says no action required, this means that you may still want to take actions on your property to address this contaminant and it may still be included in your FWFP, but actions focused on other contaminants are likely to also target these.

*Sediment is an issue in the Pleasant River Estuary and actions are being undertaken in the wider Pleasant Catchment to address sediment.

Even more information on water quality in this FMU can be found [here](#).

Handy hint - what to consider in your freshwater farm plan

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Water quality sites monitored by Council in your catchment can be viewed in our [mapping tool](#). You should then look at the water quality results for the monitoring sites in your catchment upstream and downstream of your property here and [latest monitoring results for sites in your catchment](#). If you have property specific water quality monitoring results, you can use this information as well.

Groundwater

An aquifer is a body of rock and/or sediment that can transmit significant volumes of groundwater. You can find aquifer information for your property with our [mapping tool](#). You may also find other property specific information which you can use.

Groundwater contamination happens mainly via seepage of nutrients through soil. Once nutrients reach groundwater, they accumulate over time as groundwater usually flows at relatively low velocity, hence dilution happens over long time periods (years). Groundwater contamination can also occur through insecure boreheads, which serve as a direct pathway to the aquifer. Therefore, if you have a bore on your property, it is very important to secure and maintain the borehead.

North Otago Aquifers

In the North Otago FMU, monitoring shows substantial groundwater quality issues, with many exceedances of the NZ drinking water standards for E. coli and very high nitrate-N concentrations.

As a general overview of the health of North Otago FMU's aquifers [\[a\]](#)

The lower Waitaki Plains aquifer

This aquifer has elevated nutrient loads, such as nitrate and Dissolved Reactive Phosphorus (DRP), when compared to the New Zealand Drinking Water Standards.

North Otago Volcanic aquifer

This aquifer is heavily used for irrigation, domestic use, and stock water. ORC groundwater quality monitoring shows high nitrate concentrations and Dissolved Reactive Phosphorus (DRP).

The Kauru-Kākaunui Alluvial Ribbon aquifer and the Shag Alluvial aquifer

These are ribbon aquifers highly connected to surface water. Their high connectivity means contaminants in groundwater can affect surface water quality and vice versa.

Papakaio aquifer

This aquifer underlies a large portion of the northern section of the North Otago FMU. Due to the old age of the groundwater and the naturally elevated iron, manganese, and DRP, the water has limited appeal for domestic use, stock water or irrigation.

For even more specific information on Groundwater Quality see our [technical report](#).

Wetlands

Wetlands are areas of land where soils are permanently wet ('drenched') or that are covered by water at least part of the year. These ecosystems are home to a wide variety of rare plant and animal species that can only survive in wetlands. You might think of a wetland as a bog, swamp, peatland marsh or mires.

There are 17 Regionally Significant Wetlands (RSWs) recognised in the North Otago FMU. These Regionally Significant Wetlands are classified as swamp (8 sites), marsh (3), saltmarsh (3), and unclassified (3). You can see if there is a Regionally Significant Wetland [mapped on your property here](#).

Five Regionally Significant Wetland sites are grouped close to Karitane and the Waikouaiti Estuary, the largest being Waikouaiti River Estuary Wetland Complex (71 ha) and Hawksbury Lagoon/ Matainaka (43 ha). A further eight such sites are scattered along the coast to the north, the largest being Pleasant/ Te Hikapupu River (84 ha), Waihemo/Shag River (14 ha) and All Day Bay/ Ōrore (11 ha).

Red Bank Wetland Management Area, has wetlands among snow tussock, shorter grassland, and shrubland. The wetter soils have red tussock grassland, schoenus fens, sphagnum moss land, and examples of ephemeral wetlands.

You may also have wetlands on your property which are not mapped as Regionally Significant, but you should include these in your farm plan.

Estuaries

ORC regularly monitors all the estuaries in the North Otago FMU. There are a number of estuaries in the North Otago FMU, the Kākaunui, Waihemo Shag, Pleasant/ Te Hikapupu River and Waikouaiti. The estuaries cover a range of

ecological conditions, and they are habitats for many wildlife, such as bar-tailed godwits, variable oystercatchers, flounder, and shellfish beds. They also provide spawning habitat for whitebait/ inaka. You can find the estuary nearest to you on the [Mapping Tool here](#).

Estuaries In North Otago

The Kākaunui estuary is a shallow, short-residence time tidal river estuary (SSRTE) that can close to the sea when flows are low. It is vulnerable to nutrients and shows eutrophication via macroalgal blooms, especially when flows are low, or the mouth is closed.

The Waimataitai estuary is located to the south of the Moeraki Peninsula. Moeraki have a strong cultural associated with this estuary. It is the closest to the Moeraki marae and is spoken of in the pepeha (introduction explaining someone's whakapapa and connections to iwi and place) of Moeraki whānau. There is a strong history of use of the Waimataitai for mahika kai, but it is now significantly degraded.

The Waihemo/Shag River is under stress from sediment and showing signs of nutrient enrichment with nuisance algae growth below the tide but not between high and low tide areas. The areas with high mud content are primarily in sheltered arms in the upper estuary and along channel banks and sheltered areas in the main basin. There is a large expansive salt marsh, and the estuary supports a variety of substrates; this, combined with the sediment issues, places the estuary in a "fair" condition for ecological health.

The Pleasant/ Te Hikapupu River estuary is more degraded than the other estuaries and has large areas of high enrichment conditions. It has nuisance macroalgae, high mud content and poorly oxygenated sediment, especially in the side arms and deposition areas. These are signs of sediment and nutrient stress. The indicators of estuary health in the Pleasant River range from "fair" to "poor", except for the salt marsh. The salt marsh is still extensive around the estuary and in a "very good" condition.

The Waikouaiti estuary supports various substrate types, small high-value seagrass beds and extensive salt marsh areas, with a healthy cockle bed in the lower estuary. However, there are signs of sediment stress in the upper estuary with higher mud content in depositional areas and side arms. Low levels of nuisance macroalgae are present in patches indicating some nutrient stress is influencing the estuary.

Significant species and ecosystems [\[7\]](#)

Vulnerable ecosystems in the North Otago FMU include braided rivers, ephemeral wetlands, tarns, lake margins, string mires, and wetlands. The below

waterways have been identified in the Regional Plan Water for their values. If your property is near one of these waterways, you should visit NIWA's [freshwater fish database](#) ^[8] to see if your local waterbody has been monitored and if so, what species of fish were identified.

Table 2: Waterbodies and values from Schedule 1D Regional Plan Water

Waterbody	Significant indigenous vegetation and significant habitat of indigenous fauna
Kākaunui River (note, the Kakanui Kauru Alluvium Aquifer forms an integral part of the water body)	Significant habitat for longjaw galaxiid and koaro. Significant habitat for lamprey (uncommon in Otago).
Kauru River	Significant habitat for longjaw galaxiid
Waianakarua River	Significant habitat for koaro
Waihemo/Shag River (note, the Shag Alluvium Aquifer forms an integral part of the water body)	Significant habitat for flathead galaxiid and koaro. Significant habitat for lamprey (uncommon in Otago).
Siberia Creek	Significant habitat for flathead galaxiid.
Unnamed tributary of the Waihemo/Shag River a.k.a. Deem Burn	Significant habitat for koaro upstream of I42:224388.
Happy Valley Creek	Significant habitat for flathead galaxiid
Tipperary Creek	Significant habitat for hybrid galaxiid species
Trotters Creek	Significant habitat for giant kokopu and koaro and Significant habitat for lamprey (uncommon in Otago).
Pigeon Creek	Significant habitat for giant kokopu
Waikouaiti River (excluding South Branch)	Significant habitat for flathead galaxiid, hybrid galaxiid, banded kokopu and koaro
Unnamed tributary of the Waikouaiti River at I43:097281	Significant habitat for flathead galaxiid.
Waikouaiti River South Branch	Significant habitat for koaro

Toll Bar Creek	Significant habitat for koaro
Unnamed tributary of the Waikouaiti River a.k.a. Merton Stream at I43:244065	Significant habitat for lamprey (uncommon in Otago)
Unnamed tributary of Deep Stream at H44:660958	Significant habitat for Lower Taieri galaxiid
Unnamed tributary of Deep Stream at H44:678947	Significant habitat for Lower Taieri galaxiid

Sites of significance to the community

Community swimming locations

Otago Regional Council monitors water quality at known swimming locations. The map below shows the locations and includes links to detailed information on the Land, Air, Water Aotearoa (LAWA) website. Recreational activities such as swimming, fishing or boating are important to people and we need to ensure water quality is good so that all of us can enjoy the outdoors.

Catchment groups

Within the North Otago FMU there are currently two catchment groups. North Otago Sustainable Land Management and East Otago Catchment Group (NOSLaM) and East Otago Catchment Group.

NOSLaM is a group driven by farmers to improve water quality and promote food pastoral management. NOSLaM works within North Otago and includes the Awamoko, Waiareka, Kakanui, Lower Waitaki and the Hampden/Moeraki catchment areas.

East Otago Catchment Group works with and supports landowners within the Waikouaiti, Waihemo/Shag, Post Office, Stony Creek and Pleasant/ Te Hikapupu River catchments.

Catchment Groups provide support to farmers and growers and undertake projects within their catchments. You can find out more about joining a [catchment group here](#).

Statutory context

National Policy Statement for Freshwater

The National Policy Statement for Freshwater Management 2020 (NPS-FM) sets out the objectives and policies for freshwater management in New

Zealand/Aotearoa.

The concept of Te Mana o te Wai is key for managing freshwater in New Zealand/Aotearoa.³⁸ Te Mana o te Wai, is a holistic approach that recognises that the health of fresh water is integral to social, cultural, economic, and environmental wellbeing. Te Mana o te Wai prioritises:

- first, the health and well-being of water bodies and freshwater ecosystems (it protects the mauri (life force) of the wai (water),
- second, the health needs of people, and
- third, the ability of people and communities to provide for their social, economic, and cultural well-being, now and in the future. ³⁹

Regional Rules and Policies

There are rules and regulations that may apply to your property and proposed actions in your action plan. These are in our Regional Plan: Water; Regional Plan: Waste ^[9] as well as in the National Environmental Standards for Freshwater. You can check these out here: [The Farmer's Guide \(orc.govt.nz\)](https://www.orc.govt.nz). You will need to include copies of your current consents in your farm plan. Otago also has a Regional Policy Statement that sets out the aims and outcomes for the region including for freshwater.

Find consent information relating to your property on the [mapping tool](#). You may also find other property specific information which you can use.

Cultural Context

Identified cultural matters of importance to tangata whenua

Kāi Tahu (or Ngāi Tahu ^[10]) are takata whenua of the Otago region. Within each part of the region, particular Kāi Tahu whānau and hapū (extended family groups) have mana whenua status, determined by whakapapa (genealogical ties), resource use and ahi-kā-roa (historic use and occupation). Mana whenua hold traditional customary authority and maintain ongoing relationships within an area. This authority carries with it responsibilities to ensure that the natural and physical environment is sustained for future generations.

In North Otago, mana whenua interests are represented by these rūnaka:

- Te Rūnanga o Moeraki
 - The takiwā (area of interest) of Te Rūnanga o Moeraki is centred on Moeraki and extends from the Waitaki River to the Waihemo Shag River and inland to the Main Divide.
- Kāti Huirapa Rūnaka ki Puketeraki

- The takiwā (area of interest) of Kāti Huirapa Rūnaka ki Puketeraki centres on Karitāne and extends from the Waihemo Shag River to Purehurehu Heyward Point and includes an interest in Ōtepoti and the greater harbour of Ōtākou. The takiwā extends inland to the Main Divide.

Kāi Tahu environmental perspective

The Kāi Tahu world view emphasises the importance of relationships between nature and people. Kāi Tahu do not see their existence as separate from the natural world, but as an integral part of it.

It is a holistic worldview that recognises that all environmental elements, including land, water, ecosystems and people are interconnected. This recognition is central to Kāi Tahu understanding of the natural environment, including how it functions, how people relate to it and how it can be looked after appropriately.

Wai Māori – the importance of water to Kāi Tahu ^[11]

All freshwater is significant to Kāi Tahu. In the cultural traditions, freshwater originated very early in the creation of the world, from the separation of Rakinui and Papatūānuku and their continuing tears for one another. Rain is Rakinui's tears for his beloved Papatūānuku and mist is regarded as Papatūānuku's tears for Rakinui.

Water is seen as the life giver of all things, and Kāi Tahu have an obligation to protect wai and all the life it supports. To Kāi Tahu, the condition of water is seen as a reflection of the condition of the people. When the water bodies are flourishing, the people are strong and healthy and so too is their mana.

Mauri

A prime concern for Kāi Tahu is the protection of the mauri of water bodies. The mauri of a water body is a life-giving force that connects the environment, from the mountains to the sea. Water bodies with a healthy or strong mauri are characterised by good quality waters that flow with energy and life, sustain healthy ecosystems, and support mahika kai and other cultural activities.

Wāhi tūpuna (ancestral landscapes) ^[12]

The value Kāi Tahu attach to land is evident from the fact that every part of the landscape is known and named. Wāhi tūpuna (ancestral landscapes) are made up of interconnected sites and areas reflecting the history and traditions associated with the long settlement of Kāi Tahu in Otago and the ongoing relationship with these areas. Components of wāhi tūpuna include the placenames that tell of the traditions and use of the areas, the network of

traditional trails (ara tawhito), the rock art that marks the places where tūpuna stopped and rested along the trails, wahi taoka (treasured places) that provided food and other resources, wahi tapu (places of particular spiritual significance) and landscape features such as mountains, rock formations and cliffs. These places should not be seen in isolation from one another but are part of a wider cultural setting. For example, an archaeological site adjacent to a wetland is likely to be associated with mahika kai resources in the wetland.

The character of wāhi tūpuna in past times is retained in tribal memory, for example through songs, place names and proverbs. When these references to the character of the wāhi tūpuna become incorrect due to modification of the environment, it negatively affects the Kāi Tahu relationship with that landscape. For example, a waterway named Kaituna would be expected to contain many tuna.

Rock art ^[b]

Rock art is a distinctive part of wāhi tūpuna in North Otago and provides reminders of the seasonal travel and harvest carried out by tūpuna/ ancestors. Freshwater ecosystems in rock art cultural landscapes also have important associations through provision of water, food and transport in addition to cultural and spiritual uses.

Rock art is particularly vulnerable to changes in the moisture content and chemical composition of the limestone features on which it is held, or in the soil overlying the limestone. This can affect the integrity of the rock art and the integrity of the limestone substrate. Activities that pose a risk include irrigation, drainage, diversion of waterways, groundwater abstraction and earthworks.

Taoka species and mahika kai

Taoka are treasured resources that are highly valued by Kāi Tahu, derived from the atua (gods), linked to the people through whakapapa, and left by tūpuna (ancestors) to provide for and sustain life. Kāi Tahu regard all indigenous species as taoka. In many cases taoka species are also mahika kai, treasured for their use as a resource. In the management of natural resources, it is important that the habitats and wider needs of taoka species are sustainably managed and enhanced.

Mahika kai is one of the cornerstones of Kāi Tahu cultural identity. Mahika kai refers to the customary gathering of food and natural materials and the places where those resources are gathered or produced. The term also embodies the traditions, customs and collection methods, and the gathering of natural resources for cultural use, including raraka (weaving) and rokoā (traditional

medicines). Maintaining mahika kai sites, gathering resources, and continuing to practice the tikaka that governs each resource, is an important means of maintaining and honouring whakapapa connections to land, taoka and tūpuna, and passing on cultural values and mātauraka to the next generation.

Kāi Tahu ki Otago vision and outcomes for fresh water in the North Otago FMU

Kāi Tahu ki Otago's freshwater vision^[15] explains what fresh water will be like in the North Otago FMU if cultural freshwater values are met. Kāi Tahu ki Otago's freshwater vision is included in the proposed Regional Policy Statement for Otago. You can [find this here](#).

Kāi Tahu ki Otago's freshwater management principles^[16] explain how to improve freshwater health in the North Otago FMU, these are explained below. These principles include examples of practical options you may want to consider in your farm plan actions (NOTE: This section on actions is still under development and will be included by 1 Feb 2024)

Principle 1: Mimic the natural behaviour of water bodies.

To restore the mauri of a water body, the starting point should be to understand how the water body would function in its natural state.

You may be able to find information (e.g. old maps or photographs) about what the streams and wetlands on your farm used to look like and what has changed. Think about ways to restore some of the natural behaviour.

For example:

- Are there structures or barriers that shift or trap flow that could be removed or adapted to let the river or stream flow more naturally?
- If a channel has been straightened, is there any opportunity to restore some of its natural curves?
- Are there wetland areas that could be restored?

Principle 2: Recognise interconnectedness across the catchment.

The mauri of different parts of the river system cannot be separated. Kāi Tahu believe that the contributions of all parts of the system, including tributaries, riparian areas, springs, wetlands, lakes, estuaries and groundwater, and the natural characteristics and indigenous biodiversity of the catchment, must be considered as part of an integrated whole.

Management should also support the important functions of wetlands (including providing habitat, holding water, filtering sediment and nutrients and storing carbon) by protecting and restoring wetland systems.

Think about how the different parts of the system contribute to the health of the whole.

For example:

- Springs are highly valued as sources of water that feed streams and wetlands. Are there opportunities to protect the quality and flow of remaining springs e.g. by protecting these from stock grazing, land drainage or planting of water-hungry trees, and by making sure the flow connection between the spring and the water body it feeds is not obstructed?
- Wetlands have important functions that support the whole freshwater system, including providing habitat, holding water, filtering sediment and nutrients from overland flows and storing carbon. Are there any opportunities to protect and restore wetland systems?
- How are the groundwater and surface water connected on your farm? What activities could affect the quality and quantity of groundwater flowing between streams and wetlands?
- The health of estuaries is dependent on the flow and quality of water that comes to them from the rivers. Managing sediment to prevent it getting into the river system upstream is particularly important for healthy estuaries.
- The boundary between water bodies and land is a soft rather than a hard boundary. Appropriate planting of riparian areas can help to protect water quality, provide shelter and shade for indigenous species, provide leafy and woody matter to rivers or streams and control bank erosion.

Principle 3: Water quality at the confluence/ mouth should reflect the quality at the source.

Direct or indirect discharge of contaminants to a water body as a result of human activity degrades the mauri of the water body. Kāi Tahu do not support use of rivers to dilute pollutants and consider that water quality changes along the water body targets should reflect the changes that would occur naturally. Think about how you can make sure nutrients and contaminants do not get into water.

For example:

- Are you applying fertiliser at rates that will be absorbed by the soil type on your farm?
- Are you able to remove nutrients and sediment before they get into a water body e.g. by using the natural ability of plants and soil to filter these out, or by trapping sediment?

Principle 4: Enable healthy ecosystems

To ensure that ahika kai and taoka species are able to thrive, Kāi Tahu consider that management must enable healthy ecosystems. This requires a holistic approach that, rather than just requiring minimum standards for specific indicators, looks at the interconnected needs of a healthy ecosystem, which can include factors such as:

- Good water quality;
- The variety of physical characteristics and flow patterns in the river and tributaries that are needed to support different life stages of indigenous species (both aquatic species and birds);
- Sufficient riparian vegetation to provide shelter and habitat and to enhance water quality; and
- Habitat conditions that support healthy populations of the lower order biota. Mahika kai and taoka species are part of a wider food chain - these species will only be healthy and abundant if the populations of the food they depend on (including macroinvertebrates and diatoms) are sufficient to keep them well-nourished.

Principle 5: Enable Kāi Tahu whānui to breathe life into their relationship with the water bodies.

To keep the relationship to the rivers, lakes and wetlands vital and to ensure that it is maintained for the next generation, it is important that Kāi Tahu whānui are able to interact with the water bodies, including the tributaries, for mahika kai and other customary purposes. To achieve this:

- Mahika kai species must be abundant enough to support sustainable harvest.
- Mahika kai species must be free of contaminants that would make them unsafe to eat.
- The waterways must be accessible and safe to enter.
- The condition of the waterways must be such that whānau are not deterred from interacting with them.

- Actions that support good water quality, natural flow and healthy indigenous habitats will contribute to these outcomes.

Principle 6: Manaakitaka and reciprocity.

In the modern context, manaakitaka encompasses the act of being hospitable, to share in a resource, to provide waters that are safe to drink and/or swim in, or to be generous in showing mutual respect. This principle is accompanied and balanced by the principle of reciprocity, which requires that where something is taken, something must also be given back.

Kāi Tahu recognise that water is important to land and water users as well as to other sectors of the community for their economic, social, and cultural wellbeing, and do not oppose appropriate use. However, in accordance with the principle of reciprocity, any use of a water body must respect the river and must enhance the mana of the river as well as the mana of the people using it.

Ask the question:

- What can I do to give something back to this waterbody that would improve its water quality? Natural flow behaviour? Area of instream or riparian habitat?

Further information

Further information about matters of significance to Kāi Tahu relating to specific areas in the North Otago FMU can be found in the following places. Note that this information has been produced for particular purposes and is not exhaustive.

Water bodies

Schedule 1D in the Regional Plan: Water identifies the spiritual or cultural beliefs, values or uses associated with water bodies of significance to Kai Tahu. The values are identified by geographic subregion and by individual water bodies, or groups of water bodies, Information from this schedule can be found [here](#) and [here](#).

District Plan wāhi tūpuna maps

The Dunedin City Council and the Waitaki District Council have maps that show wāhi tūpuna layers you can use to view important wāhi tupuna areas. You can find these maps [here](#).

Iwi Management Plans

The [Kāi Tahu Ki Otago Natural Resource Management Plan 2005](#) and the [Waitaki Iwi Management Plan 2019](#) explain Kāi Tahu's relationship with fresh water the North Otago FMU.

In the [Kāi Tahu Ki Otago Natural Resource Management Plan 2005](#) ^[13], Section 6.1 provides a description of the Waitaki catchments, while Section 6.4 explains mahika kai and biodiversity. Section 7.1 provides a description of the East Otago catchments, while Section 7.4 explains mahika kai and biodiversity.

In the [Waitaki Iwi Management Plan 2019](#) ^[14], Section 5 provides direction on wai/water management, Section 6 provides direction on mahika kai and ecosystems, and Section 7 provides direction on wāhi tupuna/cultural landscapes.

Handy hint - what to consider in your freshwater farm plan

In your FWFP you should consider if freshwater bodies near your farm meet Kāi Tahu's visions for fresh water. If they do not, you should have regard for Kāi Tahu's freshwater management principles and apply relevant principles in your action plan as ways to improve freshwater health in the North Otago FMU

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- [10] Ngāi Tahu means "people of Tahu" and all Ngāi Tahu whānui can trace their ancestry back to this man, the tribe's founder Tahu Pōtiki. Ngāi Tahu are the Māori people of the southern islands of New Zealand – Te Waipounamu – the Greenstone Isle. Retrieved from www.ngaitahu.iwi.nz/ngai-tahu/who-we-are/, accessed on 16 November 2023.
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